

68mm STEM-1 Rocket

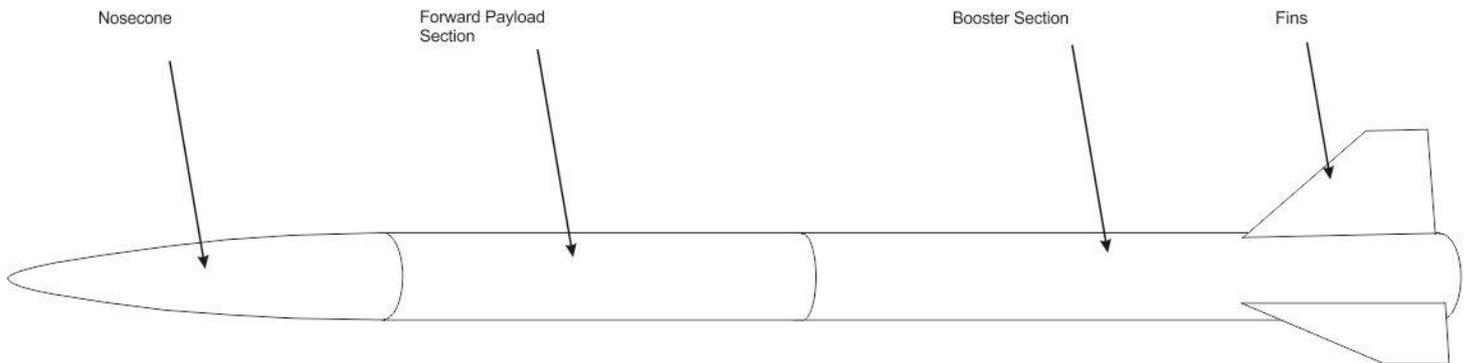
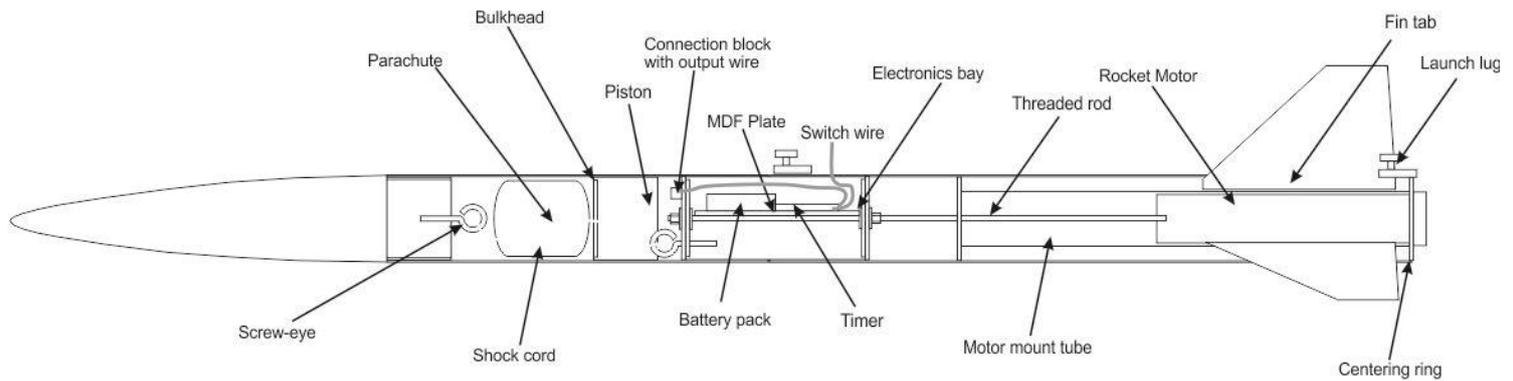


Table of contents

1. Parts list
2. What you will need
3. Motor Mount Tube assembly
4. Booster assembly
5. Electronics Bay assembly
6. Parachute installation
7. Fin Terminology
8. Fin Alignment Guide

Foreword

Thank you for purchasing an ASR Rocket Kit. This kit will provide hours of challenging fun while building this flying Model Rocket.

Please read through the entire manual before starting with the construction of your Rocket.

