AEROWORKS

1.80 Cessna 195 ARF-QB
(Quick Build)

ASSEMBLY MANUAL

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AEROWORKS

Thank you for choosing the Aeroworks Cessna 195 ARF-QB. We put great effort into making this plane the best model you will ever build and fly. We have provided you with the highest quality kit and performance possible. We wish you great success in the assembly and flying of your new Aeroworks Cessna 195 ARF-QB.

!WARNING!

An R/C aircraft is not a toy! If misused, it can cause serious bodily harm and property damage. Fly only in open areas, and AMA (Academy of Model Aeronautics) approved flying sites. Follow all manufacturer instructions included with your plane, radio, servo's, batteries and engine.

Aeroworks manufacturing warranties this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Aeroworks liability exceed the original cost of the purchased kit. Further, Aeroworks reserves the right to change or modify this warranty without notice.

In that Aeroworks has no control over the final assembly or materials used for final assembly, No liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

We, as the kit manufacturer, have provided you with a top quality, thoroughly tested kit and instructions, but ultimately the quality and fly ability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expresses or implied as to the performance or safety of your completed model.

INTRODUCTION

Your new Cessna 195 ARF-QB is a scale airplane. The aircraft builds easily, quickly, and precisely due to its state of the art CAD design, LASER cut technology, and high quality included hardware. We hope you enjoy building and flying your Cessna 195 ARF-QB.

Great care has been taken in both the design and manufacturing of the Cessna 195 ARF-QB to allow for the strongest and lightest construction possible. Only the highest quality materials from the covering, paint, wood and hardware have been used in the construction of this model.

The Cessna 195 ARF-QB has been individually hand built, covered and painted by trained and experienced craftsmen with over 25 years of manufacturing experience. Using CAD design, laser cut technology and jig-built assures accuracy in all stages of production.

The Cessna 195 ARF-QB is designed for glow and gas engines in the 1.60 glow and 30cc gas category. The OS 1.60 Satio 1.80 and DLE 30cc engine are shown in the assembly instructions. The aircraft was tested with the Satio 1.80 and has outstanding performance. The final choice of engine is left up to the builder. A computer radio is recommended to allow the pilot to take advantage of the full capabilities of this aircraft.

IMPORTANT   Please read through this manual carefully, before starting the assembly of your new Cessna 195 ARF-QB . Inventory and inspect all parts and hardware for any imperfections or damage. Notify **Aeroworks immediately** if there are missing or damaged parts.

INTENDED USE

This plane should not be regarded as a toy. This is an intermediate to advanced skill level model and is recommended for pilots who are beyond the trainer-stage.

!READ!   WARRANTY   !READ!

It is important to notify Aeroworks of any damage or problems with the model within 30 days of receiving your airplane to be covered under warranty. All returned parts must be shipped in their original shipping boxes and insured for full replacement value. If you wish to return this aircraft for any reason a 15% restock fee will be charged to the customer. In addition the customer is responsible for all return shipping cost and all prior shipping cost will not be refunded. Parts will be fixed or replaced once the original item is returned at the owner's expense. It is the decision of Aeroworks if the item is to be replaced or repaired.

Aeroworks cannot insure the skill of the modeler and can not influence the builder during the construction or use of this aircraft, and therefore, will not be accountable for any property damage, bodily injury or death caused by this aircraft.

Aeroworks cannot insure the skill of the modeler and can not influence the builder during the construction or use of this aircraft, and therefore,

The purchaser/operator accepts all responsibility of any and all structural or mechanical failures.

KIT CONTENTS
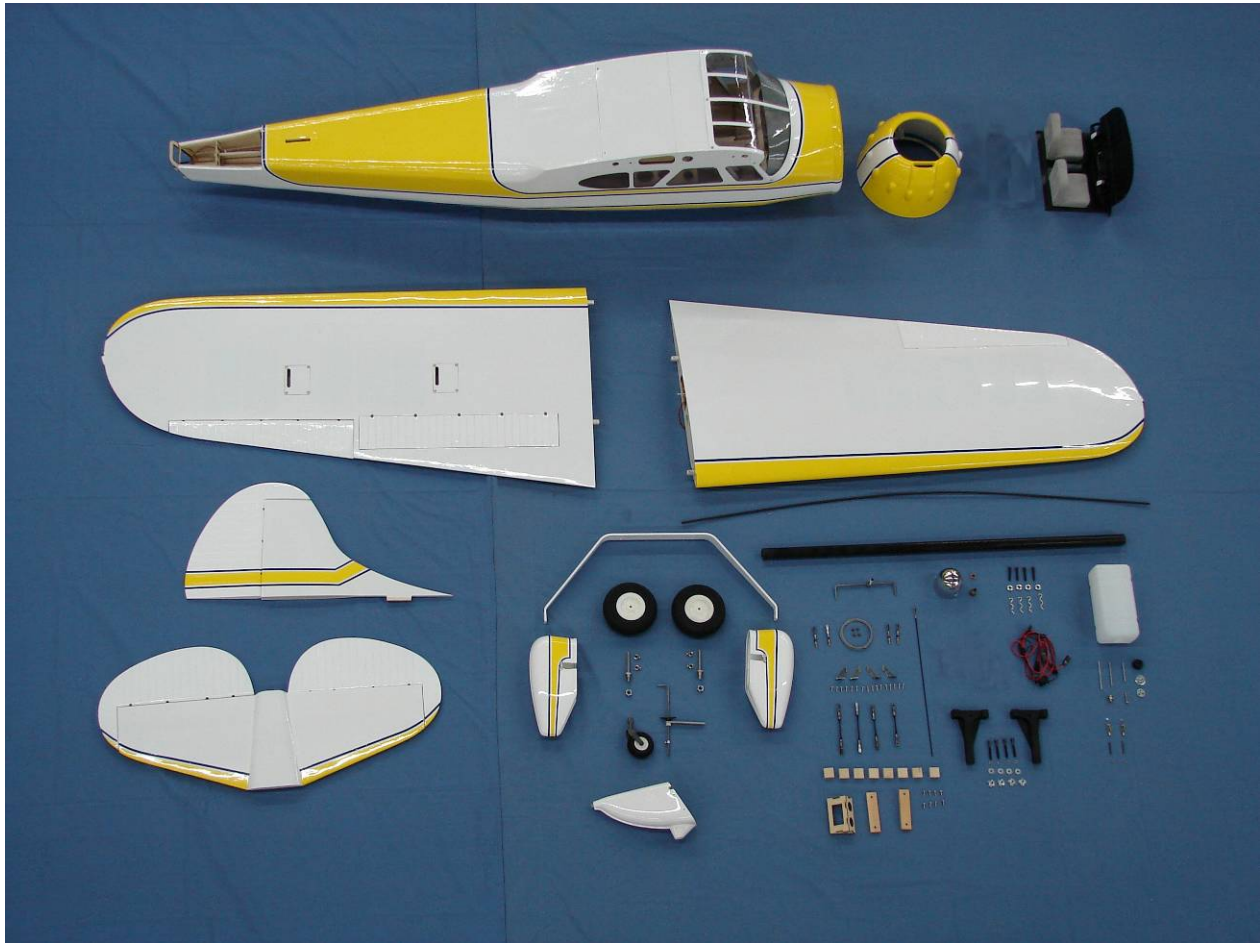
1.80-30cc Cessna 195 ARF-QB Materials List

Basic Aircraft Parts

Fuselage Covered with Oracover (4) 8-32 blind nuts pre-installed in firewall for engine mounts mounting

   (5) 4-40 blind nuts pre-installed for cowling mounting

   (4) 8-32 blind nuts pre-installed for main landing gear mounting

   (1) Removable Top Hatch in place with
        (3) 4-40x12mm hex style bolts and
        (3) Φ3mm flat washers and three
        (3) 4-40 blind nuts

   (8) Side Windows 4 each left and right glued

in place
   (1) Front Windshield, painted – in place with
        (9) T2x5mm PWA screws
   (1) Outer plastic tube for flex pushrod for elevator pre-installed
   (1) 3.5(o.d.)x900mm Antenna Tube preinstalled
   (1) White navigation light installed with wiring and connector in place inside fuselage cabin

Left Wing with Aileron, Flap – Covered, pre-drilled for the mounting of the control horns Fuel proof and paint flap Insert

   (1) 8-32 blind nut pre-installed for wing mounting
   (5) Small Pin Point Hinges glued for Flap

   (5) Large Pin Point Hinges glued for Aileron

(1) Front Anti-rotation Pin installed
(1) Rear Anti-rotation Pin installed with pre drilled cotter pin hole
(1) Red Navigation light installed with wiring and connector installed at wing root

Right Wing with Aileron, Flap – Covered, pre-drilled for the mounting of the control horns
  (1) 8-32 blind nut pre-installed for wing mounting
  (5) Small Pin Point Hinges glued for Flap
  (5) Large Pin Point Hinges glued for Aileron
  (1) Front Anti-rotation Pin installed
  (1) Rear Anti-rotation Pin installed and predrilled cotter pin hole
  (1) Green Navigation light installed with wiring and connector installed at wing root

<u>**Horizontal Stabilizer with elevators**</u> with (8) pin point hinges (not glued)-covered
Elevator connector system in place, not glued
Pre-drilled for the mounting of the control horns

<u>**Vertical Fin with Rudder**</u> with (4) pin point hinges (not glued) - covered
Pre-drilled for the mounting of the control horns

<u>**# 1**</u>
  (1) Cowl, fiberglass Factory painted and trimmed,
  (5) 4-40x16mm hex bolts for cowl mounting
  (5) #6 bonded washers for cowl mounting
  (5) Φ3mm flat washers for cowl mounting

<u>**# 2**</u>
  (1) 4mm Aluminum main landing gear - painted
  (4) 8-32x20mm hex bolts for landing gear mounting
  (4) 4mm flat washers for landing gear mounting
  (4) 4mm split ring lock washers for landing gear mounting
  (2) 100m dia. Main Wheels
  (2) 5x45mm AL Axle Bolts
  (2) M8 lock nuts
  (4) 5mm i.d. Wheel Collars with set-

screws
(4) 4-40x14mm hex style bolts for wheel pants mounting
(4) 3mm flat washers for wheel pants mounting
(4) 3mm split ring lock washers for wheel pants mounting

<u>**# 3**</u>

(2) Wheel Pants – 1 Left and 1 Right – painted
(4) 4-40 blind nuts installed in the wheel pants 2 per side

<u>**# 4**</u>

(1) Tail Wheel Assembly, assembled:
(1) 3mm Steering Wire
(2) 3mm I.D. Wheel Collar with set screws
(1) 3mm I.D.x10mm O.D.x4mm Nylon washer
(1) Metal Wheel Fork with 6-32x5mm set screw
(1) 50mm dia. rubber tail wheel
(1) Aluminum tail wheel mounting plate

<u>**#5**</u>

(2) 4-40x3" left hand and right hand threaded pushrods with nuts for ailerons
(2) 4-40x2.5" left hand and right hand threaded pushrods with nuts for flaps
(1) Wrench for the left hand and right hand threaded pushrod
(8) 4-40 Ball Links – 4 for ailerons and 4 for elevators
(8) 4-40x16mm hex head bolts
(8) 3mm flat washers
(4) Brass Spacers
(8) 4-40 Lock Nuts
(4) AL Metal Control Horns – 2 left and 2 right
(16) T2.6x12mm Phillips head screws for control horns mounting

<u>**# 6**</u>

(1) Flex Pushrod for elevator
(1) 4-40 Ball Link
(1) 4-40 Bolt
(1) Flat Washer
(1) Brass Spacer
(1) Lock Nut
(2) 4-40x1" Threaded Rod
(1) 4-40 Nut
(1) 4-40 R/C Metal Clevis with Spring

<u>**# 7**</u> (2) Φ0.8x1150mm Pull-Pull plastic coated steel Cable
(4) Φ3.5x5mm brass swage tubes

(4) Φ3.5x5mm brass swage tubes
(2) 4-40 R/C Clevises with spring
(4) 4-40 solder coupler with nuts
(2) 4-40 Ball Links
(2) 4-40x16mm hex head bolts
(2) 4-40 lock nuts
(2) Φ3mm flat washers
(2) Brass Spacers

 # 8
(1) Plastic Quick Link
(2) Wooden Rod Supports
(1) M2x300mm one end threaded rod
(1) M2 R/C Quick Link
(1) M2x20mm Threaded Rod
(1) 12" Flex Rod with Outer Case
(1) Throttle Servo Tray

 # 9
(1) Wooden Mounting Block – For 30cc DLE Gas Engine
(4) 8-32 x 20mm Hex Head Bolts
(4) 4mm Split Ring Flat Washer
(4) 4mm Flat Washer

(2) 1.20 size engine mounts, 1 left, 1 right
(4) 8-32x35mm hex head bolts for engine mounts mounting
(4) 4mm flat washers for engine mounts mounting
(4) 4mm split ring lock washers for engine mounts mounting
(4) 8-32x30mm hex head bolts for engine mounting
(4) 8-32 lock nuts for engine mounting
(4) 4mm flat washers for engine mounting
(4) 4mm split ring lock washers for engine mounting
(2) Hardwood Thrust Blocks for 2 stroke engine – marked with TOP or BOTTOM
(2) Hardwood Thrust Blocks for 4 stroke engine – marked with L or R

 # 10
(1) 750cc Fuel Tank with Rubber Stopper (Glow/Gas)
(6) Small Nylon Ties
(2) Fuel Filler Dots
(3) Large Fuel Tubes
(1) 2 feet Large Glow Fuel Line (I.D. 3mm O.D. 5.7mm)
(2) Large Glow Fuel Line for inside for Tank
(2) Fuel Clunks for inside of Tank
(1) Balsa Tri-stock for behind Fuel Tank

 # 11
(1) Tail Cone
(4) T2.6x12mm PWA Mounting Screws

 # 12
(1) Dash Panel Support - painted
(1) Dash Panel - painted
(1) Pilot Seat
(2) Steering Yokes
(2) Silicon Tubes
(2) Cotter Pins
(1) Felt Lined Cockpit sides
(6) T2.6x8mm PWA screws

 # 13
(2) Antennas for the top of the wing
(1) Air Speed Tubes – paint white

 # 14
(3) Switch Mounting Trays
(1) Battery Mounting Tray with 4 Holes and 2 slots
(4) T2.6x8mm PWA screws for battery mounting tray
(1) 6x100x60mm foam for fuel tank
(2) 8x80x300mm Sponge for receiver and battery
(4) 356x12.5mm Velcro
(6) 5x500mm Nylon Ties for fuel tank mounting
(1) Card Stock (8x12") for the template for cutting of cowling
(1) Rubber Grommets – 2 each 6,8,10 for fuel line and wire guide

 # 15
(1) Custom Throw Meter

 # 16
(1) C.G. Buddy

 # 17
(1) Aluminum Spinner

 # 18
(1) 300x300mm White covering
(1) 300x300mm Bright Yellow covering
           Or
(1) 300x300mm White covering
(1) 300x300mm True Red covering

 # 19
(4) Flap and Aileron Servo Hatch Covers
(8) Servo Mounting Hardwood Blocks
(24) T2.6x10mm PWA screws for Servo Hatch and Mounting Blocks
(2) 8-32x25mm Hex Head bolts for wing mounting
(2) #8 bonded washers
(2) Cotter Pins Rear
(1) 23x19.4x780mm Carbon/Fiberglass compound wing tube

 # 20   (1) Manual CD

 # 21   (1) Wire Loom for the Navigation
               Lights – Manual Switch Only

ITEMS NEEDED TO COMPLETE

Hardware:

- 1.60-1.80 Glow– 30cc Gas engine and ignition
- Standard or Pitts style muffler **(Pitts Recommended)**
- 2 x aileron servos (min 140 in./oz. Torque @ 6 volt, Digital, Metal Geared)
- 2 x flap servos (min 140 in./oz. Torque @ 6 volt, Digital, Metal Geared)
- 1 x rudder servo (min 180 in./oz. Torque @ 6 volt, Digital, Metal Geared)
- 1 x elevator servos (min 180 in./oz. Torque @ 6 volt, Digital, Metal Geared)
- 1 x throttle servo (Fast / Reliable)
- Servo extensions 2 x 6", 4 x 18," 2 x 24"
- 1 x 8 channel receiver (2.4Ghz recommended)
- 1 x receiver battery (min 6.0 volt / 1700ma)
- 1 x ignition battery (min 4.8 volt / 1700ma) *(Gas Only)*
- 2 x switches with charge jacks /Rec., Ing
- 1 x Light Battery (4.8 Volt/ 1700ma)
- 1x Switch with charge jack/ Nav Lights

Tools:

- Allen wrenches US and Metric.
- Dremel cutting disc and sanding drum tool
- Electric drill and selection of bits
- Razor saw
- Flat head screwdriver
- Hobby heat gun
- Hobby iron and covering sock
- Masking tape
- Modeling knife
- Needle nose pliers or crimping tool
- Paper towels
- Pen, pencil or felt tipped marker
- Phillips screwdriver
- Rubbing alcohol
- Ruler and tape measure
- Scissors
- T pins
- Waxed paper
- Wire Cutters

Adhesives:

- 15-30 Minute epoxy
- Blue Loctite
- Epoxy mixing cups, mixing sticks, brushes
- CA kicker (optional)
- Thick, Thin and Medium CA
- Rubbing alcohol
- Wipes

WARNING
Some rubbing alcohols may attack painted parts.

Removing Cockpit Hatch and Instrument Panel

1. Open your kit slowly and take care not to damage any parts of the kit. Remove all parts from their plastic protective covers for inspection. Before doing any assembly it is recommended that the cockpit hatch, canopy, and instrument panel be removed. This will aid in assembling the model. These items will be reinstalled when the rest of the model is finished. Use a Phillips screwdriver to remove the cockpit hatch as shown below.

3. Use a Phillips screw driver to remove the mounting screws holding the instrument panel in place.

2. Using a Phillips screw driver remove the canopy from the fuselage as shown below.

4. Lift the instrument panel out of the fuse through the canopy opening as shown. Be careful not to damage the instrument panel or the canopy bracing bar. Also take care not to scratch the felt inside the fuse.

TIGHTENING AND RE-SHRINKING THE COVERING

1. Before doing any assembly or installation of any decals it is very important to re-shrink or re-tighten the already applied covering. Due to the shipping process, heat and humidity changes from different climates, the covering may become lose and wrinkle in the sun. If you take the time to re-tighten the covering, you will be rewarded with a long lasting beautifully covered model.

2. Using your covering iron with a soft sock, gently apply pressure and rub in the covering. If any bubbles occur, your iron may be to hot. Reduce heat and work slowly.

3. **DO NOT** use a heat gun on the corrugated control surfaces. Heat applied directly to these surfaces will cause the material to deform and bubble.

4. If bubbles persist, use a small pin to punch holes in the bubble to relieve trapped air and reheat.

CHECKING SEAMS AND COLOR OVERLAPS FOR GOOD SEAL

1. Go over all seams and color overlaps with your sealing iron.

Note: Even if your models covering has no wrinkles out of the box it is still very important to go over all seams and overlaps to make certain they are sealed securely. This is especially important at the leading edges of the wings and stabs. We recommend checking the covering after each flying session.
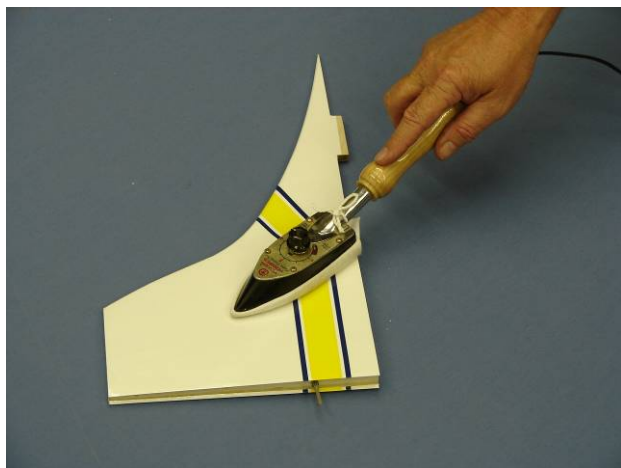
2. Use your covering iron to ensure all edges, seams, and color overlaps are securely sealed.

3. Use a small trim iron to iron out the wrinkles in the hinge lines. It is important to keep the covering sealed down in this area.

Note: Take care not to apply to much heat around any plastic or corrugated parts.

IMPORTANT:
It is the responsibility of the purchaser / operator to check the covering seams and overlaps for security and a good seal.

Aeroworks is not responsible for failure of covering seams or overlaps during flight.

Note: If covering continues to lift apply a small amount of thin CA underneath the covering. Then using a clean rag apply pressure to secure.

One of the most important tools in your flight box is a roll of clear tape. This can be used at the field for fast and easy repairs of the covering. Then once you have finished flying the covering can be permanently repaired.

Ultracote™ Colors

1. Your model is covered with Ultracote™ covering.
   In case of repairs, the colors are:

        Yellow/Blue Scheme
        Bright Yellow   #872
        Midnight Blue   #885
        White   #870

2.   **Red/Black Scheme**
        True Red   #866
        Black   #874
        White   #870

WING ASSEMBLY

Aileron/Flap Servo Installation

1. The ailerons/flaps have been pre-hinged and glued to the wing panels and are ready for flight. No other steps are necessary for hinging.

    Gather (1) wing panel, (1) aileron servo, (1) Flap Servo (8) servo mounting screws, (4) Wood screws for mounting blocks, (2) 1 1/4" servo arm , (2) safety clip (1) 6" servo extension (1) 18" Servo Extension and (4) Servo Mounting blocks as shown below for preparation of the servo installation.

