

SQUIRT

A Speed 400 Primary Trainer



V1.04WAA



Span 38" / Length 26" / Area 260Sq." / Weight 14.0-16.0oz

WARRANTY

Stevens AeroModel 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 Stevens AeroModel's liability exceed the original cost of the purchased kit. Further, Stevens AeroModel reserves the right to change or modify this warranty without notice.

In that Stevens AeroModel has no control over the final assembly or material 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.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

REQUIRED TO COMPLETE KIT:

Kit Contents:

1. Rolled Computer Drawn Plan Sheet
2. Illustrated Instruction Manual
3. Laser Cut Balsa and Hardwood Parts Sheets (See Cut Parts Inventory Sheet)
4. 2 - 1/8" x 24" Hardwood Dowel. (taped to back of wood brick)
5. Pre-Formed .093" dia. spring steel landing gear. (taped to back of wood brick)
6. Vinyl windscreen and wing stripe decal set.
7. Hardware Bag
 - 3 - 1/8" x 3" hardwood dowels
 - 1 - 3/16" x 3" hardwood dowel
 - 1 - #16 Rubber Bands
 - 2 - .045" x 11" Push Rods (Z-Bend)
 - 1 - .032" x 11" Music Wire
 - 1 - .032" ID x 11" Nylon Tube
 - 1 - Pair 2" Foam Wheels (GW/LFW-508/21) [Builder must drill hubs to fit 3/32" wire gear]
 - 1 - 1/2" Sullivan #60 Tail Wheel
 - 1 - Du-Bro 919 (BULK 27800) Micro2 Control Horns (2/Pkg.) [Builder must drill to fit .045" Push Rods]
 - 1 - Du-Bro 845 Mini EZ Connector (2/Pkg.)
 - 2 - Rubber wheel collars (GW/AD001 2.3mm)
 - 2 - 3/16" Diameter Neo. Magnets

Recommended Finishing Items:

1. One roll of AeroLITE or AeroFILM covering available from www.stevensaero.com

Suggested Electronics:

1. Your squirt will operate well on a 3-4 Channel Transmitter.
2. 2 - Hitec HS-55 Servos (use of HS-55 servos will negate the need for two 6" servo extensions)
3. 2 - 6" Servo Extension (Only required if you do not use the suggested HS-55 Servos)
4. 1 - Micro Receiver 3-4 Channel (Castle Creations Berg MS4L or similar recommended)
5. 1 - 10-20A ESC we suggest GWS ESC300A or Castle Creations Pixie 20p
6. 1 - GWS EDP-400 or 6v Speed 400 Motor
7. 1 - GWS EMM-400A Motor Mount
8. 1 - GWS DS002 or 2.3mm Prop Shaft Adapter
9. 1 - GWS 7x3.5 HD Prop
10. 1 - GWS 1/2" Spinner
11. 1 - 2 Cell 7.4V LiPo Battery we suggest Apogee 1000mah (20C) or ThunderPower 1320 (13C)

Brushless Motor Upgrades: While not necessary for proper flight performance, we understand that there many will choose to upgrade the SQUIRT to a brushless power system. The Align 430L 2250KV series motor will fit without modification to the EMM-400A Motor Mount and is an excellent performer on 7.4V batteries. Additionally a GWS gearbox may be fitted to the airframe using the supplied motor stick assembly opening up many good options. With many of the lighter brushless motors it may become necessary to relocate your servos forward into the servo tray within the radio box area of the fuselage.

Items You May Need:

1. Thin, Medium, and Thick CA (super glue) or White Glue
2. Plan/Table Protector (use the bag that this kit came in to protect your work surface from CA glue spills)
3. Razor Blade(s)
4. Med-Fine Grit Sand Paper and sanding block
5. Clear Tape
6. Balsa Wood Filler
7. .047" and .093" drills.

GENERAL ASSEMBLY INSTRUCTIONS:



Thank you, for purchasing this *Stevens AeroModel* SQUIRT – A speed 400 primary trainer. This kit provides the builder and pilot a refreshing change of pace from heavy “ARF” style plywood box airframe construction and blends stick and tissue design methods of the past with state of the art CAD technology and precision interlocking laser cut parts; the result is something you will find truly exceptional to build and fly. This kit is intended for a beginner-novice builder and beginner pilot as a primary 3-channel trainer.

Best Regards,

Bill Stevens
bill@stevensaero.com

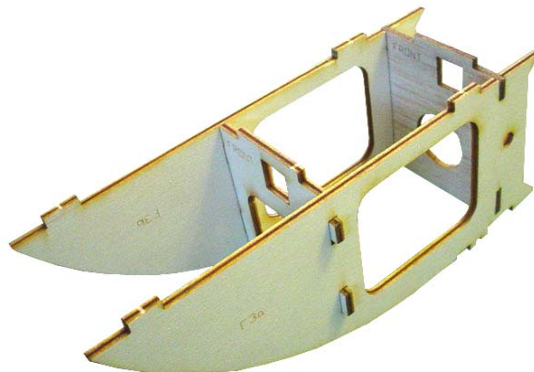
Stevens AeroModel “*Laser Engineered Kits™*”
1528 S. Nevada Ave.
Colorado Springs, CO 80906

