



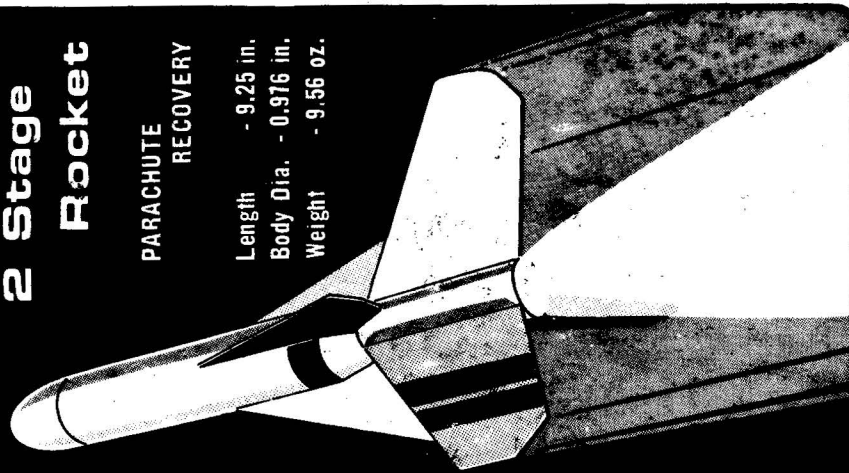
Astron

# MIDGET

## 2 Stage Rocket

PARACHUTE  
RECOVERY

Length - 9.25 in.  
Body Dia. - 0.976 in.  
Weight - 9.56 oz.



Only

**\$ 1.25**

ESTES  
INDUSTRIES, INC.  
BOX 227  
PENROSE, COLO.  
81240

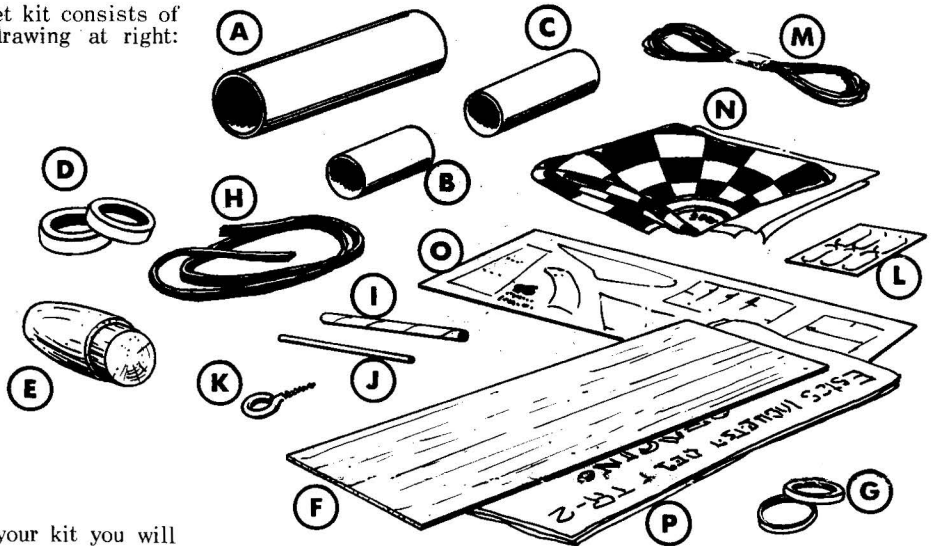
RECOMMENDED ENGINES

Kit No. **K-40**  
Booster - 1/2A6-0S  
Upper Stage - 1/4A3-4S  
1/2A6-4S

# Astron MIDGET 2 Stage Rocket K-40

Your Astron Midget two-stage model rocket kit consists of the following parts as illustrated in the drawing at right:

- A) 1 Body Tube--Part #BT-50S
- B) 1 Engine Mount Tube--Part #BT-20AE
- C) 1 Booster Body Tube--Part #BT-20M
- D) 2 Centering Rings--Part #AR-2050
- E) 1 Balsa Nose Cone--Part #BNC-50J
- F) 1 Sheet Fin Stock--Part #BFS-20
- G) 2 Engine Blocks--Part #EB-20B
- H) 1 Shock Cord--Part #SC-1B
- I) 1 Launch Lug--Part #LL-2B
- J) 1 Launch Lug Stand-Off--Part #WD-2B
- K) 1 Screw Eye--Part #SE-2
- L) 6 Tape Strips--Part #TD-2F
- M) 72" Shroud Line Cord--Part #SLT-12
- N) 1 Parachute--Part #PK-12A
- O) 1 Pattern Sheet--Part #SP-40
- P) 1 Technical Report--Part #TR-2



