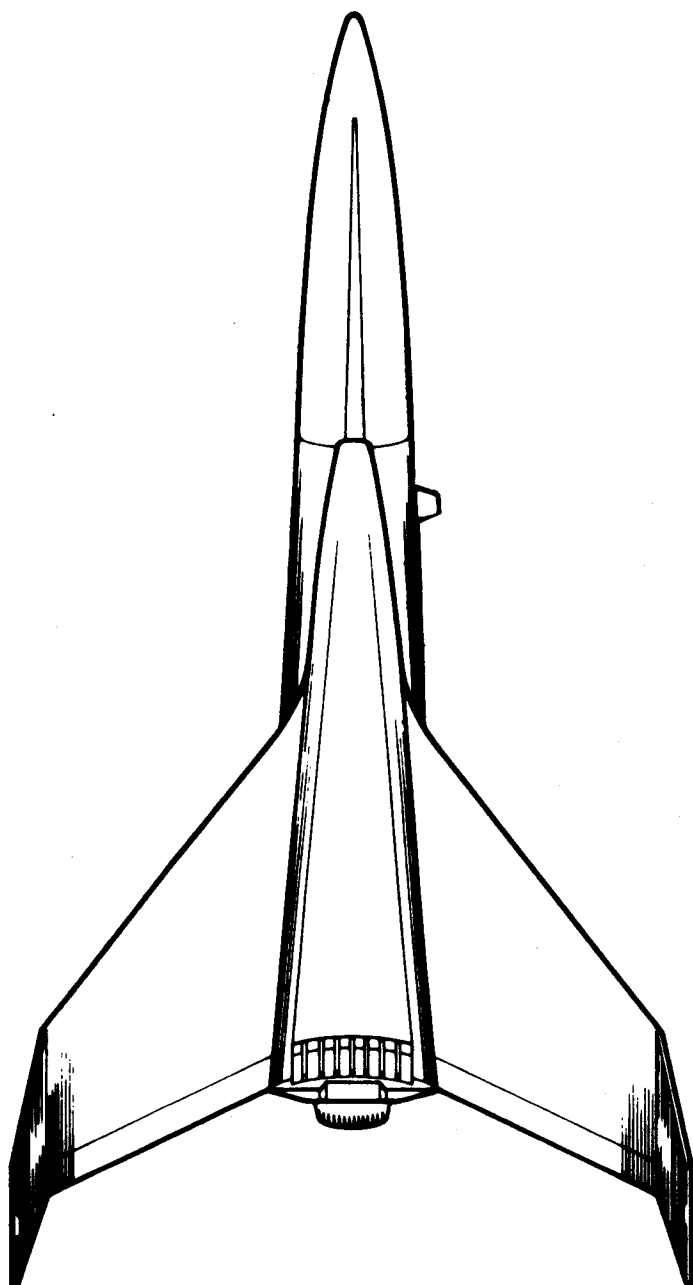


# OFFICIAL ROCKET FLIGHT MANUAL



foremost in  
ready to fly  
rockets

# SPACE SHUTTLE AMERICA



Watch how your mothership blasts off with the orbital shuttle craft gliders securely locked in place. At apogee you'll see the mothership deploy its parachute and simultaneously release the gliders. These special design warp-resistant delta wing craft then transition to a smooth glide almost instantly. After a high performance glide, both vehicles touch down gently and are ready for another exciting flight.

Inherent design stability means no trimming knowledge is required — the shuttle craft glide perfectly right out of the box! In fact, you'll find that glide efficiency and the resulting flight durations cause the biggest problem — mainly, you can lose your gliders when using the more powerful rocket engines. To prevent this always have friends along to help spot and recover the gliders when flying your Space Shuttle America!

Common clay, available at local hobby shops, can be used to trim the gliders to achieve custom glide characteristics. Since the gliders were designed to fly straight ahead the clay can also be used to add some left or right turn. A gliding turn will help keep you control how far the shuttle craft lands the launch site.

A small amount of clay on the left wing tip produces a left turn. A small amount on the right wing tip gives a right turn. If a glider mushes in flat or stalls (nose-up) add a bit of clay to the nose. If it glides excessively fast or dives (nose down) add some clay to the tail end. Trying to observe both gliders simultaneously during a rocket powered test flight can be quite confusing. For quickest re-trimming results concentrate on watching only the red (or the blue) glider alone.

