CAP-232 SPORT

ARF

ASSEMBLY MANUAL

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Warranty: Kangke Industrial USA Inc. guarantees the kit to be free of defects in both material and workmanship at the date of purchase. This warranty does not cover any parts damaged by use or modifications. In no case shall Kangke Industrial's liability exceed the purchase cost of this kit. Since Kangke Industrial has no control of final assembly and material used by user for final assembly, no liability shall be assumed or accepted for any damage resulting from the use by user of final user-assembled products. This kit has been flight test for normal use. If the plane will be used for extremely high stress flying, the modeler is responsible for reinforcing the high stress points. Inspect this kit immediately after receiving it, report any missing and damaged parts within 10 business days otherwise the claim may be denied.

Congratulations!

Kangke Industrial USA, Inc. brings you one of the finest ARF SPORT models available. Its strong, lightweight structure, generous control surfaces and large wing area result in an aircraft with outstanding performance. Powered with small engines it's a delightful aerobatic trainer, with large engines its performance is limited only by your imagination.

Specifications:	
Length	59 in.
Wing Span	61 in.
Area	991 sq. in.
Weight	5-6 lbs.
Engine (2 Cycle)	50-75
(4 Cycle)	65-91

Kit Contents:

Fuselage	1
Wing panel	2
Ailerons	2
Cowling	1
Canopy	1
PACK 1	
Stabilizer	1
Elevator	2
Fin	1
Rudder	1
PACK 2	
Dihedral brace	1
Servo tray	1
PACK 3	
Fuel tank	1
Wheels	2
Tail gear	1
Tail wheel	1
Control horn	5
Control wire	6
Control rod	2
Motor mount	1
Hardware pack	1
Pack 4	
Manual	1
Decal kit	1
Wheel pants	2

The following additional items will also be needed to build the CAP-SPORT

HOBBY ITEMS:

4 oz. 30 min. epoxy
Popsicle sticks
Hobby knife
Thin CA .5 oz.
Med. CA 1 oz.
Radio 4-channel min.
5 servos
RTV silicone
Motor
Muffler
Spinner
Fuel line 20-inches

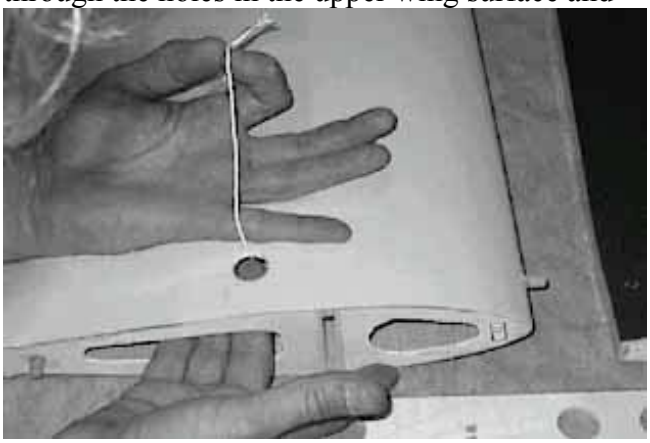
HOUSEHOLD ITEMS:

Paper towels
Alcohol
Masking tape
Ruler
Felt tip pen
Sewing thread
Screwdrivers
Pliers
5/32 drill
/8 drill
Clothes pins
Canopy glue

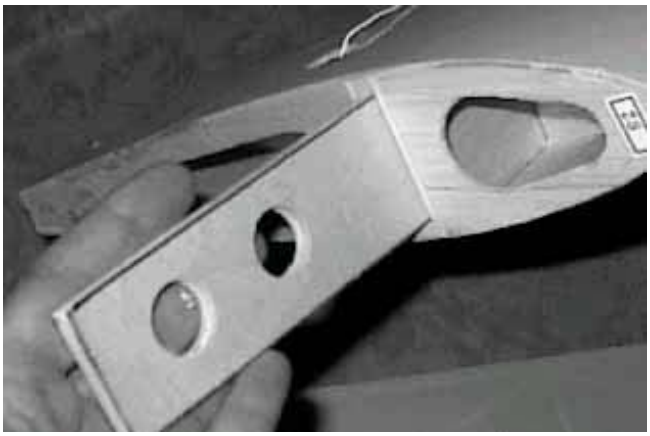
Read each step of the instructions carefully. Be sure you understand what is required and what the procedure is before you glue or cut anything. How well you assemble this model will have a direct effect on its flight characteristics.

WING ASSEMBLY

Remove the tape holding the servo wire pull string from the center of the wing, work the string through the holes in the upper wing surface and



secure to the top surface with tape.

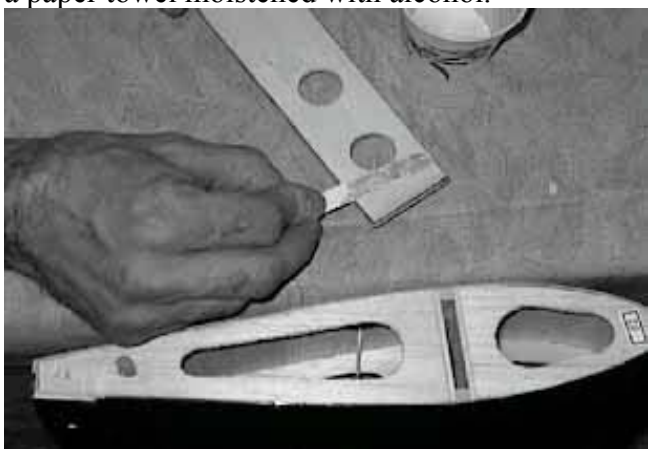


Trial fit the dihedral brace in its box in both wing

panels. The "V" shape of the brace points down to produce positive dihedral. The brace should have snug fit, sand lightly if necessary.

The following steps must be done quickly before the epoxy has time to set up. Read the procedure and gather the materials before starting.
Mix a small amount of 30-minute epoxy. Spread the epoxy in the dihedral box top, bottom, and sides about 1 inch in. The snug fit of the brace will push it down the box.

Spreads epoxy on both sides of one half of the dihedral brace and slide it into the box. Spread the epoxy that oozes out over the entire surface of the wing rib mating surface and on the other half of the dihedral brace, as well as the other wing box adding more as necessary. Slide the two wing halves together. Wipe off any excess epoxy with a paper towel moistened with alcohol.

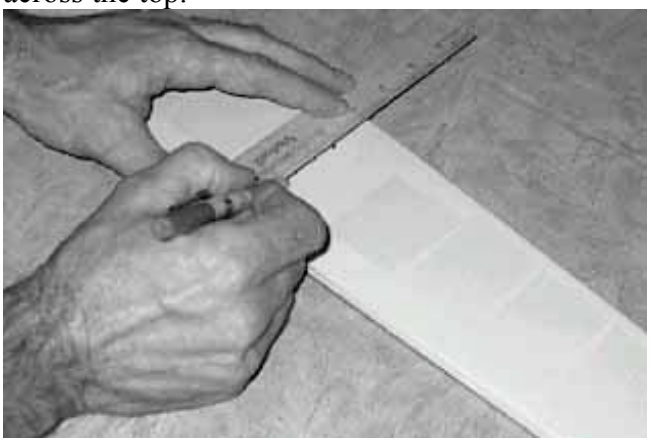


Stretch masking tape across the seam on both sides of the wing so the tape applies pressure to the joint. Stand the wing in a safe place and do not disturb till the epoxy has fully cured.