In addition to the materials included in your kit you will also need the following tools and materials:

- 1) Modeling knife or single edge razor blade
- 2) Scissors
- 3) Extra-strong white glue
- 4) Ball point pen or pencil
- 5) Fine and extra fine grit sandpaper
- 6) White paint or dope


 Read the entire assembly instructions carefully before beginning work on your rocket. Then start construction, following each step in order, checking off each step as it is completed.

Fig. 1

PRE-FORM SHROUD

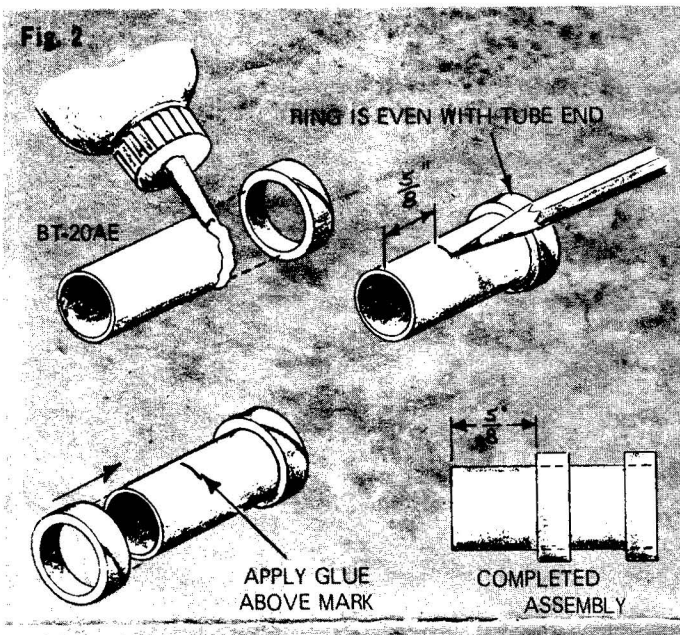
APPLY GLUE TO FLAP



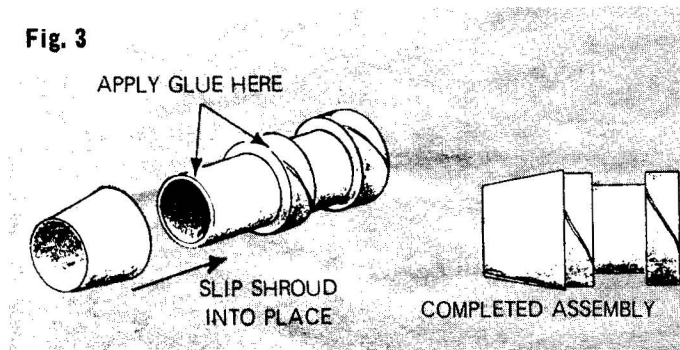
HOLD IN PLACE UNTIL GLUE SETS

## Assembly

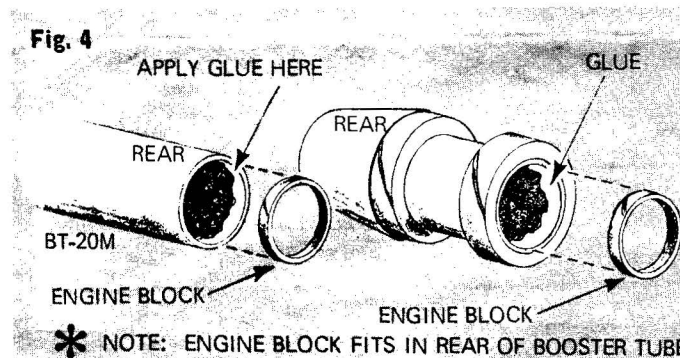
- 1 Cut out the shroud along its edge lines. This must be done carefully if it is to fit correctly. Form the shroud into a cone with the markings on the inside. Apply glue to the flap and press it into position. Hold it in place until the glue sets, then set it aside to dry thoroughly.



