

DF-11A (CSS-7 Mod 2)

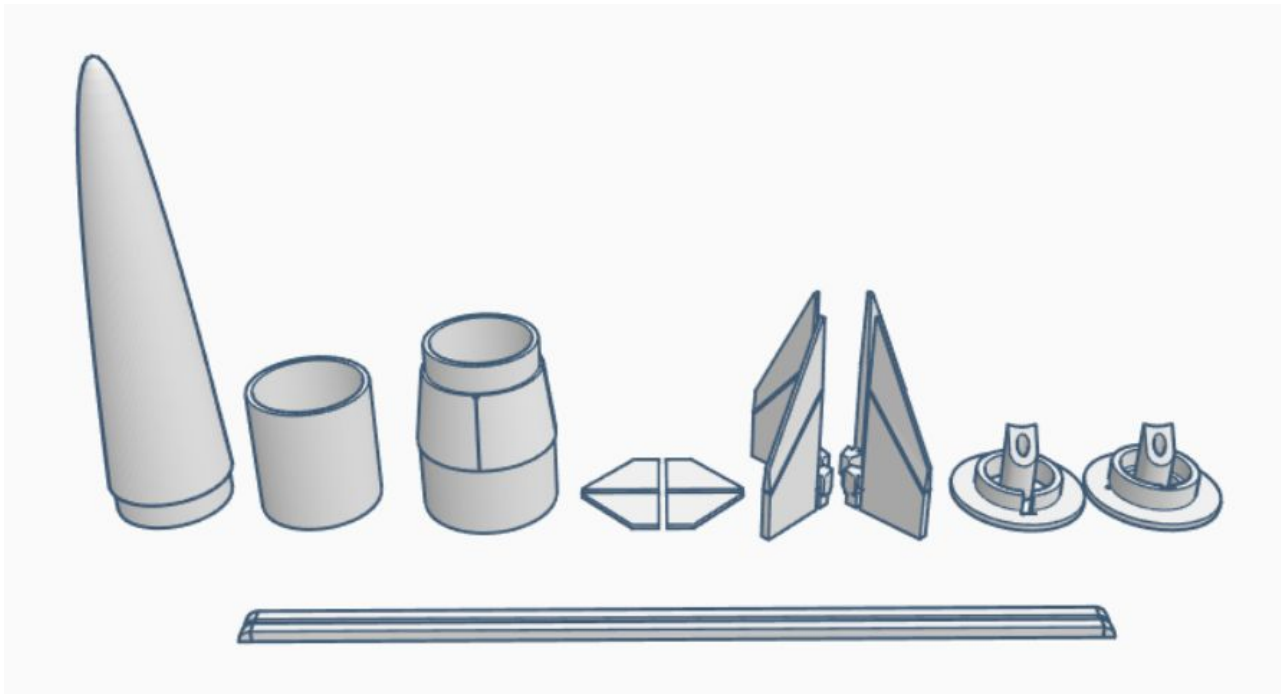
Builder's Kit Parts List

<u>Quantity</u>	<u>Part</u>
2	Centering Rings
2	Launch Lugs
4	Main Fins
1	Nose kit (nose section, tube section, frustum section, and 4 small fins)
2	Plastic Conduits
1	Template Sheet

Parts Needed to Complete

~2.2 ounces	Nose Weight
1	Body Tube, ST-18, 13.125" long (333.4mm)
1	24mm Motor Tube, 2.25" long (57.2mm)
1	Shock Cord, ~36" long (~915mm) elastic
1	Shock Cord, ~15" long (~381mm) Kevlar
1	24" Parachute (610mm)
1	Motor clip (if desired)