2. Using a Phillips screw driver remove the aileron servo mounting hatch as shown below.
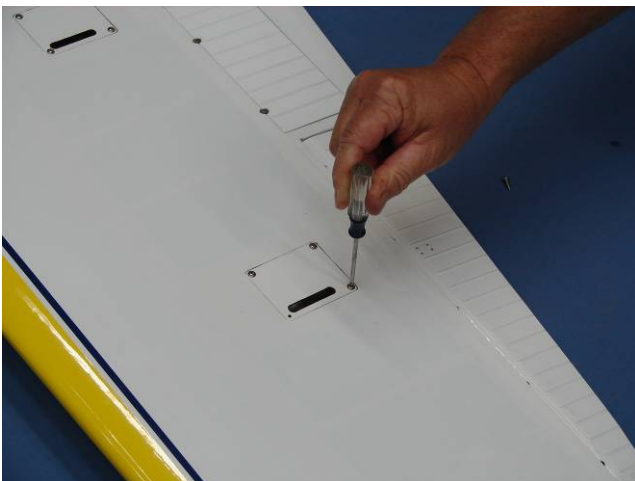
3. Use a C-Clamp to hold the servo mounting blocks to the servo as shown. Use a block of wood to elevate the servo mounting hatch as shown.
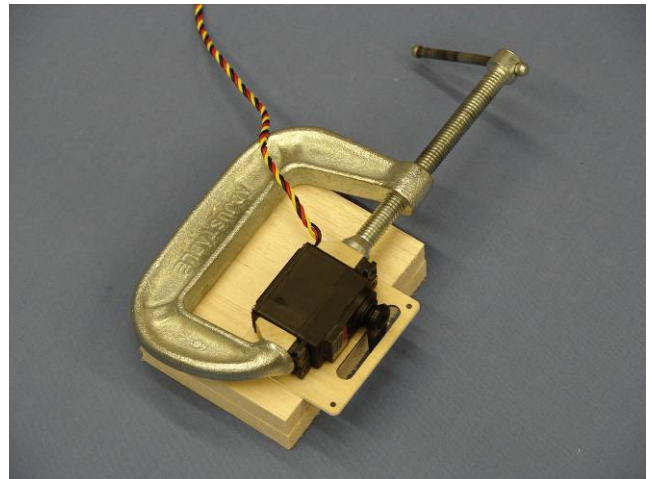
4. Use a 1/16" drill bit to drill the mounting holes for the servo mounting screws as shown.
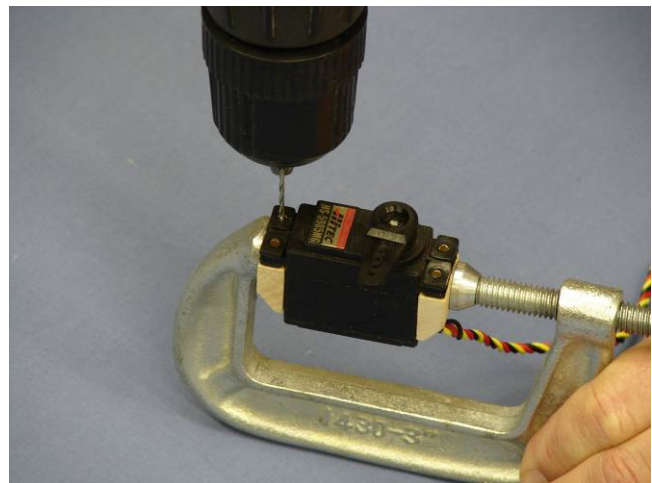
5. A hand drill may also be used to drill through the blocks as shown below.
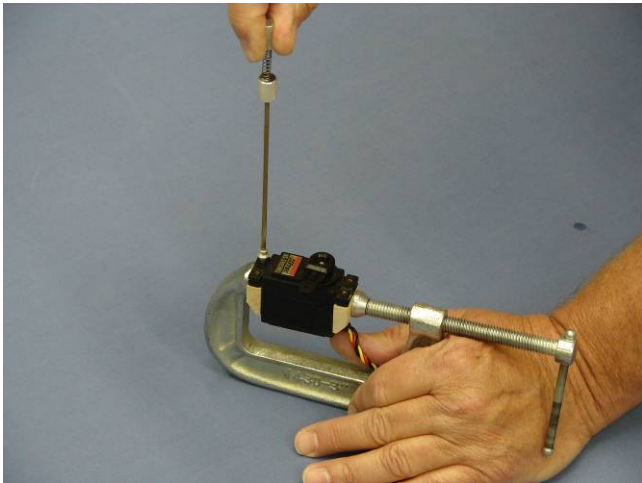
6. Install the servo mounting screws as shown.
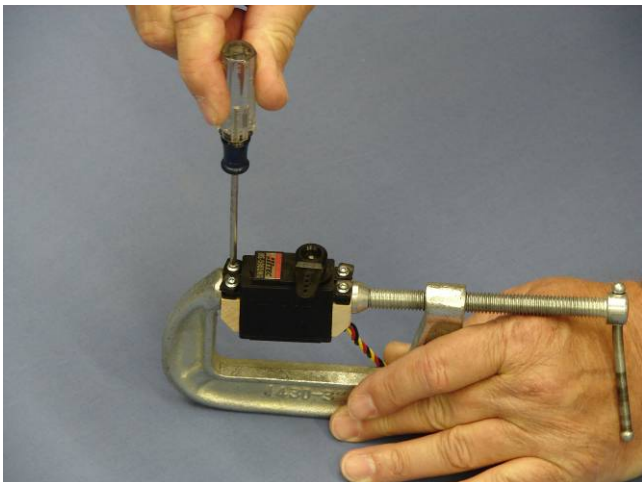
7. Mark the location of the servo mounting blocks onto the servo hatch as shown below. Make sure the servo arm is positioned in the opening as shown below.
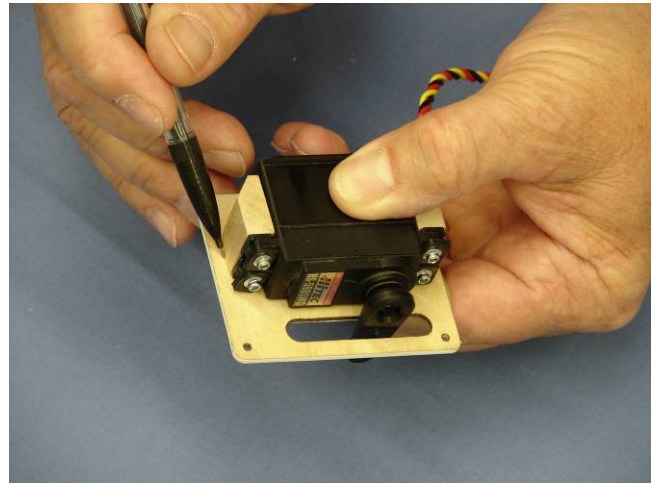
8. Use 5 to 15 minute epoxy to glue the servo mounting block to the servo hatch. Be careful not to get any epoxy on the servo case.
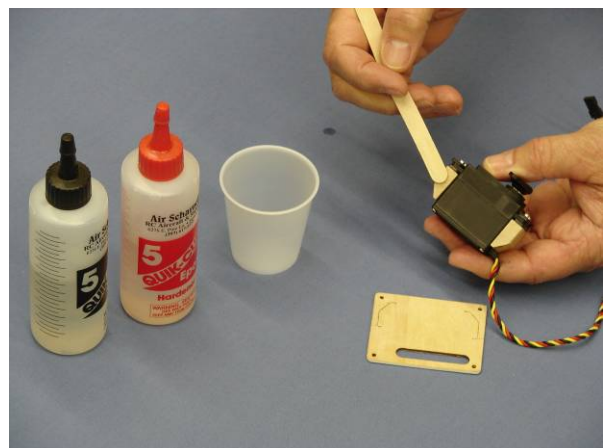
9. Use a C-Clamp to hold the servo against the hatch until the epoxy fully cures. Use a piece of balsa or foam on the bottom of the C-Clamp to avoid crushing the servo mounting hatch.

10. For added strength install provided wood screws into the servo mounting blocks as shown below. This will ensure that the block will be unable to come loose.
11. Repeat steps for the 3 remaining servos.
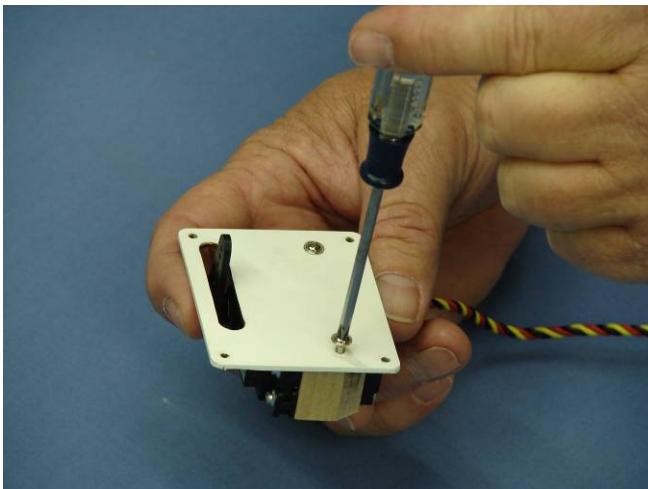
12. Attach the 6" and 18" extension to the servo lead and secure with Aeroworks Safety Clip. Ensure the connectors will not come apart from vibration or light tension.

Safety Clips Available from Aeroworks
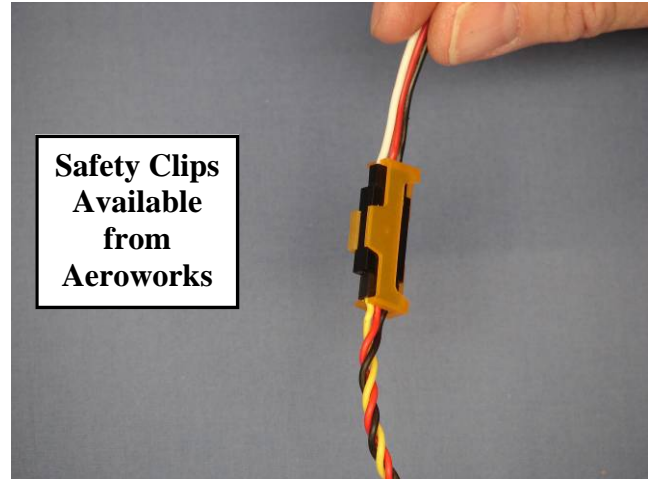
13. Layout the servos as shown below. Install the extensions at this time and double check extension length.
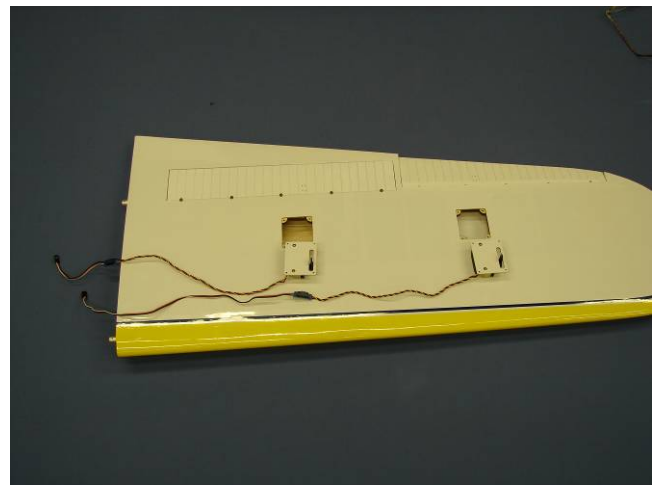
14. Fasten the pull string from the servo hole to the male plug of the servo extension.
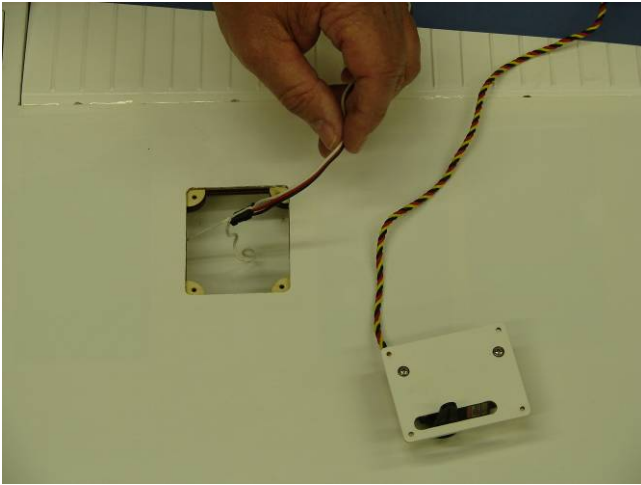
15. Draw the servo extension through the wing and pull through the wing root rib.
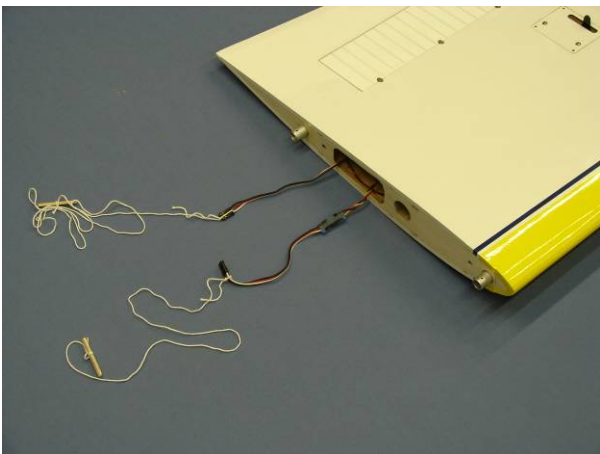
16. Taping servo lead to the inside of the wing panel will help to prevent leads from dropping back inside of wing panel during transportation.

17. Gather the aileron and flap control linkage parts as shown below. (1) 3" pushrod *aileron*, (1) 2.5" Pushrod *flap* (4) 4-40 ball link assemblies, (2) brass spacers, (4) flat washer, (2)control horns, and (8) wood screws for each wing panel.
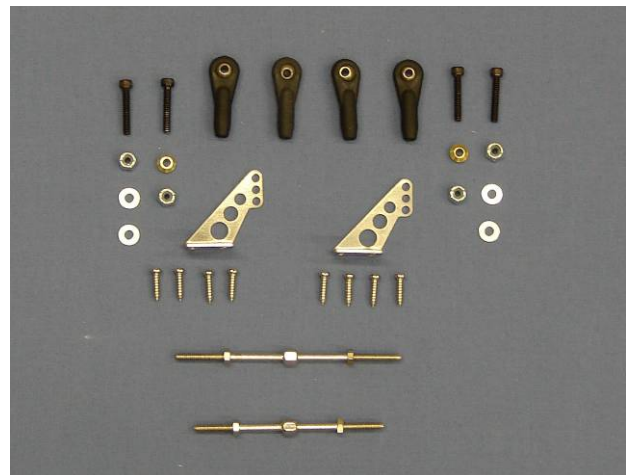
18. Install the servo hatch back in the wing as shown. The servo arms will be towards the leading edge of the wing.

20. Place the control horns over the predrilled mounting holes.

Wing Root

19. Reinstall the 4 mounting screws as shown below. Be careful not to strip the wood the screws go into.
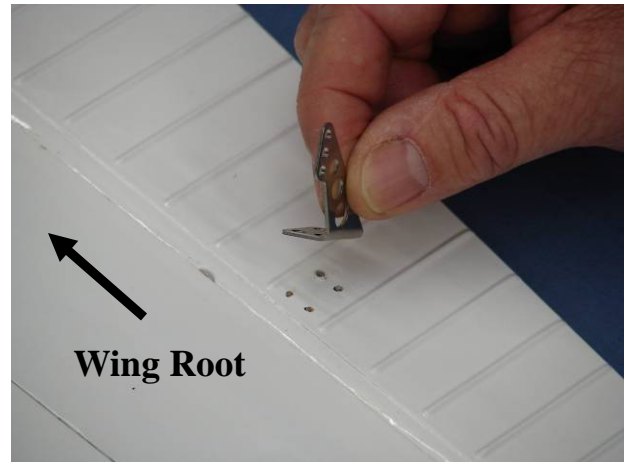
21. Use a drop of thick CA glue on each screw to prevent screws from loosening due to vibration as shown.

22. Securely fasten the control horn to the aileron with four wood screws.
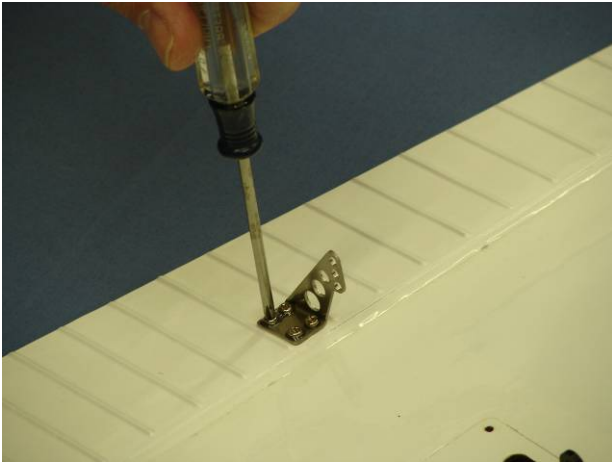
23. Correct installation of ball link to servo arm shown below.

Note: Flat washer will prevent ball link from coming loose from brass ball.

4-40 Bolt

Flat Washer

Brass Spacer

Lock Nut
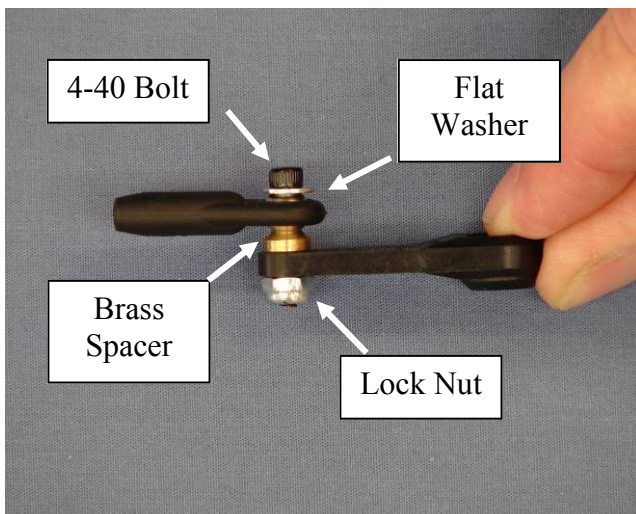
Note: Flat washer prevents ball link from coming off brass ball.

24. Install pushrod as shown below. The ball links should be positioned towards the wing tip on both the servo arm and pushrod.

Wing Tip
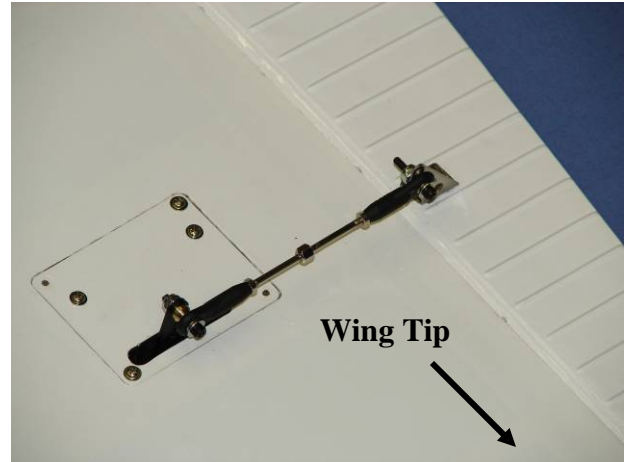
25. Correct installation of ball link to control horn shown below.

19

26. Finished wing assembly shown below.

27. Repeat all the above steps for the other wing.
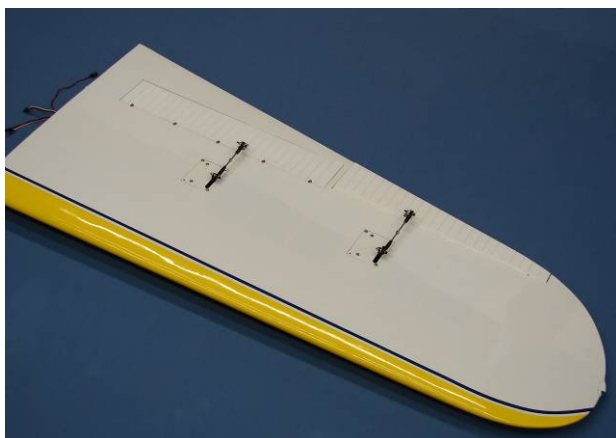
STAB AND ELEVATOR ASSEMBLY

Elevator Installation

1. Gather the horizontal stab, elevator assembly, elevator "U" rod and 8 elevator hinges as shown below.

2. Mix epoxy in mixing cup and use a tapered stick to apply the epoxy inside the pre-drilled holes in the leading edge of the elevator. Apply epoxy to one side of the elevator "U" Rod and insert the "U" Rod completely into the hole. Ensure the "U" Rod is fully inserted and straight in the elevator before epoxy cures. Wipe away excess epoxy with alcohol wetted wipes.

3. Ensure the control rod is on the bottom of the elevator assembly as shown.

4. Repeat steps for the remaining elevator half and set elevators aside on a flat surface. Insure that the elevators are aligned with each other before the epoxy fully cures.

5. Gather the elevator assembly, 30 minute epoxy, mixing stick, and mixing cup as shown below.
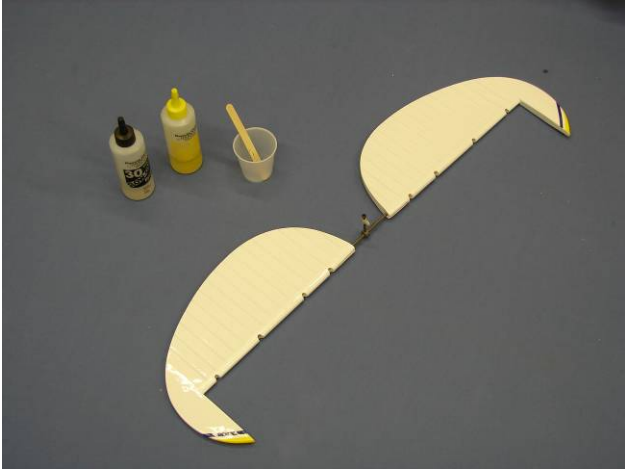
6. Prep all hinges for installation by applying Vaseline petroleum jelly or light oil to the hinge joint. This ensures no epoxy gets into the hinge during assembly.

7. Install hinge in the predrilled hole as shown. The knuckle portion of the hinge should be embedded into the elevator as shown.

8. Trial fit all hinges prior to gluing as shown below.

9. Mix epoxy in mixing cup and use a tapered stick to apply the epoxy inside the pre-drilled holes in the leading edge of the elevator. Apply epoxy to each hinge and install in elevator.

10. Set the elevator assembly aside and allow the hinges to fully cure. Check the alignment of the hinges before the glue fully cures to ensure they are straight and move freely.

11. Gather the fuse, horizontal stab, and wing tube as shown below.
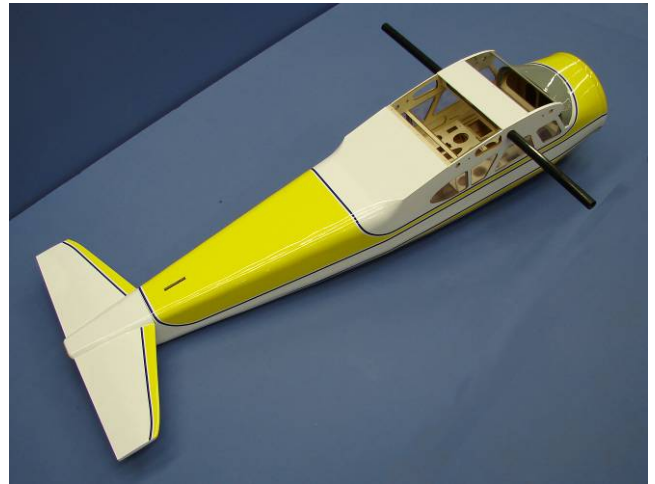
12. Install wing tube in fuse and place stab in the stab saddle as shown. Check the alignment of the horizontal stab against the wing tube. Some shimming or light sanding may be necessary for a perfect alignment.
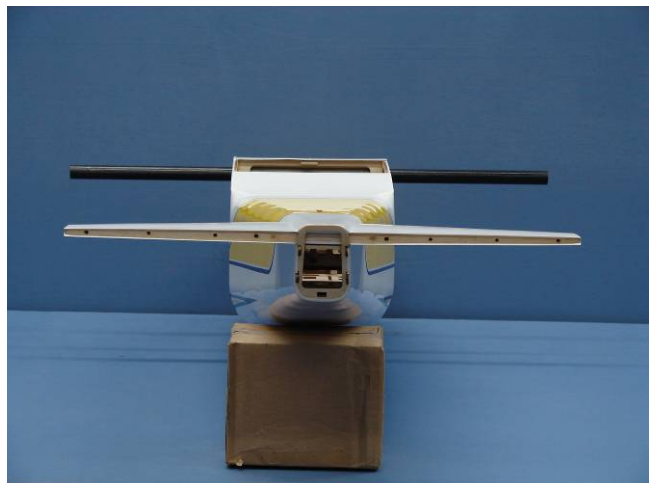
13. Mix 30 minute epoxy in mixing cup and use a stick to apply the epoxy to the stabilizer mounting rails as shown. Install the stab onto the stabilizer saddle. Use alcohol wetted wipes to remove any excess epoxy.

14. Allow epoxy to fully cure before moving on to the hinging of the elevator.
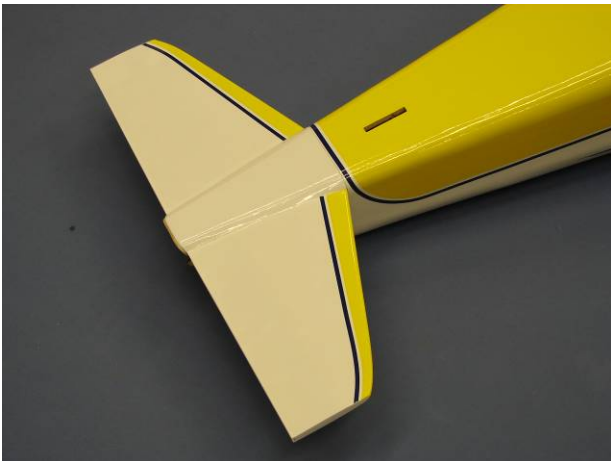
15. Mix epoxy in mixing cup and use a tapered stick to apply the epoxy inside the pre-drilled holes in the trailing edge of the elevator. Apply epoxy to each hinge.

16. Slide hinges into the predrilled holes in the elevator as shown. Make sure the hinges are pushed in all the way to avoid any gaps in the hinge line.

17. Before hinges fully cure check the hinges for proper throw as shown below.
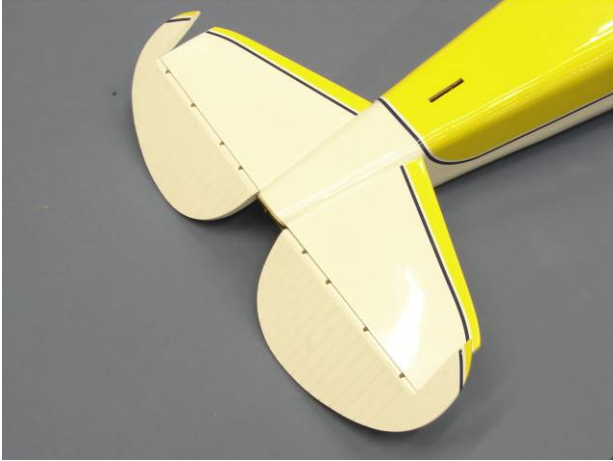
18. Ensure that the elevator control rod is positioned as shown below.