Assembly Tips

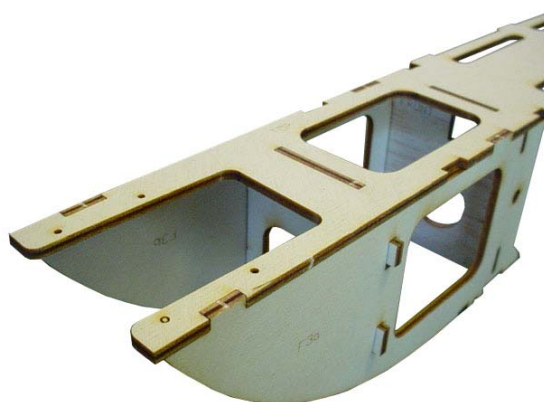
- READ THE INSTRUCTIONS** and the plan sheet prior to starting any work!
- Tape plans to work table. Cover with wax paper or plastic wrap.
- Join all joints with Thin CA unless otherwise specified.
- DO NOT REMOVE THE PARTS FROM THE Balsa SHEETS UNTIL REQUIRED!**
- DO NOT FORCE THE FIT** – when in doubt double check your parts - removal of material should not be required. If you feel that you have a poor connection check first to see that the part is not upside down. Reference each piece against the plan sheet.
- Making solid glue joints: Hold parts together on top of plan sheet using moderate pressure to fit parts - wick thin CA into joint. (There is no need to pin parts to work table as all pieces interlock and self - jig.)

Fuselage Assembly

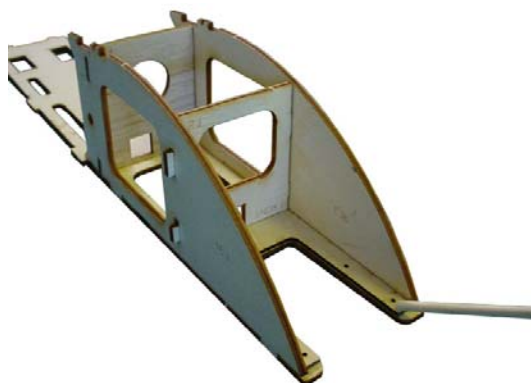
- Lets begin construction by assembling the fuselage core. Locate the following 1/8" Lite Plywood parts marked F2, F3a, and F3b. Locate the 3/32" balsa part F4. Dry fit (no glue) the assembly together as indicated in the photo below. Please note that F1 and F2 have forward designations these parts are etched with the word "FRONT" do make certain to assemble these parts with "FRONT" facing the nose of the model. Tip! If a part does not fit properly check the forward orientation.



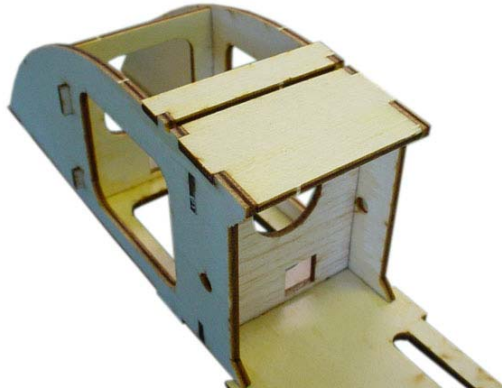
- Locate the 1/8" Lite Plywood part F1 and dry fit to the core as indicated in the photo below. Make certain that the entire assembly fits together without any gaps check for square then glue parts together by wicking thin CA glue into adjoining surfaces.



- Invert the core assembly and add the 1/16" plywood motor mount doublers to the inside of the core assembly as pictured below.



- ❑ Next, install the 1/8" Lite Plywood Parts L1 and L2 to the underside of the core as indicated in the following photo.



- ❑ Locate the 3/32" balsa fuselage sides and the 3/32" balsa former F5. Dry fit former F5 to the rear of the core assembly and the fuselage sides as indicated in the photo below. Once satisfied with the fit, glue the fuselage side to the core assembly. Repeat for the opposite side. Tip! you must fit F5 to the core prior to joining the fuselage sides.



- ❑ Now install the F7 cabin cross grain doublers they can be found on the 3/32" balsa sheet. These parts key inside the fuselage as indicated in the photo below.



- Locate the 1/16" balsa part F8 and install to the front of the cabin spanning the fuselage sides and F7 as indicated in the photo below. Tip! F7 is recessed to receive F8 align the top of F8 with the upper recess in F7.



- Now locate the 1/16" balsa part F9 and the 3/32" balsa part F6. Dry fit F9 to the top of the fuselage, next fit the former F6 to the fuselage and part F9. Invert the fuselage on your work surface, square, and retain parts with thin CA glue.



- Locate the 1/16" Plywood servo tray and glue inside the fuselage as indicated in the photos below.



- ❑ Next, fit the 3/32" balsa part F10 to the aft end of the fuselage as indicated in the photo below.



