AEROWORKS

30cc BRAVATA ARF-QB
(Quick Build)

ASSEMBLY MANUAL

TABLE OF CONTENTS

CONTACT INFORMATION

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INTRODUCTION

Thank you for choosing the Aeroworks 30cc Bravata**.** We put great effort into making this plane the best model you will ever build and fly. Aeroworks has provided you with the highest quality kit and performance possible. We wish you great success in the assembly and flying of your new Aeroworks 30cc Bravata ARF-QB.

Great care has been taken in both the design and manufacturing of the 30cc Bravata 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 30cc Bravata 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.

WARRANTY

Aeroworks manufacturing guarantees 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. Aeroworks does not accept any responsibility for structural failure.

Warranty Period
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.

KIT CONTENTS MAIN ASSEMBLEY
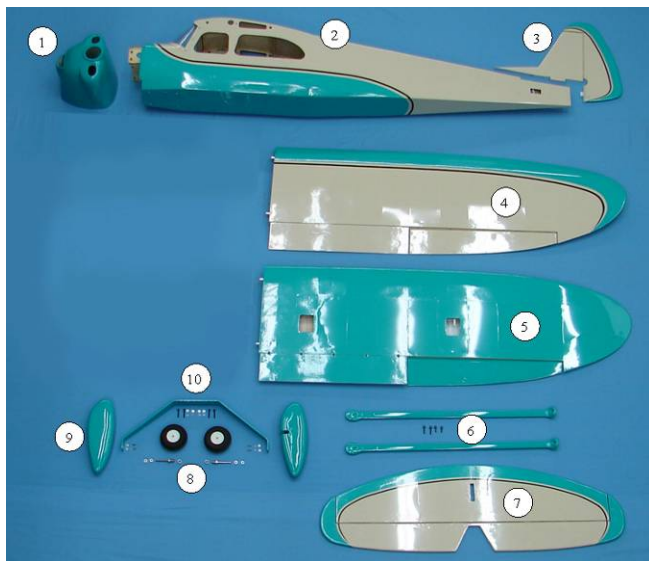
Item Number	Item Description	Part Number
	Turquoise/Cream	
1	Cowl	ABRTC30CO
2	Fuse (No Windshield)	ABRTC30FW
3	Vertical Fin w/ Rudder	ABRTC30VR
4	Right Wing	ABRTC30RW
5	Left Wing	ABRTC30LW
6	Wing Struts w/ Hardware	ABRTC30WS
7	Horizontal Stab w/ Elevator	ABRTC30HE
8	Main Wheel Set w/ Axles	ABRTC30MW
9	Wheel Pants w/ Hardware	ABRTC30WP
10	Aluminum Landing Gear	ABRTC30AL
	Deep Red/Cream	
1	Cowl	ABRDRC30CO
2	Fuse (No Windshield)	ABRDRC30FW
3	Vertical Fin w/ Rudder	ABRDRC30VR
4	Right Wing	ABRDRC30RW
5	Left Wing	ABRDRC30LW
6	Wing Struts w/ Hardware	ABRDRC30WS
7	Horizontal Stab w/ Elevator	ABRDRC30HE
8	Main Wheel Set w/ Axles	ABRDRC30MW
9	Wheel Pants w/ Hardware	ABRDRC30WP
10	Aluminum Landing Gear	ABRDRC30AL

KIT CONTENTS SUB ASSEMLEY
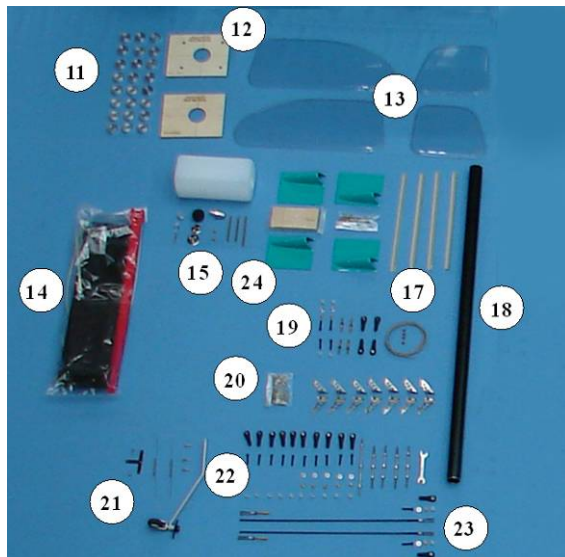
Item Number	Item Description	Part Number
11	(24) 1/4" Engine Standoffs	ABR30AS
12	Motor Mounting Templates	ABR30MT
13	Side Windows	ABR30SW
14	Foam/Velcro Mounting Pack	ABR30FV
15	15oz Fuel Tank w/ hardware	ABR30FT
16	Front Windshield (Not Shown)	ABR30WS
17	Balsa Stab Fillets	ABR30SF
18	Aluminum Wing Tube	ABR30WT
19	Rudder Pull-Pull Assembly	ABR30RP
20	Control Horn Set	ABR30CH
21	Tail Wheel Assembly	ABR30TW
22	Ball Link/Linkage Set	ABR30BL
23	Throttle Pushrod Set	ABR30TP
	Turquoise/Cream	
24	Servo Hatch Covers w/ Plates	ABRTC30HC
	Deep Red/Cream	
24	Servo Hatch Covers w/ Plates	ABRDRC30HC
25	Fuselage Top Hatch (Not Shown)	ABR30TH

SPARE PARTS

Spare parts can be ordered directly through Aeroworks. Please use the part numbers and item descriptions listed in the kit contents list above to order.

ULTRACOTE™ COLORS

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

Turquoise/Cream Scheme
Turquoise	#898
Cream	#887
Black	#874

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

Deep Red/Cream Scheme
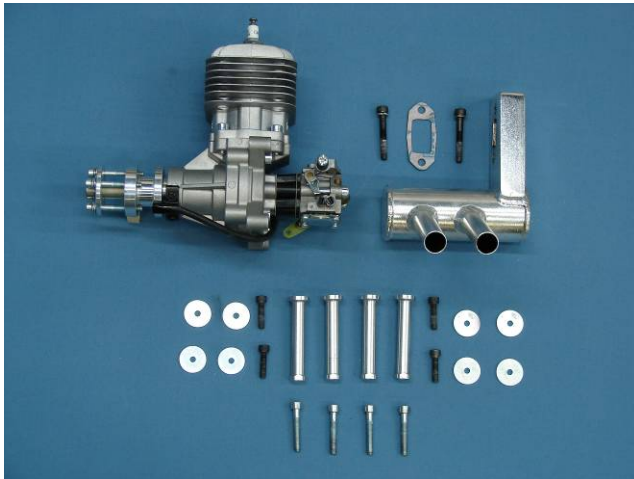|	
Deep Red	#871
Cream	#887
Black	#874

HARDWARE NEEDED TO COMPLETE

Engine:

◊   1 - DLE 30 Rear Carb
◊   1 - J'Tec Wrap Around Pitts Muffler
◊   1 - Stock 60mm Standoffs Included with motor
◊   8 - Fender Washers
◊   8 - Motor mounting bolts
◊   3' - Large Gas Fuel Line
◊   1 - 19x8 Propeller

Note: DLE 30, Propeller and J'Tec Muffler can be purchased through Aeroworks.

Servo Option 1 : Sport Performance

Hitec 5645MG Servos may be used for sport flying. If flying more aggressive aerobatics please see servo option two below.

Note: Servos available through Aeroworks

◊   6 - Hitec 5645MG Servos for flight surfaces
◊   1 - Hitec 635HB Servo for throttle

Servo Option 2: Unlimited Performance

Hitec 7954SH Servos are recommended for unlimited flying. These servos will provide the best performance possible.
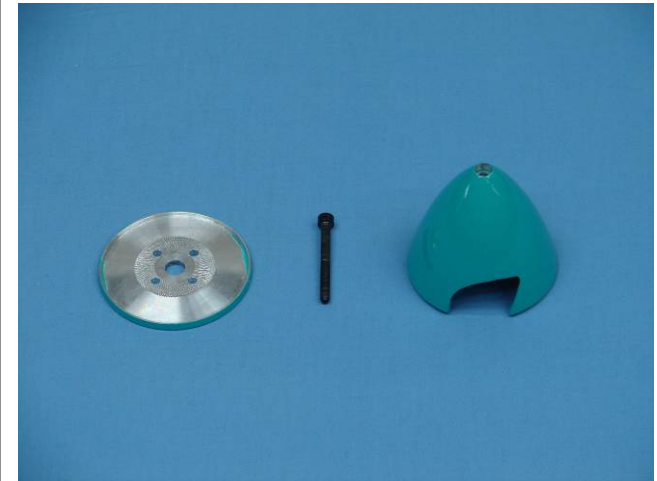
Note: Servos available through Aeroworks

◊   6 - Hitec 7954SH Servos for flight surfaces
◊   1 - Hitec 635HB Servo for throttle

Recommended Spinner:

◊   1 - 3" Spinner- Aeroworks Recommended

Note: Spinner available from Aeroworks

Electronic Accessories : Receiver

A 6 or 8 channel receiver is recommended, using a receiver with 6-8 channels will allow the builder to mix both the aileron and elevator servo together in the radio. Mixing these functions will result in a great flying, well trimmed airplane.
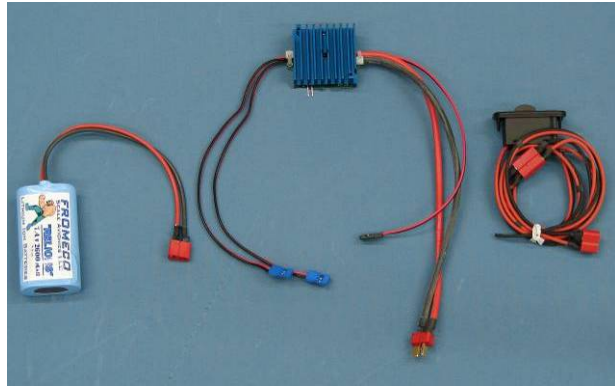
◊   1 - 6-8 Channel 2.4 GHz or PCM Receiver

Receiver Power System :

The Aeroworks 20cc-30cc Power package is recommended. The package consists of the following items:

◊ 1 - Fromeco Sahara Regulator Deans in 2 JR out
◊ 1 - Fromeco 2600mah Li-Ion Battery w/ Deans
◊ 1 - Smart-Fly Super Switch HD w/ Deans

Ignition Power System :

If using the DLE 30 or any other gas engine the Aeroworks Ignition Power System is recommended

◊ 1 - Fromeco 2600mah Li-Ion Battery w/ Universal Connector
◊ 1 - Smart-Fly Ignition Regulator
◊ 1 - MPI charge switch

Recommended Extensions:

22 AWG extensions are recommended through out the 30cc Bravata. The following sizes will be used:

◊ 1 - 36" Extensions For Elevator
◊ 2 - 18" Extensions For Ailerons
◊ 2 - 18" Extensions For Receiver to Flaps
◊ 2 - 18" Extensions For Receiver to Ailerons
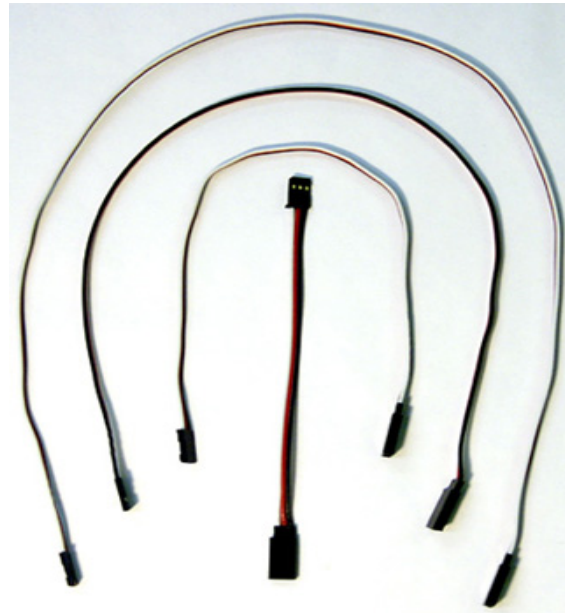
TOOLS & ADHESIVES NEEDED TO COMPLETE

- Allen wrenches US and Metric.
- 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
- Wire Cutters
- Blue Loctite
- CA kicker (optional)
- Thick, Thin and Medium CA
- Rubbing alcohol
- Wipes

<div style="border:1px solid red">

WARNING
Some rubbing alcohols may attack painted parts.

</div>

PREPARING FUSE FOR ASSEMBLEY

1. Remove the (6) Phillips head screws that attach the windshield to the fuse. Place the screws and windshield in a safe place until assembly has been completed.

Note: It is important to remove the windshield before applying any heat to the covering. Applying direct heat to the windshield can damage the plastic.
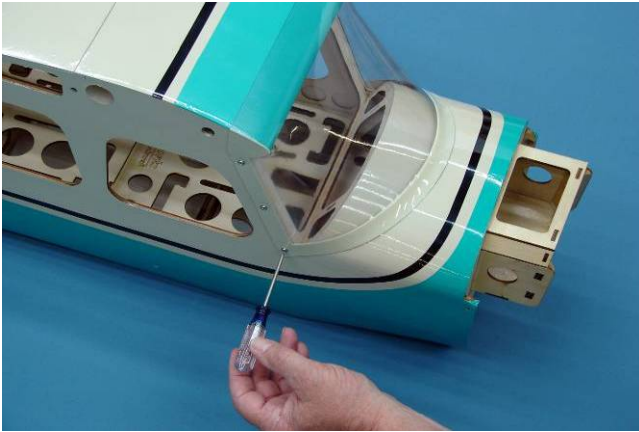
2. Remove the top fuse access hatch as shown. Use a covering iron to remove any wrinkles after it has been removed from the fuse.

Note: It is recommended that the fuse access hatch be placed on a flat surface and weighted down when not bolted in place to prevent warping.
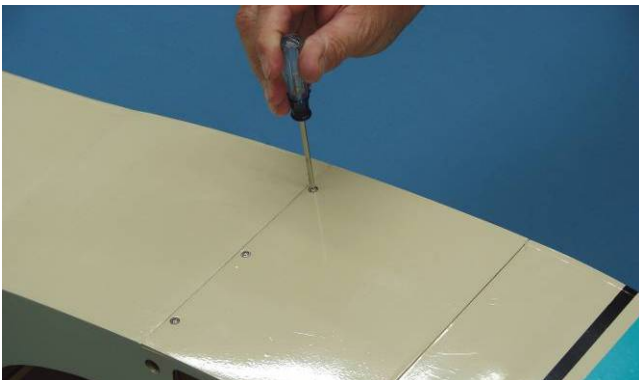

TIGHTENING AND RESHRINKING THE COVERING

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 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. Use a heat gun to remove wrinkles from large sections of covering. It is not recommended to use a heat gun near seams or where two colors meet.

3. 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.

4. If bubbles persist, use a small pin to punch holes in the bubble to relieve trapped air and reheat.
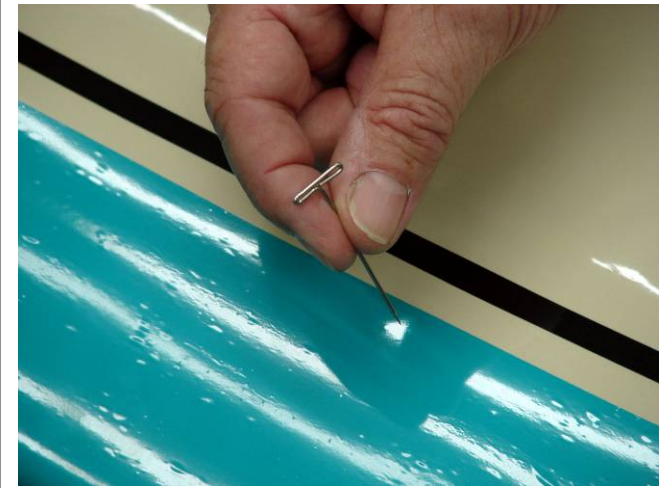
5. Use your heat gun with extreme caution. Take care not to apply too much heat to one area for long periods of time. This may cause the trim colors to over shrink and pull away leaving unsightly gaps on the color lines. The trim stripes are especially vulnerable to over shrinking.

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

7. Go over all hinge gaps ensure there are no wrinkles. Excessive wrinkles in the hinge line can cause binding and or damage the covering.

8. Use covering iron near seems and areas of exposed wood. Over heating of these areas can cause the covering to pull.

CHECKING GLUE JOINTS

1. Go over all seams and glue joints with thin CA, this will ensure your model lasts for many seasons to come.

Note: Even if you can visibly see glue on all glue joints it is still recommended that the joints be reglued. Due to changes in humidity during the life of the aircraft glue joints can separate, it is always recommended that the glue joints be checked before each flying session.

2. Apply Thin CA to all firewall joints. The firewall has already been fuel proofed and any additional fuel proofing is not necessary.

AILERON/FLAP SERVO ASSEMBLEY

1. Gather the items shown below for the installation of the aileron and flap servos.

Required Parts
◊ 2 - Servo Hatch Covers
◊ 4 - Servo mounting rails
◊ 2 - Plywood mounting plates
◊ 14 - Phillips head mounting screws

Required Parts-Not Included
◊ 1 - Aileron Servo
◊ 1 - Flap Servo
◊ 8 - Servo Mounting Screws (Micro Fastener Part number **STW0209** recommended)
◊ 2 - 1 1/4" Servo Arms
◊ 1 - 18" Servo Extension (Aileron Servo)
◊ 1 - Aeroworks Safety Clip

Required Tools and Adhesives
◊ Small Phillips screw Driver
◊ 80 Grit Sandpaper
◊ 30 Minute Epoxy
◊ Medium "C-Clamp"
◊ Electric Drill
◊ 1/16" Drill Bit
◊ Masking Tape
◊ Felt Tip Pen

2. Use 80 grit sandpaper to lightly scuff the area where the plywood mounting plate will be glued to the servo hatch cover.

Note: Take care not to sand off the pre-marked mounting plate lines.
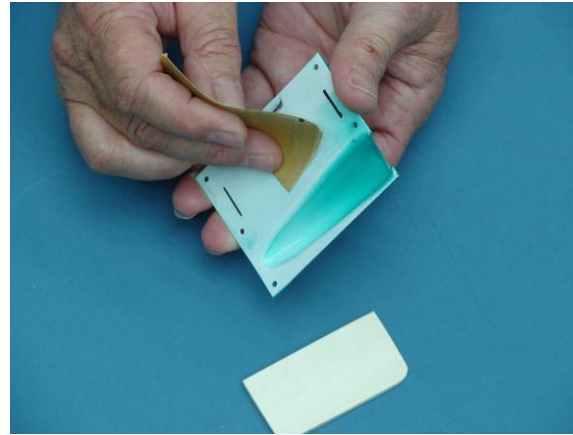
3. Apply 30 minute epoxy to the servo mounting plate as shown.

4. Align servo mounting plate with pre-marked lines on the servo hatch cover as shown.
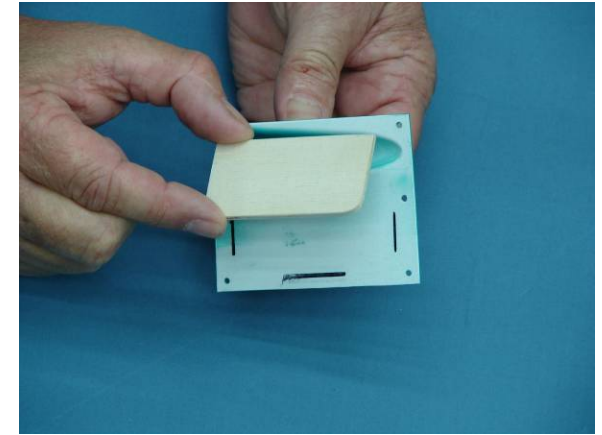
5. Allow epoxy to fully cure before continuing with servo hatch assembly. Masking tape can be used to prevent the mounting plate from shifting while the epoxy cures.
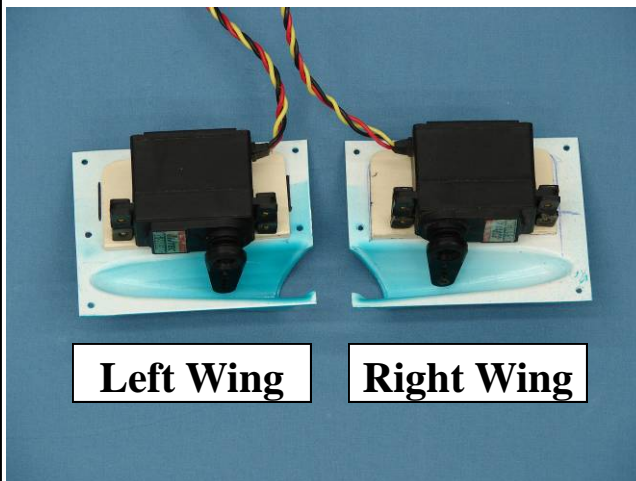
6. To ensure proper alignment, lay out the servo hatch covers as shown. There are (2) Left and (2) Right hatch covers supplied.


Wing Tip
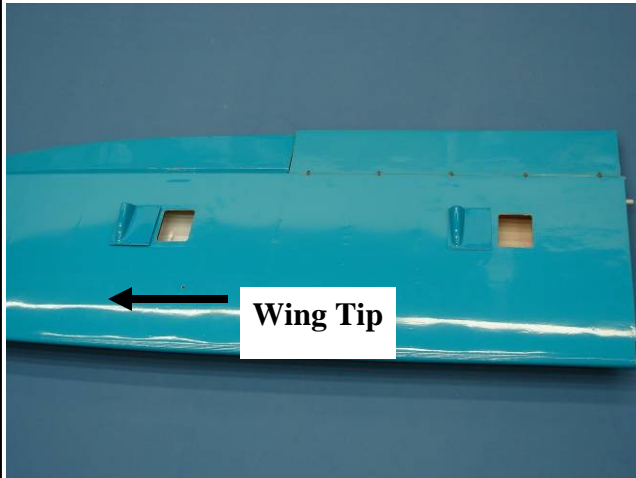
7. Lay out the flap and aileron servos as shown. Double check that the correct hatch covers are being built for the correct wing. Both a left and right hatch cover are shown below.
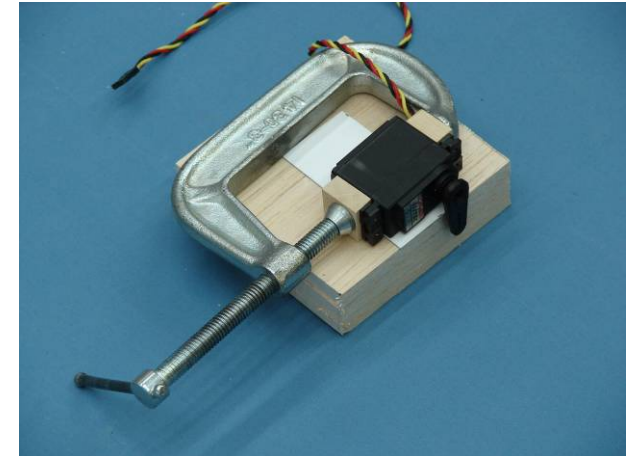

Left Wing   **Right Wing**

8. Place the servo mounting blocks under the servo mounting rails as shown.
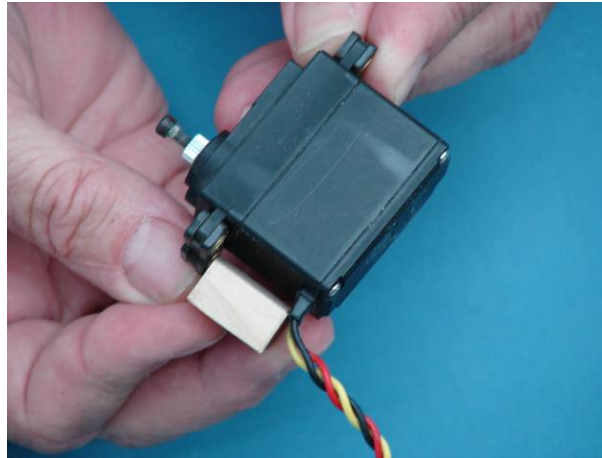
9. Before setting the servo onto a flat surface use a piece of card stock to slightly elevate the servo. The card stock should be the exact width of the servo case.
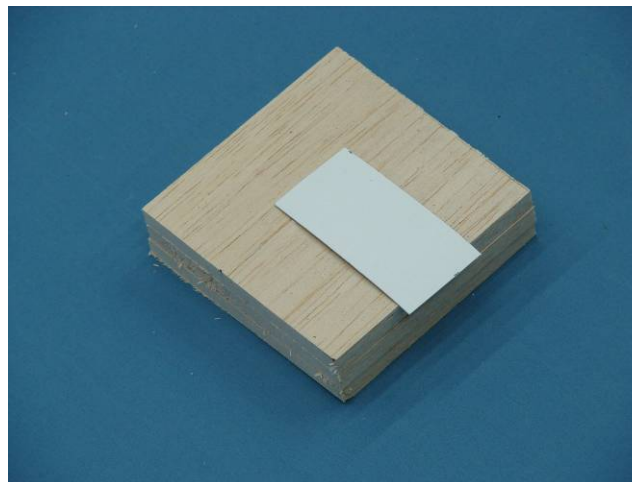
10. Place servo onto card stock and clamp mounting blocks to the servo case as shown.

