

MODEL ROCKETRY

**ESTES**

SCIENTIFIC SPACE AGE HOBBY



**1966  
MODEL ROCKET  
SUPPLIES CATALOG**

*Dedicated to Safety and Education in Rocketry*

ESTES INDUSTRIES INC. PENROSE, COLORADO

CAT. NO. 651



## WHAT IS MODEL ROCKETRY?

Imagine the thrill of pressing the launch switch and watching a rocket you have built roar skyward in a cloud of smoke, leaving a vapor trail behind as it shrinks into just a speck. Then at the apex of its flight, a parachute blossoms out, returning the rocket gently to earth, ready for another flight.

But there is more to model rocketry than this. Not only is it thrilling, but it provides an unexcelled opportunity to study and learn space science, to begin studying for a career dedicated to pushing man's frontiers farther and farther towards the stars. Scores of young rocketeers today are finding the value of model rocketry in science fair projects, school projects, and in their own private research programs.

Today's youth are finding model rocketry an ideal means for aiding their studies of aerodynamics, math, physics, optics, biology, space medicine, astronautics, electronics, photography, and psychology. They also find it of great value as a stimulant to the study of the non-science fields such as language arts, history, and literature. These young people who today are pursuing, on their own, a study of the sciences with model rocketry are a vital part of the new generation of scientists. These are the people who will explore the planets and beyond.



How does model rocketry accomplish this? A model rocket itself is a highly specialized mechanism, light in weight, utilizing nonmetallic materials such as paper, plastic, and balsa. Standard modeling tools are used to assemble the rockets. By using these materials, the model rocketeer gains the highest performance from a prepackaged commercial engine, and is able to launch accelerometers, biological specimens, electronic instruments, and many other objects inexpensively, reliably and above all, without the dangers often associated with non-professional rocketry.

The model rocketeer does not make his own engines or mix his own propellants, for he realizes that he does not have the facilities and background to do so either efficiently or safely. Instead, he makes use of propellant devices which are pre-made, providing him with a reliable power package which is consistent from one unit to the next. This introduces an element of control into his experiments and enables him to reduce and correlate his data more readily and accurately. He can now draw conclusions from his experiments which would otherwise have been only conjecture.

The type of youth science study provided by model rocketry has no equal for developing active minds which can explore new concepts and principles. Practical experience, gained from working with the same principles, theories and ideas which will be used in his profession, is necessary if today's young person is to be motivated to study for a vital career in the space sciences. When motivated he becomes a pioneer, a pioneer of the greatest frontier man has ever faced.



## GET STARTED THE EASY WAY

*Beginners Specials Give You The Best Start In Model Rocketry*

The complete outfit for getting started in model rocketry — the Beginners special contains the basic equipment for learning to build and fly model rockets. Whether you're looking for a science project or an enjoyable hobby, the Beginners Special will give you the best start.

Included in the special is the WAC Corporal rocket kit — a scale model that helps you learn about rocket stability and parachute recovery. You also get two engines for flying your model, a comprehensive manual of information on model rocketry, a launcher that will serve your needs for years and batteries to power the launcher. All this comes to you at a single, reduced price of only **\$6.00**.

**Cat. No. 651-SK-6** .....only **\$6.00** each

- 1 WAC Corporal kit #K-11
- 1 Design Booklet #P-1
- 1 Electro-Launch #FS-1
- 4 Batteries #PFB-1
- 1 Engine #½A.8-2
- 1 Engine #A.8-3

## ASSEMBLY SPECIAL

**A Complete Construction And Finishing Set**



All the tools and supplies recommended for assembling and painting most model rockets — in one convenient package. Ideal for the beginner who doesn't already have modeling equipment, this set helps you build the best models right from the start.

### **\$3.00 ASSEMBLY SPECIAL INCLUDES:**

- |                                 |         |                      |        |
|---------------------------------|---------|----------------------|--------|
| 1 Bottle White Glue             | #WG-1   | 1 Knife              | #KNS-3 |
| 3 Emery Boards                  | #BE-1   | 18 Sheets Sandpaper  | #SPA-2 |
| 3 Sheets Sanding Material       | #SP-320 | 3 Paint Brushes      | #PB-3  |
| 1 Bottle Sanding Sealer         | #SS-1   | 1 Bottle Orange Dope | #BRD-1 |
| 1 Bottle Silver Dope            | #BRD-1  | 1 Bottle White Dope  | #BRD-1 |
| 1 Bottle Dope Thinner           | #BDT-1  | 1 Roll Masking Tape  | #MT-1  |
| 1 Gold Mine Special Decal Sheet | #D-5    | 1 Bottle Black Dope  | #BRD-1 |

Shipping weight 1 lb., 8 oz.

**Cat. No. 651-CK-3A** ..... **\$3.00** each postpaid

### **ALSO AVAILABLE — THE \$2.00 BEGINNERS SPECIAL**

Recommended for beginners who have access to a launcher or wish to design and build their own. The \$2.00 Beginners Special includes:

- |                    |              |                  |             |
|--------------------|--------------|------------------|-------------|
| 1 WAC Corporal Kit | .....#K-11   | 1 Design Booklet | .....#P-1   |
| 1 Engine           | .....#½A.8-2 | 1 Engine         | .....#A.8-3 |

Shipping weight 12 oz.

**Cat No. 651-SK-2** ..... **\$2.00** each postpaid

## DESIGN AND CONSTRUCTION

Most model rockets, though varying greatly in appearance and purpose, use certain basic components. These include the nose cone or payload section, body tube, engine retainer, fins, launch lug, and recovery system. The arrangement of these parts in a working model rocket is shown in the plan. The functions of the various parts are explained on the next page.

While the range of possible sizes for model rockets is quite great, three body diameters have become the most popular. These are the .710" i.d. (BT-20), .950" i.d. (BT-50) and 1.595" i.d. (BT-60). Parts which fit these tubes are identified by their numbers. For example, a BNC-20N fits a BT-20, a BNC-60L fits a BT-60 and a TA-2050 adapter mates a BT-20 to a BT-50. The other tube sizes available follow the same system. Thus the EB-30 engine block, the BNC-30E nose cone, the PS-30B payload section and the NB-30 nose block all fit the BT-30 body tube.

All parts are manufactured to close tolerances, assuring the builder a precision fit and good appearance. When, after building several kits, the rocketeer is ready to begin designing his own models, he will find that the complete range of precision mating parts makes construction both easier and more satisfying for him.



### RECOVERY SYSTEM

Slows the rocket's descent from peak altitude to bring it back to earth undamaged and in reusable condition. This model uses a parachute which is deployed by the ejection charge built into the engine.

### PAYLOAD SECTION

Accommodates small biological specimens, instruments, etc. On models designed purely for sport or high performance, the payload section is often omitted and the recovery system is attached directly to the nose cone.

### BODY TUBE

Serves as the basic airframe of the model. Generally all other parts of the rocket are attached in some manner to the body.

### LAUNCH LUG

A tube which fits over the launch rod to guide the model along the rod for the first few feet of its flight, keeping it going straight until it is moving fast enough for the fins to guide it.

### FINS

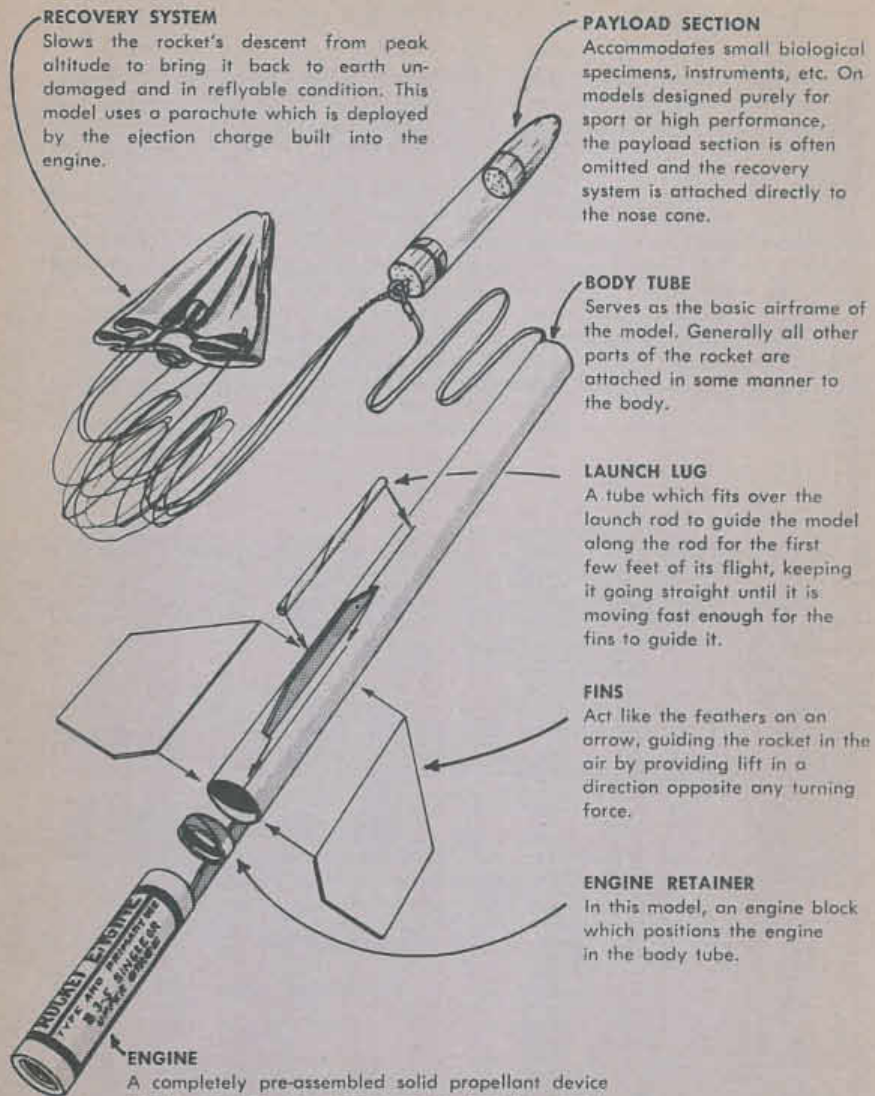
Act like the feathers on an arrow, guiding the rocket in the air by providing lift in a direction opposite any turning force.

### ENGINE RETAINER

In this model, an engine block which positions the engine in the body tube.

### ENGINE

A completely pre-assembled solid propellant device which provides the motive power for the model. In addition, single and upper stage engines contain a delay charge, activated when the propellant is exhausted, which allows the model to coast up to its peak altitude before it in turn activates the ejection charge to deploy the recovery system.



# SAFETY

Since 1960 model rocketeers across the country have flown more than 3 million model rockets. During this time they have established one of the best safety records of any sport or hobby. While no exact data is available, it is known that model rocketry is considerably safer than most "normal" sports such as hunting, swimming, bicycling, football and baseball.

Several things contribute to this safety record. Such hazardous operations as mixing and loading propellants are eliminated by the use of a pre-manufactured engine. The model rocket itself has a great margin of safety built into it. Model rockets are built of lightweight balsa and paper so that they absorb any impact rather than the object struck. The model rocket spends very little of its flight near the ground — most of its flight is several hundred feet away from **anything**. Finally, model rocketeers themselves have contributed greatly by following a recognized safety code such as the one reprinted below. The newcomer to model rocketry will do well to follow this safety code too. Not only will it add to the safety of his activities, but will make model rocketry more enjoyable and more valuable also.

**SAFETY CODE:** As a model rocketeer I will act in a mature manner with safety foremost in my mind in all my model rocket activities and will obey this safety code at all times.

