About Estes Industries, Inc.

In July 1958, G. Harry Stine of Model Missiles, Inc. in Denver, Colorado approached Vern Estes about making model rocket engines for them. On January 15, 1959, Vern's automated model rocket engine fabricating machine, "Mabel", produced the first of many millions of Estes model rocket engines. In 1960, Estes was producing more engines than Model Missiles could sell. Vern and his wife Gleda opened a mail order rocket company and introduced the Astron Scout and Astron Mark.

In 1961, a catalog was mimeographed and hand stitched on Gleda's sewing machine. Later that year, Estes Industries had outgrown the confined space in Denver. In December 1961, the entire operation was moved to an old farm in Penrose, Colorado quickly establishing the small town as the "Model Rocket Capital of the World."

Estes Industries was sold to Damon in September 1969. The name Estes is synonymous with model rocketry. Almost everyone remembers growing up firing Estes rockets or knowing someone that did. Estes Industries has introduced millions of youngsters of all ages to model rocketry for almost half a century.

About the Blue Bird Zero™

The original Blue Bird Zero was designed by Mike Dorffler while at Estes Industries. Mike was one of the most prolific designers of model rocket kits and accessories over his many years in the business. Best known for the Cineroc, Mike will also be remembered fondly for all of his classics like the Blue Bird Zero. It was released in the 1980 Estes Catalog as Cat. No. 1335 and retailed for $6.00.

The Semroc Retro-Repro™ Blue Bird Zero™ was kept close to the original. The original 18mm mount was changed to 24mm and made into a member of our Magnum series, so it also includes an 18mm adapter for flying in smaller fields. The die-cut fins are replaced with more accurate laser-cut fins. The blow molded PNC-55AO plastic nose cone is replaced with a balsa equivalent. The shock mount is replaced with a Kevlar® cord for greater reliability.

What is a Retro-Repro?

A Retro-Repro™ is a retro reproduction of an out-of-production model rocket kit. It is a close approximation of a full scale model of an early historically significant model rocket kit from one of the many companies that pioneered the hobby over the past half century. A Retro-Repro™ is not a true clone or identical copy of the original. It incorporates improvements using modern technology, while keeping the flavor and build appeal of the early kits.

March 4, 2012

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Box 1271 Knightdale, NC 27545 (919) 266-1977



Made in the U.S.A by Semroc Astronautics Corporation - Knightdale, N.C. 27545

Blue Bird Zero™
Kit No. KV-45

Specifications		Engine	Approx. Altitude
Body Diameter	1.325" (3.4 cm)	B6-4	250'
Length	41.0" (104.1 cm)	C6-5	600'
Fin Span	6.9" (17.5 cm)	D12-5	1050'
Net Weight	2.4 oz. (68.1 g)		