11. Drill holes for servo mounting screws. Either an electric drill or a manual hand drill will work well in these steps.
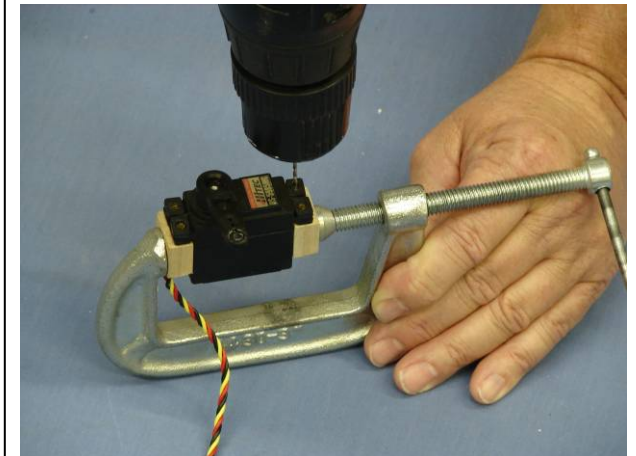
12. Install servo with servo mounting screws. Repeat servo installation process for all aileron and flap servos.
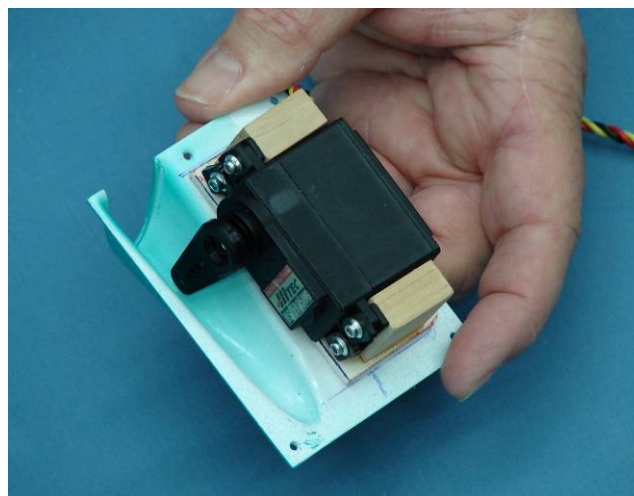

13. Mark the location of the servo mounting blocks onto the plywood mounting plate as shown. Ensure that the servo output shaft is centered on the pushrod exit slot as shown below.
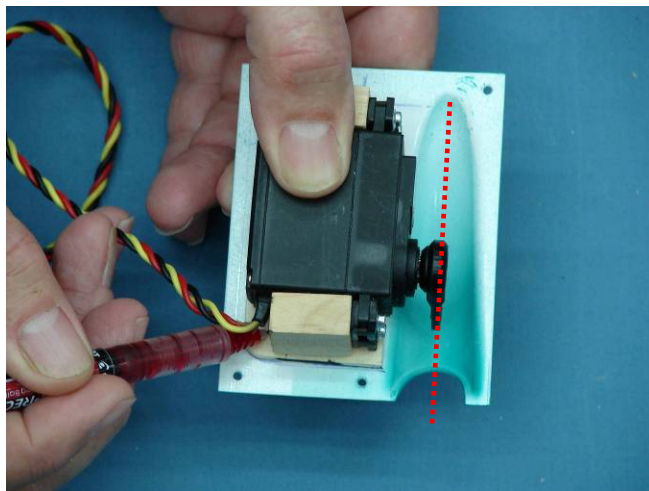

14. Apply 30 minute epoxy to the mounting blocks as shown. Clean off any excess epoxy that may get on the servo case.
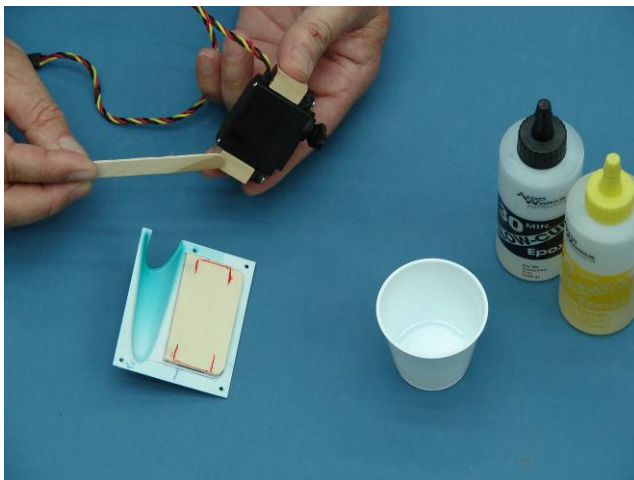
15. Allow epoxy to fully cure before continuing assembly. The servo should be clamped to the servo hatch while the epoxy cures.


16. Place masking tape on the outside of the servo hatch as show. Mark the location of the hardwood mounting blocks. A self tapping Phillips head screw will be installed through the hatch and into the mounting block for additional strength.
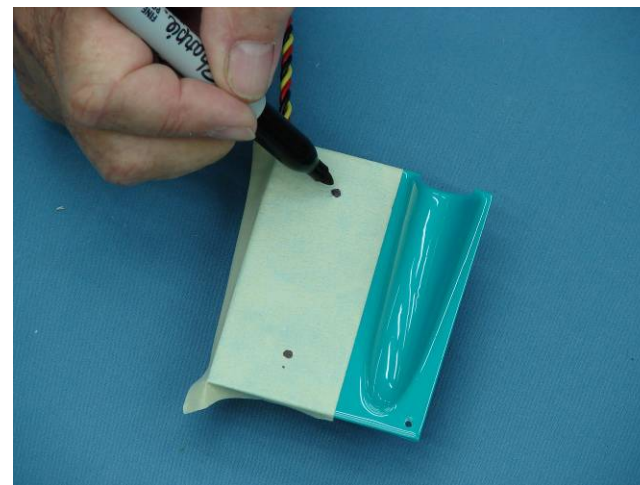
17. Use a 5/64" Drill bit to drill pilot holes for wood screws.
18. Remove masking tape.

19. Use a Phillips head screw driver to install self tapping screws. Be careful not to apply too much force when tightening the screws as this can cause the mounting block to fracture.
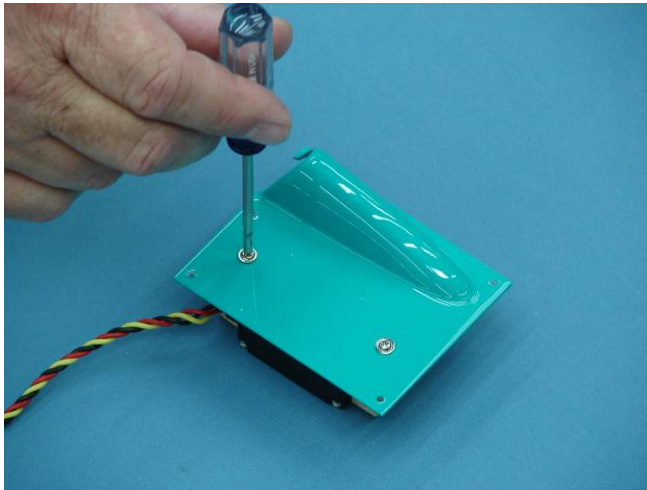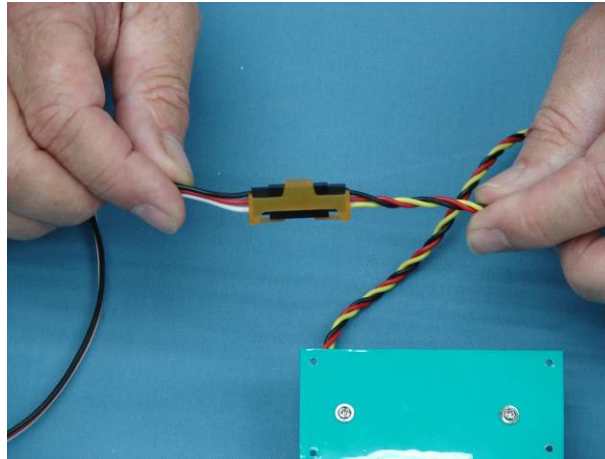
20. Lay out servos as shown. Attach an 18" servo extension to the aileron servo.

Note: Do not install servo hatches at this time, this will be done after the control horns have been installed.
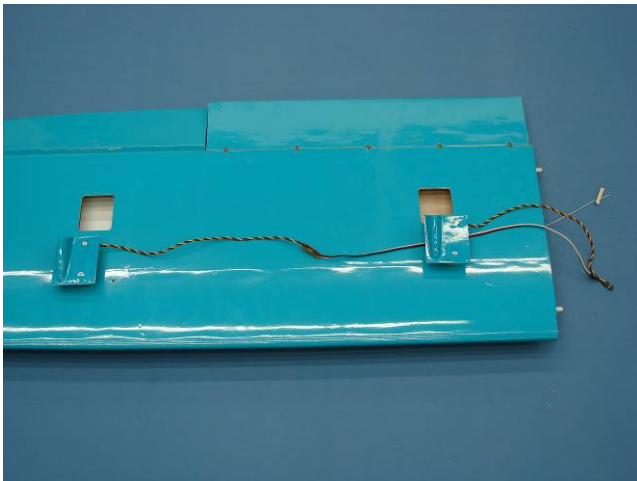
21. Use an Aeroworks Safety Clip to ensure the plugs will not come apart from vibration or light tension.

AILERON/FLAP CONTROL HORN & PUSHROD INSTALLATION

1. Gather the aileron control linkage parts as shown below.

Required Parts
  ◊ 1 - 3" Pushrod - *Aileron*
  ◊ 1 - 3" Pushrod - *Flap*
  ◊ 2 - 4-40 ball link assemblies
  ◊ 2 - Lock Nuts
  ◊ 2 - 4-40 Clevis
  ◊ 2 - Left control horns
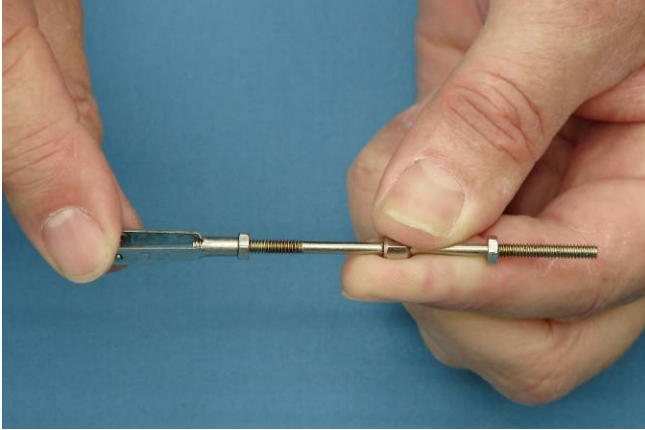 ◊ 2 - Right control horns
  ◊ 12 - T2.6x16mm Wood screws

Required Tools and Adhesives
  ◊ 5/64" Ball Driver
  ◊ 3/32" Ball Driver
  ◊ Pushrod Adjustment Wrench
  ◊ Phillips Screw Driver
  ◊ 1oz Bottle Gap Filling CA Glue
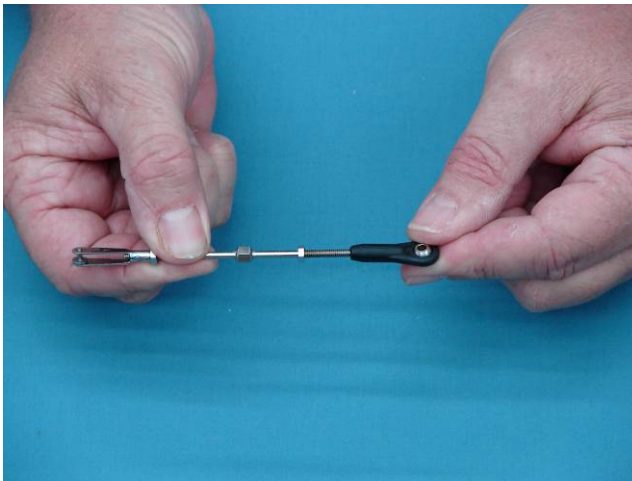 ◊ .34oz Bottle Blue IC-Loc Thread Locker

2. Thread the 4-40 clevis onto the pushrod as shown.

Note: Pushrods have both right and left handed threads to allow for full adjustments when installed. The clevis must be threaded onto the right hand thread portion of the pushrod.


3. Thread the 4-40 ball link onto the left handed threads of the pushrod.

4. Assemble the pushrod and control horn assembly as shown. The ball link goes between the left and right sides of the control horn sides and is secured with a nylon lock nut. Start with the center hole in the control horn. The ball link may be moved up or down for more or less control throw.
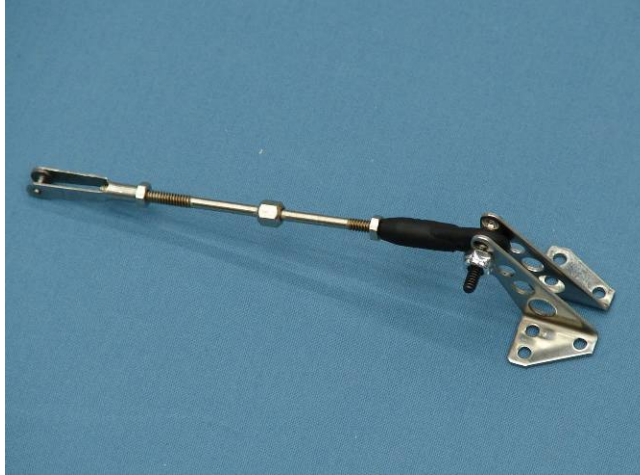
5. Align the control horns over the factory drilled holes.
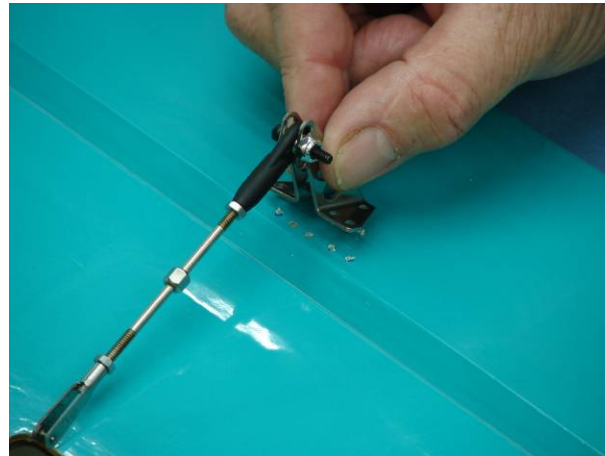
6. Use a drop of thick CA glue on each screw to prevent screws from loosening due to vibration as shown.

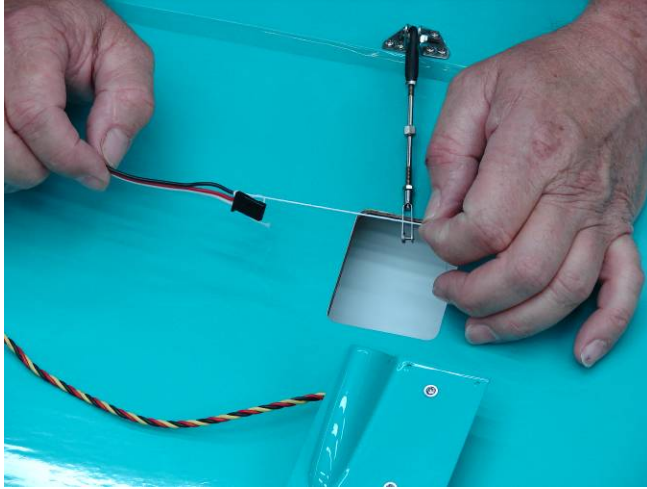**Note:** CA glues have a fast drying time. Remember to work quickly.

7. Align the left and right sides of the control horns to the mounting holes and mount using six wood screws as shown.

FINAL AILERON/FLAP SERVO INSTALLATION

1. Fasten the pull string from the servo hole to the male plug of the servo extension.

2. Rubber grommets have been pre-installed to help hold the servo leads in place. The pull string should pass through this grommet allowing the servo extension to pass through once it is pulled out the root end of the wing.

3. Pull aileron extension through root end of wing.

4. Repeat steps for the inboard servo and pull remaining extension through root end of wing.
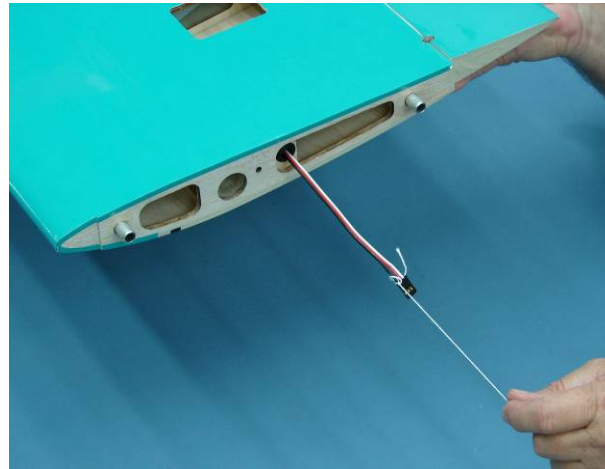

5. Attach Aileron and flap servo to your receiver as shown. Any 4.8-6 volt battery can be used for servo centering/setup.
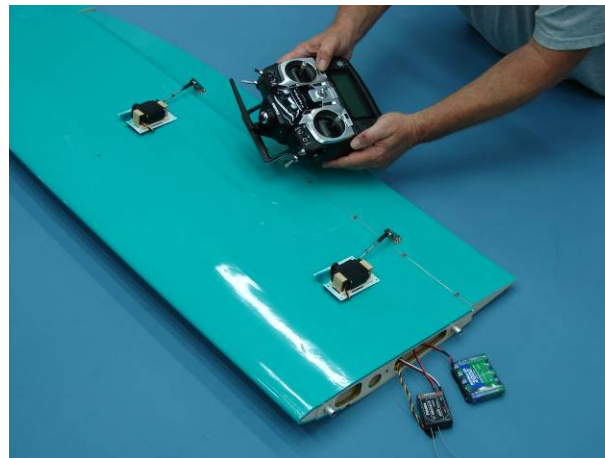

6. With the pushrod unattached to the servo arm, power up the radio and receiver. Ensure the servo trim and sub trim have been centered. Both the aileron and flap servos should be setup with the servo arm 90 degrees to the case when in the neutral position.

7. Please refer to your radio's manual for specific steps on setting up dual flap and aileron servos. It is highly recommended that this be done using the programming capabilities of your radio and not by using a "Y" harness.

8. Once initial programming is complete, attach the clevis to the servo arm. A piece of fuel tubing can be place over the clevis to prevent it from coming loose in flight.

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

Builders Tip: If using Hitec Servos, replace Phillips head servo arm screw with a socket head screw. This will allow for easier removal at a later date. These screws can be purchased from Micro Fasteners and are part number: SCM2508
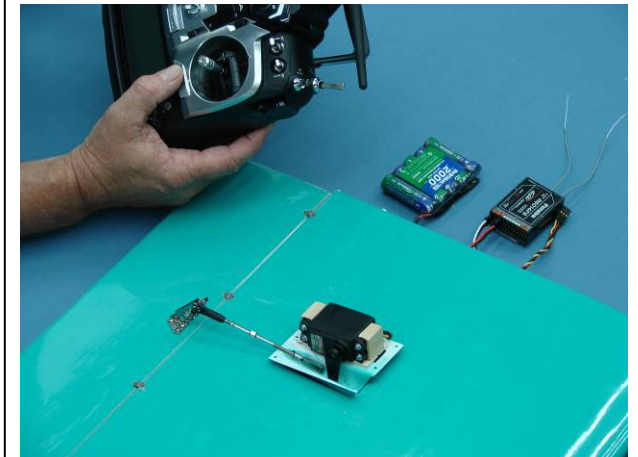
9. Install servo cover into the servo opening as shown. Make sure that the servo cover sits flush with the wing and that the servo exit slot is towards the wing tip.

Wing Tip
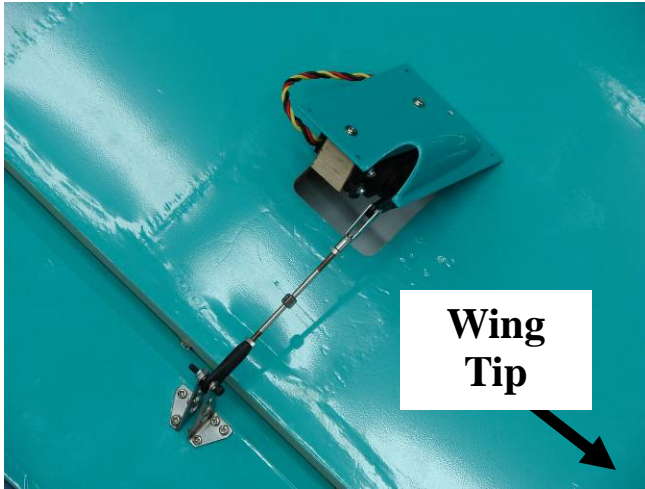
10. Use an electric drill with a 1/16" drill bit to drill the servo hatch mounting hole locations as shown.
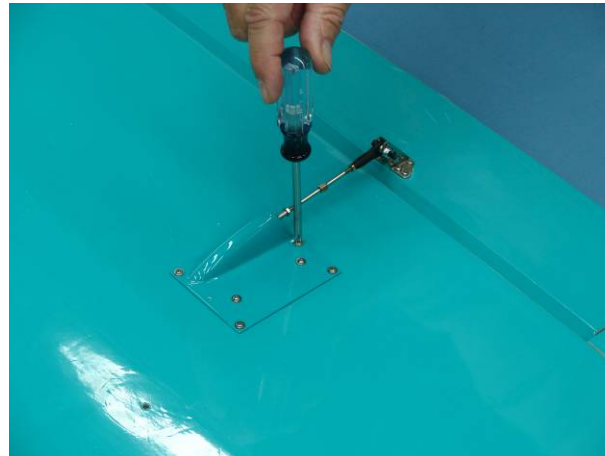

11. Use a drop of thick CA glue on each screw to prevent screws from loosening due to vibration as shown.

Note: CA glues have a fast drying time. Remember to work quickly.


12. Install five Phillips head screws as shown. Take care not to over-tighten the screw as this can damage the servo hatch cover.

13. A pushrod adjustment wrench has been included, this will allow the pushrod length to be extended or shortened with out removing the servo arm. Adjust the pushrod length so the control surface is neutral when the servo arm is 90 degrees to the servo case.
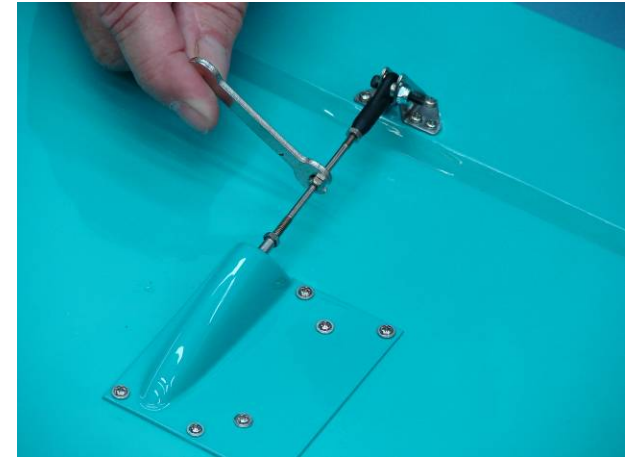
14. Finished wing assembly shown below. Repeat all previous steps for the remaining wing panel.
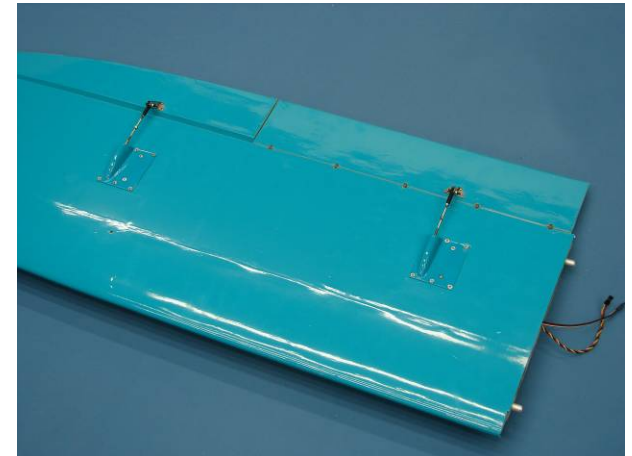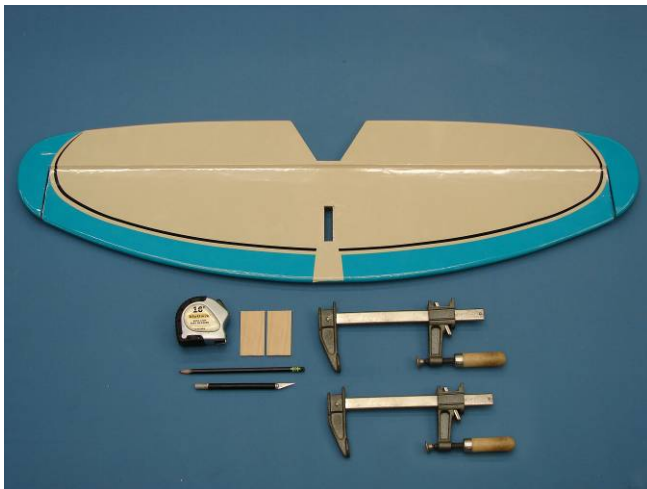
STAB/ELEVATOR ASSEMBLEY

1. Gather the items shown below for the installation of the Stabilizer and Elevator. The elevator has been pre-hinged and **glued** to the stab and is ready for flight. No other steps are necessary for hinging.

Required Parts
   ◊ 1 - Horizontal Stabilizer w/ Elevator
   ◊ 2 - Stab reinforcement strips *(Not Shown)*

Required Tools and Adhesives
   ◊ Wood Slider Clamps
   ◊ 1/16 x 3 x 5" Hardwood sheets
   ◊ 30 Minute Epoxy
   ◊ Ball Point Pen
   ◊ Pencil
   ◊ Hobby Knife
   ◊ Ruler
   ◊ Tape Measure

2. Mark the center of the elevator joiner as shown.

3. Repeat this step for the back of the fuse, this will help align the stabilizer for measuring.
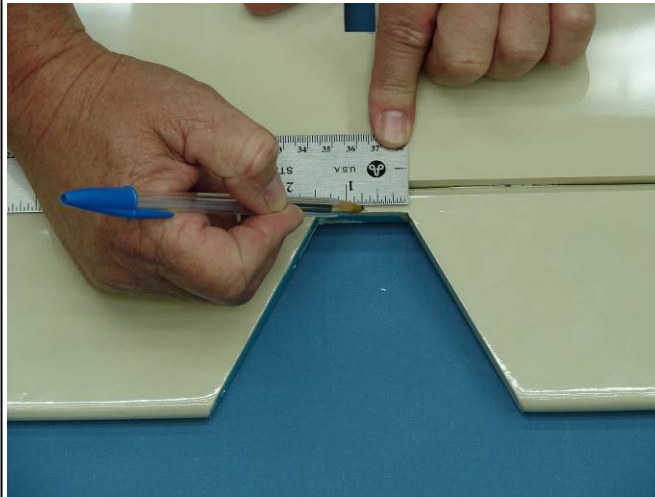
4. Place the stab/elevator assembly on the stabilizer cutout of the fuse as shown.
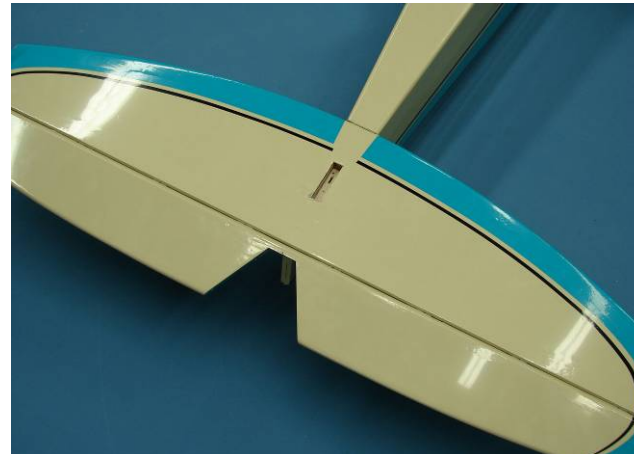
5. Align the two marks made in step 2 and 3 as shown below.

