Andromeda Build Instructions

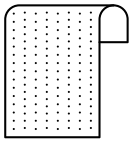
Due to the high thrust motors that can be flown in this rocket, epoxy is recommended!

Before beginning construction, read over instructions to become familiar with the proper construction steps. Check Parts List to make sure you have all the parts.

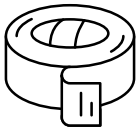
TEST FIT ALL PARTS! *Light sanding may be necessary to obtain proper fit.*

ITEMS YOU WILL NEED TO BUILD THIS KIT

Epoxy – (5, 15 and 30 Minute Recommended)



Fine and Medium Sandpaper



Masking Tape

Pencil and Ruler

Cyanoacrylate Glue (Superglue)

Paint

Basic Construction FAQ

The major parts involved in each step are shown shaded at the beginning of that step. Areas where epoxy should be applied are shown as well.

Prep and Assembly

- Read and understand the instruction steps fully before you begin the step.
- ALWAYS sand the parts to be bonded with 100-120 grit sandpaper.
- We strongly recommend you dry-fit (assemble without gluing) all parts in each step BEFORE epoxying them together. Sand or adjust fit as needed before gluing.
- Most epoxies work fine. Use 5 or 15 minute depending on how quickly you feel you can complete the step. Use longer set-time epoxy if you're unsure.
- To make internal fillets to the fins deep up into the airframe, "load up" the end of a dowel with a blob of epoxy, then stick the dowel into the airframe and onto the fin joint you're working on. After depositing enough epoxy in this fashion, you can pull the dowel toward you, making a fillet with the rounded edge of the dowel.
- Be sure to follow the "Do's & Don'ts" sheet provided with QT tubing.
- Fins do not need to be "shaped". Lightly sand the edges to remove any manufacturing burrs.

Painting/Finishing

- Before you paint the fins, scuff the entire surface with 220 grit sandpaper. This is easiest to do before mounting the fins.
- Plastic nosecone imperfections can be filled with plastic model kit putty.
- Stay with the same brand of paint throughout the process; primer, base color, accent colors, and clear coat. DO NOT skimp on the "shake the can for at least two minutes after the ball rattles" step! For the best finish, let each coat dry overnight and sand lightly with 320 or 400 grit sandpaper.
- Apply the last color coat as heavy as possible without running or sagging. Let the paint cure for at least 48 hours before handling!

Parts List

Check your parts before you begin your build!

- Pre-slotted main airframe
- Payload airframe
- Airframe coupler tube
- Coupler bulkplate
- Coupler hardware set
- Eyebolt
- Washer
- Nuts - (2)
- Nose cone
- 3 Pre-beveled fins
- Parachute
- 54mm motor mount tube
- HAMR-54/38 Motor Retainer Set
- Airframe to MMT centering ring - (2)
- Notched airframe to MMT cent. ring
- Kevlar® Shock cord
- Nylon Shock cord
- Linear Launch lugs - (2)
- Decal sheet

*Epoxy, paint, and motor not included.

- We recommend a clear coat of some sort to help protect the decals as well as "seal" their edges to help prevent them peeling off. When using any clear coat, put on only VERY thin, light coats, and wait at least 5 minutes between coats. The clear coat can damage your decals or paint if you put it on too heavily or don't wait long enough between coats!

STEP 1 - Pre-assembly Fitting and Sanding

The first few steps are going to involve scuffing, sanding and fitting some of the parts to your kit. The time you spend in the pre-assembly/fitting stage will aid in making assembly smooth when the adhesives come into play. Take your time here to get things right.