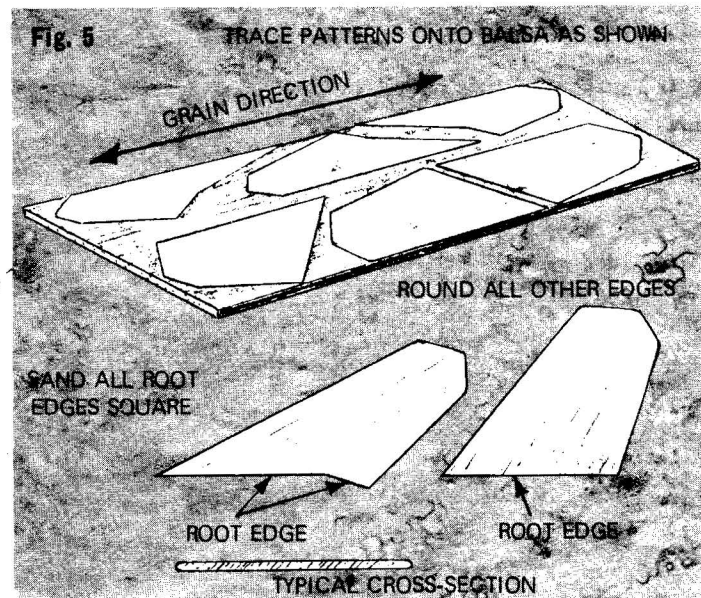
**2** Apply a line of glue around one end of the 1-1/2" long BT-20AE engine mount tube. Slip one of the centering rings onto this end of the tube to glue it in place. Mark the tube 5/8" from the other end and apply a line of glue around the tube just above this mark. Slip the second centering ring onto the tube so the lower end of the ring is on the mark as shown.



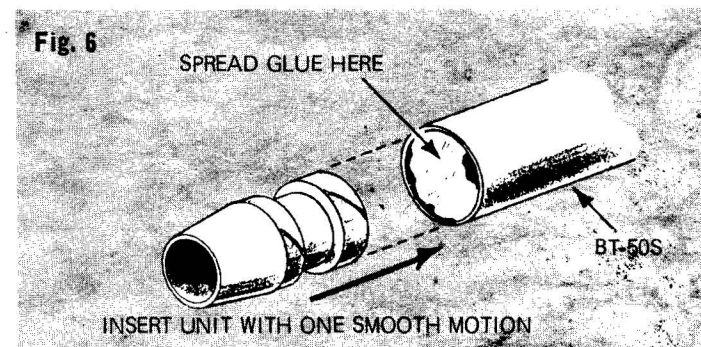
**3** Apply glue to the lower centering ring and the lower end of the engine mount tube as shown. Slip the shroud all the way forward onto the end of the tube so it is centered by the ring and tube end.



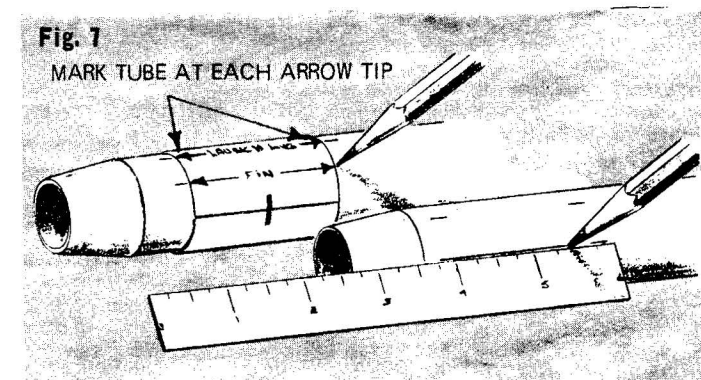
**4** Glue an engine block into one end of the 2-1/4" long booster body tube. To do this, apply glue to the last 1/8" of the inside of the tube, then slide the engine block into the tube so the end of the block is even with the end of the tube. Let the unit sit a minute, then wipe off the excess glue. Following the same procedure, glue the other engine block into the top end (the end away from the shroud) of the upper stage engine mount tube.