19. Gather the elevator servo, servo mounting screws, 1 1/4" servo arm, 4-40 ball link with hardware, 4-40 clevis, 4-40 threaded inserts and the elevator pushrod as shown below.
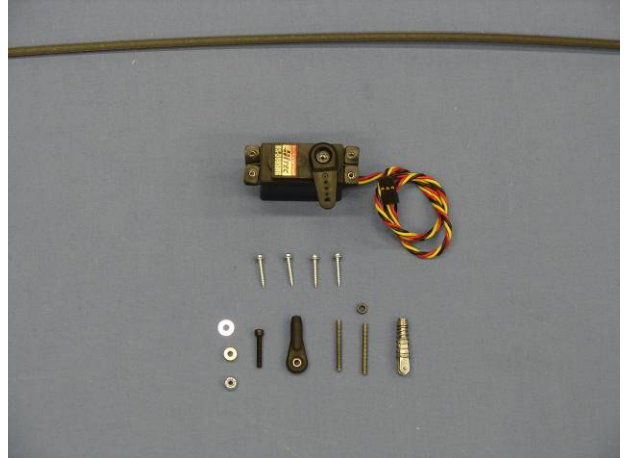
20. Install elevator servo in the fuselage cabin area as shown below.

Note: The servo output arm will go towards the front of the fuselage as shown below.
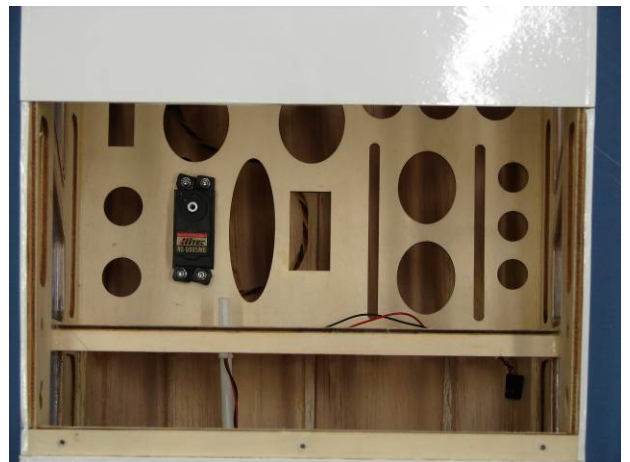
21. Install the 4-40 clevis and lock nut on the 4-40 threaded insert as shown. A drop of blue loctite may be applied to keep the clevis from loosening in flight.

22. Install the threaded insert into the pushrod as shown below. A small drop of thick CA may be used to secure the threaded insert in the pushrod.

23. Remove the elevator control rod and apply a small drop of blue loctite as shown below.

24. Reinstall the elevator control rod as shown.
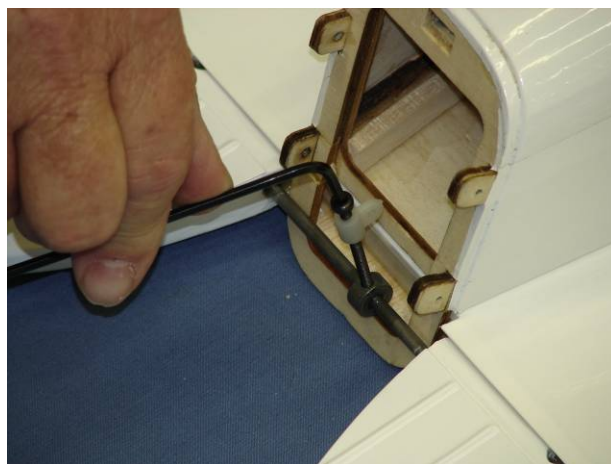
25. Slide the elevator pushrod into the preinstalled guide tube and connect to the elevator control rod.
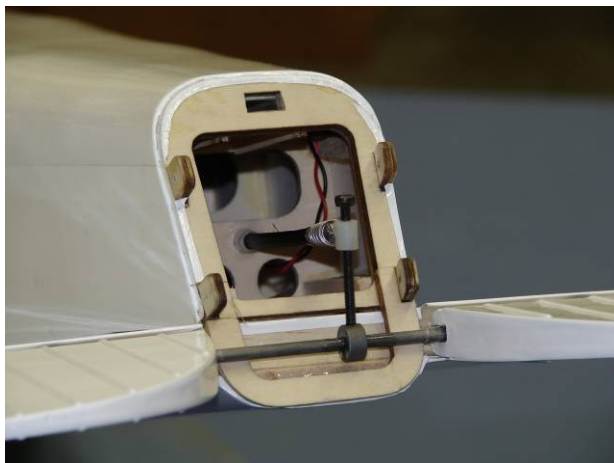
26. Tape the elevator counter balance at neutral as shown below.
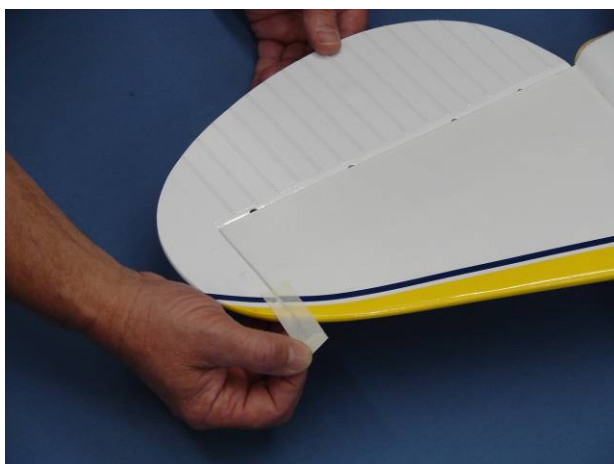
27. Attach the 4-40 ball link to the elevator servo arm as shown below. Install the 4-40 threaded insert into the ball link at this time.
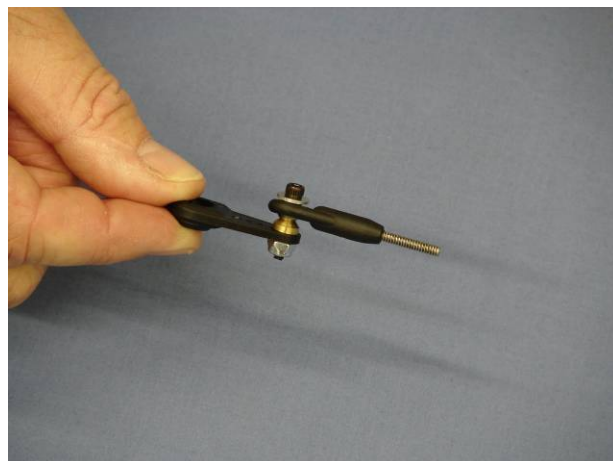
28. Place the servo arm on the servo and mark the location of the threaded insert to thread into the pushrod.

29. Install the threaded insert into the pushrod as shown below. A small drop of thick CA may be used to secure the threaded insert in the pushrod

RUDDER AND PULL – PULL CABLE ASSEMBLY

Rudder Installation

1. Gather the vertical fin, rudder, three hinges, and rudder drive assembly as shown.
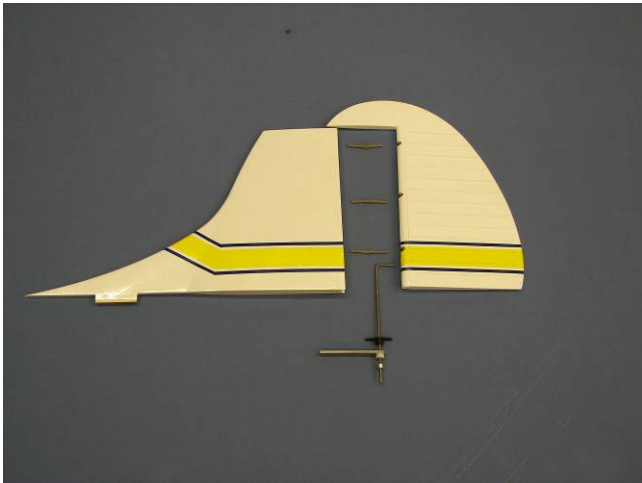
2. Mark the location of the vertical fin on the top of the fuse as shown.

3. Remove the vertical fin and ensure the lines marked in the previous step are visible.

4. Remove the covering from the top of the fuse using a hobby knife. Be careful not to cut to deep into the sheeting as this can weaken the structure.

5. Mix epoxy in mixing cup and use a stick to apply the epoxy to the bottom of the vertical fin as shown.

6. Carefully install the fin back on top of the fuse as shown below. Wipe away any epoxy with alcohol wetted wipes. Allow epoxy to fully cure before moving on to the next step.
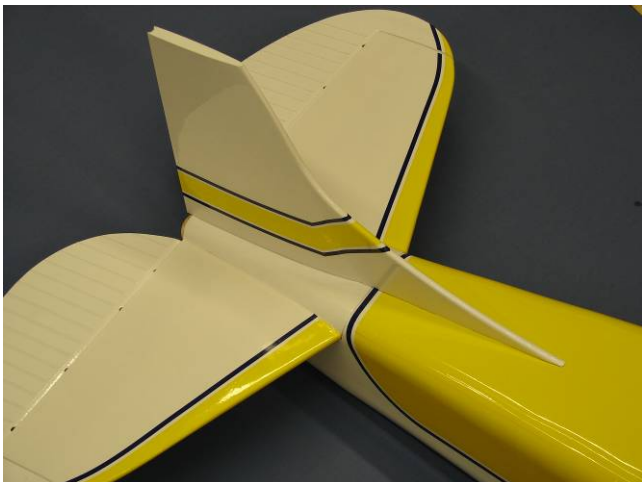
7. Correct position of fin shown below. Ensure that the trailing edge of the fin is flush with the trailing edge of the stab.

8. Glue the rudder drive assembly into the pre cut slot in the rudder using epoxy as shown below.

9. Ensure the rudder drive assembly is positioned correctly and all the way in the pre cut slot before the glue cures.

10. Mix epoxy in mixing cup and use a tapered stick to apply the epoxy inside the pre-drilled holes in the leading edge of the rudder. Apply epoxy to one end of each hinge.

11. Set the rudder assembly aside and allow the hinges to fully cure. Check the alignment of the hinges before the glue fully cures to ensure they are straight.

12. Trial fit the rudder and the rudder drive assembly as shown.

13. Test fit the tail cone assembly as shown below. The rudder drive assembly rod should be centered in the pre cut tail wheel exit hole.

14. Remove the tail cone assembly and mark the tail wheel bracket where it exits the fuse. This will allow you to apply glue in the correct area. Make sure the rod is strait and wont bend or pull on the rudder.

Mark Here

15. Mix epoxy in mixing cup and use a tapered stick to apply the epoxy inside the pre-drilled holes in the trailing edge of the vertical fin Apply epoxy to each hinge.

16. Apply epoxy to the tail wheel bracket as shown.

17. Carefully slide the hinges in rudder into each hinge hole and against the trailing edge of the fin. Slide the tail wheel bracket into position and align to mark previously drawn. Wipe away excess epoxy with alcohol wetted wipes.

18. Ensure there is no gap between fin and rudder. Allow epoxy to fully cure. Check you have full rudder deflection before epoxy fully cures.
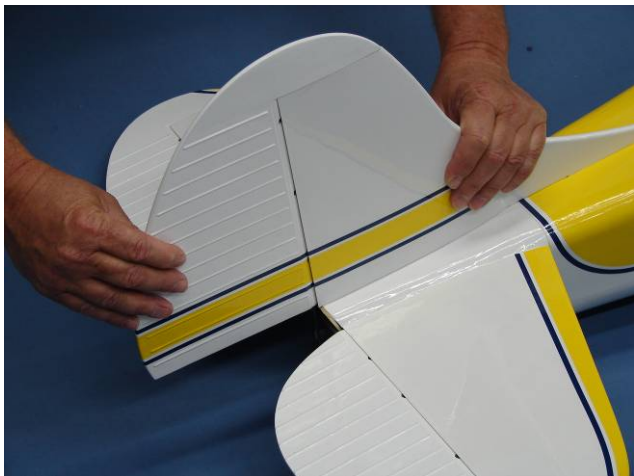
19. Finished rudder/rudder drive assembly shown below.

Pull-Pull and Rudder Servo Installation.

1. Gather the rudder control linkage parts shown below.(1) Rudder servo (1) 2 3/4" double output servo arm (4) servo mounting screws (2) rudder cables, (2) ball link assemblies, (2) flat washers, (2) Brass Spacers (2) 4-40 clevises (4) threaded couplers with lock nut, and (4) brass swaging tubes.
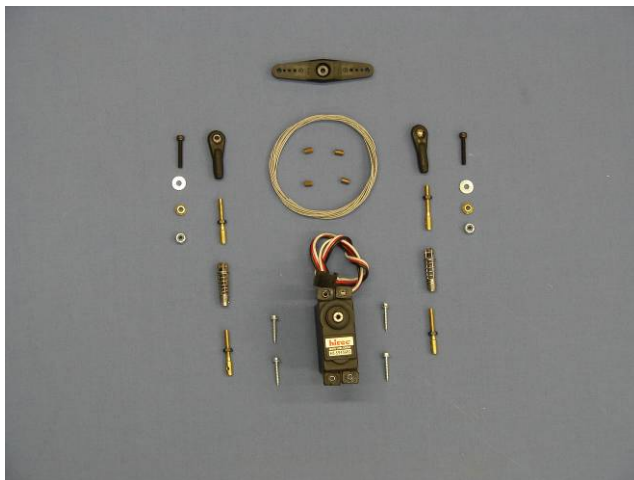
2. Tape the rudder balance tab to the top leading edge of the vertical fin in the neutral position as shown. This ensures the rudder is straight when the cables are attached.

3. Install the rudder servo in the servo cutout with the output shaft to the front.

4. Using an X-ACTO knife clean away any burrs from brass swags. This will allow the rudder cable to pass through brass swage easily.

5. Thread cable through brass swage and the threaded coupler as shown.
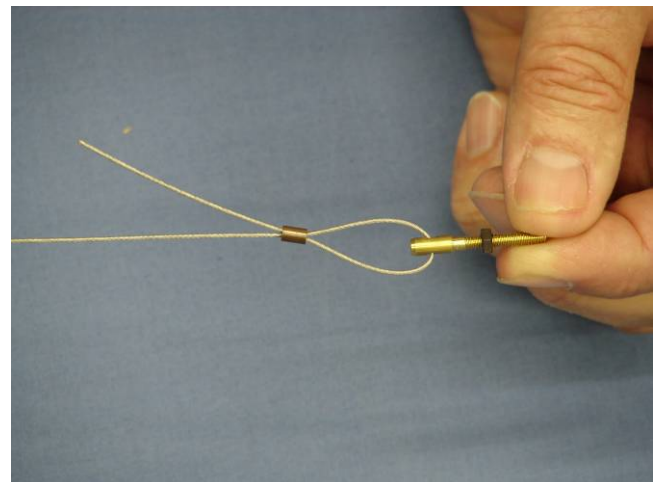
6. Loop the cable back through the brass swage tube and pull tight.
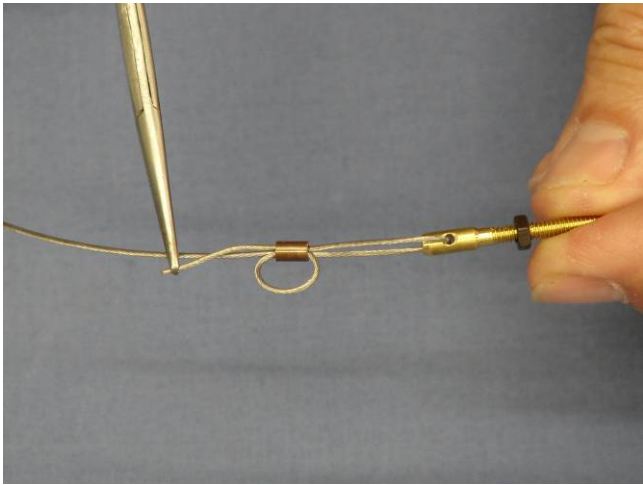
7. Crimp the brass swage tube with a crimping tool or pliers.
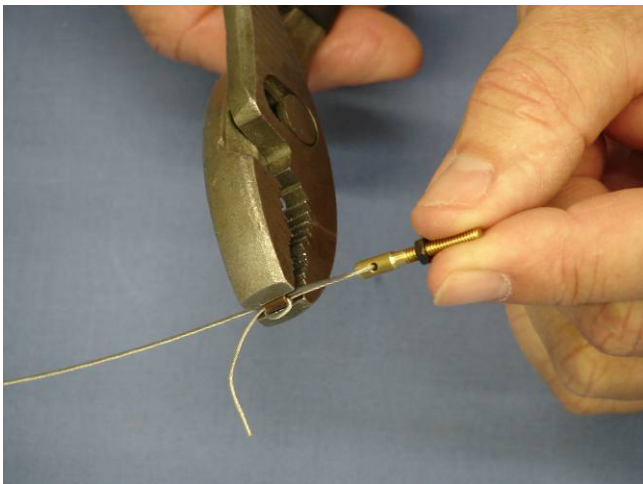
8. A drop of thin CA may be applied to the swage tube to help secure the cable.
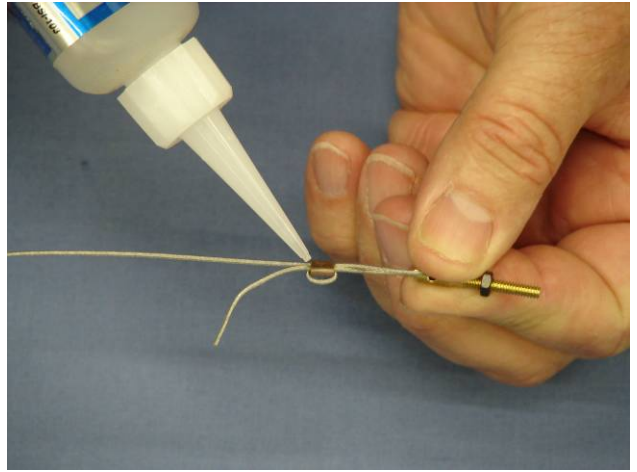
9. Cut off excess cable as shown.
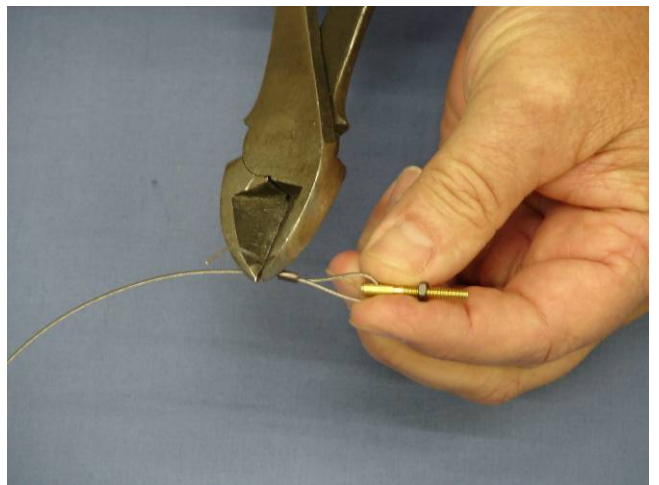
10. Thread clevis onto the threaded coupler as shown.
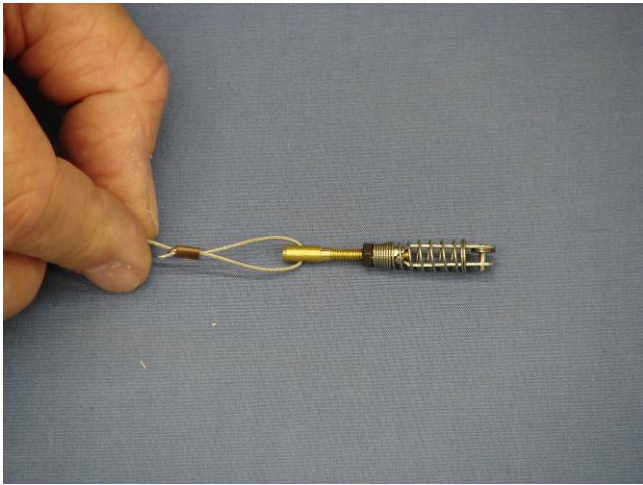
11. Attach a weight to a piece of string as sown below. This will be used to pull the pull pull cables through the fuse.

12. Drop the weight into the rear of the fuse. Turn the fuse on its nose and allow the weight with the string attached to drop into the fuse.
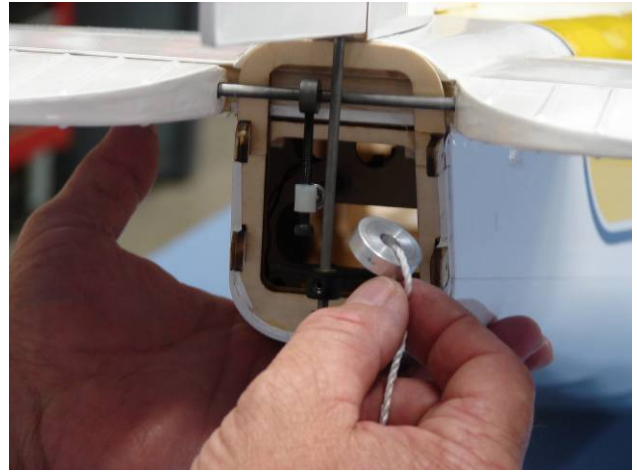
13. Tape the end of the cable without the clevis to the string. Carefully feed the cables through the fuse making sure they do not become tangled.

14. Remove the string from the clevis as shown.
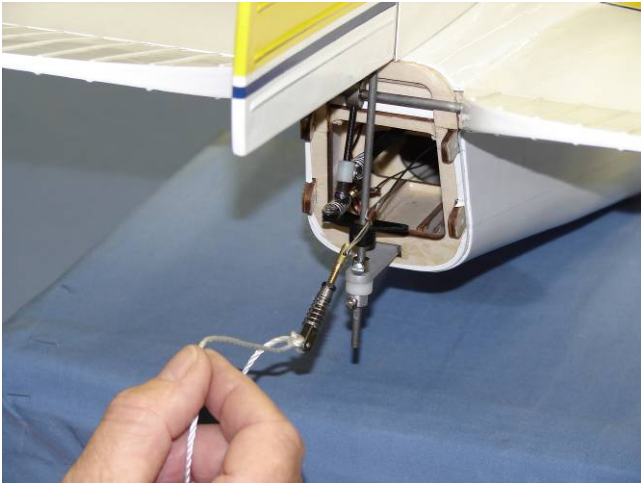
15. Attach the pull pull cables to the rudder drive assembly as shown below. Ensure that the cables are <u>not</u> crossed inside the fuse.

16. Plug the rudder servo into the rudder channel of the receiver and power up. Turn on transmitter to center rudder servo.   Ensure servo trim and sub trims are centered.

Note: On metal geared servos use blue Loctite for all Servo arm mounting screws.

17. Install the ball link onto the threaded pull pull coupler as shown below. Allow enough of the coupler to be left unthreaded for final adjustment.

18. Attach the ball link to the servo arm using the 4-40 bolt, 4-40 lock nut and brass spacer as shown below.

19. Pull the pull pull cable tight and mark where they will align with the hole in the threaded coupler as shown below.

20. Mount threaded coupler to cable using the same method used in previous steps.

21. Attach the ball link to the servo arm using the 4-40 bolt, 4-40 lock nut, washer, and brass spacer as shown below.

22. Ensure that the spring keepers are installed on the clevises and are pushed as far forward as possible. This will ensure the clevis will not slip off during flight, zip ties or fuel line may also be used.
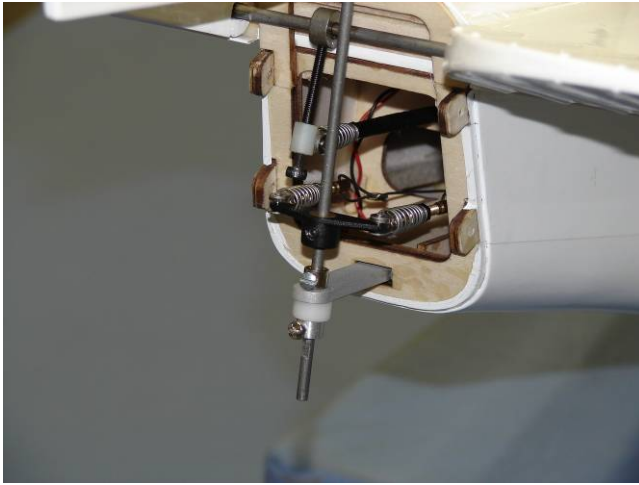
23. Remove the set screw holding the rudder control horn in place and use blue loctite to ensure it will not loosen in flight.