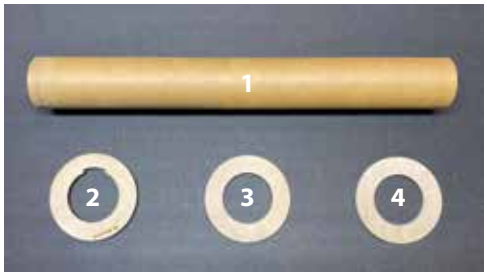


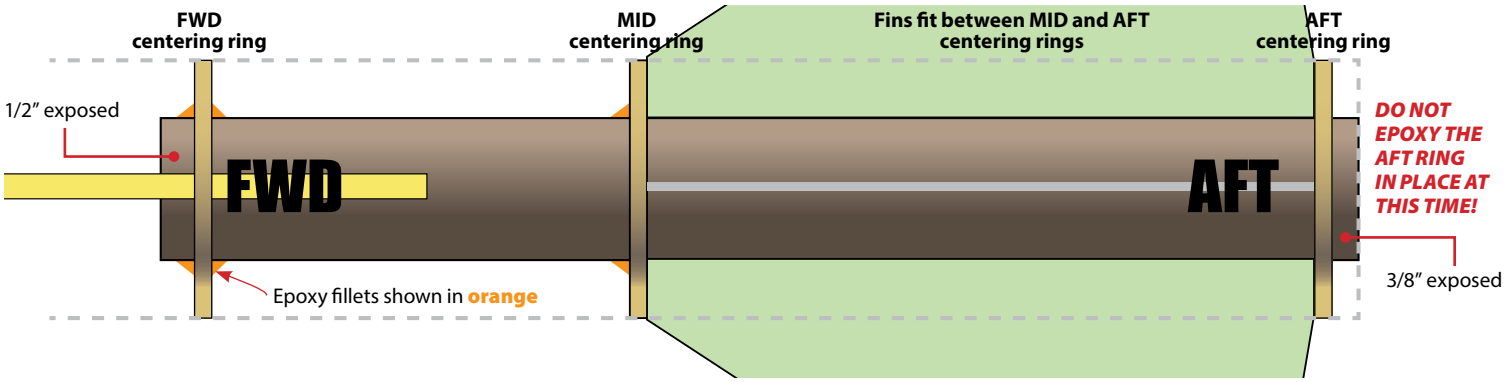
Image above shows the 1) Motor Tube, 2) FWD Notched Centering Ring, and two Mid and AFT Standard Centering Rings (3/4).

A. Lightly scuff/sand the motor tube to ensure proper adhesion of epoxy.

B. Dry fit all centering rings into the airframe and over the motor mount tube. The FWD notched ring and MID standard ring can be a little snug in the airframe and on the motor tube. If it is too tight, sand the ID and/or OD for a better fit.

C. Use a pencil to mark the AFT centering ring for identification. *You do not want to switch the MID and AFT centering rings during assembly!* The AFT standard centering ring should be looser in the airframe and over the motor mount tube; you will need to slip the AFT centering off the motor tube while it is in the airframe during a later step. Sand the ID and/or OD for a loose fit if necessary.

STEP 2 - More Pre-assembly Fitting and Sanding



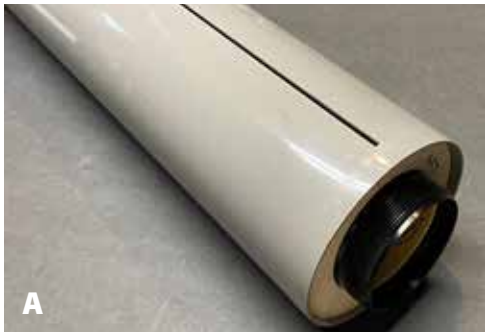
A. Slip the MID then AFT centering ring over the motor tube. Then **dry fit** (NO EPOXY!) the motor retention ring onto the motor tube. Make sure the retention ring is all the way onto the motor tube (approx. 3/8"). Slip the AFT ring down so it butts up against the retention ring

B. **Dry fit** the fins between the AFT centering ring and the MID centering ring. This gives you an accurate location of where the mid centering ring should be placed. Using cyanoacrylate glue (super glue), lightly tack the MID centering ring in place.

DO NOT GLUE THE FINS TO THE TUBE, DO NOT GLUE THE AFT RING IN PLACE!

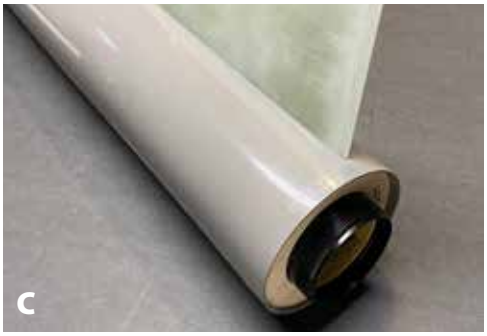
C. Locate the FWD notched centering ring 1/2" from the FWD end of the motor tube. Tack in place using cyanoacrylate glue.

