

About Semroc

Semroc was started by Carl McLawhorn in his college dorm at North Carolina State University in November, 1967. Convincing a small group of investors in his home town of Ayden, North Carolina to invest in a small corporation, the company was re-incorporated as Semroc Astronautics Corporation on December 31, 1969.

Semroc produced a full line of model rocket kits and motors. At its peak, Semroc had twenty-five full time employees working at two facilities. One was for research and development, printing, shipping, and administration. The other was outside of town and handled all production and model rocket motor manufacturing. For several years, Semroc successfully sold model rocket kits, supplies, and motors by mail-order and in hobby shops. In early 1971, Semroc became insolvent and had to close its doors.

After 31 years of dreams and preparations, Semroc Astronautics Corporation was reincorporated on April 2, 2002 with a strong commitment to helping put the fun back into model rocketry. Many years of excellent service to the rocketry community passed by until sadly, on August 11 2013, Carl passed away and left a great void in the hearts of many rocketeers. He is forever in our hearts and minds.

In February of 2015, Semroc was sold to eRockets and moved to Dayton, Ohio where it resides today. It is our goal to continue the level of service and dedication to the hobby that Carl and his family were so well known for. We strive to serve you, our customers, to the best of our abilities as we carry the vision of Carl McLawhorn boldly into the future.

About the Orbital Transport™

The Estes Orbital Transport was introduced in Catalog #683 in late 1968. It was designed by Wayne Kellner, one of the most prolific and innovative designers at Estes Industries. The Orbital Transport was based on an early NASA scramjet design for the Space Shuttle. It featured a parasite glider that deployed at ejection and parachute recovery for the booster. The Orbital Transport was released as Cat. No. K-42 and had an introductory price of \$2.50.

The Semroc Reproduction Orbital Transport™ is very close to the original with some modern changes. The original balsa nose cones are kept. All fins are precision laser-cut balsa with slots located to allow parts to come together perfectly straight and in the proper location. A Kevlar shock cord mount is added for better retention. The original rubber shock cord is replaced with elastic. The 18" parachute is reduced to 15" for less drift. The Glider hooks are updated to include a double hook. The Body Tubes are beefed up for better finishing and durability. Assembly is easier as Construction Tools or Jigs are also included in the kit.

If this is not enough to get you excited consider switching up the colors. Semroc has a variety of different color decals to make your Transport look like your own fleet.

Thank you Phil Queen and Randy Boadway for collaborating on the improvements to make this updated kit happen. And a special thanks to Phil Queen for some of the best engineering done to date.

September 2008, April 2015, December 2019

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SEMROC
Orbital Transport™

Classic 1968 Reproduction

Precision Turned Balsa
Nose Cones

Heavy Duty Body Tubes

Laser Cut Balsa Parts
With Jigs

Glider with
Double Hook
Attachment

15"
Parachute
Recovery

*Designed by:
Wayne Kellner*

MADE IN THE
USA

FLYING MODEL
ROCKET KIT

Made in the U.S.A by Semroc - Dayton, Ohio

Orbital Transport™ Kit No. KV-66

Specifications	Booster	Glider	Engines
Body Diameter	0.998"(2.53cm)	0.736"(1.9cm)	B6-4
Length	23.0"(58.4cm)	8.6"(21.8cm)	C6-5
Fin Span	8.1"(20.6cm)	5.4"(13.7cm)	C12-6
Net Weight	1.9oz(53.8g)	0.5oz(14.2g)	D16-6

Skill Level 2

BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List in these instructions. In addition to the parts included in this kit, you will also need the tools and materials listed below. Read the entire instructions before beginning to assemble your rocket. When you are thoroughly familiar with these instructions, begin construction. Read each step and study the accompanying drawings. Check off each step as it is completed. In each step, test-fit the parts together before applying any glue. It is sometimes necessary to sand lightly or build-up some parts to obtain a precision fit. If you are uncertain of the identity of some parts, refer to the exploded view. It is important that you always ensure that you have adequate glue joints.