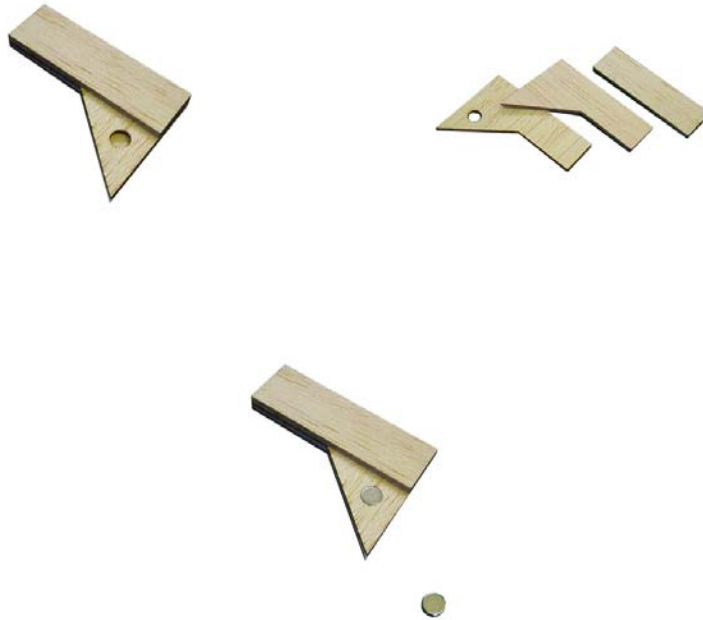
- ❑ Invert the fuselage and fit the lower 1/16" balsa decking part F11 as indicated in the photo below.



- ❑ Locate the 3/32" balsa parts F12 and key within the underside of the fuselage as indicated in the photo below. F12 doubles the fuselage battery access hatch and is shaped along its leading edge to fit snug against the inside plywood structure. Tip! Make certain that F12 rests upon the F11 decking installed in the step prior.



- Assemble the battery access hatch catch/cross brace from 1/16" balsa parts C1, C2, and C3 as indicated in the photos below. With the catch/brace assembled install one 3/16" rare earth magnet in the circular cutout – secure the magnet with thin CA glue.



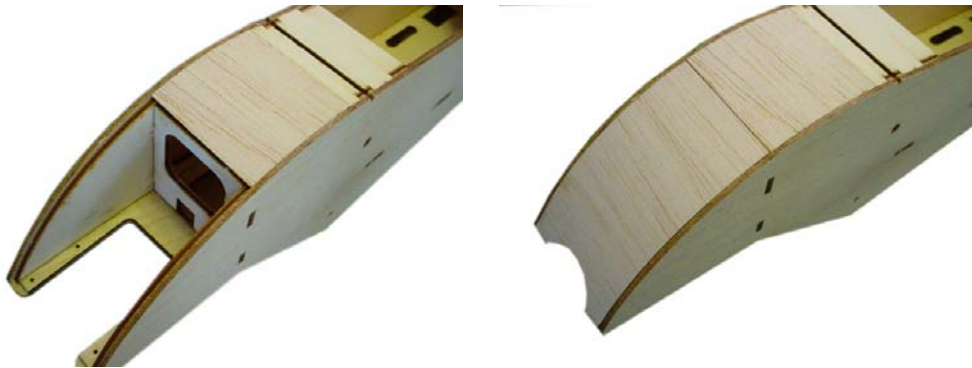
- Install the completed cross brace to the fuselage as indicated in the photo below. The leading edge of the catch/brace should be flush with the leading edge of the deck part F11. Tip! Sand lightly if the fit is too snug (a result of the C1,2,3 parts not being aligned properly when gluing) – don't force the parts to fit.



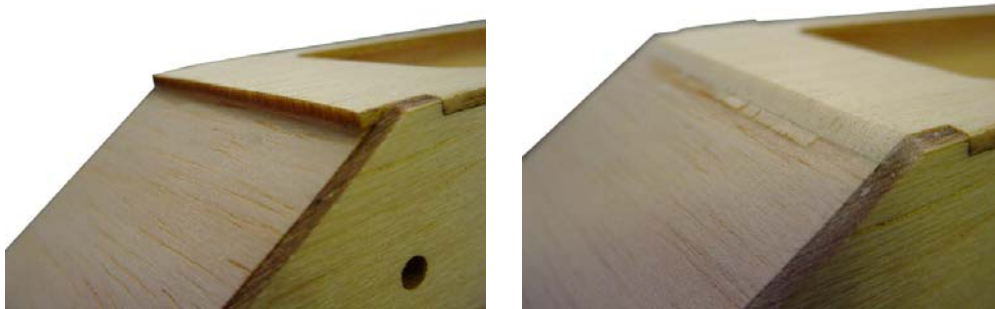
- Assemble the battery hatch from the 1/16" balsa parts H1 and H2. Note that H1 is etched with the outside shape of H2 to aide in aligning the parts. With H1 and H2 assembled as indicated in the first photo move on to installing the magnetic catch magnet and forward catch(1/16" balsa part H3). Tip! make certain you install your magnet in the hole that matches the magnet installed within the fuselage assembly.