24. Gather the tail cone, tail wheel assembly, and 4 wood screws for mounting of the tail cone as shown below.
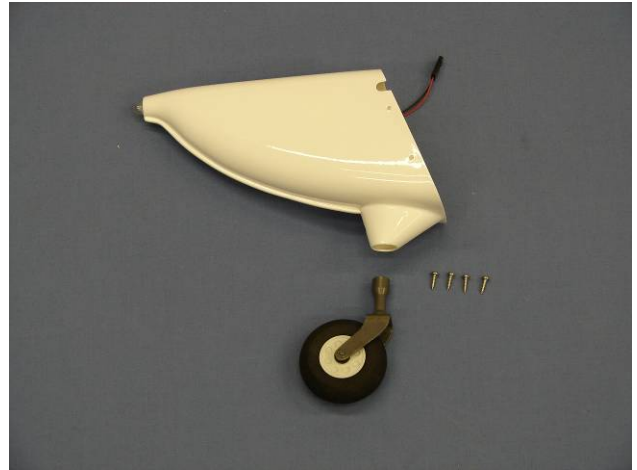
25. Install tail cone to the rear of the fuse using the 4 wood screws supplied in the kit. Remember to connect the tail light extension at this time.

26. Install the tail wheel onto the tail wheel mounting shaft and tighten set screw as shown below.

Note: Use blue loctite to ensure the set screw does not come loose due to vibration.

MAIN LANDING GEAR
AND WHEEL PANT ASSEMBLY

Main Landing Gear Installation

1. Gather the landing gear parts as shown below:
- **(1) Landing Gear Strut**
- (4) 8-32 mounting bolts
- (4) 4mm flat washers
- (4) 4mm lock washers
- **(2) Wheel Pants**
- (4) 4-40 mounting bolts
- (4) 3mm flat washer
- (4) 3mm lock washer
- (2) wheels
- (2) axles assemblies
- (4) wheel collars
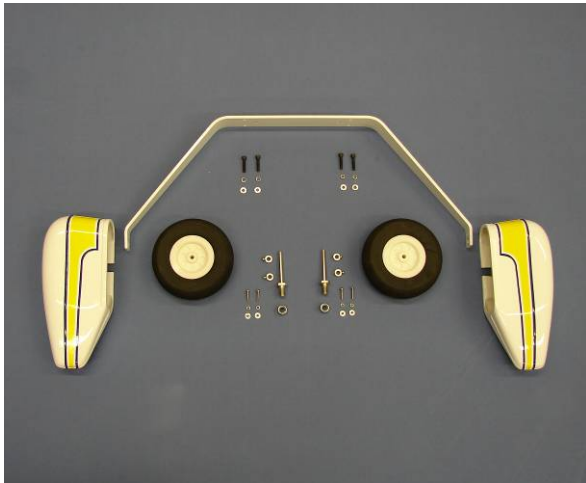
2. Remove the Phillips head screws holding the landing gear cover in place.
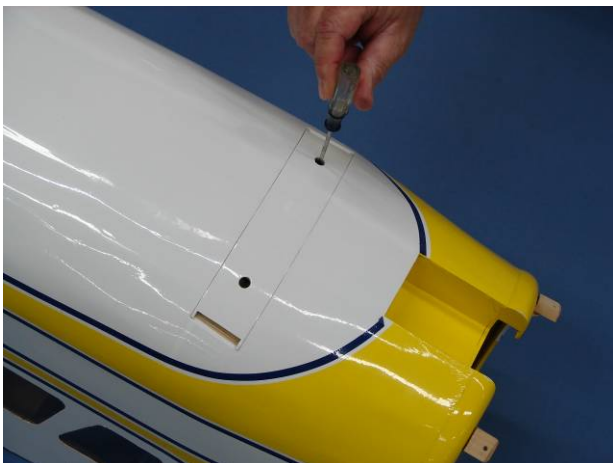
3. Align mounting holes of main landing gear with pre drilled mounting holes in fuselage mounting plate.

Note: Mounting holes have been offset to ensure proper installation of main gear.

Mounting holes have been offset to ensure correct installation

4. Assemble the landing gear bolts with lock washer and flat washer. Use a drop of blue Loctite on landing gear bolts before attaching the landing gear.
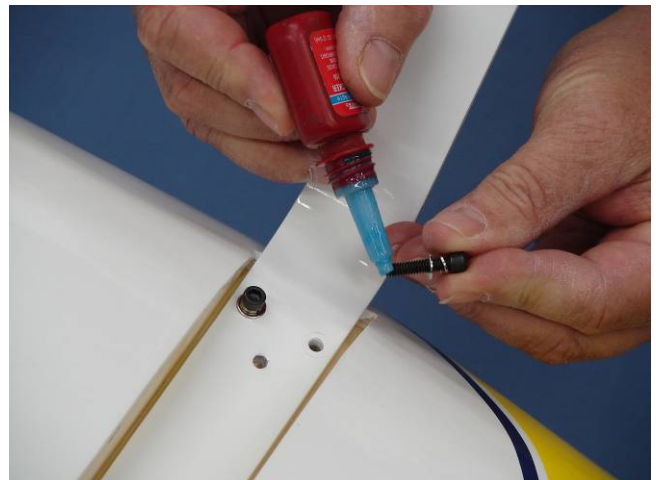
5. Reinstall the landing gear hatch cover.

6. Using lock nut install axle to gear.

Note: Do not tighten securely yet.

7. Align the wheel pant slot over the axle bolt as shown. Slide the wheel pant slot over the flat sides of the axle bolt and align blind nuts in wheel pants with mounting holes in landing gear.

Note: Do not tighten securely yet.

8. When holes are aligned tighten the lock nut against the landing gear strut to secure axle.

9. Install the inner wheel collar on the axle. Use a drop of blue Loctite on the wheel collar set screw and tighten the wheel collar in place.

10. Install the wheel and outer wheel collar. Use blue Loctite on the wheel collar set screw before final tightening.
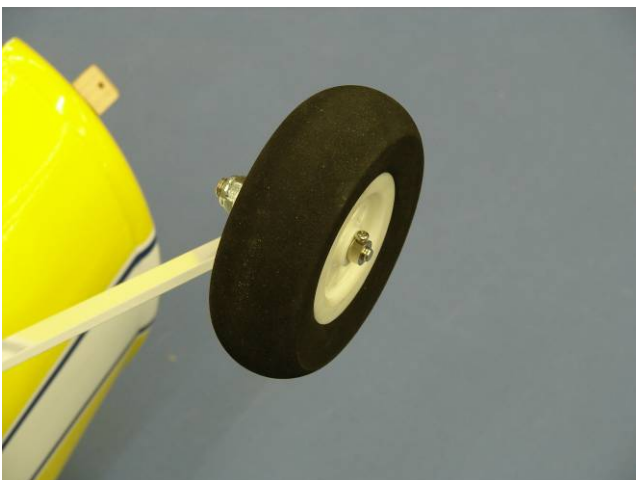
11. Final installation of wheel pant with two mounting bolts. Use blue Loctite on the 4-40 mounting bolts before final tightening.

Note: Make sure wheel turns freely without binding or rubbing against the wheel pant. Adjust wheel collars in or out until wheel turns freely.

12. Repeat above steps for other wheel and wheel pant.

13. Final landing gear installation shown below.

GLOW ENGINE INSTALLATION

4 Stroke Glow Engine Installation

1. The 1.80/ 30cc Cessna 195 will accept a wide range of engine types. The Satio 1.80, OS 1.60 and DLE 30 was mounted The Satio 1.80 was used for the test flights.

2. Satio 1.80 with stock muffler, OS 1.60 with Pitts muffler and mounting hardware shown below.

Note:
Mounting distance from front of firewall to front of engine prop hub for glow engines:
6 1/2"

3. Locate the engine mount standoffs for the vertical motor installation as shown below. There will be a right and left side as shown below, this will create the correct thrust angle for the engine.
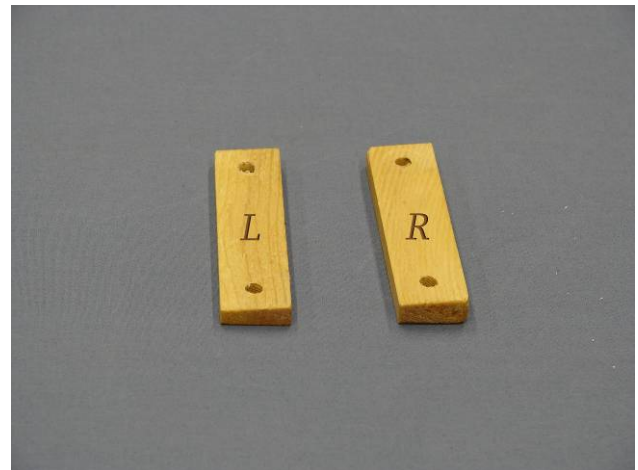

4. The standoffs will need to be oriented as shown below. It is very important that they are placed on the correct side of the firewall to achieve the proper thrust angle.

5. Install left and right side of the engine mounting rails using the supplied 8-32 x 35mm bolts, flat washers, and split lock washers. The blind nuts have already been installed in the firewall.
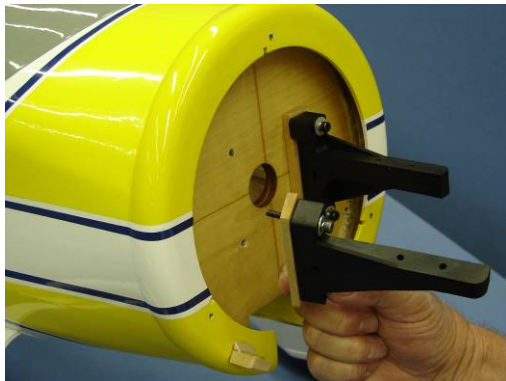
6. Use blue loctite on the mounting bolts to ensure they do not loosen from vibration.

7. Install the mount to the firewall using the diagram shown below. It is extremely important that the mount be mounted with the larger reinforcing flange towards the engine.

Motor mounts on this side
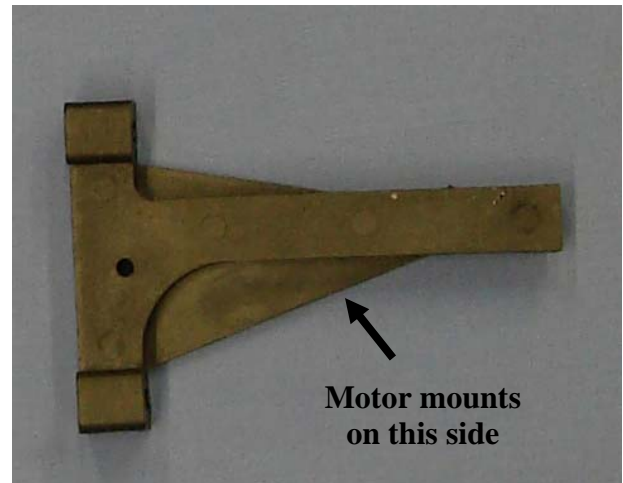
8. Install all four 8-32 x 35mm mounting bolts as shown below.

9. Set the engine in between the left and right mounting rails. It may be necessary to clamp the motor in place for the next few steps.

10. Adjust the motors position until the thrust washer is 6 1/2" away from the firewall.
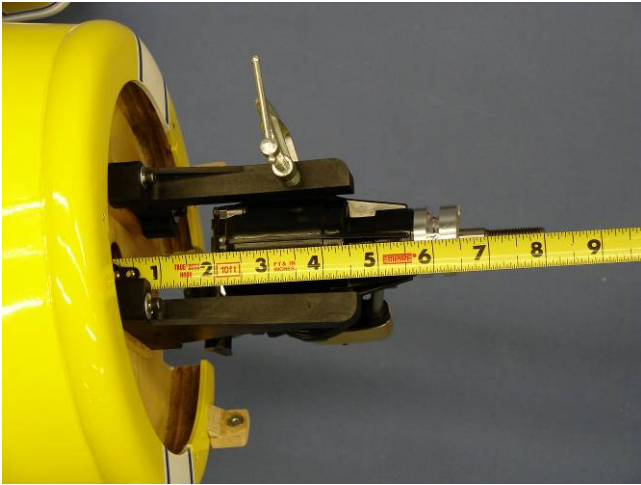
11. Mark the position of the engine mounting holes on the engine mount. Mark the center of each engine mounting hole
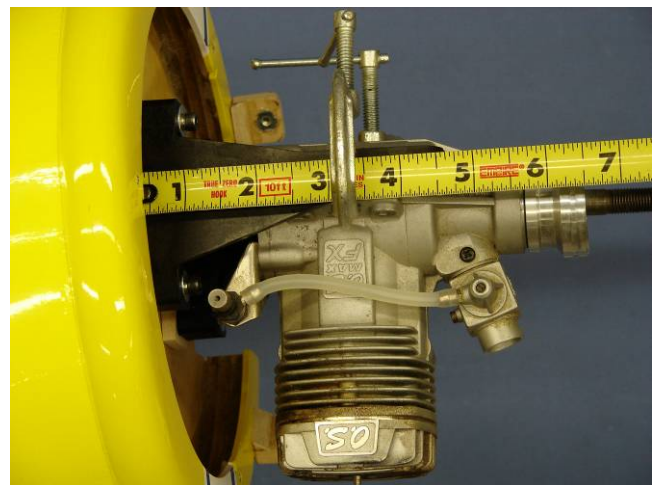with a center marking tool or beveled pencil or pen. Ensure the mark is in the center of the engine mounting hole.

> **Note:** We recommend the Great Planes Dead Center Engine Mount Hole Locator **Part #GPMR8130**

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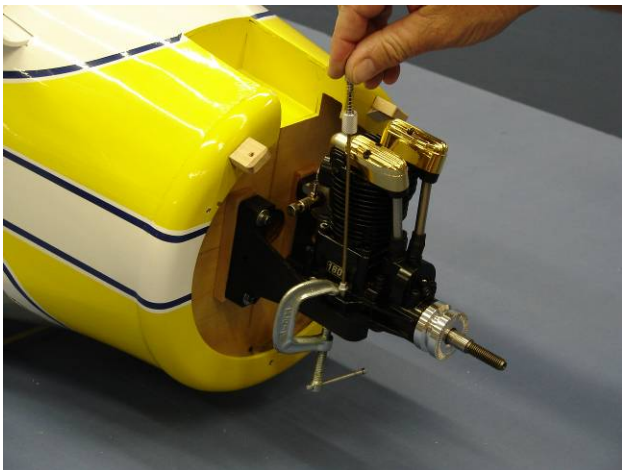
12. Attach the muffler to the engine as shown below. It may be necessary to slightly adjust the angle of the muffler for the best fit.
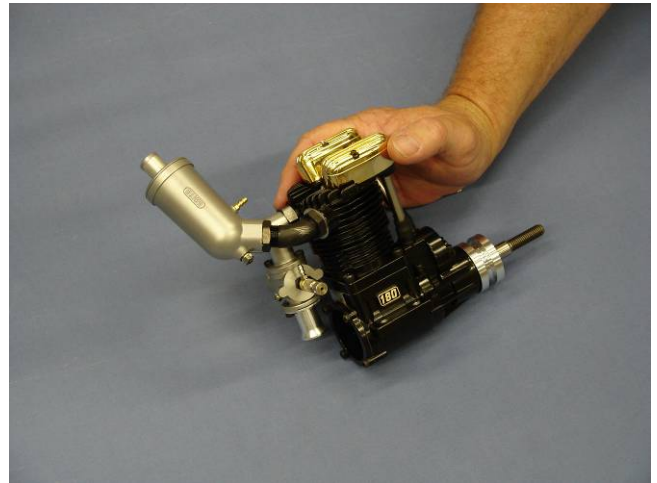
13. Use 4 8-32 x 30mm bolts, 4 flat washers, and 4 8-32 lock nuts to install the engine to the mount.
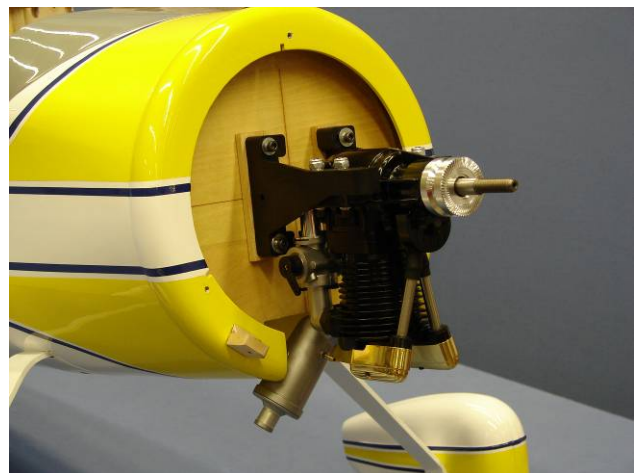
Throttle servo installation for 4 stroke engine

1. Gather the throttle servo, (2) plywood pushrod guides, (1) metal clevises with threaded insert, (1) 4-40 rod, (1) nylon keeper(1) pushrod guide tube, and (1) throttle pushrod.
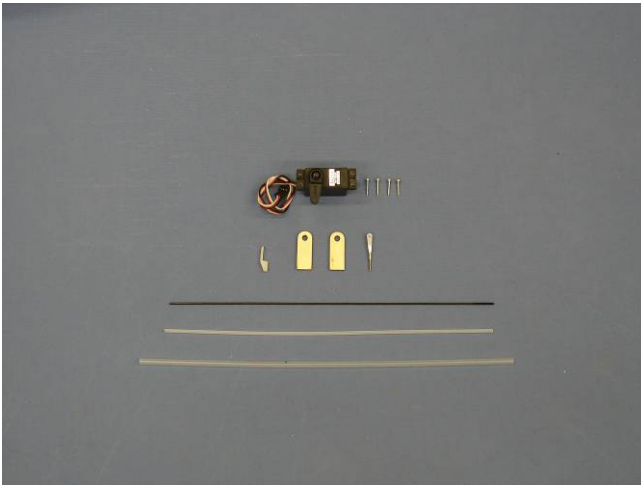

2. Mark location of the throttle pushrod guide tube onto the firewall.

   Note: Insure throttle pushrod is lined up with throttle arm of the carb.

3. Use a drill bit to drill the hole for the throttle pushrod guide tube

4. Install the throttle pushrod guide tube into the hole drilled in a previous step.
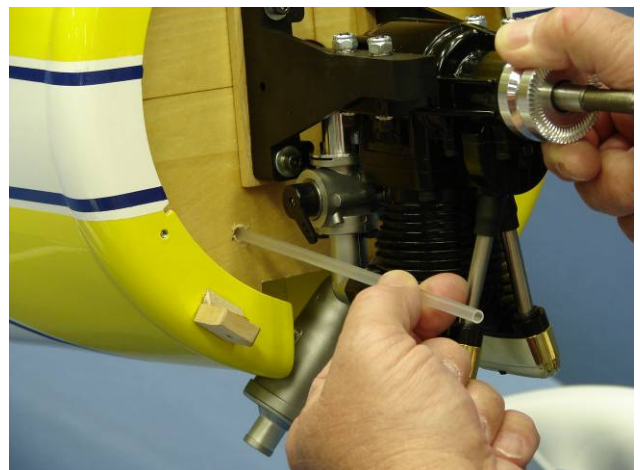
5. Push guide tube through the firewall.
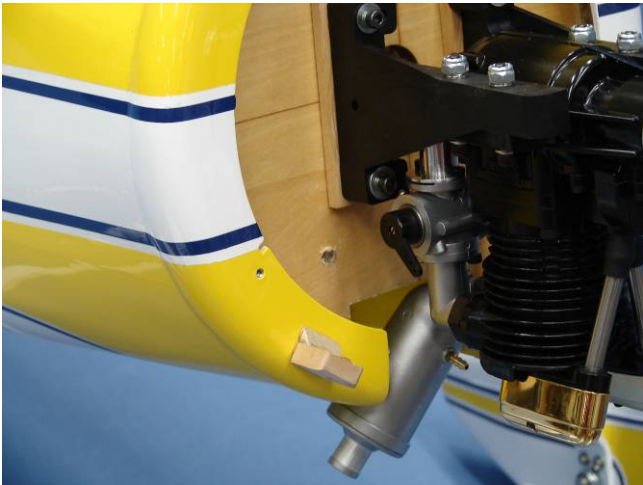
6. **Using plywood guide align pushrod guide tube with servo arm. Mark plywood guide location.**

7. Remove the unneeded portion of the plywood pushrod guide as shown. If this is not done the guide may interfere with the mounting of the fuel tank.
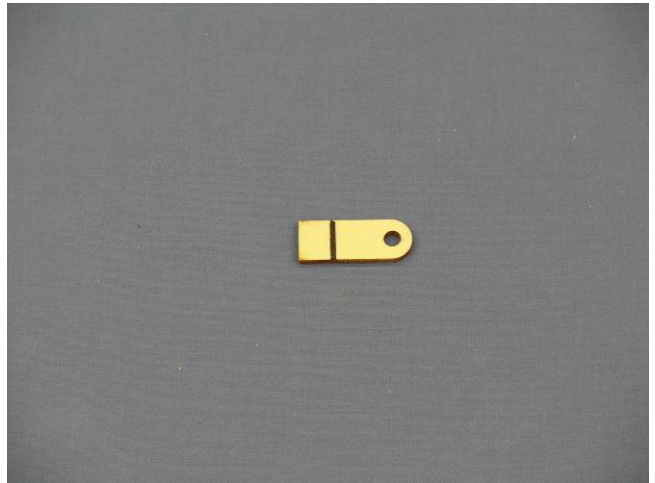
8. Glue the plywood pushrod guide in place as shown. Make sure the guide tube is aligned with the servo arm as shown.

9. Slide the pushrod through the guide tube and install the threaded rod with the clevis. Attach the clevis to the carburetor.
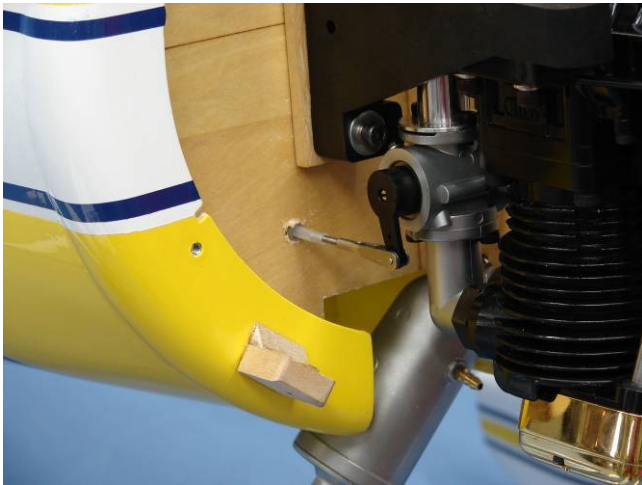
10. Install the remaining threaded rod and nylon keeper on the other side of the throttle pushrod. Attach the clevis to the throttle servo.

2 Stroke Glow Engine Installation

1. Locate the engine mount standoffs for the horizontal motor installation as shown below. There will be a top and bottom spacer as shown below, this will create the correct thrust angle for the engine.

2. The standoffs need to be oriented as shown below. It is very important that they are placed in the correct location of the firewall to achieve the proper thrust angle.
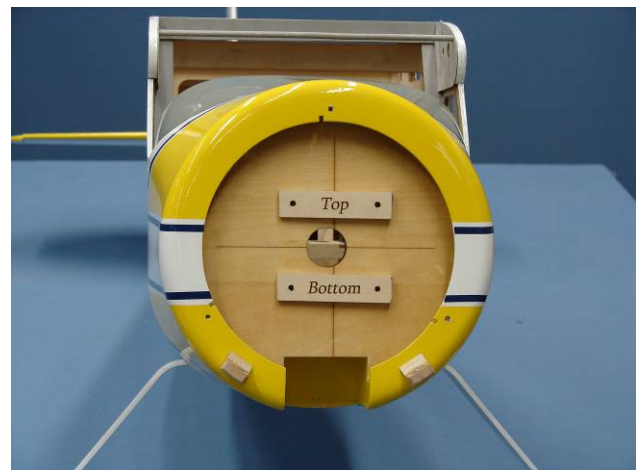
3. Install top and bottom side of the engine mount-ing rails using the supplied 8-32 x 35mm bolts, flat washers, and split lock washers. The blind nuts have already been installed in the firewall.
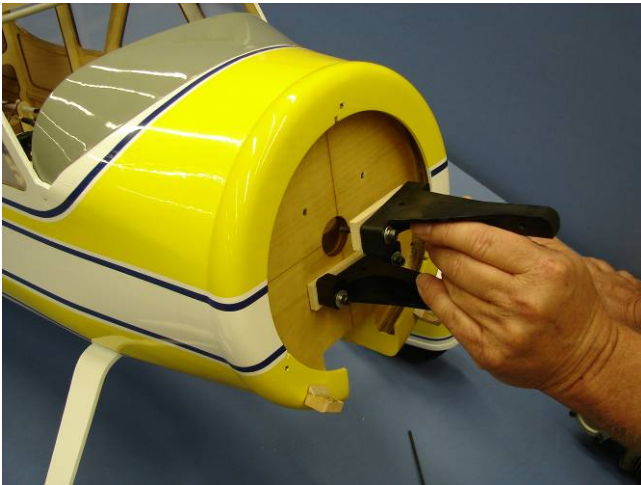
4. Use blue loctite on the mounting bolts to ensure they do not loosen from vibration.

