





ESTES INDUSTRIES
1295 H STREET
PENROSE, CO 81240 USA

BETA
SERIES



FLYING MODEL ROCKET KIT
087163

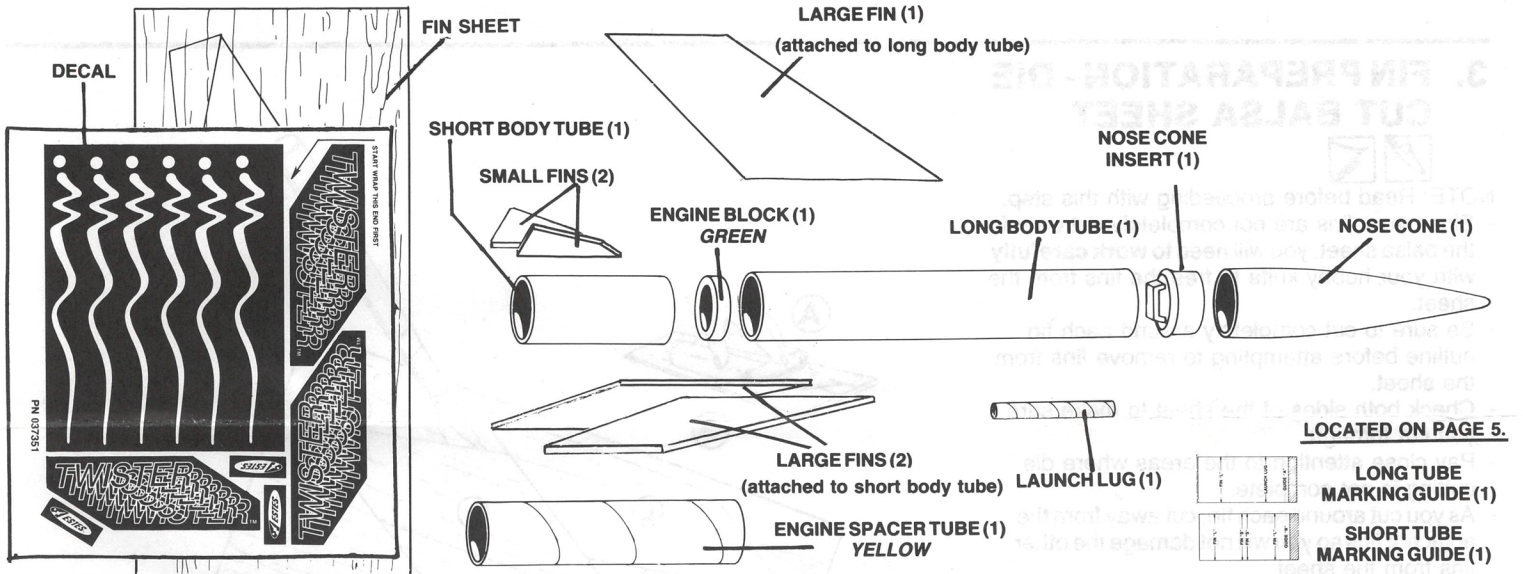


HOW TO USE THESE INSTRUCTIONS:

READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL

- A. This rocket, incorporating basic model rocketry construction techniques, will help you in the advancement of your rocketry modeling skills.
- B. **Read each step first** and visualize the procedure thoroughly in your mind before starting construction.
- C. Lay parts out on the table in front of you. (Check inside tubes for any small parts.)
- D. Use exploded view to match all parts contained in kit.
- E. Collect all construction supplies that are not included in the kit.
- F. Tube marking guides are printed on page 7 in the patterns section.
- G. Test fit parts before applying any glue.
- H. Sand parts as necessary for proper fit.
- I. The construction supplies required for each step are listed at the beginning of each step.
- J. Check off each step as you complete it.

EXPLODED VIEW



EXTREMELY IMPORTANT: THE EXPLODED VIEW IS FOR REFERENCE ONLY! DO NOT USE THIS DRAWING ALONE TO ASSEMBLE THIS MODEL.

The exploded view is only intended to assist you in locating the parts included in this kit. Refer back to this exploded view as you build your model step by step. This method will help you to put the parts into perspective as you progress through the construction.

CONSTRUCTION SUPPLIES

In addition to the parts included in your kit, you will need these construction supplies. Each step shows which supplies will be required.



SCISSORS



WOOD GLUE
(white or yellow)



PENCIL



SANDPAPER
400-600
grit



PLASTIC CEMENT



MASKING TAPE



HOBBY KNIFE



SANDING SEALER
(optional)



SPRAY PAINT

GLUE IS APPLIED TO SURFACES SHOWN IN RED.

Keep this in mind as you build the Twister™

This unique rocket consists of two separate body sections. Joined together, the long and short body sections make the complete Twister™ rocket during ascent. At apogee (the highest point your model rocket reaches above the ground), both sections must separate properly so you can experience the special recovery characteristics that the Twister™ possesses.

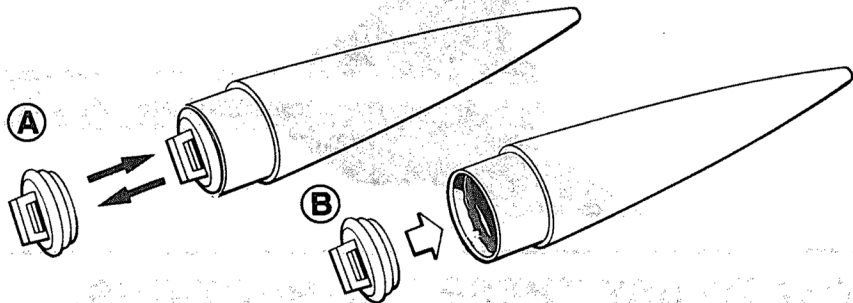
It is important to work carefully so that the fins and body sections fit together correctly. Enjoy building your Estes Twister™

NOTE: Steps 1 and 2 are the only steps in the construction of your model rocket that require plastic cement.

