

# ***SUPER KRAFT***

## **Rearwin Speedster**

### **Assembly Manual**



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**Warranty:** Kangke Industrial USA Inc. guarantees this 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 of user-assembled products. This kit has been flight tested 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 or your claim may be denied.

# **Super Kraft**

## **1/4 scale Rearwin Speedster**

**Rearwin Airplanes built the original Rearwin Speedster. The company was founded by Raymond Andrew in 1928 and sold to Empire Ordinance in 1942. The Speedster came in two models, the 6000C powered by a 95 horsepower Cirrus engine and the 6000M powered by a 125 horsepower Menasco. The plane quickly earned a reputation for it's wide speed range and nimble handling. The 6000M could cruise at 140 miles per hour and still land at only 45. With a useful load over 600 pounds and a range of over 600 miles it was a true hot rod of the sky.**

**Super Kraft made every effort to retain all the wonderful flight characteristics that made the original so popular. The ¼ scale Rearwin is a sport pilots dream plane that must be flown to be appreciated. Capable of all basic and most advanced aerobatics, even the average pilot looks like a pro. Blazing high-speed passes followed by slow gentle landings attract attention from all that see it fly.**

**The engine of choice for the proto type was the ZDZ-40 distributed by RC Showcase. The narrow width, excellent power, light weight and reliability made for a perfect combination (RC Showcase 301-374-2197).**

**The servo requirements are 50-oz for the ailerons, 55-oz for the elevators and 100-oz for the rudder. We used the Hitec HS-5475 for both aileron and elevator, with an HS-645-MG on the rudder. The programmable feature of these digital servos made set-up quick and easy, and the zero gear lash made for precise control (Hitec RCD USA 858-748-6948).**

**Skyborn Electronics supplied the Lithium-Ion battery packs. We used 6 volts for the receiver and 4.8 volts for the ignition. Powerful and lightweight, they are highly recommended (Skyborn 972-267-5099).**

**WARNING!** As model aircraft get larger and more powerful, the risk for injury increases. KANGKE's extensive testing procedures insure a high quality kit that has gone through many steps to provide you with a safe reliable airframe. Nothing we can do however will make up for poor assembly or irresponsible behavior at the field. A model this size and weight traveling at 60 MPH contains enough energy that if it were to contact another person the injuries would be extensive, possibly fatal. The responsibility for safe operation of this model is yours and yours alone. If you are a beginner or have never flown a model of this size and power, you should not make the attempt without the help of an experienced pilot.

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Because of the large assortment of radios and engines this manual should be considered a guide in those areas. Always follow the manufacture instructions for those components.

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.

If you are familiar with the assembly of ARF type aircraft you will find the order of assembly steps in this manual to be unusual, this was necessary to insure the fastest, most accurate assembly possible. Super Kraft recommends you follow the assembly order as shown.

**Specs:**

Span	96.5 inches
Length	71.5 inches
Weight	14-17.5 pounds
Area	1,460 square inches
Loading	26 average
Channels	4 with 6 servos
Engine	1.8 –3.2 Gas.
Covering	Oracover
Tail wires	functional
Wing struts	functional
Cowl	fiberglass
Wheel pants	fiberglass

**Kit contents:**

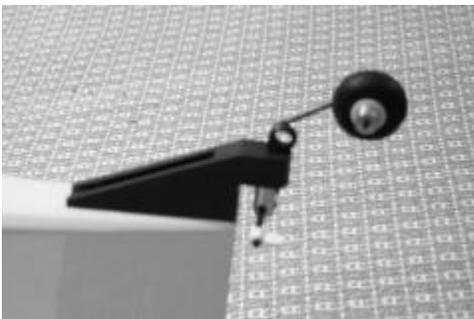
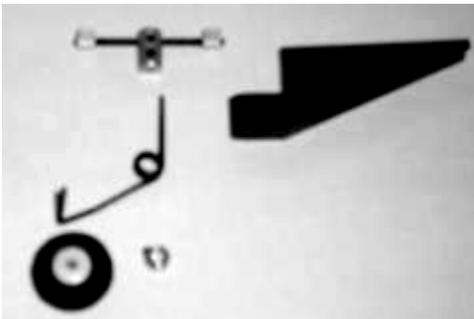
Wing panel/controls	2
Fuselage	1
Cowl	1
Window kit	1
Main gear	1
Tail gear kit	1
Stabilizer/elevator	1
Rudder/fin	1
Control rod pack	1
Tail wire pack	1
Wing strut	2
Strut bracket	1
Hardware pack	6
Wing tube	1
Wheel kit	1

Remove the upper hatch and the lower pan from the fuselage.

