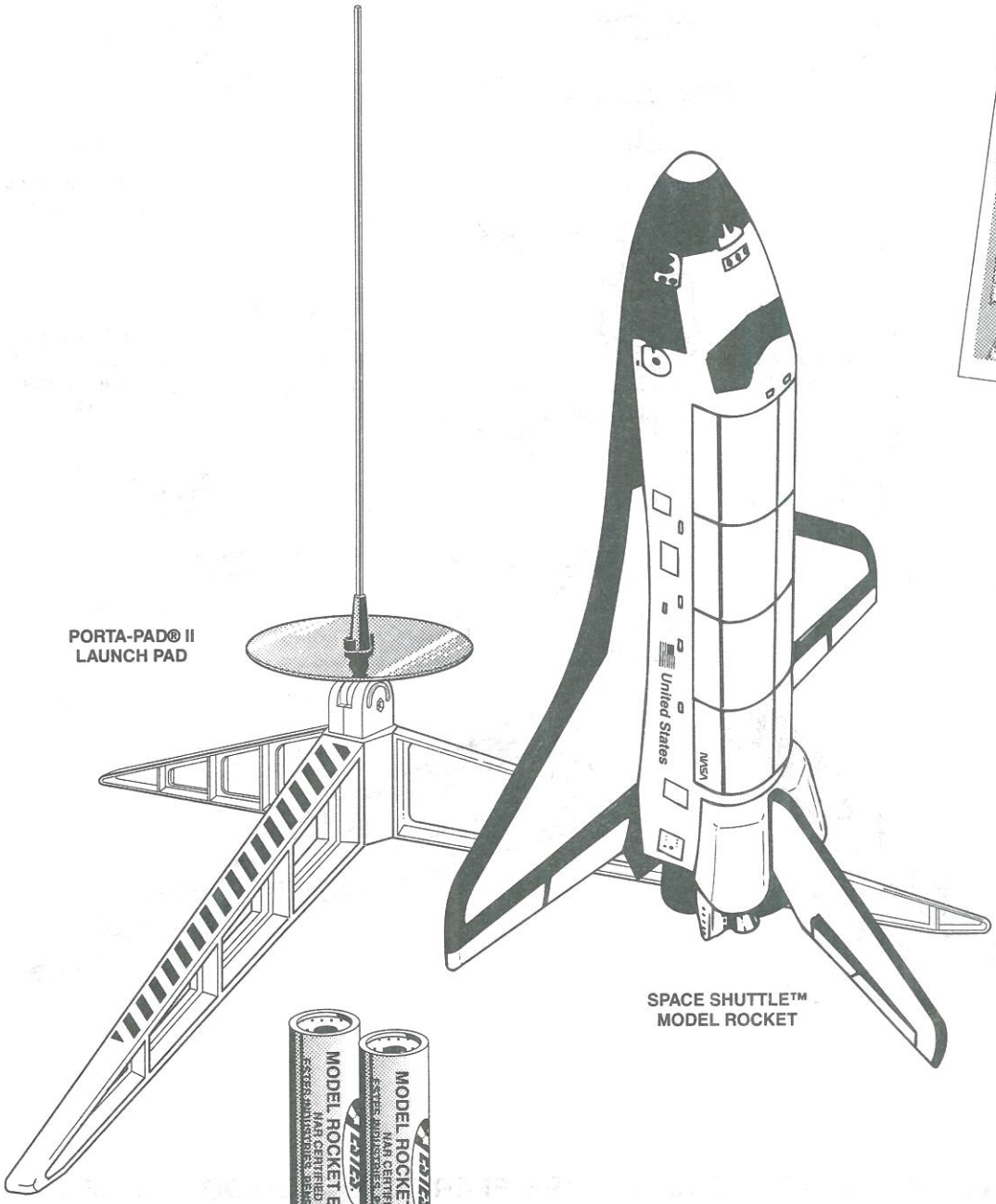
SPACE SHUTTLE™ STARTER SET

EST 1467

84074

ESTES INDUSTRIES
1295 H STREET
PENROSE, CO 81240 USA

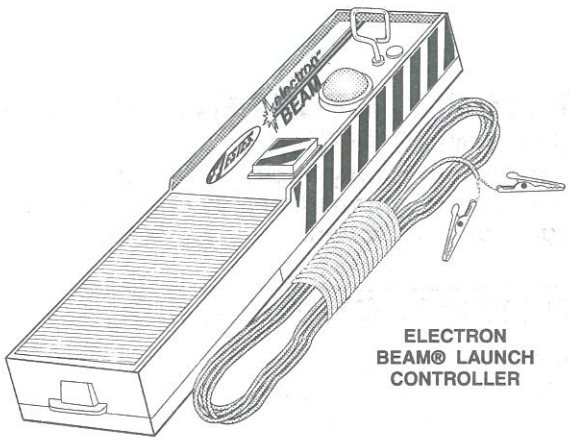
LITERATURE



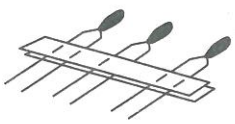
PORTA-PAD® II
LAUNCH PAD

SPACE SHUTTLE™
MODEL ROCKET

ROCKET
ENGINES
(80290)



ELECTRON
BEAM® LAUNCH
CONTROLLER



IGNITERS
(85550)

IGNITER PLUGS
(35130)

Part One: Launch Pad Assembly

HOW TO USE THESE INSTRUCTIONS:
READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL.

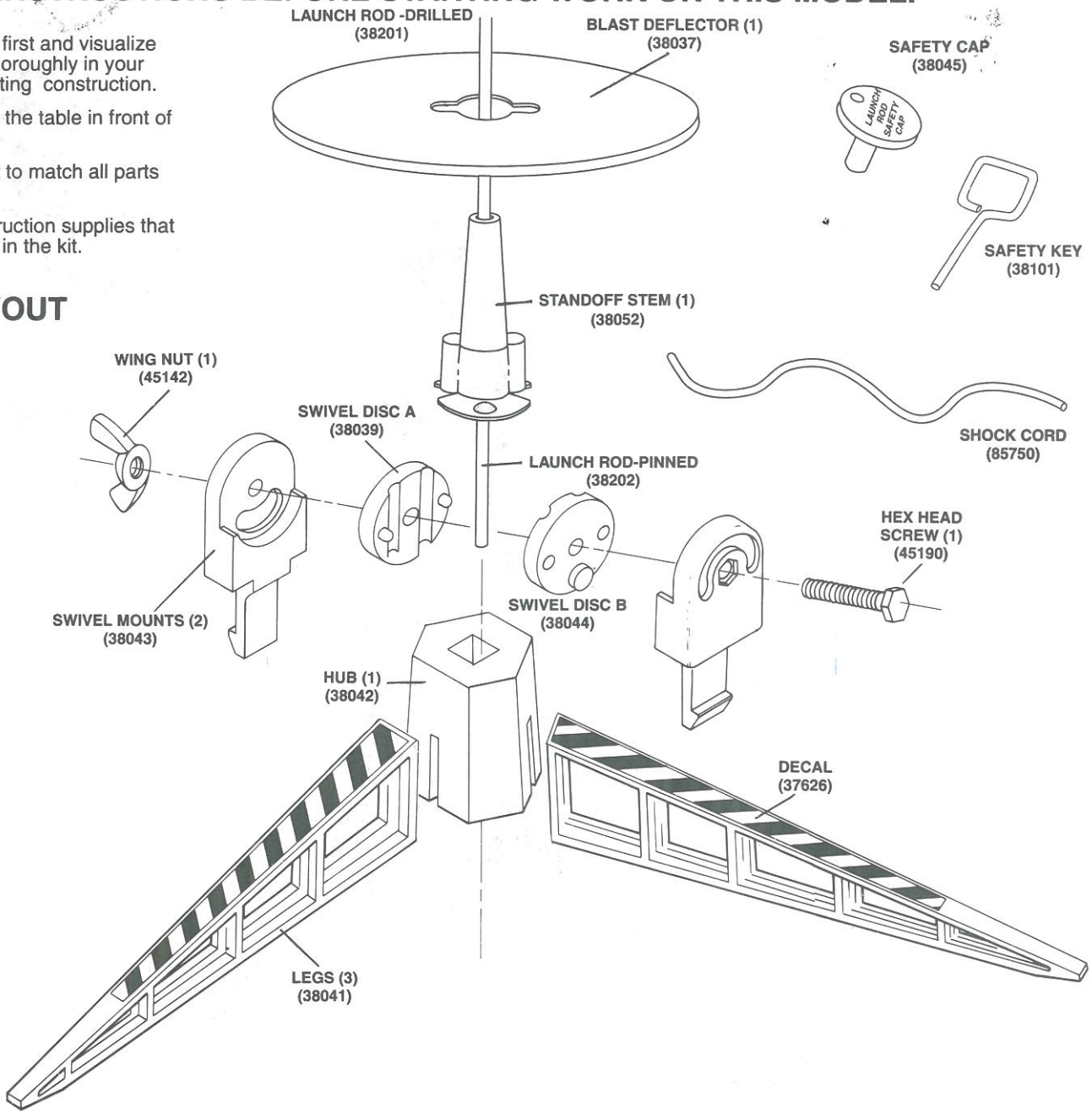
A. Read each step first and visualize the procedure thoroughly in your mind before starting construction.