STEP 2 - Dry Fit Motor Tube Assembly to Airframe

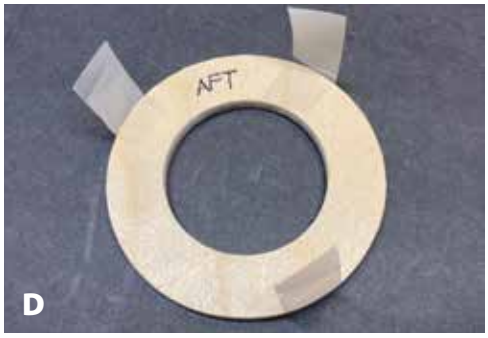


A. **Dry fit** (NO EPOXY!) the motor tube/centering ring assembly into the airframe.

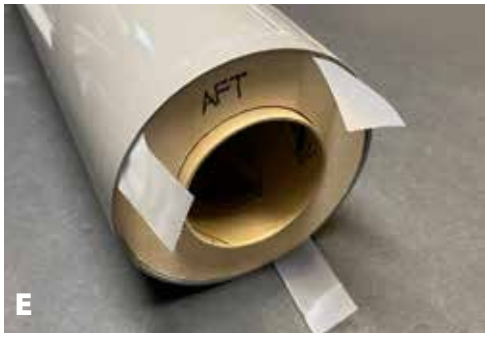
B. Make sure the MID and AFT centering rings do not interfere with the fin slots.



C. Dry fit a fin into each fin slot to make sure they fit correctly.



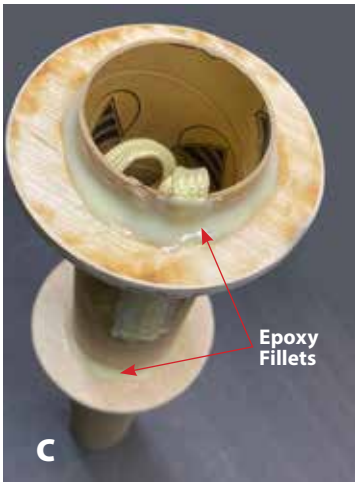
D. Remove the motor retainer from the motor tube. Make three or four cellophane tape tabs as shown above to aid in removing this ring at a later step.

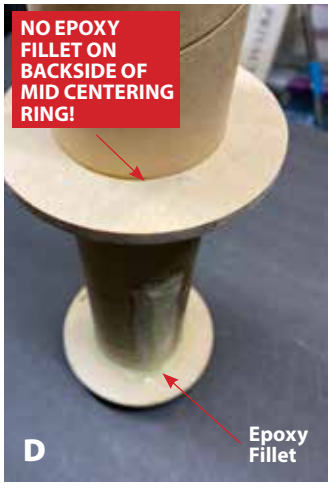


E. **Dry fit**/test the fit of the aft ring over the motor tube. You need to be able to slip this ring on and off during final motor tube/airframe assembly.

Once you are satisfied with the fit of all the components, remove the motor tube assembly from the airframe. Remove the AFT centering ring from the motor tube.

STEP 3 - Kevlar® Shock Cord and Centering Ring Fillets





The moment you've been waiting for! Get ready to use some epoxy.

A. Spread a layer of epoxy about 1" wide and 4" long on the motor tube just below the notch in the upper centering ring. Slip the raw end of the Kevlar® shock cord through the notch in the centering ring. Pull through about 4" of this strap through the notch and press it firmly into the epoxy on the side of the motor tube. Hold the strap in place against the tube with masking tape until the epoxy cures. When cured, remove the masking tape.

B. Mix another batch of epoxy and coat the shock cord. Fill the entire centering ring notch with epoxy.

C. Make an epoxy fillet on the topside of the FWD notched centering ring and the MID centering ring.

D. When the epoxy has cured, flip the motor tube over and apply an epoxy fillet to the backside of the FWD centering ring only.

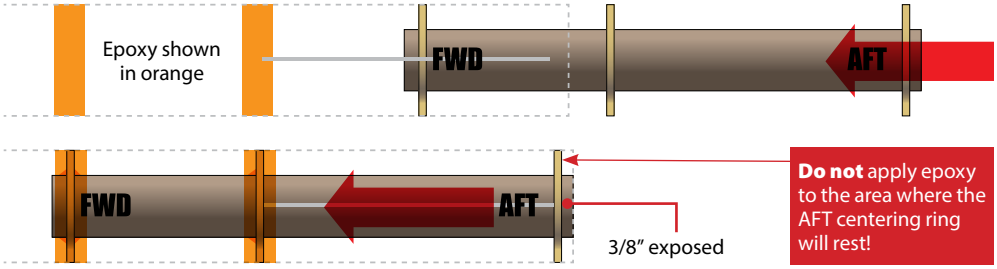
DO NOT make an epoxy fillet on the backside of the MID centering ring!

