



Merlin Assembly Instructions

** Read before beginning assembly! **

Make sure that you have all the parts included in this kit listed below. Read the kit instructions once all the way through before assembling your rocket. Don't rush! Check off each step as it is completed. Be sure to test fit parts before applying glue.

SAFETY TIP: WEAR DISPOSABLE LATEX GLOVES when USING EPOXY!

This kit contains the following parts:

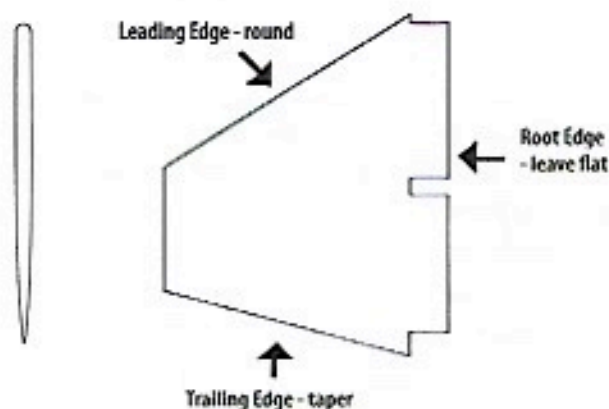
- BNC-80HK nose cone (1)
- RB5225-22 body tube (1)
- RB580H-10 body tube (1)
- BR225-80H balsa reducer (1)
- MM115-225 motor mount kit (1)
 - MM115 8-inch motor mount tube (1)
 - CR115-225 centering rings kit (1)
- EBK-225 ejection baffle kit (1)
 - EB225P ejection baffle rings (2)
 - ST-845 baffle tubes (2)
- Laser cut basswood fins (3 fins)
- LL4 14 inch launch lugs (2)
- Large Screw eye (1)
- SL410 Kevlar® Shock Line (1)
- SC-136 shock cord (1)
- NP-24 Nylon Parachute
- Merlin decal sheet (1)
- Silver Foil Trim Sheet (2)
- This instruction sheet

In addition to the supplied parts, you will need the following tools and supplies:

- 12 or 18 inch ruler
- Scissors
- Balsa wood filling compound such as balsa filler coat, or balsa prep.
- 5-minute Epoxy glue, White Glue, and Cyanoacrylate Glue
- Masking Tape
- Pencil
- Fine sandpaper (320 to 600 grit)
- Spray paint in your choice of colors

Fin Finishing

- 1) Lightly sand both sides of the basswood fins.
- 2) Round the leading edge and taper the trailing edge of each fin as shown.



- 3) Fill in the grain in the fins, balsa reducer, and balsa nose cone using the filler material of your choice. Sand between each coat. Repeat this process until a smooth finish is obtained.

Assemble and insert the Motor Mount

- 4) Assemble the motor mount using the motor mount kit instructions.
- 5) Once the motor mount has dried, use a long q-tip or stick to run a ring of 5-minute epoxy 4 inches inside of the tube. Place a bead of epoxy on the lower centering ring. Avoid getting epoxy in the fin slots. If glue gets in the fin slots quickly clean them out using a q-tip and rubbing alcohol.

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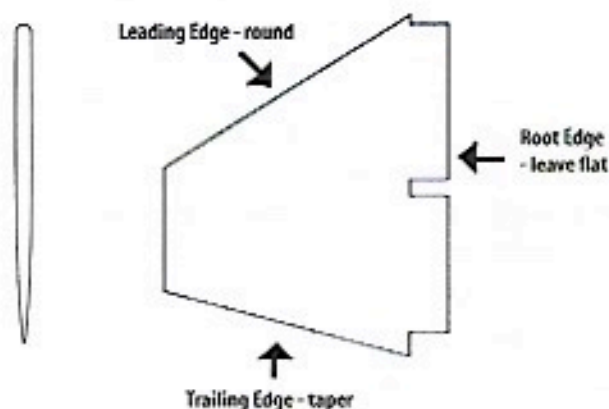
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- 1) Lightly sand both sides of the basswood fins.
- 2) Round the leading edge and taper the trailing edge of each fin as shown.



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Assemble and insert the Motor Mount

- 4) Assemble the motor mount using the motor mount kit instructions.
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Assemble and insert the Motor Mount cont'd.

6) Quickly insert the motor mount assembly and push it into the body tube until the motor mount tube protrudes about 3/8" from the base of the body tube. Make sure that the motor mount fin channels line up with the laser cut fin slots in the body tube. The top of the bottom centering ring should be even with the bottom edge of the bottom fin slot. Allow the assembly to dry.

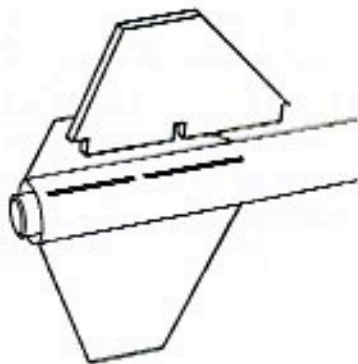


7) Using a door frame or a piece of aluminum angle as a guide, draw a line along the entire length of the body tube centered between two of the laser cut fin slots. This line will be used for placement of the launch lugs. Mark the line at 5 1/2 inches and 16 inches from the base.

Attach the Fins

8) Test fit the fin tabs into the fin slots in the body tube. Sand the fin tabs or the fin slots as necessary to obtain a good fit.