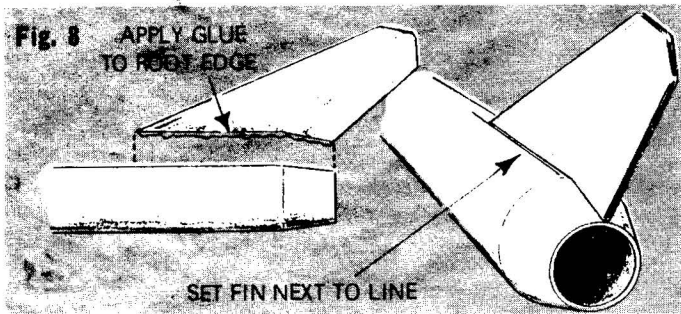
**5** Cut out the fin patterns. Trace three copies of each fin on the balsa stock, being careful to position them exactly as shown. Cut out the fins carefully and sand them as shown in fig. 5.



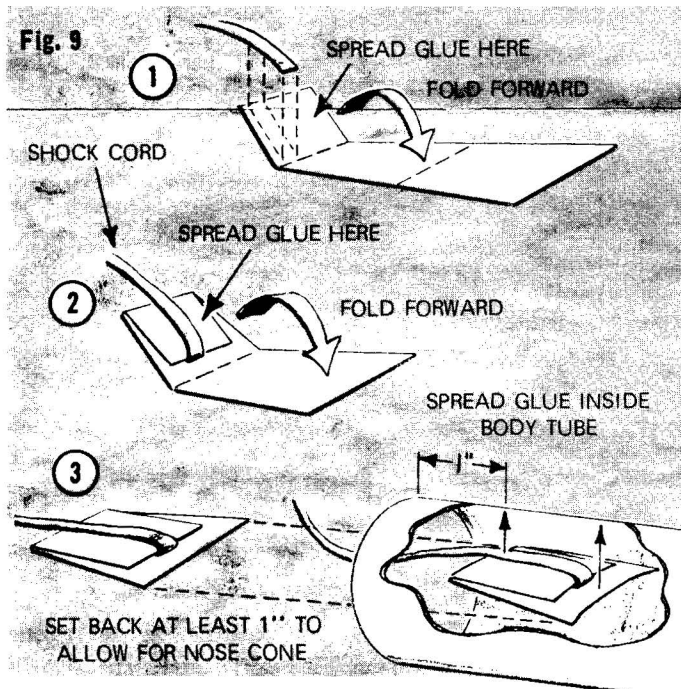
**6** After the glue on it has dried, check the fit of the engine mount unit in the upper stage body tube (BT-50S). The unit should slide easily in the tube. If it does not, carefully peel a layer of paper from the outside of each centering ring until it does slide easily. Smear glue around the inside of the body tube to cover an area 3/4" into the tube at one end. Slide the engine mount unit into this end of the body so the shroud is against the end of the tube. Do not pause, or the glue may set with the mount in the wrong position.



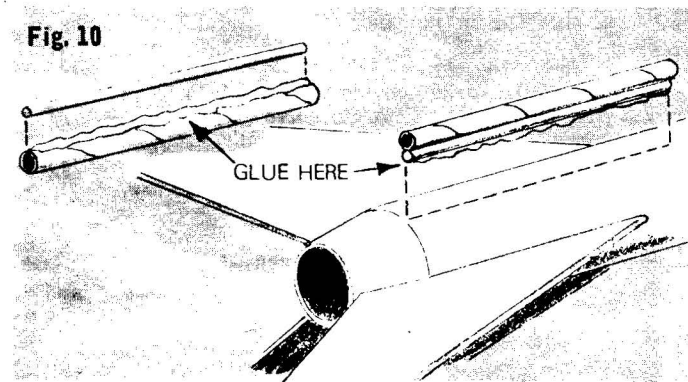
**7** Cut out the upper stage fin spacing guide from the pattern sheet. Wrap the guide around the rear end of the body and mark the tube at each of the arrow points. Draw a straight line passing over each matching front and rear mark. Cut out the booster fin spacing guide and mark the booster body tube in the same way.



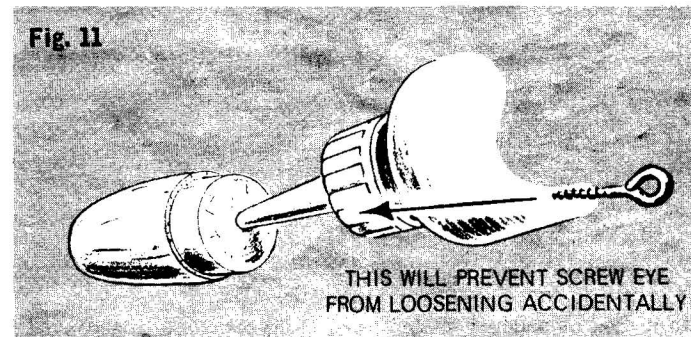
□ **8** Apply glue to the root edges of one of the upper stage fins. Attach the fin to the upper stage with the edge of the fin along one of the lines drawn in step 7. Align the fin so it projects straight away from the body tube. Following the same procedure, attach the other two upper stage fins, then attach the booster fins to the booster body tube. Do not set either stage on its fins while the glue is wet.