1. I will not attempt to compound propellants or other combustible chemicals or tamper with pre-manufactured rocket engines. I will not use model rocket engines for purposes other than those for which they are recommended by the manufacturer. I will inspect each rocket engine before use and never use an engine which shows signs of physical damage, remembering that any rocket propellant can be explosive under certain conditions.
2. I will not smoke near rocket engines, launch my rockets in the presence of highly combustible materials, use flammable recovery wadding or engage in any activity which would present a fire hazard.
3. I will never use any metallic rocket engines, will not construct my model rockets with substantial metal parts in the area of the engine, and will not launch any rocket over 16 ounces in weight or containing more than 4 ounces of propellant in compliance with Federal regulations.
4. My model rockets will be electrically ignited, using a launch system with either a switch protector or a safety interlock to prevent accidental ignition of the rocket engine, and I will remain at least 10 feet away from any rocket which is being launched. I will use only igniters of the type recommended by the engine manufacturer.
5. I will launch my model rockets using a launching rail or other suitable guide means aimed within 25 degrees of the vertical to assure a safe and predictable flight path, and will launch only rockets whose stability characteristics have been predetermined.
6. I will not fly model rockets in high winds, conditions of low visibility, in the vicinity of low flying aircraft, near tall buildings, near people not aware of the launching, or under any conditions which might endanger property or persons.
7. I will not launch rockets so that their ballistic trajectory will carry them against targets on the ground, and will never use an explosive warhead or other pyrotechnic payload in a rocket.
8. My model rockets will contain recovery devices which will deploy at an altitude of at least 50 feet to return the rocket safely and undamaged. To insure proper operation of my rocket's recovery system I will make a careful pre-launch inspection of all the recovery components with special attention to tightness of the engine and nose cone.
9. To prevent accidental eye injury I will always either place the launcher so the end of the rod is above eye level or cap the end of the rod with my hand when approaching it. I will not place my head or body over the launching rod.
10. When conducting research activities with unproven designs or methods I will, when technically possible, determine their reliability through pre-launch static tests, and I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launching.

## Get The Most From Model Rocketry

...by following a carefully planned course of study and experiments. By starting out with simple models and working up to the more complex ones, you'll have more successful flights, enjoy your studies more and learn more. By studying technical reports and other available literature you'll gain a solid knowledge of model rocketry that will serve you well in other areas of science.

To help you plan your own studies in model rocketry, here's a suggested program. With this program you tackle more advanced subjects after mastering the basic ones.

1. Build and fly the WAC Corporal. Study the rocket's design and read the included report, TR-1, to gain a thorough understanding of the principles of rocket stability which are so very important to proper rocket performance.
2. Extend your knowledge of stability by building and flying the Astron Scout.
3. Study Technical Report TR-9. Apply the principles described in it in designing, building and flying your own single stage model.
4. Build and fly the Astron Apogee. Study TR-2 (included with the kit) to master the principles of multi-staging.
5. Build and fly the Astron Farside to gain further experience in multi-staging and gain a broader knowledge in the field.
6. Design, build and fly your own multi-stage model, practicing the techniques you learned with the Apogee and the Farside.
7. Learn the principles of rear engine boost-gliders by building and flying the Astron Space Plane and studying the included report, TR-4.
8. Build the Astron Falcon to learn the principles of front engine boost-gliders and gain further experience in the art of balancing for maximum performance.
9. Design, build and fly your own boost-glider, applying the principles you have studied while working with the Space Plane and the Falcon.
10. Get started in clustering by building and flying the Astron Cobra and studying TR-6 (included with the kit).
11. Practice what you've learned by designing, building and flying your own cluster rocket.
12. Start your own special research program. Aerial photography, space medicine, electronics, meteorology, physics and aerodynamics are but a few of the fields open to the ambitious model rocketeer.



Once you've started, don't stop. The whole universe is yours to explore. As you train yourself to be a competent scientist, you'll find more and more new fields opening for you. Don't be afraid to be curious. Curiosity gave us the electric light, the radio, the automobile and the airplane. Your curiosity may well give man things he has never dreamed of.



## WHERE TO LOOK FOR TECHNICAL INFORMATION

Note: Publications in which an article is reprinted are listed in parentheses after the primary source of the article or information.



**Acceleration** — MRN V4-N2

**Altitude Tracking** — TR3, (Design Booklet, Best from Vols. 1 & 2, MRN V3-N1)

**Basic Construction** — MRN V4-N3, Design Booklet

**Bibliography** — TR-8

**Body Tube Making** — Design Booklet

**Boost-Gliders** — TR-4, (MRN V3-N3, Design Booklet), TR-7, (MRN V4-N3)

**Cluster Rockets** — TR-6, (MRN V3-N4, Design Booklet)

**Displaying Models** — MRN V5-N1  
**Drag** — MRN-V4-N2

**Estes Industries** — MRN V3-N2

**Fin Design** — TR-1, (Design Booklet), TR-9, (MRN V5-N2), MRN V3-N3

**Glossary** — Best from Vols. 1 & 2  
**Ignition (engine)** — Engine Instructions

**Mathematics** — MRN V4-N2, MRN V4-N3

**Multi-Staging** — TR-2, (MRN V4-N1, Design Booklet)

**Nose Cone Making** — Design Booklet

**Parachute Recovery** — MRN V4-N1, (Design Booklet)

**Payload Rockets** — Design Booklet, Best from Vols. 1 & 2

**Recovery Systems** — Design Booklet, MRN V4-N1, MRN V5-N2

**Safety** — MRN V3-N3, MRN V5-N1, Best from Vols. 1&2, Why Model Rocketry

**Science Fairs** — MRN V3-N1, MRN V3-N4

**Sectional Construction** — MRN V4-N2

**Specific Impulse** — MRN V4-N3

**Stability** — TR-1, (Design Booklet), TR-9, (MRN V5-N2), MRN V3-N3

**Study Guide** — TR-8

**Test Stands** — MRN V3-N1, MRN V4-N3

**Wind Tunnels** — TR-5, (Design Booklet)

**Writer's Program** — MRN V4-N2

## ... FOR MODEL ROCKET PLANS



**Aerobee-Hi (Semi-scale Model)** — MRN V5-N2

**Arrow C (Sport Model)** — Design Booklet

**Big Bertha (Demonstration Rocket)** — Design Booklet, MRN V3-N2

**Buchanan Buster (Odd Ball Rocket)** — MRN V3-N1

**Bug-A-Bye (Payload Rocket)** — Design Booklet, Best from Vols. 1 & 2

**Cloud Buster (Sport Model)** — Best from Vols. 1 & 2

**Cobra (Cluster Rocket)** — MRN V3-N4

**Commuter (Sport Model)** — MRN V5-N1

**Deacon (Two Stage Rocket)** — MRN V4-N3

**Dirty Bird (Sport Model)** — Design Booklet, Best from Vols. 1 & 2

**Flying Jenny (Boost-Glider)** — MRN V4-N2

**Loadlifter 1A (Payload Rocket)** — Design Booklet, MRN V4-N1

**Mini-X (Two Stage Rocket)** — Design Booklet

**MMSV-II (Two Stage Rocket)** — MRN V4-N1

**Moonnik I (Odd Ball Rocket)** — MRN V3-N3

**Orange Bullet (Altitude Rocket)** — Design Booklet

**Sky Bird (Sport Model)** — Design Booklet

**Sky Hook (Sport Model)** — MRN V3-N4

**Sky Slash II (Boost-Glider)** — Design Booklet

**Sly Bolt (Sport Model)** — MRN V4-N3

**Sputnik-Too (Odd Ball Rocket)** — Design Booklet, MRN V3-N3

**Tiger Shark (Two Stage Rocket)** — MRN V4-N2

## MODEL ROCKET PERFORMANCE

### HOW HIGH WILL YOUR MODEL GO?

The altitude capabilities of different model rockets vary greatly. There are several things that affect the performance of a model. The first of these is engine size. The greater the **total impulse** of an engine, the higher it will boost a model. The chart below shows the approximate altitudes that can be achieved with single stage rockets.

Engine Size	Altitude Range	Approximate Altitude in a typical 1 oz. model
¼A.8-2	50' to 250'	100'
½A.8-2	100' to 450'	300'
A.8-3	200' to 900'	650'
B.8-4	300' to 1200'	1000'

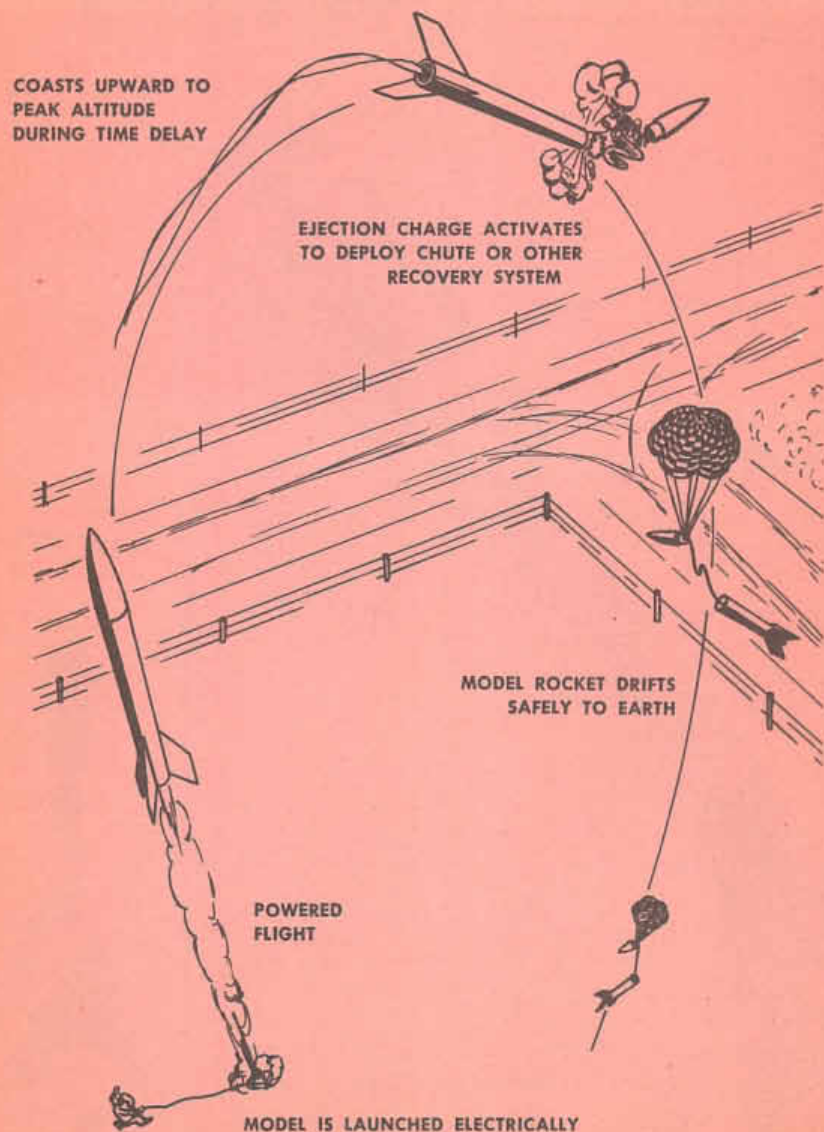
(Some high performance models will reach higher altitudes than shown above.)

The second thing that affects rocket performance is weight. The heavier a rocket is, the less altitude it will reach. A baseball can be tossed higher than an 8 pound cannon ball — and the same holds true for model rockets. In addition, heavier rockets are more apt to tilt at an angle as they leave the launcher, reducing altitude even more.