1. NOSE CONE ASSEMBLY



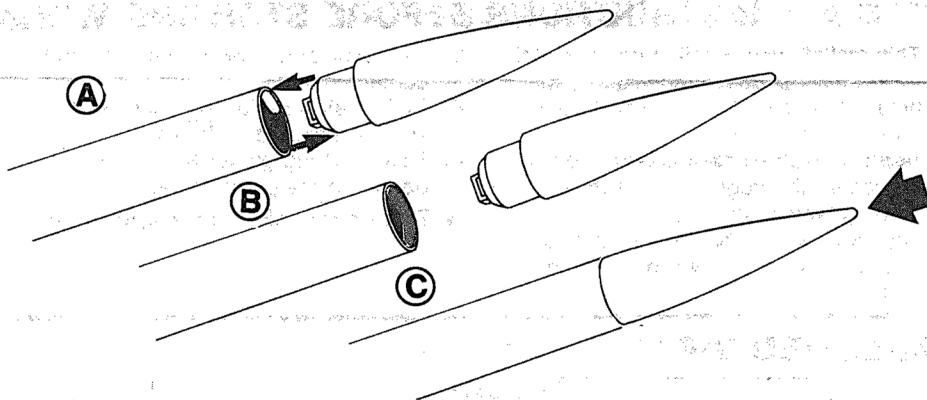
- A. Test fit the nose cone insert into the nose cone. **Do not glue at this time.** Remove the insert.
- B. Apply plastic cement as shown in the illustration and assemble the nose cone and insert pieces. Allow assembly to dry.



2. NOSE CONE ATTACHMENT



- A. Locate the long body tube. Test fit nose cone into end of body tube.
- B. Apply cement to inside of one end of tube as shown.
- C. Insert nose cone and allow to dry for at least three minutes.



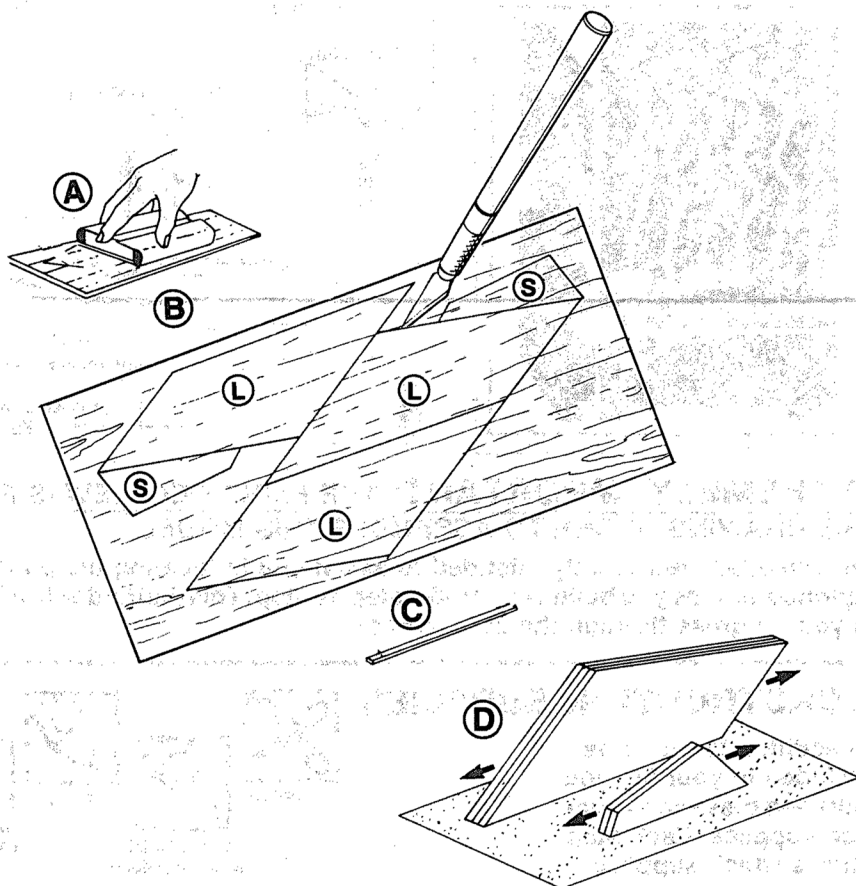
3. FIN PREPARATION - DIE CUT Balsa SHEET



NOTE: Read before proceeding with this step.

- Since your fins are not completely cut out of the balsa sheet, you will need to **work carefully** with your hobby knife to free the fins from the sheet.
- Be sure to cut completely around each fin outline before attempting to remove fins from the sheet.
- Check both sides of the sheet to make sure you cut through.
- Pay close attention to the areas where die cutting is not complete.
- As you cut around each fin, cut away from the adjacent fins so you will not damage the other fins from the sheet.

- A. Sand balsa die cut fin sheet smooth with #400 grit sandpaper.
- B. Free the fins from the sheet stock with your hobby knife. You will have three large fins (L) and two small fins (S) as shown.
- C. Keep a piece of scrap wood to use as a glue applicator in step 4G.
- D. Lay sandpaper, rough face up, on the table. Stack the three large and two small fins together by size and lightly sand the edges smooth and flat.
- E. Optional: For a better-looking and higher-performing rocket, round the leading edges and streamline the trailing edges of each fin.