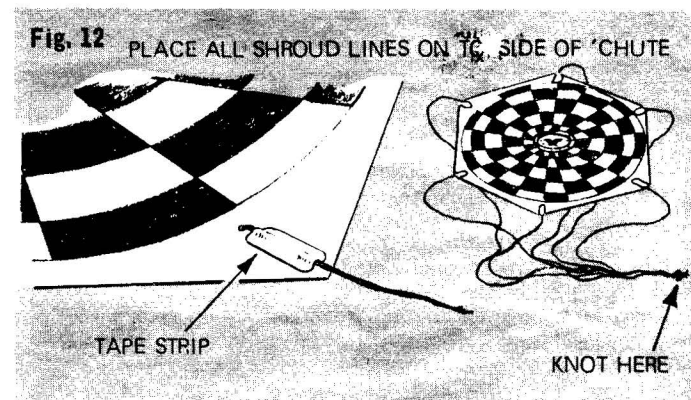
□ **9** Cut out the shock cord mount and prefold it on the dotted lines. Lay the mount out flat, apply glue to section 1 and lay the shock cord into the glue. Fold this section over as shown in the illustration. Spread glue over the back of the first section and the exposed part of the second section. Lay the shock cord as shown and fold over again. Clamp the unit together with your fingers while the glue sets. Apply glue to the inside of the body tube over an area approximately 1" to 1-1/2" from the front end. The glue should cover a shape approximately the same as the shock cord mount. Press the mount onto the glue and hold it until the glue sets.



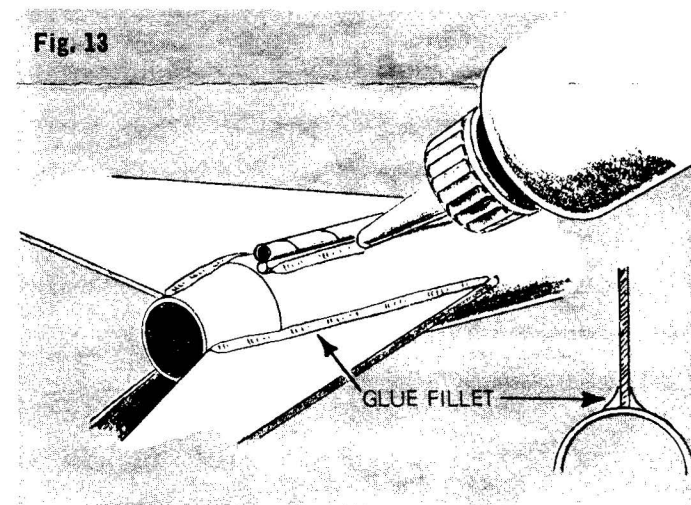
□ **10** Cut the launch lug stand-off dowel to the same length as the launch lug. Apply a line of glue to one side of the lug and press the stand-off into place on the glue. Make sure the two pieces are perfectly parallel. After the glue has set a few minutes, apply glue to the other side of the stand-off and attach the unit to the upper stage mid-way between two fins so the rear of the lug is even with the front of the shroud and the unit is parallel to the body tube.



□ **11** Insert the screw eye into the base of the nose cone. Remove the screw eye, press the nozzle of the glue bottle to the hole and squirt glue into the hole. Replace the screw eye and wipe away any excess glue.



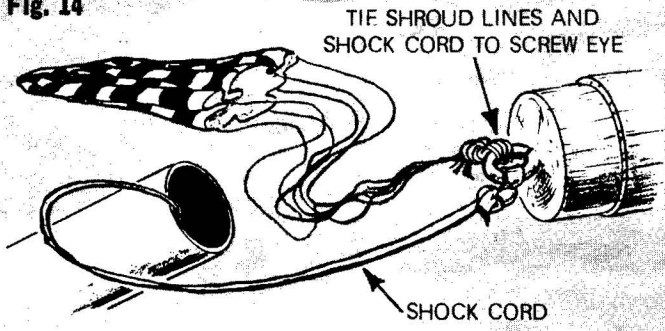
□ **12** Cut out the parachute on its edge lines as indicated on the plastic. Cut six 12" lengths of shroud line cord and attach one shroud line to each point of the parachute with a tape strip as shown in fig. 12. Tie the free ends of the lines together.