PARACHUTE RECOVERY

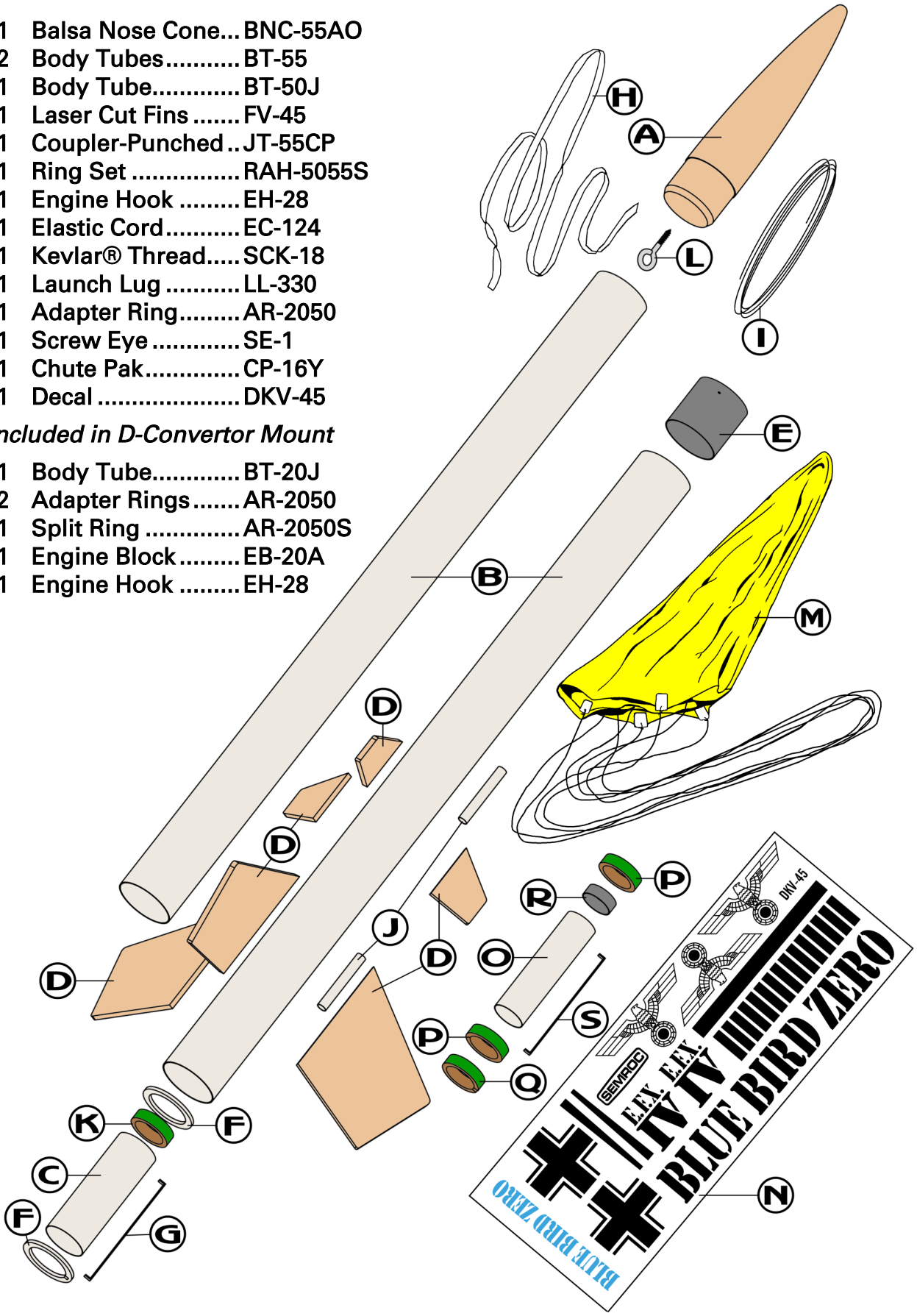
Parts List

A	1	Balsa Nose Cone...	BNC-55AO
B	2	Body Tubes.....	BT-55
C	1	Body Tube.....	BT-50J
D	1	Laser Cut Fins	FV-45
E	1	Coupler-Punched ..	JT-55CP
F	1	Ring Set	RAH-5055S
G	1	Engine Hook	EH-28
H	1	Elastic Cord.....	EC-124
I	1	Kevlar® Thread.....	SCK-18
J	1	Launch Lug	LL-330
K	1	Adapter Ring.....	AR-2050
L	1	Screw Eye	SE-1
M	1	Chute Pak.....	CP-16Y
N	1	Decal	DKV-45

Included in D-Convertor Mount

O	1	Body Tube.....	BT-20J
P	2	Adapter Rings.....	AR-2050
Q	1	Split Ring	AR-2050S
R	1	Engine Block.....	EB-20A
S	1	Engine Hook	EH-28

EXPLODED VIEW



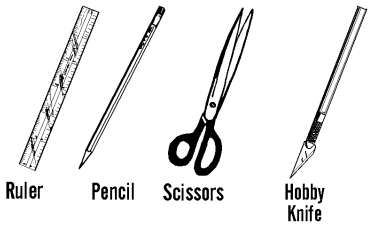
BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List in the center of 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 location of some parts, refer to the exploded view in the center of these instructions. It is important that you always ensure that you have adequate glue joints.