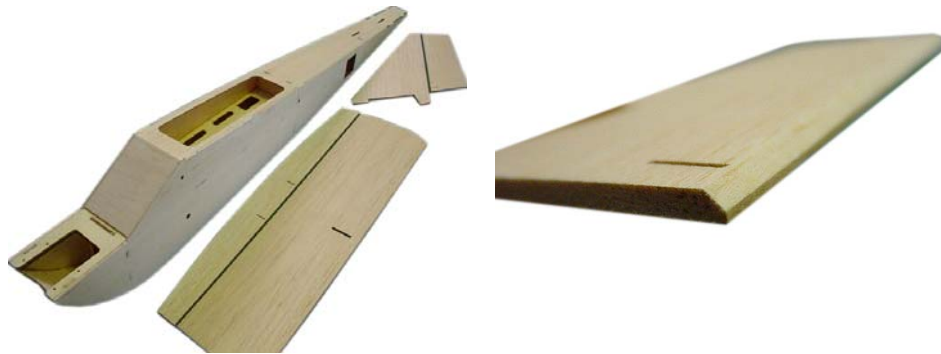
- Now locate the F13 and F14 balsa sheeting and sheet the nose of the aircraft starting from the leading edge of L2 following the recess between created by the inner plywood core and the fuselage sides as indicated in the photos below.



- You'll notice that the upper deck slightly overhangs the front of the windshield. Using a medium grit sand paper and your sanding block sand off the overhang as indicated in the photos below.



- Finish off the fuselage by filling any imperfections with balsa wood filler or a lightweight spackling compound then loading a fine grit (400) sand paper on your sanding block and lightly sand smooth the entire fuselage and tail feathers. Finish the elevator and rudder by sanding a 45 degree bevel in the leading edge of the part (ONLY THE RUDDER AND ELEVATOR) as indicated in the last photo.

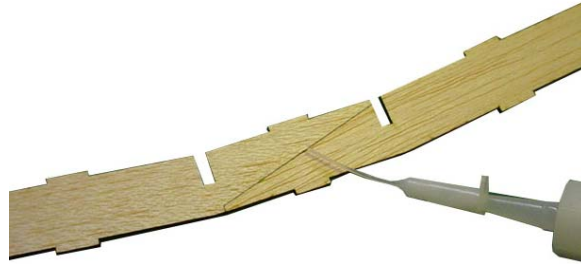


- Optional plywood 10mm stick assembly for GWS gearboxes. The 1/8" Lite Plywood sheet contains six parts to complete the GWS motor stick assembly. This assembly is only required should one desire to use the GWS EPS100-350 gearbox. Assemble the stick as indicated in the following photo and install to the fuselage through the provided holes in F2 and F4. This should NOT be installed if you wish to run the direct drive 6V S400 motor. Beginners should stick to the Speed 400 motor and rubber band motor mount. Later one may upgrade to the EPS 350 geared system when your skills improve.

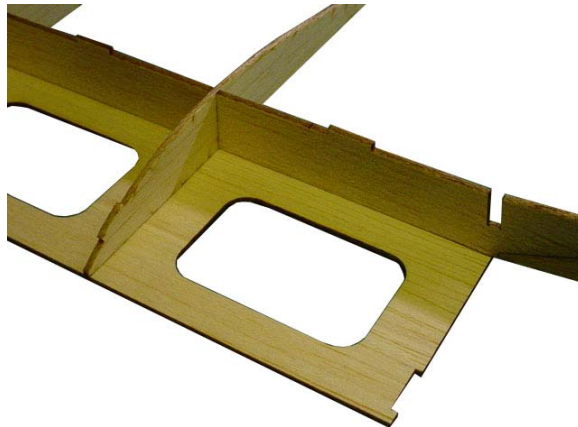


Wing Assembly

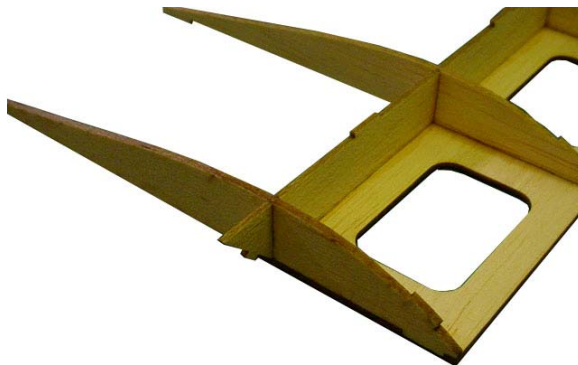
- Begin the wing assembly by locating the 1/16" Balsa parts S1a and S1b and join together as illustrated to create the main spar S1.



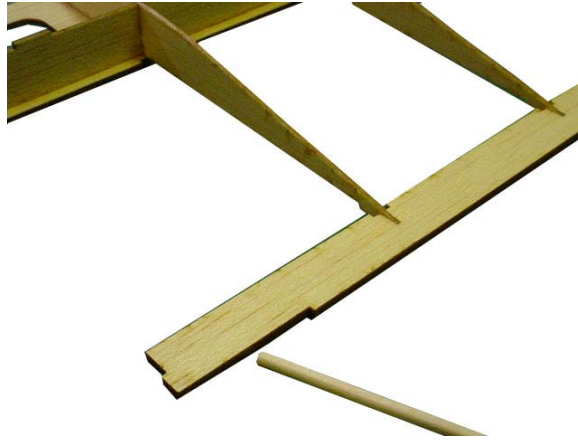
- You'll need to locate parts R2 (there are 5 of R2 in each side) Key the S1 spar assembly to one of the 1/16" Balsa W1 lower D-Tube parts and lock the spar to W1 with each of the five R2 ribs. Reference this photo and the plan sheet for placement. Lay this half of the wing on your flat building surface and glue the spar, ribs, and W1 together. Repeat for the opposite wing half. Tip! the spar is notched to only fit on part W1 in one direction if the part does not fit do not try and force the fit. Additionally part W1 is etched indicating where the inner R1 rib will meet W1.