□ **13** Apply a glue fillet to each of the fin-body joints and to the launch lug support as shown. The fillets should be smooth and free of bubbles. Support the rocket horizontally while the glue dries.



**Fig. 14**



**14** Connect the shock cord, parachute and screw eye as shown in fig. 14. Push the parachute into the body tube, packing the shroud lines and shock cord over it. Push the base of the nose cone into the forward end of the body tube.

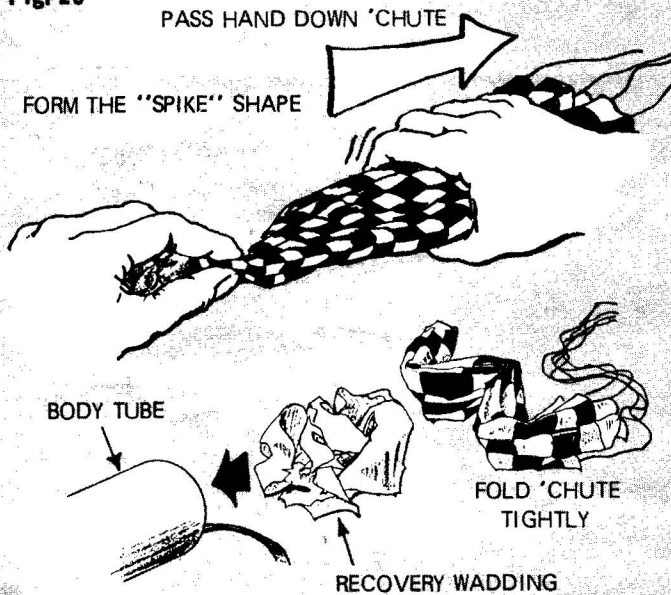
**15** Before finishing let all the glue on the outside of the rocket dry so it is hard and clear. Cover all balsa surfaces with a coat of sanding sealer. Let it dry completely and sand lightly with extra fine sandpaper. Apply a second coat, sand and apply still another coat until all the pores in the balsa are filled and the surfaces look and feel smooth. Give the rocket a clean base coat of glossy white paint or dope, let dry and follow with a high visibility color such as red, fluorescent orange, cerise, etc. to aid in tracking and retrieving.

**GENERAL INFORMATION**

Your Astron Midget is designed to fly with Series III engines only. It is important to use the correct engines in each stage. The lower (booster) stage should contain a 1/2A6-0S engine. The upper stage can use either a 1/2A6-4S or a 1/4A3-4S engine. Read Estes Industries Technical Report #TR-2 carefully before flying your model. It is especially important to tape your engines together as described in the report; upper stage ignition is not reliable without tape. Follow the countdown procedure given below to eliminate mistakes and obtain top performance.