TOOLS

In addition to the parts supplied, you will need the following tools to assemble and finish this kit.



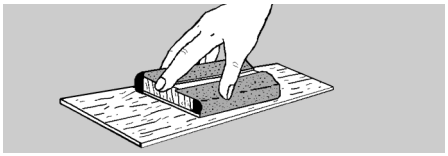


ASSEMBLY

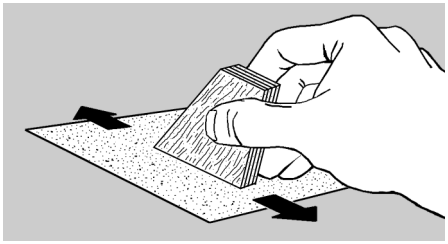
❑ **1.** These instructions are presented in a logical order to help you put your Blue Bird Zero™ together quickly and efficiently. Check off each step as you complete it and we hope you enjoy putting this kit together.

FIN PREPARATION

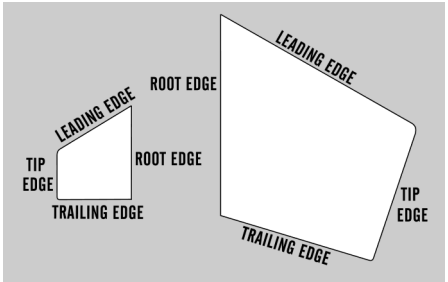
❑ **2.** Lightly sand each side of the laser-cut fins (**FV-45.**) Carefully push the laser-cut fins from their sheet. Start at one point on each fin and slowly and gently work around the fin. The balsa is thick so you might have to use you hobby knife to finish cutting through some of the fins.



❑ **3.** Stack all the like fins in sets. Line each set of fins up squarely and sand the fins back and forth over some fine sandpaper to get rid of the hold-in tabs as shown below.



❑ **4.** Round the leading and trailing edges of each fin. Leave the tip and root edges flat. Repeat for all six fins. The trailing edge can be sanded to a bevel for a more aerodynamic shape. The root edge will be glued to the body tube.

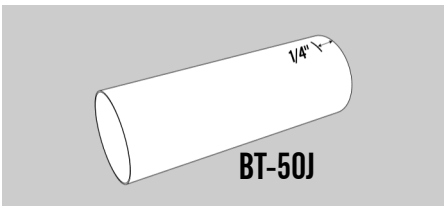


ENGINE MOUNT

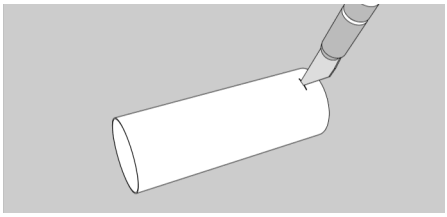
❑ **5.** Bend both of the engine hooks (**EH-28**) slightly so they form a slight bow in the direction shown.



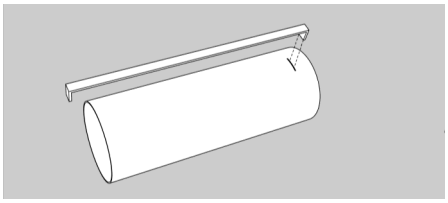
❑ **6.** Place a mark 1/4" from one end of the largest engine tube (**BT-50J**).



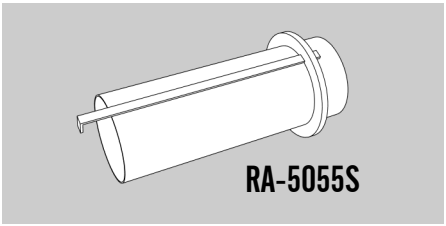
❑ **7.** Using a hobby knife, punch a small slit at the marked line.