Note: These marks are just for reference and to aid in initial stab alignment. Once clamped in place the stab will be aligned with the wing.

6. Use a wood clamp to temporarily hold the back of the stab/elevator assembly in place as shown. Use a 1/16" x 3" x 5" piece of hardwood sheet under the clamp. This will prevent the clamp from crushing the stab.
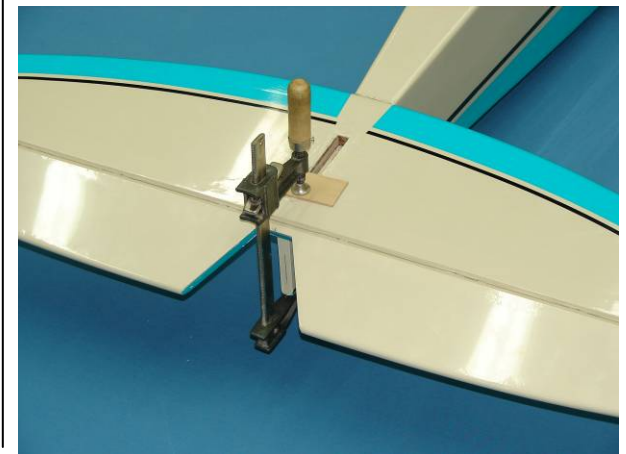
7. Using a tape measure, measure from the trailing edge of the wing to the trailing edge of the stab at the tip as shown. Repeat this step for the other side of the stab. Ensure that the measurement is identical on each side. If the stab is not straight as compared to the wing some adjustment may be necessary.

8. Making sure the airplane is completely level, sight down the elevator and ensure it is level in relation to the wing. If it is not level, it may be necessary to slightly sand the fuse on one side.

9. Place the stab reinforcement strip against the fuse and mark its location on both the stab and fuse as shown.
10. Repeat for remaining side.

11. Use a hobby knife to remove the covering, cut 1/16" to the inside of the marks made in the previous step.
12. Repeat for remaining side.

Note: Take care not to cut into the underlying wood, this may weaken the stab and can lead to an in flight failure.

13. Using a pencil, mark the location where the stab meets the fuse. This will help you align the stab for final gluing.
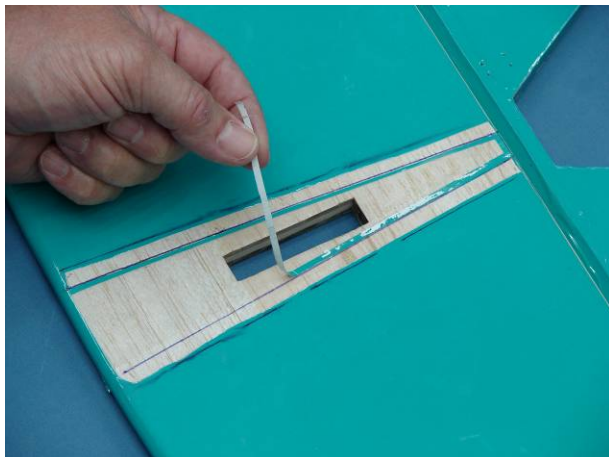14. Repeat for remaining side.

15. Remove any covering on the stab saddle as shown. This will allow for maximum gluing area.
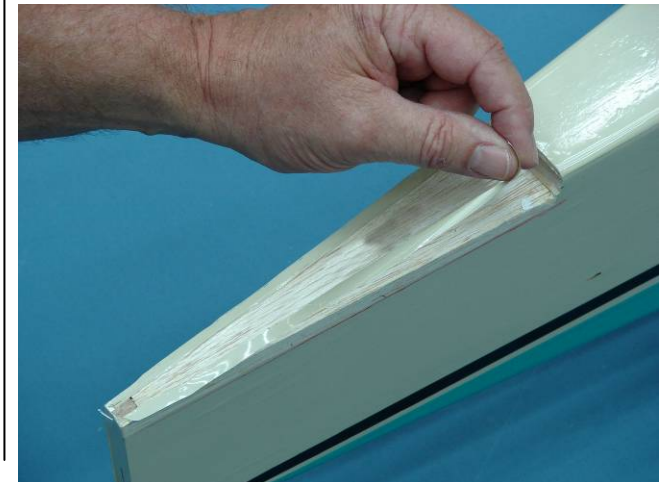
16. Remove any excess covering from the stab as shown. There should be no covering between the two stab reinforcement strips on the bottom of the stab.


17. Apply 30 minute epoxy between the pencil marks made in steps 13 and 14 on the previous page. Take care not to get any epoxy on the stab reinforcement strips gluing area at this time.

18. Use to clamps to firmly hold the stab in place while the epoxy cures. Ensure the stab stays aligned with the reference marks made in steps 13 and 14.
   Note: Use rubbing alcohol to remove any excess epoxy.
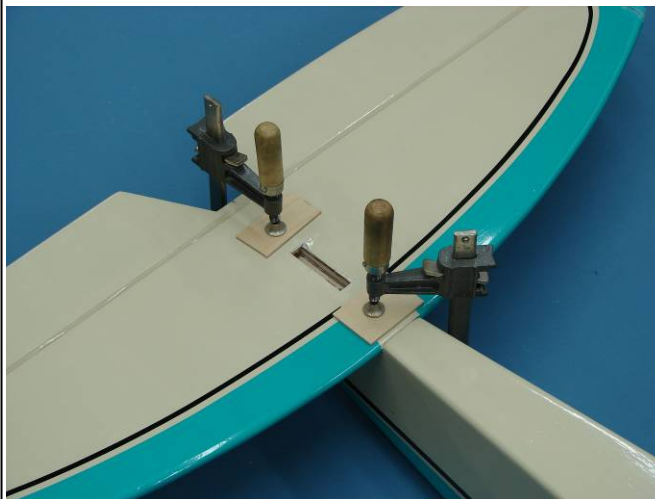
19. Apply 30 minute epoxy to the stab reinforcement strips as shown.

20. Place stab reinforcement strips against fuse as shown. Make sure the reinforcement strip fully contacts both the stab and fuse sides.
21. Repeat for remaining side.

22. Allow epoxy to fully cure before removing wood clamps. It is recommended that the fuse be kept at room temperature and allowed to dry for an hour to allow epoxy to cure properly.
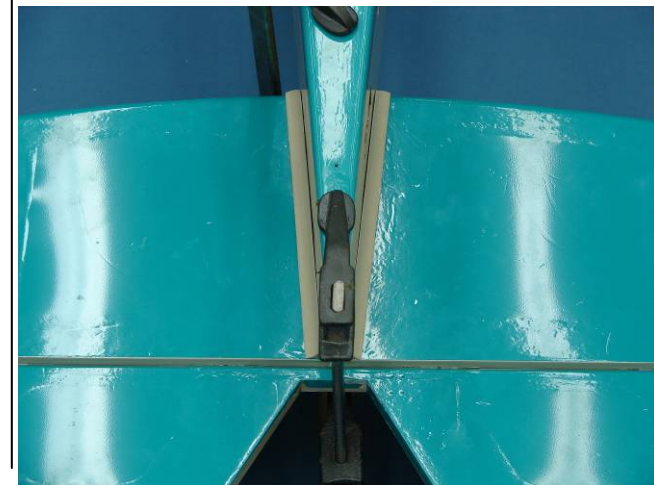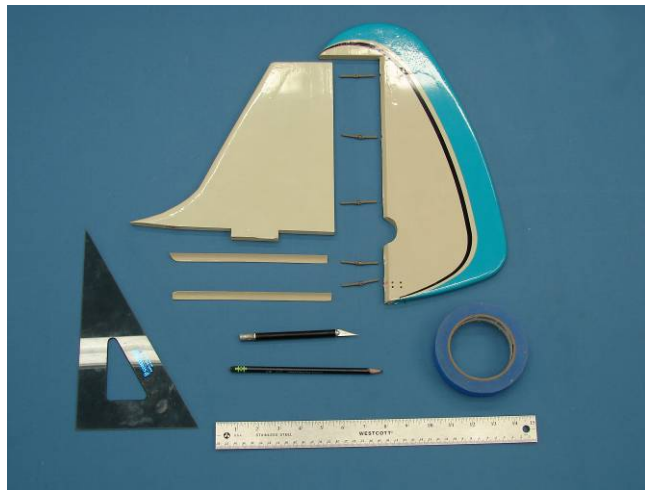
VERTICAL FIN/ RUDDER INSTALLATION

1. Gather the items shown below for the installation of the fin/rudder.

Required Parts-Not Included
- ◊   1 - Vertical Fin
- ◊   1 - Rudder
- ◊   5 - Hinge Pins
- ◊   2 - Stab reinforcement strips

Required Tools and Adhesives
- ◊   Small Square
- ◊   Pencil
- ◊   Ball Point Pen
- ◊   Ruler
- ◊   Hobby Knife
- ◊   Masking Tape
- ◊   30 Minute Epoxy

2. Place the vertical fin into the slot cut in the stabilizer as shown.
3. Measure for the center of the fuse where the vertical fin meets the fuselage.

4. Use a pin to mark the location of the vertical fin on the fuse. Do not mark the stabilizer at this time.


5. Use masking tape to secure the front of the vertical fin to the fuse. Be careful not to move the vertical fin when taping.

6. Place the stab reinforcement strips against the vertical fin and stabilizer. Use a pen to mark their location onto the fin and stab.

7. Remove the stab reinforcement pieces as shown. Their location should be clearly marked by the lines made in the previous step.
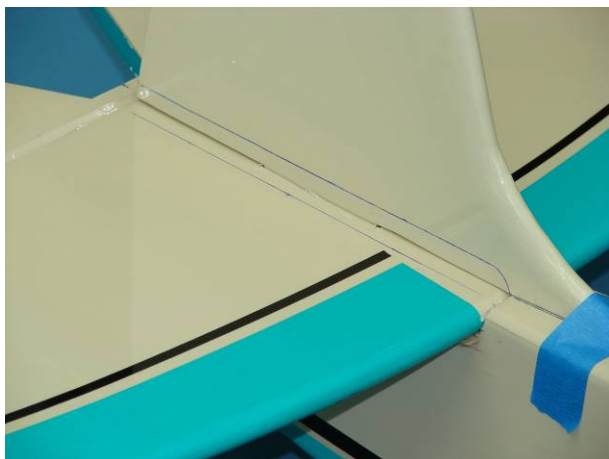

8. Use a hobby knife to remove the covering from the fuse and stabilizer, cut 1/16" to the inside of the marks made in the previous step.

Note: Take care not to cut into the underlying wood, this may weaken the stab and can lead to an in flight failure.
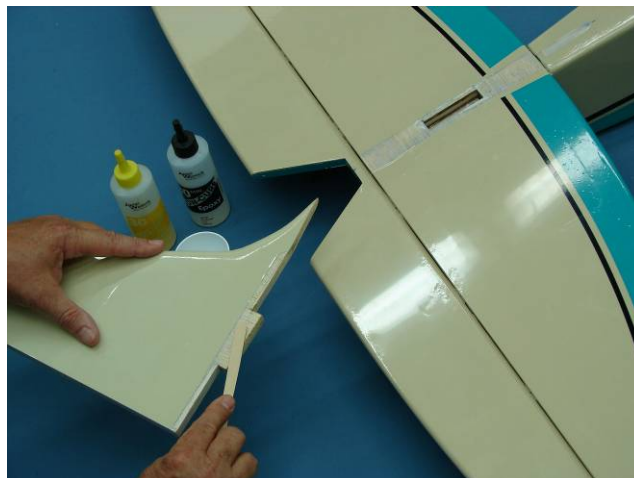

9. Use a hobby knife to remove the covering from the vertical fin, cut 1/16" to the inside of the marks made in the previous step.

Note: Take care not to cut into the underlying wood, this may weaken the fin and can lead to an in flight failure.
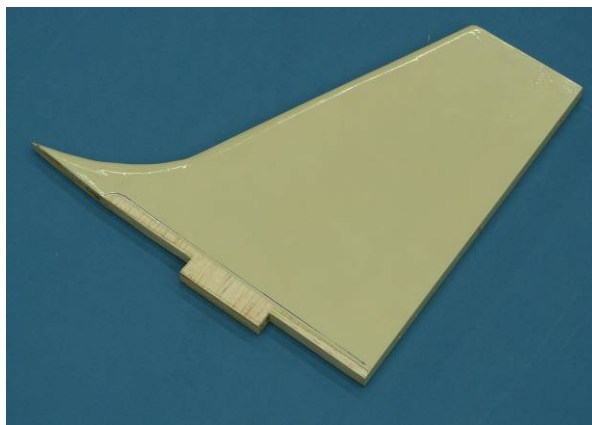
10. Apply 30 minute epoxy to vertical fin and alignment tab as shown.

11. Place vertical fin as shown. Realign the front of the vertical fin with the reference marks made earlier and tape in place.
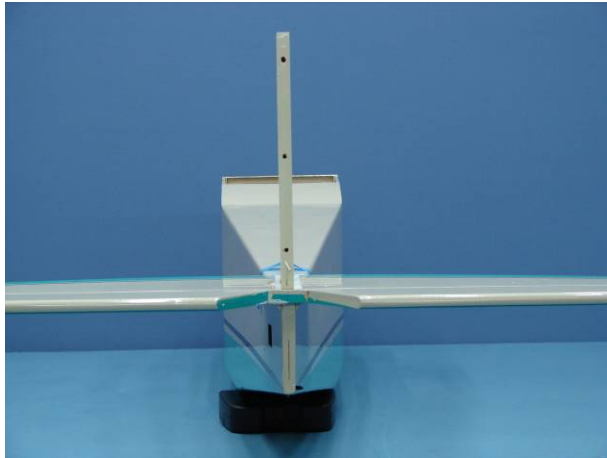
12. Use a square to ensure the vertical fin is perpendicular to the stab.

13. Place a "T" pin through the trailing edge of the vertical fin and into the stab to secure the fin while the epoxy cures.

14. Allow epoxy to fully cure before continuing with assembly. As the epoxy cure, ensure that the vertical fin is perpendicular to the stab.

15. Apply 30 minute epoxy to the stab reinforcement strips as shown.

16. Place stab reinforcement strips against fuse as shown. Make sure the reinforcement strip fully contacts both the stab and fuse sides.
17. Repeat for remaining side.
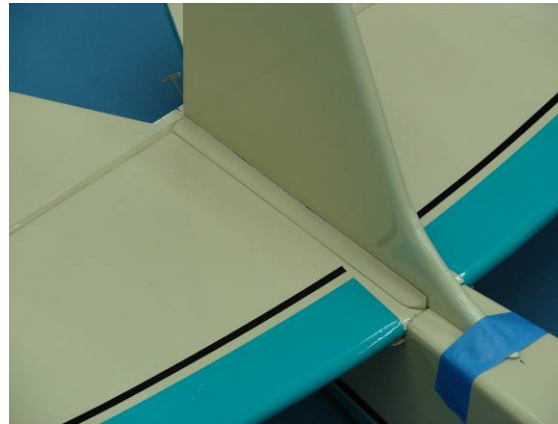
RUDDER INSTALLATION

1. Gather rudder installation items as shown below

Required Parts
◊ 1 - Rudder
◊ 5 - Pin Point Hinges **(Not Glued)**

Required Tools and Adhesives
◊ 30 Minute Epoxy
◊ Mixing Sticks
◊ Mixing Cups
◊ Rubbing alcohol
◊ Vaseline petroleum jelly or light oil

2. 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.

3. Mix epoxy in mixing cup and apply epoxy to one side of each hinge, insert the hinge completely into the predrilled holes in the trailing edge of the vertical fin.
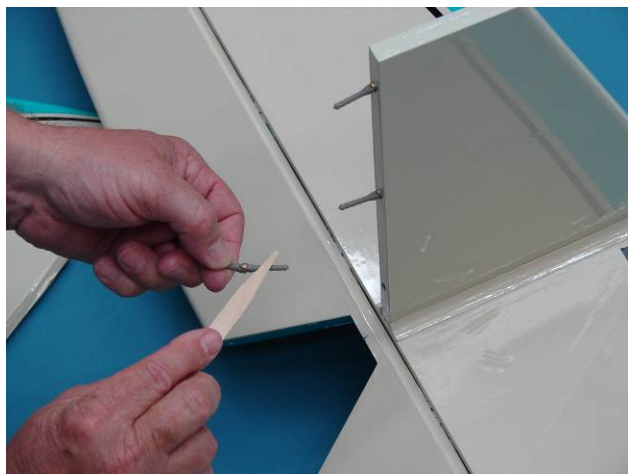
4. Mix epoxy in mixing cup and use a tapered stick to apply the epoxy inside the pre-drilled holes in the leading edge of the rudder.

5. Carefully slide the rudder onto each hinge and against the trailing edge of the fin. Wipe away excess epoxy with alcohol wetted wipes.

6. Ensure there is minimal to no gap between fin and rudder. Allow epoxy to fully cure.

Note: Ensure you have full rudder deflection before epoxy fully cures.
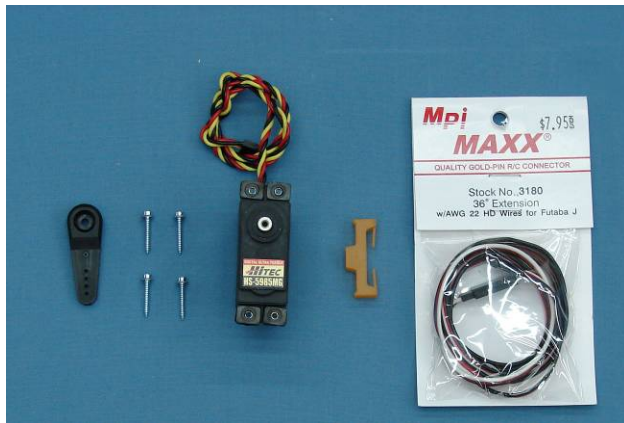
ELEVATOR SERVO INSTALLATION

1. Gather the items shown below for the elevator servo installation.

Required Parts
- ◊ 1 - Elevator Servo
- ◊ 1 - 1" Servo arm
- ◊ 1 - 36" servo extension
- ◊ 1 - Aeroworks safety clip
- ◊ 4 - Servo mounting screws (Micro Fastener Part number **STW0209** recommended)
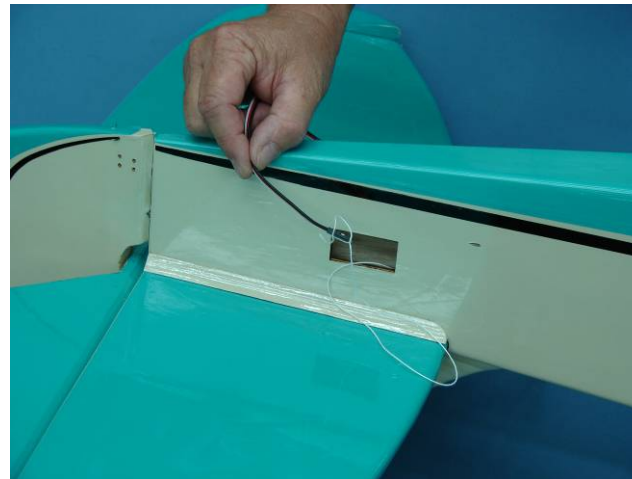
Required Tools and Adhesives
- ◊ 1 - 5/64" Ball Driver
- ◊ 1 - 3/32" Ball Driver
- ◊ 1 - Pushrod Adjustment Wrench
- ◊ 1 - Electric Drill
- ◊ 1 - 1/16" Drill Bit

2. Attach 36" servo extension to servo. Use an Aeroworks Safety Clip to ensure the plugs will not come apart from vibration or light tension.
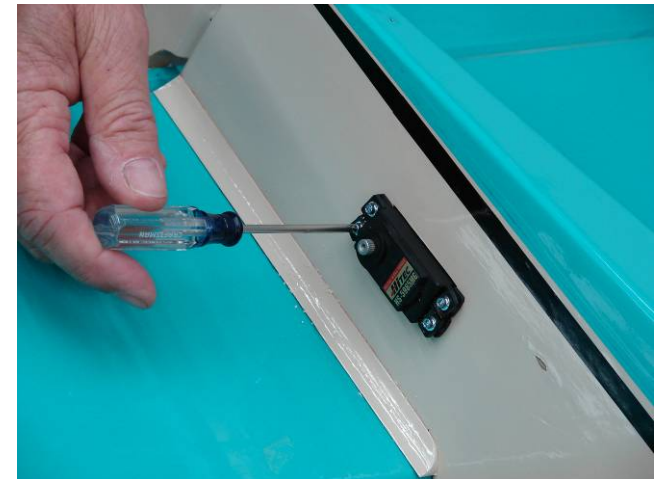

3. Attach elevator servo extension to pre-installed pull string as shown.
4. Pull extension through fuse and into radio compartment.

5. Install servo in servo well with the output shaft towards the rear of fuse as shown below.

6. Using a 1/16" drill bit, drill holes for servo screws.

7. Install servo with servo mounting screws.

ELEVATOR LINKAGE ASSEMBLEY

1. Gather the elevator control linkage parts as shown below.

Required Parts
   ◊   1 - 4" pushrod
   ◊   2 - 4-40 ball link assemblies
   ◊   1 - Brass spacers
   ◊   1 - Flat washer
   ◊   2 - Lock nuts
   ◊   1 - Left control horns
   ◊   1 - Right control horns
   ◊   6 - T2.6x16mm Wood screws

Required Tools and Adhesives
   ◊   1 - 5/64" Ball Driver
   ◊   1 - 3/32" Ball Driver
   ◊   1 - Pushrod Adjustment Wrench
   ◊   1 - Phillips Screw Driver
   ◊   1 - 1oz Bottle Gap Filling CA Glue
   ◊   1 - .34oz Bottle Blue IC-Loc Thread Locker
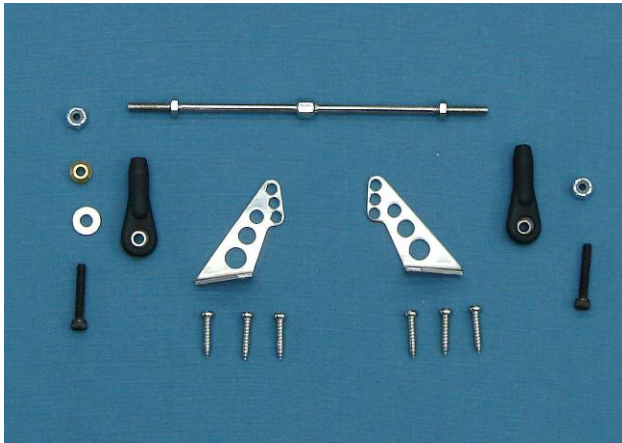
2. Correct installation of ball link to servo arm shown below.

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

Note: Flat washer prevents ball link from coming off brass ball.
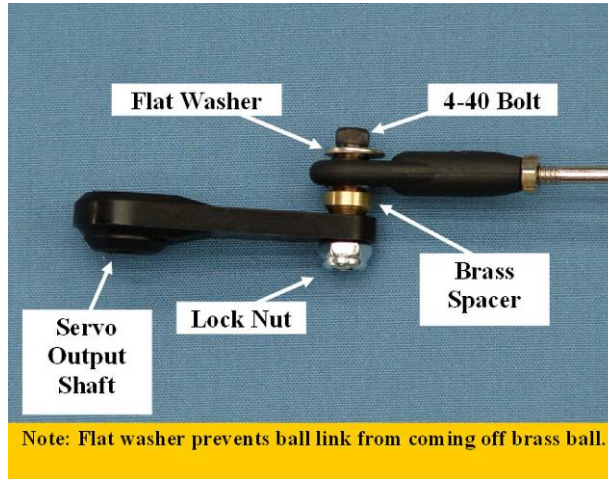
3. Assemble the pushrod and control horn assembly as shown. The ball link goes between the left and right sides of the control horn sides and is secured with a nylon lock nut. Start with the center hole in the control horn. The ball link may be moved up or down for more or less control throw.
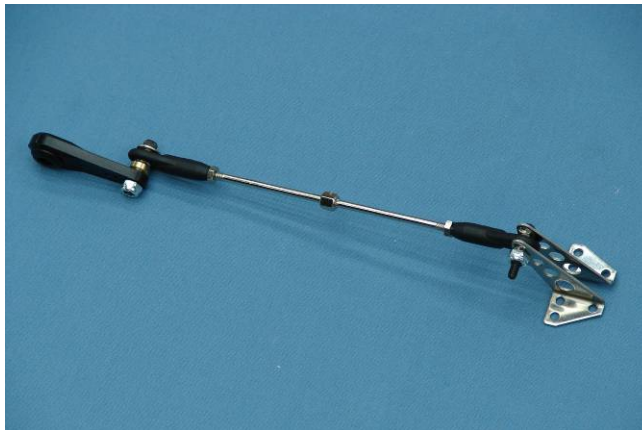
4. Align the control horns over the factory drilled holes.

5. Use thick CA on each screw prior to installing to lock screws in place.

Note: CA glues have a fast drying time. Remember to work quickly.

6. A pushrod adjustment wrench has been included, this will allow the pushrod length to be extended or shortened with out removing the servo arm. Adjust the pushrod length so the control surface is neutral when the servo arm is 90 degrees to the servo case.
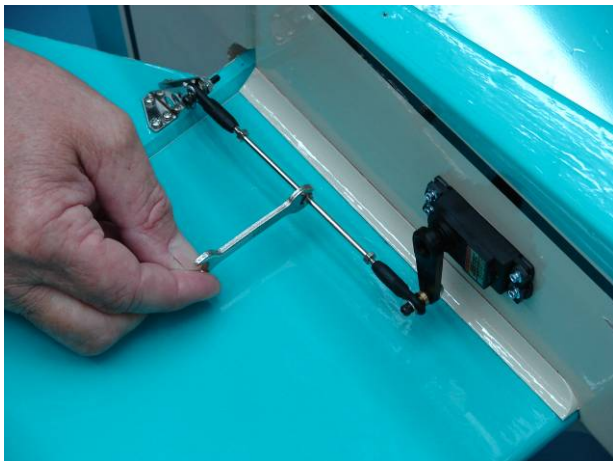
7. Finished elevator servo assembly shown below.