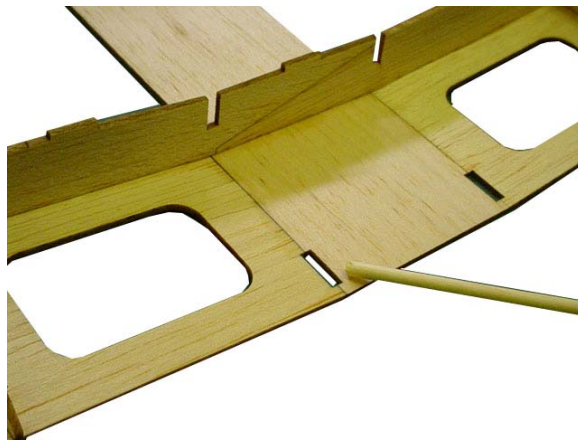
- Next add the 3/32" ribs R3 at each tip of the wing as indicated in the photo below.



- Slide the 1/8" trailing edge part TE1 in position spanning ribs R3 and all of the R2 ribs. Notice the notch indicated in the following photo – this notch is to be placed toward the root of the wing and will later accept the 1/16" ply doubler which prevents the wing retaining rubber bands from crushing the balsa wing assembly at the root. Repeat for the opposite wing half.



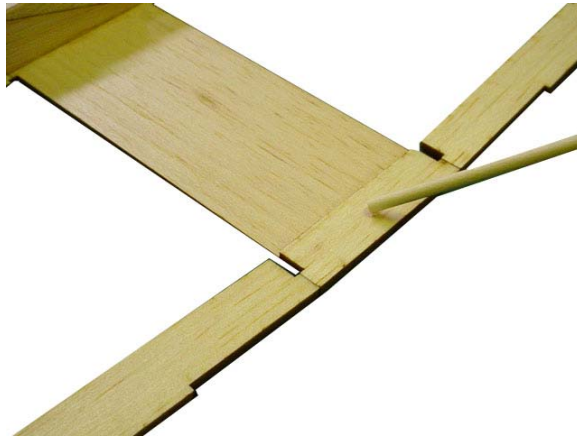
- Locate the 1/16" part W5 and install to the center wing section. W5 spans the lower center section of the wing, keys into the spar, and butts against the W1 parts. Assemble as indicated in the photo below making certain that the notching in W5 aligns with the notching in the W1 parts.



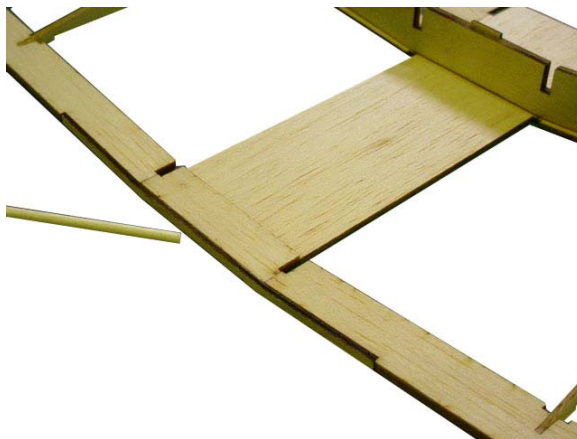
- Locate the 1/16" Plywood spar center section S2 and install to the BACKSIDE of the balsa spar S1. Reference this photo and the plan sheet for placement detail.



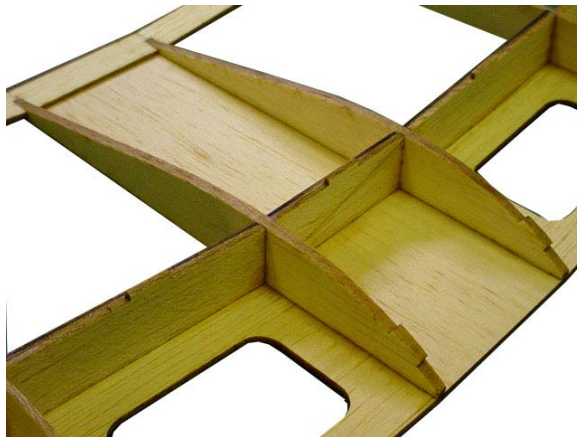
- Now find the 1/8" part TE2 and butt against the inside edges of TE1 and the aft edge of W5 as indicated in the following photo. Once satisfied with the alignment glue into position with thin CA glue.