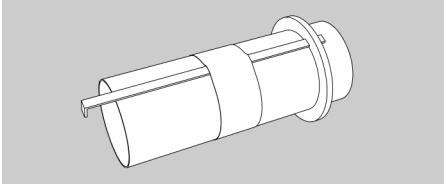
❑ **8.** Insert one end of the engine hook into the punched slit.



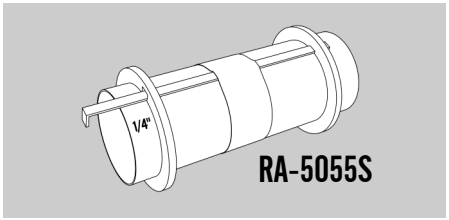
❑ **9.** Carefully punch out the two fiber rings (**RA-5055S**). Align the ring with the small slot about 1/8" from the top of the engine hook.



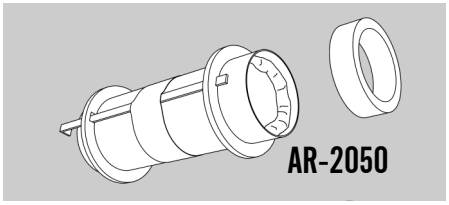
❑ **10.** Wrap a strip of masking tape around the center of the engine tube. Apply a film of glue over the masking tape and on the exposed section of the engine hook towards the front ring. Keep glue off the engine hook near the overhang end.



❑ **11.** Slide the other centering ring (**RA-5055S**) (with large slot) over the engine hook and engine tube until it is 1/4" from the bottom of the engine tube. Run a fillet of glue around each side of both of the rings. Keep glue out of the slot. Allow the glue to dry while checking for runs. Make sure the glue does not get on the outer edges of the rings.

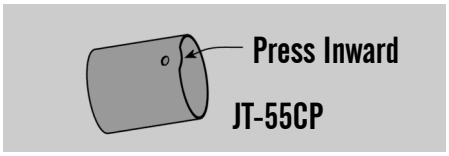


❑ **12.** Glue the thrust ring (**AR-2050**) against the top of the engine hook. After the ring is in place, run a bead of glue around the inside of the ring to protect it from the ejection gases.

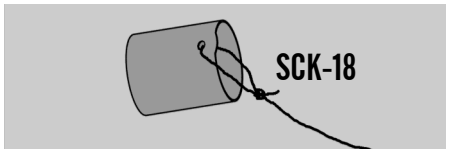


JOIN TUBES

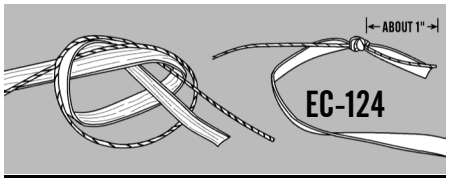
❑ **13.** Press the top edge of the coupler (**JT-55CP**) inward slightly, just above the small punched hole.



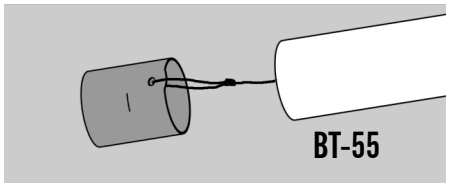
❑ **14.** Thread the Kevlar® cord through the small punched hole and form a loop with an overhand knot about 1" from the end.



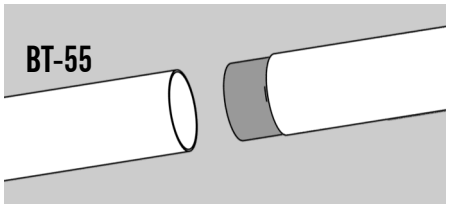
❑ **15.** Tie the free end of the Kevlar® cord to one end of the elastic cord (**EC-124**) using an overhand knot.



❑ **16.** Pull the elastic cord and Kevlar® cord through one of the two long body tubes (**BT-55**). Place a mark on the middle of the coupler. Apply a bead of glue inside the end of the large body tube and insert the coupler in the body tube until the mark is even with the end of the tube. Do not allow to dry yet.