3D Printed Builders Kit Parts



BACKGROUND

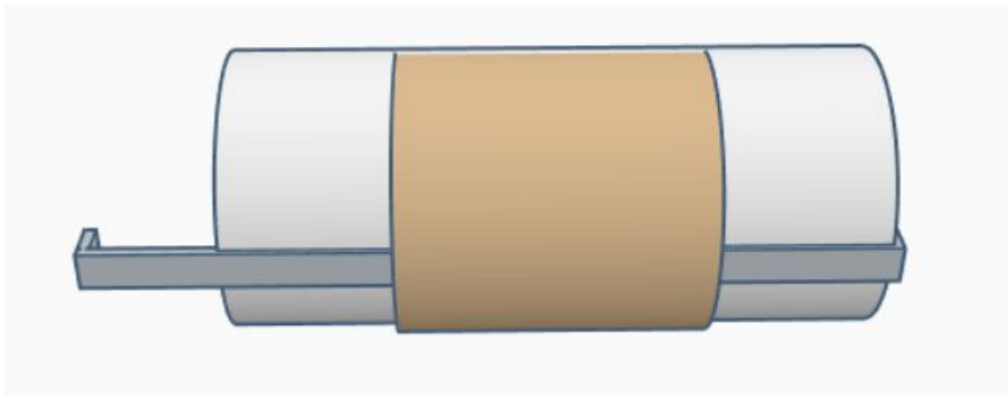
The Dong Feng-11A (DF-11A) is a single-stage, solid propellant, road-mobile short-range ballistic missile. “Dong Feng” is Mandarin Chinese for “East Wind” – a reference to a famous speech by Mao Zedong, where he predicted “the east wind shall overcome the west wind.” The DF-11A (called the “CSS-7 Mod 2” in the West) is one of many ballistic missiles created by China to assert their national prestige and power – particularly

against Taiwan. The DF-11A is slightly longer than the original DF-11, and has greater range as well. The DF-11, which once had the export designator “M-11,” was the source of great controversy, as the US asserted China had sold the M-11 to Pakistan – a violation of the Missile Technology Control Regime. While this assertion has never been verified, Pakistan now displays an “indigenous” missile called the “Ghaznavi” – which bears a striking resemblance to the DF-11! Proliferation concerns aside, the DF-11A stands as a prime example of China’s new “missile diplomacy.”

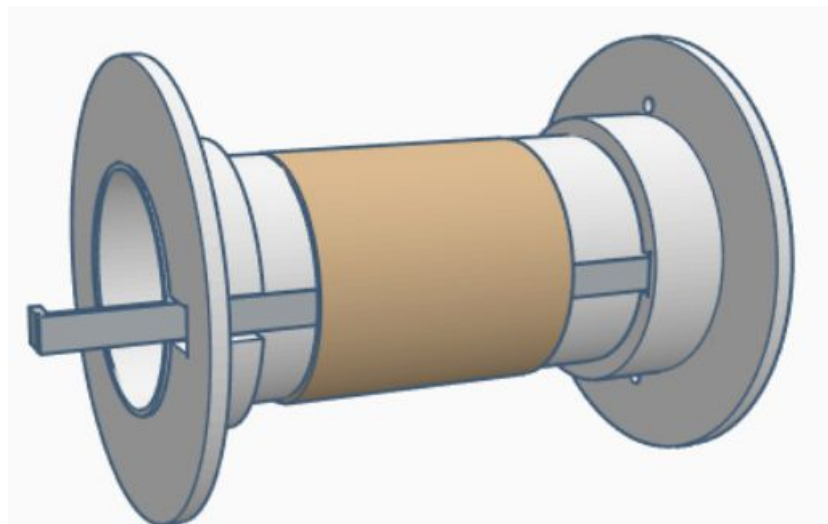
This model was created using photos and drawings of the DF-11A available on the internet. Based on reported dimensions, this model is approximately 1:19 scale.

KIT ASSEMBLY

1. Assemble the motor mount. For Estes “D” motors, you’ll need a 24mm (BT-50) motor tube 2.25” (57.2mm) long. If you plan to use “E” Motors, you’ll need a motor tube 3.25” long (82.6mm) long. Note, this motor mount is intended for a “friction fit” of the rocket motor. If you want a motor clip (not included), place the clip over the motor tube (be sure to use the correct clip length for the motors you plan to use) so the forward edge of the clip is even with the forward edge of the motor tube. Secure the clip to the tube in the center of the motor tube with a wrap of 1” (25.4mm) masking tape. Then follow the directions below.\



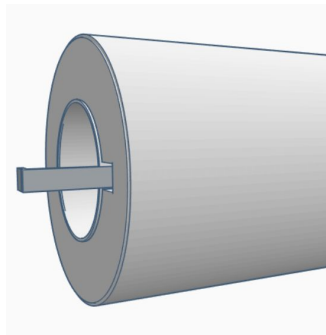
The forward centering ring has a built-in motor block and attach points for a shock cord. Using cyanoacrylate (CA) glue, or “super glue,” glue this ring to one end of the motor tube. Glue the other ring to the aft end of the motor tube, flush with the end of the tube. Apply fillets, if desired, to the tube/ring joints and allow to dry.