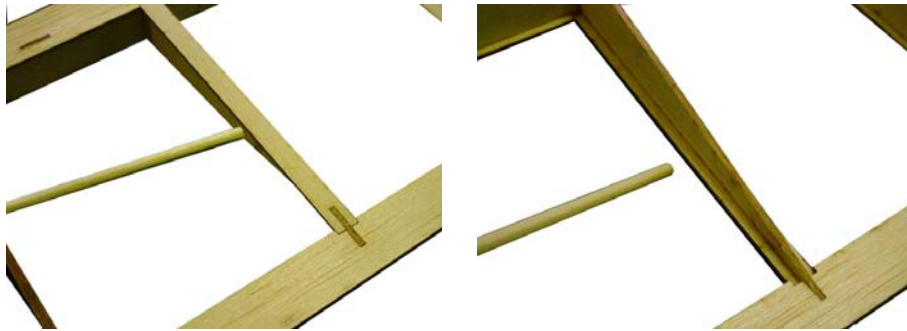
- Remove the 1/16" ply trailing edge doubler part TE3 and glue into position aligned with the notch in the back side of the wing trailing edge as indicated in the following photo.



- Now locate the 1/8" balsa root ribs R1 and glue into the center of the wing section. Reference this photo and the plan sheet for detail.



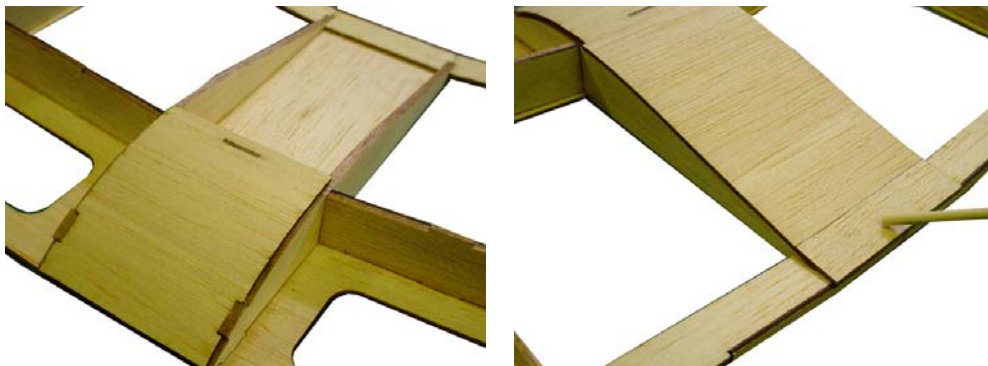
- ❑ Install the lower cap strips, carefully flip the wing onto it's top and dry fit the 1/16" balsa W9 cap strips atop all five (105) R2 ribs. Now flip the wing back over and set atop your flat building surface. Secure each cap strip with thin CA glue. Reference the photos below for the lower cap strip placement.



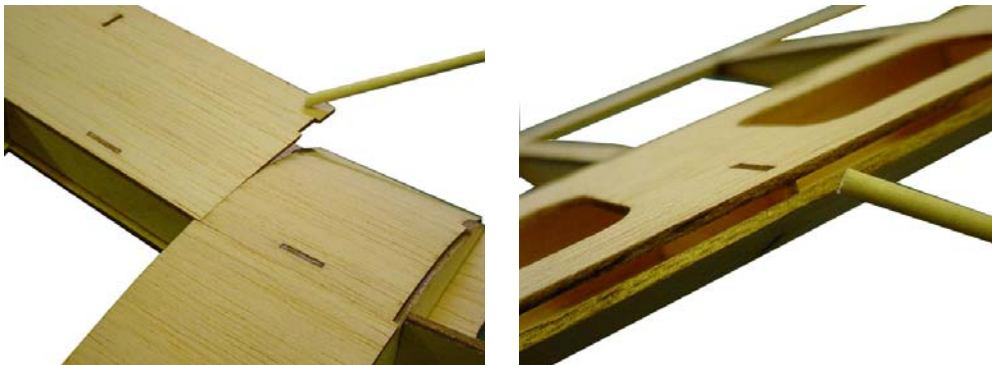
- ❑ Locate the 1/16" balsa wing tip parts W3. Key W3 to the spar S1 and align the underside with the bottom of the outer 3/32" rib R3. Once satisfied with the fit glue W3 into position.



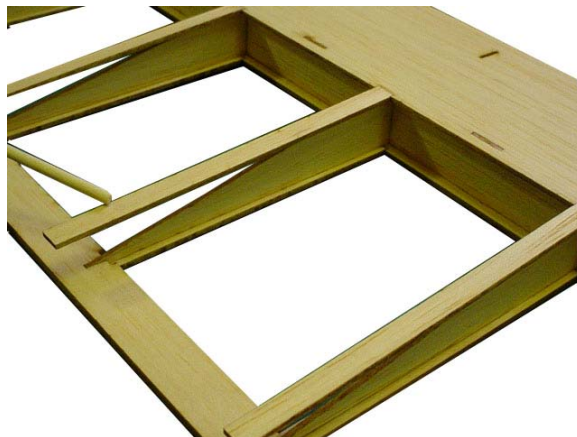
- ❑ Sheet the center section of the wing using the following 1/16" balsa parts W6, W7, and W8 following the plan sheet and photo series below as a reference.