STABLIZER ASSEMBLY

Care must be taken during the installation of both the stabilizer and the fin. Misalignment of the tail components will make the aircraft difficult to trim in flight.

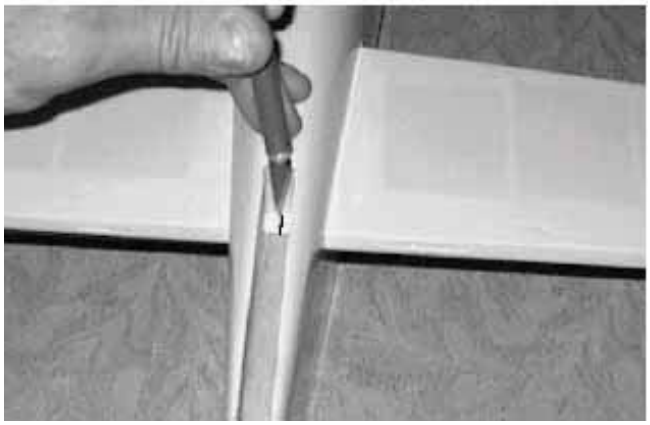
First remove the rudder and elevator halves from the fin and stabilizer. Begin by locating the center of the stabilizer. Measure its width at the leading and trailing edge of the tips, make two marks in the center and using a straight edge draw a line across the top.



Use the same procedure to locate the center of the firewall. This line will be used to insure the stabilizer is square to fuselage

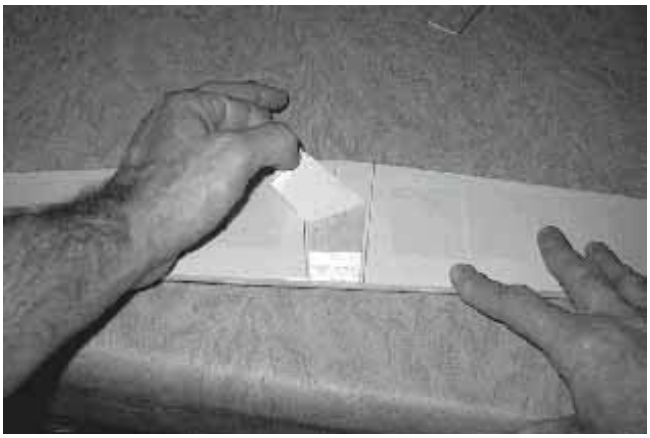
Slide the stabilizer through the slot in the rear of the fuselage. Use care not to split the wood. Looking in through the rudder slot adjust the stabilizer till the line on its center is positioned in the center of the slot.

Insert a pin in the top of the firewall directly over the centerline drawn. Tie a piece of string around the pin and pull it to the rear corner of the stabilizer. Using the string to measure, go back



and forth between the corners until both sides are equal and the line on the stabilizer is still centered in the rudder slot. Using a felt tip pen trace the outline of the fuselage on both the top and bottom of the stabilizer. Remove the stabilizer from the fuselage.

Lay the stabilizer on a flat surface. Using a sharp razor knife and a straight edge slit the covering about 3/16 inch inside the fuselage outline on both the top and bottom surfaces. Try to cut only through the covering, not into the wood surface, as that would weaken the stabilizer. Remove the covering from the center. If necessary, use a covering iron to secure the edge of the remaining covering to the stabilizer.

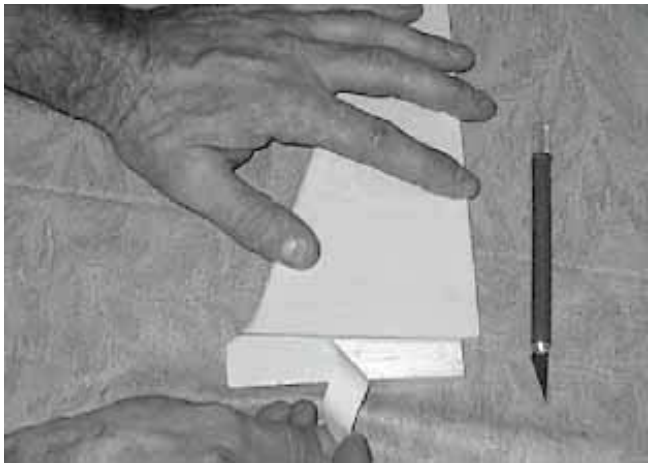


Slide the stabilizer into the fuselage slot exposing about 3/8 inch of bare wood. Apply epoxy to the top and bottom of the wood. Slide the stabilizer through the fuselage to expose the wood on the other side, apply epoxy and center the stabilizer using the outline of the fuselage as a guide. Verify the alignment using the string as before, correct if necessary. Wipe off excess epoxy with a paper towel moistened with alcohol and allow curing.

FIN ASSEMBLY

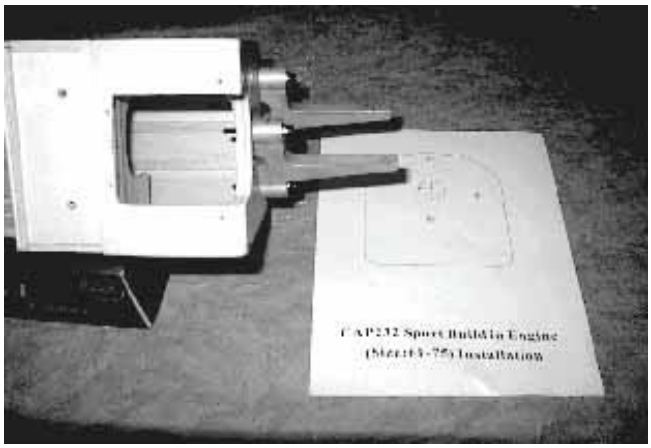
Trial fit the fin in the fuselage. Use a felt tip marker and mark the outline of the fuselage on the fin.

Using the same procedure as was used with the stabilizer, remove the covering where the wood will be glued. Apply epoxy to both sides of the fuselage slot as well as both sides of the fin. Slide the fin in place using the fuselage outline as a guide. Wipe off the excess epoxy with a paper towel moistened with alcohol.