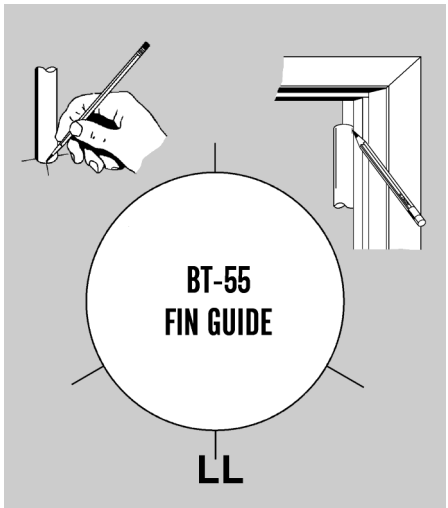


❑ **17.** Apply a bead of glue inside the end of the other large body tube (**BT-55**) and insert the coupler in the body tube until it is flush with the other body tube. Roll the tube assembly on a flat surface until the glue is dry.



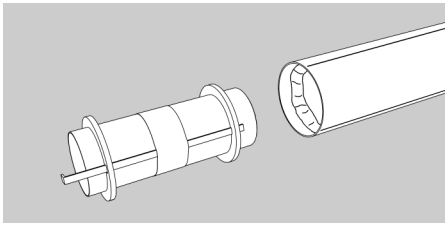
MARK TUBE

❑ **18.** Stand the body tube assembly with the shock cord upward on the fin guide below and make the fin position marks and launch lug mark "LL" on the sides of the tube. Find a convenient channel or groove such as a partially open drawer, a door jamb (as shown,) or a piece of molding. Using the channel, extend the marks the full length of the lower tube to provide lines for aligning the fins and launch lugs.



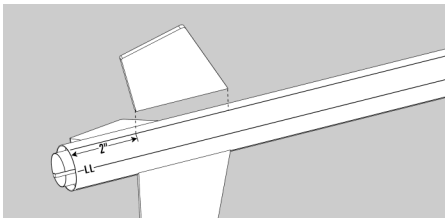
ATTACH MOUNT

❑ **19.** Apply a thick bead of glue inside the marked end of the body tube assemble and on the top side of the bottom ring, keeping glue away from the slot. Insert the engine mount assembly with the thrust ring end first into the main body tube until the bottom ring is just inside the main tube. Do not stop until it is in the correct place. Allow to dry completely in a vertical position.

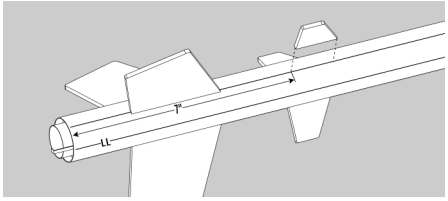


ATTACH FINS

❑ **20.** Apply glue to the root edge of one of the large fins and position it along one of the lines drawn for the fins on the side of the body tube and 2" from the bottom. Remove the fin, set it aside and allow it to almost dry, apply additional glue, and reposition. Repeat for the other two fins. If you follow these instructions, the fins will not require much additional work to keep them aligned. Allow the fins to completely dry, checking carefully to make sure they are parallel with the main body tube.

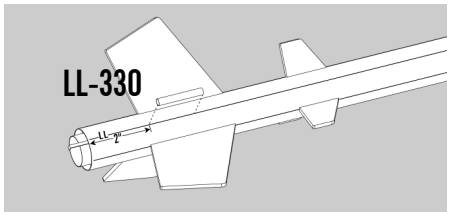


❑ **21.** Apply glue to the root edge of one of the small fins and position it along one of the lines drawn for the fins on the side of the body tube and 7" from the bottom. Use the same techniques used on the main fins and repeat for the other two fins. Allow the fins to completely dry, checking carefully to make sure they are parallel with the main body tube.