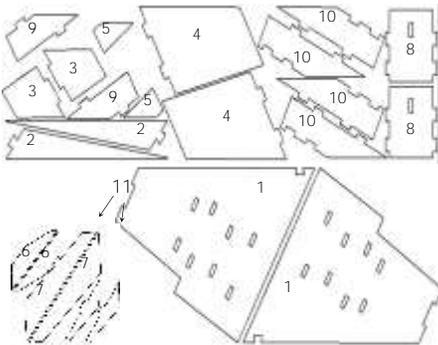
TOOLS

You will need the following for your assembly:

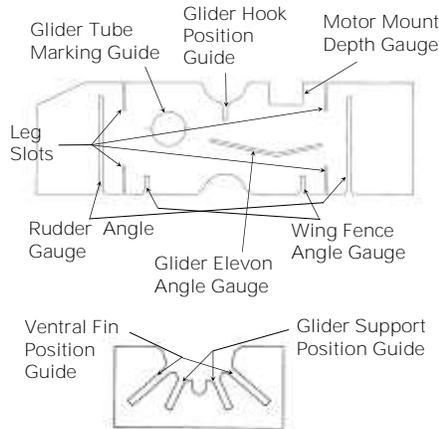
Pencil Ruler Knife Wax Paper
Wood/ Modelers Putty
White or Wood Glue
220 Grit Sandpaper
Medium Viscosity Super Glue

PARTS IDENTIFICATION

1. There are many different balsa parts included in this kit. Use the guide below to identify the parts that are called out in these instructions. The balsa parts will be referred to as (#) in these instructions.



JIG USAGE



JIG ASSEMBLY



KIT ASSEMBLY

2. These instructions are presented in a logical order to help you assemble your Semroc Orbital Transport™ quickly and efficiently. Check off each step as you complete it. We hope you enjoy putting this kit together.

3. Start by drawing a line down the length of one of the long Body Tubes (A). Use a drawer or a door frame to help keep the line straight along the side of the tube.



MOTOR MOUNT

4. Locate the Motor Tube (C) and make a mark 3/4" from the end opposite the slit in the tube.



5. Cut a notch 1/32" deep and 3/32" wide on the inside of one of the centering rings (G). This will allow the ring to clear the engine hook.



1/32" DEEP BY 3/32" WIDE SLOT

6. Insert the Motor Hook (P) into the slot in the Motor Tube. Glue the Centering Ring that you notched in the previous step over the motor hook and slide it onto the tube until it is just past the line you marked on the tube. Glue the other Centering Ring (G) on the Forward end of the Motor Tube until it is flush with the end of the Motor Tube. Cover the Motor Hook (P) with a wrap of Masking Tape. Add glue fillets to the Centering Rings keeping the glue off of the outside of the rings and set aside to dry. (Note:) If the Centering Rings don't want to fit over the Motor Tubes, you may need to remove a layer of paper from the inside of the Centering Ring.

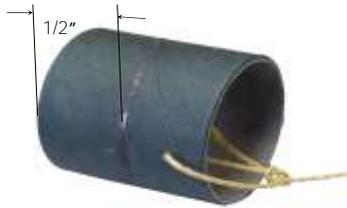


7. After the glue has dried on the motor mount, test fit it into the end of the body tube that you drew the line on (A). Make sure it slides in easily. Remove the motor mount and put a ring of glue about an inch inside one end of the tube. Also put a ring of glue on the lower centering ring on the motor tube. Using the Depth Gauge on the Alignment and Assembly Jig, insert the Motor Mount in the Body Tube until it is positioned at the correct depth. Do this in one smooth motion, or the Motor Mount may grab and get stuck in the wrong position. Align the Motor Hook with the line on the body tube.



BODY TUBE

- ❑ 8. Locate the black Tube Coupler (I). Make a Mark 1/2 inch from one end. Tie the Yellow Kevlar Cord (N) to the coupler through the hole in the coupler.



- ❑ 9. Take the Body Tube that has the Motor Mount and put a thin ring of glue in the forward end of the tube. Insert the Tube Coupler until you reach the 1/2 inch mark. After the Coupler has been inserted into the Tube, take the Kevlar Cord and work it back down into the tube to keep it out of the way for the next step.



- ❑ 10. Take the other Body Tube (A) and put a thin ring of glue in one end. Connect this tube with the other tube by sliding it over the coupler and shock cord. Do not stop until tube ends are together or the glue might grab and the joint will not come together. Roll the tubes on a flat surface to make sure the joint is straight. Work the shock cord out the forward end of the tube after the tubes have been joined. Glue the Launch Lug (O) centered on the line on the lower body tube even with the body tube joint. Add a glue fillet to the sides for extra strength.

WING ASSEMBLY

- ❑ 11. Glue the Wing (1) and the Wing Fairing (2) together on a piece of wax paper. Cover with more wax paper and stack a book or some kind of weight on top to keep it straight while the glue dries. Repeat for the other side.