B. Lay parts out on the table in front of you.

C. Use parts layout to match all parts contained in kit.

D. Collect all construction supplies that are not included in the kit.

PARTS LAYOUT



EXTREMELY IMPORTANT: THE PARTS LAYOUT IS FOR REFERENCE ONLY! DO NOT USE THIS DRAWING ALONE.

The parts layout is only intended to assist you in locating the parts included in this kit. Refer back to this parts layout as you build your pad step by step. This method will help you 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.

SCREWDRIVER

SANDPAPER

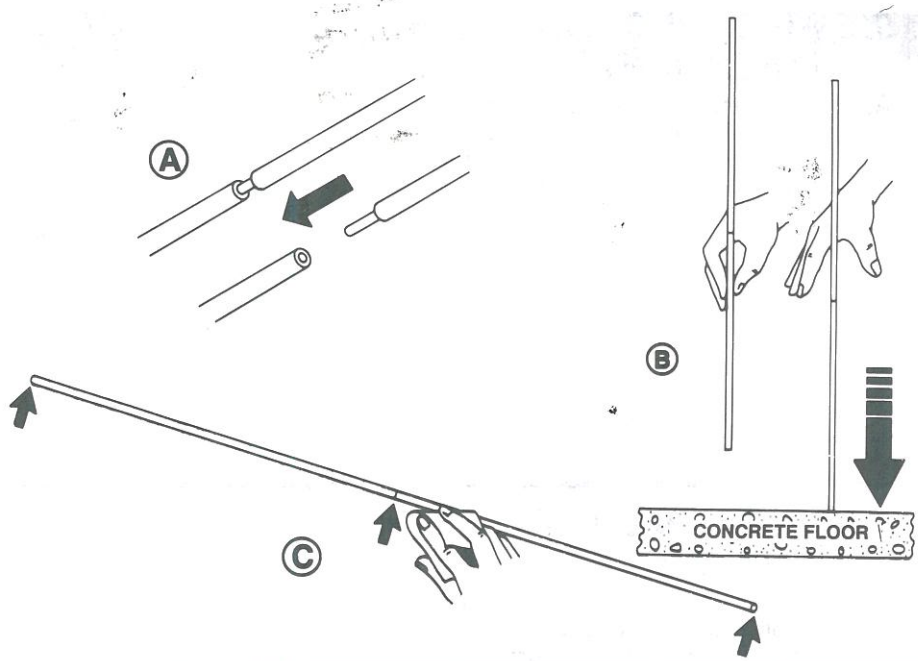
1. LAUNCH ROD ASSEMBLY

A. ☐ Join launch rod halves by inserting pin contained in one rod into hole contained in other rod. Do not attempt to push the pin in all the way.

B. ☐ Hold the joined rods above a concrete floor and repeatedly drop on end until rod halves are tightly joined.

C. ☐ Check the completed rod joint and ends for burrs. If any exist, remove them with a piece of fine sandpaper. It is important that the launch rod be smooth to avoid snagging a model rocket launch lug.

IMPORTANT
SAND JOINT AND BOTH ENDS UNTIL COMPLETELY SMOOTH

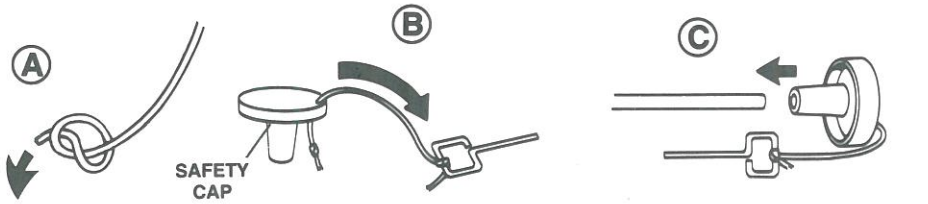


2. SAFETY CAP/KEY ASSEMBLY

A. ☐ Tie a knot in one end of elastic cord.

B. ☐ Pass the cord through the small hole in the safety cap and tie to the controller safety key.

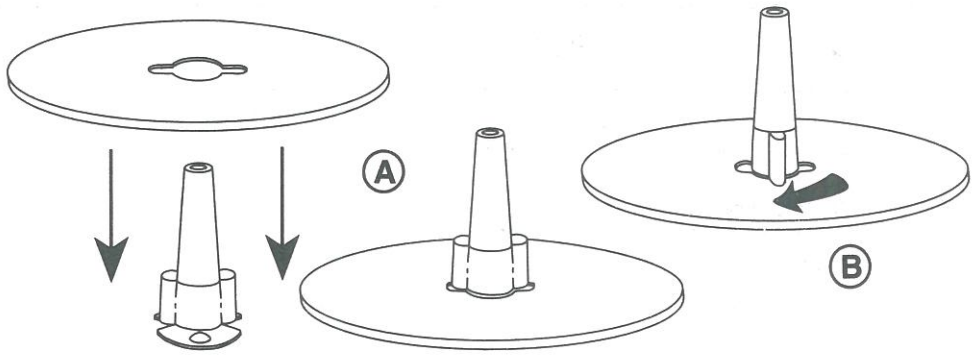
C. ☐ Place the safety cap on one end of the launch rod and set aside.



3. LAUNCH STANDOFF ASSEMBLY

A. ☐ Slide the blast deflector over the standoff stem. Make sure the blast deflector is resting on the base of the standoff.

B. ☐ Rotate the standoff stem 1/4 turn so nodes (bumps) on stem base engage in slots in the blast deflector.



4. SWIVEL HUB ASSEMBLY

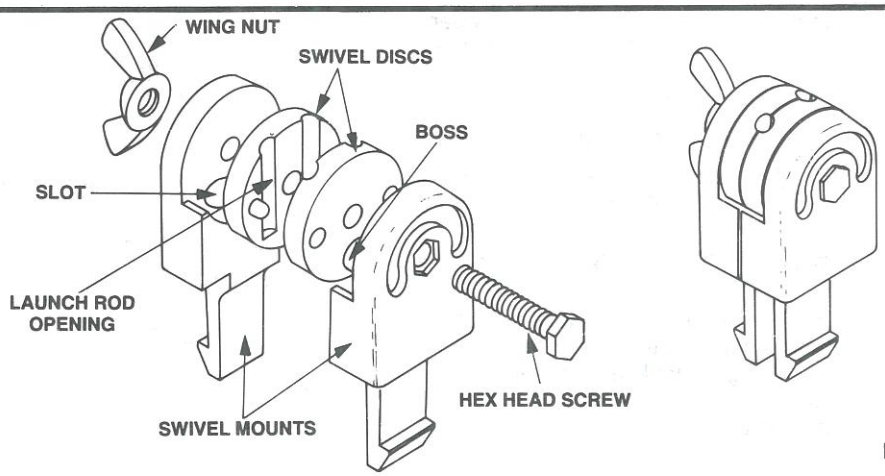
A. ☐ Join swivel discs so that the small and large launch rod openings match.

B. ☐ Insert hex head machine screw through central hole in one swivel mount.

C. ☐ Slide joined swivel discs onto hex head screw. Seat circular boss on swivel disc into slot in swivel mount.

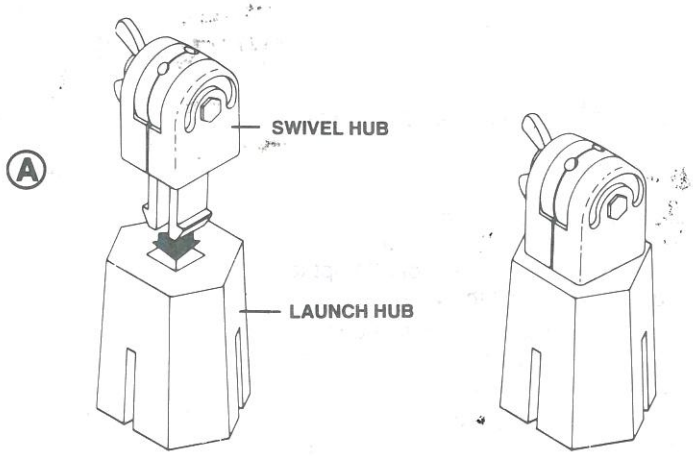
D. ☐ Slide remaining swivel mount onto hex head screw and seat slot over circular boss.