RUDDER SERVO AND PULL-PULL ASSEMBLEY

1. Gather the rudder servo and pull-pull parts as shown below.

Required Parts
◊ 2 - 1x1300mm Pull-Pull cable
◊ 4 - 4-40 ball link assemblies
◊ 4 - 4-40 Bolts
◊ 2 - Brass spacers
◊ 2 - Flat washer
◊ 4 - Lock nuts
◊ 2 - Left control horns
◊ 2 - Right control horns
◊ 6 - 2x20mm Phillip head bolts
◊ 6 - 2mm Nuts
◊ 4 - 3.5x5mm Brass swage tubes
◊ 4 - 4-40 Coupler with nuts for cable

Required Parts-Not Included
◊ 1 - Rudder servo w/ Mounting Hardware
◊ 1 - 2 1/2" Double Output Servo Arm

Required Tools and Adhesives
◊ 5/64" Ball Driver
◊ 3/32" Ball Driver
◊ Wire Cutters
◊ Pliers
◊ Phillips Screw Driver
◊ 1oz Bottle Gap Filling CA Glue
◊ .34oz Bottle Blue IC-Loc Thread Locker

2. Install rudder servo, out put shafts facing the tail, with servo mounting screws.

3. Feed the rudder cable through the pre installed cable exit tube in the tail of the fuse toward the front. Repeat for other side.

4. Loop or tape cable to fuse to prevent cable from being pulled into fuse

5. Pull the rudder cables from the fuse tail to the rudder servo tray. Take care not to cross the cables.


6. Thread brass coupler half way into ball link.

Note: There are two types of 4-40 couplers supplied, two are for the throttle and choke pushrods and four are for the pull pull system. The couplers with the solid base are to be used for the pull pull assembly.
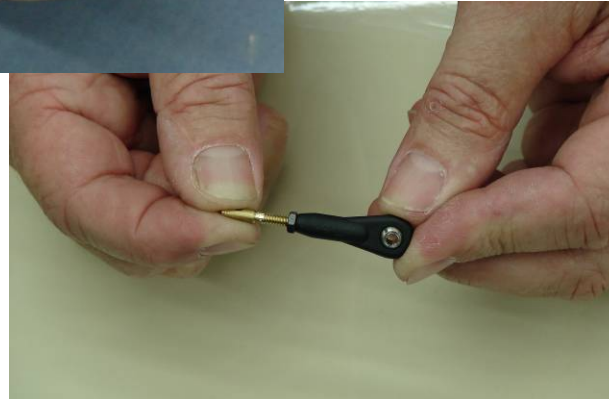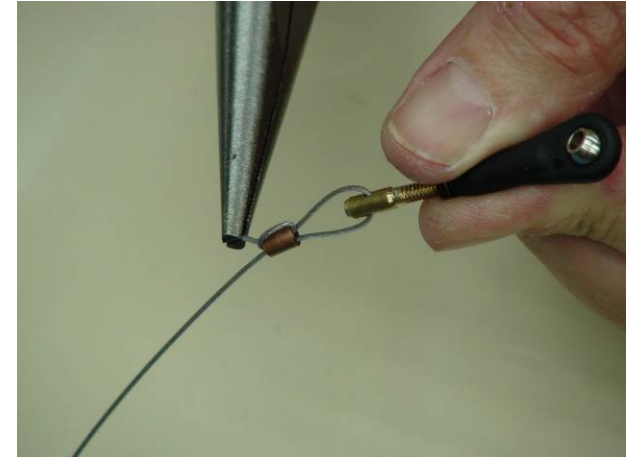

7. Thread the brass swag tube onto the pull pull cable followed by the threaded coupler.

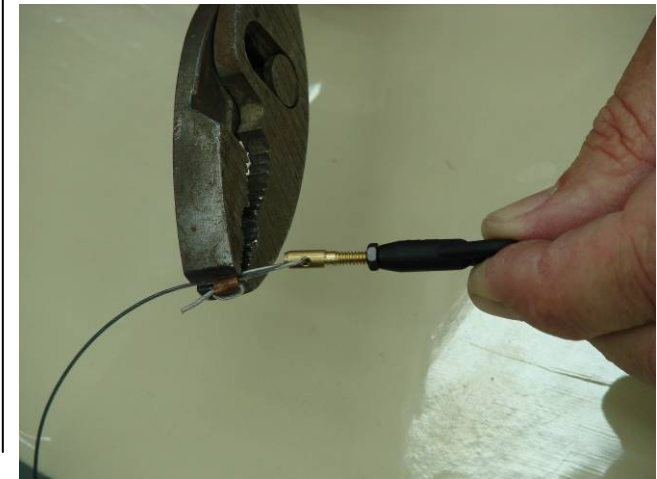8. Thread cable back through the brass swage tube as shown.
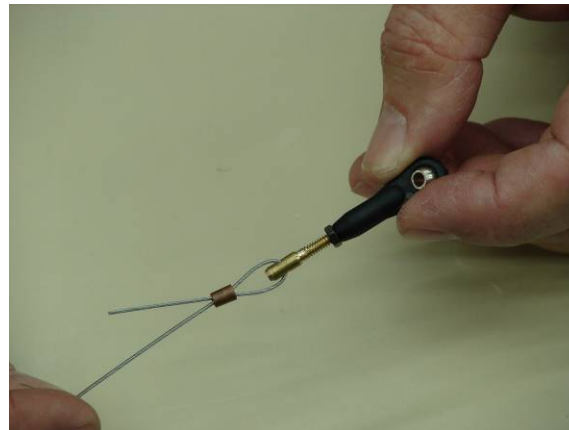
9. Loop the cable back through the brass swage tube and pull tight as shown.

10. Crimp the brass tube with a crimping tool or pliers.
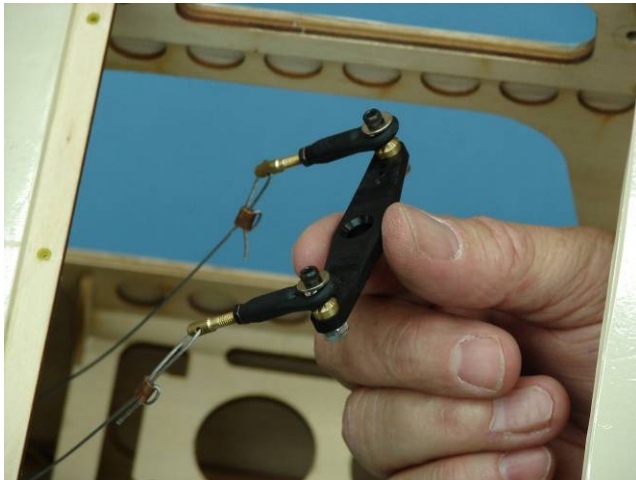11. Cut off excess cable at this time.

12. A drop of thin CA may be applied to the swage tube to help secure the cable.

13. Repeat for other side rudder control linkage.

14. Using 4-40 bolt, flat washer and lock nut, install the ball links onto servo arm as shown below.

15. Assemble the ball links between the control horns as shown. Secure with nylon lock nut.

Note: Mount ball link to inner control horn hole to obtain full rudder deflection
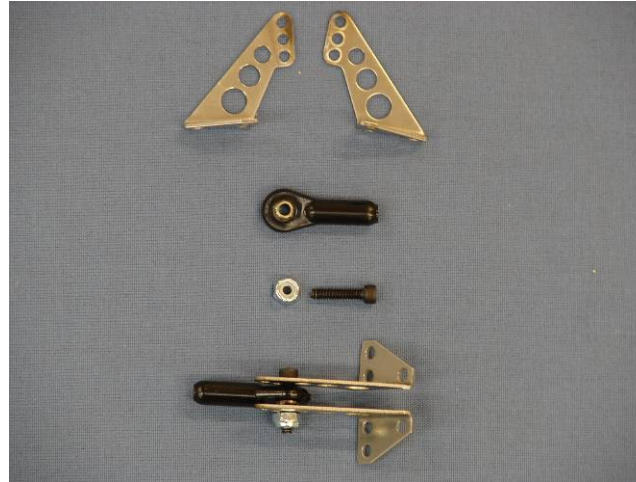
16. Pass the 2x20mm Phillips head bolts through one control horn and then through the pre-drilled holes in the rudder.

17. Install the remaining control horn and secure in place with six 2mm nuts

18. Final control horn installation shown below. Tighten the 2mm bolts evenly, this will prevent the control horns from crushing the rudder.

19. Secure nuts with a drop of thick CA. This will prevent them from coming loose in flight.

20. Plug the rudder servo into the rudder channel of the receiver and power up. Turn on transmitter to center rudder servo.
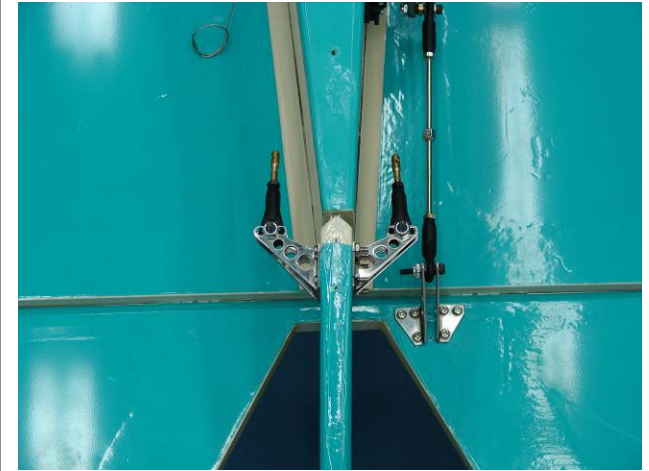

21. Tape the rudder balance tab to the top leading edge of the vertical fin in the neutral position as shown. This ensures the rudder is straight when the cables are attached.

22. Pull cable snug and attach pull pull cable to rear ball links.

23. Adjust the tension of the pull pull cables until they are tight. Overly tightening cables can bind or slow servo movement. Adjust cables to allow for some slack as shown.

Note: Due to temperature change and normal wear, it may be necessary to tighten the cables over time.
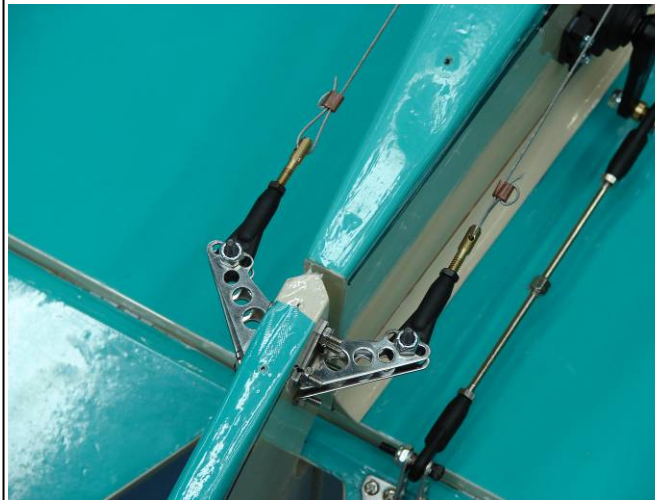
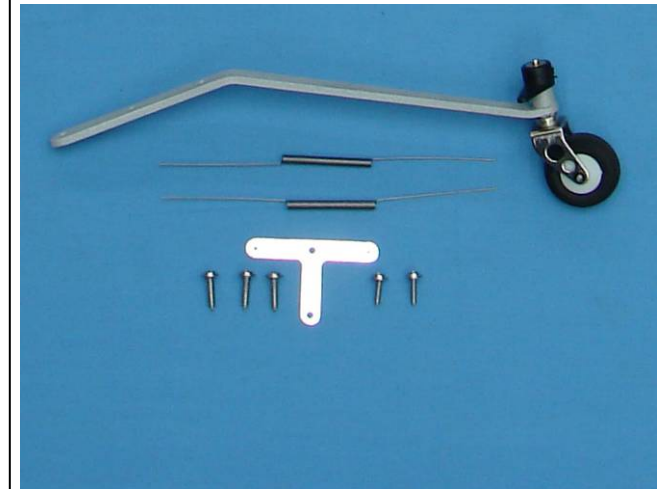

TAIL WHEEL INSTALLATION

1. Gather the tail wheel assembly items as shown below.

Required Parts
- ◊ 1 - Tail wheel assembly
- ◊ 3 - Tail wheel mounting screws
- ◊ 1 - Steering tiller
- ◊ 2 - Tiller mounting screws
- ◊ 2 - Steering springs

Required Tools and Adhesives
- ◊ 1 - Phillips Screw Driver
- ◊ 1 - 1oz Bottle Gap Filling CA Glue
- ◊ 1 - .34oz Bottle Blue IC-Loc Thread Locker

2. Place tail wheel steering tiller over the pre-drilled holes in the bottom of the rudder.

3. Apply a drop of thick CA to the mounting screws before inserting into the tiller mounting holes.

4. Mount the tail wheel steering tiller using two wood screws.
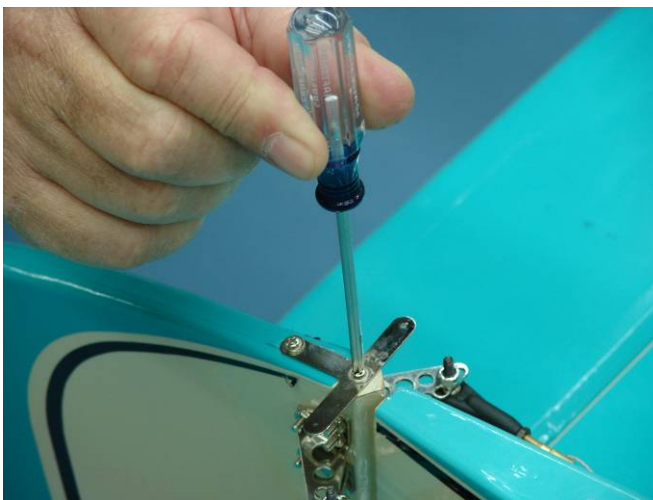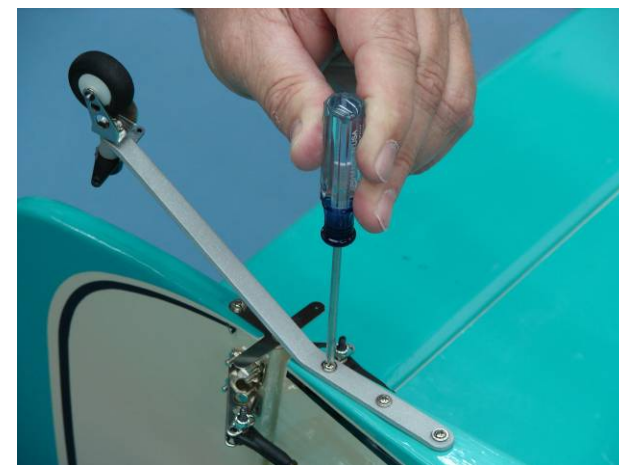
5. Place tail wheel strut over the pre-drilled holes in the bottom rear of the fuse.

6. Place a drop of thick CA on tail wheel strut mounting screws before inserting in the pre-drilled mounting holes on the bottom rear of the fuse.

7. Mount the tail wheel strut using three wood screws.

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8. Tape the rudder boost tab in place to keep the rudder aligned while tightening the steering springs.
9. Attach the steering spring to the rudder tiller. Center the spring between both tail wheel and steering tillers.

10. Twist spring end tight with pliers.

11. Repeat spring installation for other side.

12. Bottom view of completed tail wheel installation.

MAIN LANDING GEAR AND WHEEL PANT INSTALLATION

1. Gather the following items shown below for the main landing gear assembly.

Required Parts
- ◊ 1 - Aluminum landing gear strut
- ◊ 2 - 3 1/2" Foam Tires
- ◊ 2 - Axles with lock nuts
- ◊ 4 - Wheel collars
- ◊ 4 - 8-32 mounting bolts
- ◊ 4 - 8-32 Lock washers
- ◊ 4 - 8-32 Flat washers
- ◊ 2 - Wheel pants
- ◊ 4 - 4-40 Bolts
- ◊ 4 - 4-40 Lock washers
- ◊ 4 - 4-40 Flat washers

Required Tools and Adhesives
- ◊ 1 - 9/64" Ball Driver
- ◊ 1 - 12mm Open End Box Wrench
- ◊ 1 - .34oz Bottle Blue IC-Loc Thread Locker
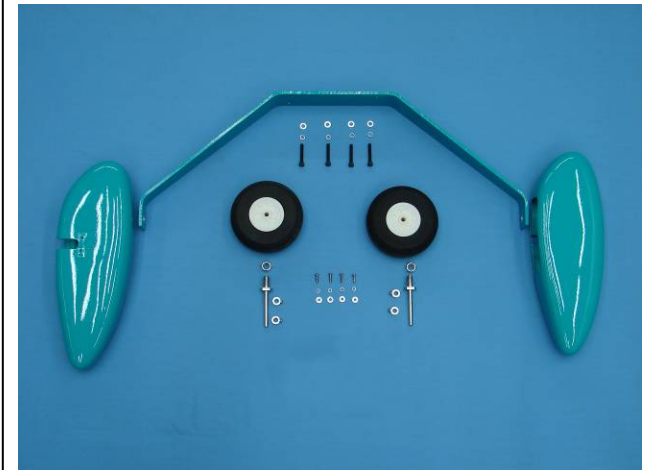
2. The tapered edge of the landing gear goes to the back of the airplane.

3. Attach the landing gear with bolt and flat washer. Use a drop of blue Loctite on landing gear bolts before attaching the landing gear.
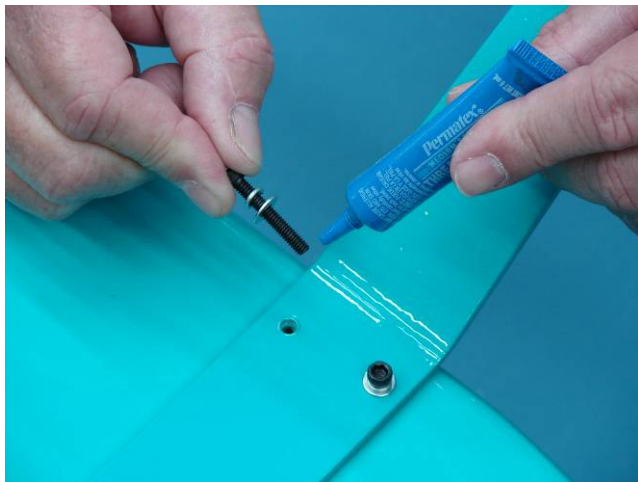
4. Bolt landing gear strut to fuse with (4) 8-32 bolts and washers.
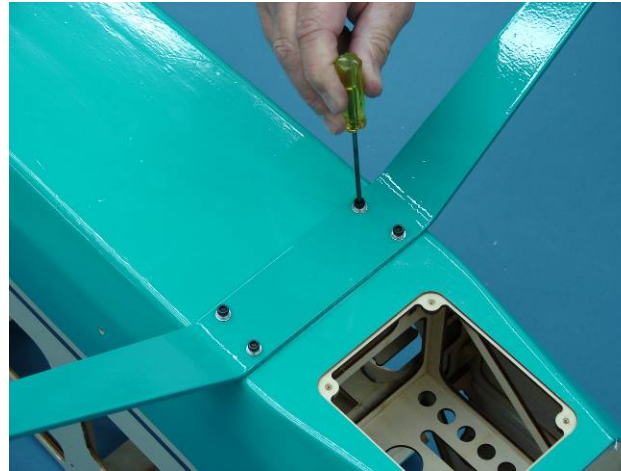
5. Install the axle into the gear strut with lock nut. Only snug tighten at this time.

6. Check alignment of axle with cutout in wheel pant. Check alignment of wheel pant mounting holes with mounting holes in gear. Securely tighten axel to gear strut.
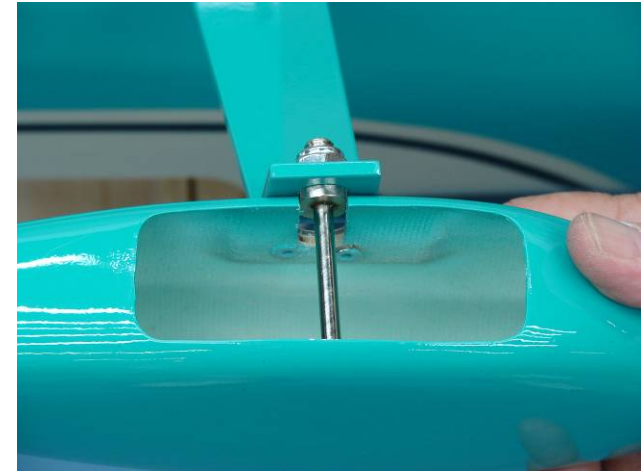
7. Install inner wheel collar. Use blue Loctite on the wheel collar set screw before final tightening.
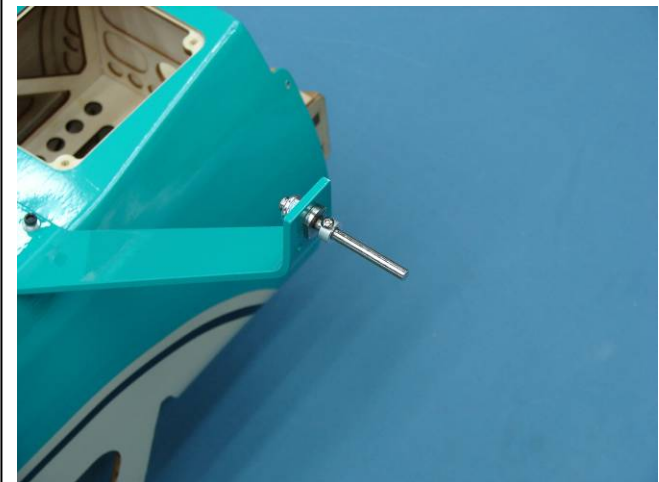
8. Install 3 1/2" wheel and outer wheel collar. Use blue Loctite on the wheel collar set screw before final tightening

9. Slide the lock washer then the flat washer on the wheel pant mounting bolts. Use blue Loctite on the bolts before final tightening.

10. Final installation of wheel pant with two mounting bolts.

11. Repeat previous steps for other wheel and wheel pant.

ENGINE INSTALLATION

1. The 30cc Bravata will accept a wide range of engine types. The DLE 30 engine with J'tec pitts muffler was used for the test flights. Gather the following items needed for engine installation:

Required Parts
◊ 1 - Universal Mounting Template

Required Parts -Not Included
◊ 1 - 30cc Engine: DLE 30 Shown
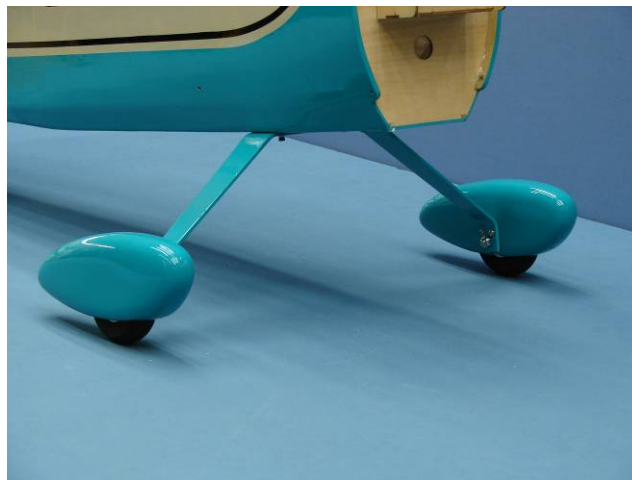◊ 4 - DLE 30 Standoffs w/ Mounting Bolts
◊ 8 - 1/2" Diameter Fender Washers
◊

Required Tools and Adhesives
◊ 1 - Pencil
◊ 1 - Masking Tape
◊ 1 - Electric Drill
◊ 1 - 3/16" Drill Bit
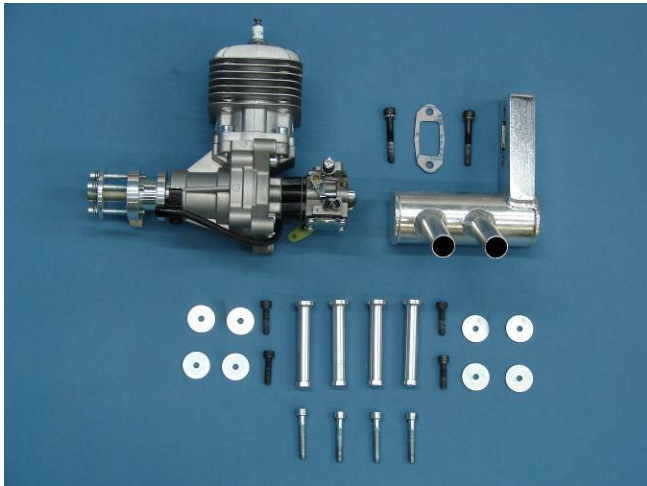
Universal Template:

2. If using a motor that is not a DLE 30 please follow these directions for using the universal template. **If a DLE 30 is to be used, please skip to step #1 On page #33**
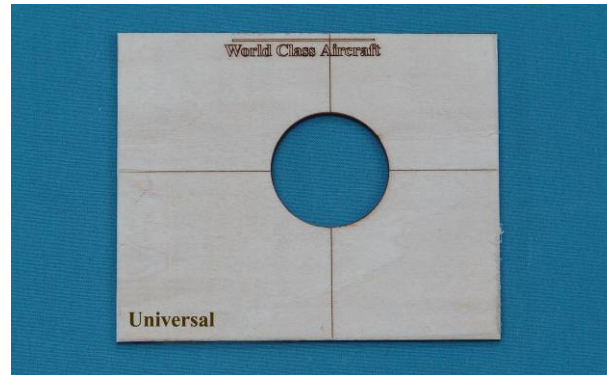
3. Place the engine on universal mounting template as shown. Use a square to align the propeller output shaft with the pre marked thrust lines on the template.
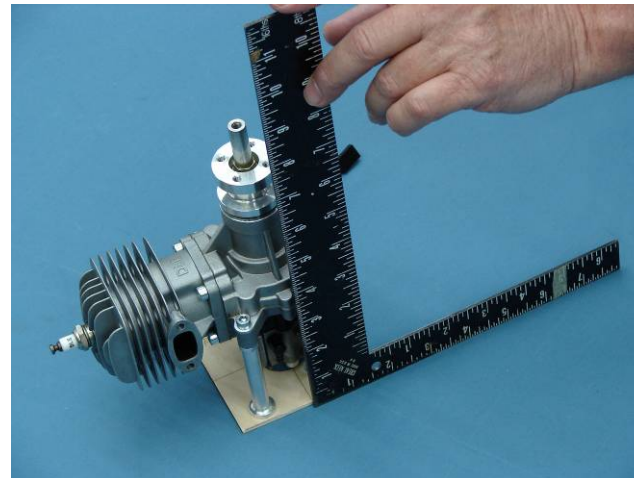
4. Mark the location of the standoffs on the template as shown. Ensure that the motor does not move during this step.
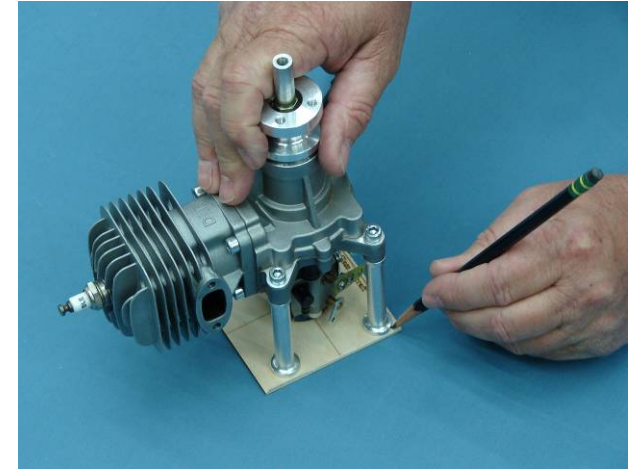
5. Use a stencil to fill in any missed parts where the standoffs were marked in step 4.
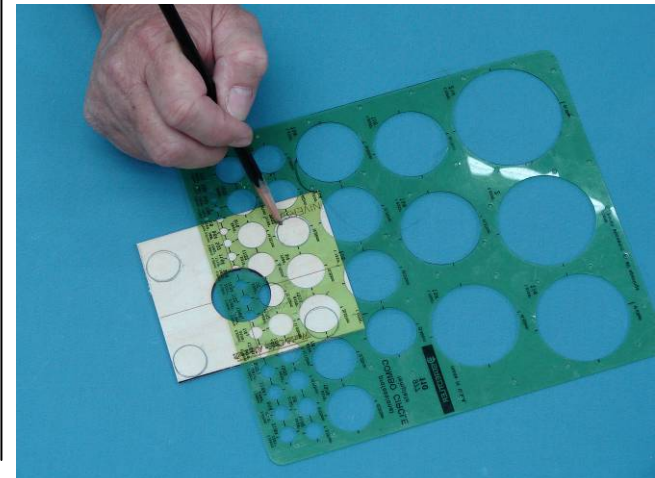
6. Mark the center of each standoff location as shown.
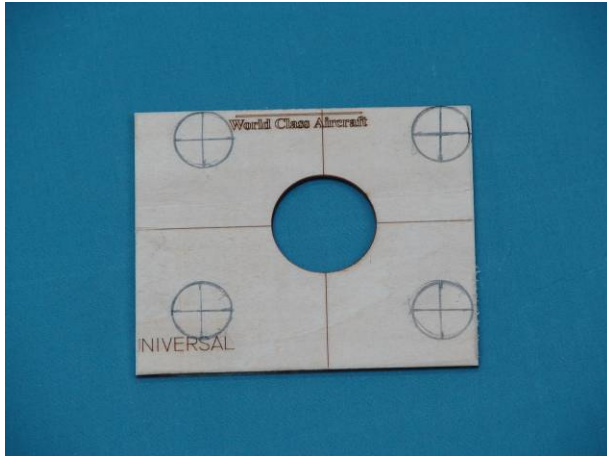
7. Use a 3/16" drill bit to drill the four mounting hole locations as shown below.