Lastly, note that displaying or storing your Space Shuttle in the launch configuration (where it rests on the four fin tips) may cause slight wing warpage. If wing warps are found, untwist by hand until the main portion of the wing is flat.

## IMPORTANT

Cox's SPACE SHUTTLE AMERICA, which is composed of a mothership and two orbital shuttle craft gliders, is unique because the glider's wings act as the rockets stabilizing fins during boost. Without both gliders in place the rocket would be unstable and therefore unsafe to launch. Never attempt to launch the mothership alone or with only one glider attached!

**ADULT SUPERVISION IS RECOMMENDED WHEN FLYING MODEL ROCKETS**

Some states require a minimum area of 5,000 square yards of clear area as a rocket launch site. If in doubt about your State's requirements, contact your local Fire Marshal.

# YOUR SPACE SHUTTLE AMERICA MODEL ROCKET

## INTRODUCTION

Before any attempt is made to launch your SPACE SHUTTLE AMERICA, you and your adult supervisor should understand the rocket. A complete description is provided here to give you this basic familiarization and also to satisfy your curiosity as to how the rocket functions. The knowledge gained will be your insurance for success — meaning maximum safety, reliability and performance.

## PARACHUTE

Deployed automatically by the rocket engine ejection charge. Provides the necessary aerodynamic braking to slow the mothership's descent for an undamaged recovery.

CLIP THE PARACHUTE AROUND THE SHOCK CORD AS SHOWN.

## FINS

The initial rocket trajectory is established by the guidance of the launch rod. Once in free flight the glider's wings provide the necessary aerodynamic stability to keep the entire rocket on course. The rocket will be **unstable** if one or both gliders are not in place!

## REAR BODY TABS

Slides into jet exhaust of each glider to secure it during boost.

**MOTHERSHIP NOSE CONE**

**NOSE TABS**

Slides into the jet intake of each glider to secure it to the mothership. This positive lock prevents early glider release.

**ELASTIC SHOCK CORD**

Once the parachute fully opens it slows down the rocket speed very rapidly. The large pulling forces that occur between the parachute and the rocket body during this interval of high deceleration are absorbed by the elastic shock cord.

SECURELY TIE THE ELASTIC SHOCK CORD TO THE ROCKET BODY AND THE NOSE AS SHOWN. BE SURE TO USE DOUBLE KNOTS.

**NOTCH**

Properly aligns nose cone with rocket body and gliders.

**WADDING**

The parachute recovery system is deployed automatically by the high pressure hot gases generated by the rocket engine's built-in ejection charge. A layer of flameproof wadding PROTECTS the plastic parachute from being melted by these gases.

**PARACHUTE BULKHEAD**

Keeps the wrapped parachute up near the nose cone for easy ejection.

**ORBITAL SHUTTLE CRAFT GLIDER**

**TWIST LOCK ENGINE RETAINER**

Prevents rocket engine from kicking backwards and out when parachute ejection charge is activated. You want the parachute to be ejected — not the rocket engine. ALWAYS secure the rocket engine with the Engine Retainer!

## SPACE SHUTTLE AMERICA PERFORMANCE CHART

ENGINE TYPE	PEAK ALTITUDE	MAXIMUM SPEED
BRAVO B6-2	150 FEET	70 MPH
CHARLIE C6-2	300 FEET	105 MPH

### ONLY USE 2 SECOND DELAY ENGINES

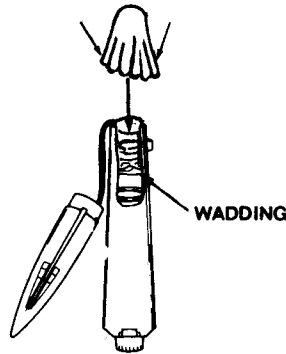
(Use of 4 or more seconds delay time is too long. The rocket will already have fallen back to earth before glider separation and parachute deployment occurs.)

