Read all instructions before beginning work on your model. Make sure you have all parts and materials. When you are thoroughly familiar with the assembly procedure, begin construction. Check off each step as you complete it. In each step, test-fit the parts together before applying any glue. If some part doesn’t fit properly, sand lightly or build up as needed for precision assembly.

PARTS LIST

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1</td>
<td>Engine Block (type EB-20A)</td>
<td>30224</td>
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<tr>
<td>B 1</td>
<td>Engine Mount Tube (type BT-20J) 2-3/4&quot;</td>
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<td>C 4</td>
<td>Adapter Rings (type AR-2050)</td>
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<td>D 1</td>
<td>Booster Engine Mount Tube (type BT-20M) 2-1/4&quot;</td>
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<td>E 1</td>
<td>Stage Coupler (type JT-50C) 1&quot;</td>
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<tr>
<td>F 1</td>
<td>Booster Body Tube (type BT-50) 2-3/4&quot;</td>
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<td>G 1</td>
<td>Balsa Nose Block (type NB-50)</td>
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<td>H 1</td>
<td>Payload Section Tube (type BT-50S) 4&quot;</td>
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<tr>
<td>I 1</td>
<td>Pattern Sheet (type SP-100)</td>
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<td>J 1</td>
<td>Main Body Tube (type BT-50L) 12-3/4&quot;</td>
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<td>K 1</td>
<td>Die-Cut Balsa Sheet (type BF-100)</td>
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<td>L 1</td>
<td>Screw Eye (type SE-2A)</td>
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<tr>
<td>M 1</td>
<td>Shock Cord (type SC-1)</td>
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<tr>
<td>N 1</td>
<td>Launch Lug (type LL-2B)</td>
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<td>O 1</td>
<td>Parachute (type PK-12A)</td>
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<td>P 1</td>
<td>Shroud Line Cord (type SLT-72) 72&quot;</td>
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<td>Q 1</td>
<td>Set of Six Tape Discs (type TD-3F)</td>
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<td>R 1</td>
<td>Plastic Nose Cone (type PNC-50Y)</td>
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<tr>
<td>S 1</td>
<td>Decal (type KD-1322)</td>
<td>37103</td>
</tr>
<tr>
<td>T 1</td>
<td>Clay Balance Weight (type CB-M4)</td>
<td>85260</td>
</tr>
</tbody>
</table>

TOOLS AND MATERIALS

In addition to the parts included in this kit you will need white glue (Titebond glue, Elmer’s, or similar household white glue is recommended), scissors, pencil and ballpoint pen, fine and extra-fine grit sandpaper, sanding sealer, masking tape and a medium size modeling paint brush. To paint your model we recommend gloss silver enamel spray paint.
**ASSEMBLY INSTRUCTIONS**

- **1** APPLY GLUE INSIDE TUBE  
  INSERT ENGINE BLOCK EVEN WITH TUBE END

  2-3/4" ENGINE MOUNT TUBE

  Glue the engine block (part A) in one end of the longer (forward) engine mount tube (part B). To do this, apply glue around the last 3/16" on the inside of the tube. Immediately slide the engine block into the same end of the tube so the end of the block is even with the end of the tube. Let the unit sit a minute, then wipe away any excess glue.

- **2** MARK TUBE REAR  
  FRONT  
  1/8"  
  1-1/8"  
  CENTER RING BETWEEN MARKS


- **3**  
  1/4"  
  1/2"  
  2-1/4" ENGINE MOUNT TUBE

  MARK THE SHORTER (REAR) ENGINE MOUNT TUBE (PART D) AT 1/4" AND 1/2" FROM ONE END. APPLY A LINE OF GLUE ALONG THE RING BETWEEN THE MARKS AND SLIDE AN ADAPTER RING ON OVER THE GLUE SO IT IS CENTERED BETWEEN THE MARKS. THIS END WILL BE THE REAR OF THE MOUNT. GLUE THE LAST RING ON SO IT IS EVEN WITH THE FRONT OF THE ENGINE MOUNT TUBE.

- **4** MARK MIDDLE STAGE COUPLER FRONT

  2-3/4" BOOSTER BODY TUBE

  APPLY GLUE TO INSIDE OF TUBE

  INSERT COUPLER TO MARK

  Mark the stage coupler (part E) at its middle (half-way from each end). Apply glue around the last 1/4" in one end of the booster body tube (part F). Immediately slide the coupler in until the mark is even with the end of the tube. Let the unit sit a minute, then wipe off any excess glue.