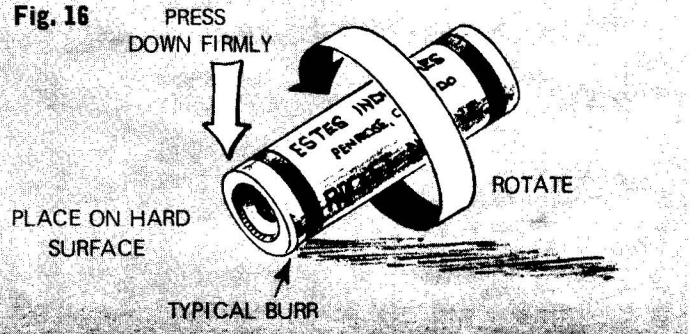
**COUNTDOWN CHECKLIST**

**Fig. 15**



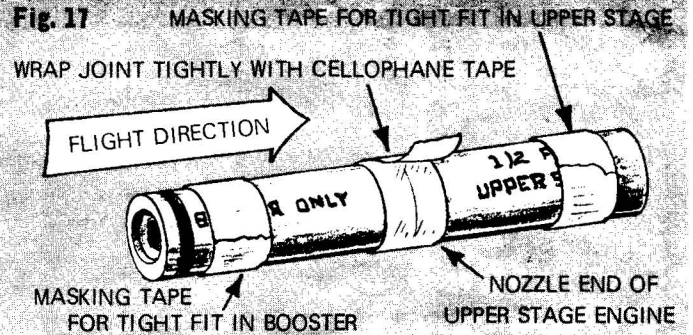
**-15-** Pack flameproof recovery wadding into the upper stage body tube from the top. The wadding should fill the tube for a distance of about an inch and should fit closely along the sides of the tube. Hold the parachute between two fingers at its center and pass the other hand down it to form a "spike" shape. Fold this spike tightly in four sections as shown. Push the folded parachute down into the tube on top of the wadding. Slide the nose cone into place.

**Fig. 16**



**-14-** Select your engines. Remove any burrs from the ends of the engines by holding them against a smooth surface and turning as in fig. 16.

**Fig. 17**



**-13-** Position the engines with the nozzle of the upper stage engine against the tip end of the booster engine and wrap a layer of cellophane tape tightly around the joint as shown in fig. 17. Check to be sure the engines are in their proper relative positions.

**-12-** Wrap masking tape around the upper stage engine about midway so it makes a tight friction fit in the engine mount tube. Insert the upper stage engine into the upper stage engine mount until the top of the engine is against the engine block.

**-11-** Wrap masking tape around the booster engine just below the cellophane tape until the engine makes a tight fit in the booster body tube. Slide the booster stage into place so the bottom of the booster engine is against the engine block in the booster body.

See also fig.17 and Estes Technical Report TR-#2

**-10-** Form an electrical igniter and insert it in the booster engine as directed in the instructions which came with the engine.

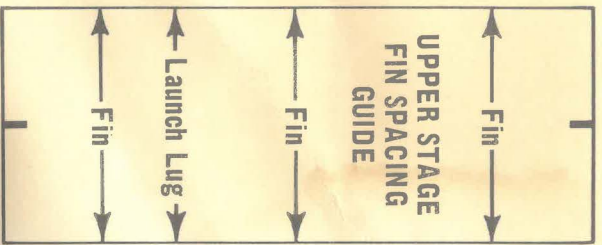
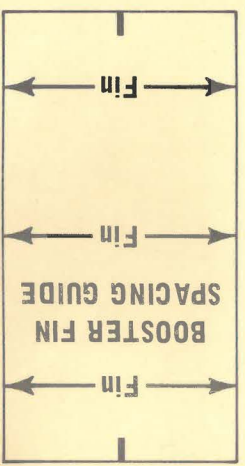
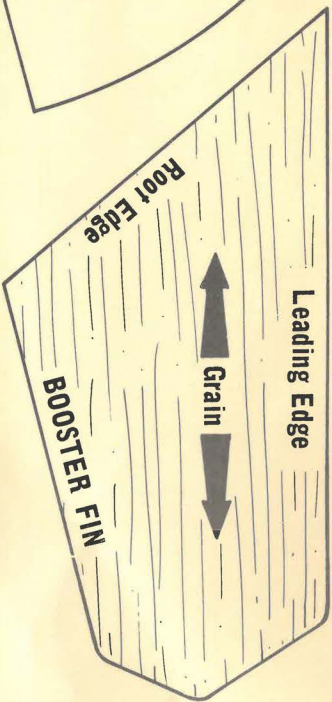
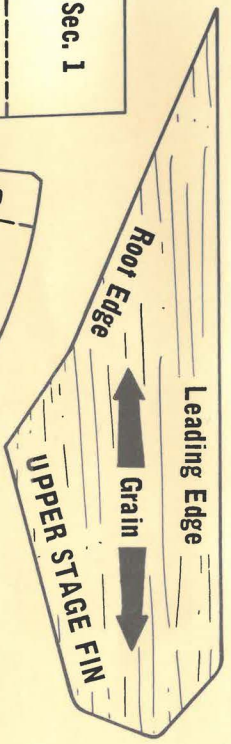
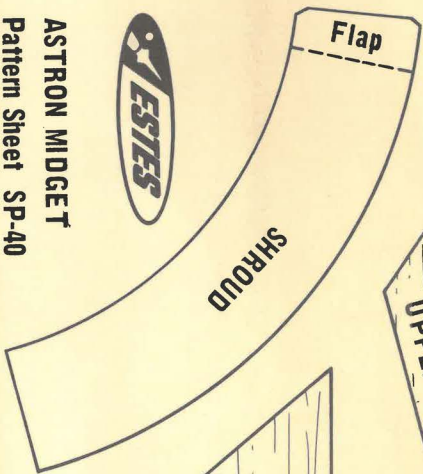
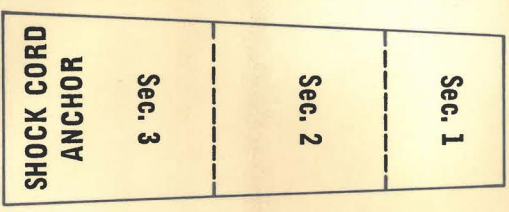
**-9-** Place the rocket on the launcher. Check to be sure the panel is disarmed. Clean the micro-clips and attach them to the igniter.