E. ☐ Attach and lightly tighten wing nut.



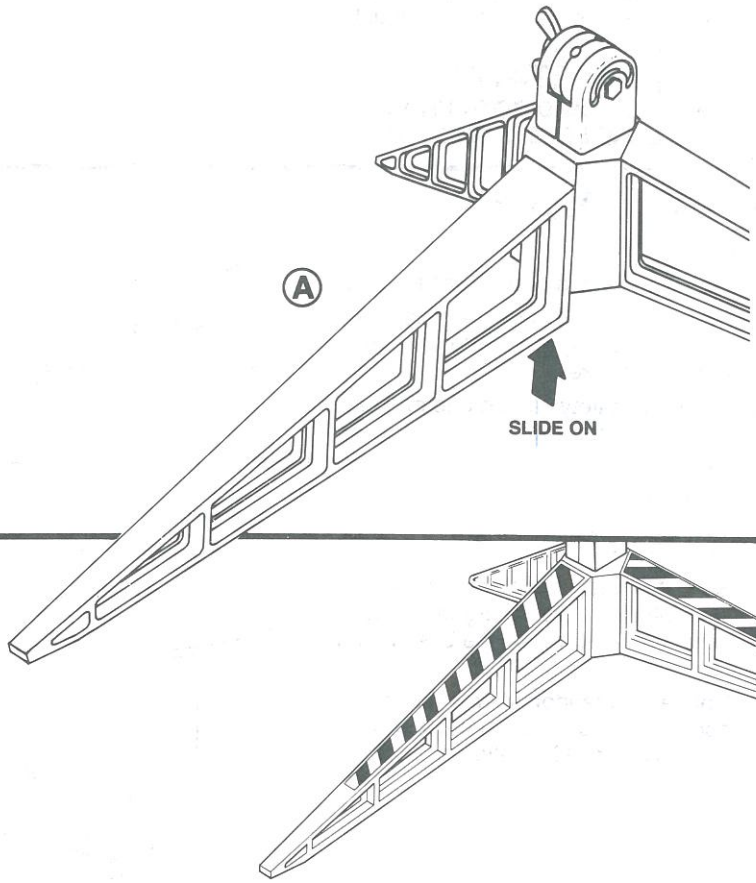
5. SWIVEL HUB ATTACHMENT

A. ☐ Push the completed swivel hub assembly into the square opening in the top of launch pad hub as far as it will go. It will snap in place.



6. LAUNCH PAD LEG ASSEMBLY

A. ☐ Attach the launch pad legs to the launch pad hub. Legs are seated properly when their tops are even with the top of the hub.



7. DECAL APPLICATION

A. ☐ Carefully remove one decal at a time from the decal sheet.

B. ☐ Lightly position it as shown in the illustration.

C. ☐ When the decal is located properly, gently rub it down to remove bubbles and stick it securely.

8. BLAST DEFLECTOR ATTACHMENT

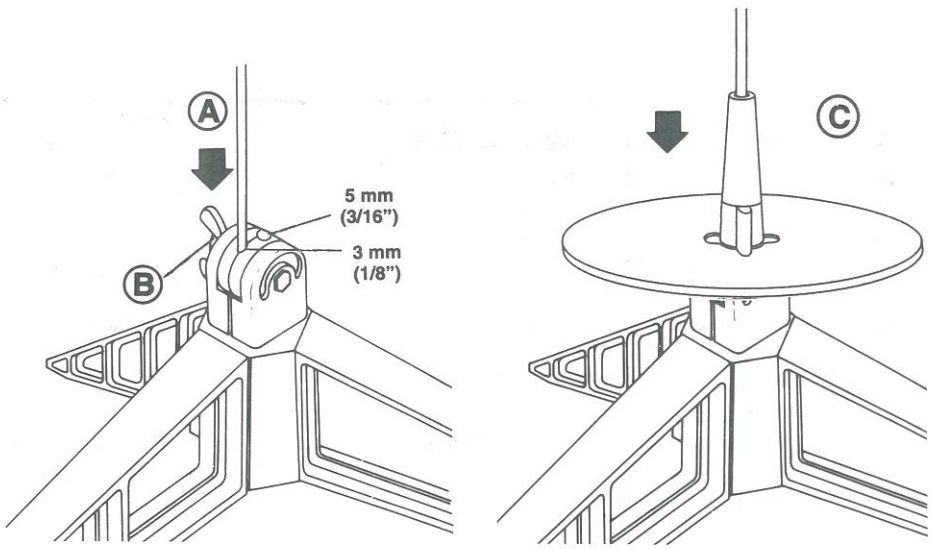
A. ☐ Insert the launch rod into the smaller 3 mm (1/8") launch rod opening between the swivel discs until it stops. (The larger 5 mm (3/16") opening is designed for Estes Maxi™ Rod launch rods.)

B. ☐ Tighten the wing nut securely.

C. ☐ Remove the safety cap from the rod end and slide the blast deflector onto the rod.

D. ☐ Replace the safety cap on the launch rod.

E. ☐ You may adjust the launch angle of your rocket in breezy conditions by loosening the wing nut and tilting the rod. Be sure to retighten the wing nut before launch.



Part Two: Controller Assembly

This controller requires four AA alkaline batteries (not included). **Only alkaline batteries are recommended.**

CONTROLLER
(85230)

SAFETY NOTE: This controller contains a safety key that must be inserted into the controller to arm the launch system. Follow this simple safety rule:

A. Never insert the key into the controller until you are ready to launch.

B. Remove the key immediately after launch or if you must return to the launch pad in case of a misfire. Always keep the safety key in your possession or place safety cap/key on launch rod.