8. Align laser etched lines on template with lines on firewall. Use a felt tip marker to mark the location of the mounting holes.

9. Follow the remaining engine mounting steps for mounting instructions.

DLE 30 Installation

1. The firewall has been pre marked for the DLE 30 gas engine.
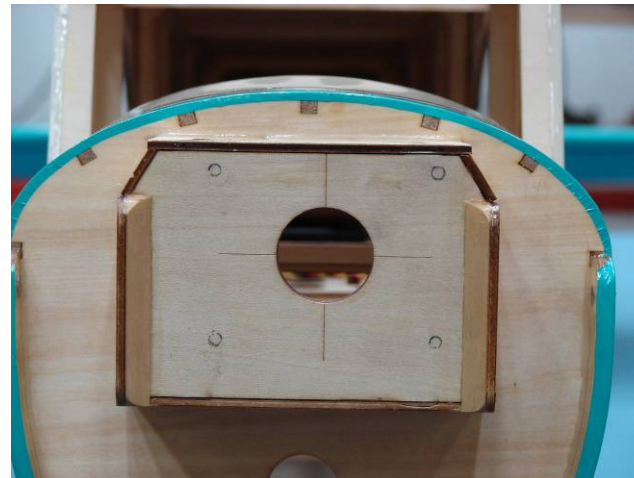
2. Use a 3/16" drill bit to drill the engine mounting holes in firewall.
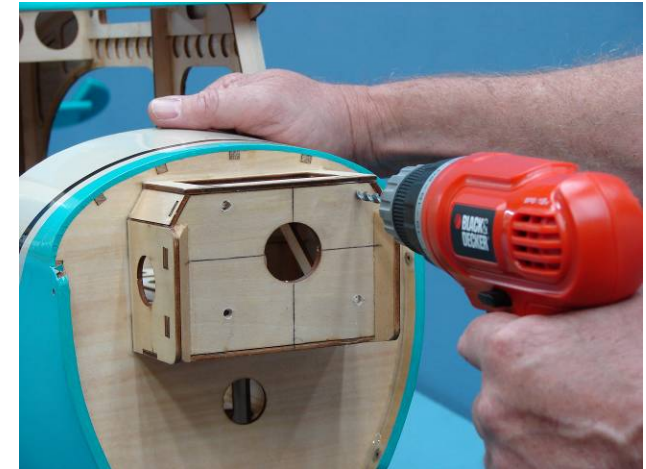
3. Using mounting bolts and flat fender washers mount engine to firewall.

4. Use blue loctite to secure the engine mounting bolts in place. This will insure that the mounting bolts stay in place over time.
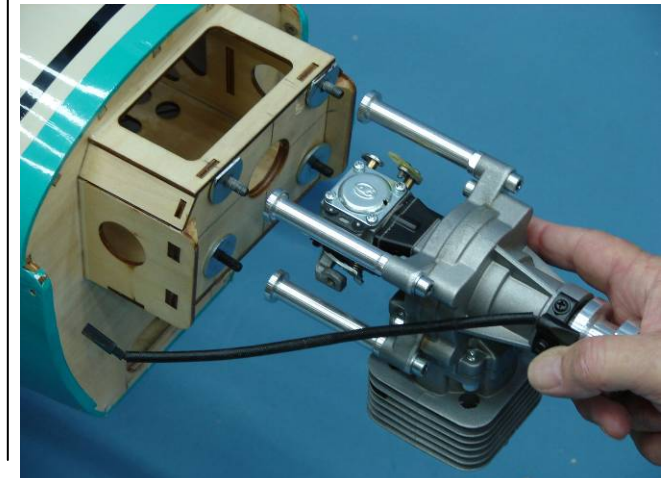
5. Tighten the bolts evenly to prevent crushing of the firewall.
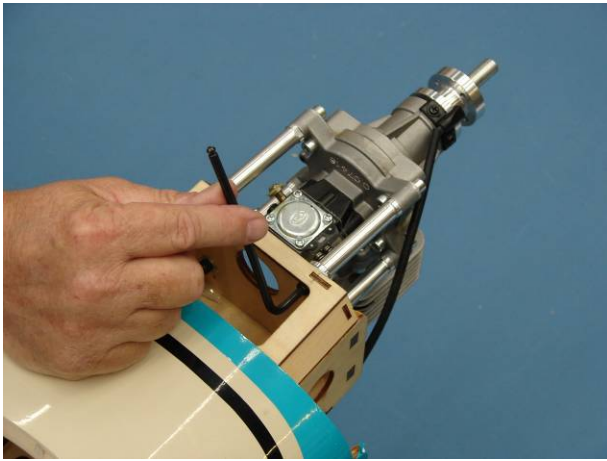
6. Distance from front of firewall to front of engine prop hub is **6 3/8"**.

Note: Use aluminum stand offs (supplied with engine) and washers (not supplied) to achieve correct distance.

Mounting Distance is: 6 3/8"
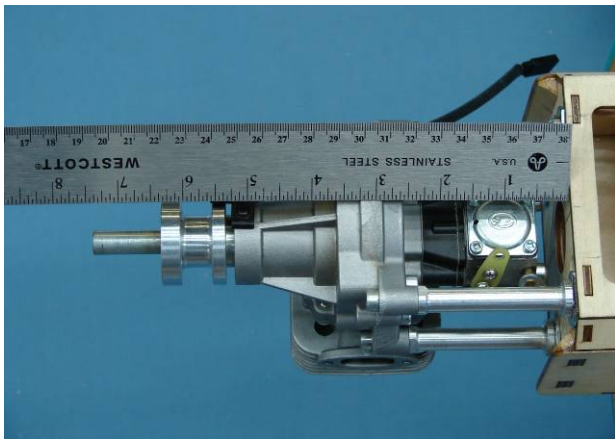
IGNITION INSTALLATION

1. Gather the items shown below for ignition installation.

Required Parts
◊ 2 - 8x80x300mm Foam Pad
◊ 3 - 8x450mm Nylon Ties

Required Parts -Not Included
◊ 1 - Ignition Module
◊ 1 - Battery *(2600mah Li-Ion Shown)*
◊ 1 - Ignition Regulator *(Smart-Fly Shown)*
◊ 1 - Ignition Switch *(MPI Shown)*
◊ 4 - Aeroworks Safety Clips
◊ 1 - Dubro Universal Kwik-Switch Mount Part# 203
◊ 1 - Dubro Ball Link Sockets Part #188

Required Tools and Adhesives
◊ 1 - Pencil/felt tip pen
◊ 1 - Electric Drill
◊ 1 - 1/16" Drill Bit
◊ 1 - Wire Cutter
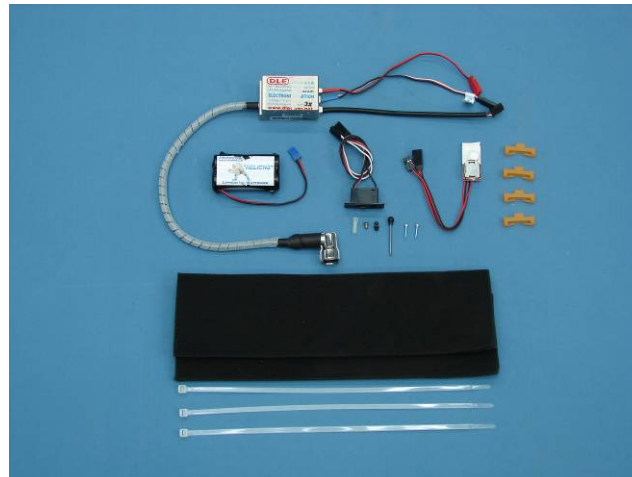
2. Position the ignition module on the side of the engine mounting box and mark the location of the nylon tie holes as shown.
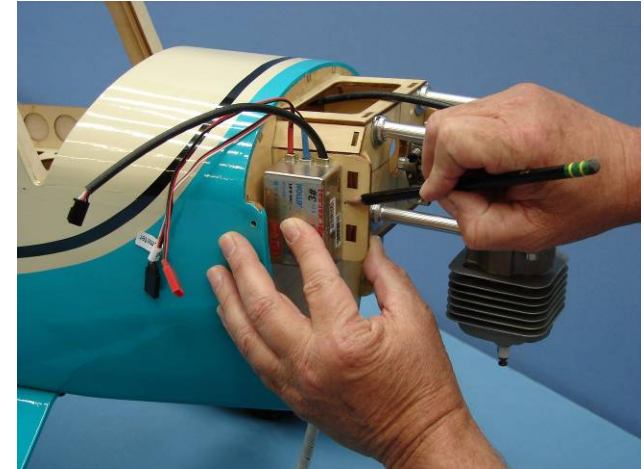
3. Use a 1/4" bit to drill the ignition module mounting holes.

4. Thread nylon tie through mounting holes.

5. Roll the supplied foam rubber to make a 4 layer pad as shown. Make the pad slightly larger than the ignition module.
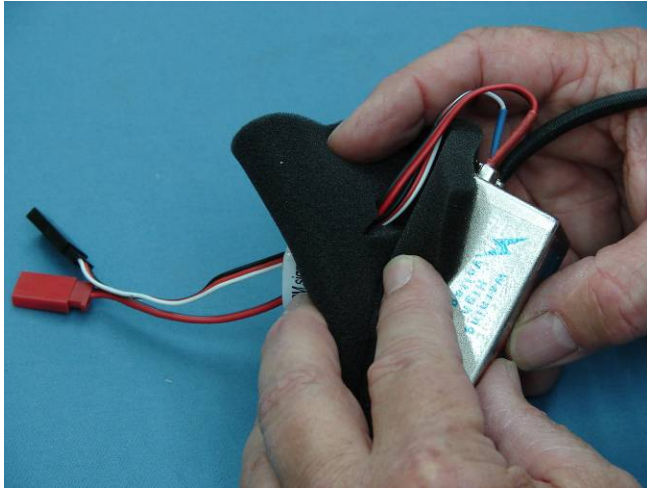
6. Secure ignition module with nylon tie as necessary.
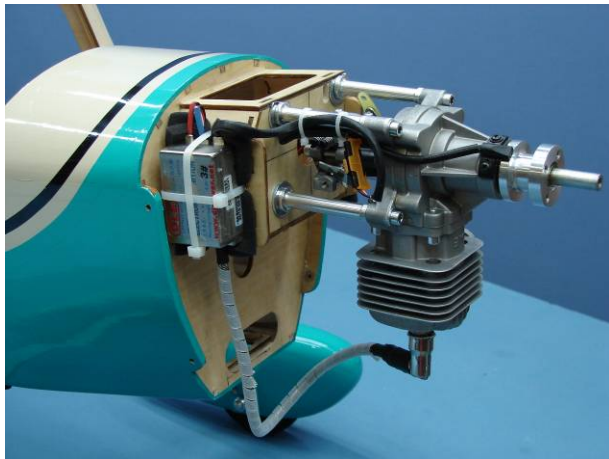
7. Using a nylon tie, install the ignition battery as shown.
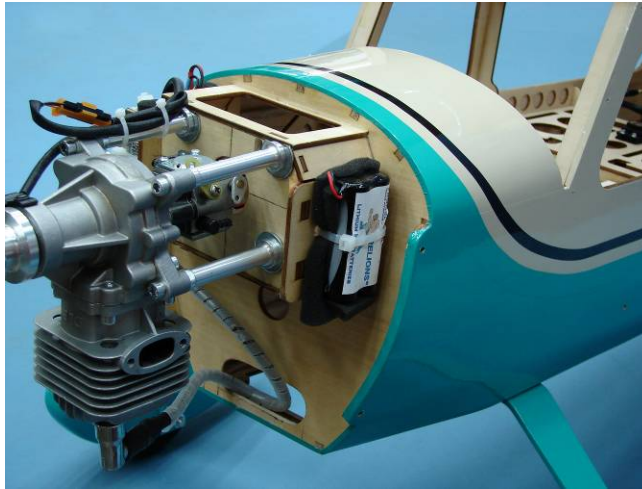
8. Using a pin vice carefully drill into the sliding portion of the switch as shown.
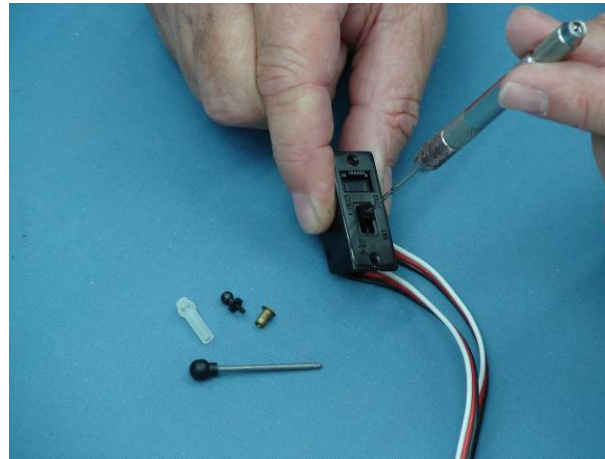
9. Install the threaded ball onto the sliding portion of the switch.
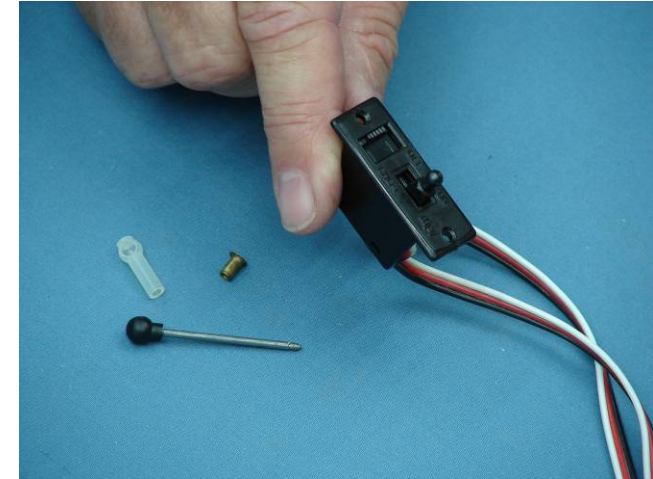
10. Switch mounting holes have been cut into the radio floor. Install your switch using the hardware supplied by the switch manufacturer.

11. Use a ball driver to locate where the switch pushrod will exit the fuse. Lightly mark the wood in this area being careful not to push through the fuse side.

12. Using a hobby knife, puncture the location marked in the previous step. This will allow you to drill from the outside.

13. Use a pin vice to drill through the fuse side as shown.
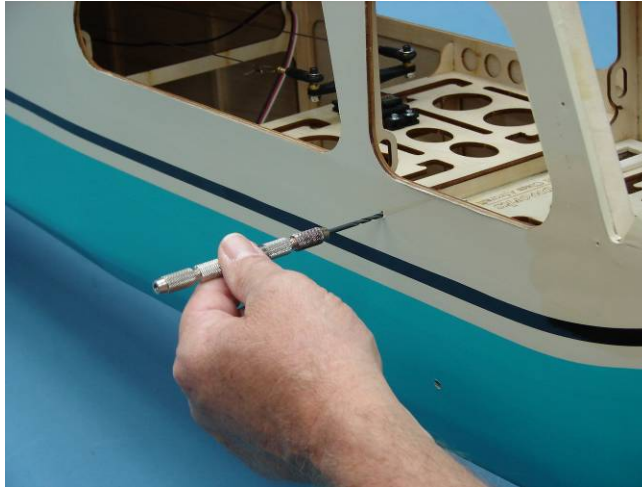
14. Glue a brass servo eyelet into the hole. This will keep the hole from widening over time.

15. Snap ball link socket onto ball and thread the switch pushrod into the ball link.

16. Finished ignition switch installation show.

17. Using a small piece of hook and loop material, secure the Smart-Fly ignition regulator to the fuse floor.
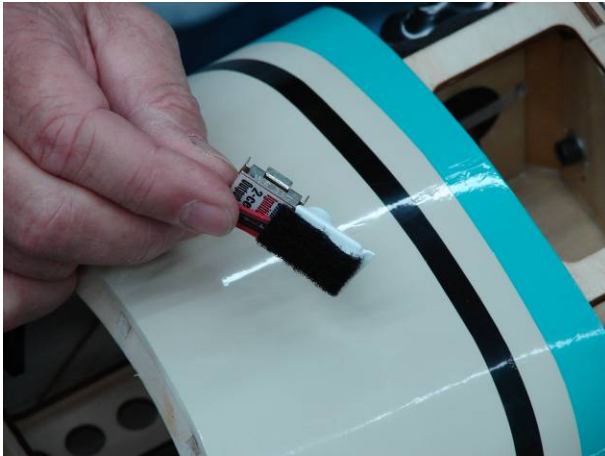
18. Final ignition regulator installation shown below.
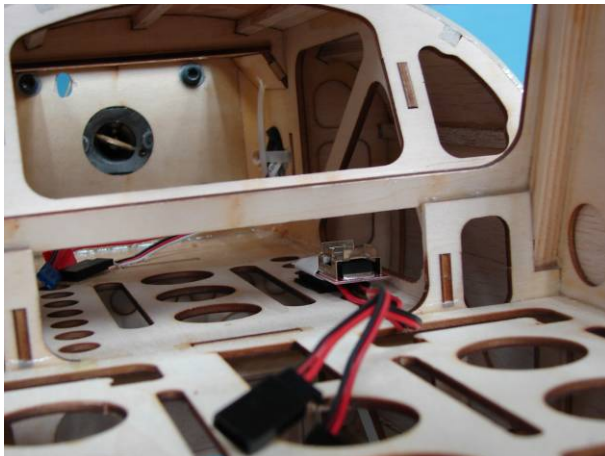
1. Gather the throttle and choke items as shown below:

Required Parts
◊ 1 - Prebuilt Plywood Servo Mount
◊ 1 - 4-40x300mm Threaded Pushrod
◊ 1 - 4-40 Threaded Solder Coupler
◊ 2 - 4-40 Ball Links
◊ 2 - 4-40x16mm Hex Head Bolts
◊ 2 - 4-40 Lock Nuts
◊ 1 - Brass Spacer
◊ 1 - 3mm Flat Washer
◊ 1 - Servo Mount Template
◊ 4 - 4-40 Servo Mount Mounting Bolts
◊ 4 - 4-40 Flat Washers

Required Parts -Not Included
◊ 1 - Throttle Servo
◊ 4 - Servo Mounting Screws (Micro Fastener Part number **STW0209** recommended)
◊ 1 - 3/4" servo arm

Required Tools and Adhesives
◊ 1 - Pencil/felt tip pen
◊ 1 - Phillips Screw Driver
◊ 1 - 5/64" Ball Driver
◊ 1 - Electric Drill
◊ 1 - 1/16" Drill Bit
◊ 1 - 7/64" Drill Bit
◊ 1 - Rotary Cutting tool with Cutting Disk
◊ 1 - Wire Cutter
◊ 1 - Soldering Iron
◊ 1 - Silver Solder *"Sta-Brite Recommended"*
◊ 1 - 80 Grit Sandpaper
◊ 1 - .34oz Bottle Blue IC-Loc Thread Locker
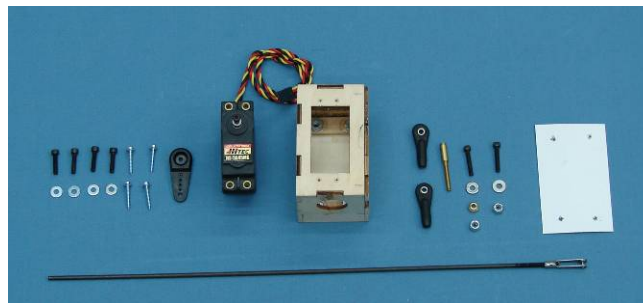
2. Mark the location of the throttle pushrod on the firewall as shown.
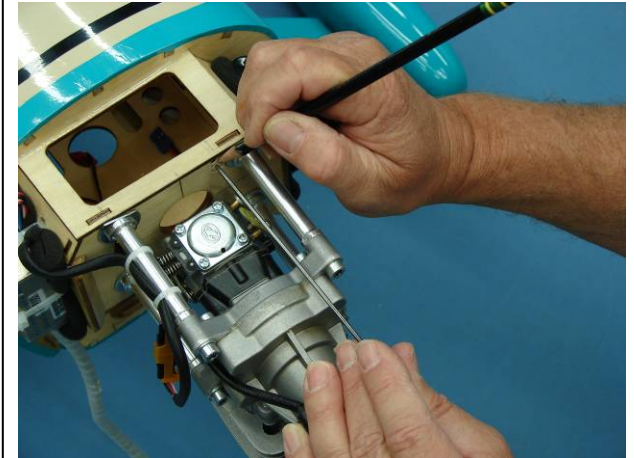
3. Use a drill bit to drill the holes for the throttle pushrod.

4. Install the throttle servo in the preassembled laser cut mounting tray as shown below.
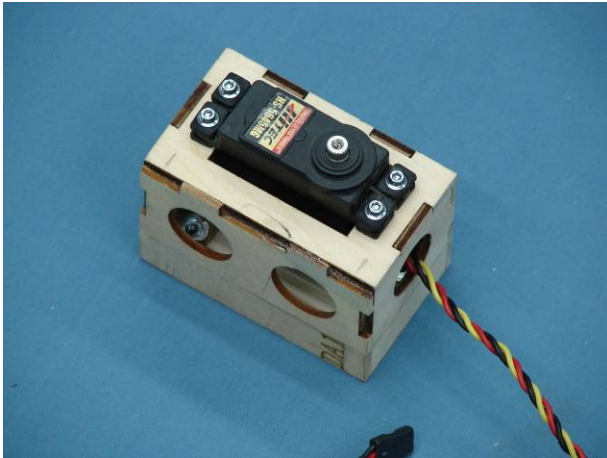
5. Place servo mounting tray inside motor box as shown.
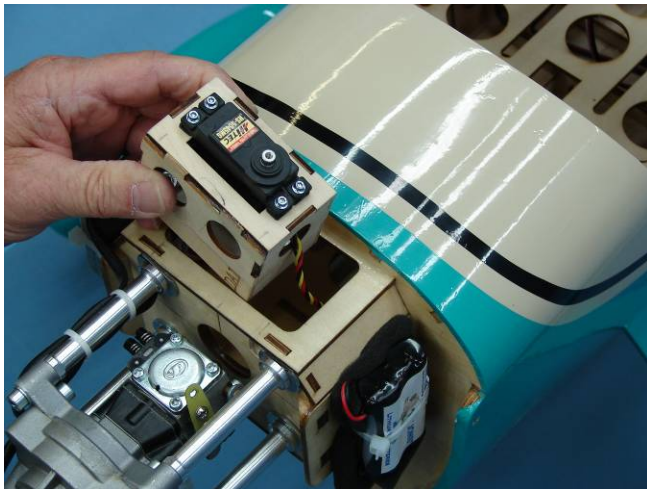
6. It may be necessary to shorten the threaded portion of the solder coupler as shown.

7. Thread ball link onto solder coupler as shown. Ball link should touch the non-threaded portion of the solder coupler.

8. Assemble brass threaded coupler to 4-40 ball link and ball link and brass spacer to the servo arm as shown below.

9. Placer Servo arm on servo. The servo arm should be parallel with the servo case.

Aeroworks 30cc Bravata Assembly Manual
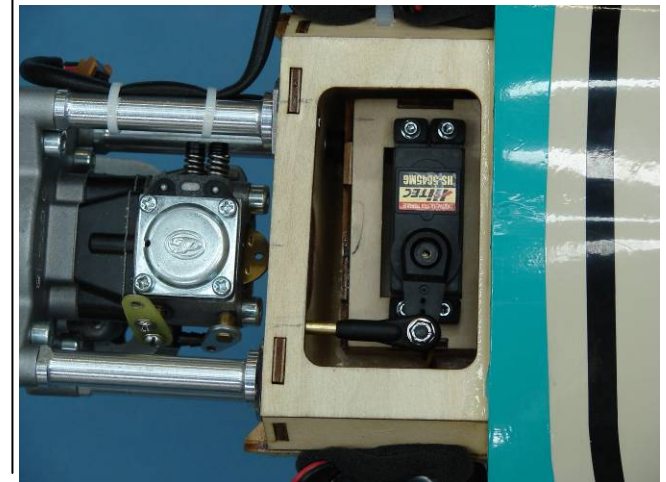
10. Mark the location of the throttle servo mount as shown. It may be necessary to go in through the cabin area to fully mark throttle servo mount.
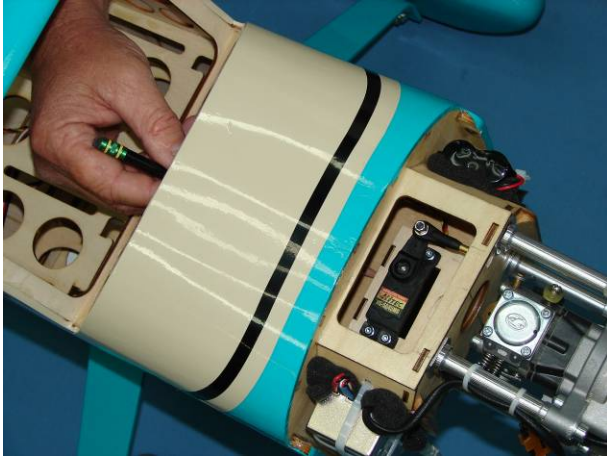
11. Finished throttle servo mount mark shown below.