If you have any questions, feel free to email us at johanngr@live.com

Parts list

1. Cardboard tubes
 - a. 500mm x 68mm
 - b. 350mm x 68mm
 - c. 65mm x 140mm
 - d. 65mm x 50mm
 - e. 350mm x 43mm
2. Wooden parts
 - a. Fins x 3
 - b. Large bulkheads(discs) x 2
 - c. Small bulkheads(discs) x 3
 - d. Centering Rings x 2
 - e. Mounting Plate
3. Metal parts
 - a. 400mm steel threaded rod
 - b. Screw-eyes x 2
 - c. Small screws X 6
 - d. Nuts and washers x 3
4. Other Small parts
 - a. Plastic rail guides x 2
 - b. Electrical Connection Block
5. Plastic Nosecone
6. Nylon Parachute with shock cord

What you will need

1. Pencil or pen
2. Ruler
3. Masking tape (20mm is fine)
4. Small flat screwdriver
5. Drill with bits (1mm for pilot holes, 6mm for wires to pass through.)
6. Sanding paper (80 or 100 grit)
7. Stanley knife (Box cutter)
8. Super glue
9. Wood glue
10. Glue Gun or Epoxy

Motor Mount Tube Assembly

The Motor Mount Tube (MMT) holds the Rocket Motor in position. It consists of three parts.

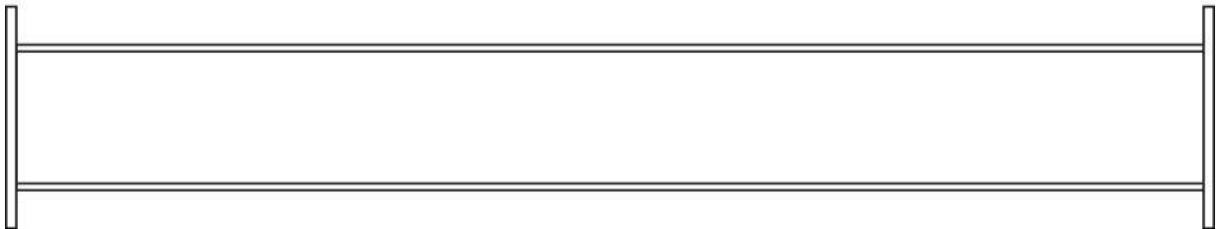
1. 350mm x 43mm Cardboard Tube
2. Centering Rings (CR) x 2

Sand the edges of the tube lightly too smooth out the ends. Be careful to sand in the direction the tube was wound. Once smooth, drop a little super glue on the edges to seal the fibres. Allow to dry and sand any remaining bumps.

Fit the CRs onto the tube and sand the inside if needed to get a proper sliding fit.

Glue each ring using the wood glue to an end of the tube. The final part should look like the image below:

Motor Mount Tube (MMT)



Booster Assembly

The Booster of the Rocket is where the Fins are attached and the Rocket Motor is installed. The Booster has several parts:

1. 500mm x 68mm Cardboard Tube (Booster Body Tube)
2. Fins x 3
3. Previously assembled MMT
4. Launch Lugs (rail guides) x 2

Using sanding paper and super glue, prepare the tube edges like you did for the MMT.

Test fit the MMT into the Booster Body Tube (BBT). If the rings are a tight fit sand the circumference down a little and try again until it slides easily into the BBT.

Important Note: Don't glue it at this point.

Using the Fin Alignment guide, mark three positions around the tube at 120 degrees apart. Make another mark 1mm to the left of each mark and another 1mm to the right of each mark.

Draw a line around the BBT, 10mm from the edge of the BBT where you made the marks.

Tip: Take a piece of paper and wrap it around the tube making sure the edges meet up. This will give you an edge to draw around the tube. Simply slide the wrapped paper to the mark you made and draw the line.

Take a fin and place it in-line with the BBT on the line you just drew. Make a mark in-front of it on the BBT. Draw a line around the BBT at this mark. This will give you two lines running around the BBT exactly the length of a fin apart.

Draw a line at each mark you made from the bottom line to the top line. This will draw a rectangle at each position where a fin must be fitted.

Using the Stanley knife carefully cut out the rectangle. It will leave a slot for the fin tab to fit into. Repeat for each of the three fin slots. Make sure the fins fit easily into the slots and remove any excess cardboard from the slots.

Slide the MMT out of the BBT a short distance. Apply some wood glue around the bottom (aft) CR and re-insert the MMT until flush with the BBT. Let it dry.