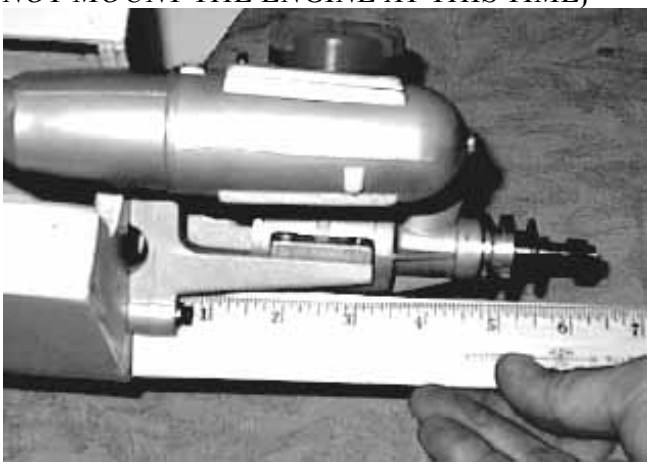


ENGINE MOUNT

Remove the exhaust cover from the bottom of the fuselage. Use the supplied template to locate and drill the holes for the motor mount bolts using a ¼-inch drill. Install the mount with the supplied bolts and “T” nuts.

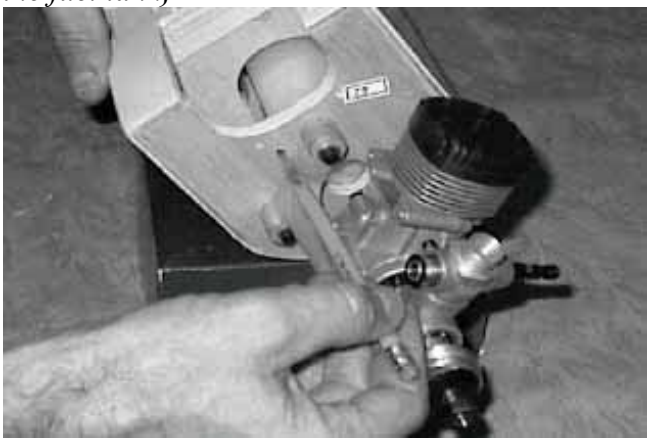


Set the engine on its mount, position the propeller flange between 5 ¼ - 5 ½ -inches from the firewall as shown. Locate the engine mounting holes on the mount. The mount may be drilled and tapped for your specific hardware, or you may use the supplied screws and nuts by through drilling the mount with a 5/32-inch drill. *{DO NOT MOUNT THE ENGINE AT THIS TIME}*

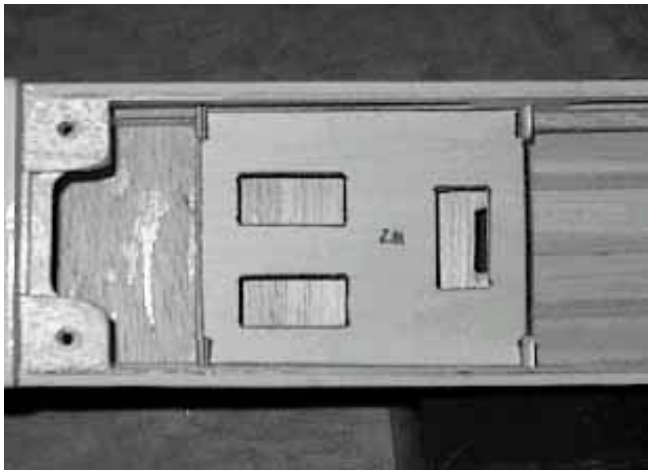


SERVO TRAY / CONTROL RODS

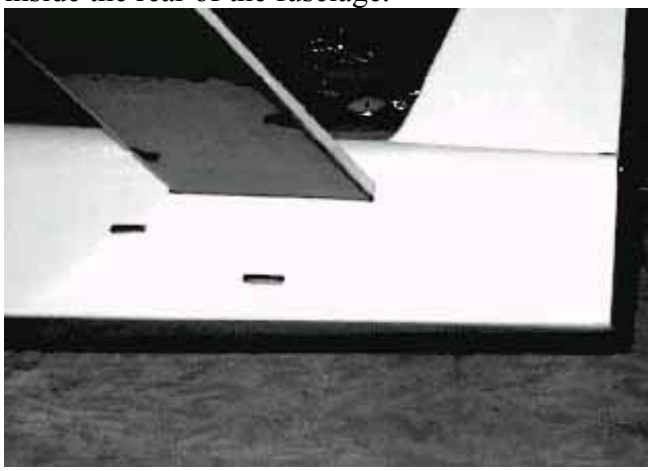
The throttle push rod must travel in as straight a line as possible from the carburetor to the firewall. With the fuel tank held in place mark the location of the push rod hole and drill with a 5/32-inch drill. *{Be sure it does not interfere with the fuel tank}*



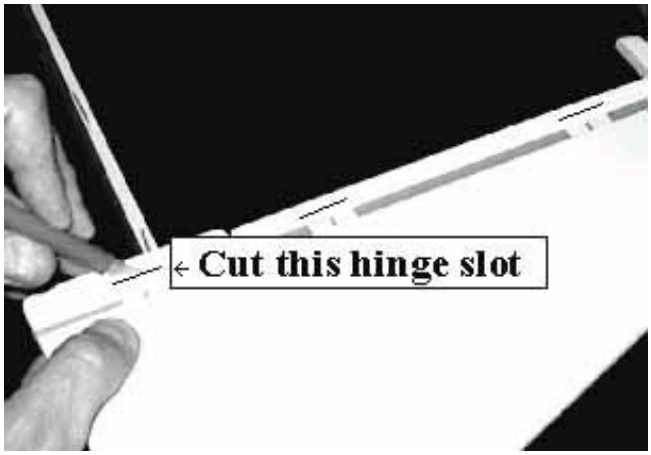
Trial fit your servos in the servo-mounting tray, open the holes if necessary, do not mount the servos at this time. Trial fit the servo-mounting tray in the fuselage. The tray should fit snugly between the fuselage sides and between the bulkheads. Epoxy in place when satisfied with the fit.



Trim the covering to open up the two elevator slots and one rudder slot in the rear of the fuselage. The rudder slot is 6-inches forward 3/4-inch up from the bottom rear of the fuselage. Open the left side rudder slot only. The elevator slots are 9-inches forward, 1 3/4-inches up. The slots can easily be found by shining a flashlight inside the rear of the fuselage.