# PREPARING THE SPACE SHUTTLE AMERICA FOR FLIGHT

## 1 INSERT WADDING

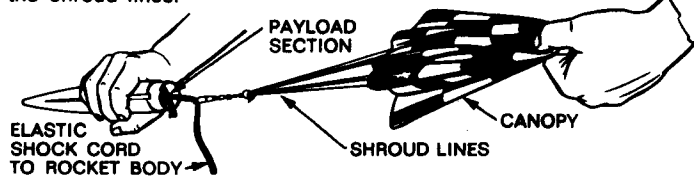
Loosely stuff a 2 1/2 inch square of the flame proof wadding down into the rocket body. Insert the edges of the wadding first as shown. This is very important and is required to achieve a proper gas seal around the edges adjacent to the body.

Thus, instead of leaking past and melting the parachute, the hot ejection charge gasses push against the wadding making it work as a piston. This piston-like action separates the nose cone from the rocket body, deploys the recovery system, and releases the two gliders.



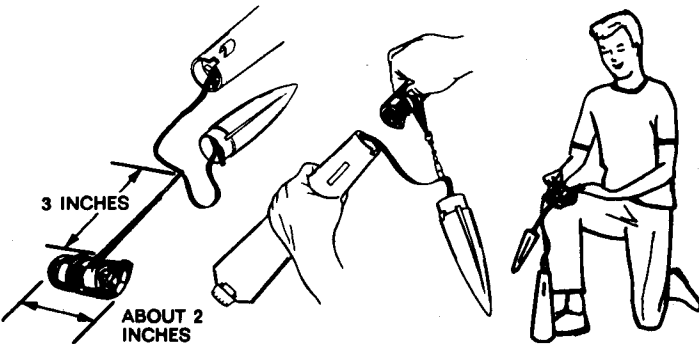
## 2 PACK PARACHUTE

Grasp the center of the parachute canopy as shown and untangle the shroud lines.



Then, starting from the center of the canopy, tightly roll up the parachute and shroud lines to form a small circular cylinder about 2 inches long. As shown below, your knee can be used as a "handy field bench" when rolling up the parachute.

Leave about three inches of the shroud lines unrolled.



Next insert the parachute into the rocket body. Remember the parachute must fit loosely for easy ejection.

Finally insert the elastic shock cord and remaining shroud lines into the body so that the nose can be mated to the rocket body to grip both gliders (using the notch as an alignment guide). Avoid jamming any shroud line, or plastic parachute material between the main body and the nose cone as this extra friction may prevent the nose cone from blowing off.

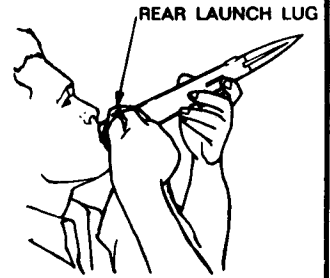
It is recommended that prior to first flight, you lightly rub talcum powder or cornstarch onto both sides of the parachute surface. This prevents the parachute folds from sticking to one another which helps insure positive chute opening.

After a series of flights, carbon residue from the ejection charge builds up on the payload section — body tube mating surfaces. To assure consistent smooth separation, occasionally clean these surfaces by washing them with a wet rag, tissue, or wadding.

In addition to the above, one special parachute packing rule must be observed. Do not prepack the parachute at home before going out to launch. Plastic parachutes tend to retain their folded shape and may not fully deploy if they sit tightly packed for more than half an hour.

## 3 PREFLIGHT TEST

Prior to first flight, pretest your parachute packing technique by blowing a hard puff of air into the SPACE SHUTTLE MOTHERSHIP as shown to simulate the action of the engine's ejection charge. If you can't blow the parachute out, it means everything is too jammed in. Don't expect the engine to be able to blow the recovery system out in flight if you can't!



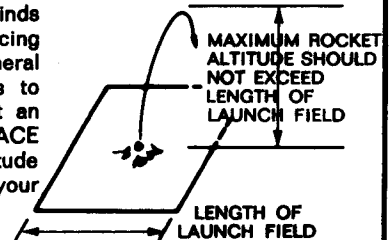
Reread wadding and parachute packing steps 1 and 2 if necessary.