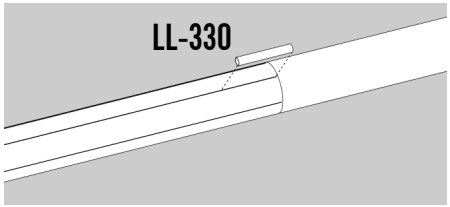


LAUNCH LUGS

❑ **22.** Cut the launch lug (**LL-330**) in half with a hobby knife. Apply a bead of glue to one of the launch lug halves and apply it to the main body tube on the LL line and 2" from the bottom. Sight from one end to make sure it is parallel with the line.

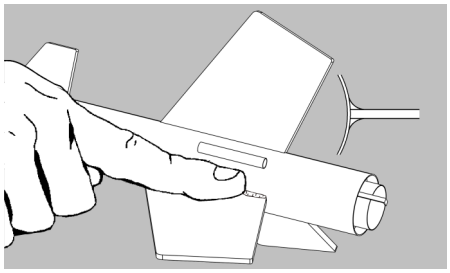


❑ **23.** Apply a bead of glue to other launch lug half and apply it to the main body tube on the LL line with its top even with the joint between the two main tubes. Sight from one end to make sure it is parallel with the line and aligned with the lower launch lug



APPLY FILLETS

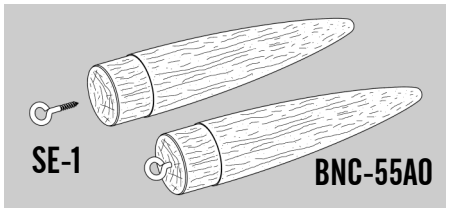
❑ **24.** After the fin assembly is completely dry, run a small bead of glue along both sides of each fin-body tube joint. Using your forefinger, smooth the glue into fillets. Apply a fillet of glue on each side of the launch lugs. Allow this assembly to dry in a vertical position.



NOSE CONE

❑ **25.** Insert the nose cone (**BNC-55AO**) in the body tube and check for proper fit. The nose cone should be snug to hold itself in alignment. If it is too loose, add masking tape. If it is too tight, sand the shoulder slightly.

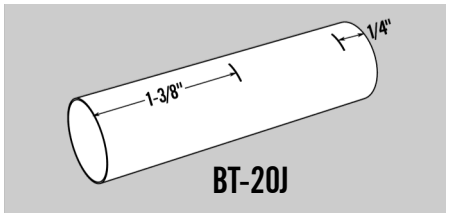
❑ **26.** Screw the screw eye (**SE-1**) into the base of the nose cone, remove and fill the hole with glue. Reinsert the screw eye until the eye is flush with the base of the nose cone.



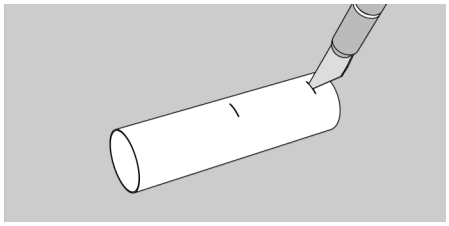
CONVERTER MOUNT

NOTE. Although the Magnum's are designed for D-power, each kit is provided with an 18 mm converter to fly it on small fields with lower power. When completed, this converter is the same size as a standard D-power engine. When using it, insert a standard 18 mm engine and make sure the engine hook is securely locked on the end of the engine. Insert this assembly into the rocket and make sure the engine hook in the rocket secures the D-Converter.

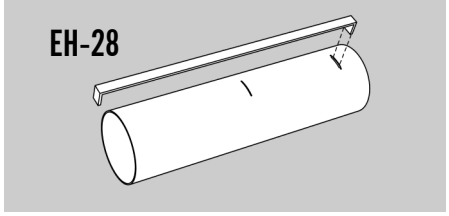
❑ **27.** Place a mark 1/4" from one end of the small engine tube (**BT-20J**). Place another mark 1-3/8" from either end.