- **5** MARK NOSE BLOCK AT MIDDLE FRONT  
  4" PAYLOAD SECTION TUBE

  SMEAR GLUE INSIDE TUBE

  INSERT NOSE BLOCK TO MARK

  Mark the nose block (part G) at its middle. Glue it in one end of the 4" long payload section tube (part H) so the mark on the block is even with the end of the tube.

- **6** MARK AT ARROW POINTS  
  HOLD TUBE IN GROOVE, MARK ALONG STRAIGHT EDGE

  Door frame

  Mark each fin line on the booster body at 1/8" from the tube's rear. Glue the booster fins to the tube on the lines, with the rear of each fin on a mark, 1/8" from the rear. Make sure the fins stick straight out from the body. Do not set the booster on its fins while the glue is wet.

- **7** SAND BOTH SIDES OF BALSA SHEET

  LEADING TIP

  LEADING TIP

  SANDPAPER AROUND BLOCK

  Fine-sand the balsa sheet (part K), then carefully remove the fins from the sheet. Free the edges with a sharp knife. Sand all edges except the root edge to a rounded shape. Make sure the root edge stays square.

- **8** RUB GLUE INTO ROOT EDGE AND LET DRY

  LEADING EDGE TOWARD FRONT OF ROCKET

  1/4"

  Rear view

  Mark each of the fin lines on the main body at 1/4" from the rear of the tube. Glue the upper stage fins to the main body on the alignment lines, with the rear of each fin on the mark, 1/4" from the rear. Adjust the fins so they stick straight out from the body tube. Do not set the rocket on its fins while the glue is wet.

- **9** LEADING EDGE TOWARD FRONT OF ROCKET

  1/8"

  Rear view

  Mark each fin line on the booster body at 1/8" from the tube's rear. Glue the booster fins to the tube on the lines, with the rear of each fin on a mark, 1/8" from the rear. Make sure the fins stick straight out from the body. Do not set the booster on its fins while the glue is wet.
10

Insert the screw eye (part L) into the rear of the nose block. Remove the screw eye and squirt a small amount of glue into the hole. Re-insert the screw eye, set aside to dry.

11

MARK TUBE 1/4" FROM REAR

FORWARD ENGINE MOUNT ASSEMBLY

INSERT ENGINE MOUNT ASSEMBLY UNTIL MARK IS EVEN WITH TUBE END

Mark the forward engine mount tube 1/4" from the end opposite the engine block. Apply a line of glue around the inside of the main body about 2" from the rear of the tube. Slide the engine mount unit, engine block end first, into the body until the mark is even with the body end. (The engine mount is in the right place when 1/4" of the engine holder tube sticks out of the body.) Do not pause when pushing the mount in, or the glue may "grab" at the wrong place!

12

SMEAR GLUE AROUND INSIDE OF TUBE

REAR ENGINE MOUNT ASSEMBLY

INSERT ENGINE MOUNT ASSEMBLY UNTIL RING REAR IS EVEN WITH TUBE END

Apply a line of glue around the inside of the booster body about 1-1/2" from the rear (the end away from the stage coupler). Check the illustration to be sure which end of the booster engine mount is the front. Slide the engine mount, front end first, into the body until the back of the rear adapter ring is even with the end of the tube. Apply a line of glue around the joint between the rear ring and the body.

13

SPREAD GLUE HERE

COVER WITH GLUE

FOLD FORWARD

FOLD FORWARD

" Cut out the shock cord mount from the pattern sheet. Crease it on the dotted lines by folding. Spread glue on the first section (1) and lay the end of the shock cord (part M) into the glue. Fold over and apply glue to the back of the first section and the exposed part of section 2. Lay the shock cord as shown and fold over again. Clamp the unit together with your fingers until the glue sets.

14

SPREAD GLUE ON MOUNT, PRESS INTO PLACE

SET BACK AT LEAST 1" TO ALLOW FOR PAYLOAD SECTION

Apply glue to the back side of section 2 and the exposed part of section 3 of the shock cord mount. Hold the mount (wide end toward tube) as shown, and press it into place in the main body tube. Make sure the front of the mount is at least 1" from the end of the tube. Hold the mount in place until the glue sets.