12. Place servo mounting template in motor box and align with marks made in the previous steps.
13. Mark mounting holes onto motor box floor.
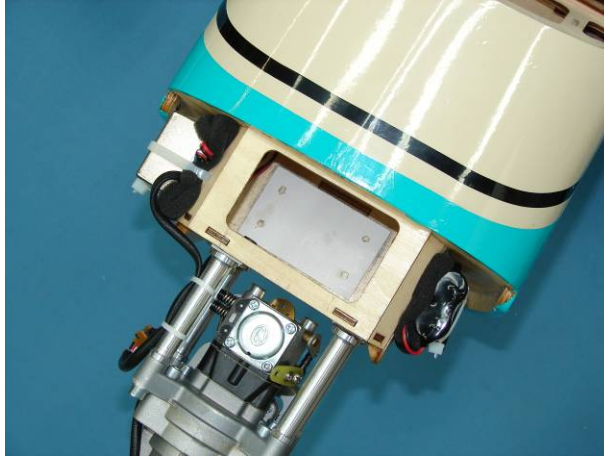
14. Drill all four mounting holes as shown. Use caution when drilling, drilling to fast may cause plywood to splinter around mounting hole.
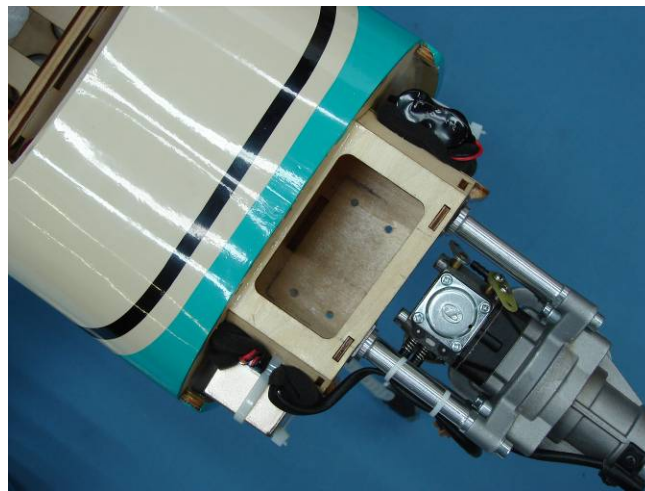
15. Place the 4-40 mounting bolt and flat washer through the mounting holes as shown. Mounting bolts will pass through the motor box with the heads accessible from the outside of motor box.

Note: Use blue loctite on mounting bolts.
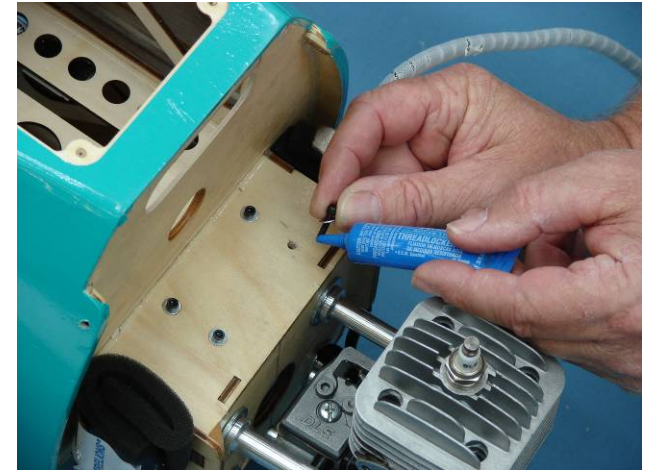
16. Place servo mount inside fuse and align with mounting bolts. Tighten mounting bolts at this time.
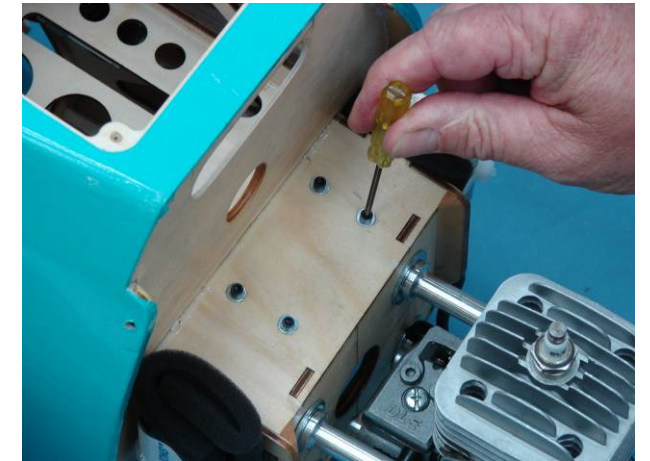
17. Assemble ball link to threaded end of pushrod.

Note: Thread ball link half way onto pushrod to allow for proper adjustment during final installation.
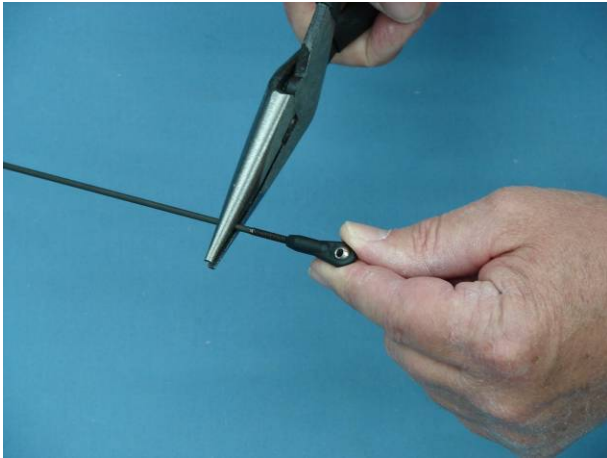
18. Attach throttle pushrod to the carburetor throttle arm with the 4/40 ball link

19. With servo arm still parallel to servo and throttle arm of carburetor in the center or half throttle position. Mark the cut location for the throttle push rod.
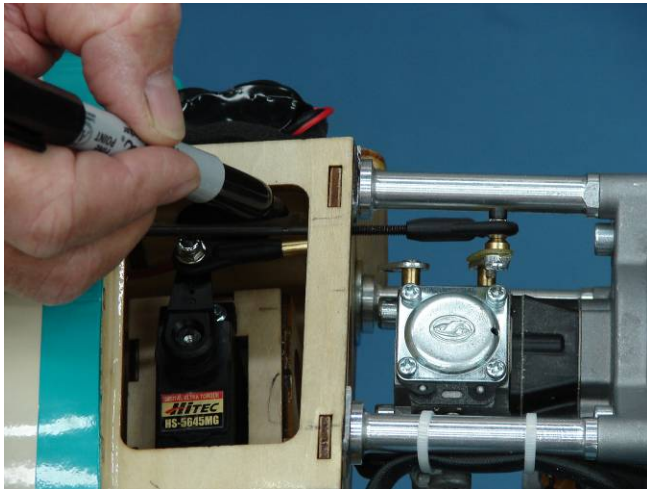
20. Solder throttle pushrod to brass coupler.

21. Attach the throttle pushrod with the 4/40 ball links and secure. Power up the receiver and throttle servo and adjust pushrod for proper operation. Ensure the servo or rod does not bind or jam at closed or full open positions.
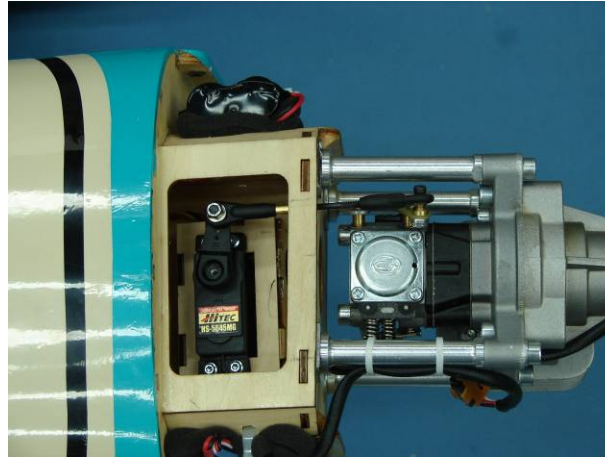
Choke Installation

1. Choke installation items shown below, items are not included.

◊ 1 - 4-40 metal rod threaded at one end
◊ 1 - 4-40 ball link assembly with hardware
◊ 1 - 4-40 Threaded insert
◊ 1 - Large Zip Tie
◊ 2 - Small Zip Ties
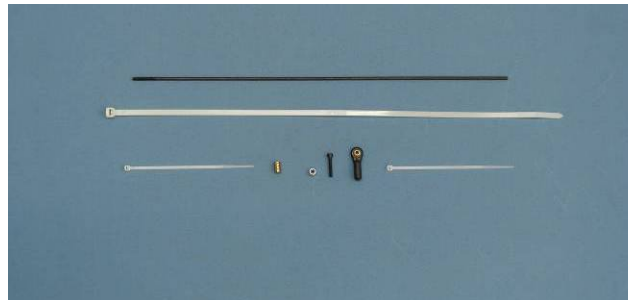
2. We recommend installing the carburetor choke pushrod as shown. Use nylon ties to provide support and holding friction for the choke pushrod. Place silicon fuel tubing over the wire pushrod to prevent damage from vibration and provide holding friction. Solder a threaded insert on the end of the pushrod to provide a finger grip.

3. Location of manual choke pushrod shown below.

FUEL TANK ASSEMBLEY

1. Gather the fuel tank parts as shown below.

Required Parts
- ◊ 1 - 450cc (15oz) Gas Tank
- ◊ 1 - Rubber Stoppers *(Universal)*
- ◊ 3 - Brass Tubes
- ◊ 1 - Aluminum Stopper Front Plates
- ◊ 1 - Aluminum Stopper Back Plates
- ◊ 1 - Phillips head bolts
- ◊ 2 - Brass Barbs for Fuel Line

Required Parts -Not Included
- ◊ 1 - Aeroworks Fuel Line Installation Kit

Required Tools and Adhesives
- ◊ Pencil/felt tip pen
- ◊ Phillips Screw Driver
- ◊ Wire Cutter
- ◊ Soldering Iron
- ◊ Silver Solder *"Sta-Brite Recommended"*
- ◊ 80 Grit Sandpaper
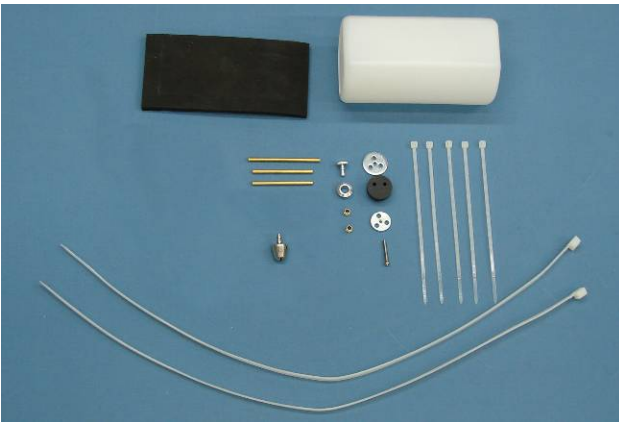
Fuel Line Installation kit available separately from Aeroworks

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.
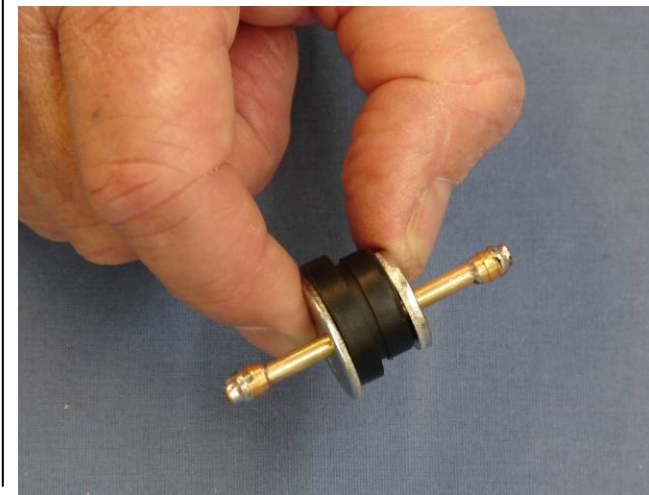
6. Install air vent tube into rubber stopper and bend upward.

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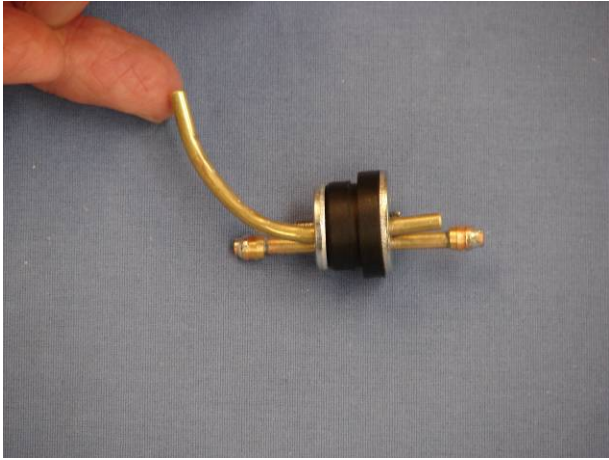
7. Install the fuel tubing and clunk. Secure the fuel tubing with nylon ties to the pick-up tube and clunk.

8. Insert the rubber stopper assembly into the tank with the vent tube at the top of the tank.
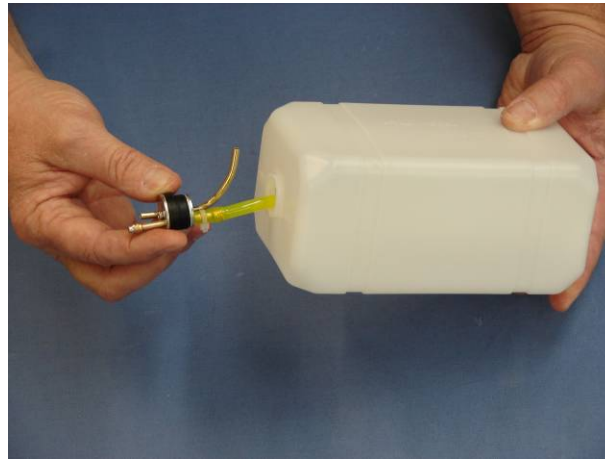
9. Secure the rubber stopper with set screw. Take care not to strip threads by over tightening set screw.

FUEL TANK INSTALLATION

1. Gather the fuel tank parts as shown below.

Required Parts
- ◊ 1 - 450cc (15oz) Gas Tank *Assembled*
- ◊ 1 - 6 x 130 x 70mm Foam Sheet
- ◊ 2 - 8 x 450mm Nylon Ties
- ◊ 7 - 3 x 150mm Nylon Ties

Required Parts -Not Included
- ◊ 1 - Aeroworks Fuel Line Installation Kit

Required Tools and Adhesives
- ◊ Pliers
- ◊ Wire Cutter
- ◊ Electric Drill
- ◊ Various Drill Bits for Fuel Dot Installation
- ◊ 1oz Bottle Gap Filling CA Glue
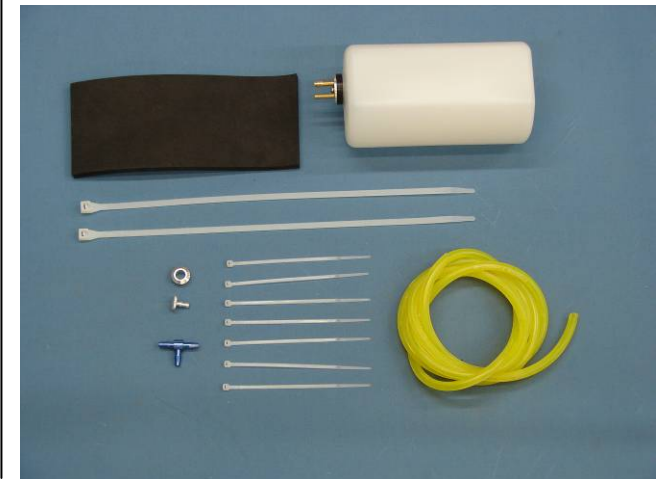
2. Thread nylon ties under tank mounting plate and center in position.

3. Install foam rubber pad for fuel tank to rest on. Foam rubber will help prevent fuel from foaming or getting air bubbles from engine vibration
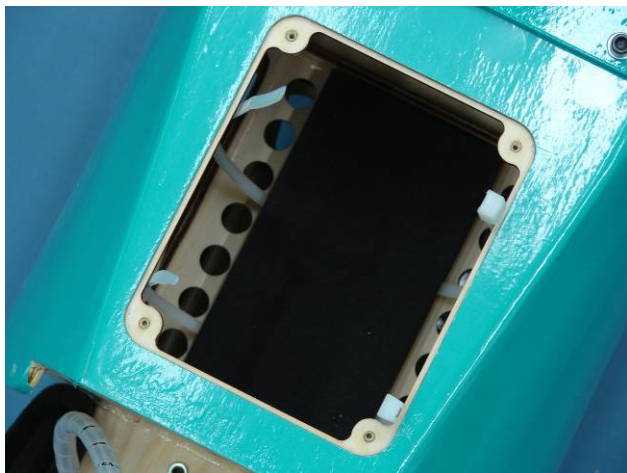
4. Tighten nylon ties to secure tank in place.

5. Use wire cutter to remove excess nylon tie after tightening.
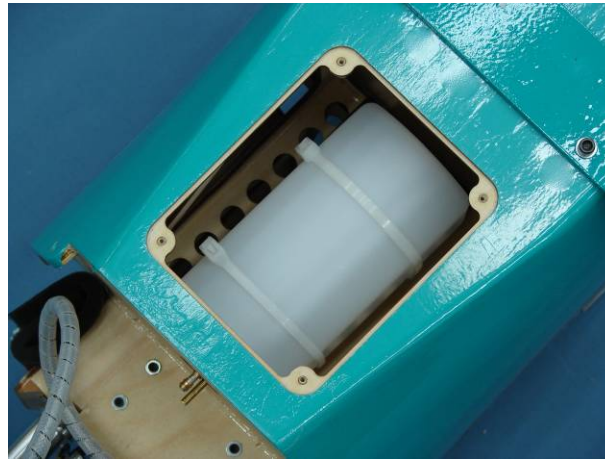
6. Install a short piece of fuel line and the fuel "T" to the fuel pick up tube.

Note: Using a heat gun to soften the fuel line will help with the installation of the fuel "T".

7. Install the fuel pick up and fuel filler lines to the fuel tank.

Note: It is recommended you always use a fuel filter on your gas can, filters should not be installed inside the airplane. Inline fuel filter can clog and cause your engine to quite.
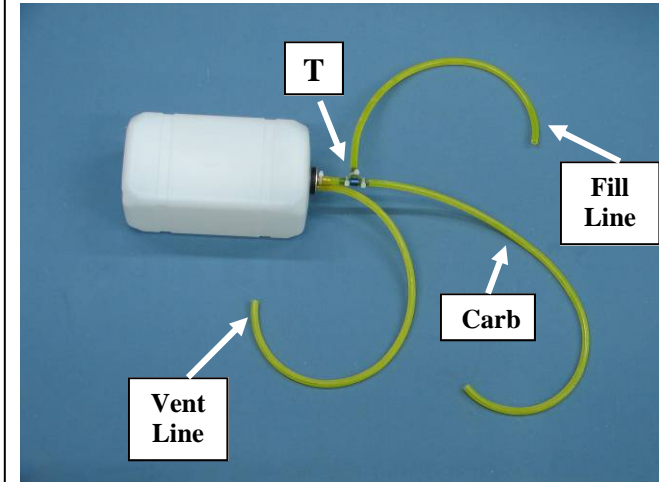
8. Use small nylon ties to secure fuel line.

Note: Gasoline will cause the fuel line to expand over time. Always secure fuel lines with nylon ties to prevent them from pulling off during flight.
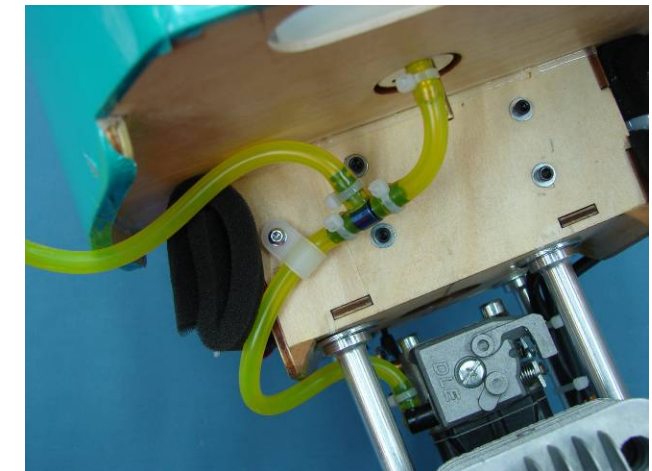
9. Gather the fuel filler dot and drill bits as shown below.

Note: We recommend you start with a smaller size drill bit then increase the bit size to the correct size to fit your filler dot. This will help prevent the fuse side from splitting or cracking.

10. Mark location of fuel filler dot.

11. Drill hole to accommodate fuel filler dot.

12. Use thick CA to secure fuel dot in fuse.

13. Drill a hole in the front fuse former and install a large grommet as shown. Pass filler line through grommet and into fuse.

14. Feed filler line through dot and plug line into filler plug as shown.
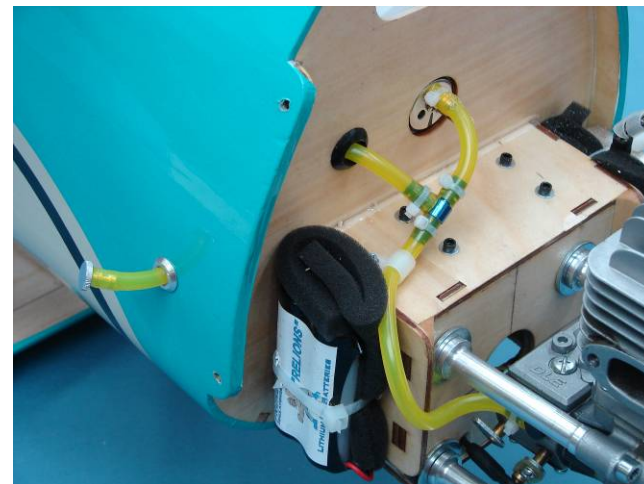
15. Feed vent line tubing through bottom of fuse. Cut off excess fuel line.

Note: Place a zip tie around the vent line as shown. Be careful not to tighten the zip tie to the point of closing the vent line. This will prevent the vent line from falling back inside the fuse and flooding the airplane with gas during fueling.

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FUSELAGE BOTTOM HATCH INSTALLATION

1. Gather the Fuse Bottom Hatch items as shown below.

Required Parts
- ◊ 1 - Fuse Bottom Hatch w/Air Vent
- ◊ 1 - Fuse Bottom Hatch w/o Air Vent
- ◊ 4 - Phillips head mounting screws

Required Tools and Adhesives
- ◊ Phillips head screw driver

2. Two different fuse bottom hatches have been included with the 30cc Bravata. If using a single cylinder motor that is mounted inverted it is highly recommended that the air exit hatch be used. This hatch has been designed to remove hot air from inside the cowling while also keeping it out of the fuselage. An inlet hole has already been cut in the fuse former to allow air to pass into the air exit hatch.

3. If a different motor option is used, a solid hatch has been provided.
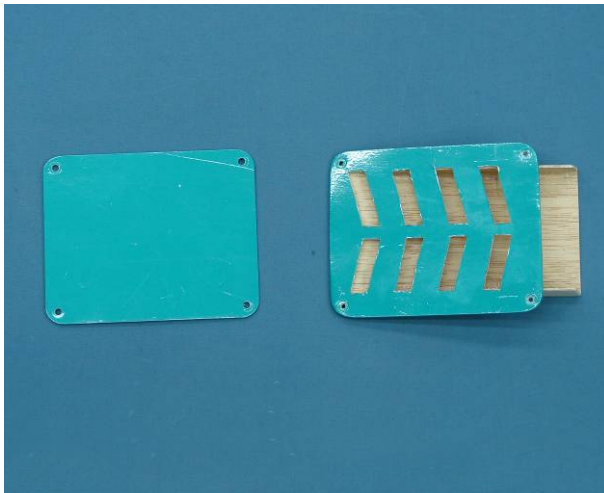
4. Place hatch into pre cut mounting location as shown. Make sure that the air scoop correctly align with the air inlet in the fuse former.
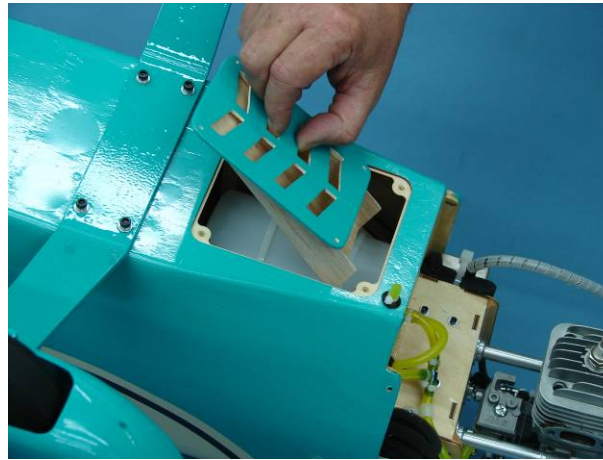
5. Secure hatch with four Phillips head mounting screws as shown.