**-8-** Clear the launch area, alert the recovery crew and trackers.

**-7-** Check for low flying aircraft and unauthorized persons in the recovery area.

**-6-** Arm the launch panel

**-5- -4- -3- -2- -1- LAUNCH!**



**Office DEPOT®**



**Astron**

MODEL ROCKETRY

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SCIENTIFIC SPACE AGE HOBBY



**FAI**

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AAAAAAAAAA  
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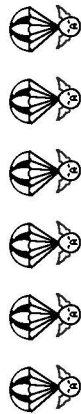
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**ESTES**  
GOOD EGGS FLY

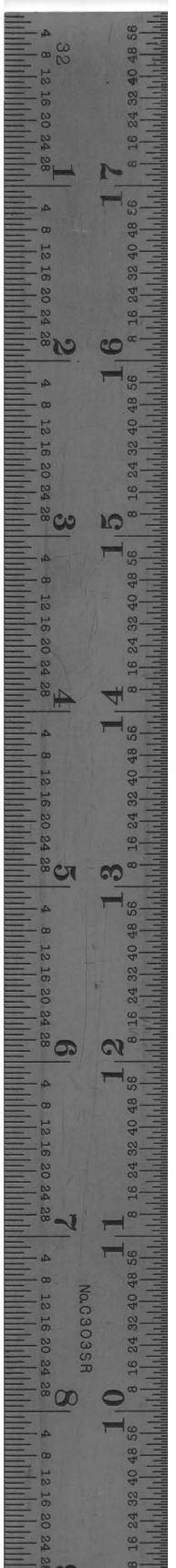
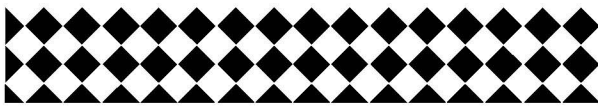
CAUTION

CAUTION

**ESTES**

MODEL ROCKETRY

SCIENTIFIC SPACE AGE HOBBY



PARTS LIST KIT NO. K-40								
Quantity	Description	Type	Number	Detail1	Detail2	Detail3	Detail4	Comment
1	PAPER BODY TUBE	BT-50S	30368	4" long	0.950" ID	0.976" OD	0.013" wall	
1	PAPER BODY TUBE	BT-20AE	30318	1.5" long	0.710" ID	0.736" OD	0.013" wall	
1	PAPER BODY TUBE	BT-20M	30334	2.25" long	0.710" ID	0.736" OD	0.013" wall	
2	CENTERING RINGS	AR-2050	3101	BT-20 in BT-50				Set of 2
1	BALSA NOSE CONE	BNC-50J	70256	1.375" long	.976" dia.	.5" shoulder		
1	BALSA FIN STOCK	BFS-20	3164	1/16" thick	3" wide	9" long		
2	ENGINE BLOCK	EB-20B	3134	.708" OD	.65" ID	.125" thick	fits BT-20	
1	Shock Cord	SC-1B	85734	1/8" x 12"				
1	LAUNCH LUG	LL-2B	2323	5/32" ID	1/8" rod	2-3/8" long		
1	DOWEL	WD-2B	?	1/12" dia.	2-3/8" long			Wood
1	Screw Eye	SE-2	2283	3/4" long				
6	Tape Strip	TD-2F	2297	1/4" x 3/4"				6x
1	Shroud Line	SLT-72	38238	72"				
1	Parachute	PK-12A	2263	12" dia.				





Images by Gerry Fortin



Images by Gerry Fortin