- It is time to install the upper D-Tube Sheeting. The 1/16" balsa part W2 forms the upper D-Tube. To install, first key to the tabs in the spar S1, tack glue into position then wrap forward and down until the forward tabs interlock with those in each of the R1, R2, and R3 ribs. Follow the photos below as a reference. Notice that W2 does not wrap all the way down to W1 – this is IMPORTANT – there will be a gap between the W1 and W2 sheets at the wing leading edge. Do not try and pinch W2 down to adhere to W1!



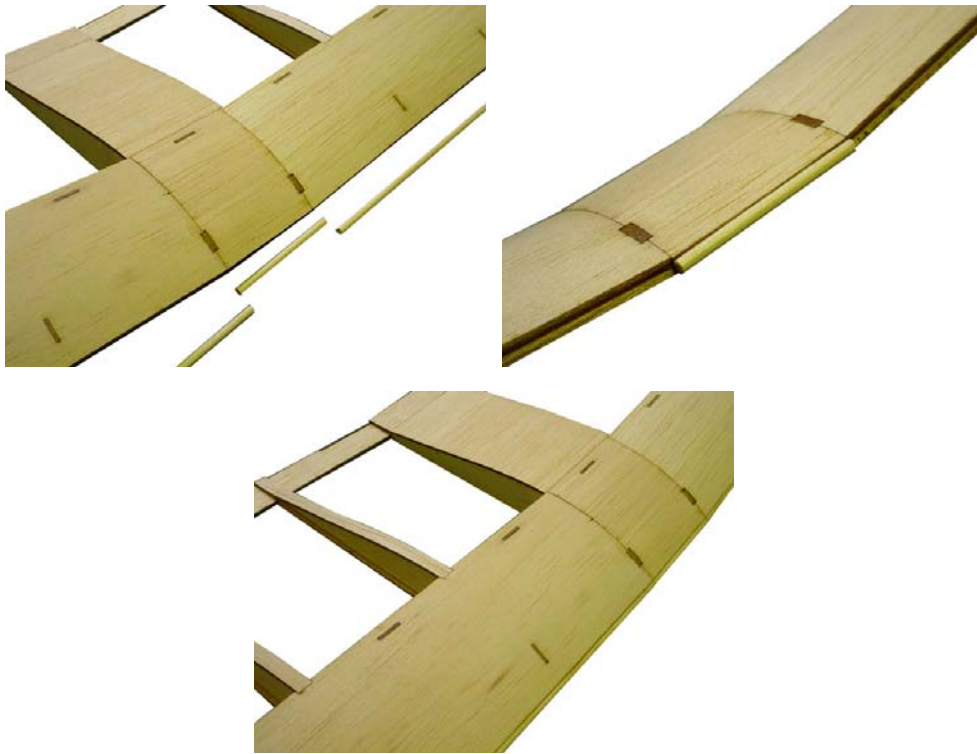
- Next locate and install W10 upper cap strips atop the ten (10) ribs R2. It is easiest to first tack glue the cap strip in place atop the rib interlocking with W2. Once the glue has set you can continue to wrap each caps strip down and back along each rib one at a time.



- Install the 1/16" balsa wing tip cap stripping part W4 as indicated in the photo below.



- Locate one 3" length of dowel and two 17.5" lengths of 1/8" dowel. Cut the 3" dowel to size to fit in the center section of the wing leading edge. Cut each of the 17.5" dowels to fit from the root rib R1 out to the tip rib R3. Once the hardwood dowel leading edge has been sized to fit glue it to the front of the wing atop the gap created by W1 and W2.



- Now you need to sand the trailing edge of each of the upper W10 cap strips and W4 to "disappear" at the trailing edge of the wing. Refer to the photos below for guidance. A sanding block is STRONGLY suggested for this step.



- ❑ Finish off the wing by filling any imperfections or gaps with balsa wood filler or a lightweight spackling compound then loading a fine grit (400) sand paper on your sanding block and lightly sand smooth the entire wing.



Covering the model

- ❑ A complete guide to covering using AeroFILM and AeroFILM Lite is available for download from www.stevensaero.com Download this document and use it as a guide for covering the SQuIRT. No surprises here just follow the directions and work slowly remember any imperfections will need to be sanded smooth as the covering will expose every bump or drip of CA glue.
- ❑ A template has been provided on the plan sheet for cutting out a wind screen decal. We typically cut this from black adhesive backed AeroTRIM or AeroFILM.