Drag, or wind resistance, is the third item which affects performance. The more drag on a rocket, the less altitude it will reach. A number of factors determine the amount of drag on a rocket. The more frontal area the rocket has, the greater its drag will be. As a result, large diameter model rockets will generally not reach as great an altitude as smaller diameter rockets with the same engine power. Rough surfaces create turbulence in the air as it flows past the rocket, increasing drag. Smooth finishes will increase the altitude capability of the model. The stability of the rocket also affects drag — if it wobbles in flight, it will have greater drag. Careful attention to reducing drag can sometimes double a rocket's altitude capability.

The kits, components and engines in this catalog have been designed to cover the entire performance range from low altitude sport and demonstration models to high altitude, high performance payload and competition rockets. By choosing his kits, materials and engines carefully, the rocketeer can fill his performance needs exactly. Complete specifications are given on all items to make this selection easy.

## MODEL ROCKET FLIGHT



EXCITING NEW BREAKTHROUGH . . . THE

# CAMROC ROCKET CAMERA

**ADVANCE TO ROCKET AERIAL PHOTOGRAPHY  
ADD A NEW DIMENSION TO YOUR MODEL  
ROCKET ACTIVITIES**

The Camroc opens an entire new field for the model rocketeer. Now you can study space-age reconnaissance techniques the practical way — over familiar terrain with known objects. At the same time you learn the principles of camera construction and operation.

With a ready-to-fly weight of under one ounce the Camroc can be carried to high altitudes by lightweight model rockets. When mounted on a suitable launch vehicle such as the Astron Delta and propelled by the correct engines, camera and rocket will follow the flight path illustrated at left, taking a picture at ejection when the lens is pointed toward the ground.

A single exposure film disc is mounted in a detachable, light-tight film holder for quick and easy replacement in the field. The camera comes complete with one film holder loaded with an unexposed film disc and one empty film holder for practicing and experimenting.

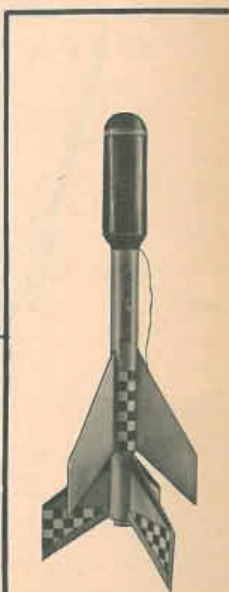
The kit includes complete instructions for camera assembly and operation as well as materials for practicing and checking the camera's operation. NOTE: While the camera system is quite simple in its operation, we recommend that you **first** learn to build and fly model rockets correctly and only then advance to camera work if good results are to be obtained.

Cat. No. 651-C-1 ..... \$4.00

(All items shipped postpaid.)

## SPECIAL COMBINATION OFFER

Complete Camroc kit plus Astron Delta kit. You save \$ .50  
Cat. No. 651-RC-1 ..... \$5.00



### Specifications

Diameter	1.6"
Length	5.3"
Fits:	BT-50

### Recommended Booster

Vehicle is the  
Astron Delta

### Recommended Engines

Multi-Stage Flights	
Booster	Upper Stage
B3-0	B 3-7
Single Stage Flights	
B 3-6	



# CAMROC PICTURES

## NOW YOUR OWN AERIAL PHOTOS

The Camroc produces a round negative of 1½" diameter. Prints produced in the E. I. photo lab are enlarged 2 times (to 3" diameter). Rocketeers who do their own processing can make contact prints the same size as the negative or can enlarge to any size they desire.

The 3" print below is a vertical shot showing part of the office area at Estes Industries. The negative is an oblique photo showing farm land east of Estes Industries. By using various launch rod angles and engine delay times it is possible to cover the entire range of aerial photograph types from high obliques to verticals.



**ACTUAL SIZE  
NEGATIVE 1½"**



**PRINT SIZE 3"**

**Easy to develop and enlarge**

## PROCESSING AND SUPPLIES

Rocketeers who have access to a photographic darkroom can develop and print negatives from the Camroc with no difficulty. For those who would rather not do their own processing, Estes Industries offers developing and printing services. All prints produced in the E. I. photo lab are enlarged 2 times from the negative size as shown.

### FILM HOLDERS AND FILM

Four sealed film holder sections for the Camroc, each preloaded with a fresh Astropan 400 film disc. A discount of \$ .25 on the price of the loaded film holders is allowed for each used film holder returned at the time the order is placed. (Film holders containing exposed film returned for processing at the same time may be counted towards this discount. However, a discount will be allowed **only** on orders for loaded film holders.)

Cat. No. 651-FFH-4 ..... 4 for \$2.00

### DEVELOPING AND PRINTING

Film returned in film holders is developed under controlled conditions and one glossy print of each negative made at 2 times enlargement (3 inch diameter image). A refund of \$ .20 will be made on any negative which does not meet the requirements for making a satisfactory print due to incorrect exposure, and the negative will be returned unprinted.

Cat. No. 651-FDP-1 ..... \$ .75 each 4 for \$2.00

### EXTRA PRINTS

Additional prints at 2x enlargement of negatives which have been previously developed. The negative(s) must be enclosed in a suitable protective package with the order. (Please do not order additional prints until you have checked the negative and the first print to determine whether it is good enough to justify making additional prints.)

Cat. No. 651-NP-1 ..... \$ .40 each 4 for \$1.10

### FILM ONLY

Six precut Astropan 400 film discs to fit the Camroc film holder. Packaged in light-proof double envelope. The envelope should be opened **only** in total darkness to prevent fogging of the film. (Loading instructions included in camera instruction.)

Cat. No. 651-NF-6 ..... 6 for \$ .75

### CHANGING BAG

Light-tight "portable darkroom" for handling film in the field. Fits over operator's arms, provides total darkness for changing film in film holders. Especially recommended for large quantity work. Shipping weight 8 oz.

Cat. No. 651-FCB-1 ..... \$1.00 each

# GEMINI-TITAN



## GT-3

- SEMI SCALE MODEL
- SPECTACULAR FLIGHTS
- PARACHUTE RECOVERY
- TWO ENGINE POWER

Spectacular on the ground and in the air, the Gemini-Titan is a model for the expert rocketeer, a model that is a challenge to build and fly. In not-so-easy-to-assemble kit form, GT-3 is a rocket that the modeler can point to with real pride when he's finished it. Features clear plastic fins to stabilize it in flight without detracting from its appearance, full 24" parachute for soft landings. Requires 24 volt Electro-Launch or 12 volt car battery power supply for launching. Kit is complete with all parts and detailed instructions (but no engines). Shipping weight 16 oz.

Cat. No. 651-K-21 ..... \$4.00 each

Specification		Recommended Engines
Length	24.4 in.	A.8-3
Body Dia.	2.22 in.	B.8-4
Weight	3.8 oz.	



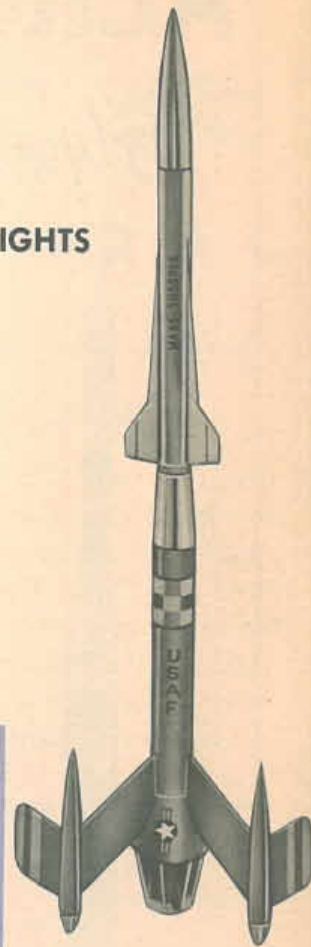
# MARS SNOOPER

- FASCINATING DESIGN
- PARACHUTE RECOVERY
- IDEAL FOR DEMONSTRATION FLIGHTS

A truly different model rocket, the Mars Snooper combines interesting appearance with reliable performance — makes an excellent model for demonstration flying and display. Features payload section and 18" parachute, precut fins for easier assembly. Recommended for the careful modeler, the Mars Snooper kit comes complete with all parts and detailed instructions (but no engines). Shipping wt. 12 oz.  
Cat. No. 651-K-20 ..... \$3.00 each



Specifications	
Length	21.7 in
Body Dia.	.95 in
Weight	2.2 oz.
Recommended Engines	
	1/2A.8-2
	A.8-3
	B.8-4



# AEROBEE 300

## *Flying Scale Model*



### PARACHUTE RECOVERY

### HIGH PERFORMANCE

### EASY TO BUILD

Easy to build scale model of a great sounding rocket. Gives top performance in flight after flight. Features parachute recovery for gentle landings, payload section for small specimens. Kit is complete with all parts and easy-to-follow instructions (but no engines). Shipping weight 14 oz.

**Cat. No. 651-K-17**                      **\$2.00 each**

Recommended Engines	Specifications
1/2 A.8-2	Length            20 in.
A.8-3	Body Dia.        1 in.
B.8-4	Weight            0.85 oz.

EASY-TO-BUILD

**WAC** 

**CORPORAL**

*Great for Flying and Display*

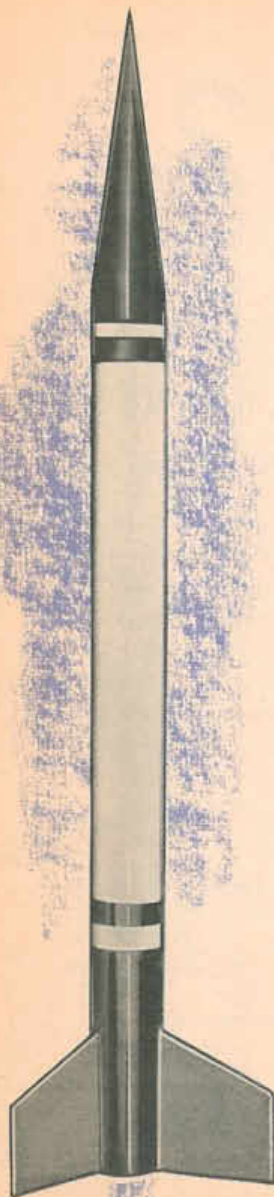
### FLYING SCALE MODEL

High-flying scale model of the famous sounding rocket! Easy enough for the novice to build, yet interesting enough for the experienced rocketeer, the WAC CORPORAL gives top performance for a scale model. Parachute recovery gives gentle landings flight after flight. Comes in easy to assemble kit form. (Engines not included.) Shipping wt. 5 oz.

**Cat. No. 651-K-11** ..... **\$1.50 each**

Body Dia. .... .736 in  
Length ..... 11.8 in  
Weight ..... .65 oz

**Recommended Engines**  
1/4 A.8-2                      1/2 A.8-2  
A.8-3                            B.8-4  
(Use 1/2 A.8-2 engines  
for first flights.)



# V-2

*Flying Scale Model*

**PARACHUTE RECOVERY**

**EASY-TO-BUILD KIT**

High performance scale model of the rocket that started the space age. Easy but interesting to build, the V-2 features reliable parachute recovery for gentle landings. Detailed instructions provide full information on assembly and finishing. Kit comes complete with all parts (but no engines). Shipping weight 7 oz.

Cat. No. 651-K-22 ..... \$1.75 each

#### Specifications

Length	11.2 in.
Body Dia.	1.325 in.
Weight	1.4 oz.

#### Recommended Engines

1/2A.8-2  
A.8-3  
B.8-4  
B.3-5

# X-RAY

*Visible Payload*

- **SINGLE STAGE**
- **PARACHUTE RECOVERY**

An easy-to-build high performance single stage payload rocket, the Astron X-Ray features parachute recovery and a large see-through payload compartment. Perfect for research work and sport flying too. Kit comes complete (less engines).

Shipping wt. 6 oz.

Cat. No. 651-K-18 ..... \$1.75 P.P.