5
4
3
2
1
INCHES

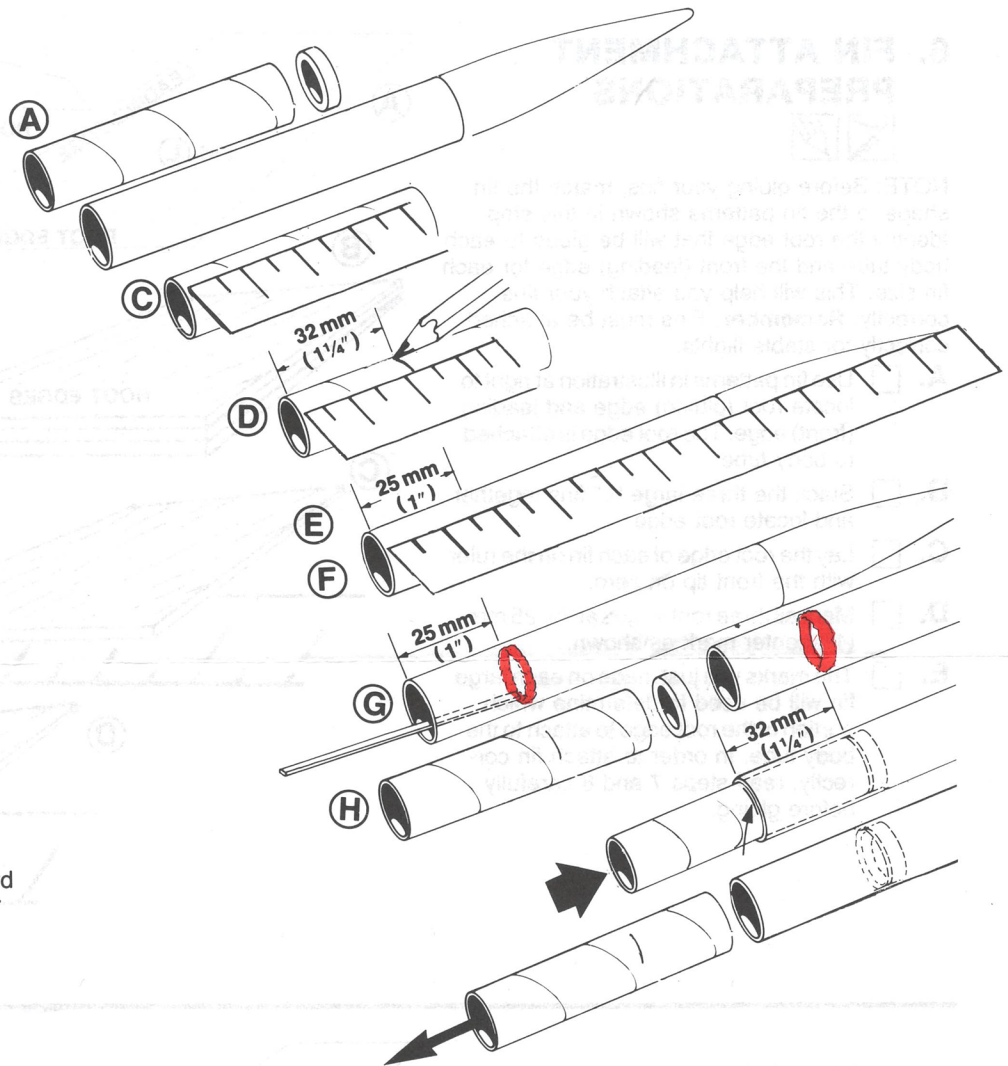
4. ENGINE MOUNT ATTACHMENT



- A. You will need the yellow spacer tube, green engine block and the long body tube.
- B. Locate the ruler printed in the center crease of this instruction sheet.
- C. Lay one end of the engine spacer tube on the zero mark of the ruler.
- D. Make a pencil mark 32 mm (1 1/4") from zero on yellow engine spacer tube.
- E. Place the body tube on zero mark of ruler.
- F. Measure approximately 25 mm (1") from rear end of the body tube. This gives you an idea of where inside the tube you will be spreading glue.
- G. Using your glue applicator from step 3C, apply glue 25 mm (1") inside rear end of body tube.
- H. Insert green engine block into tube and push with yellow engine spacer until ring is exactly 32 mm (1 1/4") into the body tube. The mark you made on the yellow spacer tube should be even with end of body tube.

NOTE: Pull the spacer tube out and discard as soon as you match the engine spacer mark with end of the body tube. Don't accidentally glue the tool into the rocket!

Allow glue to dry.



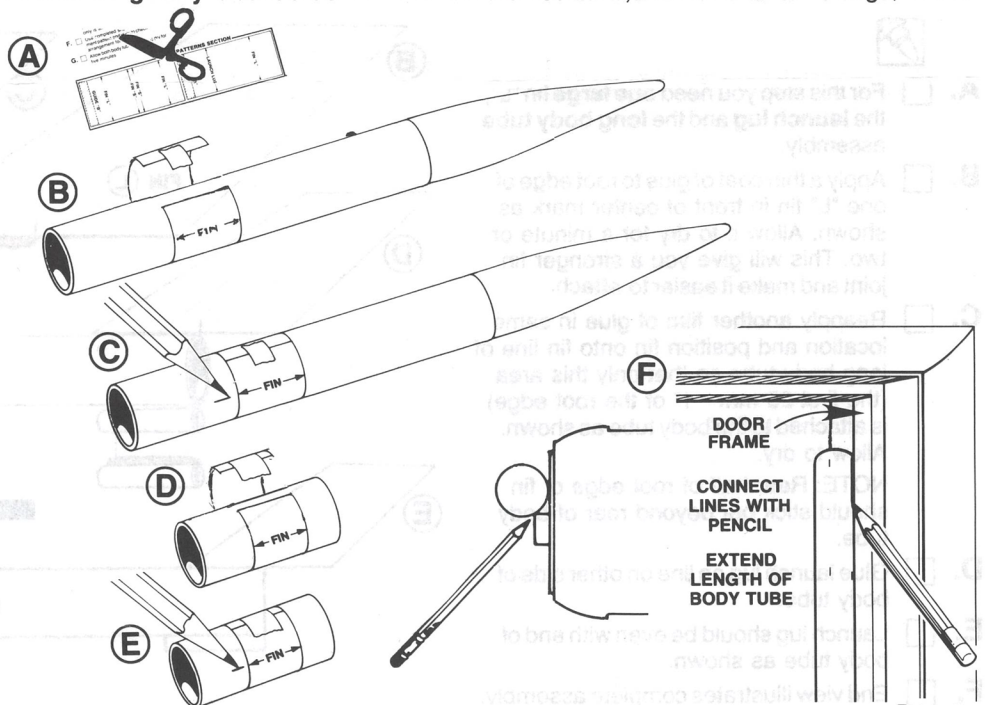
5. TUBE MARKING GUIDE: LONG AND SHORT BODY TUBES

HINT: Fins can be glued on easier by lightly sanding the body tube with #600 grit sandpaper. Do this before you mark the body tube.

NOTE: Since the Twister™ has two separate body tube sections, each with fins, you will need two tube marking guides. Guide "A" has the mark for **one fin** and the launch lug. It is used on the **long body tube**. Guide "B" has marks for **four fins**, two small and two large, and is used on the **short body tube**.



- A. Locate the two tube marking guides on the bottom of page 7 in the patterns section. Cut the guide along the outline.
- B. Wrap guide "A" around **long body tube assembly** and tape in place.
- C. Mark tube at both fin and launch lug arrows.
- D. Locate the short body tube. Wrap **guide "B"** around short body tube and tape in place.
- E. Mark tube at all fin line arrows. Remove marking guides.
- F. Using a door frame as a guide, draw straight lines connecting each pair of fin marks. Extend these lines along the length of tube.
- G. Keep in mind you drew two lines close together on the short body tube. These lines will be used to attach the **two small fins** in step 8.