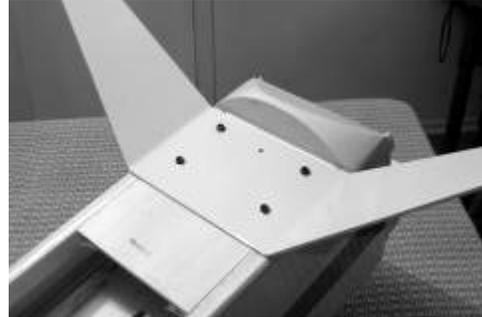


*Each hardware bag contains parts for specific components. Try to keep them separate as the assembly proceeds.*

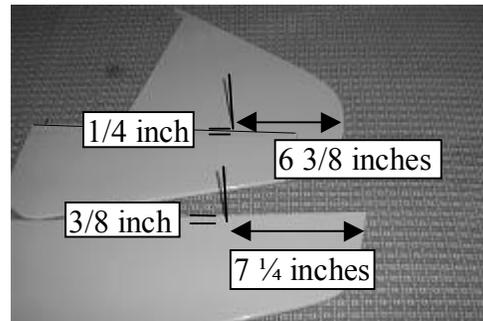
Because the fuselage is round, we will install the landing gear first and use it as a work stand. Locate the hardware bag containing the tail wheel parts *{this package also contains all the wood screws and washers for the airframe}*. Assemble the parts as shown in the next two photos. Be sure to align the tail wheel block with the back of the fuselage as shown. Install the block with the supplied wood screws and washers. Save the springs and rudder bracket for installation later.



Locate the hardware bag for the main gear and install it as shown with four screws and washers *{this bag also contains the wing attach screws, and the upper hatch / lower pan screws}*.



Locate the holes for the flying wires in the stabilizer and fin. The holes are small and difficult to find, use a pin to open them. Use the dimensions shown below to locate them.



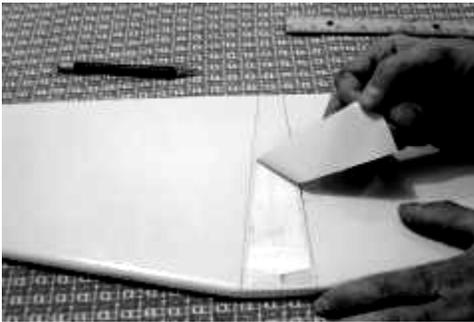
Slide the stabilizer through the tail slot and center carefully. Install a lower pan screw in the main gear center. From the pan screw use a string to go back and forth from tip to tip of the stabilizer until square.



Use a felt tip pen to mark the fuselage outline on the top and bottom of the stabilizer.



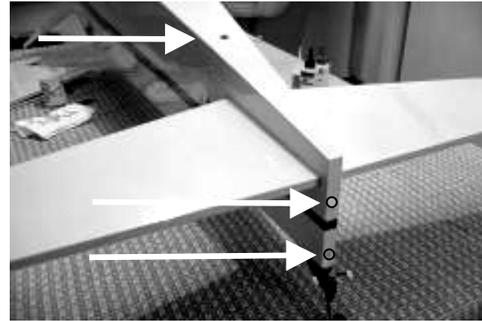
With a sharp razor knife, cut and remove the covering 1/8-inch inside the lines



Slide the stabilizer in the fuselage leaving 3/8-inch wood exposed. Coat the wood with epoxy, top and bottom. Slide the stabilizer through the fuselage exposing wood on the other side, coat with epoxy and then center using the pen lines. Before the epoxy cures double check the stabilizer with the string and square if necessary. Clean the excess epoxy with a paper towel moistened with alcohol.