#### RECOMMENDED ENGINES:

1/2A.8-2  
A.8-3  
B.8-4  
B.3-5

Length ..... 16 3/4"  
Body Dia. .... .736"  
Payload  
Sec. Dia. .... .950"  
Weight ..... 7 oz.



# ASTRON DRIFTER

## 2 BIG CHUTES



**GREAT FOR  
COMPETITION AND  
SPORT FLYING**

Spectacular in upward flight and recovery, the Astron Drifter combines low weight with large chute capacity. Perfect in any competition with its 24" chute, the Astron Drifter is a great performer with its 12" chute for test and sport flying too! Parachutes are easily interchanged.

**Cat. No. 651-K-14** ..... \$1.75 each  
Shipping weight ..... 8 oz.

**Recommended engines are:**

1/2 A.8-2      A.8-3  
B.8-2        B.8-4

Body Dia. ... 1 in.  
Length ..... 14.3 in.  
Weight ..... 1 oz.

only  
**\$1.75**

# ASTRON SCOUT

Patent No.  
3,114,317

**Recommended Engines**  
1/4 A.8-2  
1/2 A.8-2  
A.8-3  
B.8-4  
(Use 1/4 A.8-2 for first flights.)

Length ... 7 in  
Body Dia. ... .765 in  
Weight ... .28 oz



- LEARN FROM BUILDING
- TUMBLE RECOVERY
- EDUCATIONAL

Get valuable experience building and flying the Astron Scout. Kit teaches rocket balance principles. A must for the rocketeer who wishes to learn to design his own models. Kit comes complete with all parts, instructions, and a copy of technical report TR-1 (but no engines). Shipping weight 2 oz.

**Cat. No. 651-K-1** ..... \$ .70 each

# ASTRON MARK

**THE NEXT STEP  
FOR THE  
BEGINNER**

**IDEAL FOR SPORT AND  
DEMONSTRATION FLYING**

An excellent bird for novice or experienced rocketeer. Easy to build, ideal for sport and demonstration flying, the Astron Mark gives top notch performance. Kit comes complete with all parts and instructions (but no engines). Shipping weight 5 oz.

**Cat. No. 651-K-2** ..... \$1.25

**Recommended Engines**

1/4 A.8-2      1/2 A.8-2  
A.8-3        B.8-4

B 3-5

(Use 1/2 A.8-2 for first flights.)

Length ..... 9.12 in  
Body Dia. ... .765 in  
Weight ..... .65 oz



# ASTRON **FAR SIDE** 3-STAGES

A sophisticated ultra-high altitude probe or a workhorse vehicle for high altitude studies with large payloads — take your choice with the Astron Farside. Advanced stage coupling gives dependable ignition and stage separation. Perfect for your advanced research programs. Top stage flies to well over 2500', returns gently by parachute. Available with standard 1" payload section (No. 651-K-12) or with extra large 1½" dia. capsule for large payloads (No. 651-K-12X). Be sure to specify model type when ordering. Kit comes complete with all parts and assembly instructions (but no engines). Shipping wt. 8 ounces.

**STANDARD MODEL:**  
Cat. No. 651-K-12 \$2.75 each

**LARGE PAYLOAD MODEL:**  
Cat. No. 651-K-12X  
\$3.00 each

	K-12	K-12X
Length .....	21.5 in	25 in
Weight .....	2.0 oz.	2.5 oz
Diameter .....	1 in	1.5 in

## RECOMMENDED ENGINES

First Stage	Second Stage	Top Stage
¼ A.8-0	¼ A.8-0	¼ A.8-4
½ A.8-0	½ A.8-0	½ A.8-4
B 3-0	A.8-0	A.8-4
	B.8-0	B.8-6
	C.8-0	B 3-5
	B 3-0	

NOTE: Other booster engines may be used if there is no wind.



Patent Pending

# ASTRON **APOGEE II**



IN ORBIT...

THE HIGHEST OR FARTHEST POINT FROM EARTH IS CALLED "APOGEE."

The ability of this rocket to reach extreme altitudes consistently makes "APOGEE" a natural name choice.

The ultimate in two stage performance and dependability. The new, improved Astron Apogee II incorporates revolutionary discoveries in multi-stage methods, features a transparent, see-through payload capsule — lets you observe specimens without removing them from the rocket. Parachute recovered for soft landings. Complete with all parts and instructions (but no engines). Shipping weight 6 ounces.

Cat. No. 651-K-5 ..... \$2.00 each

## Recommended Engines

Booster	Upper Stage
¼ A.8-0	¼ A.8-4
½ A.8-0	½ A.8-4
A.8-0	A.8-4
B.8-0	B.8-6
C.8-0	B 3-5
B 3-0	



Patent Pending

Weight .....	.60 oz
Length .....	14.75 in
Body Dia. ....	.736 in



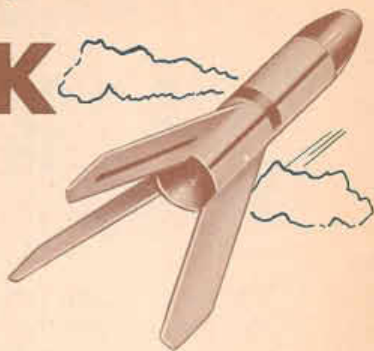
*Spectacular Single Engine Performance*

## ASTRON **STREAK**

**2,000 ft. flights**

Low weight and wind cheating design give the Astron Streak fantastic performance. Uses mylar body tube for high strength and low weight — only  $\frac{1}{8}$  ounce without engine. Ideal for contests and records. Recommended engine for normal flying is the  $\frac{1}{4}$ A.8-4. Kit comes complete with all parts and instructions (but no engines). Shipping weight 4 oz.

Cat. No. 651-K-4 ..... \$ .50



Body Dia. .... .72 in  
Length ..... 5.6 in  
Weight ..... .125 oz

**Recommended Engines**  
 $\frac{1}{4}$ A.8-4       $\frac{1}{2}$ A.8-4  
A.8-4      B.8-6

## ASTRON **PHANTOM**

*Complete Cutaway Rocket*

**DEMONSTRATES BASIC BUILDING RULES.**

**Great for classroom or science fair!**

This bird will never fly, but it will certainly help get your science fair project or special demonstration off the ground! The Astron Phantom has a transparent body to show all the insides of a model rocket — plus a special dummy engine cut in half to show its insides. A great help in answering questions on model rocketry, the Astron Phantom kit comes complete with all parts and instructions (but no fins). Shipping weight 5 oz.

Cat. No. 651-K-7 ..... **\$1.75**



Weight .. .72 oz  
Body Dia. .736 in  
Length .. 8.7 in

## ASTRON **SKY HOOK**

ONLY

**\$1<sup>35</sup>**

Body Dia. .765 in  
Length .... 12 in  
Weight .. .65 oz

**Recommended Engines**  
 $\frac{1}{4}$ A.8-2  
 $\frac{1}{2}$ A.8-2  
A.8-3  
B.8-4  
B.8-5

(For first flights  
use  $\frac{1}{2}$ A.8-2  
engines.)

- EASY TO BUILD
- PARACHUTE RECOVERY
- TERRIFIC PERFORMER

You'll really enjoy building and flying your Astron Sky Hook. Easy to build and durable, parachute recovery brings it back gently for flight after flight. Kit comes complete with all parts and instructions (but no engines). Shipping weight 5 oz.

Cat. No. 651-K-8 ..... **\$1.35 P.P.**



## ASTRON **SPACE MAN**

The most controversial model rocket yet. Some feel he's a disgrace to the sport, others say he does an important job in showing that a rocket doesn't have to look like a rocket to fly well. Requires patience and a bit of artistic ability to build. Uses the featherweight recovery system. Kit comes complete with all parts and instructions (but no engines). Shipping weight 7 oz.

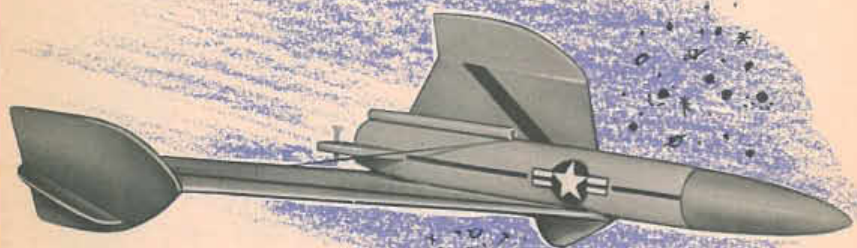
Cat. No. 651-K-9 ..... **\$ .75 P.P.**

4" wide, 7.25" long,  
weights .45 oz.

**Recommended Engines**  
 $\frac{1}{4}$ A.8-2       $\frac{1}{2}$ A.8-2  
A.8-3      B.8-4  
(Use  $\frac{1}{4}$ A.8-2 engines  
for first flights.)



# ASTRON SPACE PLANE



Patent No. 3,157,960

## ALWAYS A WINNER!

### AMERICA'S NO. 1 CONTEST WINNER AND RECORD HOLDER!

Rocket powered glider — ascends vertically, then glides to a gentle landing. The most successful boost-glider ever developed, the Space Plane wins duration contests with amazing regularity. The Space Plane features easy and accurate adjustment of glide characteristics, plus a payload compartment large enough to handle small biological specimens and other scientific objects. The Astron Space Plane is easy to launch and with proper care will give you unlimited flying enjoyment. This kit is recommended for the experienced modeler, and must be assembled with precision and care. (Engines not included.) Shipping weight 5 oz.

**Cat. No. 651-K-3** ..... **\$1.80 each**

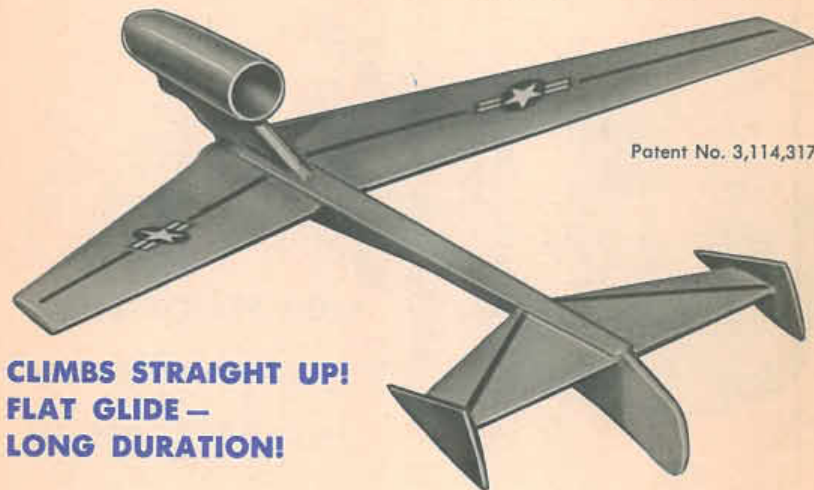
Body Dia. .... .765 in  
Length ..... 10 in  
Wing Span ..... 9 in  
Weight ..... .5 oz

#### Recommended Engines

1/4 A.8-2	1/2 A.8-2
A.8-3	B.8-4
B.8-2	

(Use 1/4 A or 1/2 A engines for first flights.)

# ASTRON FALCON ROCKET GLIDER



Patent No. 3,114,317

## CLIMBS STRAIGHT UP! FLAT GLIDE— LONG DURATION!

Get sky-high performance with the new Astron Falcon boost-glider. Beautiful climb — glide durations up to and over 1½ minutes on 1/4 A engines, even more with larger engines. A great bird for the experienced rocketeer. Glide recovery brings it back gently, ready for a fresh engine and another flight. Kit comes complete with all parts and instructions (engines not included). Shipping wt. 5 ounces.