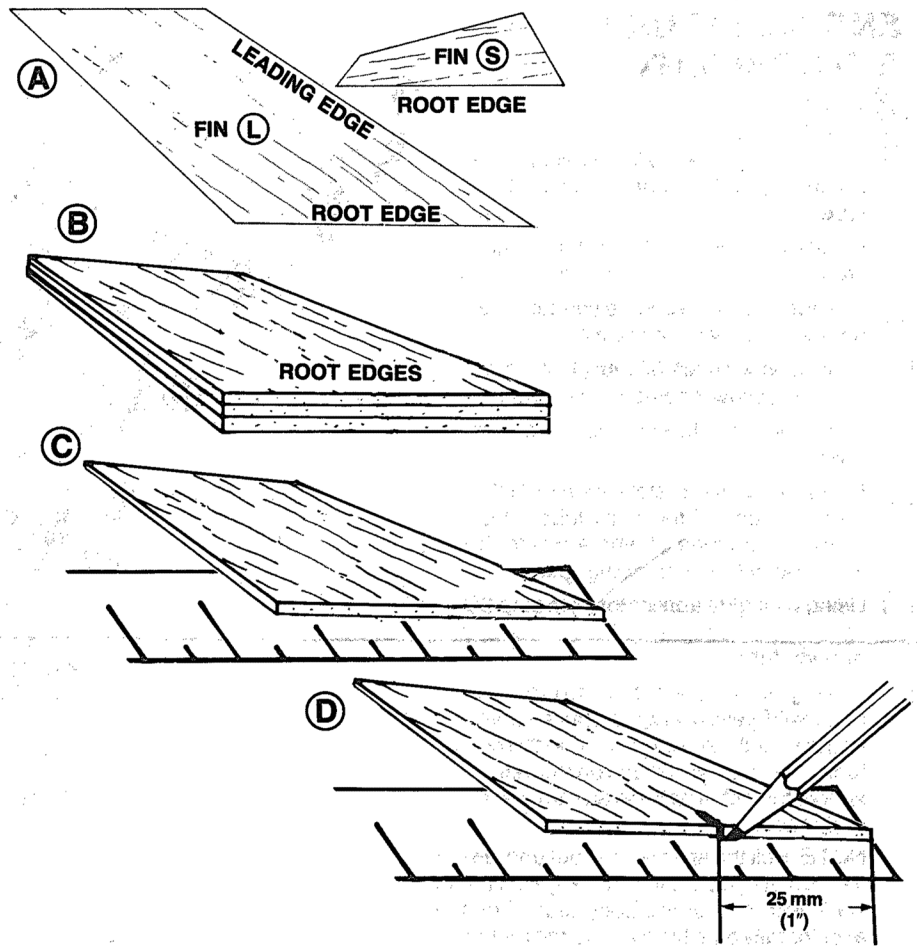


6. FIN ATTACHMENT PREPARATIONS



NOTE: Before gluing your fins, match the fin shape to the fin patterns shown in this step. Identify the root edge that will be glued to each body tube and the front (leading) edge for each fin size. This will help you attach your fins correctly. **Remember:** Fins must be attached correctly for stable flights.

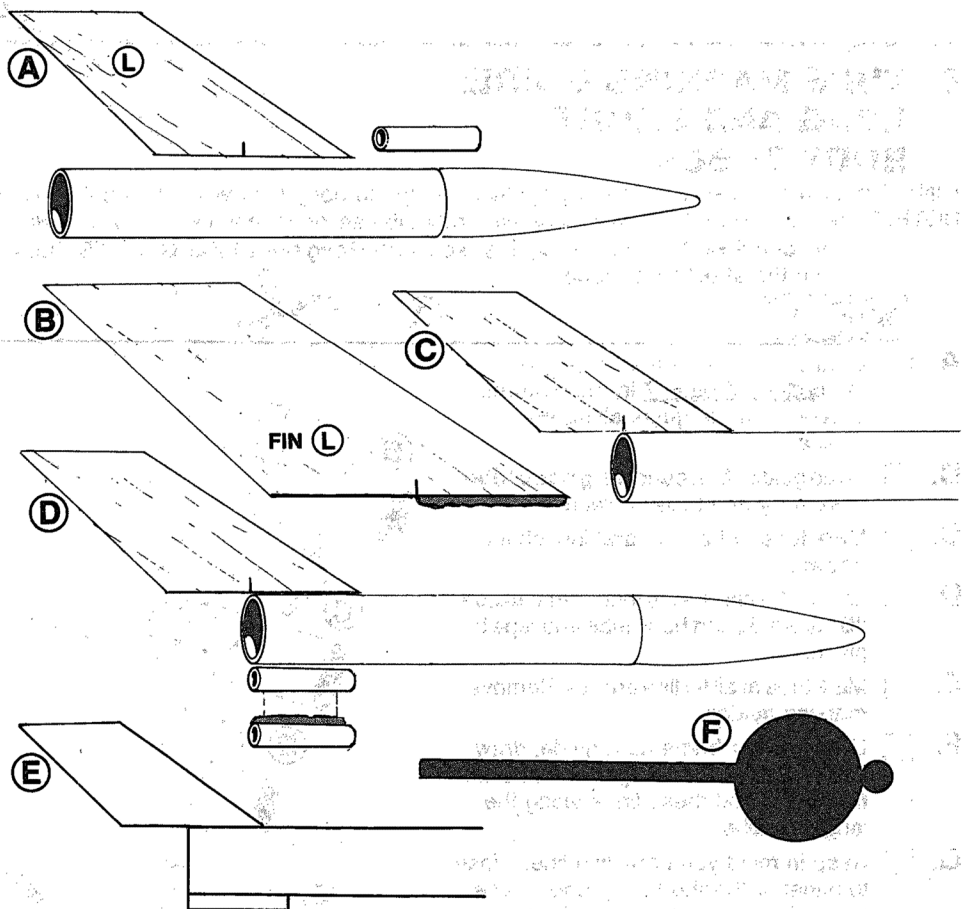
- A. Use fin patterns in illustration at right to locate root (gluing) edge and leading (front) edge. The root edge is attached to body tube.
- B. Stack the three large "L" fins together and locate root edge.
- C. Lay the root edge of each fin on the ruler with the front tip on zero.
- D. Mark all three root edges at the 25 mm (1") center mark as shown.
- E. The marks you just made on each large fin will be used to determine which portion of the root edge to attach to the body tube. In order to attach fin correctly, read steps 7 and 8 carefully before gluing.