15

GLUE LUG ON LINE 3" FROM REAR OF BODY

Glue the launch lug (part N) to the body on its line. The rear of the lug should be 3" from the rear of the main body. Align the lug straight on the body.

16

TAPE DISC—PRESS DOWN FIRMLY

SHROUD LINE

PARACHUTE

PASS PARACHUTE THROUGH LOOP AND PULL TIGHT

TIE SHOCK CORD TO SCREW EYE

Cut out the parachute (part O) on its edge lines. Cut three 24" lengths of shroud line (part P). Attach line ends to the top of the parachute with tape discs (part Q) as shown. Pass the shroud line loops through the screw eye on the payload section. Pass the parachute through the loop ends and pull the lines tight against the screw eye. Set the knot with a drop of glue. Tie the free end of the shock cord to the screw eye.

17

APPLY THIN LINE OF GLUE TO JOINT

WHEN FIN JOINTS HAVE DRIED, APPLY GLUE REINFORCEMENTS TO EACH JOINT. HOLDING THE MODEL LEVEL, APPLY A NARROW LINE OF GLUE TO BOTH SIDES OF EACH FIN JOINT. SMOOTH OUT THE GLUE WITH YOUR FINGER. KEEP THE MODEL LEVEL UNTIL THE GLUE DRIES.
PAINTING AND DETAILING

When all glue on the outside of the body is dry, prepare
the fins for painting. Apply at least two coats of sanding sealer
to the fins. Let dry and sand thoroughly between coats. Do this
until the tiny holes in the wood are filled in and all looks
and feels smooth. Install the nose cone (part R) in the front
of the payload section. Paint the entire model with gloss silver
eamel. Let the paint dry overnight.

- When all paint is completely dry, apply decals (part S) in
the positions shown. To apply decals, cut out a decal section,
dip it in lukewarm water for 10 seconds, and hold it until it
starts to uncurl. Slip the decal off the backing sheet and onto
your model. Blot excess water away. When all decals are in
place, let the model dry overnight. After drying, apply a coat
of clear spray to protect the decals.

ROLL CLAY INTO “SNAKE”

INSERT CLAY

9”

PACK CLAY TIGHTLY
INTO FRONT OF NOSE CONE

BALANCE POINT WITHOUT ENGINES

Cut the clay balance weight (part T) in half. Roll one half
between your hands to make a “snake” about 1/4” diameter.
Break off sections of clay about 1” long. Poke a couple of
pieces of clay through the hole in the rear of the nose cone.
Use a flat-ended pencil or dowel to push the clay forward
in the cone until it is packed tightly in the front of the cone.
Place the nose cone in the front of the model and check the model’s
balance point. Without engines the complete model should
balance at a point 9” ahead of the rear of the main stage body.
If necessary, add more clay until the model balances correctly.

FLYING THE DELTA STAR

Your Delta Star model has been designed as a high per-
formance two-stage payload sport model. The upper stage may
also be flown by itself as a single stage payload or demonstra-
tion model. Here are some suggestions for getting the best re-
results from your model:

Obtain a copy of Estes Industries Technical Report TR-2
and study it before flying two-stage models.

Always be extra careful when installing engines. Make sure
they face the correct direction for proper staging. Make sure
they are held tightly in place to ensure proper recovery opera-
tion.

Have an extra person with you when launching to watch
the booster stage and retrieve it after flight.

Launch in calm weather. The upper stage will drift a long
way in a wind.

When flying as a single stage model, make sure the engine
is securely held in place.

Always follow the Countdown Checklist when launching
your model.

LAUNCHING COMPONENTS

To launch your rocket you will need the following items:

- Masking tape and transparent tape.
- An Estes model rocket launching system.
- Flameproof recovery wadding (Estes Cat. No. 2274).
- Estes Booster and Upper Stage engines.

RECOMMENDED ENGINES

- **BOOSTER**
  1/2A6-0, A8-0, B6-0, C6-0
  1/2A6-4, A8-5, B4-6, B6-6, C6-7

- **UPPER STAGE**
  Use an A8-0 and an A8-5 for the first multi-stage flight.

SINGLE STAGE LAUNCHES

- A8-3, B4-4, B6-4, B14-5, C6-5

- Use an A8-3 engine for the first single stage flight.

Be sure to follow the HIAA-NAR Model Rocketry Safety
Code when carrying out your model rocketry activities.

-HIAA-NAR – Hobby Industry Association of America
National Association of Rocketry