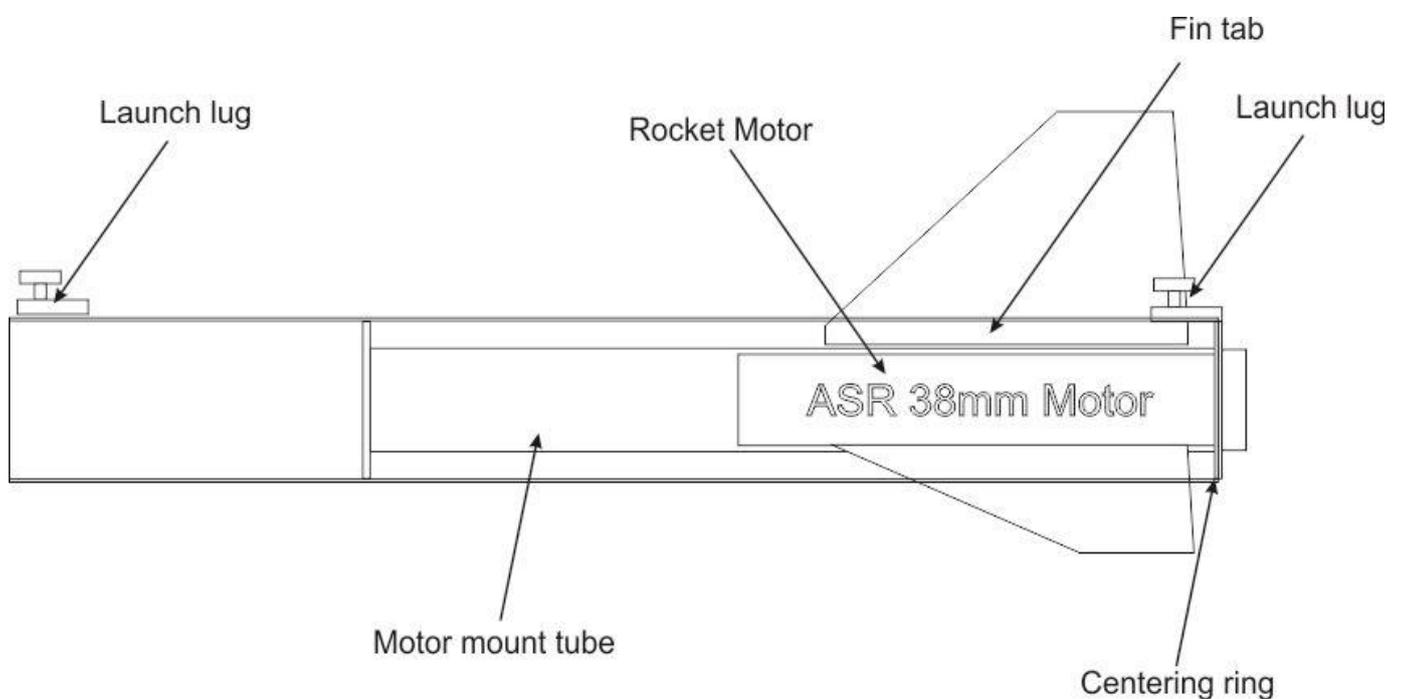
Take each fin one at a time and apply some wood glue to the root edge (fin tab) of the fin. Insert the fin straight down through the fin slot until it reaches the MMT. Press down firmly and check that the fin is protruding straight out of the BBT. Let it dry and move on the next fin.

Draw a line from the one end of the BBT to the other, halfway between two of the fins. This will be the centre line on which the rail guides will be positioned.

Prepare the rail guides by first cutting off the short “tail” at the bend. Now using the Stanley knife, score the inside of the guide’s foot with Xs. This will give the glue a better hold.

Using either the Glue Gun or Epoxy fill the inside of the rail guide’s foot and press it onto the top most position on the centre line. Repeat with another rail guide on the bottom most position on the centre line. This part can be done after the rocket has been painted.

The booster assembly is now complete.



Electronics Bay Assembly

The Electronics Bay holds the electronics (avionics) needed to release the parachute.

Parts used:

1. 140mm x 65mm Cardboard Tube
2. Wooden cap (large disc + small disc) x 2
3. Threaded rod with nuts and washers
4. Connection block
5. Timer with MDF mounting plate
6. Small screws x 6

Take a nut and screw it onto the threaded rod 170mm from one end. Put a washer next to it onto the rod. Take one Wooden Cap (bulkhead), large disc towards the washer and nut and put it next to the washer onto the rod. Put a washer next to the bulkhead and the thread a nut on to secure the assembly.

Add some wood glue onto the edge of the bulkhead and place the 140mm tube over it. Put the other bulkhead over the rod to close the tube. Put a washer and nut onto the rod to secure the assembly while the glue dries. Be sure not to glue the top bulkhead as it needs to open later.