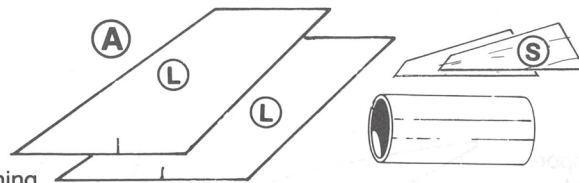
7. FIN ATTACHMENT: LONG BODY TUBE



- A. For this step you need **one large fin "L"**, the **launch lug** and the **long body tube** assembly.
- B. Apply a thin coat of glue to root edge of one "L" fin in front of center mark as shown. Allow it to dry for a minute or two. This will give you a stronger fin joint and make it easier to attach.
- C. Reapply another film of glue in same location and position fin onto fin line of long body tube so that only this area (the first 25 mm - 1" of the root edge) is attached to the body tube as shown. Allow to dry.
NOTE: Rear half of root edge of fin should stick out beyond rear of body tube.
- D. Glue launch lug on line on other side of body tube.
- E. Launch lug should be even with end of body tube as shown.
- F. End view illustrates complete assembly.

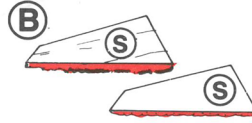


8. FIN ATTACHMENT: SHORT BODY TUBE

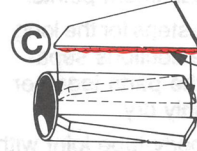


- A. For this step you need the remaining **two large fins "L"**, **two small fins "S"** and the **short body tube**.

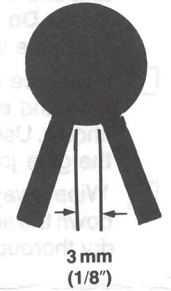
- B. Apply a thin film of glue to root edge of both small "S" fins. Allow glue to become tacky.



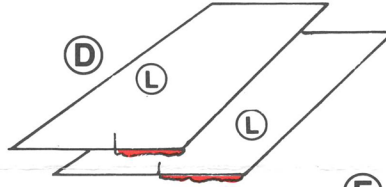
- C. Reapply more glue and position fins on **outside edges** of the two lines, that were drawn close together, on the short body tube section.



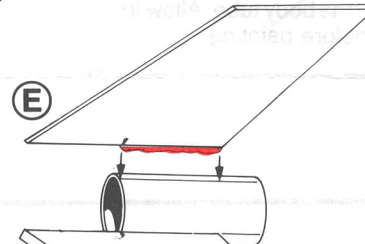
NOTE: Fins should be spaced 3 mm (1/8") at point where they are glued to body tube. Use alignment pattern at right to check fin arrangement. Stand tube on end over pattern to check this distance.



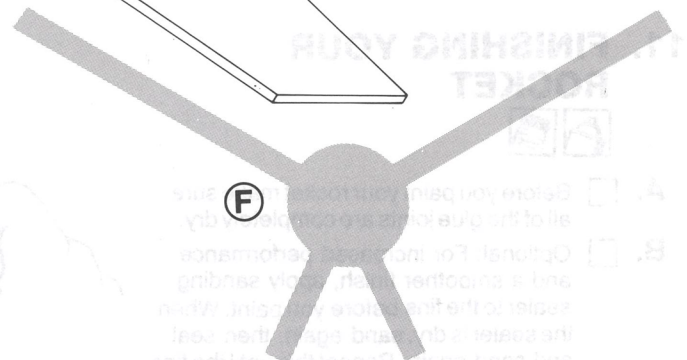
- D. Apply a thin film of glue to the root edge of the two remaining "L" fins, **behind the center mark**, as shown.



- E. Reapply glue when tacky and position fins on two remaining fin lines as shown.
- NOTE: The rear portion of the root edge only is attached to the body tube.



- F. Use completed short body tube alignment pattern end view to check final fin arrangement for this step.



- G. Allow both body tube sections to dry thoroughly before proceeding.

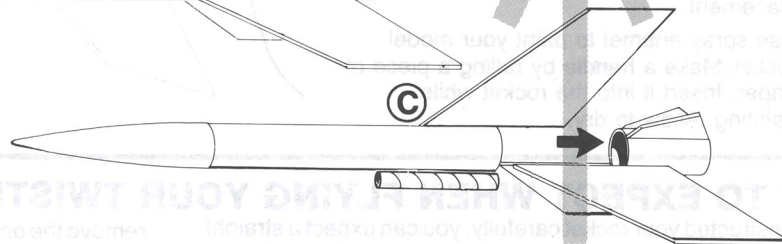
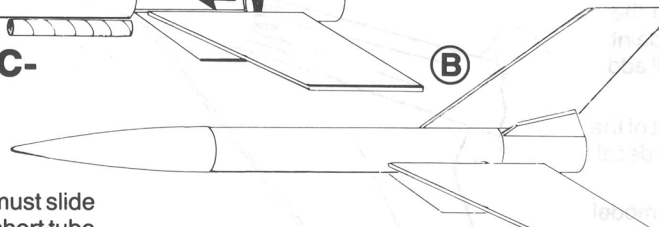
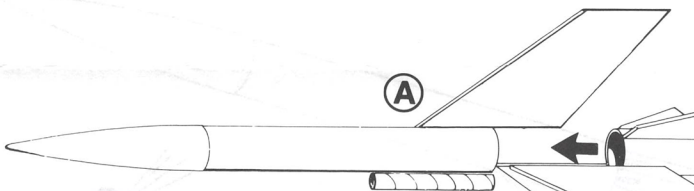
9. TEST FITTING SECTIONS

NOTE: The large fin on the long tube must slide between the two small "S" fins on the short tube as shown. **Do not glue these body tubes together.** Use an engine to join these sections together for flight. See "Prepare Engine" instructions on page 7.

- A. Fit the long and short body sections together.

- B. The illustration shows completed arrangement. Check fin alignment using completed pattern end view.