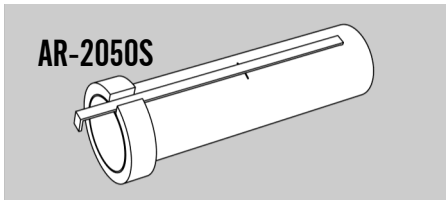
❑ **28.** Using a hobby knife, punch a small slit at the 1/4" marked line.



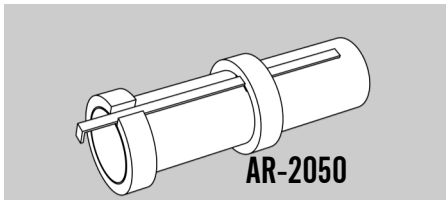
❑ **29.** Insert one end of the engine hook (**EH-28**) into the punched slit.



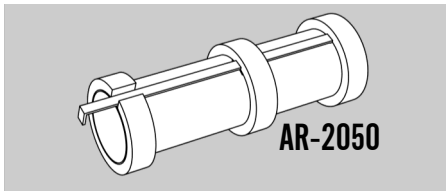
❑ **30.** Slide the split ring (**AR-2050S**) over the bottom end of the engine tube. Align it even with the end and centered around the engine hook. Do not glue yet.



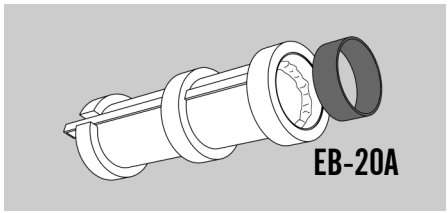
❑ **31.** Slide one of the centering rings (**AR-2050**) over the top of the tube and even with the 1-3/8" mark.



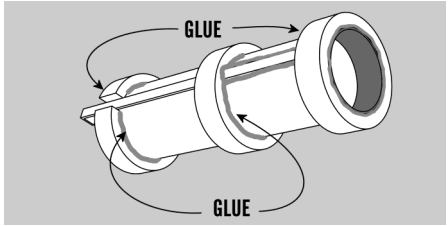
❑ **32.** Slide the remaining centering ring (**AR-2050**) over the top of the tube and even with the top of the tube.



❑ **33.** Glue the engine block (**EB-20A**) against the top of the engine hook and even with the engine tube. After the ring is in place, run a bead of glue around the inside of the ring to protect it from the ejection gases.

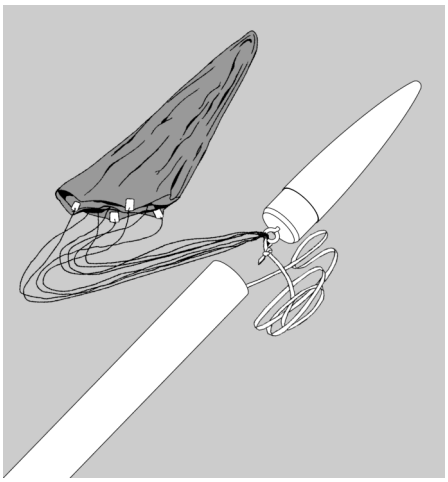


❑ **34.** Check the alignment of all the centering rings and apply a bead of glue around each joint. Be sure to keep all glue off the outer edge of the rings!



FINAL ASSEMBLY

❑ **35.** Assemble the chute (**CP-16Y**) using instructions provided with it. Pull the lines tight on the chute and make sure they are all of equal length. Attach the chute by tying them to the screw eye. Put a drop of glue on the joint to keep the lines from moving. Attach the free end of the elastic cord to the screw eye. Put a drop of glue on that joint as well.