5. Install the mount to the firewall using the dia-gram shown below. It is extremely important that the mount be mounted with the larger rein-forcing flange towards the engine.

**Motor mounts
on this side**
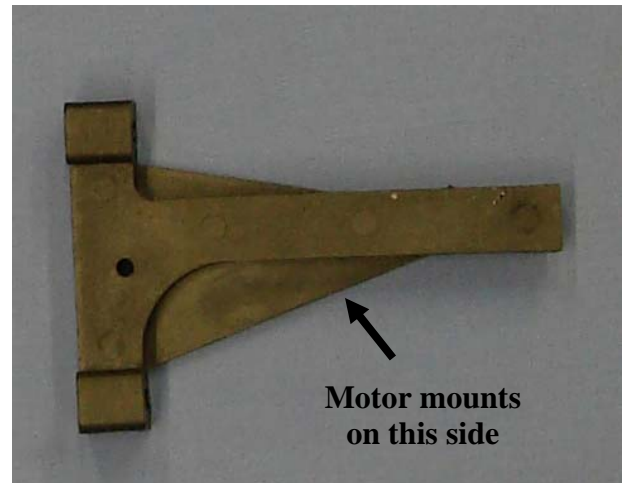
6. Set the engine in between the top and bottom mounting rails. It may be necessary to clamp the motor in place for the next few steps.

7. Adjust the motors position until the thrust washer is 6 1/2" away from the firewall.

8. Mark the position of the engine mounting holes on the engine mount. Mark the center of each engine mounting hole
with a center marking tool or beveled pencil or pen. Ensure the mark is in the center of the engine mounting hole.

> **Note:** We recommend the Great Planes Dead Center Engine Mount Hole Locator **Part #GPMR8130**

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9. Use 4 8-32 bolts, 4 flat washers, and 4 8-32 lock nuts to install the engine to the mount.

10. Mark location of the throttle pushrod guide tube onto the firewall.

> **Note:** Insure throttle pushrod is lined up with throttle arm of the carb.

> **Note:** Follow steps outlined for 4 stroke throttle pushrod assembly
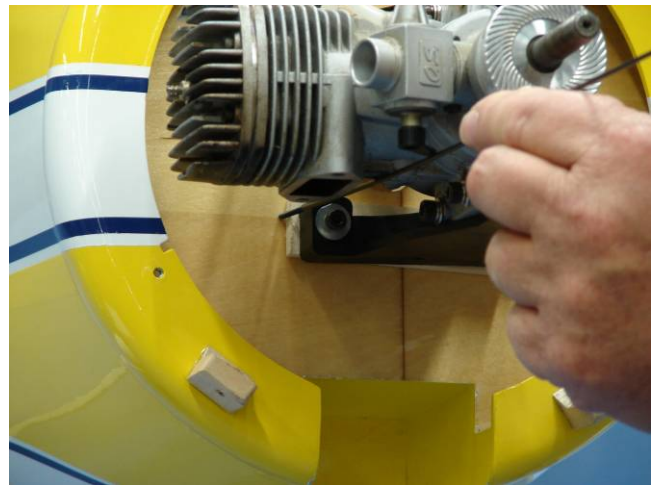
11. Install muffler onto the motor as shown. Blue loctite is recommended to prevent the bolts from loosening in flight.
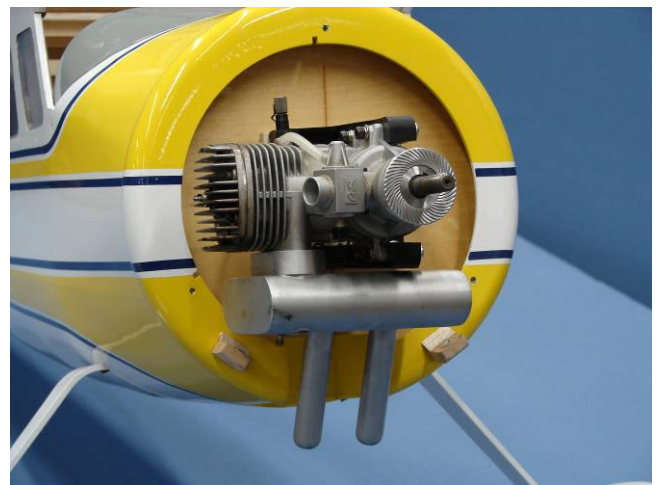
Remote Glow Plug Installation

1. Gather the remote glow plug assembly as shown below.

    Note: Remote glow plug is an optional accessory and is not included with the kit.
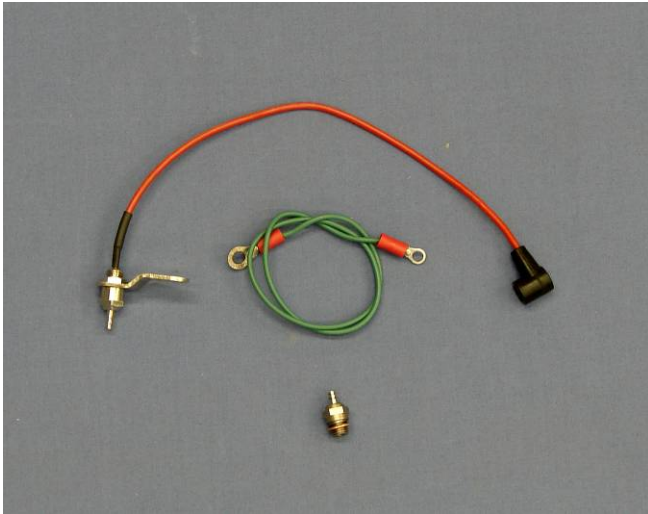
2. Install the remote glow plug assembly as shown below. Refer to remote glow plug manufacturers instructions for specific mounting techniques.

GAS ENGINE INSTALLATION

30cc Gas Engine Installation

1. The 1.80/ 30cc Cessna 195 will accept a wide range of engine types. The Satio 1.80, OS 1.60 and DLE 30 was mounted The Satio 1.80 was used for the test flights.

2. DLE 30, Ignition, Muffler, mounting bolts with hardware, 1 1/16" standoffs, Motor box, Motor box mounting hardware shown below.

Note:
Mounting distance from front of firewall to front of engine prop hub for gas engines: 6 3/4"

Note: optional wrap around muffler (not shown) available from Aeroworks
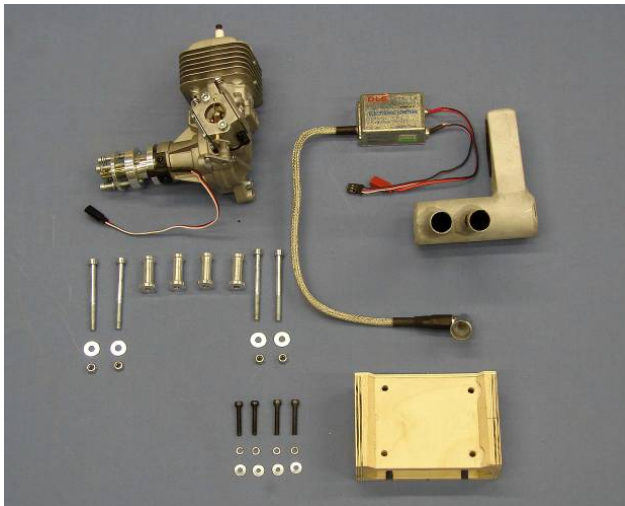
3. Locate the engine mount and remove the 3 wood screws holding the top hatch in place.
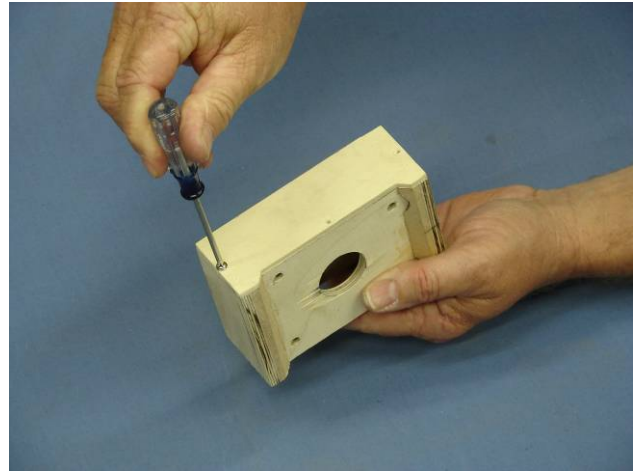
4. Install the bottom 8-32 x 20mm bolts lock washers and flat washers for the engine mount as shown. Use blue loctite to ensure the bolts will not loosen from vibration.

Note: Use only 8-32 x 20mm bolts to keep from puncturing fuel tank.
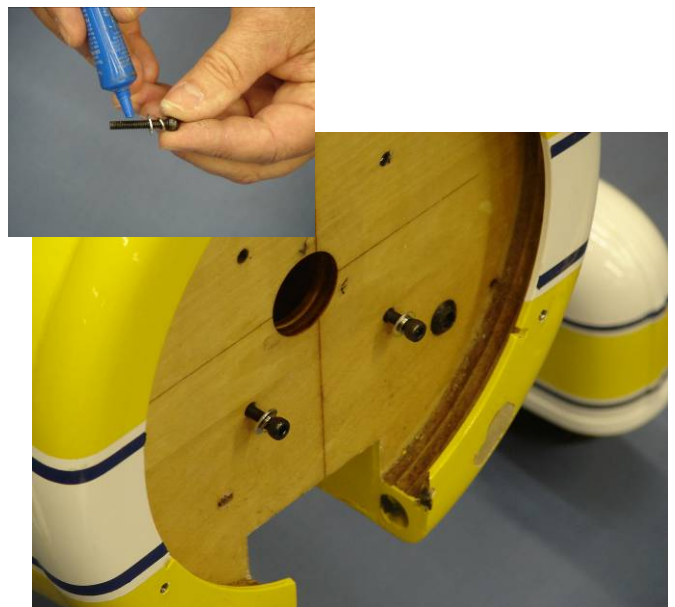
5. Mix 30 minute epoxy in mixing cup and use a stick to apply the epoxy to the back side of the engine mount as shown.

.

6. Slide engine mount over the 8-32 x 20mm bolts installed in a previous step as shown.
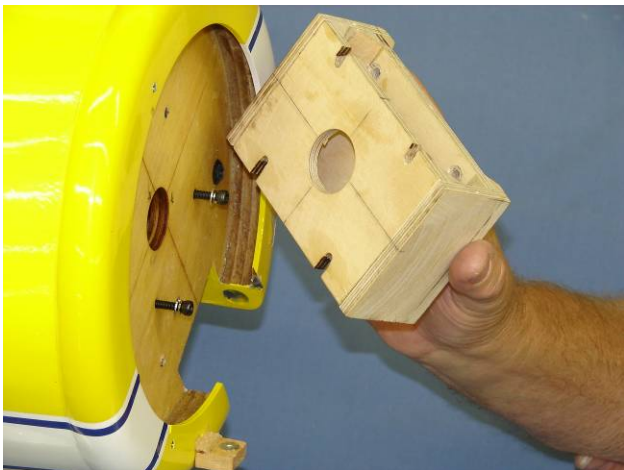
7. Tighten the engine mounting bolts as shown below. Wipe away any epoxy with alcohol wetted wipes
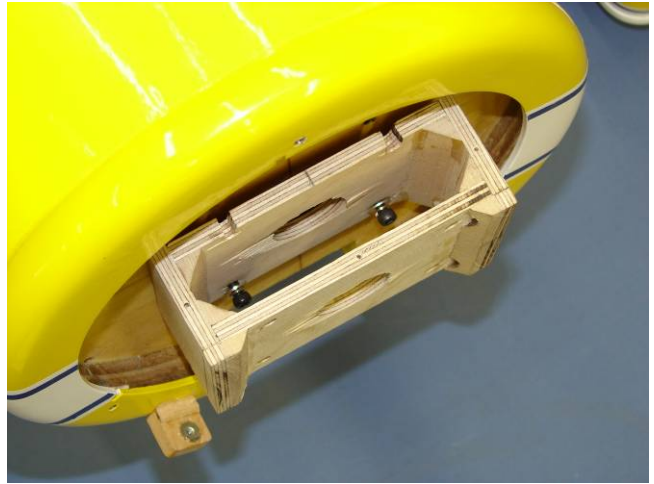
8. Install the remaining engine mount bolts with lock washers and standard washers as shown. Use blue loctite to ensure the bolts will not loosen from vibration.
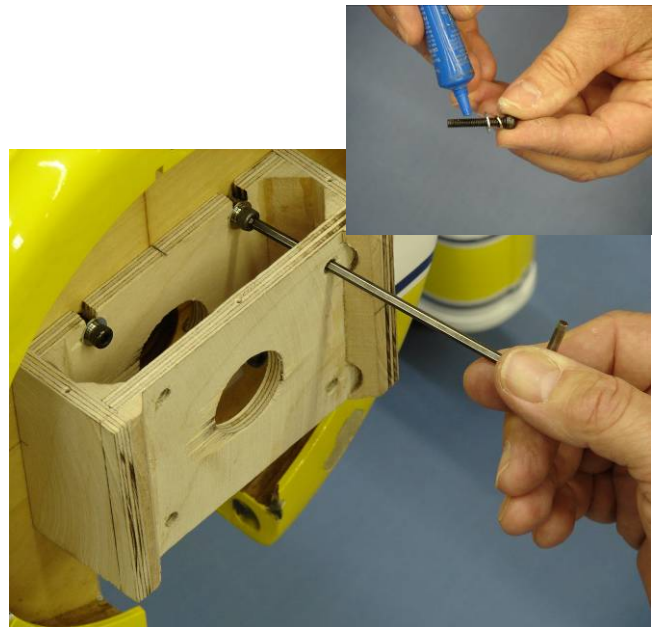
9. Finished engine mount installation shown below.

10. Locate the engine standoffs, mounting bolts, lock nuts, and washers. Slide the bolts through the engine and install standoffs as shown. Slide the engine mounting bolts through the pre drilled holes in the engine mount.
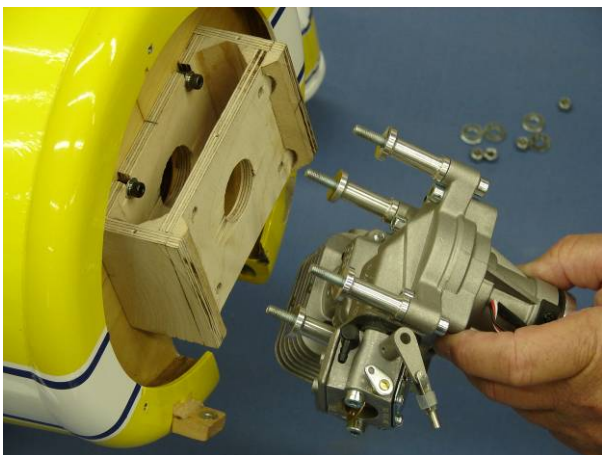
11. Install washers and lock nuts on the back side of the engine mount and tighten engine mounting bolts as shown.

Note: Do not over tighten engine mounting bolts, this can cause the wood to compress and will weaken the engine mounting box.
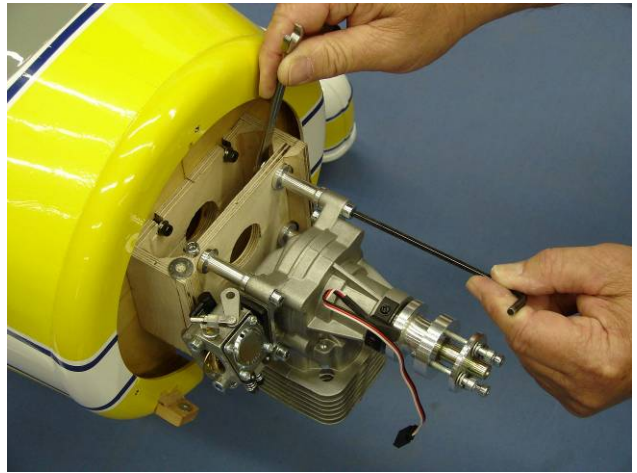
12. Distance from front of firewall to front of engine prop hub is **6 3/4"**.
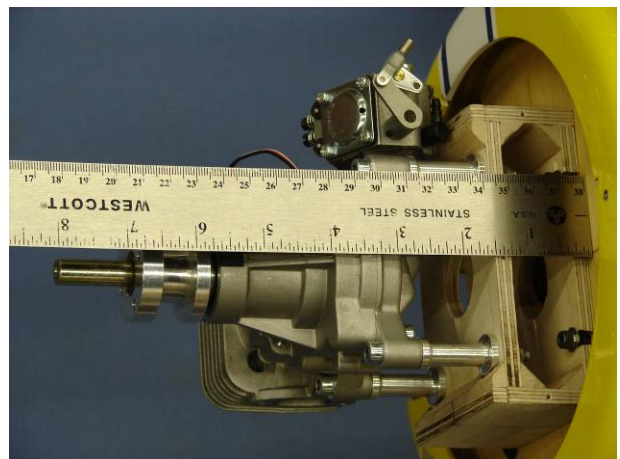
13. Final DLE 30 installation shown below.
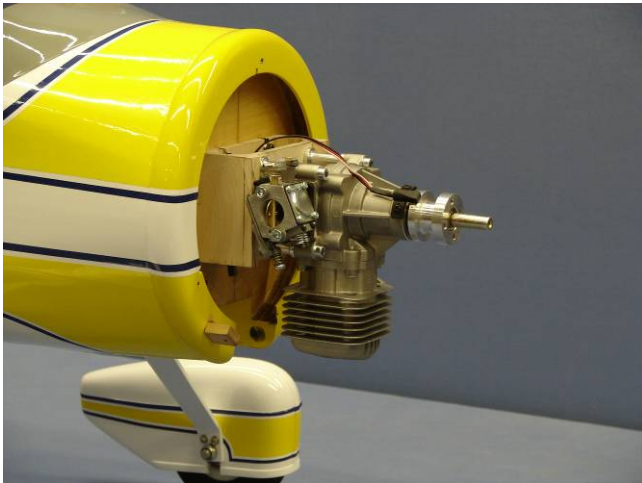
Throttle servo installation

1. Gather the throttle servo, 1" servo arm, (4) servo mounting screws, plywood pushrod guides, and Sullivan pushrod set part# S503 as shown below.

Note: throttle hardware for gas engine not supplied.
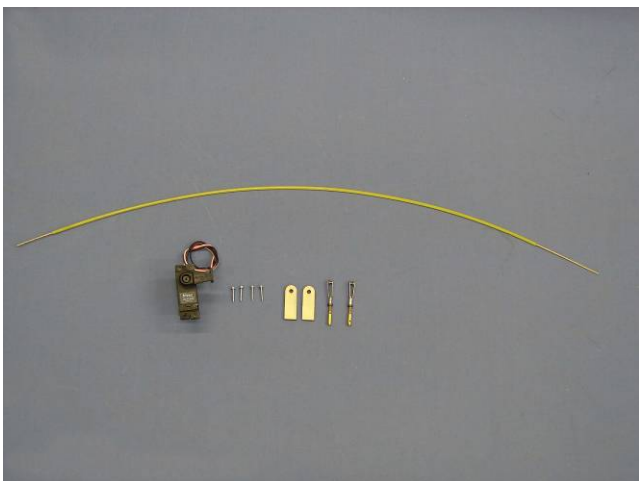
2. Mark location of the throttle pushrod guide tube onto the firewall.

> **Note:** Insure throttle pushrod is lined up with throttle arm of the carb.

3. Use a drill bit to drill the holes for the throttle pushrod guide tube
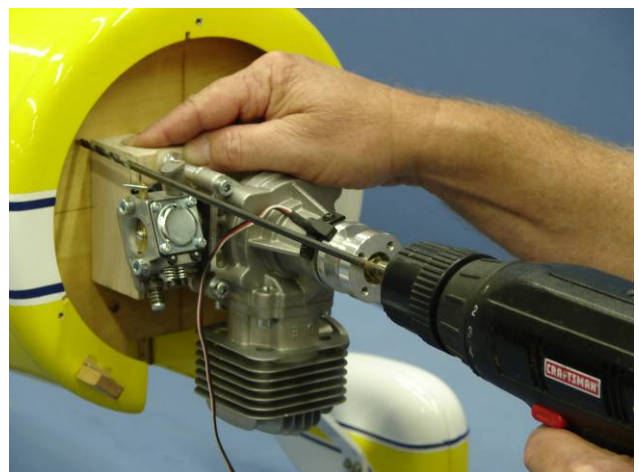
4. Slide the pushrod through the hole drilled in the previous step as shown. Ensure that the pushrod goes all the way to the throttle servo mount.
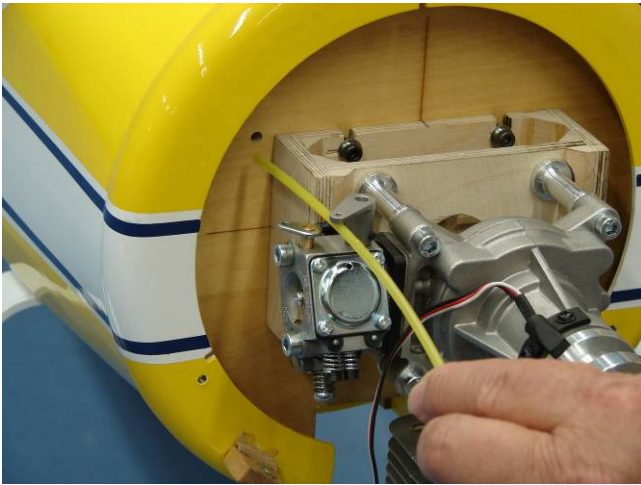
5. Install throttle servo with the output shaft facing the tail as shown. Follow steps outlined in the glow engine installation on page 48 for plywood pushrod guide installation.

6. Solder the brass coupler to the pushrod as shown below.

7. Glue the pushrod guide tube to the plywood guides as shown. Trim the guide tube flush with the rear guide.

8. Trim the pushrod guide tube flush with the fire-
    wall as shown below.

9. Slide the pushrod through the guide tube from
    inside the fuse out towards the engine. Attach
    the clevis to the servo arm as shown.

Note: Use a piece of fuel line over the clevis to pre
    vent it from coming loose in flight.

10. Install the clevis on the throttle arm of the carbu-
    retor and solder in place.

11. Throttle installation is now complete.

Fuel Tank Installation

Glow Fuel Tank Installation

1. Gather the fuel tank parts as shown below. Fuel tank, hardware, and fuel tubing.

Note: Fuel tank stopper can be used for both gas or glow fuel.
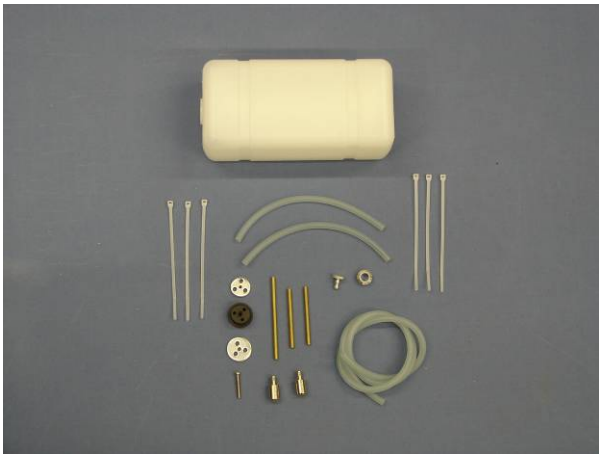
2. Assemble the stopper as shown below. Use Zip ties to secure the pick up line to the tubing as well as to the clunk.

Fill

Carb
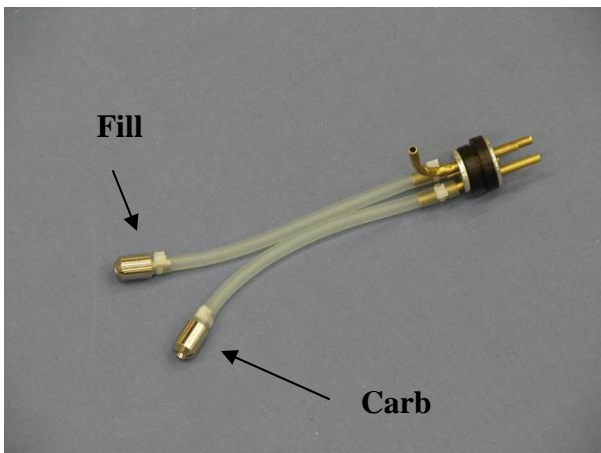
3. Assemble the fuel tank as shown below.