- C. Separate the two sections.

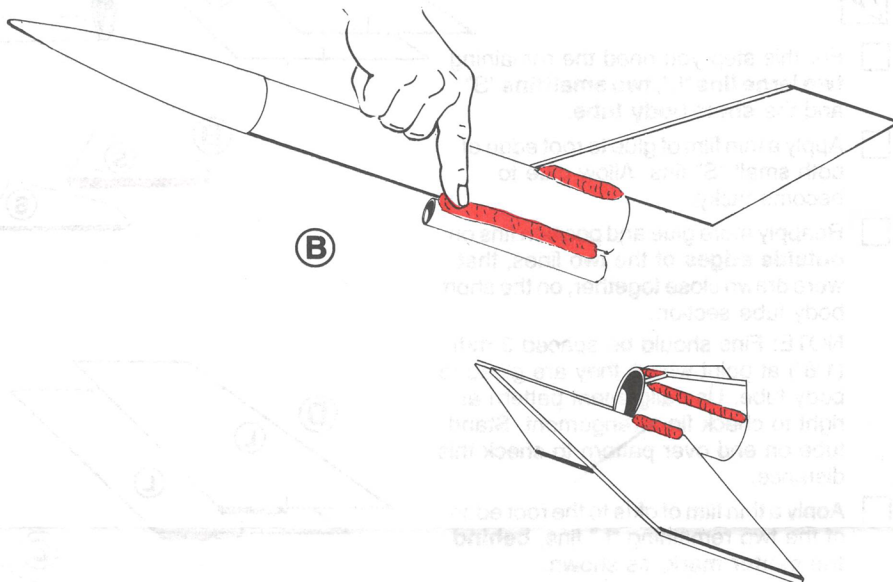


10. GLUE REINFORCEMENT DETAIL



NOTE: Glue reinforcements or fillets are important because they help blend the fins, launch lugs or other components into the body tube. This blending improves the looks of your model, allows smoother air flow over your rocket during flight and strengthens the attachment points.

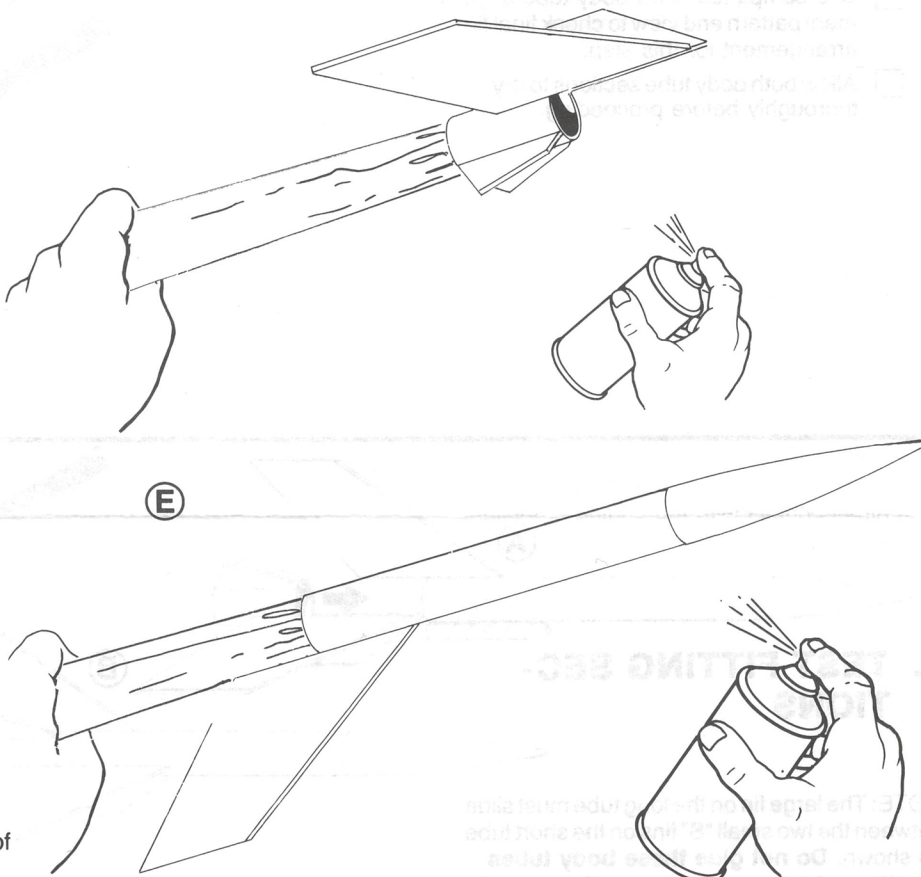
- A. Perform the next two steps for the long and short body tube sections separately. **Do not** join the parts together until glue is thoroughly dry.
- B. Reinforce each fin/body tube joint with glue and each side of launch lug as shown. Use your finger to help smooth the glue joints.
- C. Wipe away any excess glue that may run down the side of the body tube. Allow to dry thoroughly before painting.



11. FINISHING YOUR ROCKET



- A. Before you paint your rocket make sure all of the glue joints are completely dry.
- B. Optional: For increased performance and a smoother finish, apply sanding sealer to the fins before you paint. When the sealer is dry, sand again, then seal and sand again. Repeat this until the fins are smooth.
- C. Optional: For a smoother and better-looking finish, spray a coat of automotive primer on your rocket. Do not apply too much. Lightly sand the rocket with a 400 to 600 grit sandpaper. Apply another coat if needed. Sand between coats. The primer will allow the final coats of paint to adhere better to the rocket. Several light mist coats of paint are preferable. Too much paint will add to the rocket's weight.
- D. Refer to the illustration on the front of the color panel for paint locations and decal placement.
- E. Use spray enamel to paint your model rocket. Make a handle by rolling a piece of paper. Insert it into the rocket while painting. Allow to dry.