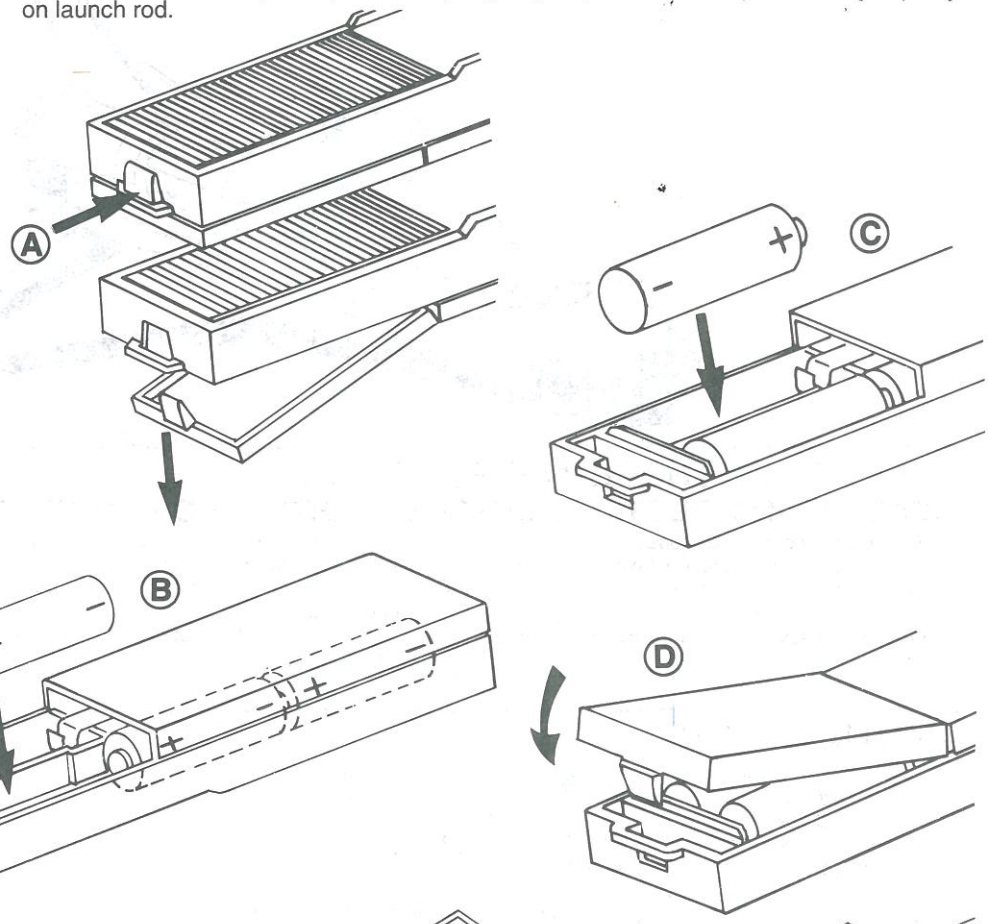
1. BATTERY INSTALLATION

A. ☐ Remove battery door. Push in on tab and pull down on door.

B. ☐ Install three batteries in long compartment. Plus (+) ends of batteries must face towards rear of controller.

C. ☐ Install remaining battery in short compartment with plus (+) end of battery facing forward.

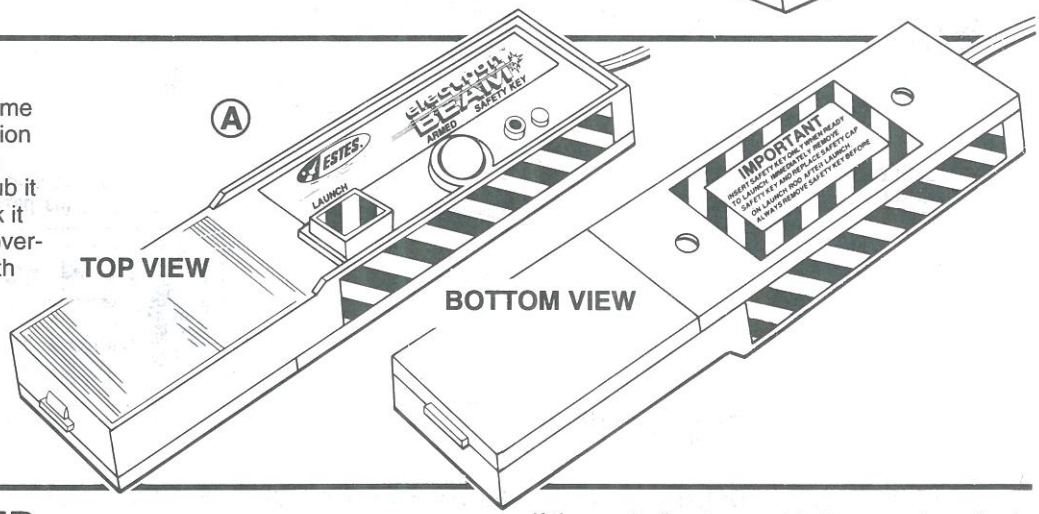
D. ☐ Replace battery door.



2. DECAL PLACEMENT

A. ☐ Carefully remove one decal at a time from the decal sheet. Lightly position as shown in the illustration. When decal is located properly, gently rub it down to remove bubbles and stick it securely. Note: Be careful not to overlap launch controller body joint with the side decals.

DECAL
(37624)

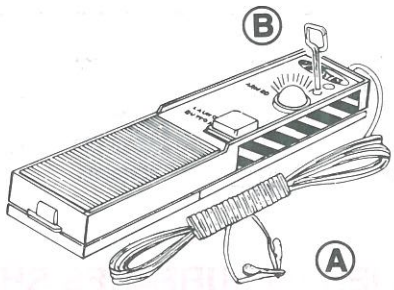


3. TEST THE CONTROLLER

A. ☐ Clip micro-clips together.

B. ☐ Insert safety key. This will cause the bulb to light.

C. ☐ Press the launch button for **only a moment**. Bulb will go out while button is depressed.



If the controller does not behave as described, check the following:

- Make sure the micro-clips are firmly clipped together.
- Remove and re-insert the safety key to insure it is making contact.
- Make sure batteries are correctly inserted as described.

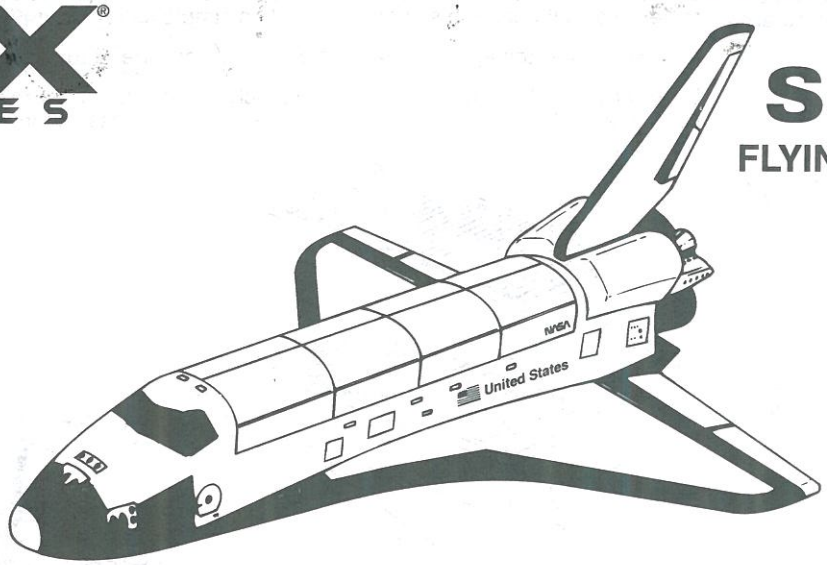
If you cannot get the controller to work, return it to Estes for replacement (see warranty which comes in your kit).

Part Three: Shuttle Assembly

EZX SERIES

SPACE SHUTTLE™

FLYING MODEL ROCKET KIT
EST 1467



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 development of your rocketry modeling skills.

B. Read each step first and visualize the procedure thoroughly in your mind before starting construction.

C. Lay the parts out on the table in front of you. (Check inside tubes for any small parts.)

D. Use the parts layout to match all parts contained in kit.

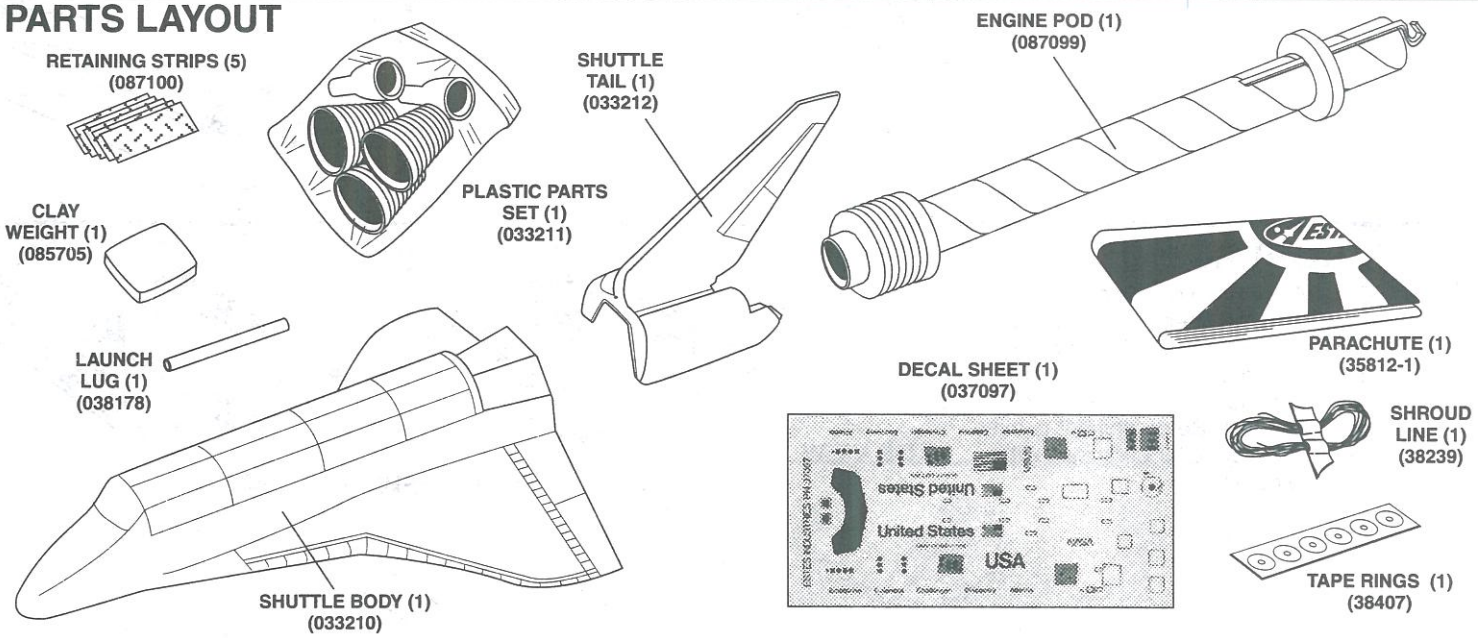
E. Collect all construction supplies that are not included in this kit.

F. Test fit parts before applying any glue.

G. The construction supplies required for each step are listed at the beginning of each step.

H. Check off each step as you complete it.

PARTS LAYOUT



EXTREMELY IMPORTANT: THE PARTS LAYOUT IS FOR REFERENCE ONLY!

The parts layout is only intended to assist you in locating the parts included in this kit.

CONSTRUCTION SUPPLIES

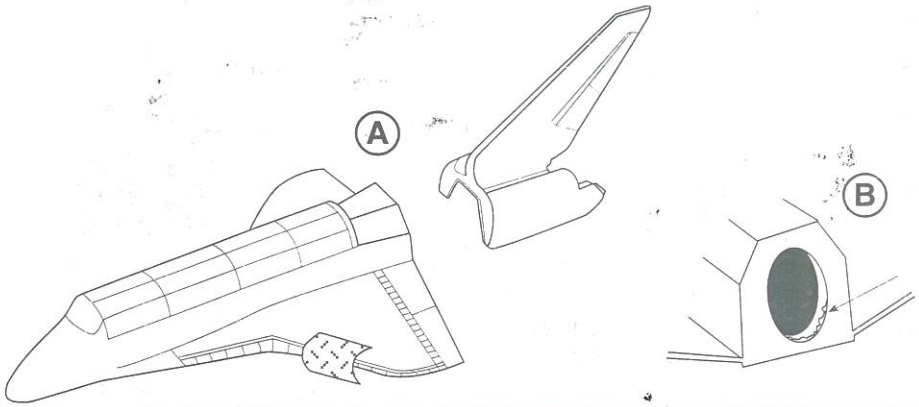
In addition to the parts included in your kit, you will need these construction supplies. Each step shows which supplies will be required.