**NOTE:** To prevent most of the air puff from escaping out the side, use a handkerchief to seal the rear launch lug holes when performing the chute deployment test.

## 4 SELECT ENGINE

Cox does not supply engines. There are several brands of standard size engines which fit Cox rockets. Visit your local hobby shop to purchase engines. Select engine size recommended in your Space Shuttle America PERFORMANCE CHART.

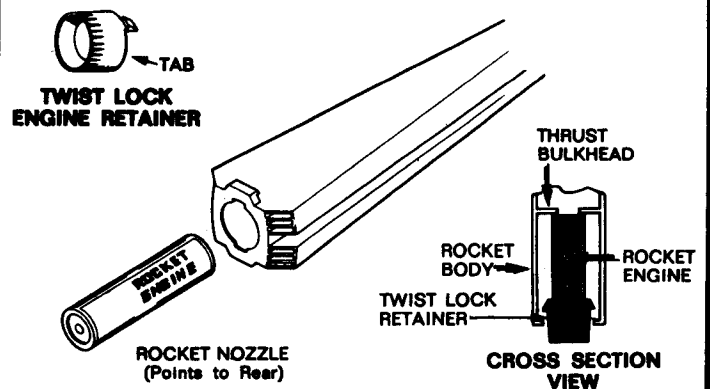
Available flying site size and winds are two good reasons for reducing the engine power used. A general rule of thumb for newcomers to rocketry to follow is to select an engine which will lift the SPACE SHUTTLE AMERICA to an altitude no greater than the length of your flying site.



The above rule of thumb for a flying site size is only reasonable when winds are mild or perfectly calm. In windy conditions the gliders will drift a greater distance from any given altitude. Using Charlie power in a 20 mile per hour wind condition will result in your SHUTTLE drifting a considerable distance from its lift off point. The possibility of losing the mothership or one of the gliders becomes a problem.

## 5 INSTALL ENGINE

Slide the engine, which you have selected, up into the rocket body until it rests firmly against the thrust bulkhead.



Next align the TWIST LOCK tabs with the rocket body notches and push the retainer up into the body. Then twist clockwise until tight. To remove it after a flight, turn it counterclockwise until tabs on the retainer align with slots in rocket body.

# LAUNCHING THE SPACE SHUTTLE AMERICA

## 1 PREPARE LAUNCHER

Read the instructions enclosed with the LAUNCHER and Rocket Engine you purchased separately.

Upon reaching your flying site set up the LAUNCHER on level ground, or adjust the legs so the LAUNCH ROD is vertical.

Unroll the ignition leads to position the LAUNCH CONTROLLER as far from the LAUNCHER as possible. Before doing anything else REMOVE the SAFETY KEY from your LAUNCH CONTROLLER and keep it in your pocket until you are ready to ignite the rocket engine.

Now you can install the batteries in the LAUNCH CONTROLLER according to the instructions provided with the LAUNCHER you purchased.

The SAFETY KEY is the system's master switch. When the key is with you it is perfectly safe to approach an armed rocket and you can be confident that no inadvertent ignition will occur while you're handling the rocket.

With the SAFETY KEY in your hand (or in the hands of your adult supervisor) you can now approach the launcher to mount your SPACE SHUTTLE. Part of your normal countdown procedure at this time should include a recovery system check. If the parachute has been sitting packed in the rocket body for over half an hour or if temperatures are near freezing, repack the parachute at this time for maximum recovery reliability.

Mount the rocket by sliding the upper and lower launch lugs over the launch rod. BE SURE to rotate the MOTHERSHIP around on the launch rod so that the hot rocket engine exhaust gases at lift off will impinge on the metal blast deflector rather than on the plastic base.

NEVER ATTEMPT TO LAUNCH THE MOTHERSHIP ALONE OR WITH JUST ONE OF THE GLIDERS IN PLACE!