STEP 3 - Motor Tube to Airframe Assembly

A. Coil the Kevlar® shock cord and shove it into the motor tube to protect it during the next steps.

Lay your motor tube alongside the airframe and make a mark where your FWD and MID centering rings will rest when installed. Scuff/sand the **inside** of the airframe where the centering rings will rest when installed.

B. You will need a long stick or dowel for applying epoxy in this step. Make two marks on the stick at so you can tell how deep the stick is in the airframe when spreading the epoxy. Using your extended epoxy applicator, spread a bead of epoxy around the inside circumference of the airframe where the FWD and MID centering rings will rest.



DO NOT APPLY EPOXY WHERE THE AFT CENTERING RING WILL REST!!! You will need to slip the AFT centering ring off the motor tube in a future step. Push the motor tube assembly into the airframe.

The motor mount tube must be protruding 3/8" from the face of the AFT centering ring!

Make sure the MID and AFT centering rings do not interfere with the fin slots. Flip the airframe to a vertical position (FWD end up) and let the epoxy cure.

STEP 4 - Fin to Airframe Assembly

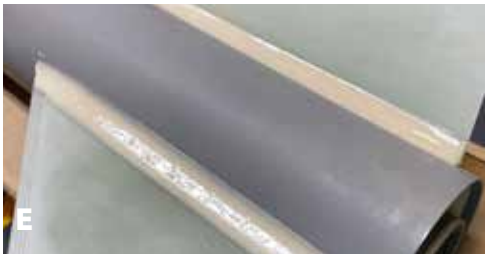
A. Apply a bead of epoxy to the root edge of one fin tab and insert fin into fin slot. ***Make sure the fin is at a right angle (90˚) to the airframe***. Set aside to cure. Keep the airframe in a horizontal position until the epoxy cures. Do one fin at a time, and let cure; then move on to the second fin and repeat the epoxy process. Repeat with the last remaining fin.

B. Gently pull the AFT centering ring off the end of the rocket by tugging on the tape tabs. Place tape over the end of the motor tube to protect it during the next step. ***Do not get epoxy inside the motor tube!***

C. Using a stick, apply an epoxy fillet to the fins at the motor mount tube and the inner airframe wall.

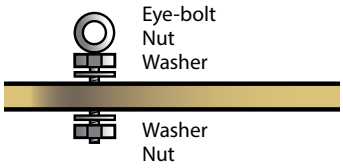
D. Remove the tape tabs from the centering ring and permanently epoxy it in the base of the rocket. ***The motor tube must protrude 3/8" from the face of the centering ring!***

E. Apply an outer epoxy fillet to both sides of each fin. Carefully smooth the epoxy with your finger before it begins to gel. Allow the epoxy to set up before rotating the rocket to do the next set of fins. Once the epoxy has fully cured, you should sand the fillet smooth with fine sandpaper. Sanding will help the primer hold better to the epoxy.



LOC PRO Build Tip! Adjustable Density Expanding Foam

Two-part expanding foam, great for fin encapsulation, securing lose weight, etc. By combining equal parts of A and B, the foam expands to about 10 times its original liquid volume. The result is a rigid foam that is extremely strong and still relatively lightweight. This is perfect for filling small spaces where the highest strength is required and weight is not a real issue. ***Go here!***



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STEP 4 - Bulkhead Assembly

A. Assemble the bulkhead as shown in the drawing.

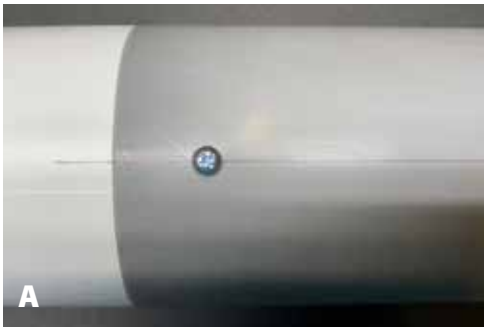
- Slip a washer over the eye bolt
- Push the eye bolt into the hole in the bulk plate.
- Slip the second washer onto the eye bolt.
- Thread the nut on to the eye bolt and tighten it with a wrench.
- Spread epoxy over the nut and washers for a secure connection.