GLUE IS APPLIED TO SURFACES SHOWN IN RED.

1. **READ INSTRUCTIONS CAREFULLY BEFORE DOING ANY WORK.**

A. ☐ Lightly sand the shuttle and tail assemblies with fine sandpaper to remove the small bumps. It is important that you DO NOT sand hard enough to sand completely through the skin layer or any of the surface detail.

B. ☐ Lightly sand away any excess material extending into the body tube at the rear of the shuttle body. Slide the engine pod into the tube, remove and re-sand until pod slides in and out of the tube freely.



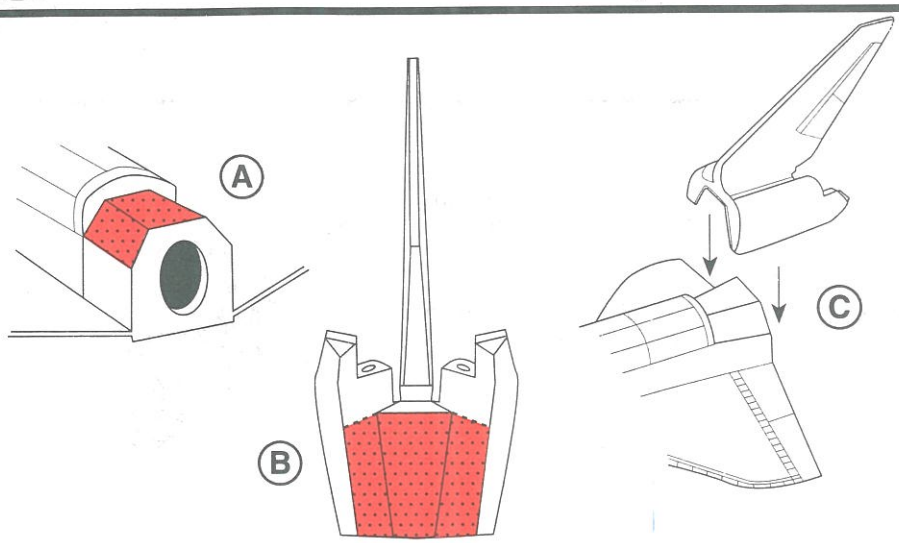
2. **Do not use epoxy-type cement to construct or repair this kit.**

A. ☐ Lightly sand the tail mount areas on the shuttle body and tail as shown.

NOTE: In the next steps it is recommended you use contact-type cement for best results, but a good quality white or yellow wood glue will work. The drying time of the wood glue will be longer than a thin layer of contact cement.

B. ☐ Apply a thin layer of contact cement to **both** parts to be joined. **Allow cement to dry to the touch before parts are joined.** The cement adheres instantly, so parts must be positioned accurately before they are allowed to touch each other completely.

C. ☐ When part is aligned, push parts together and hold to seal the bond.

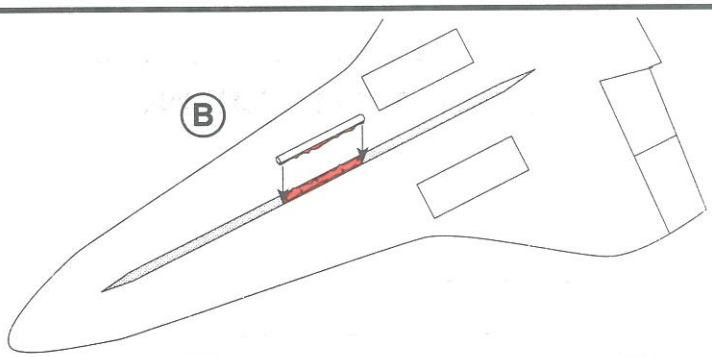


3.

A. ☐ Locate the launch lug and center the lug within the groove (as shown) on the bottom of the shuttle . Do not glue lug yet. Note how the lug fits in the groove.

B. ☐ Apply a thin layer of contact cement to the launch lug and the lug location in groove. Let cement become dry to the touch.

C. ☐ Align parts and push lug into position. Hold to seal the bond.



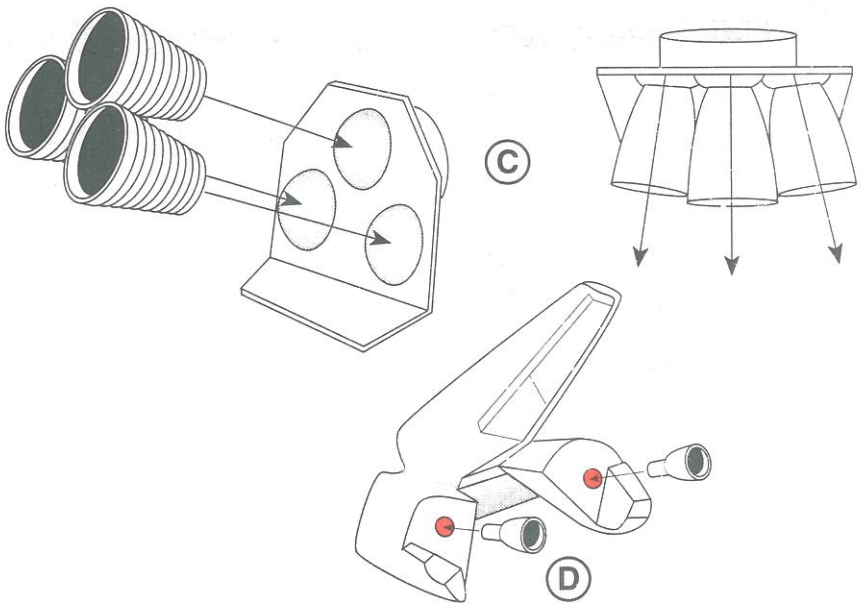
4.

A. ☐ Open the bag of plastic parts and identify them.

B. ☐ If you wish to paint the plastic parts, this would be a good time to do so. Follow the optional painting and detailing section for colors and locations. Scrape off any paint from mating surfaces of parts to be joined for good cement bond.

C. ☐ Apply plastic cement to the back of the three nozzles and attach to the rear bulkhead as shown. Angle the two outside nozzles slightly outward. **This assembly is for display purposes only, it is NOT cemented into rear of shuttle, it must be removed when shuttle is actually flown.**

D. ☐ Apply a thin layer of contact cement to the two auxiliary nozzles and in the holes where they are to be glued. Once cement is dry, push the nozzles into place and set aside to dry.



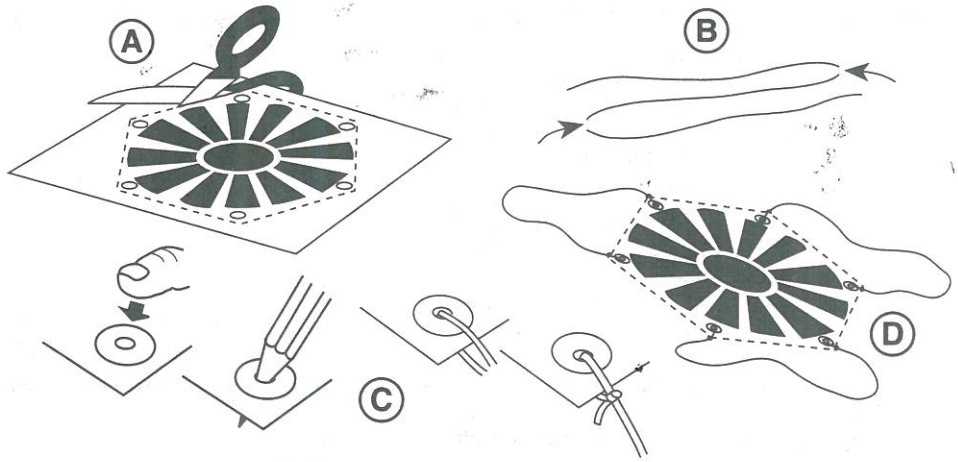
5.

A. ☐ Cut out the parachute on printed edge lines.

B. ☐ Remove tape from shroud lines, fold and cut into three equal lengths.

C. ☐ Attach tape rings to top of parachute and press firmly into place. Punch holes in parachute and tape ring with a sharp pencil. Tie lines through holes and secure end with double knot.