**Cat. No. 651-K-13** ..... **\$1.00 P.P.**

Length ..... 12 in  
Wing Span ..... 10 in  
Weight ..... .40 oz

#### Recommended Engines

1/4 A.8-2	1/2 A.8-2
A.8-3	B.8-4
B.8-2	

For normal flying only 1/4 A and 1/2 A engines are recommended — the Astron Falcon can easily glide out of sight with larger engines if it is built and balanced carefully.





# ASTRON INVADER

**HIGH PERFORMANCE  
GLIDE RECOVERY  
FUTURISTIC DESIGN**

Flying saucer? UFO? The Astron Invader is a truly unique boost-glider. Recommended for the experienced modeler, the Invader gives top duration in flight after flight — fascinates spectators with its performance and appearance. Comes in kit form with complete instructions (less engines). Shipping weight 5 oz.

**Cat. No. 651-K-19** ..... **\$1.20**

#### Specifications

Length	11.8 in.
Span	8.7 in.
Body Dia.	.736 in.
Weight	.89 oz.

#### Recommended Engines

1/2 A.8-2  
A.8-3  
B.8-2



# ASTRON SPRITE

*Ideal for small field sport and demonstration flying*

**HIGH PERFORMANCE • TUMBLE RECOVERY**



The perfect model for small fields and sport or demonstration flying. The Astron Sprite is easy to build, with tumble recovery to teach principles of rocket balance and bring the model back safely — close to the launcher. Uses lightweight Series III engines only, gives top performance for its size. Kit comes complete with instructions and a copy of TR-1 (but no engines). Shipping weight 5 oz.

**Cat. No. 651-K-15** ..... **\$ .75 each**

#### Specifications

Length	5.3 in.
Body Dia.	.765 in.
Weight	0.3 oz.

#### Recommended Engines

1/4 A.8-2S
1/2 A.8-2S
1/2 A.8-4S

Patent No. 3,114,317

# DELTA

**TWO STAGES • FLIES OVER 2000 FEET  
ADVANCED DESIGN • MULTI PURPOSE**

Reliable workhorse booster for payload research. The Astron Delta accommodates all BT-50 size payload sections. May be flown either as a single or two stage vehicle, features advanced stage coupling for top dependability. Kit is complete with all parts and easy-to-follow instructions (nose section and engines not included). Shipping weight 8 oz.

**Cat. No. 651-K-16** ..... **\$1.50 each**

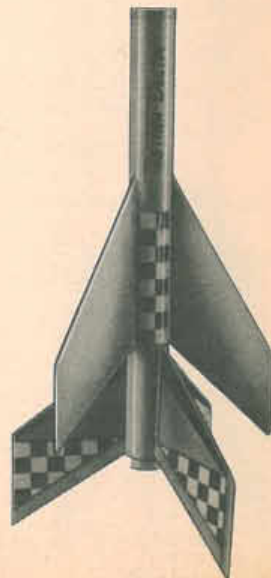
#### Specifications

Length	13.6 in.
Body Dia.	1 in.
Weight	1.45 oz.

#### Recommended Engines

Multi-Stage Flights	
Booster	Upper Stage
B.8-6	B.8-6
B3-0	B 3-6
	B 3-7
Single Stage Flights	
A.8-3	B.8-4
B 3-5	B 3-6

Patent Pending



**PARACHUTE RECOVERY**

# BIG BERTHA

**SIMPLE — RELIABLE  
PARACHUTE RECOVERY  
PERFECT FOR  
DEMONSTRATIONS  
SINGLE ENGINE OPERATION**

Easy-to-build, reliable and impressive in flight, Big Bertha is an ideal model for demonstration flights. Features a slow, realistic takeoff that fascinates spectators. This is the model shown in action on the inside front and back covers. Big 18" chute gives slow descent and gentle landings. Kit comes complete with all parts and easy to follow instructions (but no engines). Shipping weight 16 oz.

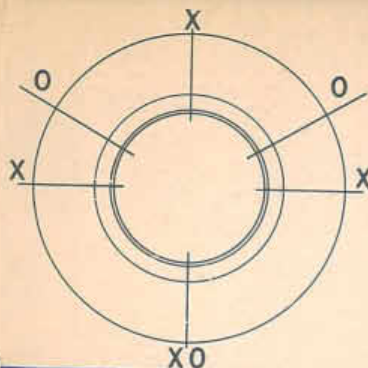
Cat. No. 651-K-23 ..... \$2.00

#### Specifications

Length	24 in.
Body Dia	1.6 in.
Weight	2.25 oz.

#### Recommended

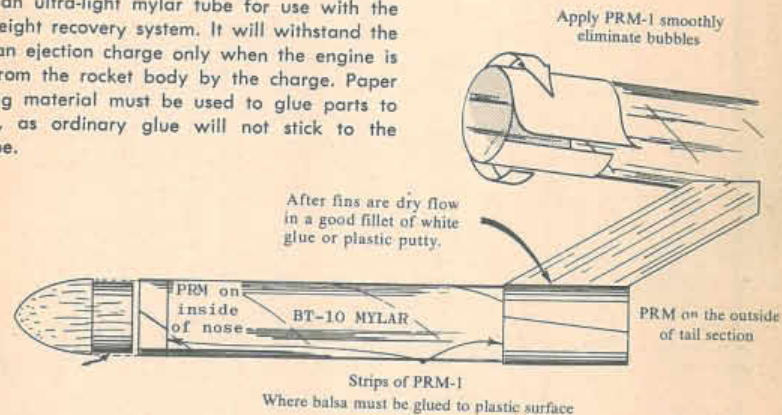
Engine  
B.8-2



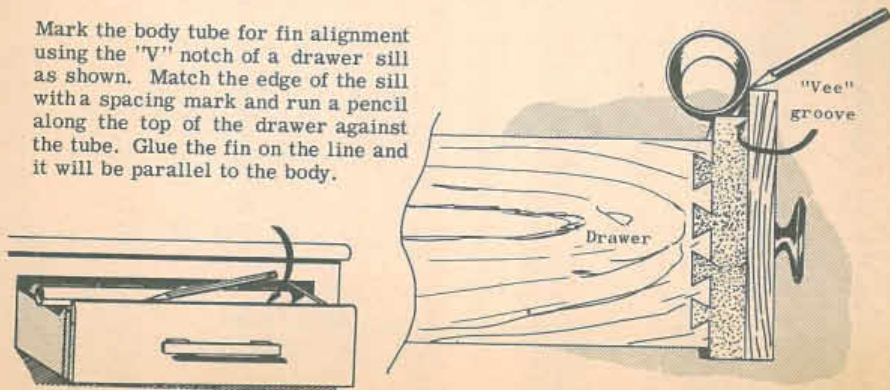
## CONSTRUCTION TIPS

This Fin Spacing Guide will space equally three or four fins on all body tubes sold by Estes Industries. To space the fins, center the end of the tube in the circles, then mark at the "X" lines for four fins or on the "O" lines for three fins. Draw lines from these marks as shown in the bottom drawing.

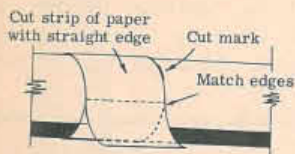
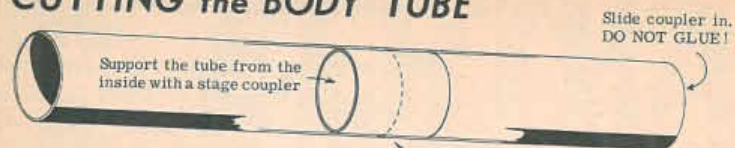
BT-10 is an ultra-light mylar tube for use with the featherweight recovery system. It will withstand the heat of an ejection charge only when the engine is ejected from the rocket body by the charge. Paper reinforcing material must be used to glue parts to the tube, as ordinary glue will not stick to the mylar tube.



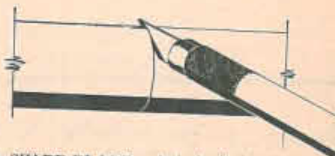
Mark the body tube for fin alignment using the "V" notch of a drawer sill as shown. Match the edge of the sill with spacing mark and run a pencil along the top of the drawer against the tube. Glue the fin on the line and it will be parallel to the body.



## CUTTING the BODY TUBE



Proposed cut area



Wrap paper around tube and align edge with cut location mark. Draw a line completely around the tube.

USE A SHARP BLADE... but don't try to cut through the tube on the first turn. Follow the line cutting very little more than the surface layer. One or two more turns keeping the same knife pressure should give a clean square cut.

## Layout...



Fin pattern

Where all sides of fin are straight, the pin-hole method is easiest. Just lay the pattern over the balsa with the grain direction aligned properly and push a straight pin through each corner of the pattern. Remove the pattern and draw connecting lines between the pin holes.

## FINS



Carefully trace a more complex design onto stiff paper or cardboard. Cut out and align on the fin-stock and trace around this template.

## Cutting...



Use a metal straightedge wherever possible. Hold knife or saw blade at 90° angle from the surface being cut and hold the handle about a 45° angle for a clean cut. Soft balsa tends to tear if blade is dull or held at too high an angle.

## Sanding...

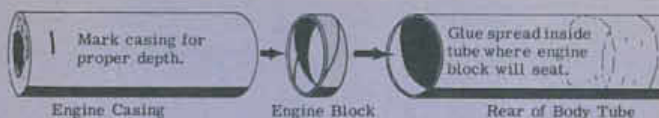
For general purposes sand all but the root edges round.



THICK FINS MUST BE GIVEN MORE ATTENTION

Sand to rough airfoil shape with medium sandpaper and block. The final shape is reached with extra-fine sandpaper and a gentle touch.

## ENGINE BLOCK INSTALLATION



Use to press engine block into position. When the mark on the case is even with the rear edge of the body tube the engine block is in place. Withdraw the engine casing immediately.

Start the engine block into the rear of the body tube. Press it into position with the engine casing in one smooth movement to prevent the block from "freezing" in the wrong position.

## ENGINE HOLDERS



For BT-20 installation measure and slot the body tube as shown above. Insert holder and coat area with glue. While glue is wet, press reinforcing gauze into place as shown. Let dry.

ENGINE HOLDERS PROVIDE FOR QUICK EASY AND RELIABLE POSITIONING AND RETAINING OF THE ENGINE

## FINISHING

Apply two or more coats of sanding sealer sanding lightly between each coat.

Sealer is exaggerated here but emphasizes that the wood grain should be filled and the surface smooth for the application of the color coat.

REMEMBER - FINAL FINISH IS ONLY AS GOOD AS THE BASE PREPARED FOR IT

### Brush

Make sure the brush is clean. Old dope will mix with and dis-

color fresh dope. Dope can be thinned 50% for a smoother finish. Avoid "brushing over" as the surface sets rapidly. Unnecessary brushing can produce an uneven finish. Lighter colors are more difficult to apply.

### Spraying

A better than average finish for the beginner... an excellent finish when you've got the "hang" of it.

DON'T



Revolve the can.

DO



Maintain even distance.

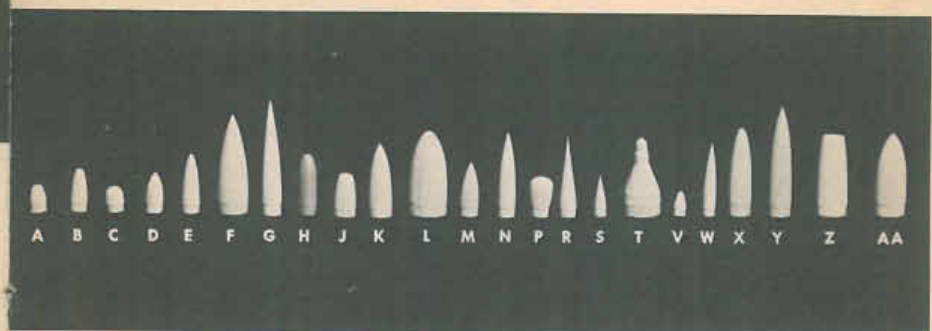


Spray too close! Hold can 8 to 12 inches from work.