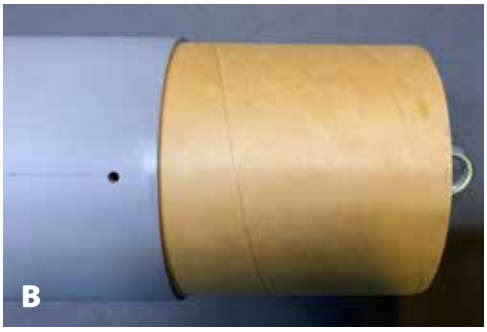
B. Spread a layer of epoxy around the inside circumference of the coupler to a depth of about 1/2".

Push the bulkhead assembly into the coupler until it is about 1/4" past the edge. Allow the epoxy to set. Then apply an epoxy fillet to both sides of the bulkhead.

C. Draw a pencil mark at the midpoint of the coupler. Spread a layer of epoxy around the inside circumference of the payload section tube to a depth of 1/2 of the tube diameter. With a slow twisting motion, push the coupler into the payload section tube up to the pencil mark. Allow the epoxy to cure.

STEP 5 - Nosecone Payload Bay Assembly





A. Slip the nosecone into the top of the payload section tube. Secure the nosecone to the payload section with 3 small screws or removable plastic rivets equally spaced around the circumference of the payload section tube about 1" below the nosecone. Be sure to pre-drill holes of the appropriate size when using screws. 1/4" long sheet metal screws work well in this application. If you prefer to use PML Removable Plastic Rivets (RVT-24) , you will need to drill 5/32" diameter holes.

B. Next drill a 1/8" or 5/32" hole near the base of the payload section tube completely through the coupler. This hole is needed for high speed, high altitude flights to bleed off internal air pressure.

Parachute Loop 1/3 of the way from one end

Long Shock Cord end to Kevlar® cord attachment

A quick link makes it easy to change out shock cords if needed.

STEP 6 - Parachute / Recovery System Assembly

Make a parachute loop in the nylon shock cord 1/3 of the way from one end. Tie the **long** end of the shock cord onto the yellow Kevlar® shock cord. Attach the **short** end of the shock cord to the eye bolt in the payload bay bulkhead. Most builders use a quick link (not included) for this purpose. A quick link makes it easy to change out shock cords if needed.

STEP 7 - Rail Guides Installation

A. Install the rail guides into the booster with provided screws. Drill a small hole at the location of the forward and aft centering rings, centered between fin set.

B. Drop a small amount of epoxy in drilled holes, thread the rail guides and screws in the holes, rotate rocket 180 degrees & let cure.