WHAT TO EXPECT WHEN FLYING YOUR TWISTER™ ROCKET

If you've constructed your rocket carefully, you can expect a straight and vertical ascent. During recovery the unique qualities of the Twister™ appear. Twister™ separates at ejection into two pieces. As its name implies, these parts begin to rotate like twisters and descend slowly to the ground. Once both parts are recovered,

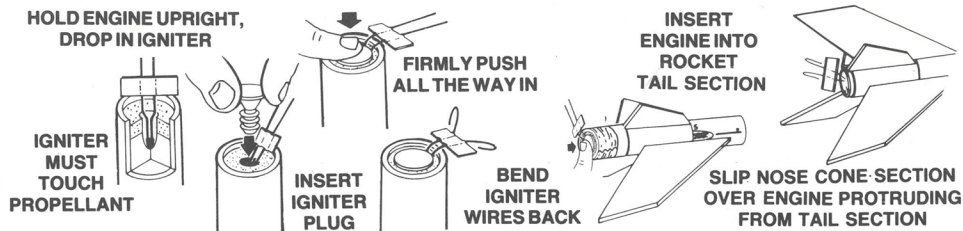
remove the engine from the lower, short body section and prepare the rocket for another flight. The rocket can fly as low as 91 meters (300 feet) on a 1/2A engine or over 305 meters (1000 feet) on a "B" engine. Have a friend help you track the two pieces as they twist down.

PREPARE ENGINE

NOTE: Igniter plugs come with rocket engines. If your engines did not come with plugs, follow the instructions that came with the engines.



SEPARATE IGNITER AND IGNITER PLUG



LAUNCH SUPPLIES

To launch your rocket you will need the following items:

- Estes Electrical Launch Controller and Launch Pad
 - Estes Recovery Wadding No. 2274
 - Recommended Estes Engines: 1/2A6-2 (First Flight) A8-3, A8-5, B4-4, B4-6, B6-4, B6-6, B8-5
- To become familiar with your rocket's flight pattern, use a 1/2A6-2 engine for your first flight. **Use only Estes products to launch this rocket.**

FLYING YOUR ROCKET

Choose a large field away from power lines, tall trees, and low flying aircraft. Try to find a field at least 76 meters (250 feet) square. The larger the launch area, the better your chance of recovering your rocket. Football fields and playgrounds are great.

Launch area must be free of dry weeds and brown grass.

Launch only during calm weather with little or no wind and good visibility.

MISFIRES

If the igniter functions properly but the propellant does not ignite, keep in mind the following: An Estes igniter will function properly even if the coated tip is chipped. However, if the coated tip is not in direct contact with the engine propellant, it will only heat and not ignite the engine.

When an ignition failure occurs, remove the safety key from the launch control system and wait one minute before approaching the rocket. Remove the expended igniter from the engine and install a new one. Be certain the coated tip is in direct contact with the engine propellant, then reinstall the igniter plug as illustrated above. Repeat the countdown and launch procedure.

FOR YOUR SAFETY AND ENJOYMENT

Always follow the NAR* MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities.

*National Association of Rocketry

MICRO-CLIPS MUST NOT TOUCH BLAST DEFLECTOR OR EACH OTHER

If necessary, place a piece of tape on side of engine to friction fit it into body. Engine must not eject from rocket during flight.

SAFETY KEY MUST NOT BE IN LAUNCH CONTROLLER WHEN ATTACHING MICRO-CLIPS TO ENGINE IGNITERS

COUNTDOWN AND LAUNCH

- ⑩ BE CERTAIN SAFETY KEY IS NOT IN LAUNCH CONTROLLER.
- ⑨ Remove safety cap and slide launch lug over launch rod to place rocket on launch pad. Make sure the rocket slides freely on the launch rod.
- ⑧ Attach micro-clips to the igniter wires. Arrange the clips so they do not touch each other or the metal blast deflector. Attach clips as close to protective tape on igniter as possible.
- ⑦ Move back from your rocket as far as launch wire will permit (at least 5 meters - 15 feet).
- ⑥ INSERT SAFETY KEY to arm the launch controller.

Give audible countdown 5...4...3...2...1

LAUNCH!!

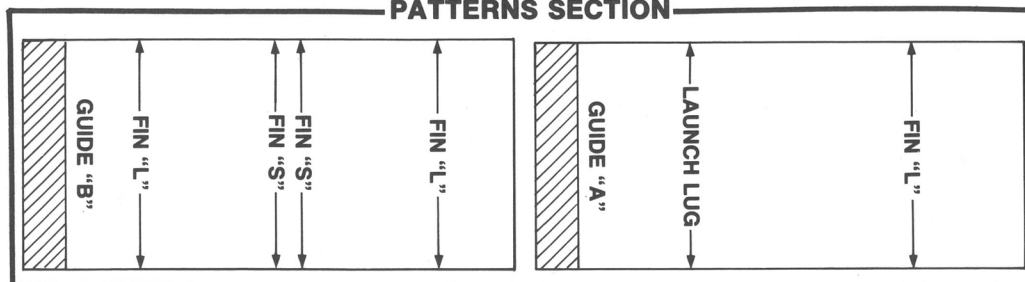
PUSH AND HOLD LAUNCH BUTTON UNTIL ENGINE IGNITES

REMOVE SAFETY KEY FROM LAUNCH CONTROLLER. REPLACE SAFETY KEY AND SAFETY CAP ON LAUNCH ROD.

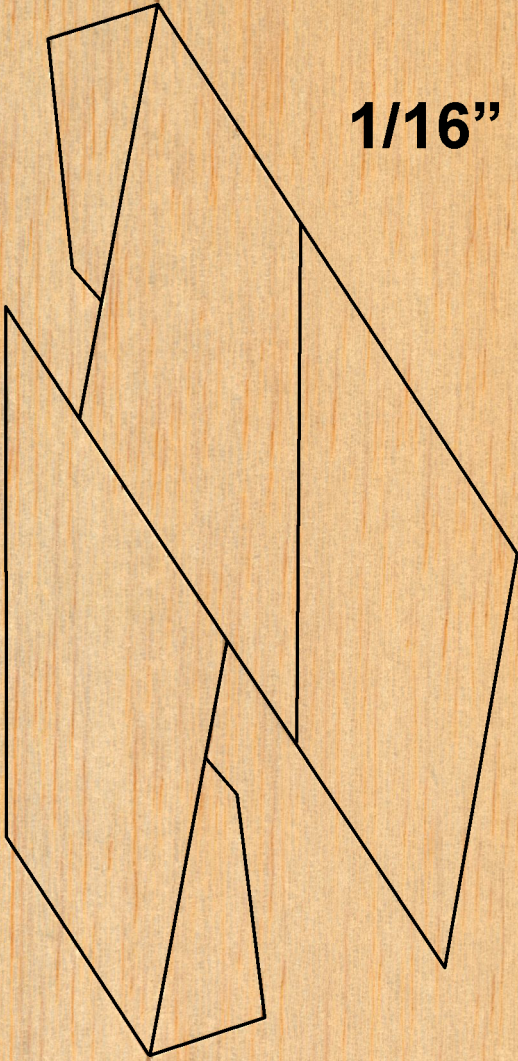
If you use the ultrasafe E2™ or Command™ Launch Controllers to fly your models, use the following launch steps.