Note: Aeroworks has found this method to provide sufficient cooling for the DLE 30 gas engine. It is still important to check motor temperatures to ensure it is not running too hot. If your engine does run hotter than the manufacturer suggest, cooling hole may need to be made in the cowling.
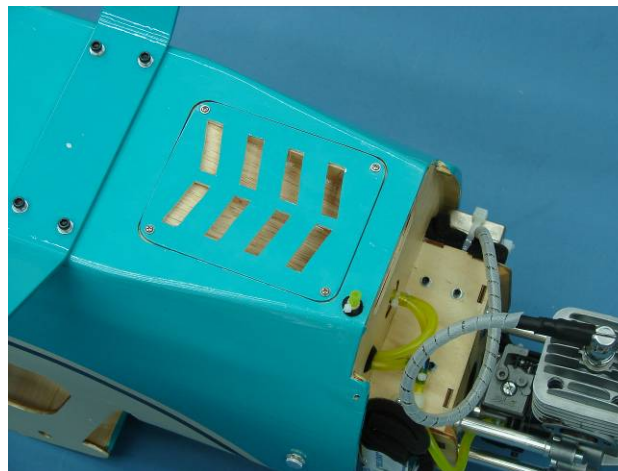
COWLING INSTALLATION

1. Gather the following items for the cowling installation.

Required Parts
- ◊ 1 - 30CC Bravata Cowling
- ◊ 1 - 3 x 6" Card Stock for Muffler Template

Required Tools and Adhesives
- ◊ 1 - Felt tip pen
- ◊ 1 - Masking Tape
- ◊ 1 - Rotary Cutting tool with Cutting Disk
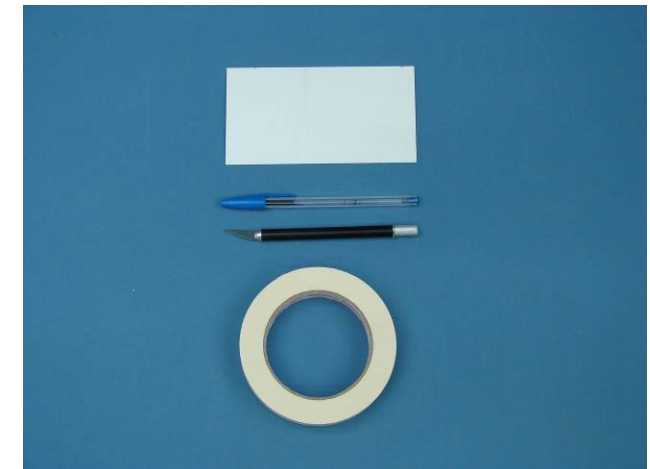
2. Temporarily install wrap around pitts muffler to engine as shown.
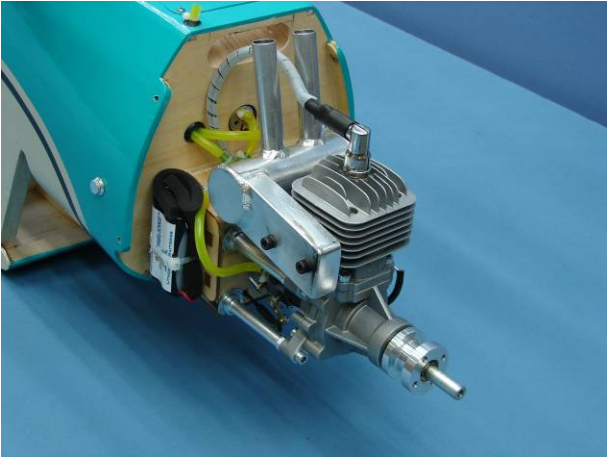
3. Tape card stock to bottom of fuse and mark its location. This will ensure the template is placed in the exact spot when marking the cowl.
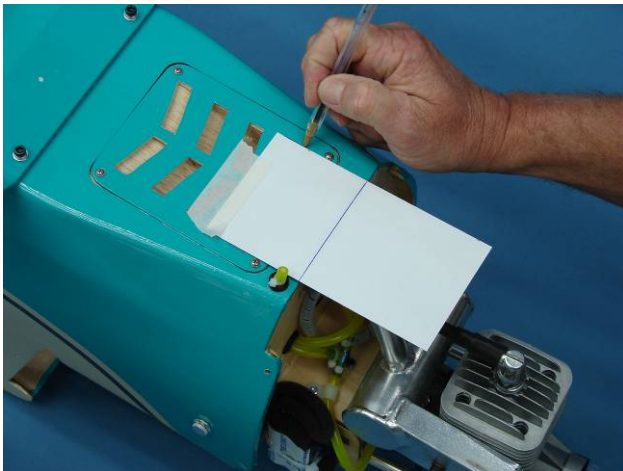
4. Fully tape card stock to fuse to prevent it from shifting while marking muffler exit location.
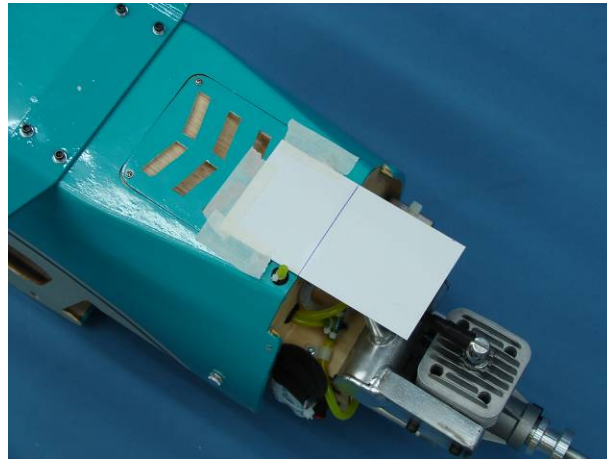
5. Mark the location of the individual exhaust exits as shown.
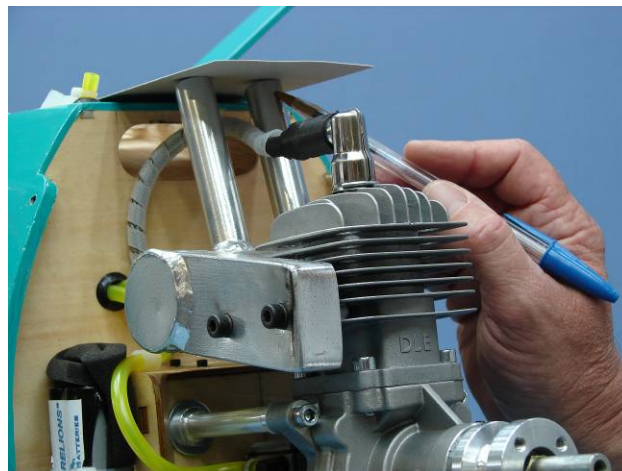
6. Remove template from fuse and using a hobby knife to remove card stock from marked areas of template.
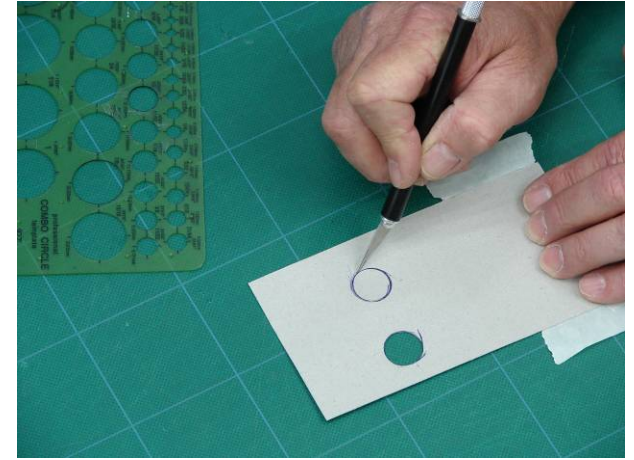
7. Place template back on fuse aligning with marks made in a previous step.

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.
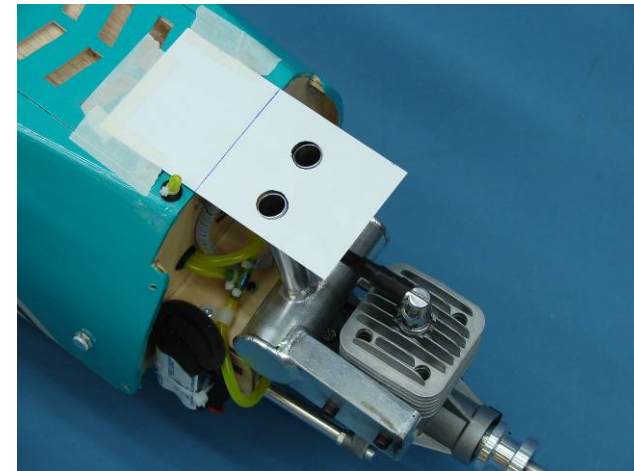
9. Remove pitts muffler from engine at this time. Use caution not to disturb the template.
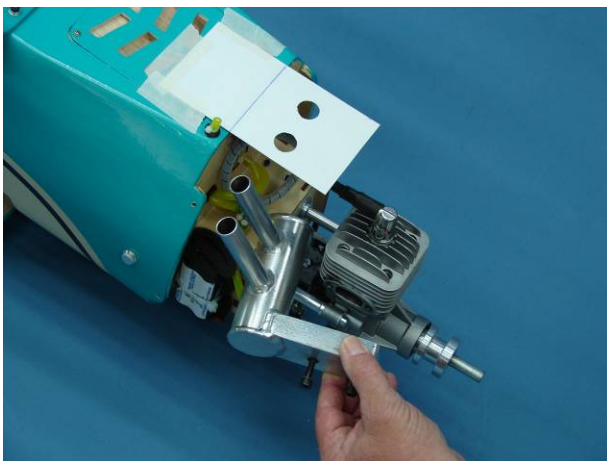
10. Align template with bottom of cowl. Use a felt tip marker to transfer the template cutout pattern to the cowl and mark cut location.

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!
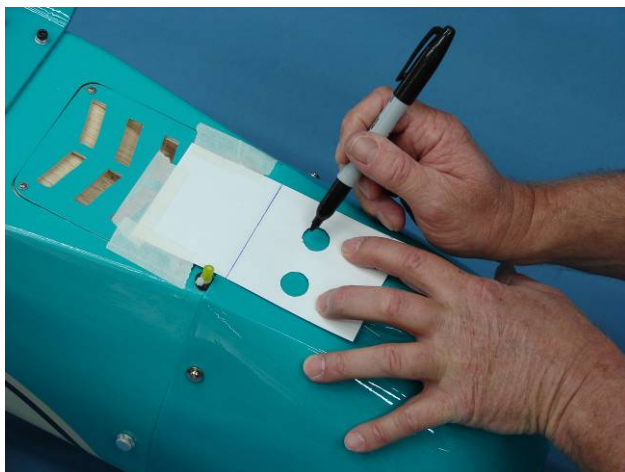
11. Remove the template and use a rotary cutting tool and sanding drum to cut out the openings in the cowl.

Note: Take care not to cut or scratch the cowl.

12. Reinstall muffler using the supplied gasket or high temp silicon gasket material and securely bolt to cylinder head.

1. Gather the following items to cut the front air inlet.

Required Parts
◊ 1 - 30CC Bravata Cowling
◊ 1 - Front Air Inlet Template
◊ 4 - 4-40 Cowl Mounting Bolts
◊ 4 - #6 Bonded Washers

Required Tools and Adhesives
◊ Felt tip pen
◊ Masking Tape
◊ Rotary Cutting tool with Cutting Disk
◊ Ruler
◊ 5/64" Ball Driver

2. Front air inlet has been designed for inverted motor installation. If using a different motor installation these inlet holes are not required.

3. Ensure front air inlet aligns with engine head. This will allow maximum airflow over the cooling fins of the engine.
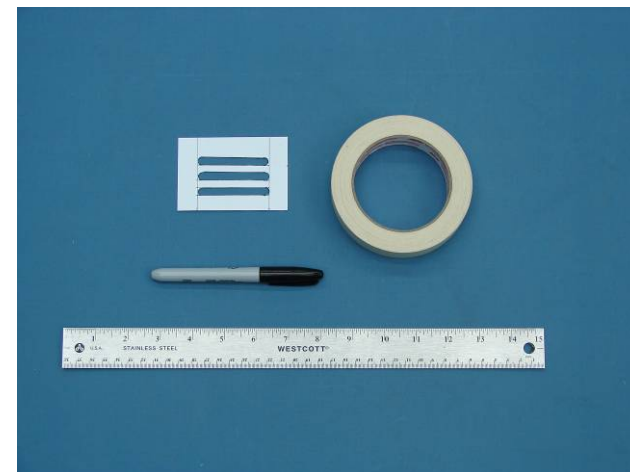
4. Align template with front of cowl. Use a felt tip marker to transfer the template cutout pattern to the cowl and mark cut location.

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!

5. Remove the template and use a rotary cutting tool and sanding drum to cut out the openings in the cowl.

Note: Take care not to cut or scratch the cowl.

6. Finished front air inlet cutout shown below.

Builders Tip: A round dowel wrapped with 120 grit sandpaper can be used to clean up cutouts. This will ensure all 3 cutouts are the same size and have the same radius.

7. Mount cowl to the fuse using
   (4) 4-40x16mm button style hex head bolts
   (4)#6 bonded washers

RADIO INSTALLATION

1. Gather the radio installation items as shown below.

Required Parts
- ◊ 2 - 8x80x300mm Foam Pad
- ◊ 3 - 356x12.5mm Velcro Straps

Required Parts -Not Included
- ◊ 1 - Receiver 6-8 channel recommended
- ◊ 1 - Batteries *(2600mah Li-Ion Shown)*
- ◊ 1 - Regulators *(Fromeco Sahara Shown)*
- ◊ 1 - Receiver Switch *(Smart-Fly Shown)*
- ◊ 4 - 18" Servo Extensions
- ◊ 1 - Dubro Universal Kwik-Switch Mount Part# 203
- ◊ 1 - Dubro Ball Link Sockets Part #188
- ◊ 1 - Adhesive backed Velcro
- ◊ 4 - Small Nylon Ties

Required Tools and Adhesives
- ◊ Pencil/felt tip pen
- ◊ Electric Drill
- ◊ 1/16" Drill Bit
- ◊ Wire Cutter
- ◊ Masking Tape
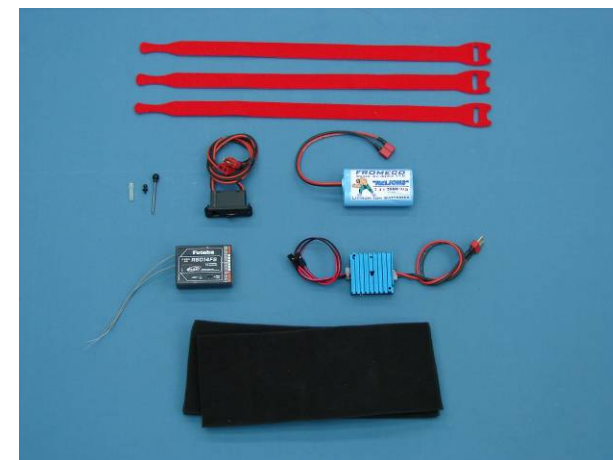
2. Install receiver switch using same steps outlined for ignition switch installation.

Note: Ignition switch installation shown on pages 35 and 36 Steps 8-16

3. Attach hook and loop material to the backside of the regulator as shown. Secure regulator to fuse floor.

Builders Tip: Placing thick CA on adhesive side of hook and loop material will allow it to adhere firmly to the plywood radio floor.

4. Slide 2 One Wrap Straps under radio tray as shown.

5. Install battery using foam padding and securely tighten one wrap straps as shown.

6. Mount the receiver using the same method as used for battery mounting.

7. Gather four 18" Servo extensions and small nylon ties as shown. This will be used to connect the ailerons and flaps to the receiver.
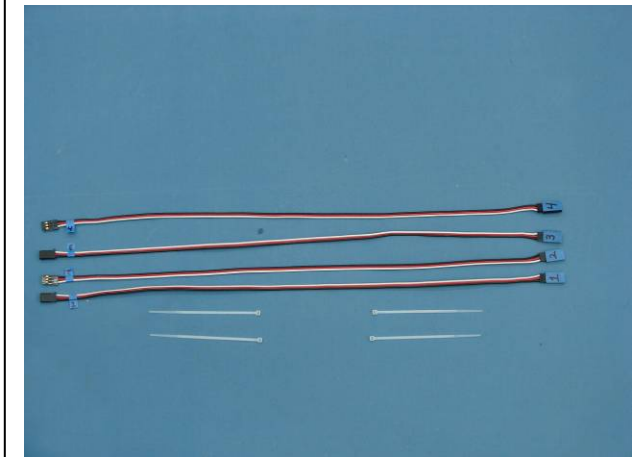
8. Label the four extensions 1-4 as shown. Repeat this step for the aileron and flap connectors coming out of the wing. This will allow the extensions to be plugged into the correct channels during field assembly.
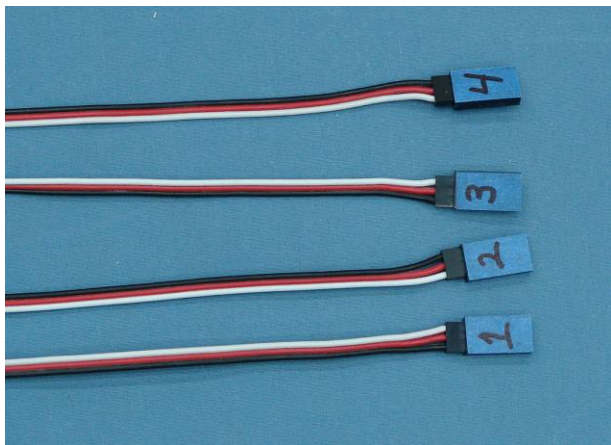
9. Drill 2 small holes through fuse former as shown below.
10. Pass small nylon tie through holes in fuse former. These will secure the extensions and help keep them away from the windows.
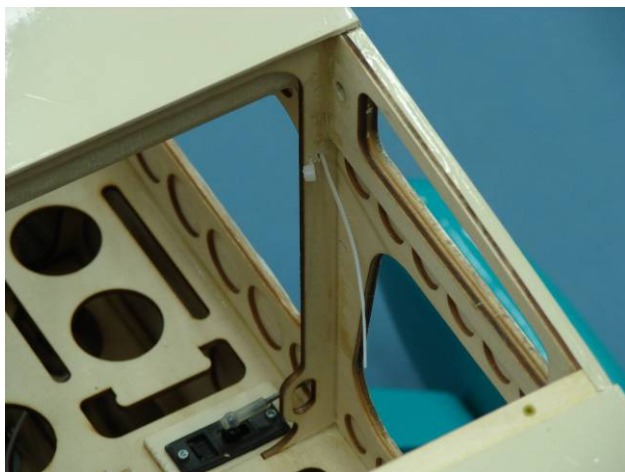
11. Route 2 extensions up the fuse former and out the access hole in the side of the fuse. Tighten nylon ties and remove excess with wire cutters.

12. Repeat for remaining 2 extensions on opposite side of fuse.
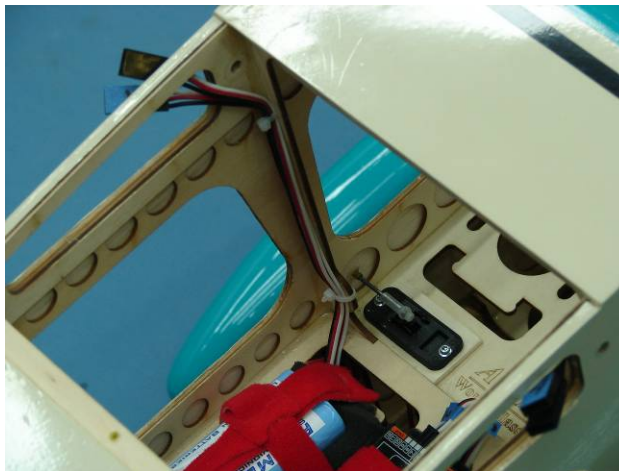
13. Finished receiver installation shown below.

DECAL INSTALLATION

1. Gather the DECAL installation items as shown below.

Required Parts
   ◊   1 - Vinyl Decal Set
   ◊   1 - Large Transfer Tape
Required Tools and Adhesives
   ◊   Ball Point Pen
   ◊   Hobby Knife
   ◊   Ruler
   ◊   Scotch Tape
   ◊   Rapid Tac Decal Application Fluid
   ◊   Plastic Squeegee

Builders Tip: Clean surface and tighten all covering before any decals are applied.

Note: Only one piece of transfer tape has been supplied. This transfer tape must be applied to decal and then reused for the next decal. **Do Not** attempt to install decal with out transfer tape.

2. Placement of included decals shown below.

3. Placement of included decals shown below.

4. Placement of included decals shown below.

5. Placement of included decals shown below.

SIDE WINDOW AND WINDSHIELD INSTALLATION

1. Gather the window installation items as shown below.

Required Parts
   ◊ 1 - Front Windshield -*(Not Shown)*
   ◊ 6 - Phillips Head Mounting Screws
   ◊ 2- Front Side Windows (Left & Right Set)
   ◊ 2 - Rear Side Windows (Left & Right Set)
Required Parts- Not Included
   ◊ 1 - Custom Dash Panel
Required Tools and Adhesives
   ◊ Masking Tape
   ◊ Canopy Glue
   ◊ Phillips Head Screw Driver

Builders Tip: Clean windows from both sides before installing.

2. Make a small handle using masking tape by folding masking tape over itself as shown.

3. Stick masking tape handle to inside of window as shown. This will allow the window to be placed in the fuse cut out without smearing canopy glue.

4. Apply a small amount of canopy glue to the window mounting rail as shown.

Builders tip: Lightly scuffing the window mounting rail with 80 grit sandpaper will help the glue adhere to window. Use caution to not scratch the visible portion of window if this is done.

5. Place window in fuse cutout from inside fuse cabin as shown. Allow glue to full cure before removing masking tape.

6. Repeat previous steps for all remaining side windows.

7. Install optional dash panel at this time. Small wood screws and double sided tape are recommended to secure dash panel.
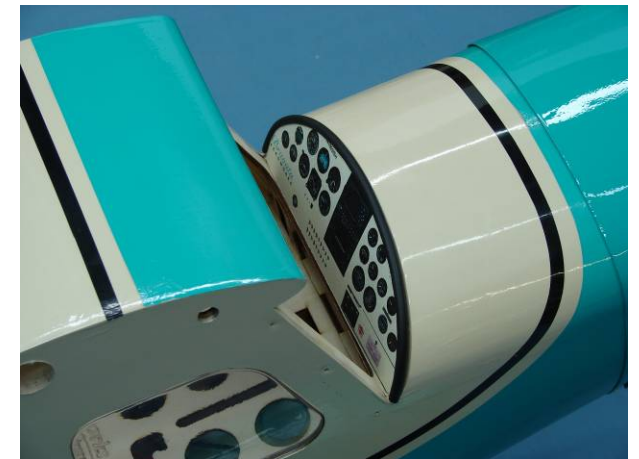
2. Reinstall front windshield using Phillips head screws at this time.

Builders Tip: A small amount of silicone can be applied to the mounting screw to prevent the windshield from cracking over time.
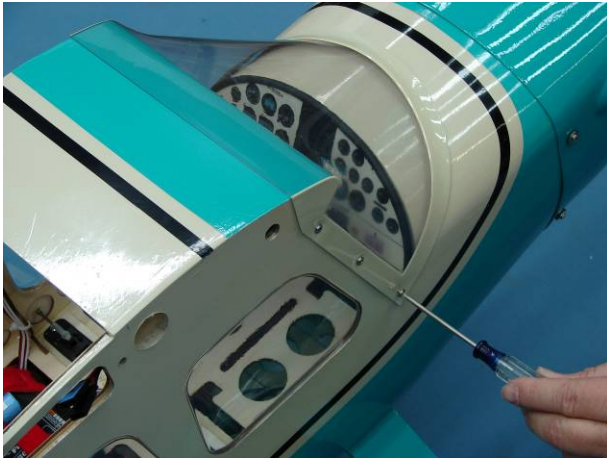
1. Gather (2) 8-32 wing mounting bolts and (2) #8 rubber backed washers for preparation of mounting the wings.

2. Slide the wing tube in the fuse wing tube sleeve. Slide the wings on the wing tube and plug in the aileron 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. Attach the 18" extension to the servo lead and secure with Aeroworks Safety Clip. Ensure the connectors will not come apart from vibration or light tension.

4. Gather (4) 6-32 strut mounting bolts and (4) #6 rubber backed washers for preparation of mounting the struts.

5. Slide the #6 Rubber backed washer onto the strut mounting bolts as shown.

6. Secure struts to wing and then to fuse as shown. Ensure both mounting bolts are fully tightened.

Important: Wing Struts are not optional and must be used at all times. Failure to do so may result in a catastrophic failure of the wing.

7. Secure fuse access hatch with (3) Phillips head screws as shown.
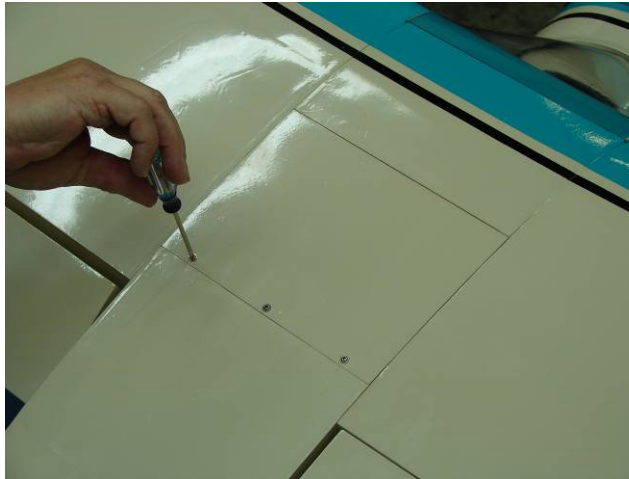
CONTROL THROW DEFLECTION TABLE

	Low Rate	High Rate
Aileron	1" or 15˚ up	2 1/2" or 35˚ up
	1" or 15˚ down	2 1/2" or 35˚ down
Rudder	15˚ left	28˚ left
	15˚ right	28˚ right
Elevator	3/4" or 12˚ up	1 1/2 " or 25˚ up
	3/4" or 12˚ down	1 1/2" or 25˚ down
Flap	1 1 2" or 25˚ down	2 1/2" or 40˚ down

Recommend Expediential:

25% expediential on low rates
40% expediential on high rates

Use the given rates as a starting point. Then adjust rates from there to suit your own flying style.

MEASURING CONTROL THROWS

1. Gather the Rudder Throw Meter (*Supplied*) and scotch tape.
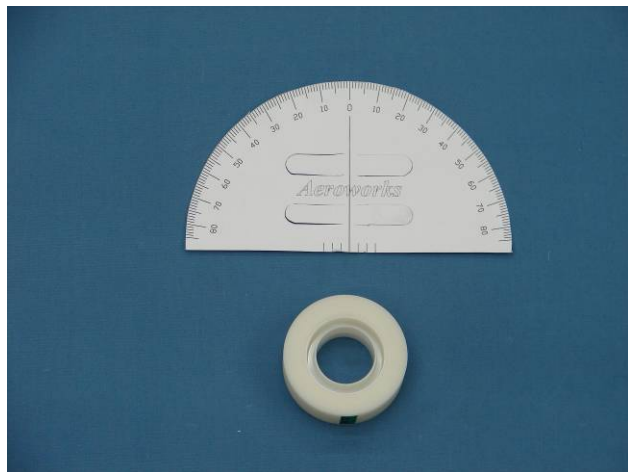
2. Slide the throw meter under the rudder boost tab.