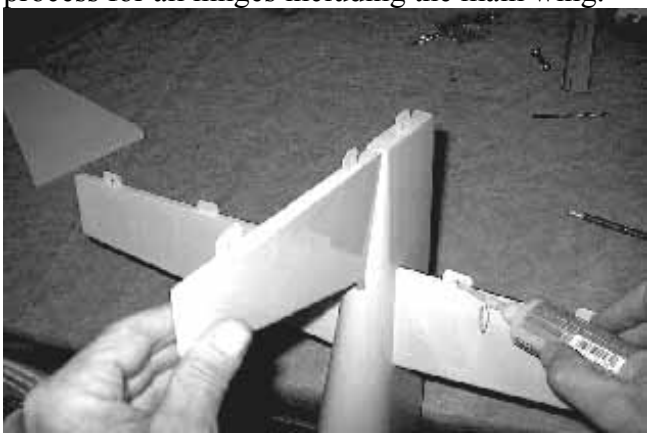
HINGES



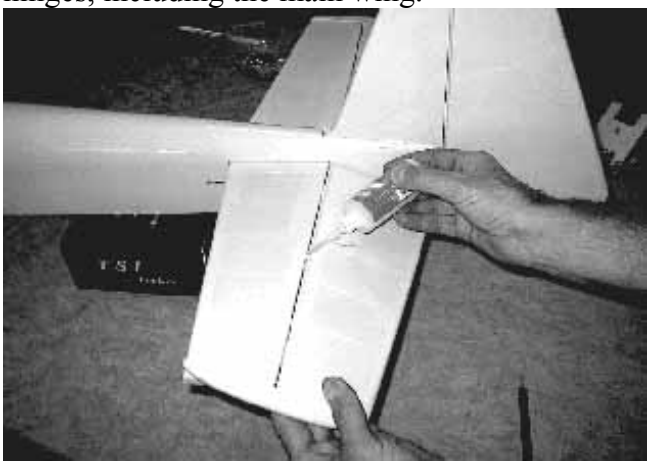
Temporally install the hinges in the rudder. Use the rudder to locate and make the hinge slot in the

rear of the fuselage. Cut the slot carefully down the center of the fuselage.

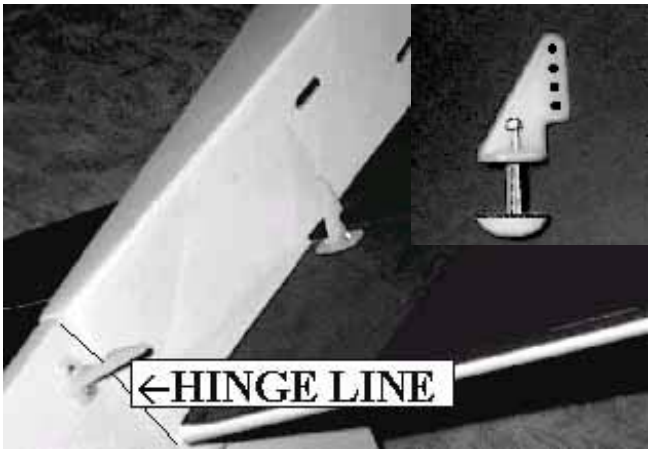
Install each hinge ½ way into the stabilizer, fin and wing. Place one drop of thin CA into the center slot in the hinge. {The CA will "wick" down the hinge and secure it to the wood. Repeat process for all hinges including the main wing.



Install the control surface and align it carefully. Place one more drop of CA on each hinge to secure it in place. Repeat this for all remaining hinges, including the main wing.

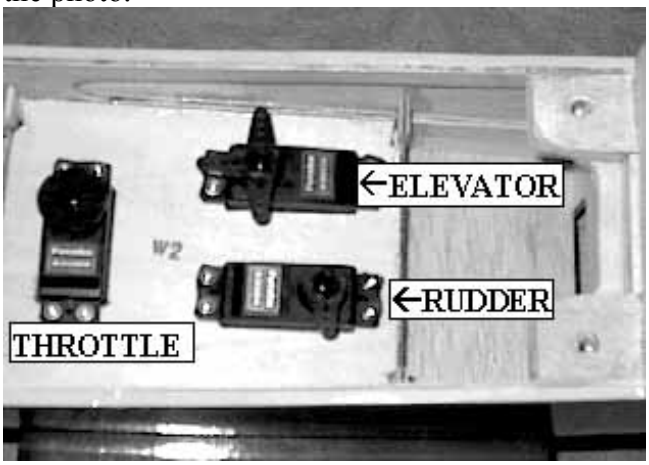


CONTROL HORNS

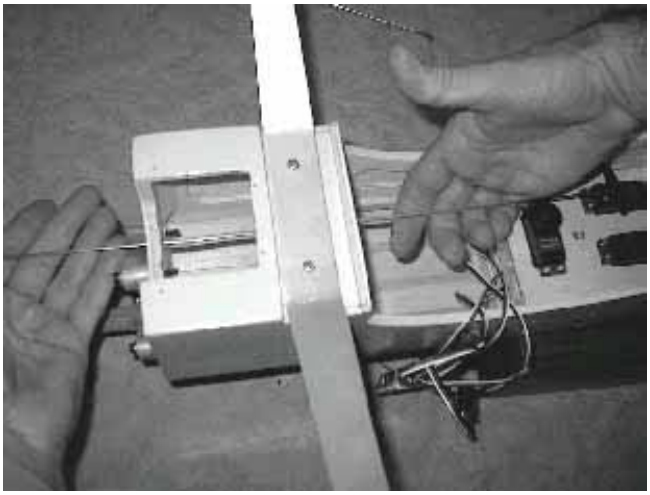


Align the control horns on the elevator in such a way that the inside screw hole is ½-inch from the inside edge and the clevis holes are directly over the hinge line. Mark and drill the holes with a 1/16-inch drill. install the supplied 1.5mm screws and backing plates. Use the same procedure with the rudder with the bottom screw ½-inch up from the rudder bottom.

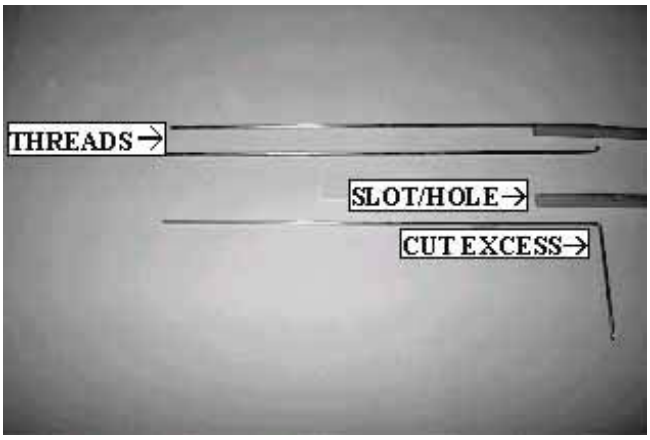
Install the servos according to the manufacture instructions. Be sure they arranged as shown in the photo.



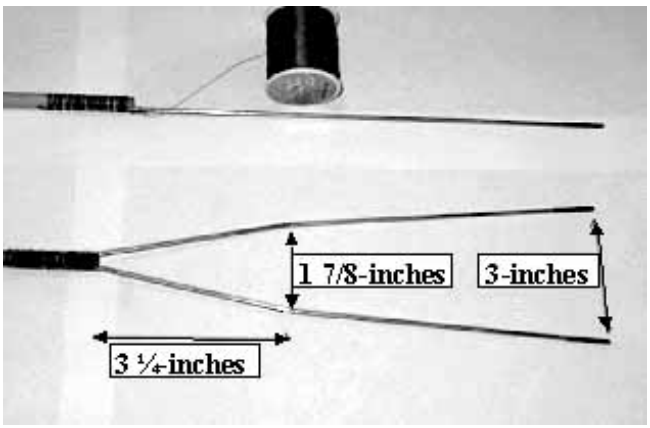
Sand one end of the throttle outer casing and epoxy it to the previously drilled hole in the firewall.