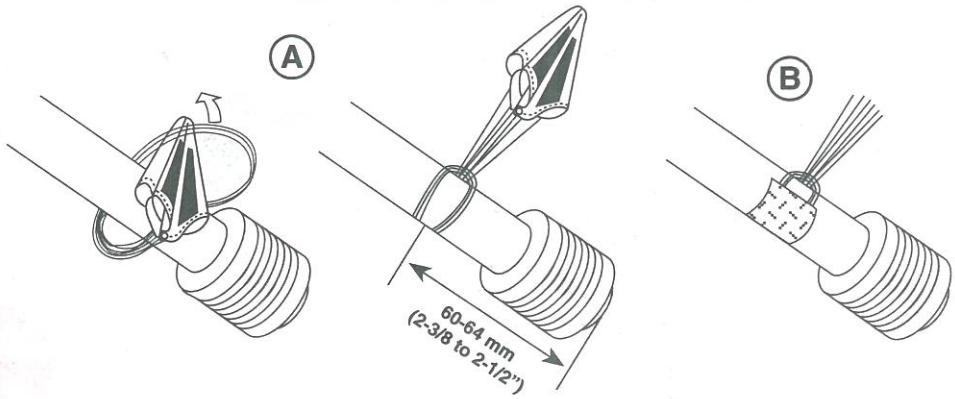
D. ☐ Attach remaining lines to other corners to complete parachute.



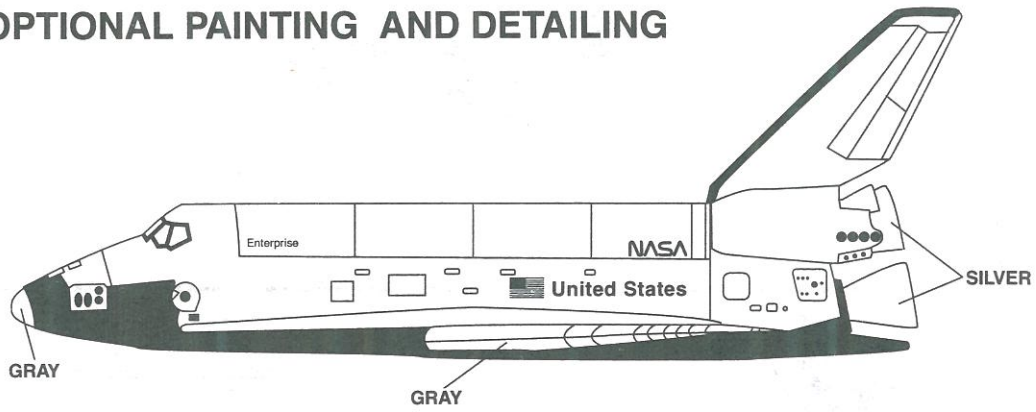
6.

A. ☐ Locate the engine pod and attach the parachute to pod at 60 to 64 mm (2-3/8" to 2-1/2") from the end as shown.

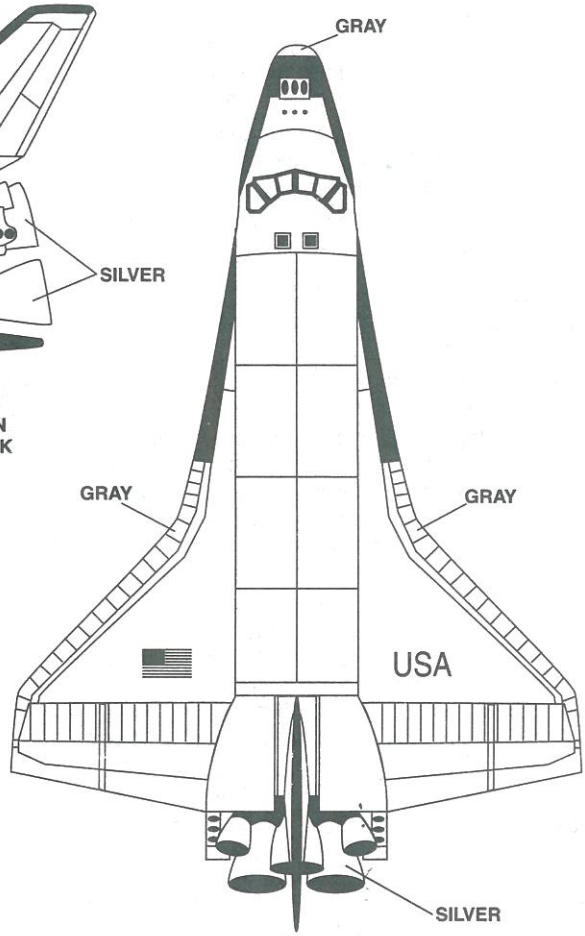
B. ☐ Secure the shroud lines of parachute around pod with masking tape.



OPTIONAL PAINTING AND DETAILING



ALL AREAS PICTURED IN BLACK WILL PAINT BLACK



7.

You may wish to paint your shuttle, but painting adds weight and will diminish its glide performance. It is not recommended you paint the shuttle. Apply decals in locations shown and set aside to dry. **Use only Testor™-type paint.**

TRIMMING YOUR SHUTTLE FOR FLIGHT

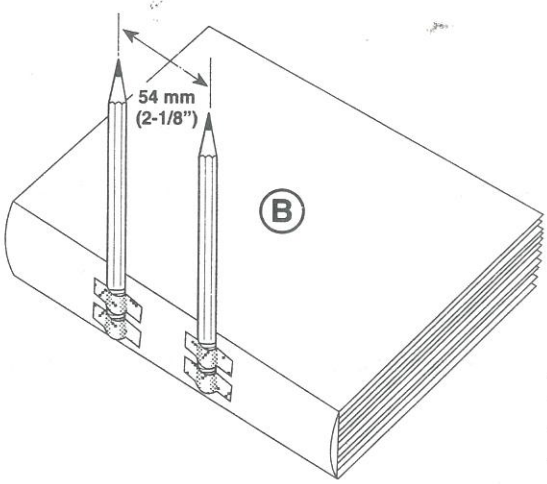
8.

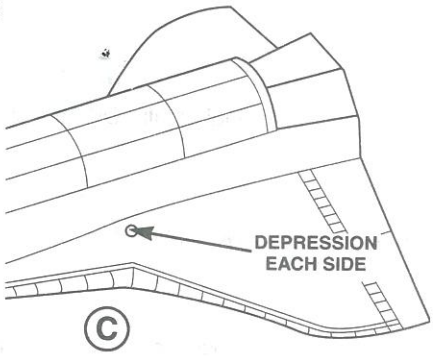
A. ☐ Locate two pencils or pens of equal length.

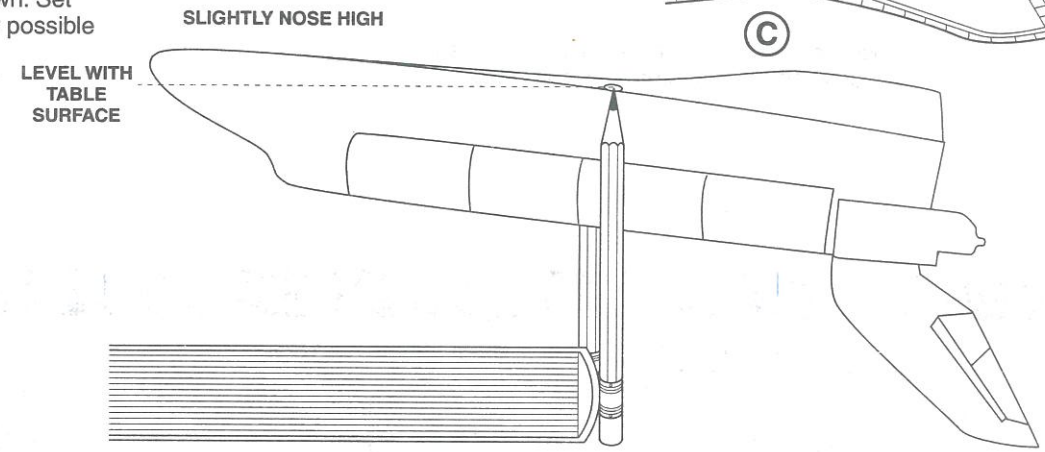
B. ☐ Tape pencils to the edge of a book at a distance of 54 mm (2-1/8") apart as shown. This will be a balancing fixture to trim your shuttle's glide.

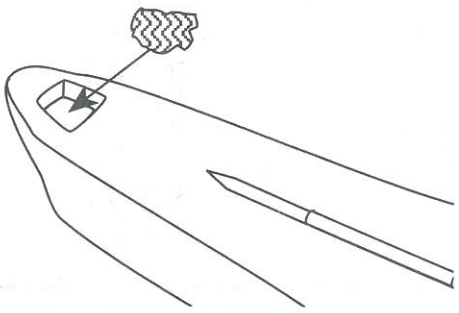
C. ☐ **Remove the Power Pod and display nozzles.** Find the two depressions in the top of the shuttle wings. Suspend the shuttle on your trim fixture as shown. The shuttle will be tail heavy.