- A. After attaching micro-clips, etc., insert the safety key into the controller receptacle. If the igniter clips have been attached properly to the igniter, the red L.E.D. will now begin to flash on and off and the audio continuity indicator will beep on and off.
- B. Hold the yellow (left) arm button down. The L.E.D. will stop flashing and the audio indicator will produce a steady tone.
- C. Verbally count down from five to zero loud enough for the bystanders to hear. Still holding the yellow arm button down, push and hold the orange (right) button down until the rocket ignites and lifts off.

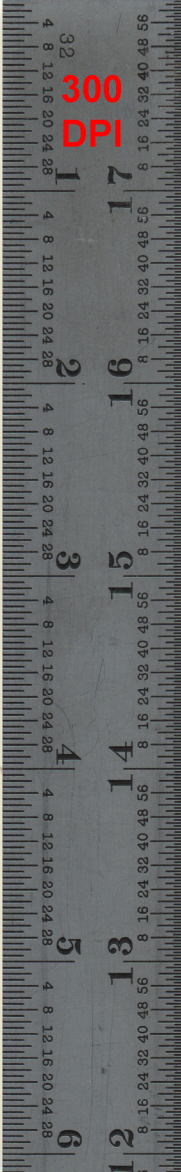
PATTERNS SECTION



1/16"



300
DPI



START WRAP THIS END FIRST



CUT ALL DECALS OUT ON PRINTED EDGE.

PN 037351



300
DPI

PARTS LIST KIT NO. 87162 - Twister								
Quantity	Description	Type	Number	Detail1	Detail2	Detail3	Detail4	Comment
1	PAPER BODY TUBE	BT-20DJ	30332	4" long	0.710" ID	0.736" OD	0.013" wall	Glassine
1	PAPER BODY TUBE	BT-20AE	30319	1.5" long	0.710" ID	0.736" OD	0.013" wall	Glassine
1	BALSA FIN STOCK	BFS-20(3x6)	*	3" wide	6" long	1/16" thick	0.0625	Scan
1	LAUNCH LUG	LL-2A	38175	5/32" ID	1/8" rod	1.25" long		Mylar
1	ENGINE BLOCK	EB-20	30162	.69" OD	.542" ID	0.19" long		Green
1	SPACER TUBE (18 mm)	N/A	35003	2.75" long	.708" OD	0.65" ID	0.01" wall	Yellow
1	PLASTIC NOSE CONE	PNC-20A	72602	2.81" long	.736" dia.	.5" shoulder	White	Injection Molded
1	NOSE CONE INSERT	PIN-20	72603	0.16" total length	0.67" dia.	0.1" shoulder	.06" lip	Injection Molded
1	Decal	KD-87162	37351	4" wide	4.5" long	Blk, Org, Fus	Slef Stick	Scan
* Diecut part #32722. Same as #2004 Tirnado.								

ASTES

THE QUALITY
OF THE
ASTES
KIT IS
UNMATCHED

ASTES
FLYING MODEL ROCKET KIT
587183



HOW TO USE THESE INSTRUCTIONS:

READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL.

- | | | | | |
|---|--|--|---|--|
| 1. This model is constructed from wood. | 2. Use the correct tools to make the work. | 3. Use the correct sandpaper to smooth the work. | 4. Use the correct glue to assemble the work. | 5. Use the correct paint to finish the work. |
|---|--|--|---|--|

EXPLODED VIEW



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CONSTRUCTION SUPPLIES

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GLUE IS APPLIED TO SURFACES SHOWN IN RED.



03/14/2011 07:23PM

ERX SERIES

S T A R T E R S E T

EXTRA VALUE...
2 ROCKETS
IN ONE KIT!



Super Shot™

FLYING MODEL ROCKET Starter Set

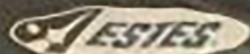


Complete with Two Out-of-Sight Flying Model Rockets:

- THE QUICK BUILDING SUPER SHOT™**
 - HOT PERFORMANCE
 - HOT DECALS
 - PERFECT FIRST ROCKET
 - FLIES UP TO ALTITUDES OF 244 METERS (800 FEET)!
- THEN THE NEXT STEP... BUILD AND FLY THE CRAZY TWISTER™ (SKILL LEVEL 2)**
 - EYE-TWISTING DECALS
 - GYRATING HELICOPTER STYLE RECOVERY
 - UP TO 305 METERS (1000 FEET) IN ALTITUDE!
- SET INCLUDES:**
 - COMPLETE ELECTRICAL LAUNCH SYSTEM AND SUPPLIES FOR YOUR FIRST THREE EXCITING FLIGHTS

For ages 10 and up. Adult supervision for those under 12. Must be 14 to purchase A-D and 18 to purchase E-F engines in CA and NJ. This set contains models requiring assembly. Requires tube-type plastic cement, white glue, paint, hobby tools and 4 AA alkaline batteries for construction and operation - not included.

EST 1449



Over 35 Years of Safety, Quality and Customer Satisfaction



ESTES

FLYING MODEL

ROCKET

STARTER SET

SUPER SHOT™

2
Out-of-
sight
rockets
included!

ROARS
to over
800 feet
(244 m)!

SCORES
to over
1000 feet
(305 m)

3-in-1
Launch
Tube!
Watch the
FW!



- ▶ Hot performing Super Shot™ rocket - scores to 1000 feet (305 m) and has 3000 ft (914 m) Parachute Recovery!
- ▶ The crazy Twister™ Rocket - Scores to over 1000 feet (305 m) Parachute opening technique necessary!
- ▶ Includes reusable storage case with handles!
- ▶ Complete with launch system and supplies!



Official Model Rocket
Supplier

WARNING-FLAMMABLE!
Read Book of Procedures and Instructions Before Use!

Caution: Do not use in areas where fire is prohibited. Do not use in areas where fire is prohibited.

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