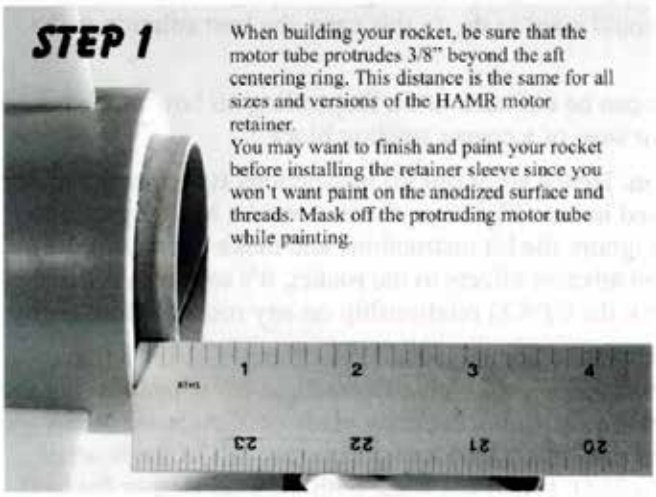
STEP 9 - Paint / Finish

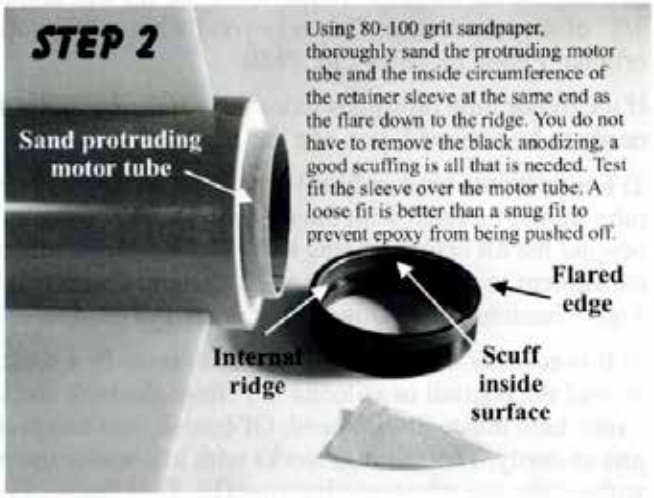
Seal fins and launch lug with sanding sealer using a brush. Sand lightly between coats to fill pores and obtain a smooth finish. Lightly sand plastic nose cone with fine sandpaper to remove molding seam line. At this time, remove any plastic flash that was molded into the nose cone eyelet.

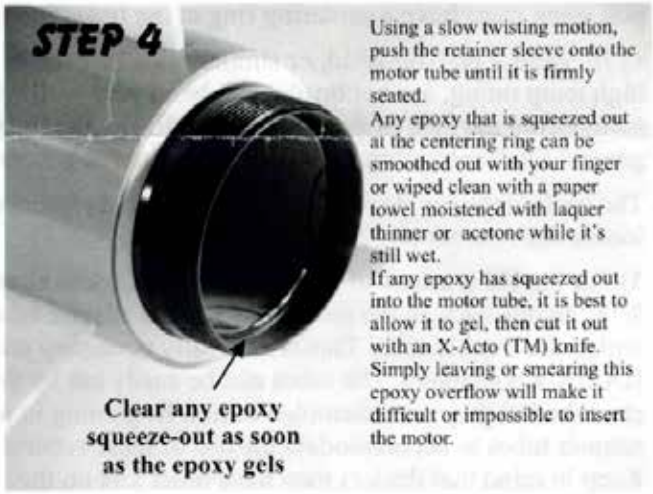
When you are satisfied with the smooth sanded finish of your model, it is ready to prime and paint.

- Spray rocket with primer, sand and repeat until smooth finish is obtained
- Spray rocket with paint of choice, let dry.
- Apply protective clear coat
- Apply vinyl decals to your liking
- Repeat with clear coat.

STEP 10 - HAMR Motor Retainer Installation







General notes for retro-fitting the HAMR system onto existing rockets and other important information:

1) The motor tube must protrude 3/8" beyond the aft ring for the sleeve to fit. If the rocket is already built and the motor tube is flush with the ring, difficult but possible surgery is required for a retro-fit. You will have to Dremel out the aft ring, Dremel back the fin tabs about 1/4", then insert a new ring to the proper depth to expose 3/8" of the motor tube. This is beyond what most people would want to do. In this case, the best solution is the original Public Missiles Ltd. PMR.

If the motor tube protrudes more than 3/8", the motor tube can be cut back to fit. Depending on how much tube needs to be removed, you can use a hack saw, X-Acto razor saw, or a coarse sanding block.

2) For years we have only sold the PMR for motor retention. Hence all of our kit instructions state that the motor tube should be flush with the aft centering ring. But as stated in note #1 above, the motor tube MUST protrude beyond the aft centering ring by 3/8". You can confidently ignore the kit instructions and make the required adjustment to facilitate the HAMR system. There will be no adverse effects to the rocket, it's assembly, or it's flight characteristics. However, it is always prudent to check the CP/CG relationship on any rocket before flight.

3) It is actually a very simple matter to retro-fit a rocket that uses a boattail or tailcone. Simply scribe a line around the boattail or tailcone 3/8" from the base and cut this section off with a Dremel cut-off wheel leaving the motor tube intact and exposed. Of course, you can perform the cut with a hacksaw blade or X-Acto razor saw just as easily. This method works with kits where the motor tube is wedged into the narrow end of the boattail without the use of a centering ring (IE. Bull Puppy, Pit Bull 256). It will not work with the Bull Dog or Pit Bull 600 since these have a centering ring at the base. See note #1 above for details.

4) JB Weld, Loc-Tite Weld, or similar must be used to secure the sleeve to the motor tube. These epoxies have a high temp rating, are not brittle, and bond very well with phenolic and aluminum. Common hobby epoxy may soften from the heat of the motor and fail. Do NOT use standard hobby epoxy or even the epoxy PML sells for general kit construction. The high temperatures generated by the motor can cause these epoxies to fail.

The motor retainer sleeve should be inspected after every flight to make sure the impact from landing did not loosen the retainer sleeve.