2. Attach the shock cord. The motor mount is designed to use a Kevlar anchor. 100-pound Kevlar works well. The length should be approximately 15” (381mm). Thread one end of the Kevlar through a hole in the forward centering ring. Wrap the Kevlar around the motor tube and tie a knot. Try to keep the Kevlar tight against the 3-D plastic, as this is preferable to the Kevlar “digging into” the motor tube. At the other end of the Kevlar, make a loop about 1” in diameter. To this loop, attach an elastic shock cord roughly 36” long (915mm). We prefer ¼” (6.35mm) braided elastic.

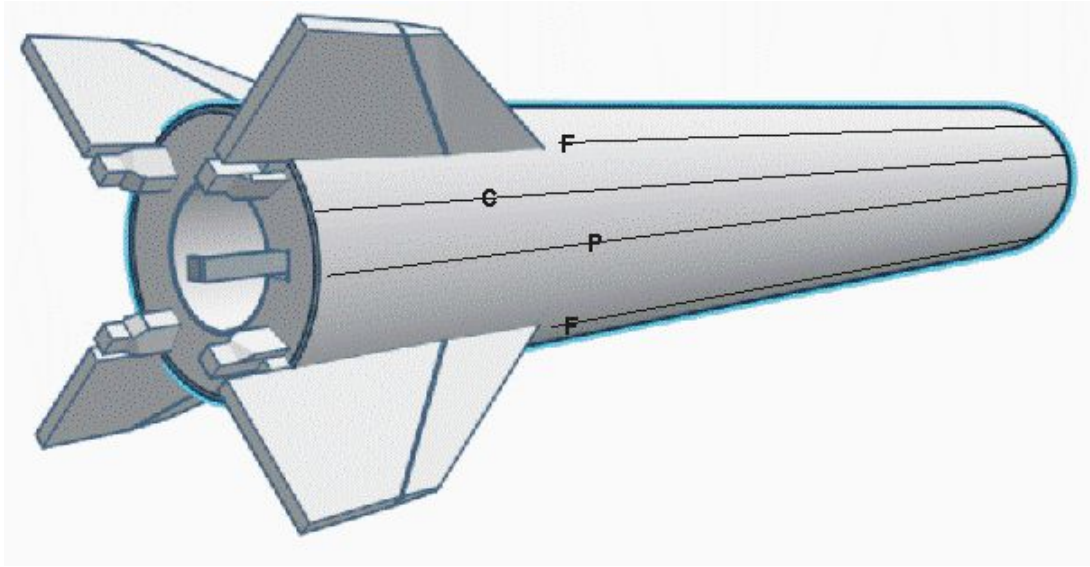


3. Install the motor mount. The body tube for the DF-11A is ST-18 (1.84” outside diameter, 1.80” inside diameter). The length should be 13.125”, or 333.4mm. Test fit the motor mount assembly in body tube. If the fit is too tight, lightly sand the centering rings until you get the right fit. Apply a generous ring of CA inside the body tube, drop the shock cord through the tube, then insert the motor mount until the aft centering ring is flush with the end of the body tube. Allow to dry. Apply a bead of epoxy or CA to the exposed front ring/body tube joint for extra strength.