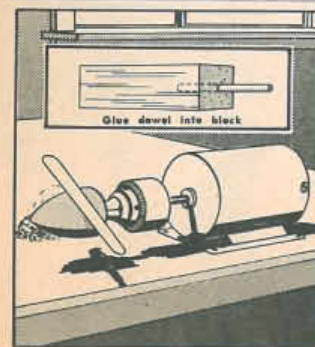
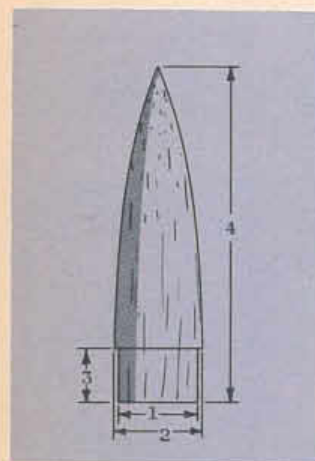
Start spray ahead of and cut off beyond end of work.

# NOSE CONES



Catalog No.	Dimensions				Material	Ill.	Average Weight	Ship. Weight	Price	
	1	2	3	4					Each	3 for
<b>LIGHTWEIGHT GEMS FOR BT-5</b>										
651-BNC-5E	0.515"	0.541"	1/4"	1-5/8"	Balsa	E	.020 oz.	1 oz.	\$.25	\$.50
651-BNC-5W	0.515"	0.541"	1/4"	3-1/8"	Balsa	W	.039 oz.	2 oz.	\$.40	\$.80
651-BNC-5S	0.515"	0.541"	1/4"	1-3/4"	Balsa	S	.016 oz.	1 oz.	\$.25	\$.50
651-BNC-5V	0.515"	0.541"	1/4"	1"	Balsa	V	.013 oz.	1 oz.	\$.25	\$.50
<b>PERFECT FOR BT-10</b>										
651-BNC-10A	0.702"	0.728"	1/4"	1-1/16"	Balsa	A	.03 oz.	1 oz.	\$.25	\$.50
651-BNC-10B	0.702"	0.728"	5/16"	2"	Balsa	B	.05 oz.	1 oz.	\$.25	\$.50
<b>VARIETY FOR A BT-20</b>										
651-BNC-20A	0.710"	0.736"	1/4"	1-1/16"	Balsa	A	.03 oz.	1 oz.	\$.25	\$.50
651-BNC-20B	0.710"	0.736"	5/16"	2"	Balsa	B	.05 oz.	1 oz.	\$.25	\$.50
651-BNC-20N	0.710"	0.736"	1/2"	3-1/4"	Balsa	N	.08 oz.	2 oz.	\$.45	\$.90
651-BNC-20P	0.710"	0.900"	7/16"	1-3/4"	Balsa	P	.07 oz.	4 oz.	\$.25	\$.50
651-BNC-20R	0.710"	0.736"	3/8"	3-1/8"	Balsa	R	.07 oz.	2 oz.	\$.40	\$.80
<b>BALSA BEAUTIES FOR BT-30</b>										
651-BNC-30C	0.725"	0.767"	3/8"	3-1/8"	Balsa	C	.04 oz.	1 oz.	\$.30	\$.60
651-BNC-30D	0.725"	0.767"	3/8"	1-7/8"	Balsa	D	.06 oz.	1 oz.	\$.30	\$.60
651-BNC-30E	0.725"	0.767"	7/16"	2-5/8"	Balsa	E	.07 oz.	1 oz.	\$.40	\$.80
651-BNC-30M	0.725"	0.767"	1/2"	2"	Balsa	M	.06 oz.	1 oz.	\$.40	\$.80
651-BNC-30N	0.725"	0.767"	1/2"	3-1/4"	Balsa	N	.08 oz.	2 oz.	\$.45	\$.90
<b>PLASTIC AND BALSA FOR BT-40</b>										
651-BNC-40D	0.765"	0.822"	3/8"	1-7/8"	Balsa	D	.06 oz.	1 oz.	\$.30	\$.60
651-BNC-40N	0.765"	0.822"	1/2"	3-1/4"	Balsa	N	.08 oz.	2 oz.	\$.45	\$.90
651-PNC-40G	0.765"	0.822"	1/2"	5"	Plastic	G	.71 oz.	5 oz.	\$.75	\$2.25
651-PNC-40H	0.765"	0.822"	1/2"	2-3/4"	Plastic	H	.40 oz.	2 oz.	\$.35	\$.80
<b>DESIGNED FOR THE BT-50</b>										
651-BNC-50J	0.950"	0.976"	1/2"	1-7/8"	Balsa	J	.08 oz.	4 oz.	\$.40	\$.80
651-BNC-50K	0.950"	0.976"	1/2"	3-1/4"	Balsa	K	.13 oz.	4 oz.	\$.45	\$.90
651-BNC-50X	0.950"	0.976"	1/2"	3-3/4"	Balsa	X	.15 oz.	4 oz.	\$.50	\$1.00
651-BNC-50Y	0.950"	0.976"	3/8"	4-3/4"	Balsa	Y	.16 oz.	6 oz.	\$.75	\$1.50
<b>JUST RIGHT FOR THE BT-55</b>										
651-BNC-55F	1.283"	1.325"	1/2"	4-3/8"	Balsa	F	.19 oz.	4 oz.	\$.75	\$1.50
651-BNC-55AA	1.283"	1.325"	1/2"	3-5/8"	Balsa	AA	.15 oz.	4 oz.	\$.75	\$1.50
<b>EXCLUSIVELY FOR THE BT-60</b>										
651-BNC-60L	1.595"	1.637"	5/8"	3-3/4"	Balsa	L	.34 oz.	4 oz.	\$.75	\$1.50
651-BNC-60T	1.595"	1.637"	1/2"	3-3/8"	Balsa	T	.17 oz.	4 oz.	\$.75	\$1.50
<b>IDEAL FOR THE PST-65</b>										
651-BNC-65L	1.750"	1.796"	1/2"	3-3/4"	Balsa	L	.41 oz.	4 oz.	\$.75	\$1.50
<b>ESPECIALLY FOR OUR ENGINE MAILING TUBE</b>										
651-BNC-MTD	0.937"	1.002"	3/8"	1-7/8"	Balsa	D	.06 oz.	4 oz.	\$.30	\$.60
<b>AND A TAIL CONE FOR BT-55 (with pre-drilled hole)</b>										
651-BTC-55Z	1.283"	1.325"	1/2"	3-1/2"	Balsa	Z	.25 oz.	4 oz.	\$.75	\$1.50

Letters listed under "Ill." identify nose cone shape as shown in the picture on page 53. Dimensions are shown in the drawing on that page.



Nose cone dimensions listed on opposite page.

**NOTES:** Dimensions may vary .003".

**CAUTION:** Before using light weight nose cones be sure to study TR-1 on rocket balance and stability.

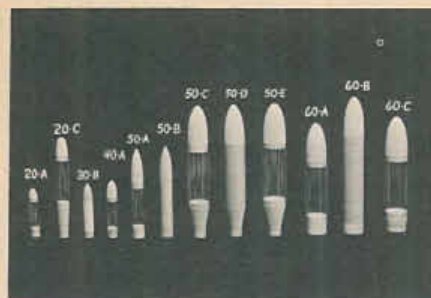
Don't forget to order screw eyes and nose cone weights.

**NOSE CONE STOCK:** 4" to 6" lengths of balsa block for making nose cones of your own design. Cut-off pieces from our nose cone manufacturing process, they have damaged corners which will not interfere with their usability.

**1" x 1" Blocks:** Shipping Weight 1 oz.  
**Cat. No. 651-NCS-1** ..... \$ .15 each  
**2" x 2" Blocks:** Shipping Weight 3 oz.  
**Cat. No. 651-NCS-2** ..... \$ .20 each

**NOSE CONE DOWELS:** Use as shown in the drawing. Hardwood, 1/4" diam., 2" long.

Shipping weight 2 oz.  
**Cat. No. 651-NCD-2** ..... 3 for \$ .10



## PAYLOAD SECTIONS

Ideal for payload launchings! Carry instruments, biological specimens, etc., in these lightweight, high capacity payload sections. These capsules come complete with all needed parts, including nose cone, body tube, nose block or adapter and screw eye.

Cat. No.	Body Mat'l.	Weight oz.		Fits	Inside Dia.	Inside Length	Overall Length	Price Each
		Net	Ship.					
651-PS-20A	Clear Plastic	.16	1	BT-20	.710"	2"	4"	\$.80
651-PS-20C	Clear Plastic	.40	4	BT-20	.950"	3"	7"	\$.85
651-PS-30B	Regular Tube	.24	1	BT-30	.725"	2"	3.75"	\$.65
651-PS-40A	Clear Plastic	.32	1	BT-40	.765"	2"	3.75"	\$.85
651-PS-50A	Clear Plastic	.39	4	BT-50	.950"	3"	6.50"	\$.90
651-PS-50B	Regular Tube	.36	4	BT-50	.950"	3"	6.50"	\$.85
651-PS-50C	Clear Plastic	1.0	11	BT-50	1.59"	4"	10.5"	\$1.30
651-PS-50D	Regular Tube	.95	11	BT-50	1.59"	4"	10.5"	\$1.25
651-PS-50E	Clear Plastic	1.1	11	BT-50	1.75"	4"	10.5"	\$1.35
651-PS-60A	Clear Plastic	.98	11	BT-60	1.59"	4"	9.50"	\$1.30
651-PS-60B	Regular Tube	.90	11	BT-60	1.59"	6"	10.5"	\$1.25
651-PS-60C	Clear Plastic	1.0	11	BT-60	1.75"	4"	9.50"	\$1.35

## MERCURY CAPSULE

Add a special touch to your rockets. Get this model Mercury Capsule. A big 1.8 inches in diameter and 3.2 inches high, this capsule is equipped with a removable base for easy payload access. Comes in easy to assemble kit form with a full set of adapters to fit the capsule to all Estes body tubes. Makes an ideal display model too. Shipping weight 3 ounces.

Cat. No. 651-PSM-1 ..... \$1.00 each



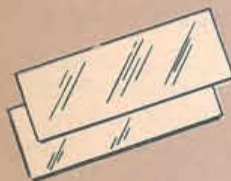
PERFECT FOR  
PAYLOADS

## FIN STOCK

Top quality balsa sheeting for making fins for model rockets. For maximum strength, grain of wood should follow the leading edge of fin. Read FINS in Vol. 3, No. 3 of the *Model Rocket News* for more information.



Catalog No.	Dimensions (In Inches)	Weight oz.		Major Use	Price
		Net	Ship.		
651-BFS-10	1/32 x 3 x 9	.065	4	High Performance	3 for \$ .35
651-BFS-20	1/16 x 3 x 9	.130	4	High Performance	3 for \$ .40
651-BFS-20L	1/16 x 3 x 12	.173	6	High Performance	3 for \$ .55
651-BFS-20B	1/16 x 1/2 x 6	.015	2	Glider Elevon	2 for \$ .10
651-BFS-30	3/32 x 3 x 9	.150	4	Sport Models	3 for \$ .45
651-BFS-30L	3/32 x 3 x 12	.200	6	Sport Models	3 for \$ .60
651-BFS-40	1/8 x 3 x 9	.200	4	Cluster Rockets	3 for \$ .50
651-BFS-40L	1/8 x 3 x 12	.265	6	Glider Wings	3 for \$ .65
651-BFS-60S	3/16 x 1/2 x 3.7	.020	2	Scout Fin Replacement	3 for \$ .15
651-BFS-80	1/4 x 2 x 17	1.00	12	Sky Slash Body	\$ .30 each 3 for \$ .60



**CLEAR PLASTIC FIN STOCK:** Build flyable models of finless space boosters and retain scale appearance. Clear plastic fins can be practically invisible; yet can also be as large as needed for proper stability. Recommended practice is to form a tube of 0.020" thick plastic to slide onto the outside of your model and glue fins made from 0.040" thick plastic to this tube. Use clear butyrate dope for gluing and filleting. In 3" x 9" sheets, shipping weight 4 oz.