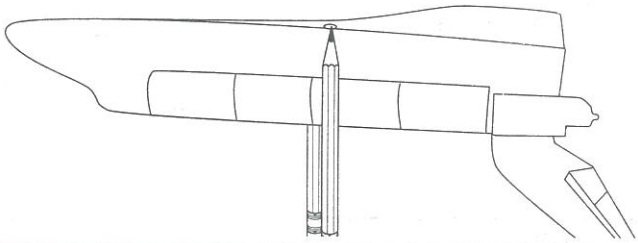
D. ☐ Locate the clay weight and apply small pieces of clay into the nose pocket until shuttle balances in a slight "nose-high" attitude as shown. Push clay tightly into pocket and wipe off any clay residue from around the pocket. Apply one weight retaining strip over clay pocket as shown. Set aside the remaining strips for possible use later, when optimizing the glide of your shuttle. Your shuttle is now ready for its first flight.

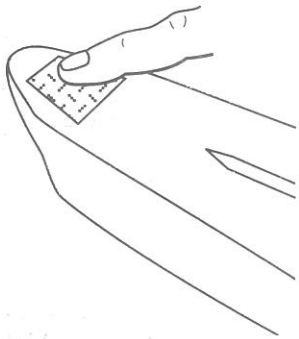








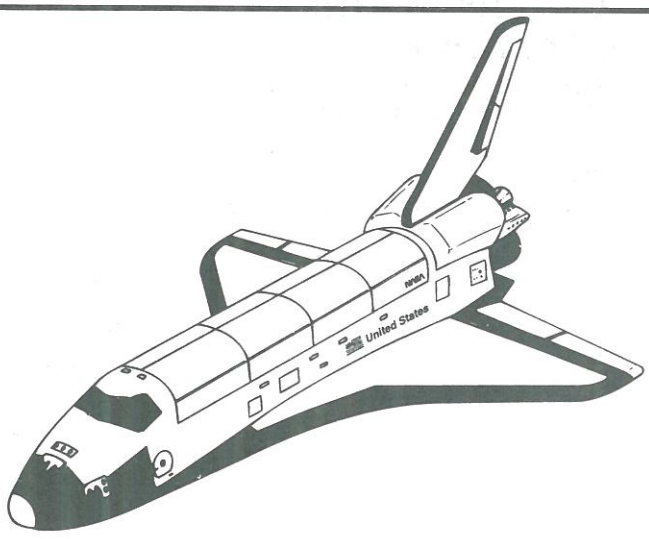




WHAT TO EXPECT WHEN FLYING YOUR SPACE SHUTTLE™

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

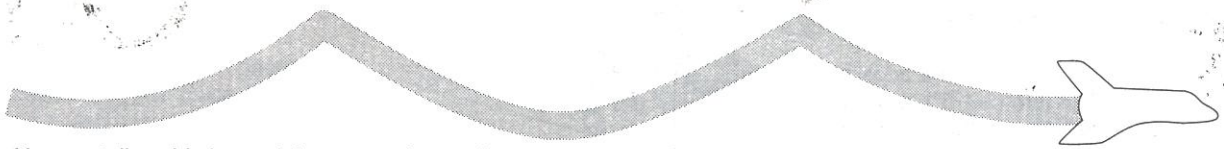
Your shuttle is boosted into the air with a C6-3 engine in the engine pod. At apogee (the highest point of flight) the engine pod ejects and returns on the parachute. The shuttle begins to glide back. Retrieve the parts and you are ready to fly again. On your first flight, observe your shuttle's glide and correct if necessary by following the Optimizing the Glide section of the instructions. **Do not use epoxy-type cement to repair your model.**



OPTIMIZING THE GLIDE OF YOUR SHUTTLE

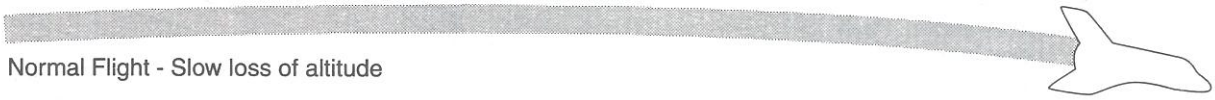
Your space shuttle is designed to glide the first time if it is balanced and trimmed according to the instructions. Some fine tuning can be done to optimize the shuttle's glide. **Launch only during calm, weather with little or no wind and good visibility.**

Observe the Glide:

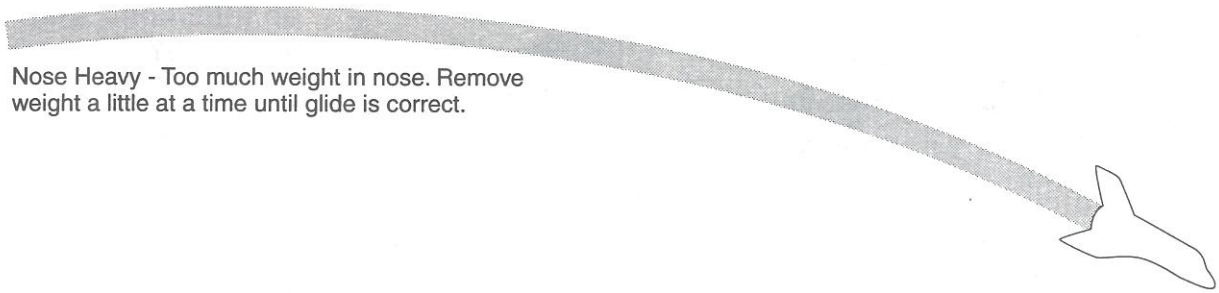


Heavy stall - add clay weight to nose in small amounts and re-fly after each addition until glide improves

Light stall - OK , but clay weight can be added in small amounts to nose until glide improves



Normal Flight - Slow loss of altitude



Nose Heavy - Too much weight in nose. Remove weight a little at a time until glide is correct.

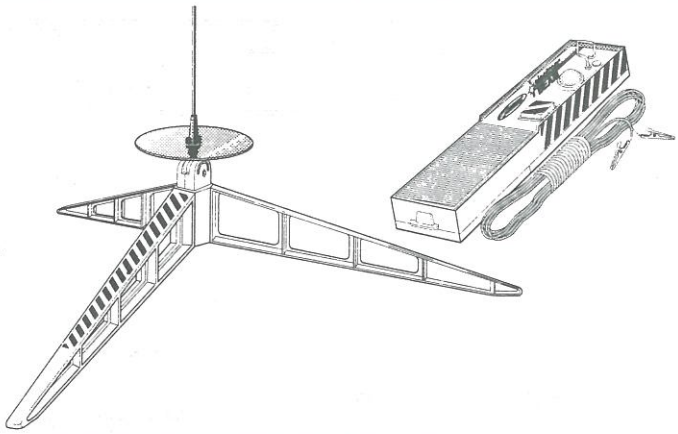
Part Four: Flight Preparation

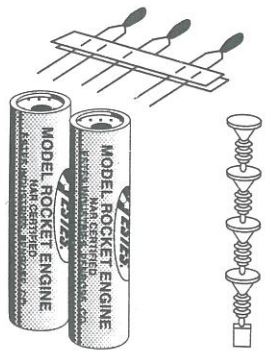
1. LAUNCH SUPPLIES

To launch your shuttle you will need the following items:

- Estes Electrical Launch Controller and Launch Pad
- Recommended Estes Engine: C6-3 (First Flight)

All Estes engines include igniters and igniter plugs. Use only Estes products to launch this glider.



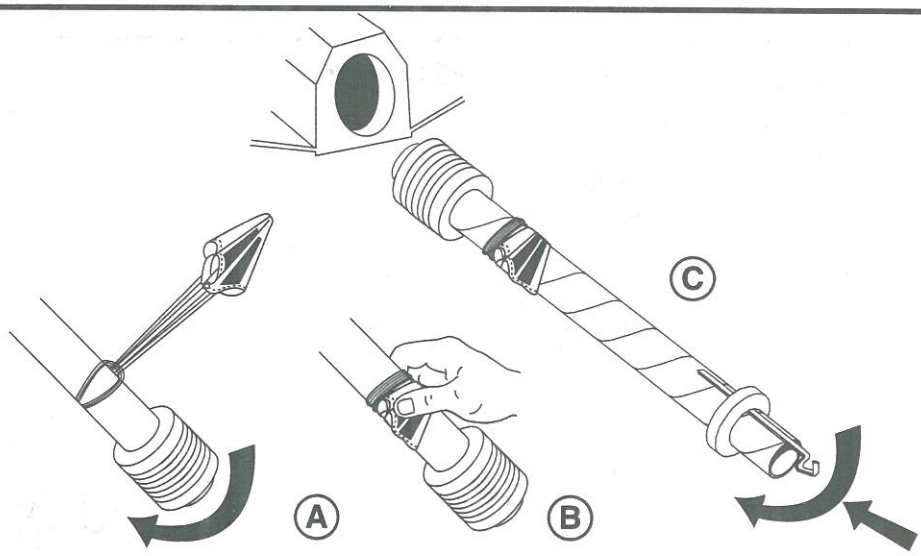


2. RECOVERY SYSTEM PREPARATION

A. ☐ Pull 'chute into spike shape, and roll shroud lines around engine pod.

B. ☐ Roll 'chute around pod, and hold in place.

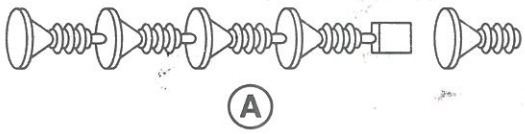
C. ☐ Insert pod into shuttle. Roll pod and parachute as you slide pod into shuttle. Push pod all the way into shuttle.