Begin the elevator and rudder control rods by bending 3 rods at a 90-degree angle 10 inches from the threaded end. Using wire cutters cut the wire 3/16-inch from the bend. The elevator control rod has two slots in one end, one slot in the other. The rudder control rod has one slot at each end.

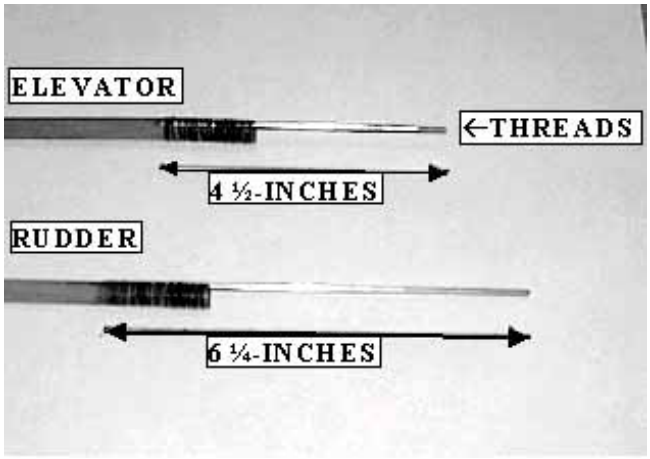


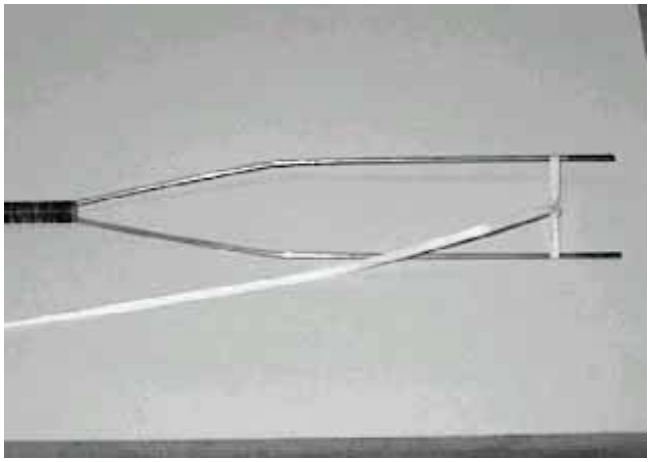
Insert the bent end in the hole with the wire in the slot. Wrap the wire with thread, soak with medium CA, and allow to cure. Repeat the procedure for the other ends. Bend the elevator wire as shown at the control rod.



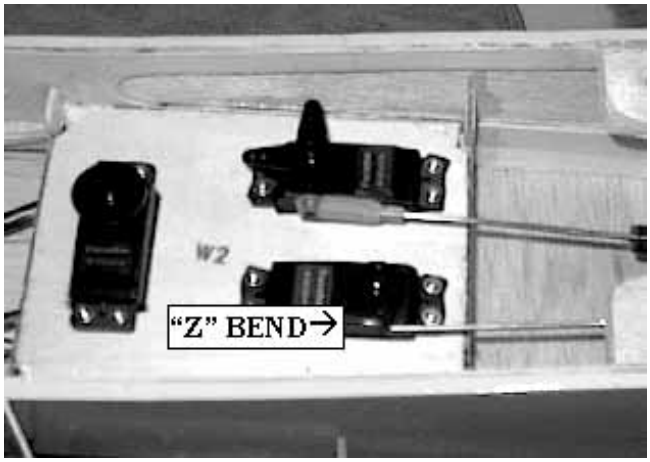
Bend one control rod 4 ½ inches from the threaded end, cut off the excess and secure it to the servo end of the elevator push rod. Secure a 6 ¼ inch length to the rudder control rod. Note that the rudder DOES NOT GET A THREADED END.

Turn on the radio gear and center the servos. Install the elevator push rod by pulling the ends together with string as shown. Once the ends are lined up with the slots, pull the sting forward to release the control wires. Install the clevises and adjust the elevator halves.





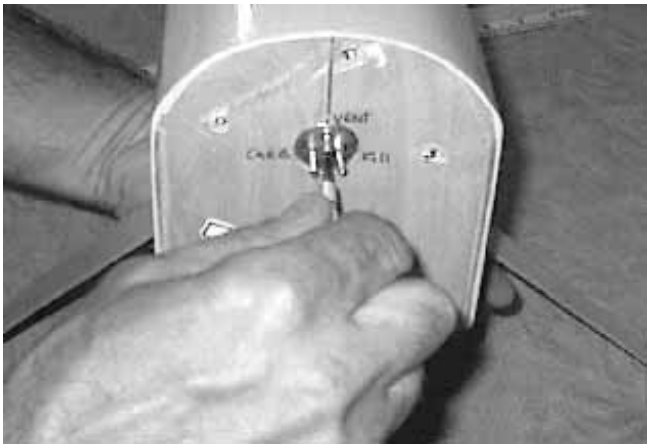
Install the rudder push rod. Because of the length of the push rod it may be necessary to install it through the fuel tank opening in the firewall. Install a clevis on the end and attach it to the rudder. With the rudder centered, mark the wire at the servo arm hole. Make a “Z” bend and install in the servo.



FUEL TANK

Because the motor and carburetor are completely enclosed by the cowling it will be necessary to ad a fill/drain line to eliminate the need to remove the cowl to refuel the aircraft.

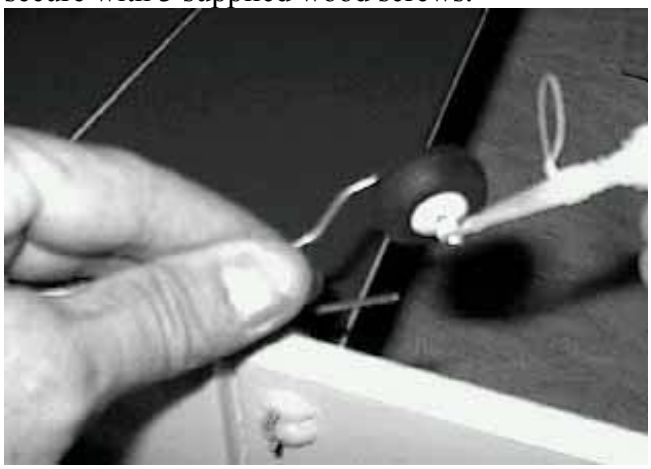
Insert the three tubes through the rubber stopper. Install the inner and outer cap plates and the center screw, do not tighten the screw. Slide the long and one short tube in allowing 3/8-inch to protrude to the outside. The second short tube [*fill/drain*] should be 1/8-inch beyond the inner plate. Bend the long tube as shown to the tank top bubble. Insert the flop weight in the end of the supplied flop tube. Cut the flop tube just short enough so the flop weight cannot touch the tank end when assembled. Lube the rubber stopper lightly with cooking oil, align the vent tube with the tank bubble and carefully insert into the tank. Do not tighten the screw.