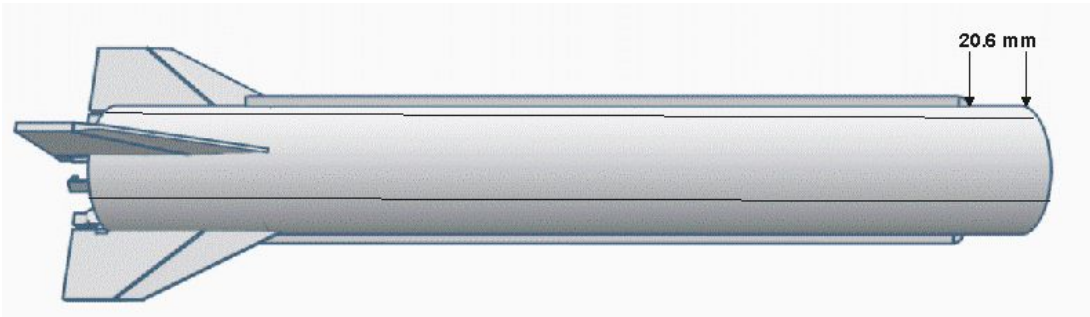


4. Mark the body tube. Place the body tube (aft end down) on the fin location guide. Mark the fin locations, the thrust-termination port cover locations, launch lug location, and the conduit locations. We recommend marking the fin locations with an “F,” the port cover locations with a “P,” launch lug location with an “L,” and the conduit locations with a “C.” Using a straight edge, extend the fin marks about 4” (~102mm) along the tube. Extend the “P,” “L,” and “C” lines the entire length of the body tube. (Keeping the fin lines short will help prevent confusion later on).

5. Assemble the fins. Glue one main fin on each of the fin lines. The plastic piece at the bottom of each fin (a fixture the actual missile rests on, when it is upright on the launch table) will sit up against the aft centering ring (apply glue to this joint, as well as the fin/body tube joint). Make sure the fins are straight when drying. Apply CA or epoxy fillets to the fin/tube joints. For scale accuracy, the fillets should be thin – just for added strength.



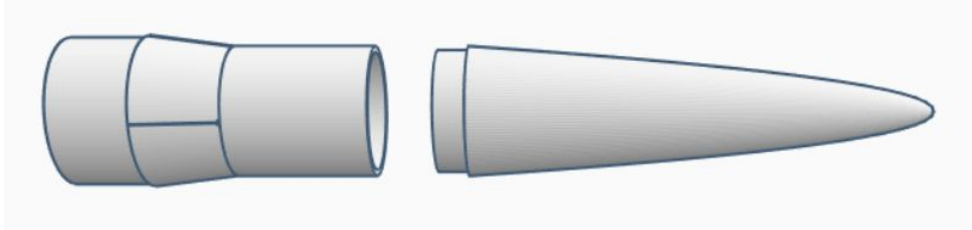
6. Airframe details. Mark the two conduit (“C”) lines 13/16” (20.6mm) from the FRONT of the body tube. Glue one conduit on each of the conduit lines, with the front end of the conduit at the 13/16”/20.6mm mark. Make sure the conduit is straight along the tube. It should be parallel with the sides of the body tube. Cut out the four thrust-termination port covers (black oval shapes) from the template sheet. Mark the port cover (“P”) lines 1/4” (6.4mm) from the FRONT of the body tube. Glue one oval on each port cover line at the 1/4”/6.4mm mark. The ovals should be centered on the lines, with their longer axis along the line.



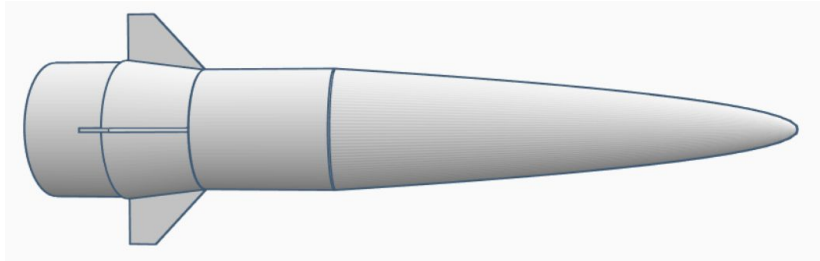
7. Attach the launch lugs. The launch lugs are, of course, located on the launch lug line. Mark this line 1/4” (6.4mm) and 6.5” (165.1mm) from that AFT end of the body tube. Attach the launch lugs with their aft ends at these marks using CA glue, making sure the launch lugs are aligned. Apply CA or epoxy fillets to the launch lug/body joints. Allow to dry.