Place the Electronics bay halfway into the booster section. Draw a line around the tube to mark the centre. Mark three positions around the BBT at the end where the Electronics bay is. Tip: The fin alignment guide works well for this too. Extend each mark 50mm down the BBT. With the Electronics bay in position, drill a 1mm hole at each of the three points at the end of the 50mm lines. Do one first and insert a small screw and then do the next one.

The electronics bay will now be securely held in the BBT.

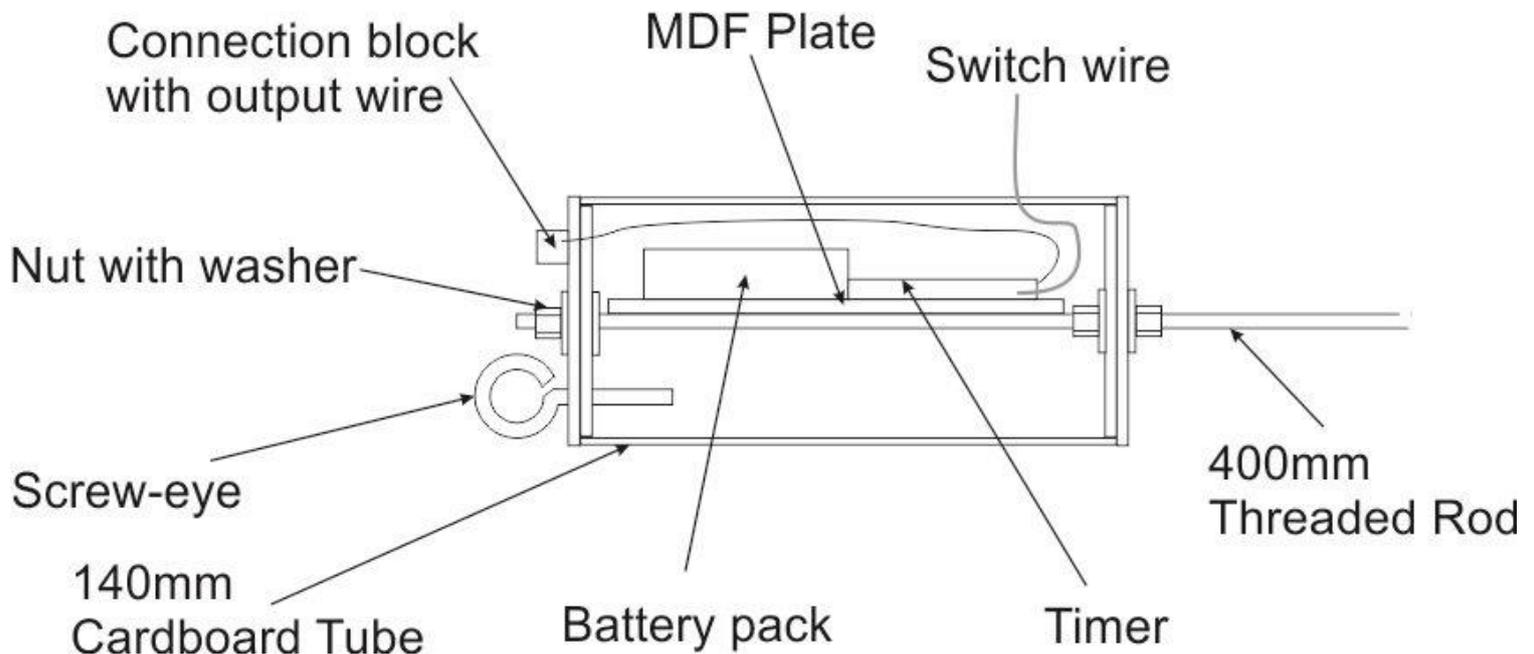
Take the remain body tube, the 350mm tube and place it over the electronics bay. Use a piece of masking tape to hold it in position. Now extend the lines from the BBT to the forward section for 50mm. Drill a 1mm hole at each of the ends of these lines like you did earlier with the BBT. Insert a screw into each hole you drill.

Now make a mark 30mm down one of the lines on the BBT. Drill a 6mm hole. This will be the hole through which the switch wires will be passed.

Remove the screws from the forward section and remove the forward section tube. Remove the nut and washer retain the forward bulkhead onto the electronics bay. Take the timer and insert the switch wire through the hole drilled for it. Lower it down into the bay. Take the output wire and thread it through the hole in the forward bulkhead. If it is too short use a short piece of electrical wire to extend it. Connect the wire to the connection block.

Place the forward bulkhead back on the electronics bay. Put the washer and nut on to secure the bulkhead.