0.020" THICK: Cat. No. 651-CF5-20 ..... \$ .20 each

0.040" THICK: Cat. No. 651-CF5-40 ..... \$ .40 each



**SPIN FIN:** One-piece plastic unit has fins set at an angle to make the rocket spin. Made of molded polyethylene, fits body tube BT-40. Ideal for beginners and experimenters. For the best fit, slot the body on opposite sides. Net weight 0.35 oz. Shipping weight 4 oz.

Cat. No. 651-PF-40B ..... \$ .50 each 3 for \$1.20

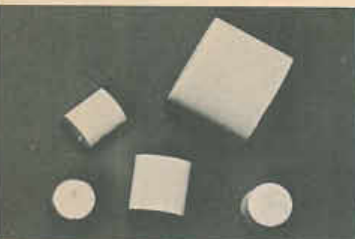
**FIN PATTERN SHEET:** Fourteen different popular fin designs, all tried and proven, printed full size on heavy index stock. Simply cut out and trace around pattern to transfer design to balsa. A must for the model rocket designer. Shipping wt. 1 oz.

Cat. No. 651-PP-2 ..... \$ .25 each 3 for \$ .50



## NOSE BLOCKS

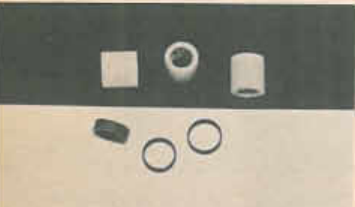
Use these top quality, featherweight balsa nose blocks in payload sections and anywhere else a solid bulkhead is required. Precision turned for exact fit in body tubes.



Cat. No.	Dimensions		Fits	Weight oz.		Price	
	O. D.	Length		Net	Ship.	Each	3 for
651-NB-20	.710"	3/4"	BT-20	.014	1	\$ .30	\$ .60
651-NB-30	.725"	3/4"	BT-30	.014	1	\$ .30	\$ .60
651-NB-40	.765"	3/4"	BT-40	.015	1	\$ .30	\$ .60
651-NB-50	.950"	1"	BT-50	.040	4	\$ .35	\$ .70
651-NB-60	1.595"	1 1/2"	BT-60	.190	4	\$ .50	\$1.00
651-NB-1MT	.937"	1"	Mailing Tube	.040	4	\$ .35	\$ .70

## ENGINE BLOCKS

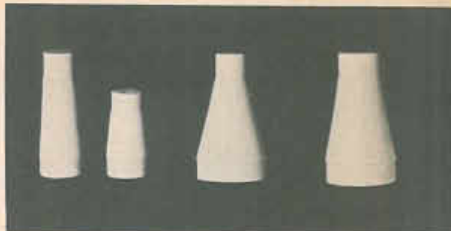
Get light weight, precision fitting engine blocks for the best internal construction on your models. These hollow bulkheads position the engine, allow gases to pass forward unobstructed for normal ejection or upper stage ignition.



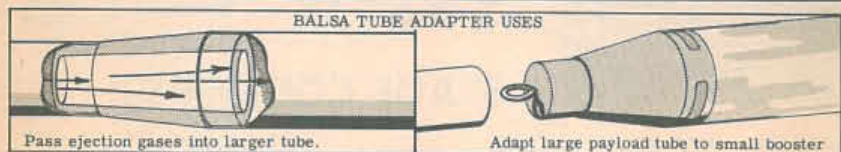
Cat. No.	Dimensions			Fits	Weight oz.		Price	
	O. D.	I. D.	Length		Net	Ship.	Each	3 for
<b>BALSA ENGINE BLOCKS</b>								
651-EB-20	.710"	.46"	3/4"	BT-20	.007	1	\$ .30	\$ .60
651-EB-30	.725"	.46"	3/4"	BT-30	.007	1	\$ .30	\$ .60
651-EB-40	.765"	.46"	3/4"	BT-40	.008	1	\$ .30	\$ .60
<b>PAPER ENGINE BLOCKS</b>								
651-EB-20A	.708"	.65"	1/4"	BT-20	.009	1	\$ .10	\$ .20
651-EB-20B	.708"	.65"	1/8"	BT-20	.005	1	\$ .10	\$ .20
651-EB-30A	.724"	.65"	1/4"	BT-30	.010	1	\$ .10	\$ .20
651-EB-40A	.763"	.65"	1/4"	BT-40	.011	1	\$ .10	\$ .20

## BALSA ADAPTERS

Super light, precision-made balsa adapters give unlimited flexibility for model rocket design. Switch from one size body tube to another for payload capsules, parachute compartments, propulsion sections, etc. Adapters fitting BT-20 can be built up with masking tape to fit BT-30 or BT-40. Any adapter can be hollowed with a knife or drill to make a passage for ejection gases. All adapters have a 1/2" mating surface on each end.



Catalog No.	Mates	Length	Taper Length	Weight oz. Net	Ship.	Price Each
651-TA-520	BT- 5 to BT-20	1.75"	0.75"	.04	1	\$ .30
651-TA-550	BT- 5 to BT-50	2.2"	1"	.06	4	\$ .35
651-TA-2050	BT-20 to BT-50	3"	2"	.15	4	\$ .40
651-TA-2050A	BT-20 to BT-50	2"	1"	.11	4	\$ .35
651-TA-2060	BT-20 to BT-60	3"	2"	.20	4	\$ .60
651-TA-5060	BT-50 to BT-60	3"	2"	.23	4	\$ .60
651-TA-5065	BT-50 to PST-65	3"	2"	.26	4	\$ .60
651-TA-6065	BT-60 to PST-65	2"	0.5"	.23	4	\$ .50



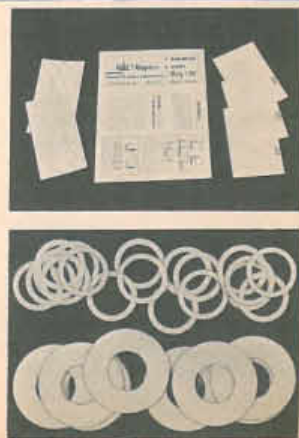
## PAPER ADAPTERS

Add still another dimension to rocket design. Easy-to-use paper adapters are perfect for making transitions between tube sizes for countless designs. Set includes 20 rings for positioning BT-5 in BT-20; BT-5, BT-20, BT-30 and BT-40 in BT-50; and BT-5, BT-20, BT-30, BT-40, and BT-50 in BT-60, three universal tapered shrouds and instructions. (Does not include body tubes or nose cones.) Shipping weight 2 oz.

Cat. No. 651-TA-1 ..... \$ .35 each

**20-50 RINGS** — Set of 20 rings for centering and mounting BT-20 in BT-50. Shipping weight 2 oz. Cat. No. 651-RA-2050 ..... \$ .30 per set

**20-60 RINGS** — Set of 10 rings for centering and mounting BT-20 in BT-60. Shipping weight 2 oz. Cat. No. 651-RA-2060 ..... \$ .30 per set



## ENGINE MOUNTS

Get a precision engine fit in large body tubes without adding unnecessary weight. Engine mount sets come complete with instructions — just assemble and glue in place in your model.

**EH-2040** Fits BT-40, includes BT-20J and EB-20A. Mount slips easily into rocket body. Net wt. .05 oz. Shipping wt. 5 oz.

Cat. No. 651-EH-2040 ..... \$ .15 each

**EH-2050** Fits BT-50, includes BT-20J, EB-20A, 2 rings for centering holder tube, and JT-50C for positioning rings. Net weight 0.1 oz. Shipping weight 5 oz.

Cat. No. 651-EH-2050 ..... \$ .35 each

**EH-2055** Fits BT-55, includes BT-20J, EB-20A, 2 rings for centering holder tube, and JT-55C for positioning rings. Net weight 0.14 oz. Shipping weight 5 oz.

Cat. No. 651-EH-2055 ..... \$ .35 each

**EH-2060** Fits BT-60, includes BT-20J, EB-20A, 2 rings for centering holder tube, and JT-60C for positioning rings. Net weight 0.17 oz. Shipping weight 5 oz.

Cat. No. 651-EH-2060 ..... \$ .35 each

## STAGE COUPLERS

Little tubes with many uses, stage couplers exactly fit the inside of the tube designated. Great for multi-staging, joining body tubes, positioning adapter rings, etc. Make perfect guides for cutting body tubes and sanding cut edges of body tubes, too. Extra durable, light weight. Shipping weights: JT-5C, JT-20C, 30C, and 40C, 1 oz., JT-50C and 60C, 5 oz.

Cat. No.	Dimensions			Fits	Average Weight	Price	
	O. D.	I. D.	Length			Each	3 for
651-JT-5C	.513"	.455"	¾"	BT-5	.020 oz	\$ .10	\$ .20
651-JT-20C	.708"	.650"	¾"	BT-20	.027 oz	\$ .10	\$ .20
651-JT-30C	.724"	.650"	¾"	BT-30	.030 oz	\$ .10	\$ .20
651-JT-40C	.763"	.650"	¾"	BT-40	.033 oz	\$ .10	\$ .20
651-JT-50C	.949"	.920"	1"	BT-50	.051 oz	\$ .15	\$ .30
651-JT-55C	1.28"	1.25"	1.3"	BT-55	.088 oz	\$ .15	\$ .30
651-JT-60C	1.59"	1.55"	1½"	BT-60	.124 oz	\$ .15	\$ .30

## RECOVERY SUPPLIES

**RECOVERY WADDING:** Extra soft and flexible, light weight tissue paper (bathroom type), specially treated to make it flame resistant. Gives the very best protection from hot ejection gases for parachutes and streamers. Each package contains approximately 75 4½" squares — enough wadding for up to 25 flights. Instructions included in package. Shipping weight 6 oz. Cat. No. 651-RP-1A ..... \$ .25 each

**SHROUD LINES:** Build reliable, durable custom parachutes with this strong, hard surface shroud line cord. Comes in 72 yard spools. Available in red or white. **Specify color when ordering.** Shipping weight 5 oz. Cat. No. 651-SLT-1 ..... \$ .25 each

**SCREW EYES:** Attach recovery systems to nose cones or nose blocks with these light weight metal screw eyes. Available in three sizes, specify size when ordering. Shipping weight for 3 eyes 1 oz.

**LARGE EYE:** 1" long; .04 oz.;  
Cat. No. 651-SE-1 3 for \$ .10 12 for \$ .35

**SMALL EYE:** ¾" long; .03 oz.;  
Cat. No. 651-SE-2 3 for \$ .10 12 for \$ .35

**EXTRA SMALL EYE:** ⅝" long; .01 oz.;  
Cat. No. 651-SE-3 3 for \$ .10 12 for \$ .35

**TAPE DISCS:** Fasten shroud lines to plastic 'chutes with these ¾" pressure sensitive tape discs. Shipping weight for 12 discs, 1 oz. Cat. No. 651-TD-1 ..... 4 for \$ .10  
12 for \$ .15 Roll of 1,000, \$4.00

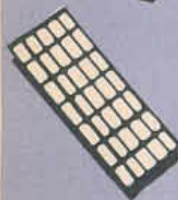
**TAPE STRIPS:** For top strength, low bulk and low weight, fasten shroud lines with these ¼" x ¾" tape strips. In sheets of 35 strips, shipping weight 1 oz.  
Cat. No. 651-TD-2 ..... \$ .30 per sheet

**SHOCK CORD:** Convenient 18" lengths of model airplane contest rubber to absorb shock of ejection and recovery system deployment. In ⅛" widths for normal models, ¼" widths for heavy rockets. **Specify width when ordering.** Both are .03" thick. Shipping weight 1 oz.  
⅛" WIDE: Net wt. .039 oz.