Open the three holes in the covering for the fin as shown.



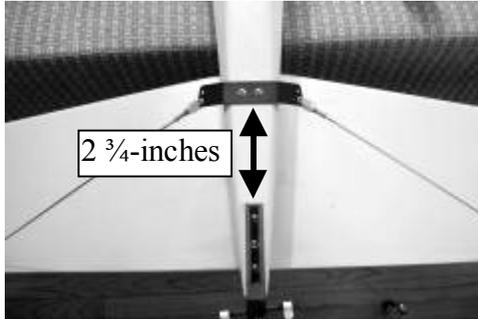
Coat the mating surface of the fin with a thin layer of epoxy. It is not necessary to remove any of the covering. Install the fin starting with the lower pin, tapping gently forward. Remove the excess epoxy with a paper towel moistened with alcohol.



Open the hardware pack with the flying wire brackets and screws. Bend the six brackets to an angle of approximately 45-degrees. Install the brackets in the fin and stabilizer with the supplied screws. With the screws tight apply a small amount of paint or RTV silicone to lock the threads.



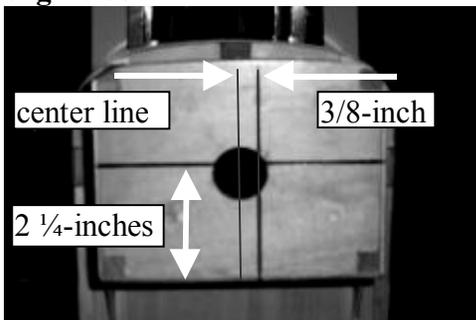
Install the lower bracket  $2\frac{3}{4}$ - inches in front of the tail wheel bracket. Install the lower flying wires, they should be just tight enough to have no endplay but not distort the stabilizer.



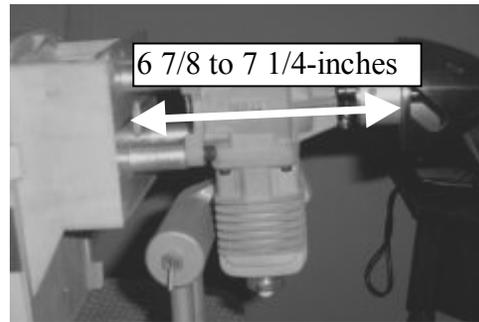
Once adjusted, tighten the lock nut and install the rubber keeper. Repeat the process for the upper wires.



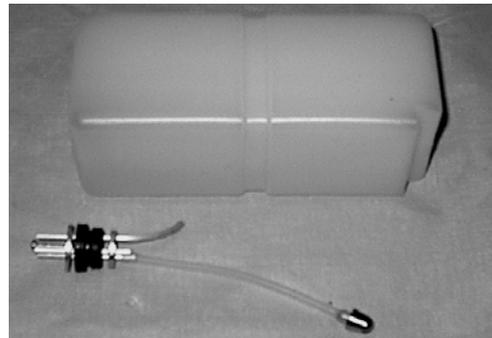
Because right thrust is built into the firewall it is necessary to mount the engine  $\frac{3}{8}$ -inch to the left of the firewall centerline. This will insure the prop/spinner is in the center of the cowl hole. The vertical center will be  $2\frac{1}{4}$ -inches up from the bottom of the engine box.



The distance from the firewall to the propeller flange or spinner must be between  $6\frac{7}{8}$ -inches and  $7\frac{1}{4}$ -inches.