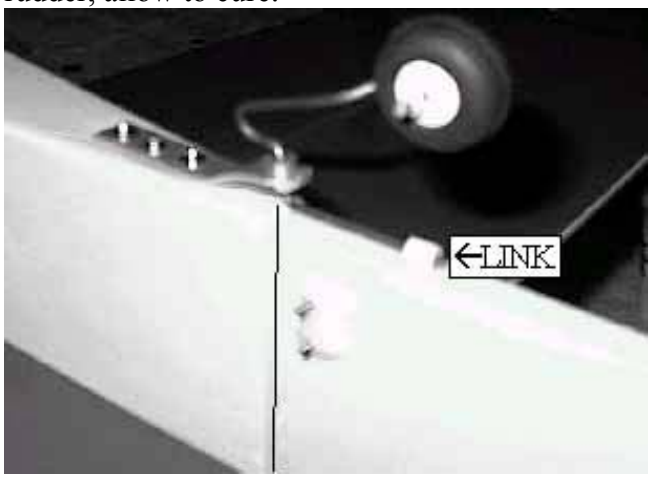
Apply a bead of RTV type silicon around the stopper on the front of the tank. Slide the tank into position and while holding it there tighten the stopper screw. The stopper will expand, holding the tank in position.

LANDING GEAR

Install the tail wheel on the bracket using the small lock tube and medium CA. *do not get glue on the wheel.* Aligh the tail wheel pivot with the center line of the rudder hinge as shown, secure with 3 supplied wood screws.

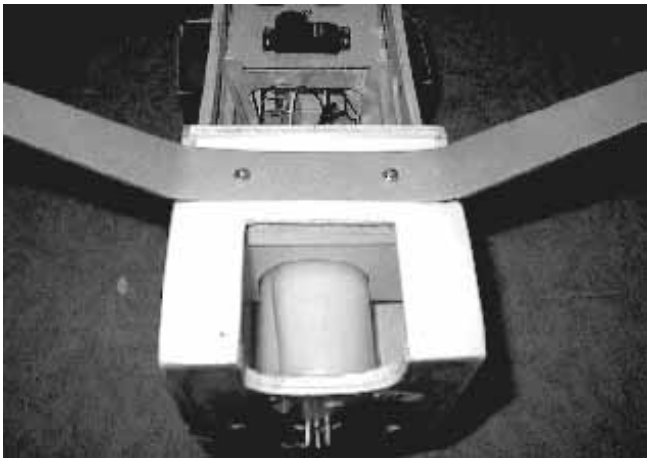


Aligh the tail wheel steering arm with the rudder, make a mark 1/8-inch forward from the end of the arm. Cut a slot at the mark to fit the rudder/steering arm link. Epoxy the link to the rudder, allow to cure.



Attach the main gear to the fuselage with the provided 4-mm screws.

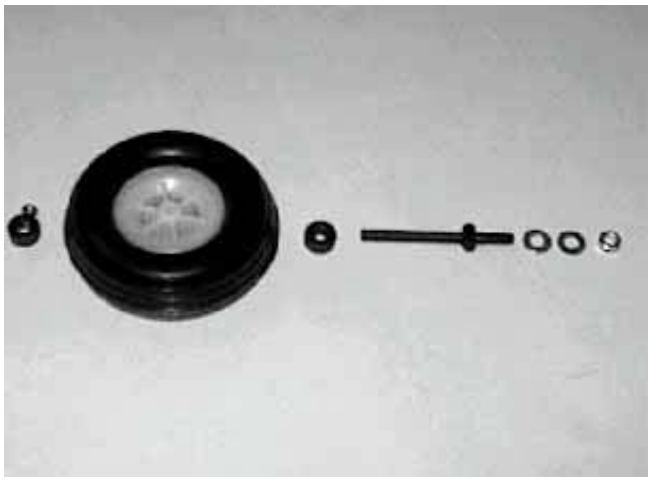
Drill one Axel hole in each wheel pant at the locator marks {be sure to make a right and a left}.

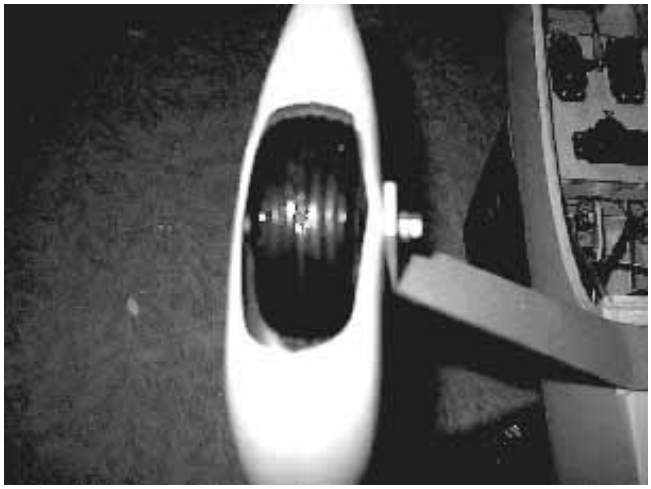


Temporaly insert the axel and align the wheel pant. Drill the second hole for the lock screw.

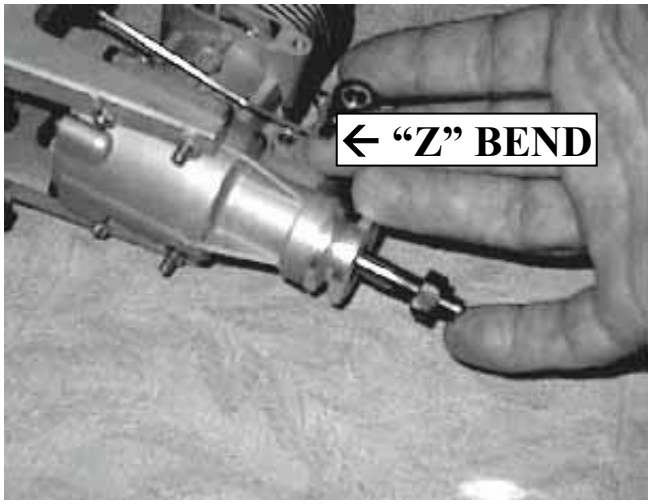
Insert the supplied 2-mm screw through the hole just drilled, place a washer and nut on the inside of the pant and tighten. Assemble the axel, spacer,wheel and lock as shown.

Spread the wheel pant and work the axel with a washer through the hole. Secure with the supplied nut. Add a drop of CA to lock the threads.