SLIDE DOWN OVER LAUNCH ROD (DO NOT LEAN OVER ROD WHEN MOUNTING ROCKET)

ROCKET ENGINE MUST BE POSITIONED OVER BLAST DEFLECTOR FOR LAUNCH

BLAST DEFLECTOR

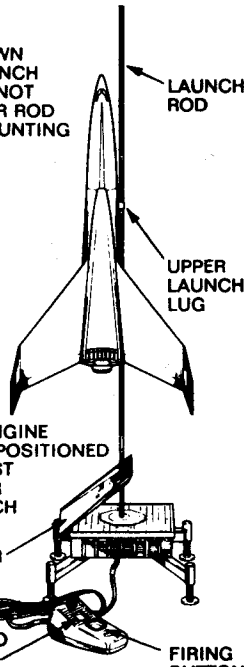
SAFETY KEY

SYSTEM GO LIGHT

LAUNCH ROD

UPPER LAUNCH LUG

FIRING BUTTON

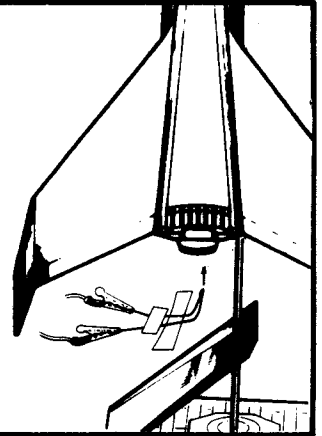


## 2 INSTALL SAFETY IGNITER

Now you can proceed to arm the rocket for launch. First the igniter (supplied with the rocket engines you purchased) should be inserted up into the engine nozzle. Follow the directions supplied with the engines you purchased.

Make certain the SAFETY KEY is out of the LAUNCH CONTROLLER, then gently connect the miniature alligator clips to the igniter wires.

This completes the arming of the rocket and you can return to the LAUNCH CONTROLLER. At this time request any spectators to move back behind you and your adult supervisor.



## 3 GO FOR LAUNCH

The SAFETY KEY can now be reinserted into the LAUNCH CONTROLLER switch. The SYSTEM GO light should appear, meaning electrical power is ready and the ignition circuit is armed. Once you have verified that no low flying aircraft are overhead start a LOUD countdown from TEN to alert the spectators. Press the firing button just as you reach ZERO in your countdown and hold it firmly until the rocket engine ignites.

Your SPACE SHUTTLE AMERICA will then blast off and streak skyward.

The tense moments are over once you spot the white puff of smoke near the peak altitude. The nose cone blows out, the mothership's chute deploys, and the two shuttlecraft begin gliding smoothly back to earth. Retrieve the gliders after they land and you're ready for another exciting flight.

**DO NOT INSTALL IGNITER UNTIL LAUNCH TIME!**



## REPLACEMENT PARTS

Dear Customer:

We have listed those items which are most likely to require replacement during the life of this product. We have also included an exploded assembly drawing which identifies all replacement items available.

**Ordering Instructions:** You may order parts from Cox by telephone or mail. Orders may be charged to your Visa or MasterCard. For a credit card order please give the following information: Name, card number and expiration date. For other orders please send check or money order made payable to Cox Hobbies for the full amount including the following postage and handling charges:

The following postage and handling charges must be added to order:

ORDER SIZE	POSTAGE & HANDLING CHARGES
\$ .00 to \$ 5.00	\$ 1.00
5.01 to 10.00	2.00
10.01 to 20.00	3.00
20.01 to 30.00	4.00
30.01 and over	5.00

Insured packages—Add \$1.00

International Orders—Please pay with International Money Order only. Add \$5.00 additional for postage.

California residents add state sales tax.

Allow 2-3 weeks for delivery.

### TELEPHONE ORDERS

Call the COX COURTESY LINE Toll Free 800/451-0339 8:00 AM until 4:30 PM Pacific Time. Monday to Friday. VISA or MasterCard only.

### MAIL ORDERS

Send check, money order, VISA or MasterCard number to COX Customer Service Department, 350 West Rincon Street, Corona CA 91720

CAT. NO.	DESCRIPTION	LIST PRICE
5200100D	Main Body	\$ 4.00
5200200D	Nose Cone	3.00
5200300F	Glider (red)	3.50
5200300T	Glider (blue)	3.50
52000400	Sticker Sheet	1.50
5000012	Parachute	3.00
5051010B	Engine Retainer	2.00
5000100	Wadding	1.00
5000200	Shock Cord	.50

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### COX HOBBIES, INC.

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