Electronics bay



Parachute installation

Take the thick end of the shock cord and tie it onto the screw-eye on the forward bulkhead of the electronics bay. You can also use a quick-link to attach it.

Take the 50mm x 65mm tube and glue the remaining disc into one end using wood glue. This is the Piston. Once dry, enlarge the hole in the disc a little to allow the joint between the thick and thin sections of the shock cord to pass through. Glue this joint in the middle into the disc of the Piston using the Glue gun or epoxy. Let it dry.

Take the forward section and pass the shock cord and piston through it. Put it over the electronics bay and secure with the screws.

Thread a screw-eye into the wooden disc on the base of the nosecone.

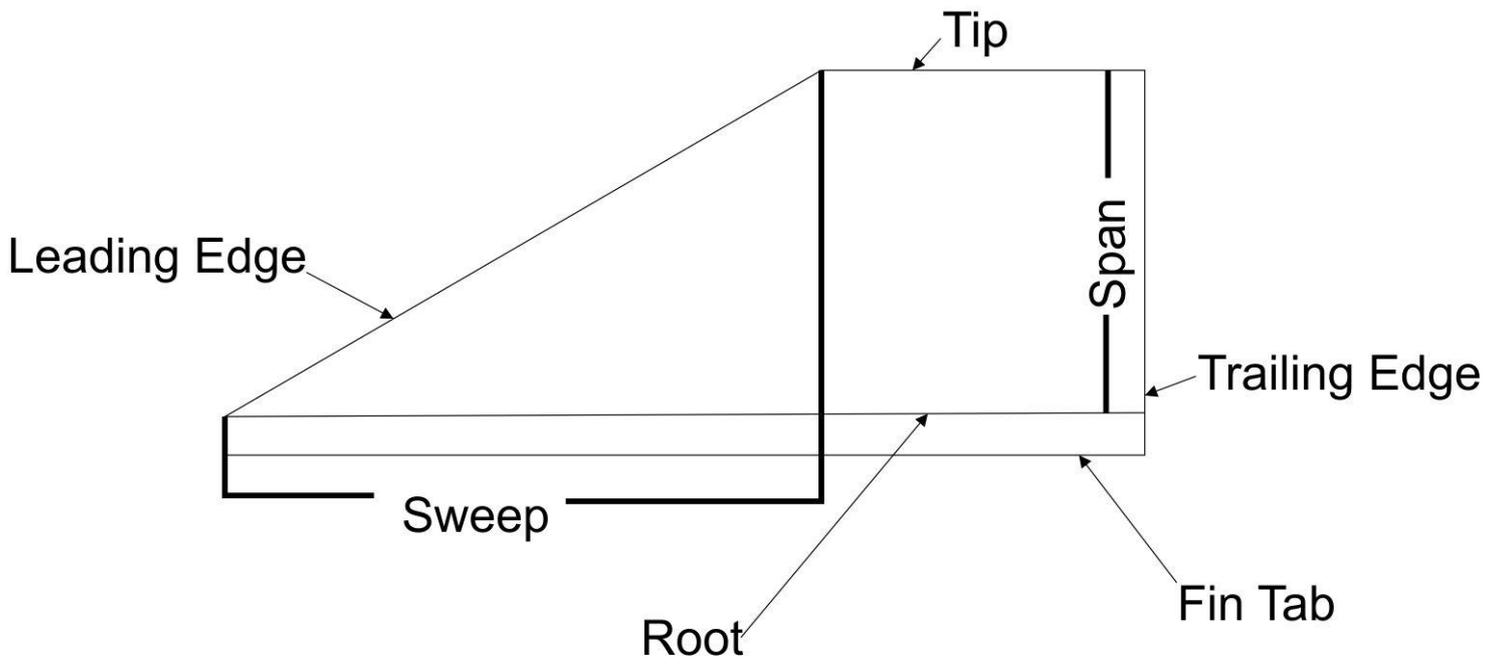
Tie the thin end of the shock cord onto the screw-eye of the nosecone.

Tie the parachute cords onto the shock cord about 1m from the nosecone. The best way is to make a loop with the parachute cords. Hold the loop over the shock cord and pass the parachute through the hole formed. Pull tight. This knot is easy to loosen but will never come loose.

Fold the parachute and fold the cords into the chute. Push it into the forward section making sure the cords won't cause knots when pushed out.

Place the Nosecone into the forward section. Your Rocket is now ready to be painted!

Fin terminology



Easy Fin Alignment Guide