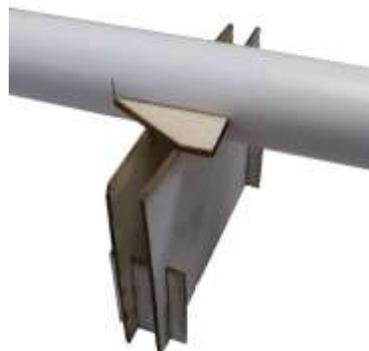
- ❑ 12. Take two of the small BT-5C Body Tubes (D) and glue them together side by side with the ends flush with each other as shown. Repeat with the other two tubes.



- ❑ 13. Assemble the Assembly and Alignment Jigs as shown previously. Lay the Body Tube Assembly in the center of the Jig with the Motor Mount over the Large Jig with the Motor Hook up. Use the Smaller Jig to support the front of the body tube. Take one of the Wing Assemblies and glue it to the side of the body tube, resting the Wing Assembly on the Jig with the rear of the wing flush with the rear of the body tube. Make sure the wing remains flat on the Jig at both ends. Repeat for the other side. After these have dried, add glue fillets along the body tube to give added strength to the glue joint.



- ❑ 14. Make a mark 4 1/2 inches from the front of the body tube on both sides of the tube. Using the Smaller Alignment Jig, glue the Canard Fins (5) to the sides of the Body Tube. The Long side of the fin goes against the body tube and the point of the fin is located at the mark on the body.



BOTTOM SIDE DETAILS

- ❑ 15. Using the smaller jigs, glue the Ventral Fins (7) to the Body Tube flush with the rear of the tube. The tallest part of the fin goes to the rear. After these parts have dried, apply glue fillets for added strength.



SCRAMJET BOXES

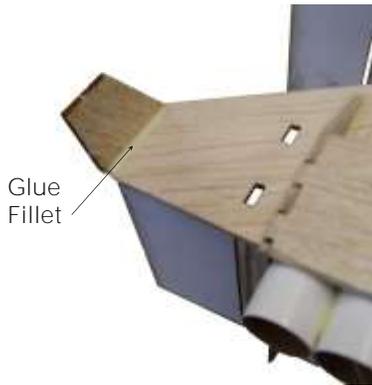
- ❑ 16. Locate the balsa parts for one of the Scramjet Boxes, parts (8,9,10). The center support mounts to the bottom of the box with the tab fitting in the slot with the short side glued to the bottom. The sides then glue to the edges of the bottom with the tabs interlocking. Make sure all parts remain square. Glue the 2 BT-5C tubes (D) that were glued together earlier onto the bottom, between the sides and directly behind the center support. Repeat for the other side.



- ❑ 17. These assemblies can now be installed onto the lower side of the wing. They fit into the slots closest to the body tube. See picture for location. Repeat for the other side. Add glue fillets for added strength. (Note:) Ventral Fins not shown for clarity.



❑ 18. Glue the Wing Tips (3) to the Wings. Use one of the small fiber tools to make sure the wing tips are square with the wings. Once the Tips have had a chance to dry for a little while, go back and apply a glue fillet to add some extra strength to the joint.

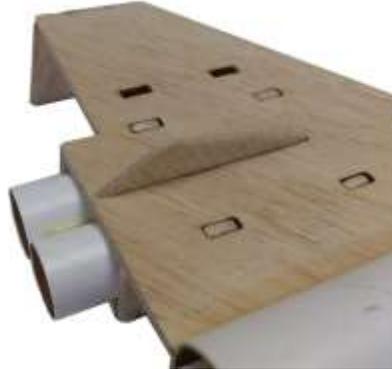


TOP SIDE DETAILS

❑ 19. Turn the model over and mark the body tube 5 inches from the rear of the body tube. Using the small alignment jigs, glue the Glider Supports (6) to the top of the body with the front of the supports even with the mark. Add glue fillets for added strength.



❑ 20. Glue a Wing Fence (7) to the top of the wing in the open slot closest to the body tube. Add glue fillet for added strength when glue has had time to dry. Allow glue fillet to dry. Repeat for other wing.



❑ 21. Glue the Rudder (4), to the wing in the two remaining open holes in the wing. You can use one of the pieces of the assembly jig to help keep the Rudder perpendicular to the wing as the glue dries. Again, add a glue fillet for added strength along the bottom of the Rudder. Repeat for other wing. Allow glue to dry.