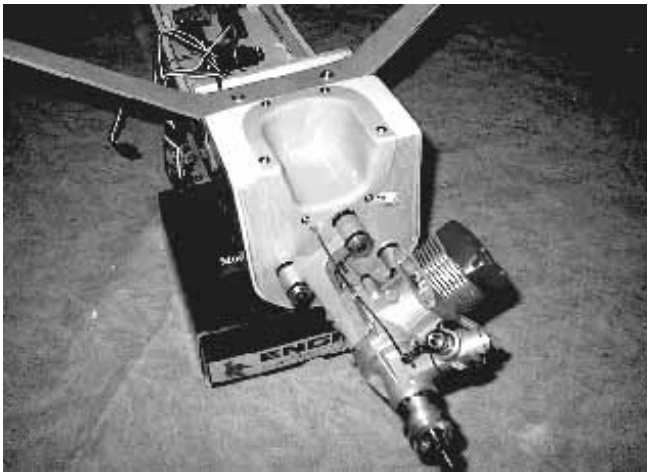




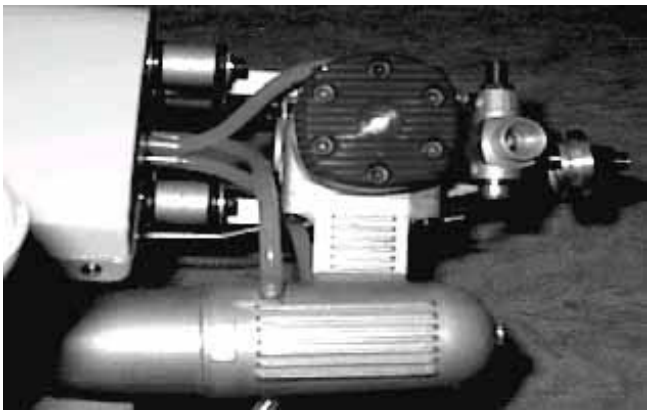
Install the engine mount and the engine. Be sure the mount screws do not interfere with the fuel tank. Fabricate the throttle control rod using "Z" bends as before.



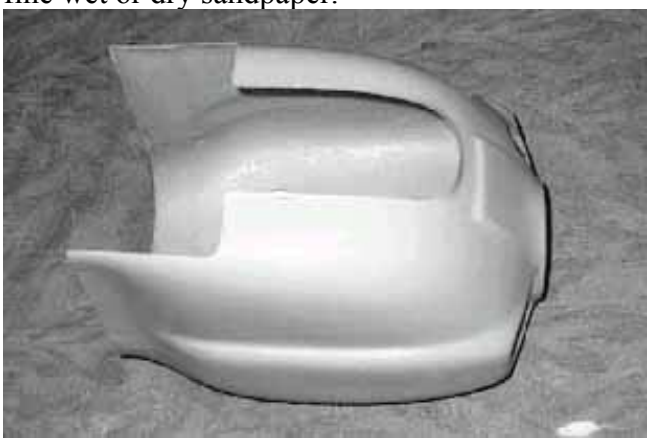
Apply a bead of RTV silicone around the exhaust cover and reinstall.



Install the Fuel lines and muffler.

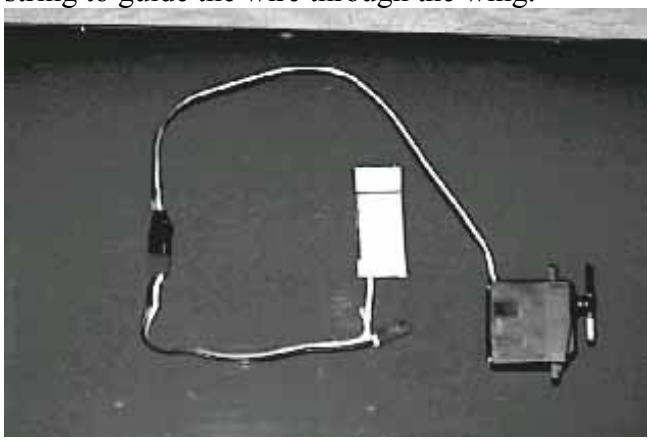


Open the bottom of the cowl to allow room for the muffler as well as hot air exit. Other openings in the cowl for cylinder head, glow plug and needle valve access will depend on the engine you have chosen. Dermal tools works well for this, go slowly and sand the edges smooth with fine wet or dry sandpaper.



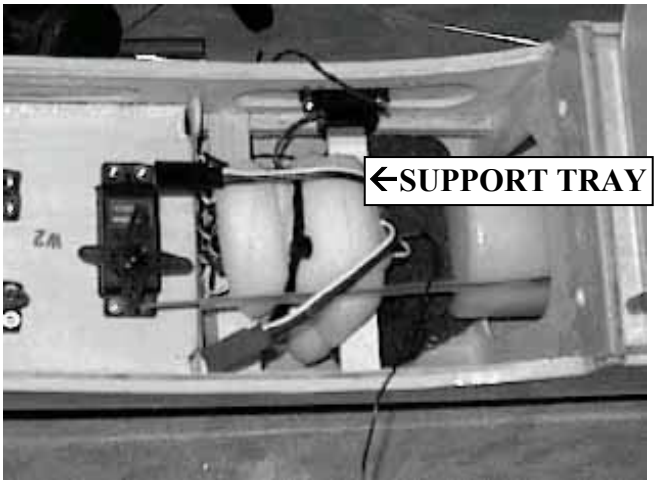
Slide the cowl in position and temporarily install the spinner. With the cowl aligned with the spinner, secure it with 4 screws. The screws should be placed 3/16-inch forward of the back edge of the cowl. The lower screws go ½-inch up from the fuselage bottom; the upper screws go 3 ½-inches up. This location will insure the screws attach to the ply doublers inside the fuselage.

Check you wing servo leads for length, if necessary add a servo extension. If an extension is used be sure to secure the connector to prevent separation in the wing. Use the servo wire pull string to guide the wire through the wing.

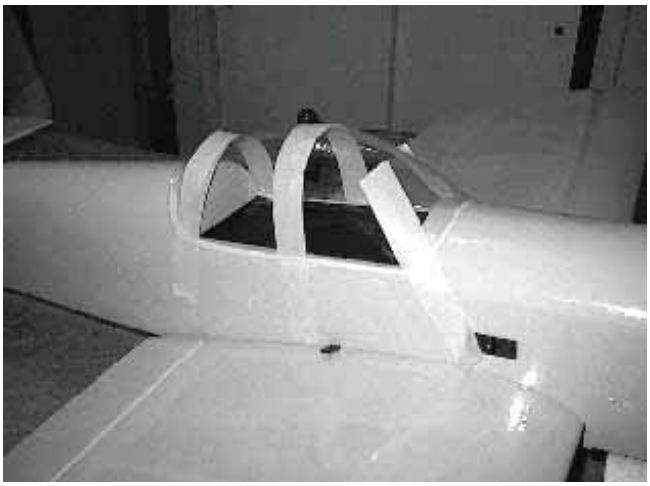


Install the control horn in the aileron triangular hard point. This can be found by shinning a flashlight through the covering. Screw a clevis on the end of the supplied control rod. Attach the clevis to the horn and as was done before make a mark at the servo arm and install with a “Z” bend.