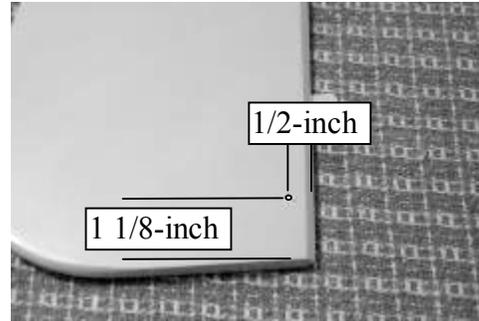
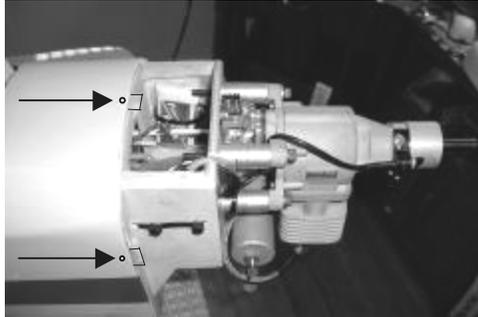
Assemble the fuel tank with the proper stopper for your fuel type. The proto-type uses a three-line system with two vents out the bottom; this will only work with gas. Check your engine manufactures instructions for the required fuel line system.



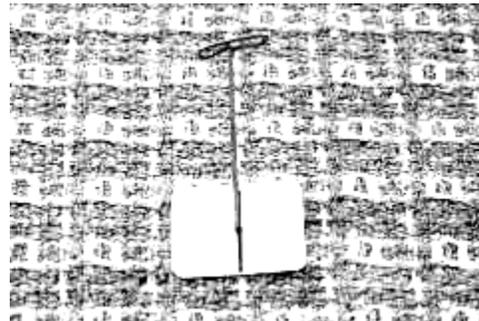
Install the throttle servo and the supplied nylon push rod. Follow the radio manufactures instructions for mounting the servo. Be sure the servo operates in the proper direction. Cut and fit the push rod to the engine.



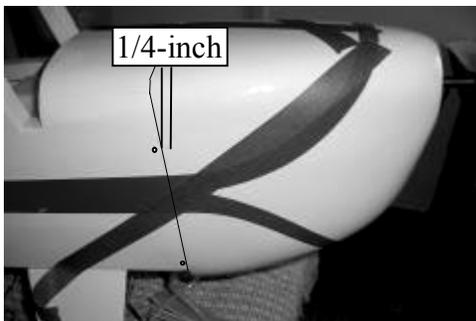
Complete the engine installation following the manufacture instructions. Use a felt tip pen to make a dot at the center of each cowl mount tab.



Locate the center of each hinge, and insert a pin through the hinge.



Securely tap the cowl in place; make sure it is butted against the fuselage. Drill 1/16-inch holes in the cowl 1/4-inch forward of the back edge.



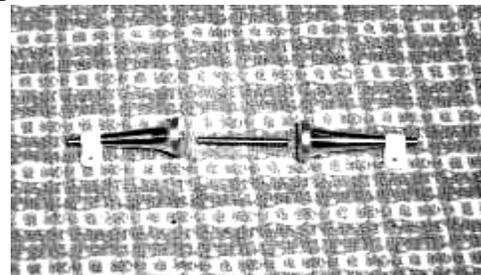
Install the hinges in the rudder, then the rudder on the fin. Align carefully, remove the pins and apply two drops of thin CA to each side of each hinge.



Locate and open the necessary holes for your engine. Be sure to open a hole in the front large enough to insure good cooling.

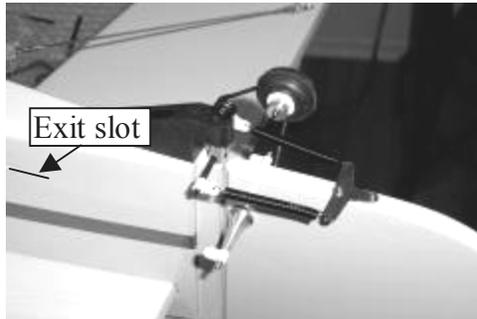


Use the two long control horns with the threaded rod for the rudder pull-pull.



Drill a 1/8-inch hole in the rudder for the control horns. Locate the hole 1 1/8-inch up from the bottom and 1/2-inch back from the hinge line.