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

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

5. Elevator throw measured in degrees. Locate throw meter at widest point of the elevator.

6. Aileron throw measured in degrees at widest point of the aileron.

7. Flap throw measured in degrees at widest point of the flap.

8. Elevator throw measured in inches at the widest point of the elevator

9. Aileron throw measured in inches at the widest point of the aileron.

CHECKING C.G. USING C.G. BUDDY

C.G. Is 5 7/8" Back from the Wing L.E. Measured at the Fuse Side

1. Aeroworks has included the new CG Buddy with the 30cc Bravata . 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:
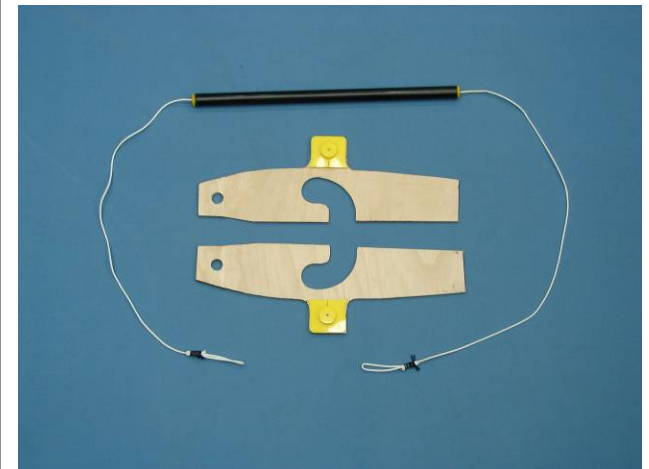
3. Tuck aileron and flap servo extensions inside wing. This will allow the C.G. Buddy to sit flush against the wing and fuse.
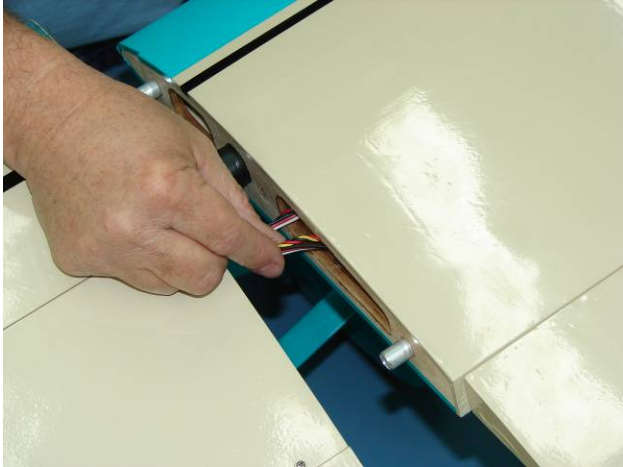
4. Slide wings away from fuse and install the CG Buddy on the wing tube and front rotation dowel as shown. The cable attachment should be on the top side of the wing. Make sure the CG Buddy is securely latched to the wing tube and dowel before moving further.
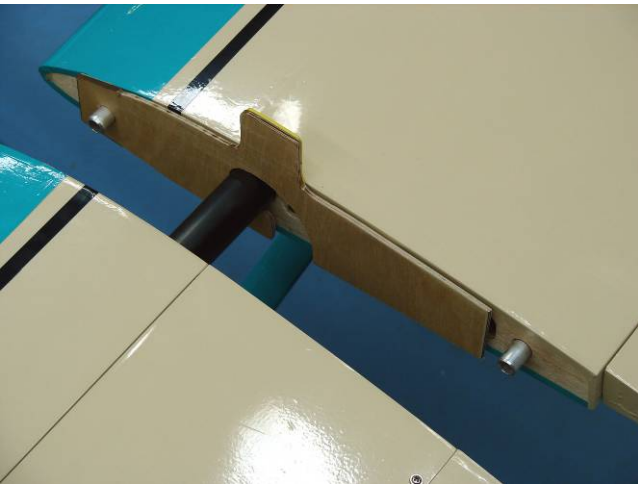
5. Slide wing back against the fuse as shown below.

6. Install CG Buddy on the opposite wing using the same methods described above.
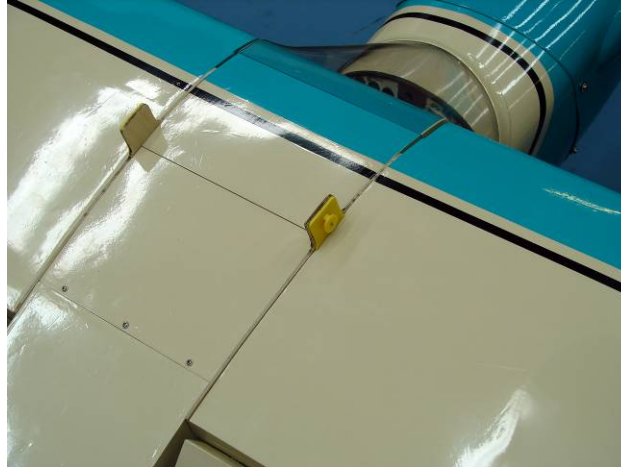
7. Wing struts must be installed when checking C.G. measuring C.G with struts not installed will effect C.G. Location.

8. Attach loop to cable attachment as shown below.
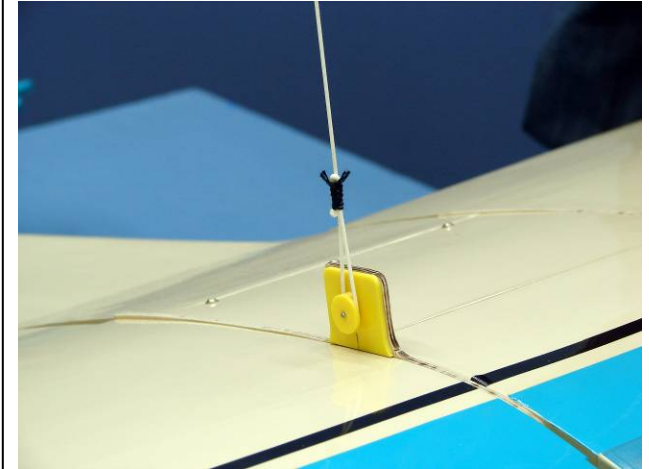
9. Lift airplane from center handle as shown, plane should sit level when lifted. Balance the Bravata without fuel in the tank with the batteries installed and **READY TO FLY**. Try to balance the model by moving the batteries and receiver before adding any ballast.

FLYING THE 30CC BRAVATA

The 30cc Bravata has been designed to be a forgiving high wing sport airplane that can provide big thrills for even the most seasoned pilot. Capable of slow inverted and upright flight, large loops , knife edge flight, rolls and any combination of point rolls, the 30cc Bravata is sure to impress anyone who fly's it.

First Flights:
The first few flights should be performed on low rates until you are comfortable with the airplane. Takeoff is as easy as slowly applying power until the airplane reaches take off speed, allow the tail wheel to rise off the ground before pulling the airplane into the air.

Once airborne, fly the 30cc Bravata around the pattern a few times, getting used to its low and high speed handling characteristics. You will see that the 30cc Bravata has a very soft stall that can only be induced at low speeds, when stall speed is achieved the airplane will drop the nose and attempt to keep flying. By utilizing flaps this stall speed can be reduced even further, we found that using 25˚ of flaps will give the best overall performance. The use of a flap to elevator mix is recommended to reduce any pitching when the flaps are deployed. Use a small amount of down elevator mixed with the flaps to really enjoy all that the flaps have to offer.

After you have become comfortable with the plane, switch to high rates and really explore the 30cc Bravata's full aerobatic potential. Weather flying large figures eights just inches from the ground or performing a slow high angle knife edge pass the Bravata feels very comfortable. The large wings do cause the airplane to roll slower than most aerobatic airplanes so be sure to give yourself plenty of altitude before attempting rolling maneuvers at first.

Landing the 30cc Bravata is very simple, so much so that the flaps are rarely needed to slow for landings. Align the airplane with the center line of the runway and slowly reduce power. As you approach the runway slowly apply up elevator and let the airplane settle in for a nice 3 point landing.

MAINTAINING THE 30CC BRAVATA

It is always a good idea to check your airplane before each flying session. Listed below are a couple of key areas that should be checked before each flying session, checking these items will result in an airframe that lasts for many years.

- Covering seams and Overlaps
- Glue joints
- Motor mounting bolts
- Prop mounting bolts
- Servo mounting screws
- Servo gears
- Hinges
- Control Horns

By checking each of the above listed items before each flying session your airplane will last for many season. These guidelines are a great way to check any airplane in your hangar to prevent unnecessary accidents with your airplanes.

SAFE CHARGING PROCEDURES FOR Li-ion BATTERIES

Lithium Ion batteries are significantly more volatile than Ni-Cd/ Ni-MH batteries used in RC applications. Follow all manufactures instructions while using these batteries. Mishandling of Li-ion batteries can result in fire. Always follow the manufacturer's instructions when disposing of Lithium Polymer batteries.

2012 ACADEMEY OF MODEL AERONAUTICS SAFETY CODE

1.A model aircraft shall be defined as a non-human carrying
device capable of sustained flight in the atmosphere. It shall not exceed limitations established in this code and is intended to be used exclusively for recreational or competition activity.

2. The maximum takeoff weight of a model aircraft, including fuel, is 55 pounds, except for those flown under the AMA Experimental Aircraft Rules.

3. I will abide by this Safety Code and all rules established for the flying site I use. I will not willfully fly my model aircraft in a reckless and/or dangerous manner.

4. I will not fly my model aircraft in sanctioned events,
air shows, or model demonstrations until it has been proven airworthy.

5. I will not fly my model aircraft higher than approximately 400 feet above ground level, when within three (3) miles of an airport without notifying the airport operator. I will yield the right-of-way and avoid flying in the proximity of full-scale aircraft, utilizing a spotter when appropriate.

6. I will not fly my model aircraft unless it is identified
with my name and address, or AMA number, inside or affixed to the outside of the model aircraft. This does not apply to model aircraft flown indoors.

7. I will not operate model aircraft with metal-blade propellers or with gaseous boosts (other than air), nor will I operate model aircraft with fuels containing tetranitromethane or hydrazine.

8. I will not operate model aircraft carrying pyrotechnic devices which explode burn, or propel a projectile of any kind. Exceptions include Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight. Rocket motors up to a G-series size may be used, provided they remain firmly attached to the model aircraft during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code; however, they may not be launched from model aircraft. Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Air Show Advisory Committee Document.

9. I will not operate my model aircraft while under the influence of alcohol or within eight (8) hours of having consumed alcohol.

10. I will not operate my model aircraft while using any drug which could adversely affect my ability to safely control my model aircraft.

11. Children under six (6) years old are only allowed on a flightline or in a flight area as a pilot or while under flight instruction.

12. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

RADIO CONTROL

1. All model flying shall be conducted in a manner to avoid over flight of unprotected people.

2. I will have completed a successful radio equipment ground-range check before the first flight of a new or repaired model aircraft.

3. I will not fly my model aircraft in the presence of spectators until I become a proficient flier, unless I am assisted by an experienced pilot.

4. At all flying sites a line must be established, in front of which all flying takes place. Only personnel associated with flying the model aircraft are allowed at or in front of the line. In the case of air shows demonstrations straight line must be established. An area away from the line must be maintained for spectators. Intentional flying behind the line is prohibited.

5. I will operate my model aircraft using only radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.

6. I will not knowingly operate my model aircraft within three (3) miles of any preexisting flying site without a frequency-management agreement. A frequency management agreement may be an allocation of frequencies for each site, a day use agreement between sites, or testing which determines that no interference exists. A frequency management
agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.

7. With the exception of events flown under official
AMA rules, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and located at the flight line.
8. Under no circumstances may a pilot or other person touch a model aircraft in flight while it is still under power, except to divert it from striking an individual.

9. Radio-controlled night flying is limited to low performance model aircraft (less than 100 mph). The model aircraft must be equipped with a Lighting system which clearly defines the aircraft's attitude and direction at all times.

10. The operator of a radio-controlled model aircraft shall control it during the entire flight, maintaining visual contact without enhancement other than by corrective lenses that are prescribed for the pilot. No model aircraft shall be equipped with devices which allow it to be flown to a selected location which is beyond the visual range of the pilot.

Enjoy your new Aeroworks 30cc Bravata ARF-QB!

30cc BRAVATA ARF – MATERIALS LIST

Fuselage -Firewall area fuel-proofed and pre-marked for the mounting of DLE30cc; Covered with Oracover; pre-drilled three holes for tail wheel assembly:
(7) 4-40 blind nuts pre-installed
(4) for cowling mounting
(3) for top hatch cover
(8) 8-32 blind nuts pre-installed for main landing gear mounting
(4) for the rear gear for floats
(2) 6-32 blind nuts pre-installed for wing struts Mounting
(1)Top Fuselage Hatch cover pre-installed with:
(3) 4-40x10mm button head bolts
(1) Bottom Fuselage Hatch with air slots and baffling-pre-cut covering away from slots – Pre-installed in the fuse with
(4) T2.6x8mm PWA screws
(1) Molded Clear Plastic Windshield painted and installed with
(6) T2.6x8mm PWA screws
(1) Elevator Servo String installed
(2) 3.5(o.d.)x100mm pull-pull exit tube installed

Left Wing with Aileron, Flap – Covered, pre-drilled for the mounting of the control horns
(1) 8-32 blind nuts pre-installed for wing mounting
(1) 6-32 blind nuts pre-installed for wing struts Mounting
(5) Large Pin Point Hinges glued for Flap
(5) Small Pin Point Hinges glued for Aileron
(1) 10mm Rubber Grommet – installed for Aileron and Flap Extension to pass through
(2) Anti-rotation Pins installed
(1) Aileron servo string installed
(1) Flap servo string installed

Right Wing with Aileron, Flap – Covered, predrilled for the mounting of the control horns
(1) 8-32 blind nuts pre-installed for wing mounting
(1) 6-32 blind nuts pre-installed for wing struts Mounting
(5) Large Pin Point Hinges glued for Flap

(5) Small Pin Point Hinges glued for Aileron
(1) 10mm Rubber Grommet – installed for Aileron and Flap Extension to pass through
(2) Anti-rotation Pins installed
(1) Aileron servo string installed
(1) Flap servo string installed

Horizontal Stabilizer & elevators with:
(10) Small pin point hinges (glued)-covered Pre-drilled for the mounting of the control horns

Fin & Rudder with:
(5) Small pin point hinges (not glued) - Covered Pre-drilled for the mounting of the control horns

Parts Bags:

1
(1) Cowl, fiberglass & factory painted and trimmed
(4) 4-40x14mm hex head bolts for cowling Mounting
(4) #6 bonded washers for cowling mounting
(4) 3mm Split-ring Lock washers for cowling mounting

2
(1) 5mm Aluminum Main landing gear – painted
(4) 8-32x25mm Hex head bolts for main landing gear mounting
(4) 4mm flat washers for landing gear mounting
(4) 3mm Split-ring Lock washers for landing gear Mounting
(2) 5x45mm AL Axle Bolts
(2) M8 Lock Nuts
(4) 5mm i.d. Wheel Collars with set-screws
(2) 90mm i.d. Main Wheels
(4) 4-40x12mm Button Head bolts for wheel pants Mounting
(4) 3mm flat washers for wheel pants mounting
(4) 3mm Split-ring Lock washers for wheel pants mounting

#3
(2) Fiberglass Wheel Pants – painted, 1 Left; 1 Right
(4) 4-40 blind nuts installed on the wheel pants, 2 per side

4
(1) AL Tail Wheel Assembly – Small

#5
(2) 4-40x3" left hand and right hand threaded pushrods with nuts for ailerons
(2) 4-40x3" left hand and right hand threaded pushrods with nuts for flaps
(1) 4-40x4" left hand and right hand threaded pushrods with nuts for elevators
(1) Wrench for the left hand and right hand threaded pushrod
(4) 4-40 Metal Clevis – 2 for ailerons, 2 for flaps
(6) 4-40 Ball Links – 2 for ailerons, 2 for flaps and 2 for elevators
(6) 4-40x16mm hex head bolts
(6) 4-40 Lock Nuts
(1) 3mm flat washers for elevator
(1) Brass Spacers for elevator
(5) AL Double Control Horns
(30)T2.6x12mm Phillips head screws for control horns mounting

6
(2) 0.8x1300mm Pull-Pull plastic coated steel Cable
(4) 2x5mm brass swage tubes
(4) Threaded Coupler with Nut
(2) AL Double Control Horns
(6) M2x20mm Phillip head bolts for control horn mounting
(6) M2 Nuts for control horn mounting
(4) 4-40 Ball Link Assemblies
(4) 4-40x16mm hex head bolts
(4) 4-40 lock nuts
(2) 3mm flat washers
(2) Brass Spacers

30cc BRAVATA ARF – MATERIALS LIST (CONTINUED)

 # 7
(1) Pushrod Threaded at One End for Throttle
(1) 4-40 threaded brass Coupler
(2) 4-40 Ball Links
(2) 4-40x16mm hex head bolts
(2) 4-40 lock nuts
(1) Brass spacers
(2) 3mm flat washers
(1) Throttle Servo Mounting Tray with
(4) pre-installed 4-40 Blind Nuts
(4) 4-40x12mm Bolts
(4) Flat Washers
(1) Paper Mounting Template

 # 8
(1) Pushrod Threaded at One End for Choke
(1) 4-40 Ball Links
(1) 4-40x16mm hex head bolts
(1) 4-40 lock nuts
(2) Brass Fuel Barb
(2) Small Nylon Tie
(1) Large Nylon Tie

 # 9
(1) 450cc (15 ounce) Gas Fuel Tank with Rubber
    Stopper
(1) Brass Barbs for fuel line
(2) Fuel Filler Dots – 1 male and 1 female

 # 10
(2) Wing Struts, Painted, 1 Left; 1 Right
(2) 6-32x20mm hex head bolts for the attachment of
    wing struts with wing
(2) 6-32x25mm hex head bolts for the attachment of
    wing struts with fuselage

 # 11
(1) 23dia. x600mm aluminum wing joiner – black
    anodized
(2) 8-32x25mm hex head bolts for wing mounting
(2) #8 bonded washers
(2) 4mm Split-ring Lock Washers

#12
(4) Plastic Hatch Covers for ailerons & flaps Servos
    – 2 Left; 2 Right
(4) Plywood Mounting Plates
(8) Hardwood Servo Mounting Rails
(28) Small Wood Screws

 # 13
(4) Pre-covered Balsa Fillets for top and bottom of
    stab
(1) Fuselage Bottom Hatch without air slots
(1) Universal Engine Mounting Template
(1) 3x6" Card Stock Material for the template for
    cutting of cowling
(1) Paper Template for Cutting Front of Cowling
(1) 6x130x70mm foam for fuel tank
(2) 8x80x300mm Sponge for receiver and battery
(2) 356x12.5mm Velcro
(2) 8x450mm Nylon Ties for fuel tank mounting
(6) 3x150mm Nylon Ties for the fuel line
(1) 12mm aluminum insert
(6) Rubber Grommets – 2 each 6mm, 8mm, 10mm
    for fuel line and wire guide
(1) 4.25" Paper Degree Meter for the rudder

 # 14
(1) C.G. Buddy

 # 15
(24) 6.35mm Aluminum Engine Stand offs

 # 16
(1) 300x300mm Turquoise(#898) Covering
(2) 300x300mm Cream (#887) covering
                    OR
(1) 300x300mm Deep Red (#871) covering
(2) 300x300mm Cream (#887) covering

 # 17
(1) Manual CD

 # 18
(1) Decal Sheet

Accessories Available From Aeroworks

For more information or to order accessories visit our website: WWW.AERO-WORKS.NET

Custom Throw Meter

Use the Aeroworks Throw Meter to precisely set your control throws on the elevator and ailerons.

Custom Wing/Stab Bags

Designed especially for the 30cc Bravata. The wing and stab bags are lightweight, yet heavy enough to protect your wings and stabs from hanger rash or small nicks and dents from transporting too and from the flying field.

5-15 LB Carbon Tail Wheel

This Carbon Tail Wheel is designed to fit perfectly on the 30cc Bravata. The carbon leaf spring adds tremendous strength compared to the stock alumi-
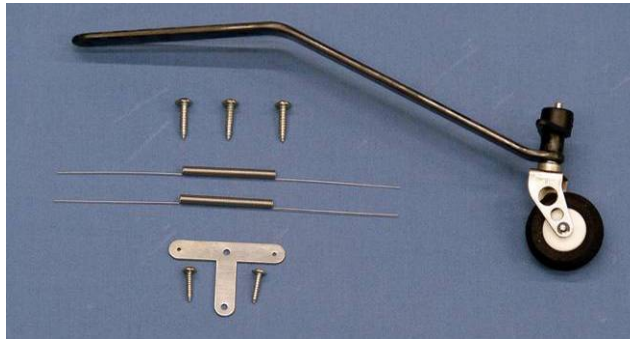
Fuel Line Installation Kit

The fuel line installation kit includes everything needed to plumb your gasoline powered aircraft.

- 3 feet of 1/8" I.D. Dubro tygon tubing is provided.
- Simple ¼ turn fuel dot provides a nice, finished look to any model.
- Aluminum fuel "T" with 1/8" I.D. will provide superior fuel flow.

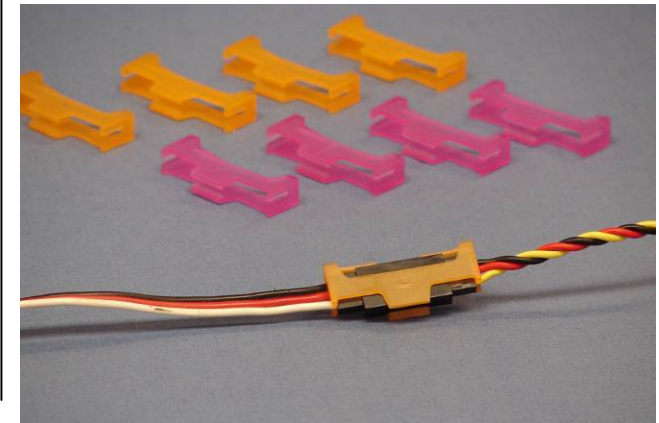## 2.5 Gallon Gas Hand Crank Fuel System

The 2.5 Gallon Hand Crank fuel system is perfect for pilots venturing into gas powered airplanes for the first time. This gas can comes out of the box assembled and ready for use.

Aeroworks Safety Clips

Made from flexible plastic the Aeroworks Safety Clips provide a easy and safe way to secure your servo connections.

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Custom Float Set

Convert the 30cc Bravata to a unique float plane with the Aeroworks float set. Made of High Quality fiberglass with Steerable water rudders these floats will turn your 30cc Bravata into a versatile easy flying float plane.
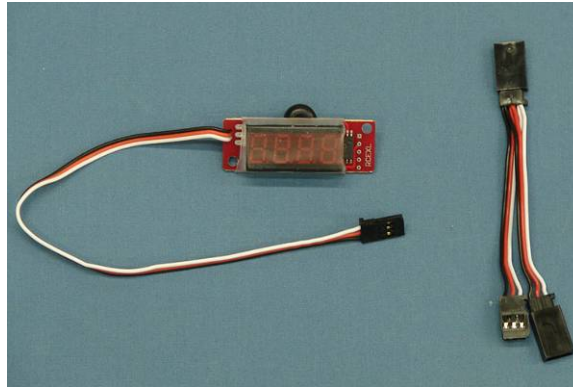
DLE 30 Drill Guide

Never drill your props wrong again! This easy to use propeller drill jig guide will allow you to quickly drill props for your DLE 30.

RCexl Mini Tachometer

The RCexl Mini Tach will allow you to monitor engine RPM while conveniently mounted inside the airplane.

Rcexl Opto Gas Engine Kill Switch

This device allows you to safely and remotely kill your electronic ignition equipped engine from your transmitter. The kill switch is Fiber Optically coupled to isolate your ignition system from your radio system with No Interference. Easy Installation simply plugs into any spare channel in your receiver
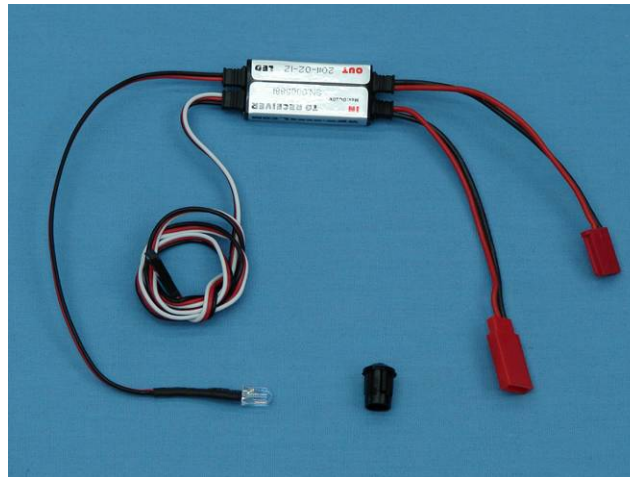
30cc Bravata Custom Dash Panel

Dress up the cabin of your 30cc Bravata with this vintage 3 dimensional dash panel. Made from rigid plastic and printed with a imitation wood grain finish this dash panel will provide the finishing touch to your 30cc Bravata.

Vent Exit Dot

Clean up your fuel vent exit on the bottom of your model with these clean looking vent exit dots. Machined from high quality aluminum these exit dots are compatible with all fuel types.
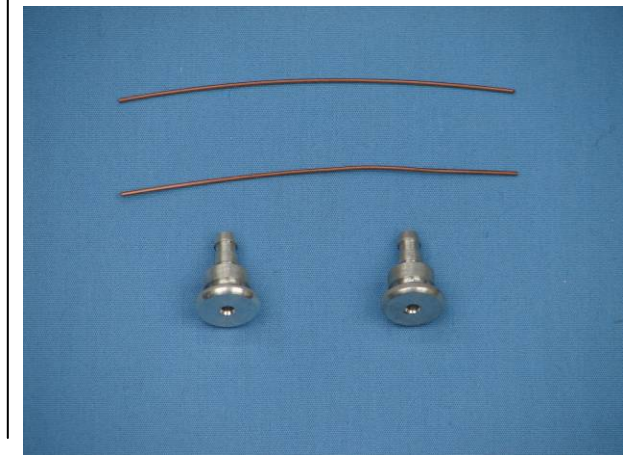
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ABRTC30
Deep Red/Cream:
ABRDRC30

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Printed: 02/2012