Note: Fuel "T" not supplied

Muffler Pressure

Fuel Dot

Overflow
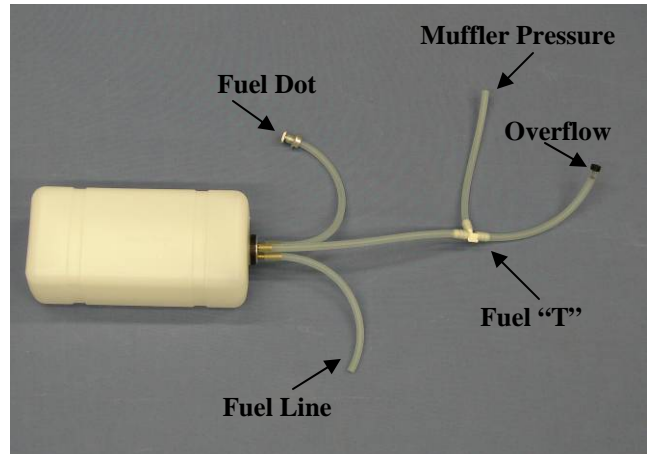
Fuel "T"

Fuel Line

4. Slide the fuel tank into the precut slots inside the fuse as shown.

5. Locate the supplied tristock and glue in place behind the fuel tank as shown. This will keep the fuel tank secure during flight.

6. Attach the fuel line to the carburetor inlet as shown below.
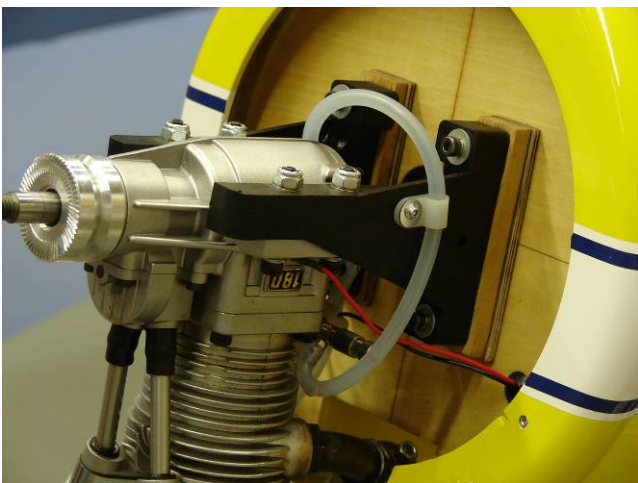
7. Attach the pressure line to the muffler.

8. Use two fuel dots to plug both the overflow and the fill line as shown below.

9. Install the two fuel dots in the lower portion of the cowl as shown.

Gas Fuel Tank Installation

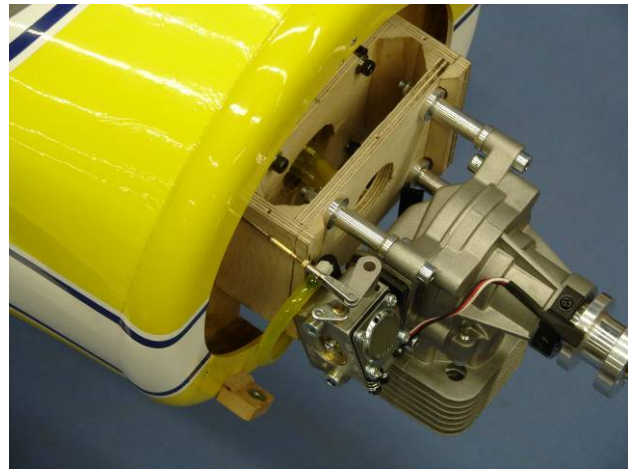1. Gather the fuel tank parts as shown below.
- Fuel tank
- Hardware
- Brass barbs
- Fuel tubing

Note: Fuel tank stopper can be used for both gas or glow fuel.

Note: Tygon fuel line is not supplied but is available through Aeroworks
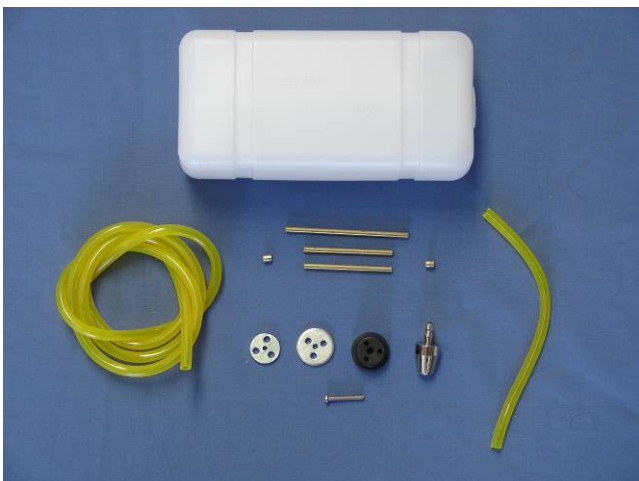
2. Locate the (2) supplied brass fuel barbs. Solder a brass fuel barb to the fuel line pick up tube. This will keep the weight of the fuel clunk from pulling the fuel line off the brass tube.

Note: No brass barbs are required for the air vent lines.

3. Assemble the fuel pick up line, rubber stopper and metal end caps. As shown below.

4. Solder a brass fuel barb to the other end of the fuel pick up line.

5. Final assembly of rubber fuel stopper with fuel pick up tube shown below.
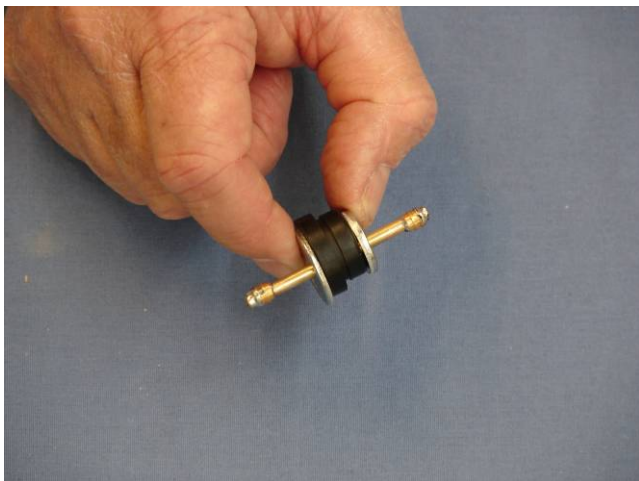
6. Install air vent tube into rubber stopper and bend upward.

   Note: No brass barbs are required for the air vent tube.
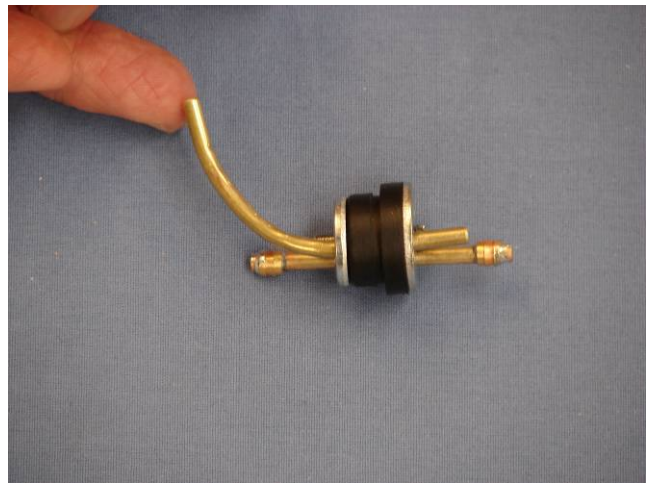
7. Install the fuel tubing and clunk. Secure the fuel tubing with nylon ties to the pick-up tube and clunk.

8. Insert the rubber stopper assembly into the tank with the vent tube at the top of the tank.
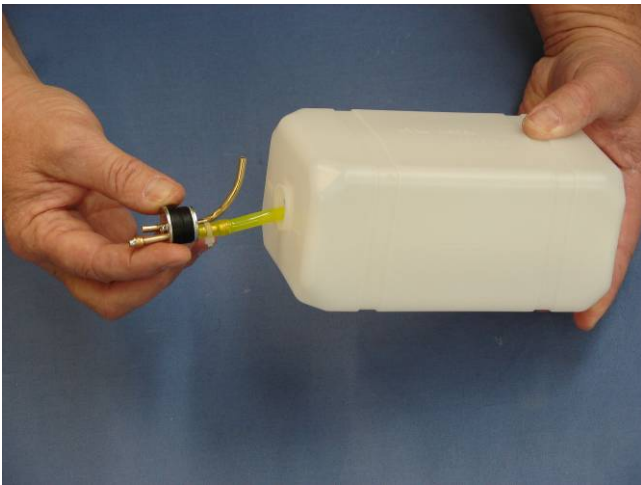
9. Secure the rubber stopper with set screw. Take care not to strip threads by over tightening set screw.
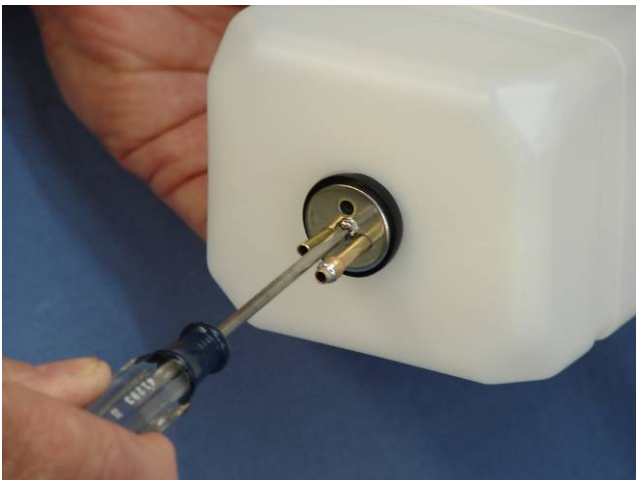
1. Gather the fuel tank parts as shown below. Fuel tank, fuel tubing,, fuel "T", fuel filler dot, and nylon ties.

Note: The fuel "T", is not supplied, but is available through Aeroworks.
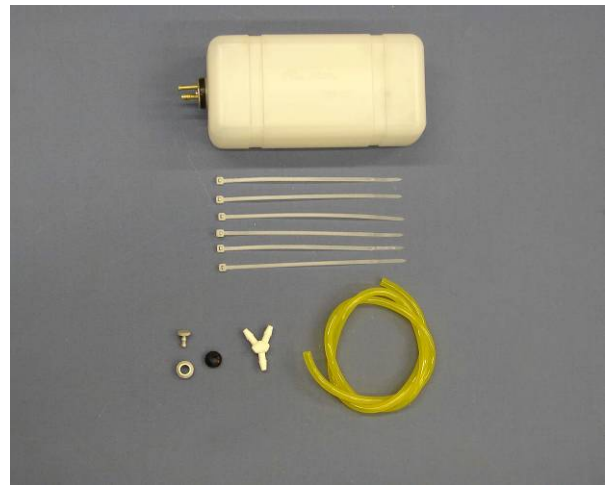
2. Install the fuel filter, fuel pick up and fuel filler lines to the fuel tank.

Carb

T

Fill Line

Overflow
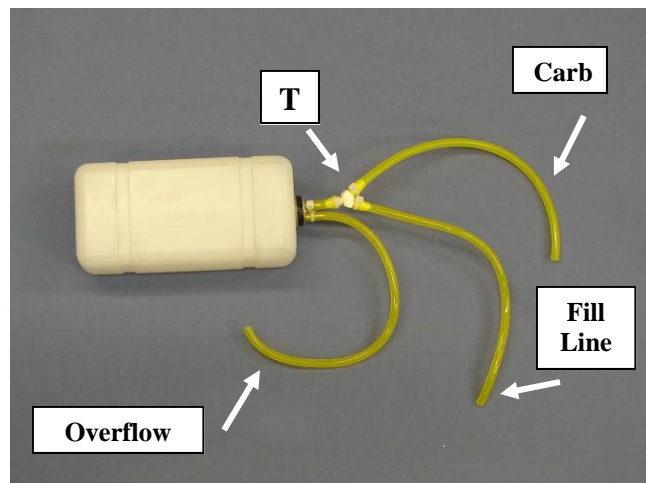
3. Slide the fuel tank into the precut slots inside the fuse as shown.

4. Locate the supplied tristock and glue in place behind the fuel tank as shown. This will keep the fuel tank secure during flight.

5. Secure fuel pick up line to engine carburetor with small nylon tie.

IGNITION INSTALLATION

1. Gather the ignition module, battery, switch, switch mount, external switch pushrod assembly (not supplied) Dubro Part # 203. and installation parts as shown below.
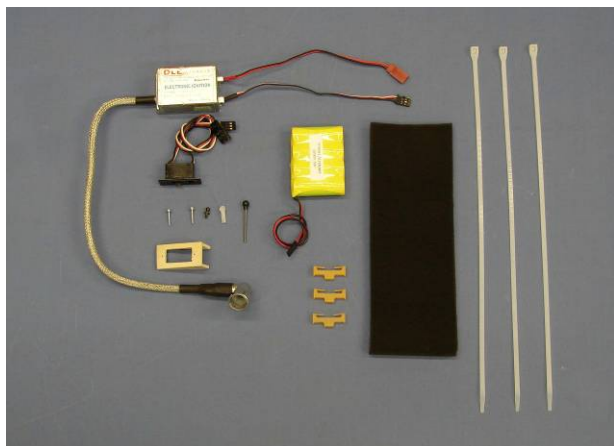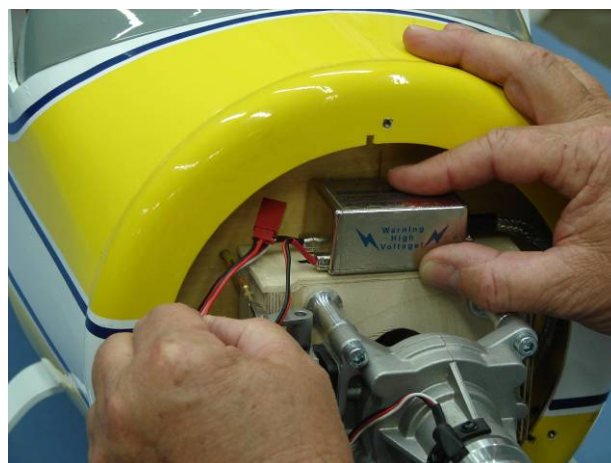

2. Place engine mount top hatch back on top of engine mount.
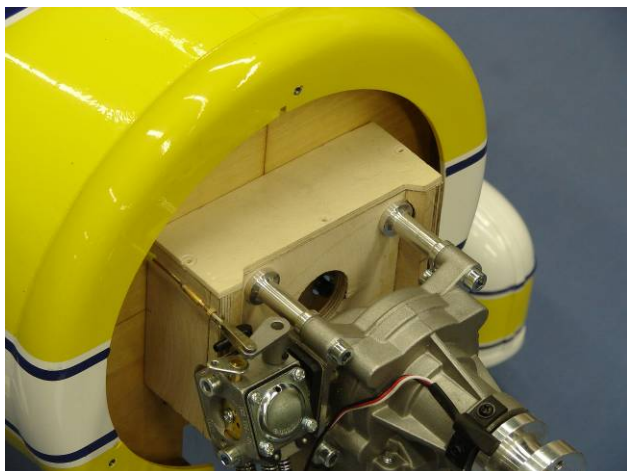
3. Mark location for zip tie to pass through the hatch as shown.

4. Mark location for ignition power lead to pass through the firewall as shown below.
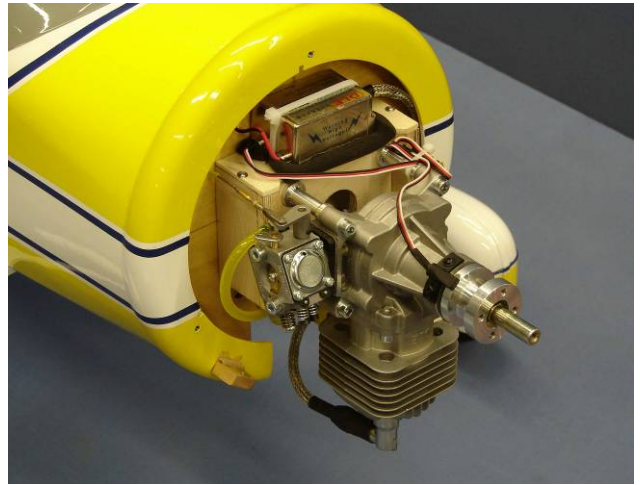
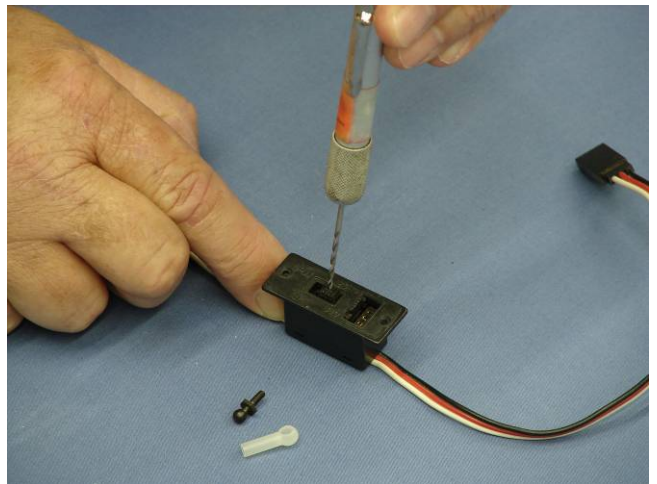5. Drill the top hatch and ignition power lead holes marked in the previous steps as shown below.
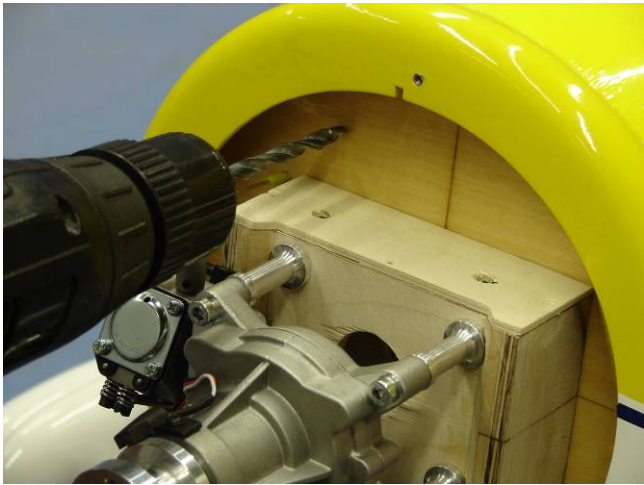
6. Mount the engine ignition module using nylon tie and foam rubber as shown.
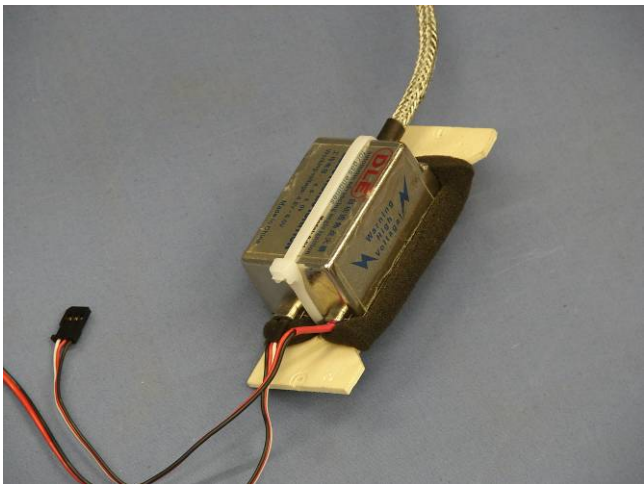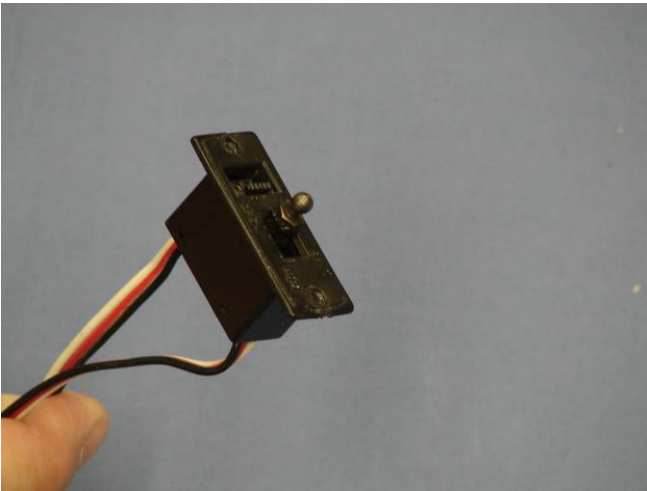

7. Secure ignition wire with nylon ties as necessary. Finished ignition installation shown below.
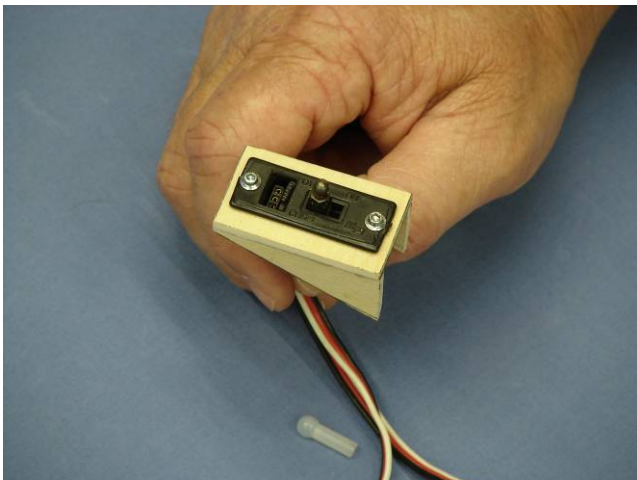

8. If using the external switch pushrod assembly drill a small hole in the switch as shown below.
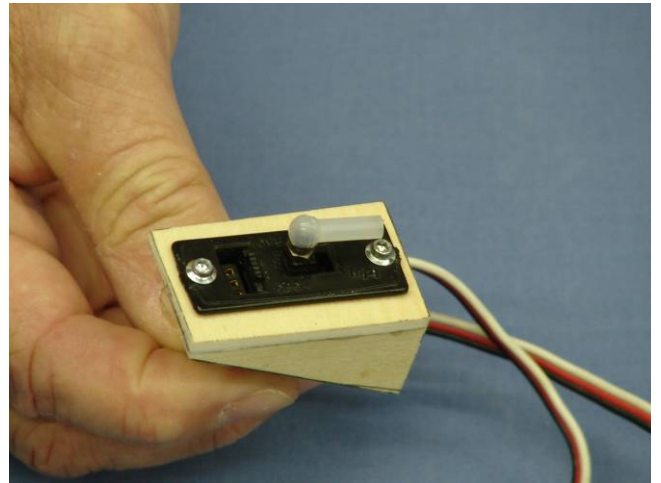
9. Install the ball joint onto the switch as shown.

10. Install the switch into the switch mount as shown.

11. Install ball link coupler onto the ball joint as shown.

12. Mark the location for the switch pushrod to pass through the fuse. The final position is left to the builder.

13. Drill through the fuse as shown below.

14. Use thick CA to glue a brass servo eyelet into the hole drilled in the previous step. This will prevent the wood from breaking over time.

15. Finished eyelet installation shown below. The flanged portion of the eyelet should be towards the outside of the fuse.

16. Install the switch pushrod with mounting ball as shown below.

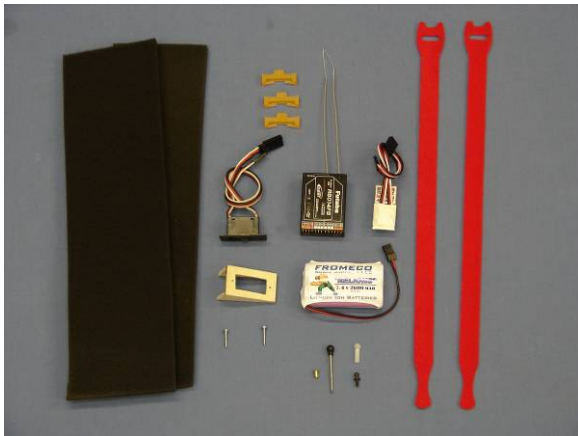17. Use thick CA to glue the switch mounting box in place as shown.