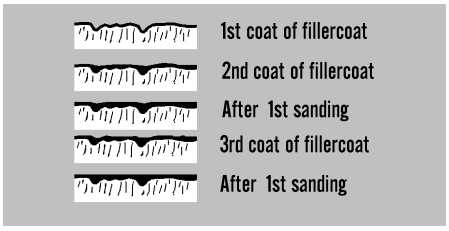


This completes the assembly of your

BLUE BIRD ZERO

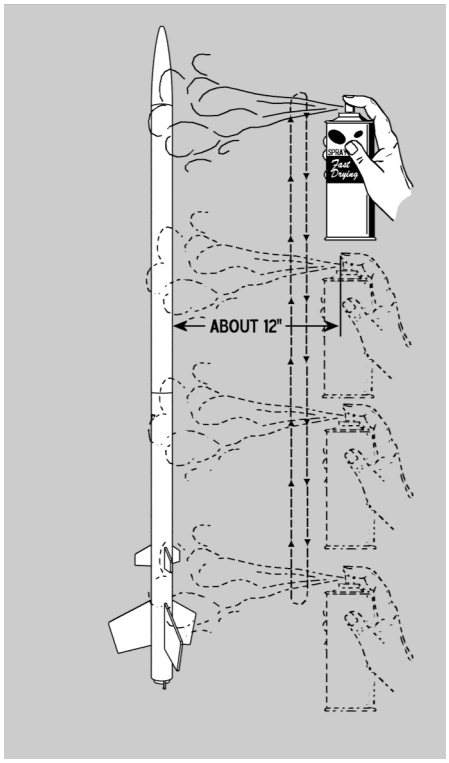
FINISHING

❑ **36.** When the fillets have dried, prepare balsa surfaces for a smooth professional looking finish. Fill the wood grain with balsa fillercoat or sanding sealer, When dry, sand with fine sandpaper. Repeat until smooth.

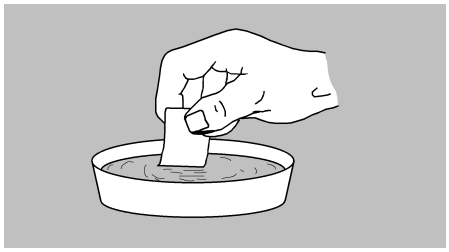


❑ **37.** After all balsa surfaces have been prepared, wipe off all balsa dust with a dry cloth. First spray the model with an enamel primer. Choose high visibility colors like white and light blue for the final colors.

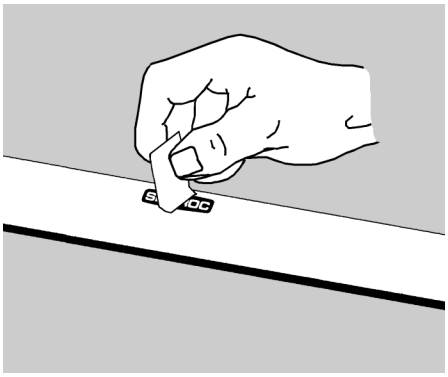
❑ **38.** Spray painting your model with a fast-drying enamel will produce the best results. PATIENCE…is the most important ingredient. Use several thin coats, allowing each coat to completely dry before the next coat. Start each spray a few inches above the model and end a few inches below the model. 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.



❑ **39.** After the paint has dried, decals should be applied. The decals supplied with the Blue Bird Zero™ are waterslide decals. Each decal should be cut separately from the sheet. Think about where you want to apply each decal and check for fit before wetting the decal. Use the cover photo for suggested placement. Dip each decal in a small dish of water that has a drop of detergent. It will take about 30 seconds before the decal is loose enough to apply.



❑ **40.** Slide the decal in place and use the paper backing to work the bubble out. Repeat for all the decals.



FLIGHT PREPPING

❑ **41.** Mounting the engine: Insert the engine and make sure the engine hook keeps the engine in snugly. The hook may be slightly bent to make sure the engine is retained.

❑ **42.** Apply a few sheets of recovery wadding in the top of the main body tube. 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.

❑ **43.** 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.

❑ **44.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the Blue Bird Zero™ from a 3/16″ diameter by 36″ long launch rod. For smaller than D-power, a standard 1/8″ x 36″ rod may be used.

❑ **45.** After each flight, promptly remove the spent engine casing and dispose of properly.