5) For the KS washers to work with older KS kits already in the field, both adapter tubes must be cut 1/8" to 3/16" by the user. In the past, we made the adapter tubes a bit long to aid in insertion and removal of the adapters within the mother tube. This is not really necessary and now the adapter tubes are too long to work with the HAMR-KS adapters. The tubes can be easily cut by the user with a hack saw, Dremel, miter saw, X-Acto saw, etc. whether they are assembled or not. Beginning in mid-February, 2007, we have changed the length of the KS adapter tubes to accommodate the use of these retainers. This includes all KS kits that were in stock at that time. Keep in mind that dealers may have older kits on their shelves for an extended period of time. If all of the tubes in the Kwik-Switch set (Mother tube and both adapter tubes) are the same length, then you have the new version. This change will not affect the use of the original PMR KS version.

6) The bonding surface of the sleeve must be sanded with 80 grit sandpaper to thoroughly scuff the anodized surface. The anodizing does NOT have to be removed (that's almost impossible anyway), just scuffed.

7) The motor tube must be sanded with 80 grit as well. The retainer sleeve should fit loosely on the motor tube. IE. It should just fall off when tipped. This will assure that the JB Weld (or similar) is not just pushed out of the way when mounting the sleeve on the tube. The sleeve's bonding surface and the tube should be coated with the epoxy and then the sleeve should be pushed onto the tube with a slow twisting motion. Any epoxy squeeze-out can be removed when the epoxy gels but before it cures.

8) After....and only after....the adapter sleeve is epoxied to the rocket, the threads can be lubed with a tiny bit of grease for smoother threading of the 2 pieces and to prevent future galling (however unlikely). The grease should not be applied before assembly since even the slightest bit accidentally smeared on the bonding surface will weaken the epoxy bond.

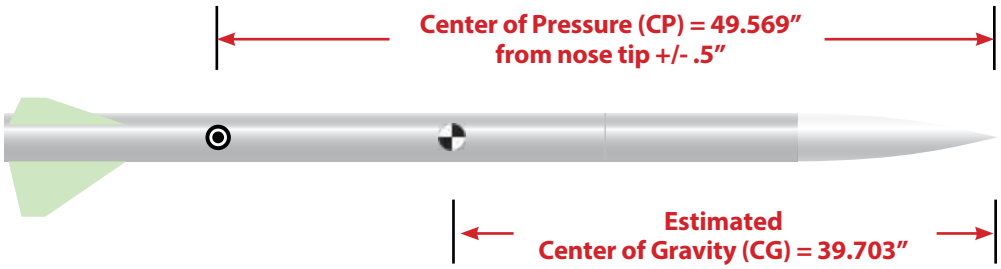
How to Use the HAMR Motor Retention System

PREFLIGHT

Sim Your Rocket!

This rocket is recommended for high power rocket motors H through J impulse. Depending on your flying field and finished weight, this is a very versatile kit. The Rocksim® file is available on the product page on our website.

Always check stability to ensure stable flight; the Center of Gravity (CG) must be forward of the Center of Pressure (CP) in flight ready condition.



Andromeda Specs

Height: 64.5"
Diameter: 3.9"

Motor Suggestions: H-J capable impulse

For motor recommendations please sim your rocket.

The center of pressure (CP) of this rocket is 49.569 inches from nose tip. After finishing your rocket, permanently mark the center of pressure on the airframe. After loading the rocket with a motor, make sure that the center of gravity (balancing point) is at least one body diameter forward of the center of pressure mark. The center of gravity can be moved forward by adding weight to the nose cone.

Remember to use enough recovery wadding to protect the chute and shock cord from the hot ejection gases .

Always follow motor manufacturer's instructions for motor use and ignition, and launch this vehicle on calm, windless days to insure safe recovery.

Model Rocket Safety Code

Materials – I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.

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.

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.

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.

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. When conducting a simultaneous launch of more than ten rockets, I will observe a safe distance of 1.5 times the maximum expected altitude of any launched rocket.

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.

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.

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.

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.

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.

Recovery Safety – I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

Launch Site Dimensions

Installed Total Impulse (N-sec)	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 G's	1,500′

Schools, Clubs and Other Groups

Loc Precision Multi-Packs are available for this and other Loc Precision Rocket kits. Call or email us for multi-pack pricing.

E-MAIL: info@locprecision.com | PHONE: 920.892.0557