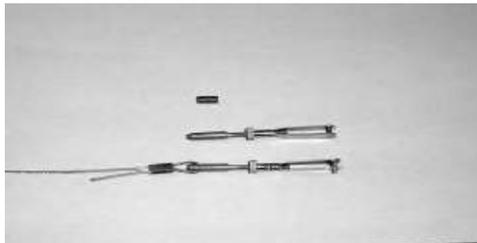
Assemble the control horn in the rudder. Install the tail wheel "T" 2 1/4-inches behind the hinge line. Install the tail wheel control springs. With a razor knife cut the covering over the cable exit slots.



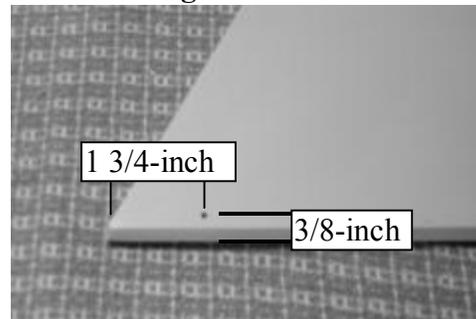
Fabricate the rudder end of the cable in the same way. Adjust the cables so that with the servo and rudder on center there is no free play. Do not over tighten the cables.



Fabricate one end of each pull-pull cable. Pass the cable through the collar, then through the hole on the end of the coupler and back through the collar. Crush the collar with pliers and add a drop of CA.



Drill a 1/8-inch hole in each elevator half for the control horn. Locate the hole 1 3/4-inch out and 3/8-inch back from the hinge line.



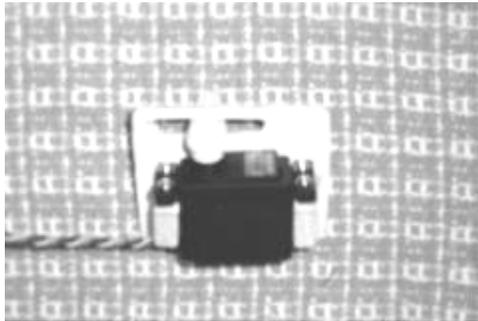
Install the rudder servo attach the cables. Run the cables through the slots at the rear of the fuselage. Some modelers like to cross the cables others do not. The choice is yours.



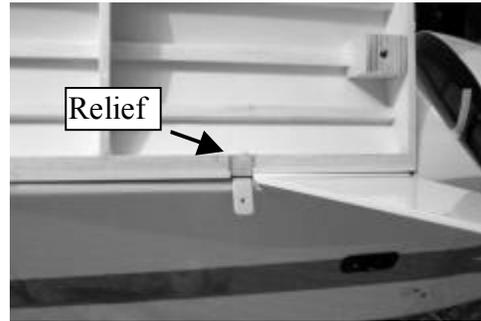
Install the elevators with the same procedure used on the rudder hinges. Install the medium length control horns with the provided screws and top plates. It may be necessary to drill through the hinge for the horns.



**Open the servo arms slots and install the servos in its door. Be sure the servo is centered.**



**Cut a small relief in the belly pan to clear the strut bracket.**



**Run the servo wires through the fuselage and install the servo doors.**



**Install the belly pan with the supplied screws.**



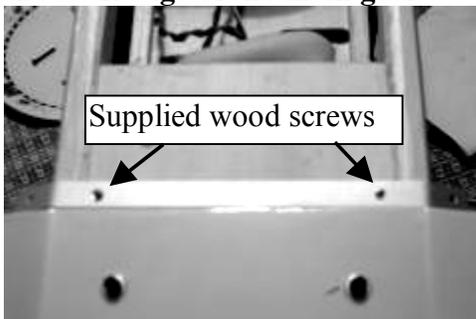
**Adjust and install the elevator push rods.**



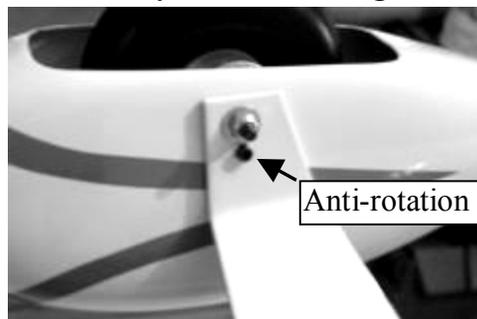
**Assemble the wheels and axles. Slide the axle through the wheel, followed by the spacer and the standard nut.**