❑ 22. Glue one of the Glider Hooks (7) to the top of the Body Tube with the front edge of the hook even with the joint of the two body tubes and centered between the Glider Supports. Make sure that the teeth of the Hook are facing the front of the rocket.



❑ 23. Insert the Screw Eye (L) into the bottom of the Nose Cone (E). Remove the Screw Eye and fill the hole with glue and then re-insert the Screw Eye back into the hole. The glue will help keep the Screw Eye from coming back out.

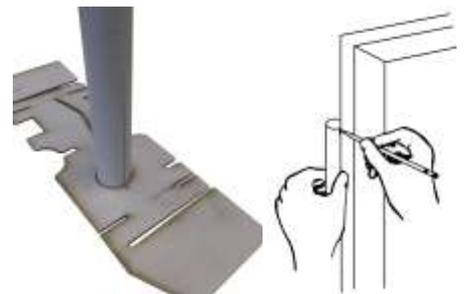


❑ 24. Fish the Kevlar Cord out of the front of the body tube and attach the piece of Elastic Shock Cord (M) to the end of the Kevlar. Secure with a strong knot. Attach the opposite end of the Elastic Cord to the Screw Eye, again using a strong knot.

❑ 25. Using the instructions supplied with the Parachute (Q), assemble a 15" Parachute for use with your Orbital Transport. Once completed, attach it to the Screw Eye in the Nose cone, and the assembly of the Booster portion is complete.

GLIDER ASSEMBLY

❑ 26. Begin your glider assembly by removing the circular cutout on one of the Assembly Jig pieces. **Do not** throw the disc away as it will be used in a later step. Stand the Glider Body Tube (B) on end in the hole in the alignment jig and mark the body tube at the marks on the jig. Once you have the body tube marked, use a piece of angle or a door jamb to extend the marks the length of the body tube.



❑ 27. Take the two Glider Wing halves (12) and sand a slight bevel on the edge where the two halves will be joined. Lay them across the body tube on a flat surface to check that the joints line up correctly. When you have the bevel shaped to your satisfaction, place a piece of wax paper over the body tube and glue the wing halves together with the joint resting on the body tube and the wing tips resting flat on the table. Weight the wing tips to keep everything in place while the glue dries if needed.



❑ 28. Once the wings have dried, glue them to the body tube with the rear edge flush with the end of the body tube, with the joint of the wings centered over one of the lines that have been drawn on the body tube. Set aside to dry.



❑ 29. Once the wings have dried glue the other Glider Hook (J) onto the body tube in the notch at the front of the wing. Make sure the teeth of the hook are facing towards the rear of the glider



❑ 30. Glue the two Side covers (K) onto the sides of the Glider Hook. Apply glue sparingly so as not to get glue down into the teeth of the hook.



❑ 31. Using the Alignment Jigs, glue the Elevons (13) to the back of the wings. Keep the outside edges even with the edge of the wings.



❑ 32. Glue the Glider Rudder (14) on the line on the top of the glider flush with the rear of the body tube. Make sure it is centered over top of the line and is perpendicular to the body tube.



❑ 33. Cut the Glider Motor Nozzle (U) out of its sheet. Carefully work it into shape so that you can glue the ends together as shown.



❑ 34. Take one of the circular cut-outs that you saved from the Alignment Jigs and glue the CR-5-20 Centering Ring (V) to it with the centering ring centered on the disc.



❑ 35. Once the glue has dried on the centering ring, turn this assembly over and glue the Nozzle to the center of the disc. It can then be installed in the rear end of the glider. **Do not glue in at this time.**

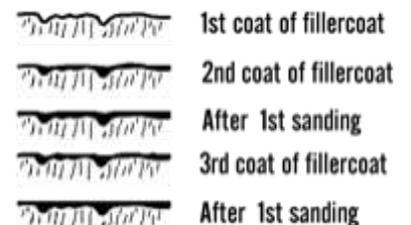


❑ 36. Insert the Nose Cone into the front of the glider body tube. **Do Not Glue at this time.**



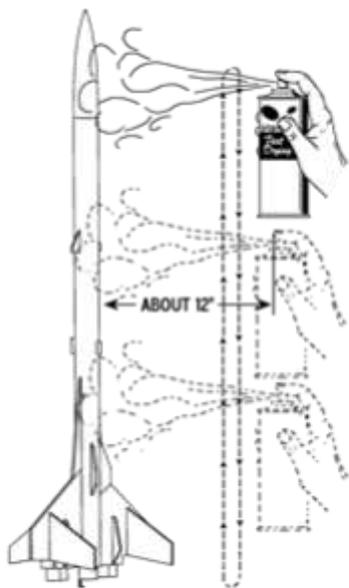
FINISHING

❑ 37. After all the glue has dried, prepare balsa for a smooth professional looking finish. Fill the wood grain with **Fill'n'Finish**, balsa filler-coat, or sanding sealer. When dry, sand with fine sandpaper. Repeat **until smooth**. **Don't overdo it!** Layers of un-sanded filler can add much weight!