3. ENGINE/IGNITER INSTALLATION

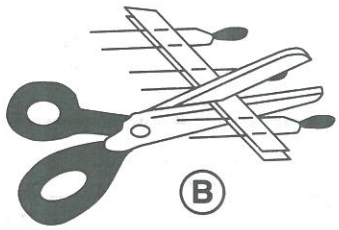
Note: Always launch your rocket by electrical means only. Our professionally engineered system uses an electrical igniter and color-coded igniter plug. The plug holds the igniter against the engine propellant so positive ignition will occur. The plug is ejected at ignition and may be recovered and used again. Follow this easy procedure to ensure reliable operation.

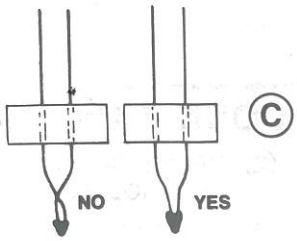
- **A.** ☐ Separate one igniter plug from its tree as shown. The plugs are color-coded to fit specific engine sizes. A tag attached to the tree also designates which engines may be used with a certain plug.
- **B.** ☐ Carefully remove the staple holding the igniters in paper. Cut one igniter from the strip as shown.
- **C.** ☐ Igniter will fail if wire leads touch. Gently separate wires if necessary.
- **D.** ☐ Hold engine upright, drop igniter into nozzle. Note: Igniter must touch propellant.
- **E.** ☐ Insert igniter plug.
- **F.** ☐ Firmly push the plug all the way in.
- **G.** ☐ Bend igniter wires into loops to allow a more positive micro-clip attachment.
- **H.** ☐ Push end of engine hook back and insert engine into mount tube. Hook must latch securely over end of engine to hold it in place.
- **I.** ☐ Engine must be rotated so igniter is NOT aligned beneath launch lug
- **J.** ☐ Your shuttle is now prepared for flight.

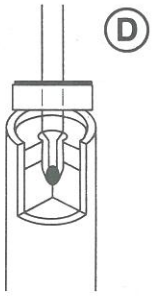


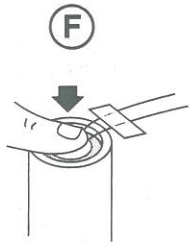
The following is a list of engine size and respective color of the igniter plug. Engines will be color-coded to match the plug color.

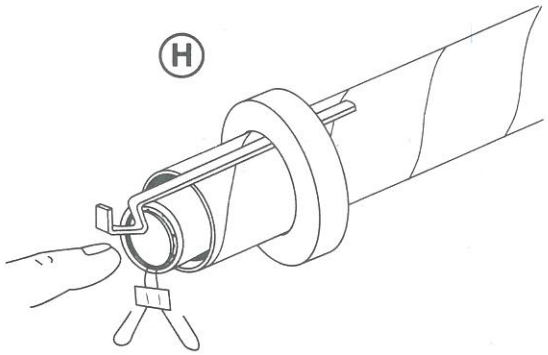
Engine Type and Color	
A3	- ORANGE
A10	- GREEN
A8; B4	- YELLOW
B6; C6	- MAGENTA
B8; C5	- BLUE
D12	- WHITE











Part Five: Launch & Recovery

A. FLYING YOUR SHUTTLE

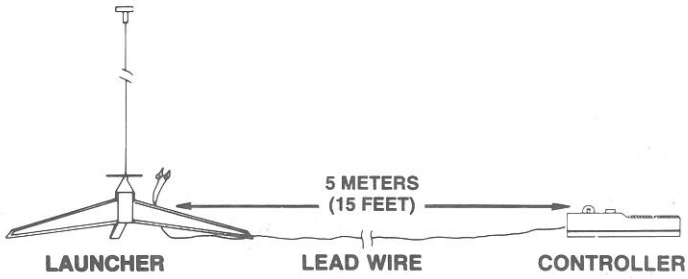
Set up launch pad in an open area. Choose a large field away from power lines, tall trees, and low flying aircraft. Try to find a field at least 76 meters (250 feet) square. The larger the launch area, the better your chances of recovering your glider. Football fields and large playgrounds are great.

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

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

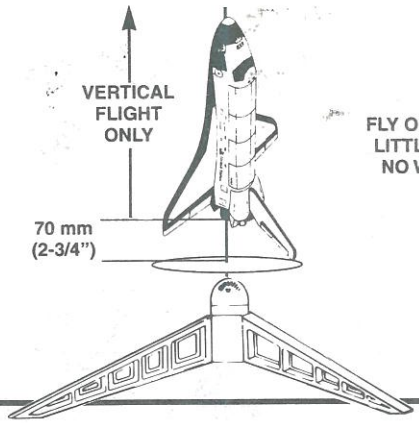
Don't leave parachute packed more than a minute or so before launch during cold weather (colder than 4˚ Celsius - 40˚ Fahrenheit).

Parachute may be dusted with talcum powder to avoid sticking.



B. ☐ PAD ADJUSTMENT

Your Porta-Pad® II can be adjusted by loosening and tightening the wing nut. **Only fly your Space Shuttle™ with the Porta-Pad® II pointing straight up, do not angle the launch pad. Apply tape to the launch rod so that the shuttle is 70 mm (2-3/4") off the blast deflector.**



FLY ONLY IN LITTLE OR NO WIND

C. ☐ 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).

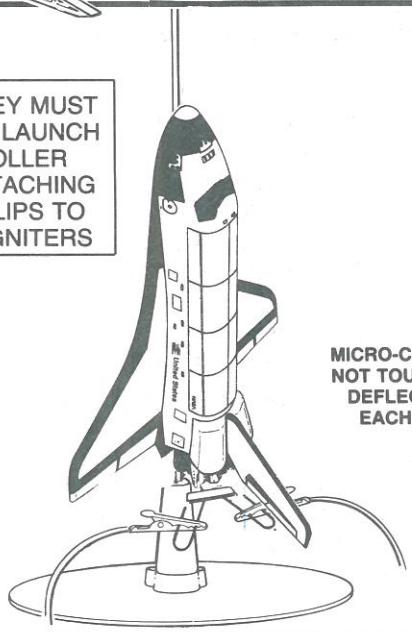
⑥ INSERT SAFETY KEY to arm the launch controller.

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

LAUNCH!!

PUSH AND HOLD LAUNCH BUTTON UNTIL ENGINE IGNITES

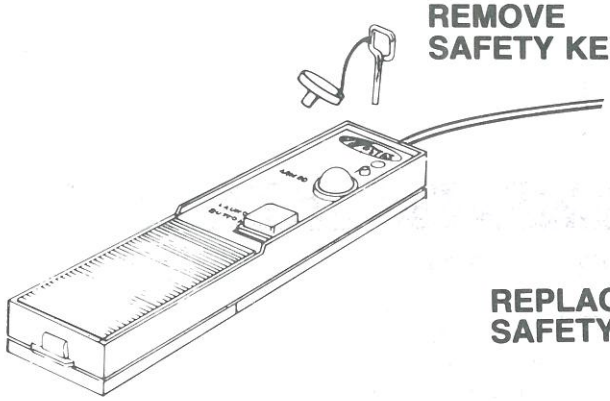
SAFETY KEY MUST NOT BE IN LAUNCH CONTROLLER WHEN ATTACHING MICRO-CLIPS TO ENGINE IGNITERS



MICRO-CLIPS MUST NOT TOUCH BLAST DEFLECTOR OR EACH OTHER

D. ☐ POST-LAUNCH SAFETY

REMOVE SAFETY KEY FROM LAUNCH CONTROLLER. KEEP KEY WITH YOU OR REPLACE SAFETY KEY AND SAFETY CAP ON LAUNCH ROD.



E. ☐ 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. Repeat the countdown and launch procedure.

The full line of Estes products is available from most toy and hobby shops and many chain stores. Or for more information, write:
Estes Industries
P.O. 227, Penrose, CO 81240.

FOR YOUR SAFETY AND ENJOYMENT

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

*National Association of Rocketry