18. Mount the ignition battery using foam pad and zip ties as shown below. Ignition installation is now complete.
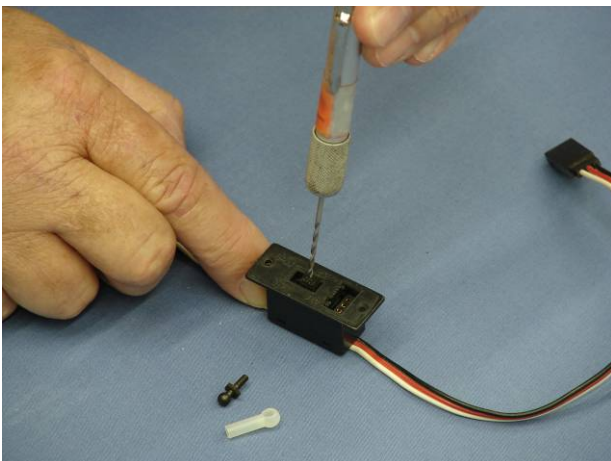
RADIO INSTALLATION

1. Gather the radio components as shown below. Battery, Switch, Regulator if used, receiver, switch mount, foam rubber and Velcro one wrap straps.
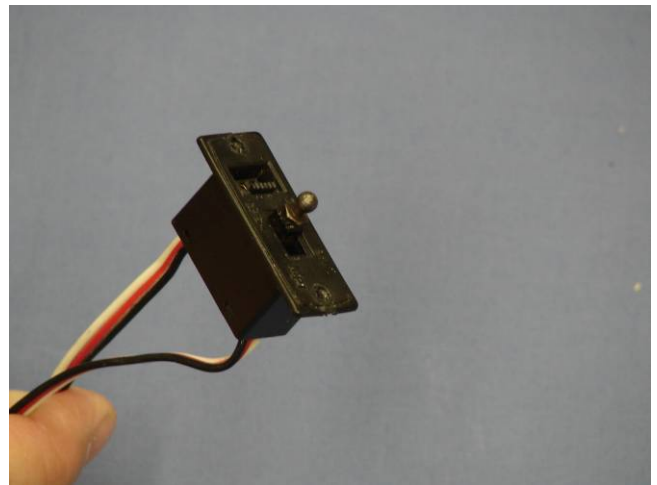

2. Mount radio switch in accordance with the switch manufacturers instructions and hardware.
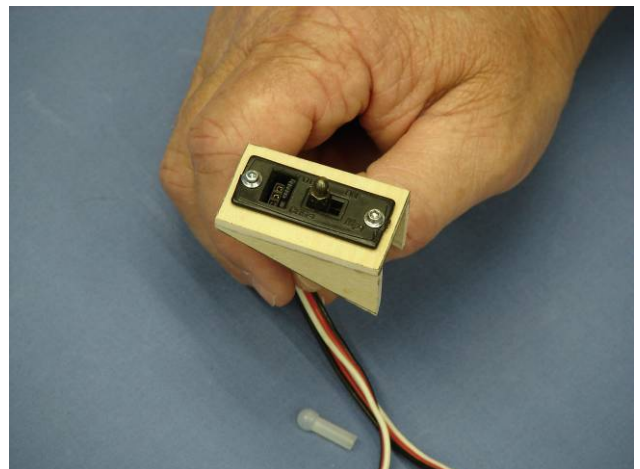
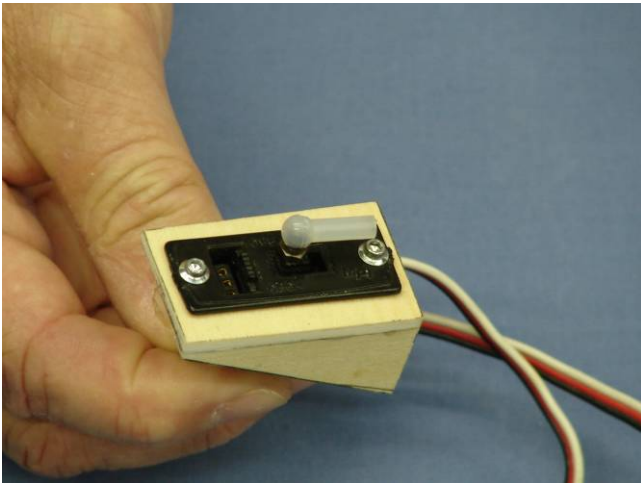**Note:** Ensure switch does not interfere with wings or cowl installation.

3. Install the ball joint onto the switch as shown.

4. Install the switch into the switch mount as shown.

5. Install ball link coupler onto the ball joint as shown.

6. Mark the location for the switch pushrod to pass through the fuse. The final position is left to the builder.

7. Drill through the fuse as shown below.

8. Use thick CA to glue a brass servo eyelet into the hole drilled in the previous step. This will prevent the wood from breaking over time.

9. Finished eyelet installation shown below. The flanged portion of the eyelet should be towards the outside of the fuse.

10. Install the switch pushrod with mounting ball as shown below.

11. Use thick CA to glue the switch mounting box in place as shown.


12. If using the external lighting switch install it in the same manner as described in the previous steps for the receiver switch.

13. Temporarily place the cockpit back inside the fuse and mark the location of the rear cockpit floor onto the fuse floor as shown. This will allow the builder to locate as much of the electronics under the cockpit for a better scale look.

14. Gather the battery mounting tray and (4) wood screws as shown below.
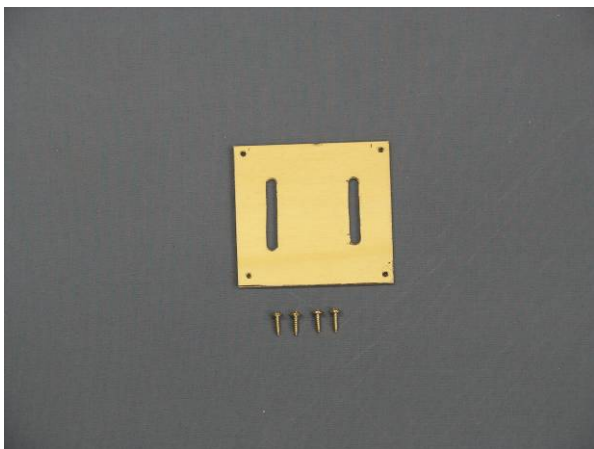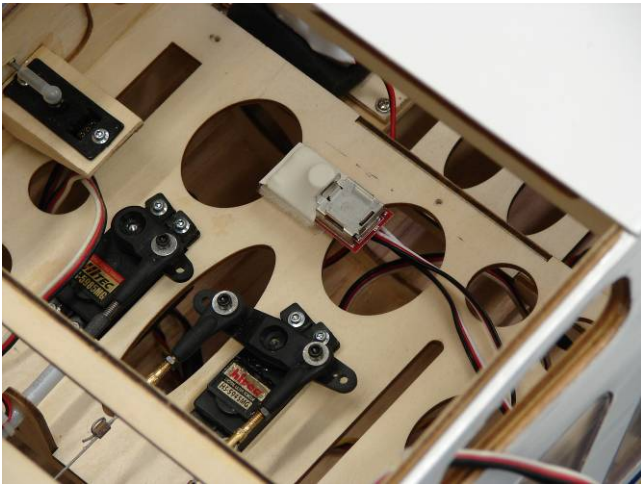

15. Install battery to battery tray using foam padding and Velcro one wrap strap.
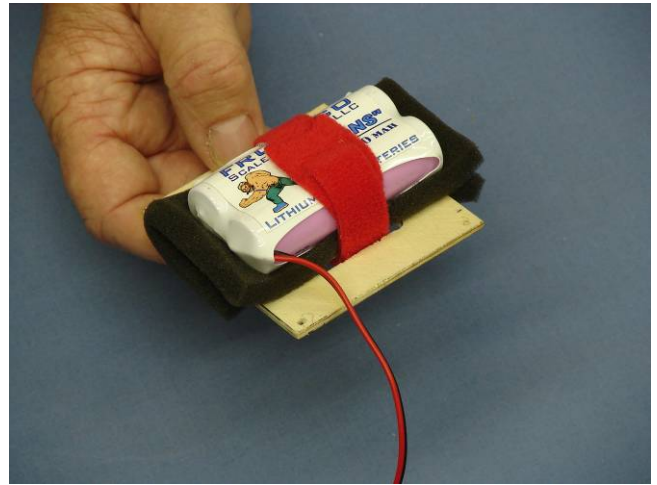
16. Screw the battery mounting tray to the fuse floor as shown.

17. If a regulator is used install it at this time. Refer to the regulator manufacturers instructions for specific regulator mounting.


18. Install the receiver using foam pad and Velcro one wrap strap. Refer to receiver manufacturers instructions for specific antenna orientation.
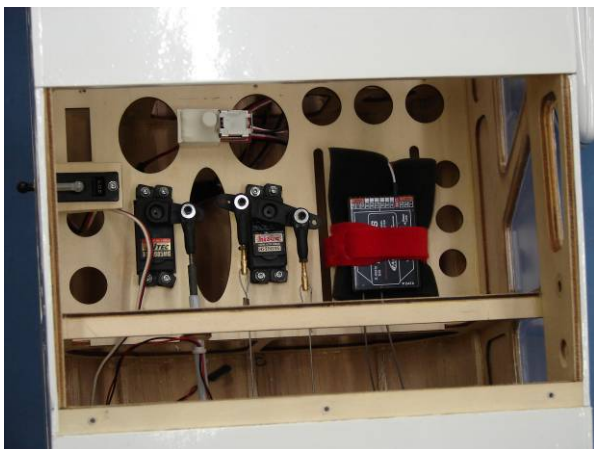

Lighting Kit Installation

1. Gather the following items for the optional lighting system. Wiring harness (supplied), switch, 4.8V battery, (2) 18" extensions, (2) 24" extensions, switch mount, Velcro strap, zip ties, foam padding, (6) Aeroworks Safety Clips as shown below.
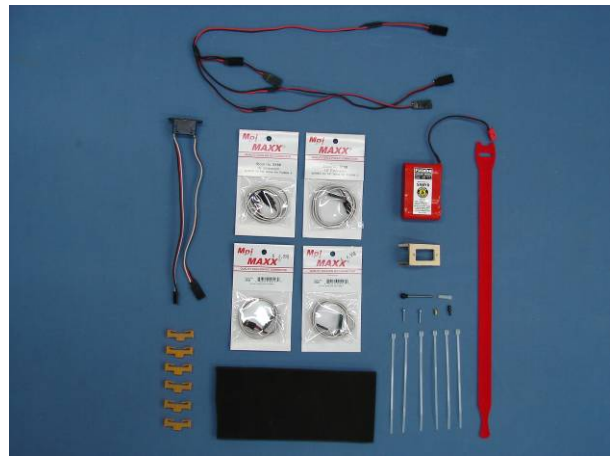

2. Both the included (top) as well as the optional remote (bottom) wiring harnesses are shown below. The remote harness will enable the pilot to turn the lights on and off via the transmitter. This harness is available from Aeroworks separately.
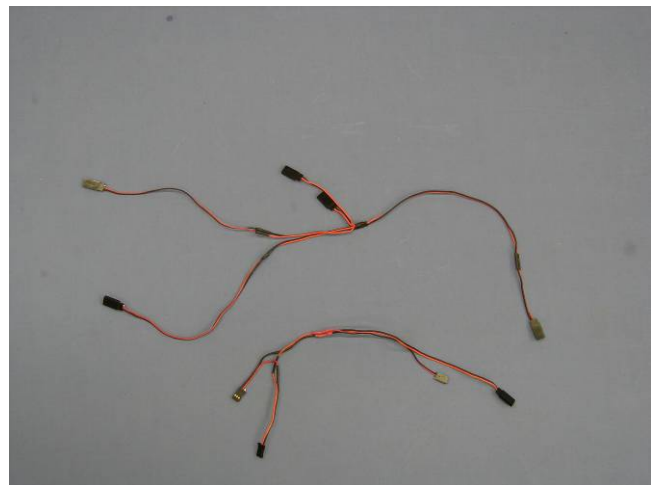
3. The manual switch lighting layout is shown be-
    low. This setup will be used for an external
    lighting switch.
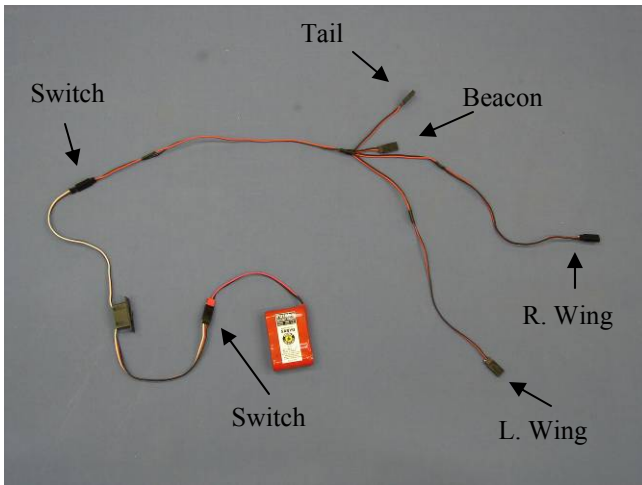
4. The electronic switch setup is shown below. Fol-
    low the same wiring diagram as shown in the
   above step using an electronic switch as shown.
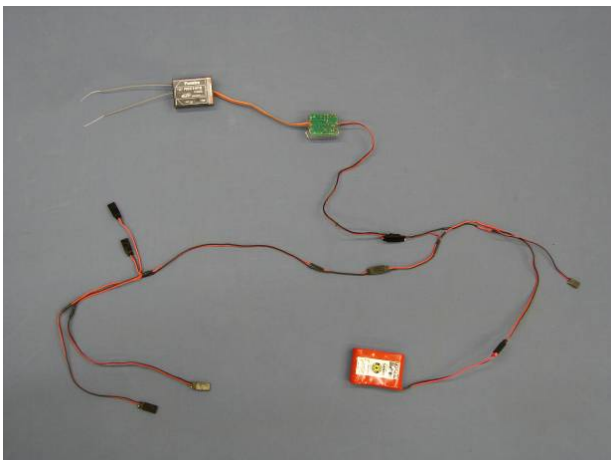
5. The rear bulkhead of the fuse has 3 small holes
    laser cut on both sides of the fuse. These 3 holes
    are to allow the zip ties to pass through and hold
    the aileron, flap, and wing tip light extensions
    for a clean installation.

6. Slide a zip tie through each of the 3 precut holes
    as shown below.

7. Gather the aileron, flap, and wing tip nav light extensions as shown.
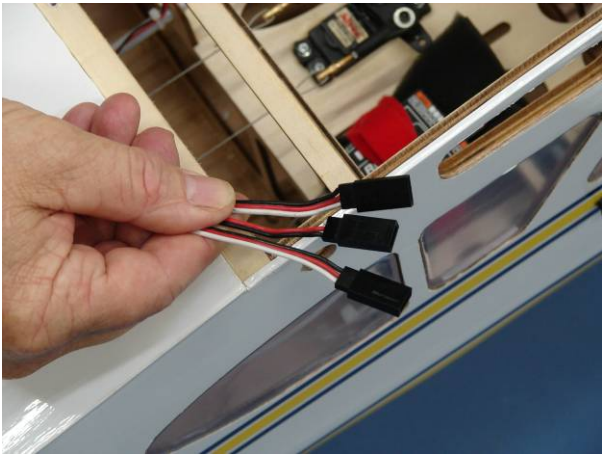
8. Place extensions on the bulkhead and tighten zip ties. Allow approximately 2 1/2 inches of the extensions to protrude over the top of the bulkhead and out the side of the fuse as shown.
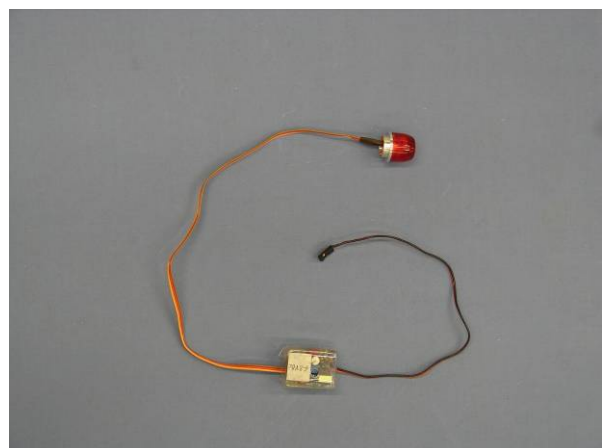

9. Follow the same steps for the remaining side of the fuse. Finished radio installation shown below.
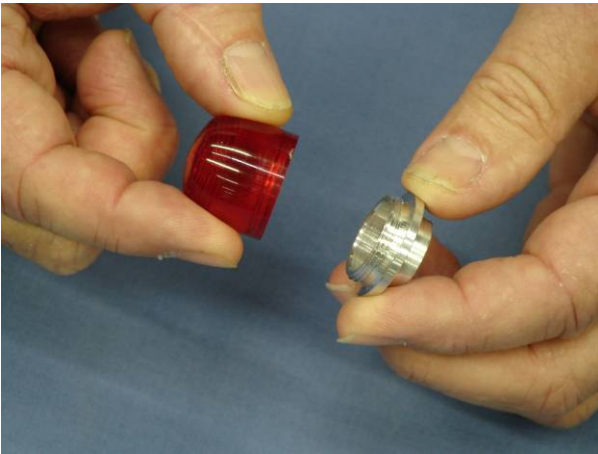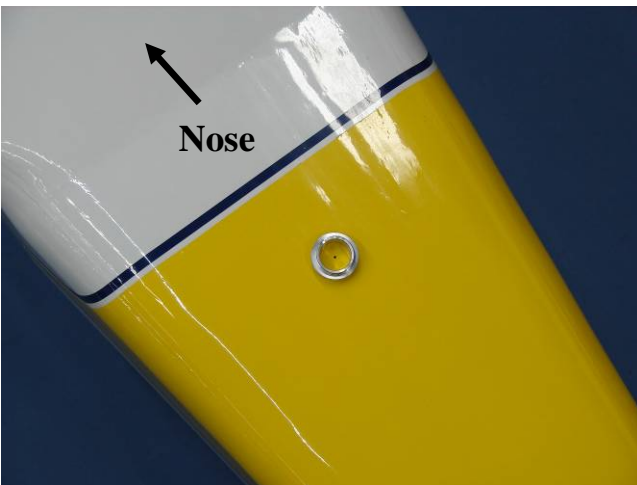

Optional Beacon Kit Installation

1. Gather the optional Beacon kit shown below. This kit can be purchased separately from Aeroworks.

2. Remove the lens from the top of the beacon as shown below.

3. Place the beacon lens mount on the center of the fuse behind the wing, and mark its location with a felt tip pen as shown below.

Nose

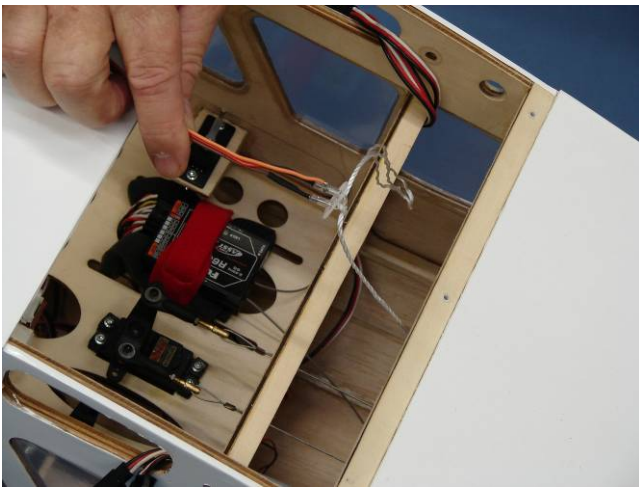4. Use a hobby knife to remove the covering and wood for the beacon.

5. Use thick CA to glue the beacon lens mount to the fuse as shown below.

6. Pass a string through the beacon mount hole into the radio compartment as shown below.

7. Tie the beacon light and wiring to the string as shown below.

8. Pull the beacon light and wiring through the fuse and out the beacon mount hole as shown below.
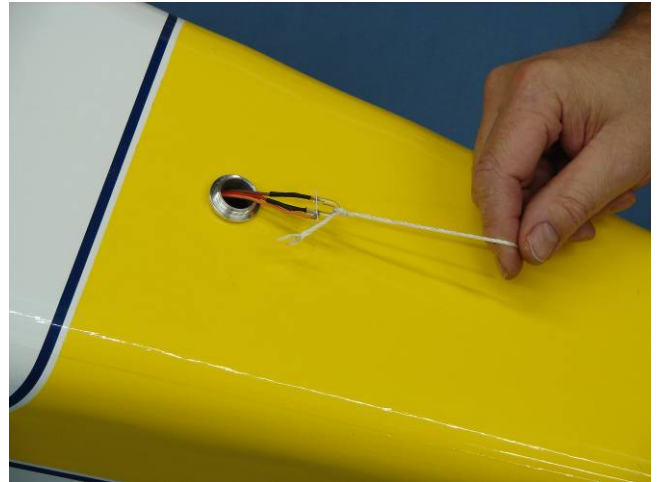
9. Remove the string and install the beacon light lens cover onto the light and then onto the beacon lens mount.

10. Use Velcro or double sided tape to hold the beacon control box in place.

11. Place the beacon control box at the bottom of the fuse as shown.

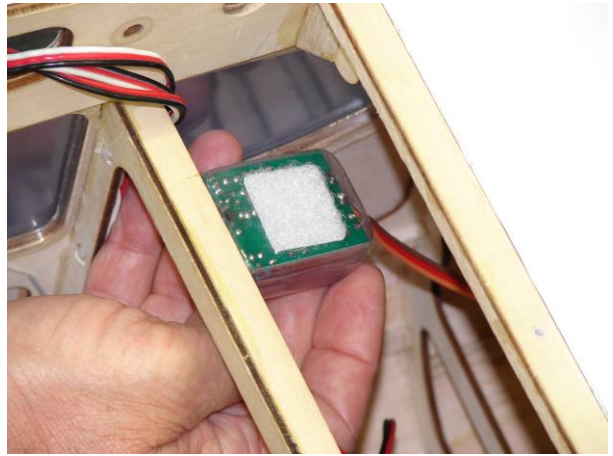# Cockpit Assembly/Installation

1. Locate the included cockpit kit as shown below.
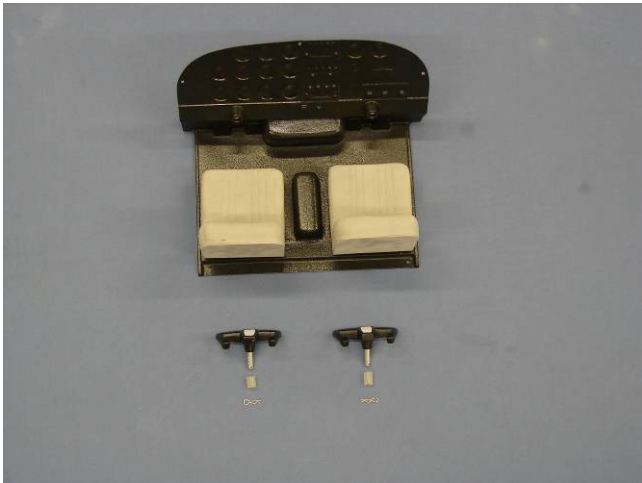
2. Gather the following items for the cockpit assembly, (2) Control yokes, (2) Control yoke spacers, and (2) cotter pins as shown below.

3. Slide the control yoke through the predrilled hole in the dash, slide the spacer onto the mounting rod and attach the cotter pin as shown.

4. Finished cockpit assembly shown below.
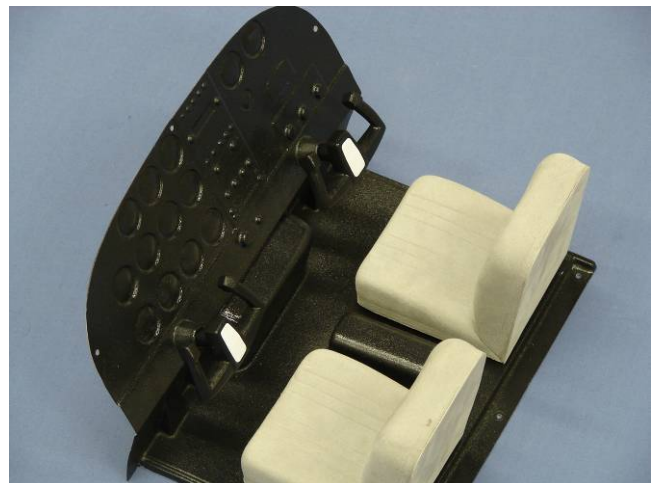
5. Slide the cockpit back into the fuse as shown below.

Note: Be careful not to scratch the felt lining on the inside of the fuse.

6. Screw the cockpit assembly into place using the screws removed during the beginning of assembly.

7. Reinstall the canopy using the provided mounting screws.

COWL INSTALLATION

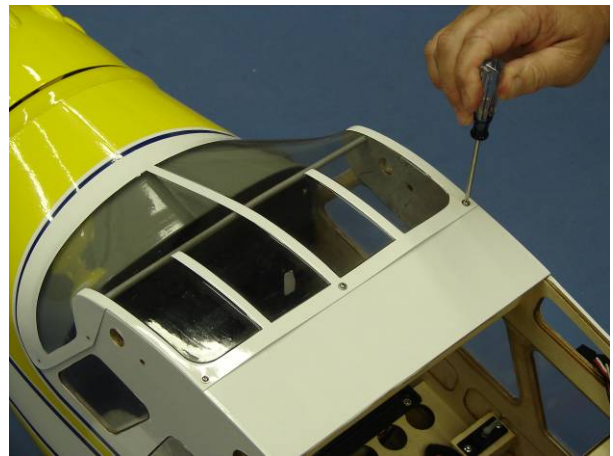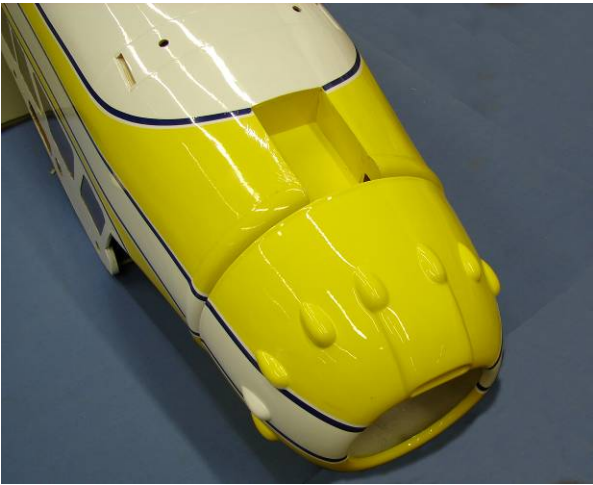1. Cowl installed on fuse as shown below. There are two mounting options which will depend on engine selection. These two options will be outlined in the following steps.