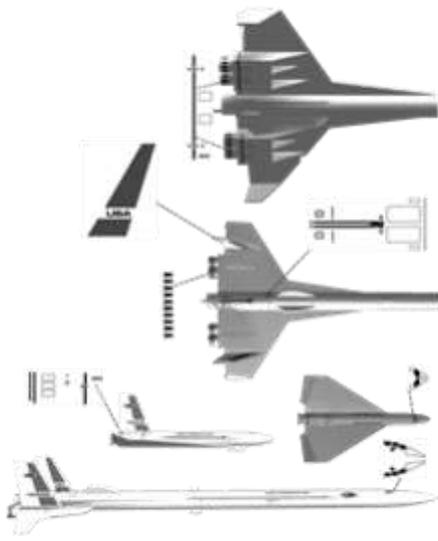


❑ 38. After all balsa surfaces have been prepared, wipe off all wood dust with a dry cloth. First spray the model with an enamel primer, then spray both the booster and glider gloss white if using the supplied decals.

- ❑ 39. Spray painting your model with a fast-drying enamel will produce **the best results**. **PATIENCE...is the most important ingredient**. Use several thin coats, allowing each coat to completely dry before the next coat. Start each spray a few inches above the model and end a few inches below the model. Keep the can about **12" away and use quick light coats**. The final coat can be a little heavier to give the model a glossy wet-looking finish.



- ❑ 40. After the paint has dried, decals should be applied. The decals supplied with the Orbital Transport™ are waterslide decals. Refer to the photo on the front and the diagram below for decal placement. Check for fit before wetting the decal. A drop of detergent in the water will allow for more movement before the decal sets.



GLIDE TRIMMING

- ❑ 41. Locate a clear grassy area free of objects that will damage your glider. Face the wind and gently toss the glider with a slight angle of attack upward. If the glider stalls, remove the nose cone and add some weight clay (S) and try again. If it dives, remove the nozzle and add some weight clay there. If it turns sharply in flight, lower the elevon on the side that turns by softening the glue joint with the heat from a light bulb or hair dryer until it glides straight. If you have a very small field, you may want the glider to turn to stay in the area. Once you have the glider performing how you want it, glue the nose cone and nozzle to the body tube.

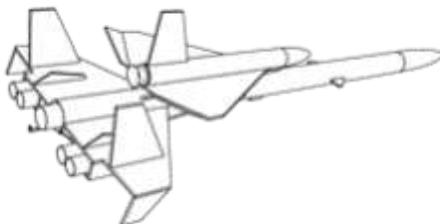
FLIGHT PREP

- ❑ 42. The B6-4 and C6-5 are the two recommended engines for the Orbital Transport™. Insert it into the booster and make sure the engine hook will retain it.

- ❑ 43. Pack the recovery wadding from the top of the body tube. Use a sufficient quantity to protect the parachute, but not too much that there is no room left.

- ❑ 44. Fold the parachute and pack it and the shock cord on top of the recovery wadding. Slide the nose cone into place, making sure it does not pinch the shock cord or parachute.

- ❑ 45. Attach the glider to the booster by mating the sawtooth hook on the bottom of the glider to the sawtooth hook on the top of the booster. The glider should rest on the glider supports when held in a horizontal position.



- ❑ 46. Refer to the model rocket engine manufacturer's instructions to complete the engine prepping. Different engines have different igniters and methods of hooking them up to the launch controllers.

- ❑ 47. Launch your Orbital Transport™ from a 1/8" diameter by 36" long launch rod. Always launch in a vertical position in calm winds. Use the smaller engine for the first flights.

- ❑ 48. Make sure the sky is clear and the range is clear. Perform a countdown. 5-4-3-2-1-Launch. Recover your Orbital Transport Rocket and Glider and remove and properly discard the spent motor.

- ❑ 49. Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist.