**Install the wing strut attach bracket at the back edge of the main gear.**



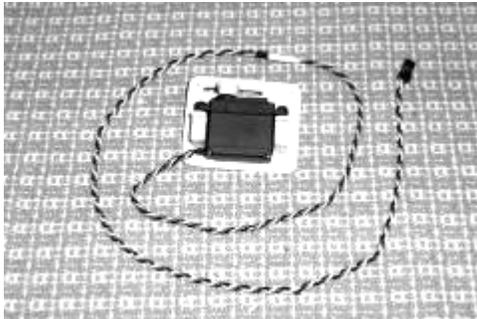
**Install the anti-rotation screw followed by the axle and tighten.**



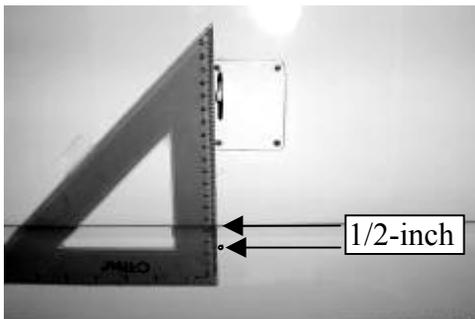
**Cut and fit the windshield and side windows. Install with canopy adhesive. Tape securely in place and allow to cure. Cut the side window 1/8-inch larger than the opening and secure with canopy adhesive.**



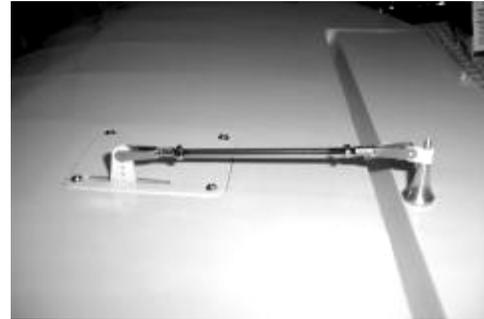
**Mount the servo to the wing servo door with the correct length extension just as was done with the fuselage.**



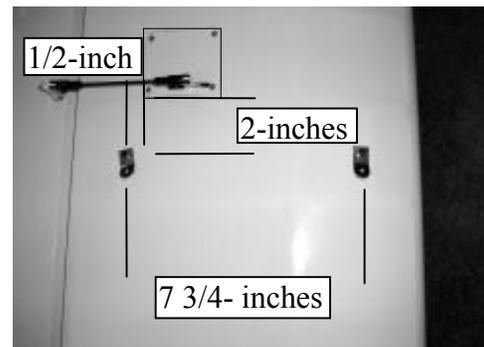
**Install the ailerons on the wings using the same process as was used with the elevator and rudder. Install the servo using the provided string the pull the wire through. Drill a 1/8-inch hole in the aileron 1/2-inch behind the hinge line. Install the short control horns.**



**With the servo centered install and adjust the push rod. Align the aileron carefully.**



**Locate and open the holes for the wing strut attach brackets as shown and install the brackets.**



**Install the wing tube in the fuselage, slide the wings on and secure with the supplied screws. Install the wing struts to the fuselage with the screws and lock nuts. Adjust the struts so there is no free play but not so tight as to twist or deform the wing.**



## ***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 a small change in the balance point makes a large change 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.**

## **BALANCE**

The balance range for the Rearwin is the width of the wing tube. Wrap a piece of wire around the tube under the top hatch and lift the plane off the ground. It should hang from 10-degrees nose down to 10-degrees nose up.

## **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 1-inch up / down  
Rudder 1 3/4- inch right / left  
Aileron 1-inch up / down**

## **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.

**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, etc.).

Although the Rearwin 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!***

#### TRIMMING BASIC FLIGHT

**The Rearwin 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. As you become more familiar with the flight characteristics increase the control travel until loops take about 75 feet and knife-edge can be maintained with 50% stick deflection. The 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.**