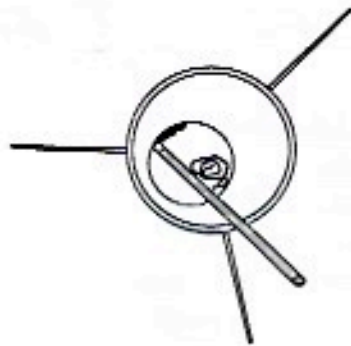
9) Place 5-minute epoxy in the motor mount / body tube fin slot and on the root edge and tab of the fin tab. Insert the fin tab into the fin slot and wipe away any excess epoxy. Make sure the fin is straight up from the body tube (you can sight down the length of the tube to see if the fin is straight). The straighter the fin, the better the model will fly. Repeat for the other two fins.



Final Construction

10) Assemble the ejection baffle using the baffle kit instructions.

11) Once the baffle has dried, test fit it in the main body tube. Sand the ring edges so that the baffle will slide freely in the body tube. Apply a bead of 5 minute epoxy about 6 inches inside the top of the body tube. Slide the baffle in, making sure that the kevlar cord is at the top end. Push the baffle past the bead of epoxy until the top of the baffle is about 6 to 7 inches from the top of the tube.



12) Once the body tube / baffle assembly has dried, place a generous bead of glue around the top of the ejection baffle using a long q-tip, or stick. Make sure not to get any glue on the kevlar shock cord. Allow the assembly to dry.

13) Shake the kevlar cord out of the top of the baffle and out of the body tube. Tie the free end of the kevlar cord and the free end of the elastic shock cord together. Put a drop of white glue on the knot to ensure it will not come untied.

14) Run a bead of 5-minute epoxy around the inside edge of the payload compartment, and slide in the balsa reducer. Carefully wipe off any excess epoxy.

15) Screw the screw eye into the center of the base of the balsa reducer. Unscrew the screw eye, and squirt a little bit of 5-minute epoxy in the hole. Reinsert the screw eye.

16) Place the nose cone onto the top of the payload compartment. The nose cone should be a snug fit so that it will not come off during flight. If the nose cone fits loosely wrap masking tape around the base and test fit until a snug fit is obtained.

17) Tie the free end of the shock cord to the balsa coupler screw eye using a double knot.

18) Tie the free end of the parachute shroud lines to the balsa coupler screw eye using a double knot. Fold and pack the parachute and place the payload compartment onto the rocket.

19) **WEAR DISPOSABLE LATEX GLOVES FOR THIS STEP!**
Using 5-minute or 20 minute epoxy, glue the launch lugs onto the short side of the two basswood standoffs. Once the lug / stand off assemblies are dry, glue each one at 5 1/2 inch and the other at 16 inch marks on the launch lug line. Sight down the length of the rocket to make sure the launch lugs are properly aligned .

20) **WEAR DISPOSABLE LATEX GLOVES FOR THIS STEP!**
Apply 5-minute or 20-minute epoxy to the fin / body tube and launch lug body tube joints and smooth with your finger. These are called fillets. Once the fillets are dry, you are ready to paint your rocket!

Painting

21) Check your model to ensure a smooth surface. Lightly sand any imperfections (glue, balsa filler, etc) that need to be removed. Wipe the model with a clean, dry cloth.

22) It is recommended that you apply at least one or two coats of white primer, sanding between coats. Wipe the model again with a clean, dry cloth.

23) Spray your choice of color in several light, even coats. In order to get a glossy shine, the last coat should be slightly heavier than the first. Allow the model to dry 24 hours before applying decals or other decorations.

Launching

Always follow the NAR safety code when flying your rocket.

1) If desired, put 3 to 5 pieces of flameproof recovery wadding into the top of the body tube to make sure the parachute will be protected from the heat of the motor ejection charge. The wadding should be a loose enough fit that it will easily exit the body tube after the parachute at ejection.

2) Fold the parachute and insert the shock cord and parachute into the body tube and place the nose cone on the rocket.

3) Choose your motor from the recommended motor listing on the face card of this rocket kit. Insert the motor into the motor mount with the nozzle facing outwards. Please Note - In order to allow the widest possible range of motor options, Merlin does not include a motor retention system. The motor must be installed using the friction fit method. First, create a 1/8" masking tape thrust ring at the base of the motor. Then, apply tape to the motor casing to obtain a very tight fit. Once the motor is installed, wrap several layers of masking tape around the motor tube / masking tape thrust ring to ensure the motor will not come free at ejection. Remember - if the motor breaks free your model will be destroyed, and can cause injury!

4) Insert an igniter into the motor according to the motor manufacturer's instructions.

5) Place the model on the launch pad, and attach igniter clips.

6) Observing all safety rules, perform a 5-point countdown and launch!



NAR Modeling Safety Code

- 1. Materials.** I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.
- 2. Motors.** I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.
- 3. Ignition System.** I will launch my rockets with an electrical launch system and electrical motor igniters. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.
- 4. Misfires.** If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.
- 5. Launch Safety.** I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with D motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them away to a safe distance.
- 6. Launcher.** I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or will cap the end of the rod when it is not in use.
- 7. Size.** My model rocket will not weigh more than 1,500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse. If my model rocket weighs more than one pound (453 grams) at liftoff or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration regulations before flying.
- 8. Flight Safety.** I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.

- 9. Launch Site.** I will launch my rocket outdoors, in an open area at least as large as shown in the accompanying table, and in safe weather conditions with wind speeds no greater than 20 miles per hour. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.
- 10. Recovery System.** I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.
- 11. Recovery Safety.** I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

Installed Total Impulse (N-sec)	LAUNCH SITE DIMENSIONS	
	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00-1.25	1/4A, 1/2A	50
1.26-2.50	A	100
2.51-5.00	B	200
5.01-10.00	C	400
10.01-20.00	D	500
20.01-40.00	E	1,000
40.01-80.00	F	1,000
80.01-160.00	G	1,000
160.01-320.00	Two Gs	1,500

Revision of February, 2001