The receiver support tray may be installed if desired. Install the switch harness and finish the radio installation following the radio manufactures instructions.



Carefully trim and align the canopy. Secure the canopy using "canopy adhesive". Tape the canopy securely in place while the adhesive cures.



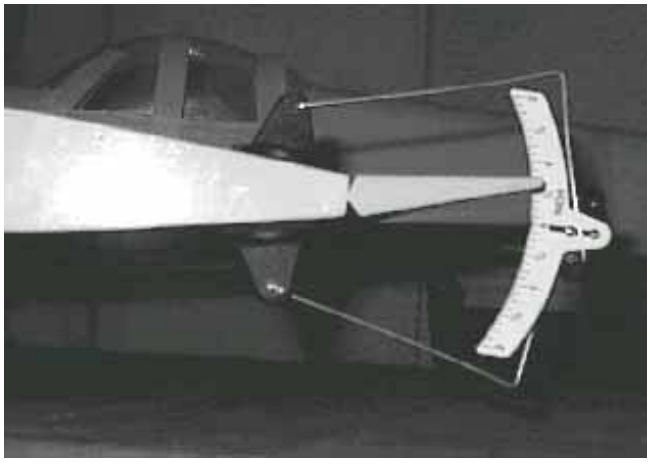
WEIGHT AND BALANCE

Nothing affects the way a plane flies more than weight and balance. Failure to perform this procedure may result in an aircraft that is at best difficult to control and at worst impossible to fly. Even small changes in the balance point make large changes in stability. For your first flights we recommend using a balance point at the forward end of the center of gravity {C.G.} range, this location will provide the most stability. As your comfort and skill increase slowly move the C.G. aft to increase the control response.

For the first flights of the Cap Sport, the CG should be between 3 ¾-inches and 4 ¼- inches measured straight back from the wing leading edge along the fuselage side. Turn the aircraft upside down and support it from between the two marks. Shifting the battery front to rear in the fuselage can be used to help balance. If necessary add weight to the nose or tail.

CONTROL THROWS

With your radio on, center all trims and adjust the clevises so all control surfaces are straight. Measure the control surface movement at the widest part of each surface. Use the servo horns and bell crank holes to adjust the control throw. For your first flights the control throws should be set to the following:



Elevator 9/16-inch up / down
Rudder 1 ½- inch right / left
Aileron 3/8-inch up / down

Double check all controls move in the proper direction.

MOTOR SET UP

Be sure the motor is properly broken in using the manufacture instructions. Set the throttle throw to shut the motor off when the trim is pulled down and idles reliably with the trim up.
After the motor is set, run one tank of gas at full throttle, measure how much time it takes to run the tank dry.

CONGRADULATIONS you are now ready for test flights.

Before leaving for the field be sure your batteries are fully charged and you have all the required support equipment {fuel, starter, glow driver, ect.}.

Although the CAP SPORT will fly well in wind, wait for a nice day.
At the field have a helper hold the airplane, following the radio manufactures instructions perform a range check of the radio. Do this with the motor off, start the motor and do it again. *Perform this test EVERY TIME YOU GO TO FLY!*

TRIMING BASIC FLIGHT

The CAP SPORT is NOT a trainer. A true aerobatic aircraft, it goes only where you point it and will not recover to level flight without control input. If you do not have high performance experience seek the help of someone who does.

Line up on the center of the runway and slowly open the throttle, using the rudder to maintain directional control. Once the tail is up apply a little up elevator and allow the plane to gently lift off the runway. Keep the climb angle and turns shallow until you reach a safe altitude. Reduce the throttle to about 60% power. With the airplane flying away from you adjust the radio aileron trim tab till the wing stays level. Turn and line up the plane with the runway. Adjust the elevator trim till the plane maintains level flight. Once again with the airplane flying away from you adjust the rudder trim till the fuselage tracks straight {it may be necessary to correct the aileron trim after this procedure}. Continue to fly and trim until the aircraft is tracking well, land before the fuel runs out. Carry a little power on final approach until over the end of the runway, then cut power to idle, hold the plane just off the runway till the airspeed bleeds off and the plane settles on. If the landing is too long add power go around and try again, don't try to force it to the ground.
Now its time to zero out the trims. To do this measure the control location, center the trim tab on the radio and adjust the servo horn for large changes, the control clevis for small changes. For example if after the flight the rudder is 3/16 inch to the right, center the radio trim and adjust the clevis till the rudder once again measures 3/16 right. By doing this whenever you fly, setting the radio trims at center will result in a well-trimmed plane. Increase the control travel, as you become more familiar with the flight characteristics until loops take about 50 feet and knife edge can be maintained with 80% stick deflection. Final roll rate should be 300-360 degrees per second.

If you have followed the procedures in this Manuel you will now be rewarded with one of the finest flying sport models available. All primary aerobatic maneuvers are at your fingertips and the aircraft will perform them with ease. No further trim work will be required until you are ready for unlimited or advanced 3-D flight. Before attempting any of the ADVANCED FLIGHT TRIM procedures you must be completely comfortable with inverted and knife-edge flight. The following trim sequence is very time consuming and you may not be able to complete it in one day. Every change made during this procedure will affect all others so it will be necessary to start the procedure from the beginning after each adjustment.

ADVANCED FLIGHT TRIM
All the following tests should be performed at 80% power unless noted.

C.G. Fine Tuning:
Roll inverted, neutral elevator to two clicks of down trim, if the model descends move the C.G. aft. If the model climbs move the C.G. forward. C.G. movement should be no more than ¼-inch at a time.

Engine Thrust Angle Right/Left:
On a low pass 50% power directly into the wind, go to 80% power and pull to a vertical line at the same time. As the model slows do not correct the path with rudder. If the model yaws right add 1/16-inch shims under the right side motor mount bolts at the firewall. If the model yaws left place the shims under the left side.

Main Wing Incidence:
Roll to knife-edge flight, if down elevator is required to maintain a straight line, shim the back of the main wing 1/8-inch at a time till the elevator is neutral. If up elevator is required shave the rear of the wing saddle 1/8-inch at a time.

Engine Thrust Angle Up/Down:
On a low pass 50% power crosswind, go to 80% power and pull vertical at the same time. As the model slows do not correct path with elevator. If the model tries to loop add 1/16-inch shims to the top motor mount bolts. If the model tries to push over to the wheel side, add 1/16-inch shims to the lower motor mount bolts.

Wing Tip Weight:
Level flight into the wind, roll inverted neutral aileron. If one wing drops add weight to the other wing tip 1/8-once at a time.

Elevator Surface Alignment:
Fly away from you directly into any wind, apply full throttle and pull two consecutive loops. Model rolls right, raise left elevator, model rolls left, raise right elevator.