Final Assembly

- ❑ For a detailed final assembly guide for the SQuIRT please visit www.stevensaero.com. Remove a small piece of covering from the center section of the elevator assembly and remove covering from the alignment hole in the horizontal stab to allow the vertical stabilizer to key into these parts. The tabs in the top of the horizontal stabilizer and the fuselage top/bottom align the vertical stab. The vertical stabilizer in-turn centers the horizontal stabilizer to the fuselage. Dry fit these parts then wick thin ca around joints to lock into position.
- ❑ Poke two small holes in the covering at each wing retention dowel point and at the install point for the 3/16" landing gear lug dowel. Reference the plan sheet for more detail.
- ❑ Hinge the elevator to the horizontal stabilizer using clear tape and methods described on plan set.
- ❑ Complete tail wheel assembly per instructions on plan set.
- ❑ With tail wheel assembly complete and installed to fuselage slide the rudder over the Tail Gear steering arm then hinge to the Vertical Stabilizer using clear tape and methods described on plan set.
- ❑ Using a .047" drill bit ream the holes in the supplied Du-Bro Micro2 (DUB27800) control horns then install to the rudder and elevator with control horns on same side of surface as servo pocket. Retain with medium CA glue. Trim control horn posts flush where they exit the opposite side of control surface.
- ❑ Install the motor mount assembly GWS MMT-400A to the fuselage assembly using the screws provided with the GWS motor mount.
- ❑ Install your motor to the GWS mount and retain with the supplied rubber bands. (use no more than one rubber band with two wraps across the motor)
- ❑ Install your servos (HS-55's) and connect the rudder/elevator linkage to the servos using the supplied Du-Bro Mini EZ Connector (DUB845). EZ Connectors should be installed to inside most hole on servo control horn.
- ❑ Install .045" control rods to outer most hole of control surface side control horn then pass through previously installed Du-Bro Mini EZ Connector. Refer to the plan sheet as a guide for location of control rods.
- ❑ Ream the hubs of the supplied 2" wheels with a 3/32" drill bit to fit the landing gear and spin freely. Retain wheels with the supplied rubber wheel retainers. Cut off excess wire gear that extends beyond the rubber gear retainers.
- ❑ Set the main gear into the groove created by L1 and L2 then wrap one rubber band around each gear leg and over the gear lug 4-6 wraps seems to be sufficient. More wraps increase your spring gear resistance to movement.
- ❑ Mount and connect your radio to your esc and servos.
- ❑ Attach the upper wing to the fuselage using no more than four #16 rubber bands. Remember more rubber bands increases the tension on the wing and will make it more likely to break in a crash.
- ❑ Test your radio setup for function and proceed on to first flight.

First Flight

- ❑ Are you using fresh rubber bands for each attachment? If not, then replace the motor mount, landing gear, and wing rubber bands with new.
- ❑ Prior to your first flight we suggest you read the included beginners flight manual and seek the assistance of an experienced pilot. For your initial flight balance aircraft on or just forward of the main spar as indicated on the plan sheet. For more advanced maneuvers you may slowly move the CG back once you are comfortable with the flight envelope of this model.
- ❑ Sight along wings and tail surfaced and remove warps if found. Your rudder should be perpendicular to your horizontal stabilizer and your horizontal stabilizer should be parallel to your wings. Wing tips should not twist down in the back (wash in). They should be either perfectly flat or have a slight up-twist (wash-out).

A simple way to check your wing for warps is to sight along the underside of the wing from the back of the model – to do this let your models main gear rest on the ground stand behind the model and raise the tail up until you can see the underside of the wing. Slowly drop the tail until the underside of the wing starts to vanish from your line of sight – hold the model in this position and compare the visible surfaces of the top and bottom of both wings. If you can see more of the bottom of the right wing compared to the left then you probably have a bit of wash-out (a slight twist up at the wing tip trailing edge) in the right wing alternatively you may have a bit of wash-in in the left wing or the tendency for the wing trailing edge to twist down. You can also lay each wing half on a flat surface, hold the root of the wing (inside rib) flat against your table top and observe if your wing lies flat on the table. Wash out will make the plane more stable and spin resistant, as the tips of the wing will continue to fly while the root is stalled. Wash-in will make the plane more difficult to fly at near stall speeds. A model that always drops one wing at stall will often have a bit of twist in the wing or wash-in on the wing that drops.

- ❑ Set control surface throws.

Suggested Control Surface Travel

Elevator +/- 3/8 "

Rudder +/- 1/2"

- ❑ Choose a calm day and a grassy field for your maiden trim flight!
- ❑ Slowly advance throttle to ¾ power – pick a point on the ground about 100' out and give the SQuiRT an easy LEVEL toss into the wind aiming at that point on the ground DO NOT THROW THE PLANE UP into the air. Alternatively you may ROG (rise off ground) by setting the SQuiRT on a smooth dirt or paved surface facing into the wind and advancing the throttle slowly - steer with rudder to track the plane straight – within about 10-20' you will be airborne. Either way allow the plane to climb slowly under power resisting the urge to add excessive elevator to climb out. Climb out to 100+ feet and begin trimming the plane for level flight at cruise.
- ❑ First trim the SQuiRT in pitch. You will notice that the SQuiRT will climb under power this is part of the planes nature and stems from it's positive stability (the SQuiRT will recover rapidly to level flight from a dive by simply centering the control surfaces and allowing the plane to fly itself out of trouble). To trim for pitch set your throttle to just over ½. Next, use the trim tab on your transmitter for elevator to add or decrease elevator trim until you have the plane flying level. Reducing power or adding power will necessitate re-trimming the plane in pitch. Remember when you want your plane to climb add power not up elevator. When you want to descend, reduce power.
- ❑ Next, trim the plane in roll. Using the rudder trim tab on your transmitter add left or right rudder trim until the plane tracks a straight line.
- ❑ The SQuiRT carries energy very well and will glide in nicely for simple landings once the plane has been trimmed.
- ❑ Enjoy your SQuiRT!