8. Assemble the nose cone. Use CA glue when attaching nose cone sections. Glue the 3D-printed “tube” section to the frustum section, but do not glue the nose section to the tube yet. Remove the four small fins from the 3D-printed “rafts” by gently bending the rafts to pop the fins loose. Sand the faces of the fins smooth. Glue the fins on the transition portion of the RV in the slots provided (we recommend using SLOW CURE CA glue so the fins can be adjusted before the glue dries). The aft end of the fin should align with the point where the body tube will meet the frustum.

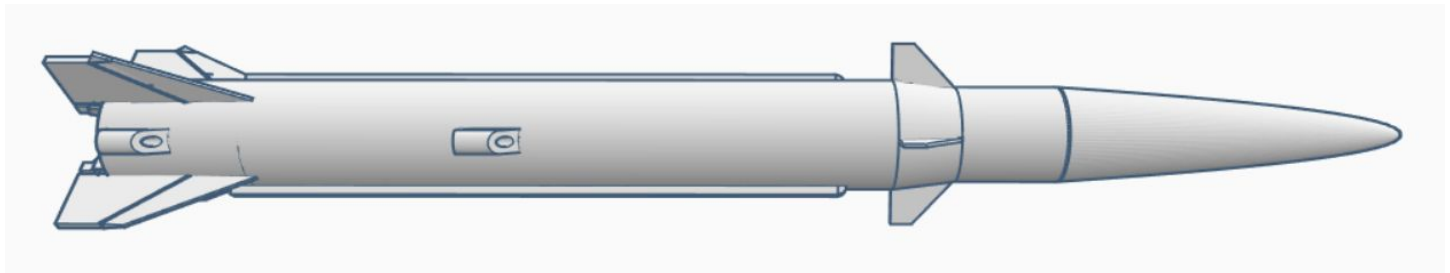


Epoxy weight into the tip of the nose cone. Add 2.25 oz of nose weight and then epoxy in place. Remember epoxy gets hot as it hardens. To protect the plastic, you can place the cone tip-down in cool water while the epoxy dries. Once you have added sufficient nose weight, glue the nose into the 3D printed tube section.



9. Finish the 3D-printed pieces. To finish the 3D-printed pieces, sand all pieces thoroughly, then spray with a sandable, filling primer. Sand the primer, then repeat the process at least once more. After two rounds of primer and sanding, the grooves from the 3D printing should all but disappear.

10. Final assembly. Use a 24” (610mm) parachute for your model, due to the nose weight. Attach the parachute to one of the attach points on the nose cone. Attach the free end of the elastic shock cord to the other attach point on the nose cone. As an alternative, tie a loop in the free end of the elastic shock cord and attach the parachute to the loop. Run a roughly 6” (152mm) length of Kevlar through one of the attach points on the nose cone and attach it to the elastic loop.



11. Finishing. We recommend painting your model with one last coat of regular primer and sanding until you achieve a smooth finish. Internet photos of the DF-11A reveal a number of paint schemes. We recommend you search the internet for the paint scheme you prefer. Parade missiles have been painted glossy white, with gloss red and black details. Some missiles are shown with three-color camouflage schemes for those who seek a stimulating and challenging paint job. The Pakistani missiles also have interesting camouflage. It appears most operational missiles in China, however, are simply painted dark green or olive drab with yellow stripes (which denote handling points for the missile), as shown on the prototype model. One yellow stripe is at the forward end of the RV tube section, the other is just in front of the forward launch lug. The square ends of the missile rests are silver.

12. Flying. Unless you added a motor clip, the motor must be “friction-fitted” in the model. Wrap tape around the motor and insert into the motor mount. The motor should be snug (so it won’t be ejected) but not so tight you won’t be able to remove it later. A C11-3 will produce a very low altitude flight. A D12-3 will take your model a bit higher. We haven’t tested larger (“E” or “F”) motors, so try larger motors at your own risk! Please note – the fins on this scale model are rather small. We therefore recommend flying this model only in calm wind conditions.



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