2. The top mounting hole will be used regardless of engine selection.

3. The bottom mounts for the cowling have two mounting locations. The airplane comes setup for a blind style mounting for bolts to pass through the cowl ring. If these bolts are blocked by the engine external mounts will be used. The mounting block and blind nuts have been installed and all that is required is to drill holes in the cowl for the mounting bolts. This decision will be based on the engine selection.

4. Gather the materials as shown below. Template material, hobby knife, ruler, tape, marker and pencil.
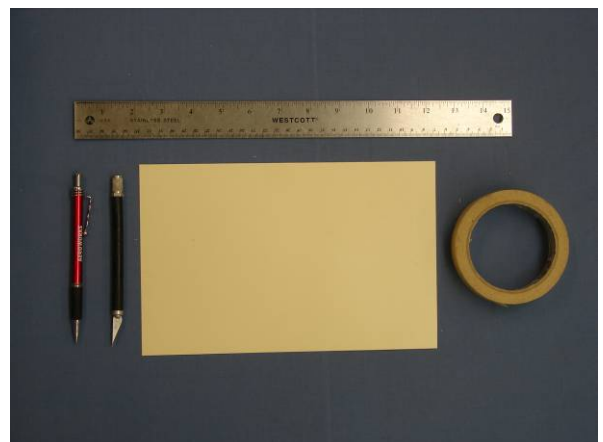
2 Stroke Cowl Installation

5. Tape the provided template material to the bottom of the fuse as shown below.
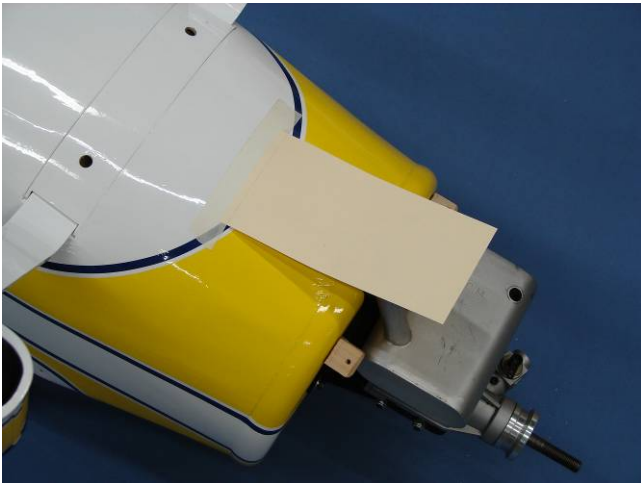
6. Trace around the muffler being careful to keep the template in the same location.

7. Remove the template and use a hobby knife to cut out the muffler exit opening as shown.

8. Check the fit of the template at this time. It may be necessary to make small adjustments to the cutout to get it to fit properly.

9. Trace around the template as shown below. It may be necessary to increase the size of the cutout to aid in cowl installation.
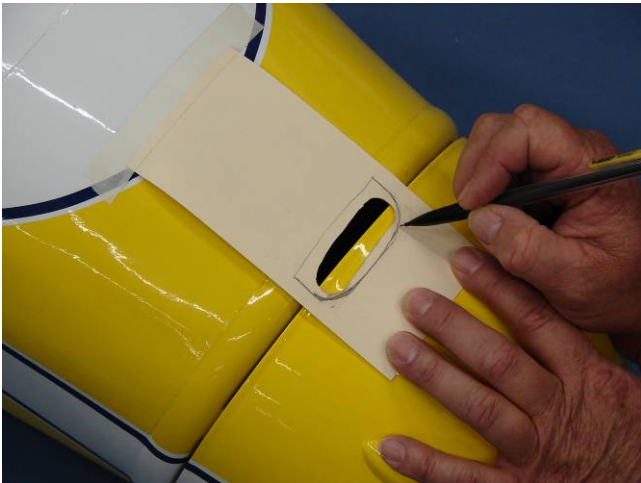
10. Align template with bottom of cowl. Use a felt tip marker to transfer the template cutout pattern to the cowl and mark cut location.
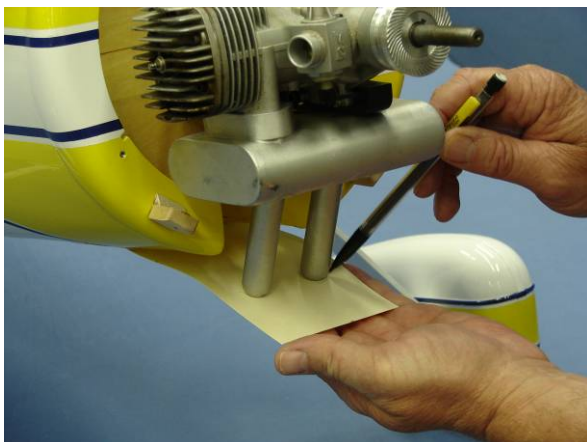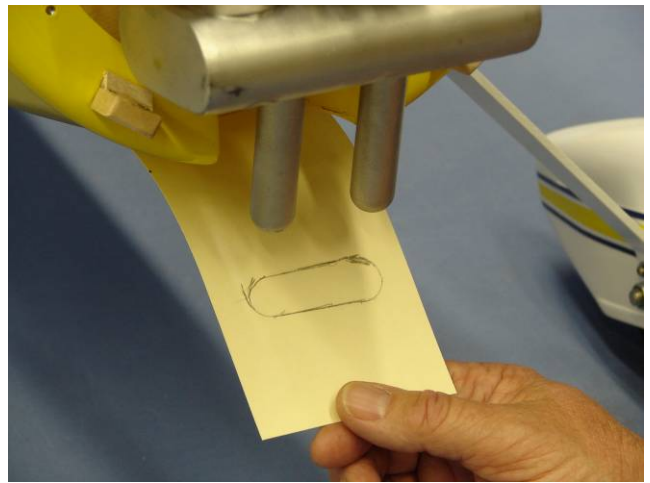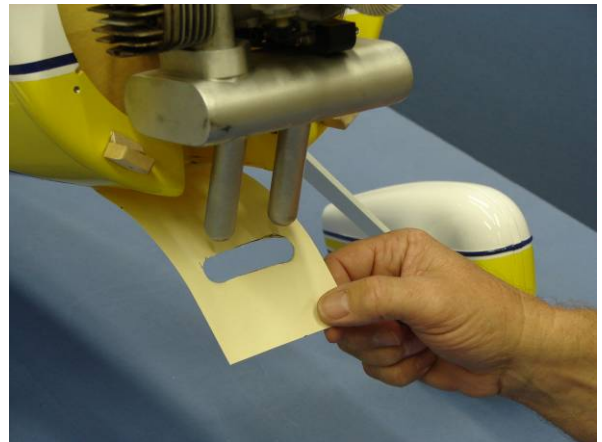
Note: Pay close attention to the marker you choose. Some permanent markers may not be easily removed. Also, When using rubbing alcohols or other paint removers, always test on painted parts before using!

11. Mark the location of the inner cowl ring as shown. This portion of the cowl ring will be removed. The removal of the cowl ring will not weaken the cowl or its mounting areas.

12. Cut a strip of the template long enough to reach the glow plug on the engine. Tape this strip to the side of the fuse and mark the location of the plug (if not using a remote glow plug). Also use this method to locate the needle valve adjustment screw.

13. Bolt the cowl in place and slide the template over it. Use a pen to transfer the location of the cutout onto the cowl.
14. Cutout the marked area just like the previous steps.

4 Stroke Cowl Installation

1. Tape the provided template material to the bottom of the fuse as shown below. Cut out access hole to fit muffler.
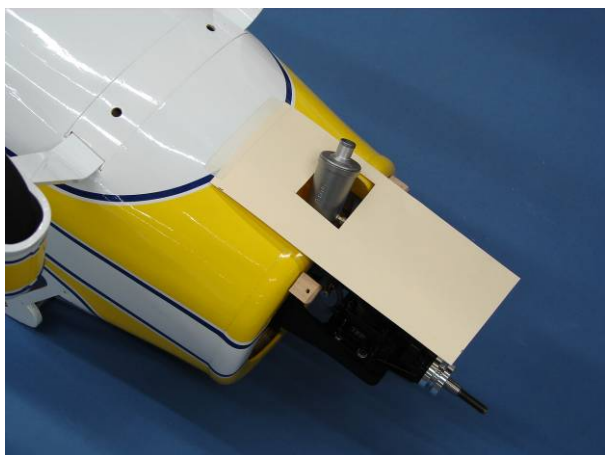
2. Trace around the valve covers being careful to keep the template in the same location.


3. Remove the template and use a hobby knife to cut out the valve cover exit opening as shown.
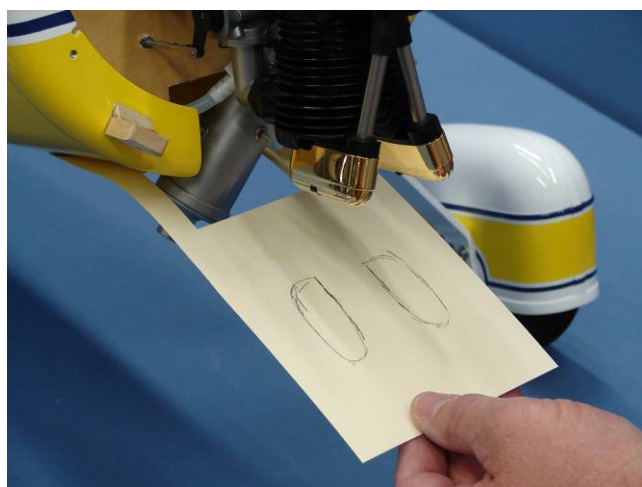
4. Check the fit of the template at this time. It may be necessary to make small adjustments to the cutout to get it to fit properly.
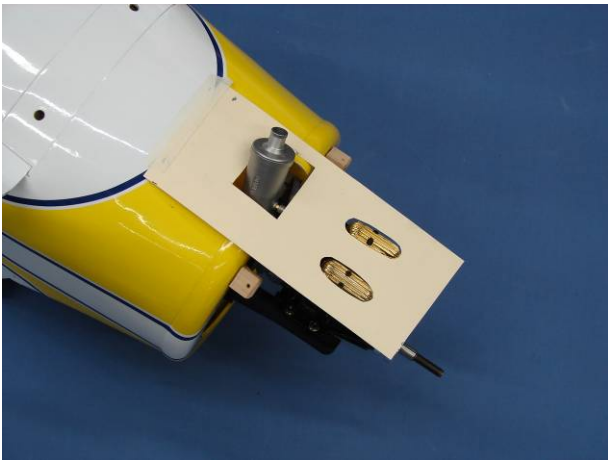
5. Align template with bottom of cowl. Use a felt tip marker to transfer the template cutout pattern to the cowl and mark cut location.

Note: Pay close attention to the marker you choose. Some permanent markers may not be easily removed. Also, When using rubbing alcohols or other paint removers, always test on painted parts before using!

6. Cut a strip of the template long enough to reach the needle valve on the engine. Tape this strip to the side of the fuse and mark the location of the needle valve. Also use this method to locate glow plug.
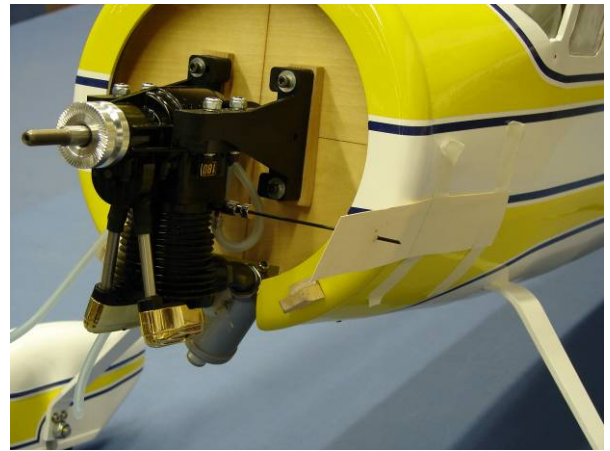

7. Bolt the cowl in place and slide the template over it. Use a pen to transfer the location of the cutout onto the cowl.
8. Cutout the marked area just like the previous steps.

9. Finished cowl installation shown below.

Gas Cowl Installation

1. Use the steps included for the 2 and 4 stroke cowl cutting directions to cut the cowl for the Gas engine installation.
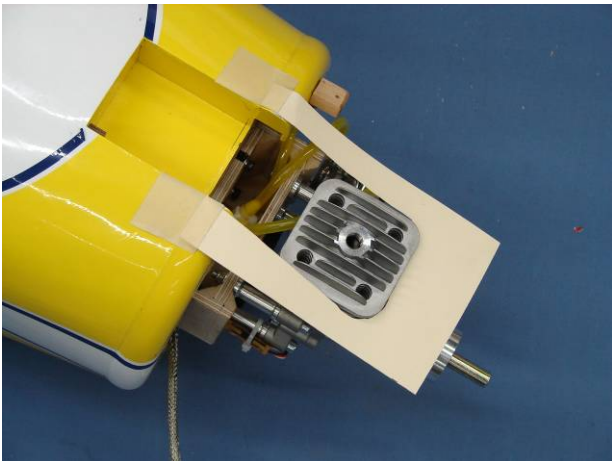
PRE-FLIGHT PREPARATION

1. Gather (2) 8-32 wing mounting bolts, (2) #8 rubber backed washers and (2) hairpins for preparation of mounting the wings.

2. Slide the wing tube in the fuse wing tube sleeve. Slide the wings on the wing tube and plug in the aileron, flap, and light servo connectors. Slide the rubber backed washers on the wing mounting bolts and insert bolts through the fuse side and into the wing root blind nuts. Tighten snugly but do not over tighten and crack the fuse or wing root wood.

3. Secure the aileron, flap, and lighting connectors with Aeroworks Safety Clip. Ensure the connectors will not come apart from vibration or light tension.

4. Install hairpins into rear aluminum anti-rotation wing dowels to provide additional security.
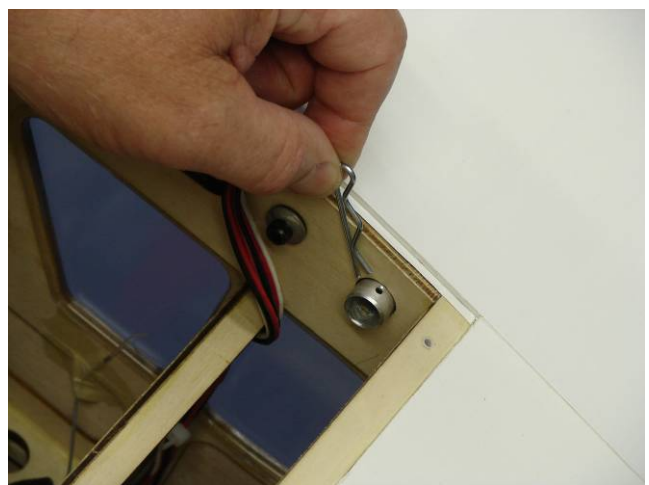
5. Install the top hatch using the 3 supplied mounting screws as shown below.
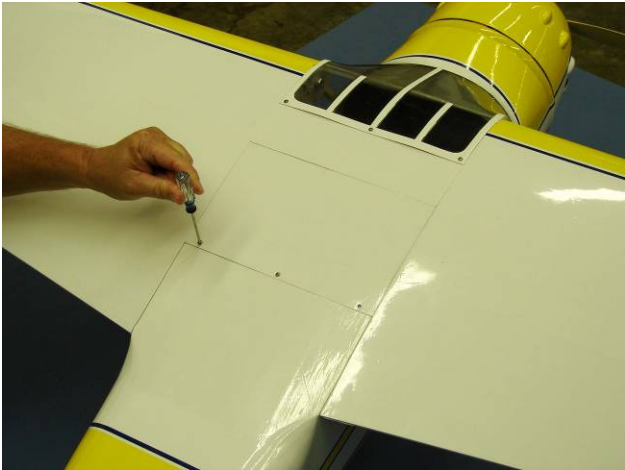
6. Locate the predrilled pitot tube hole in the left wing as shown below,

7. Screw the pitot tube in place, it is recommended that the pitot tube be removed for transport to protect it from damage.
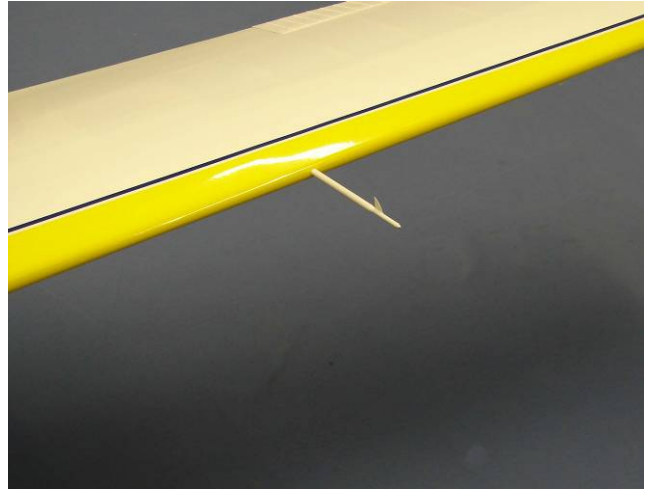
Center Of Gravity– CG Buddy
5 5/8" Back From The Wing Leading Edge
Measured From the Root End of the Wing

1. Aeroworks has included the new CG Buddy with the Cessna 195. This handy tool will allow the builder to balance the airplane without the need for an assistant.

2. Gather the CG buddy as shown below:

3. Slide wings away from fuse and install the CG Buddy on the wing tube and front rotation dowel as shown. The cable attachment should be on the top side of the wing. Make sure the CG Buddy is securely latched to the wing tube and dowel before moving further.

4. Slide wing back against the fuse as shown below.

5. Install CG Buddy on the opposite wing using the same methods described above.

6. Attach loop to cable attachment as shown below.

7. Insure both wings are pushed firmly against fuse.
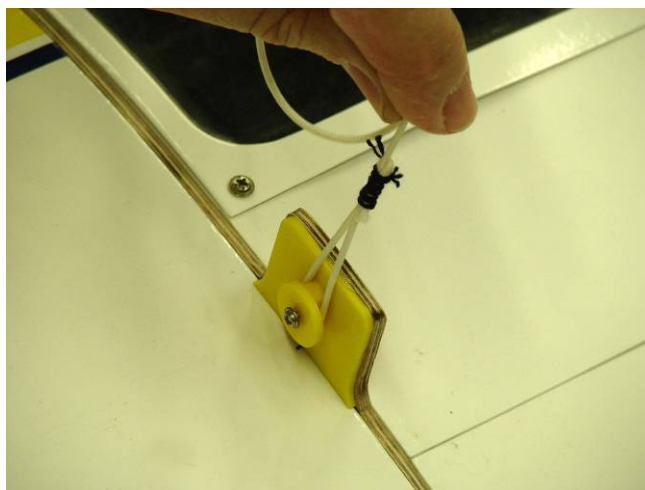
8. Lift airplane from center handle as shown, plane should sit level when lifted. Balance the Cessna 195 without fuel in the tank with the batteries installed and **READY TO FLY**. Try to balance the model by moving the batteries and receiver before adding any ballast.

IMPORTANT

The CG Buddy **is not** adjustable and is set to balance the airplane at the recommended CG of 5 5/8" back from the leading edge at the wing root this is just a starting point and can be adjusted as the pilot becomes familiar with the airplane.

Control Throws

1. The amount of control throw should be adjusted using mechanical means as much as possible and then electronically with the radio. The control throws are shown in degrees and inches of deflection measured at the widest point of the control surface for both low and high rates.

2. Use the supplied flight control deflection meter to measure the throws in degrees. Prop up the tail of the aircraft until the fuselage is parallel to the table top.

3. Use the widest part of the aileron to measure the aileron throw in degrees.

4. Use the widest part of the elevator to measure the elevator throw in degrees.

5. A ruler will be needed to measure the deflection of the flaps.

6. Gather the Rudder Deflection Meter (*Supplied*) and scotch tape.

7. Slide the deflection meter under the rudder boost tab.
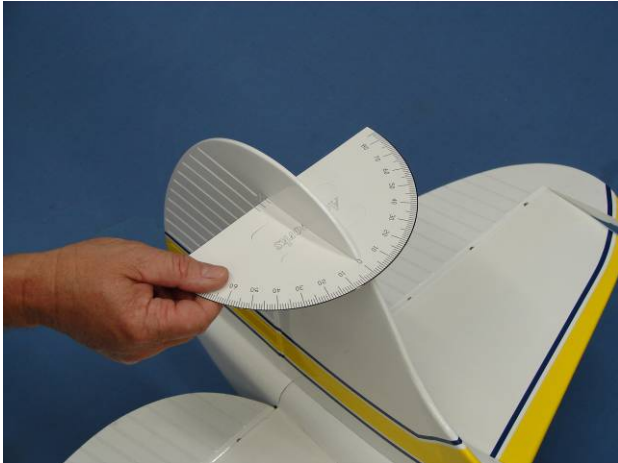
8. Center the deflection meter on the rudder using the centering marks on the meter to aid with alignment. Bend the precut positioning tabs down around the fin.

9. Secure the tabs to the fin using scotch tape.

10. Degrees are measured at the tip of the boost tab as shown below.

Control Throw Deflection Table

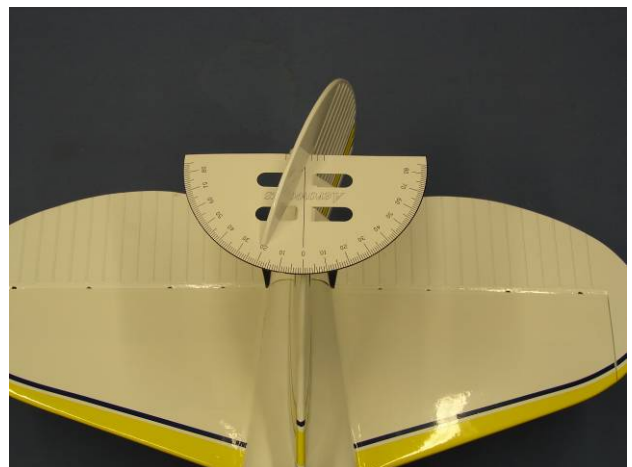|	**Low Rate**	**High Rate**
Aileron	10˚ up 10˚ down	20˚ up 20˚ down
Rudder	10˚ left 10˚ right	25˚ left 25˚ right
Elevator	10˚ up 10˚ down	20˚ up 20˚ down
Flap	3/4" down	1 1/2" down

We recommend 15% Expo on low rates, 30% expo on high rates as a starting point. You a can adjust from there to suit your own flying style.

Preflight Checks

Center of Gravity: Check CG is set properly.

Engine: The engine should run smoothly at all throttle settings with smooth transition from idle to full throttle without stalling or hesitation. Do not fly an unreliable engine. Read engine instructions including break in and tuning completely.

Prop balancing: Ensure prop is properly balanced prior to mounting on engine.

Flight Controls: Ensure all flight controls are free from binding and are centered. Check that all hinges are tight and will not pull out. Control linkages must be rigid and tight and have no slop. Confirm proper direction of ailerons, rudder, and elevator. Experienced flyers have lost airplanes due to reversed ailerons. Right roll is right up, left down. Left roll is left up, right down.

Batteries: Transmitter, ignition and receiver batteries are fully charged.

Fasteners: Check all engine bolts, wing bolts, hatch bolts, servo screws, control horn bolts, wheel collars, and clevis keepers are tight and secure.

Covering: Check all covering and seams are sealed and secure.

Radio: Check trims set to neutral and controls centered. Check rate and condition switches set properly. Check the receiver antenna is fully extended and not reversed on it self.

Range check: Do a range check with and without the engine running in accordance with the radio manufacturer instructions. If there is insufficient range or a large reduction with the engine running, do not fly until it is resolved!

Fuel: Fill the fuel tank before each flight.

<u>1.80-30cc Cessna 195 ARF-QB NOTES</u>