Cat. No. 651-SC-1 \$ .10 each 3 for \$ .20  
¼" WIDE: Net wt. .078 oz.

Cat. No. 651-SC-2 \$ .15 each 3 for \$ .20

**SNAP SWIVELS:** For quick changes and reduced tangling in your recovery systems, use these tiny 1" long snap swivels. Net weight .01 oz. Shipping weight 1 oz.  
Cat. No. 651-SV-12 ..... 6 for \$ .20



SC-1



SC-2





## RECOVERY EQUIPMENT

**PARACHUTE KITS:** Get the best in parachute recovery! Two color printed plastic 'chutes give maximum visibility — feature easy to see pattern. Lightweight, durable and easily folded, these 'chutes are only 0.00075" thick, allowing the most material to be packed into the least body space. Each kit comes complete with 'chute material, tape strips and shroud lines.

Specify color combination and size when ordering. Shipping weight 2 oz.

Cat. No.	Parachute Diameter	Color Combinations Available	Net Weight	Price Each	3 for
651-PK-12	12 inches	Orange and White Red and White Red and Yellow Yellow and Black Orange and Black	.078 oz.	\$ .20	\$ .50
651-PK-18	18 inches	Red and White Red and Yellow Orange and Black	.144 oz.	\$ .30	\$ .75
651-PK-24	24 inches	Red and White Orange and Black	.298 oz.	\$ .45	\$1.00

**PARACHUTE MATERIAL:** You get a big square yard of extra strength, high visibility black plastic 'chute material. Each sheet can be cut to make one or more round or square parachutes up to 36" across. Net weight .98 oz. Shipping weight 5 oz.

Cat. No. 651-PM-2 ..... \$ .45 each

**STREAMER MATERIAL:** Bring light weight models back to earth with bright orange, flame resistant crepe paper streamers. In 7½ foot lengths, enough for two to eight streamers. Available in 1" and 2" widths. Specify size when ordering. Shipping weight 1 oz.

1" wide Net wt. .092 oz.

Cat. No. 651-SM-1 ..... \$ .15 each 3 for \$ .30

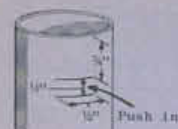
2" wide Net wt. .184 oz.

Cat. No. 651-SM-2 ..... \$ .20 each 3 for \$ .40



## MODEL ROCKET RECOVERY

### Shock Cord Attachment



**Step 1:**  
Cut two 1/2" slits and push in the area in between them.



**Step 2:**  
Thread shock cord through slit as illustrated.

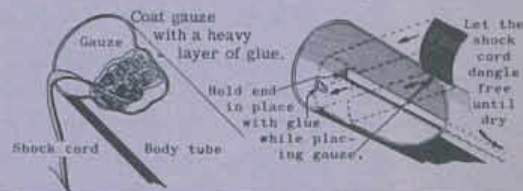


**Step 3:**  
Restore slit to original tube contours, clamping shock cord in place. Cover area with glue.

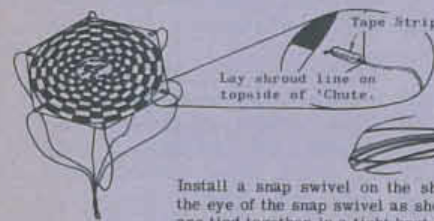
Perhaps the most important part of the recovery system (next to the 'chute) is the shock cord and its anchor.

Shown at left is the standard attachment method.

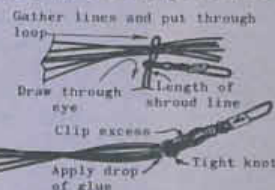
For BT-50 and larger body tubes the installation method shown at the right may be used. This system is particularly desirable for scale models.



### 'Chute Assembly



### Install a snap swivel



Install a snap swivel on the shroud lines by drawing them through the eye of the snap swivel as shown. Once through the eye the lines are tied together in a tight knot and pulled back against the eye.

## Assembly and Use of Recovery System

Install screw eye (1) in nose cone (2). Tie shock cord (3) to screw eye. Tie shroud-lines (4) to snap swivel (5) and clip to screw eye.



Pack your bird with flameproof wadding before each flight. The wadding should fill the tube for a distance of at least 1-1/2 times its diameter.



To be sure the ejection gases activate the recovery system correctly, secure the engine in parachute and streamer models by wrapping the nozzle end with tape until it makes a snug press fit in the body.





## FINISHING SUPPLIES



**ASTROSEAL Balsa Filler:** The first step to a perfect finish. Astroseal contains 40% balsa wood plus additional fillers to completely fill the grain in balsa parts. Gives smooth surface for dope or enamel application. Brush on two to four coats, letting each dry thoroughly. Sand with #SP-320 sanding material between coats. In four ounce jar. Shipping weight 7 oz.

Cat. No. 651-SS-2 ..... \$ .60 each



**HEAT RESISTANT PAINT:** Protect exposed rocket parts from heat damage with easy to apply, brush-on, high heat aluminum paint. Protects to 1000°, gives a bright metallic finish. Recommended for swept fins and other parts exposed to hot exhaust gases. In 1½ ounce bottles. Shipping weight 6 oz.

Cat. No. 651-AP-1 ..... \$ .35 each



**FLUORESCENT SPRAY PAINT:** The brightest colors anywhere — make rockets easy to spot in the air and on the ground. Glowing, high visibility paint comes in handy 6 oz. spray cans, dries in minutes. For maximum brilliance use glossy white enamel as an undercoat. Available in Cerise Red, Yellow Orange, Red Orange and Green. **Specify colors when ordering.** Shipping weight 16 oz. each.

Cat. No. 651-FP-1 ..... \$1.40 each



**ENAMEL SPRAY PAINT:** Get that "professional" appearance for your best models. Top quality enamel in handy 5 oz. spray cans dries in minutes. Use indoors and outdoors. Not fluorescent. Available in the popular colors of Regal Blue, Hunter Green, Chrome Yellow, Glossy Black, Glossy White and Cherry Red. **Specify colors when ordering.** Shipping weight 16 oz. each.

Cat. No. 651-EP-1 ..... \$1.20 each



**CLEAR SPRAY:** Crystal clear spray coating goes on clear — stays clear. Gives extra gloss to enamel finishes, protects decals and decorations, makes fluorescent finishes smooth, durable and glossy. For best results, let paint dry thoroughly before applying clear spray, use several light coats for maximum gloss. In handy 5 oz. spray can. Shipping weight 16 oz.

Cat. No. 651-EP-2 ..... \$1.20 each



**BUTYRATE DOPE:** The dope preferred by expert modelers for perfect finishes. Brushes on smoothly, easily, comes in convenient 1 oz. bottles. Available in Insignia Red, International Orange, Dark Green, Gloss Black, Insignia White, True Blue, Sky Blue, Aircraft Gray, Orange Yellow, Silver, Gold and Clear. **Specify colors when ordering.** Shipping wt. 4 oz.

Cat. No. 651-BRD-1 ..... \$ .20 each

**SANDING SEALER:** Fills small holes in balsa, paper and other porous materials, provides a smooth surface for paint or dope. To use, sand the surface, brush on sealer, let dry and sand again. Repeat as needed to obtain a glass-like surface. In 1 ounce bottles. Shipping weight 4 oz.

Cat. No. 651-SS-1 ..... \$ .20 each

**THINNER:** For diluting butyrate dope, sanding sealer and Astroseal and for brush cleaning. Completely colorless — won't interfere with the drying action of the dope. Comes in 1 ounce bottles. Shipping weight 4 oz.

Cat. No. 651-BDT-1 ..... \$ .20 each

**WHITE GLUE:** Preferred for rocket building! Sets fast, gives super strong joints with wood, paper, cloth and other porous materials. In 2 ounce plastic squeeze bottle. Shipping weight 6 oz.

Cat. No. 651-WG-1 ..... \$ .40 each

**BODY PUTTY:** For super-sleek models. Fill cracks, holes, grain marks in balsa parts, make smooth fin-body joints. In 21 cc. tube. Shipping weight 5 oz.

Cat. No. 651-FM-1 ..... \$ .30 each

**FINISHING WAX:** For the high gloss finish so important to appearance and low drag. Apply with soft cloth, let dry and polish with a soft, dry cloth. Recommended for use on enamel and butyrate finishes only. In 2 ounce jar. Shipping weight 5 oz.

Cat. No. 651-FW-2 ..... \$ .80 each

**SANDING MATERIAL:** Fold, roll or crumple it for hard to reach places. Special mylar plastic backed abrasive sheet can be used over and over again. Helps you get a mirror finish. Extra fine 320 grit in easy to handle 2½" x 2¼" sheets. Shipping weight 1 oz.

Cat. No. 651-SP-320 ..... 3 sheets \$ .10

**SANDPAPER:** Shape and smooth model rocket parts with these handy 3" x 3" sheets of top quality sandpaper. Available in three grades. **Specify grade when ordering.** Shipping weight 1 ounce for 6 sheets.

6 SHEETS MEDIUM — Cat. No. 651-SPM-2 ..... \$ .10

6 SHEETS FINE — Cat. No. 651-SPF-2 ..... \$ .10

6 SHEETS EXTRA FINE — Cat. No. 651-SPEF-2 ..... \$ .10

18 SHEETS ASSORTED (6 each) — Cat. No. 651-SPA-2 ..... \$ .25

**PAINT BRUSHES:** The set designed for model rocketry. You get one #1 brush for extra fine work, one #4 brush for normal work and one #6 brush for covering large areas rapidly. Brushes are 6" long with quality camel hair bristles set in nicked ferrules. Available in sets of three only. Shipping weight 2 oz.

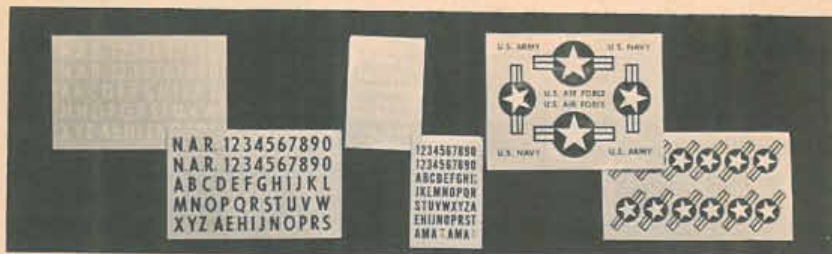
Cat. No. 651-PB-3 ..... \$ .30 per set

**MASKING TAPE:** Secure engines in model, mask for painting, etc. Extra strong ½" wide tape comes in 30 foot rolls. Flexible, seals tightly and strips off clean. Shipping weight 5 oz.

Cat. No. 651-MT-1 ..... \$ .30 each



## DECALS



**STARS AND BARS:** Sheet of 12 red, white and blue Air Force emblems, each 1 1/4" wide. Fit on fins and body tubes, look great on gliders. Shipping weight 1 oz.

Cat. No. 651-D-1 ..... \$ .15 each

**LARGE STARS AND BARS:** Add a special touch to your large models. Sheet contains two large 2" insignia, two medium 1 3/4" insignia and appropriate designations. Shipping weight 1 oz.

Cat. No. 651-D-2 ..... \$ .15 each

**3/8" LETTERS AND NUMBERS:** Identify and decorate models the easy way with these 3/8" high letter and number decals. Sheet contains 62 characters. Available in black or white. Specify color when ordering. Shipping weight 1 oz.

Cat. No. 651-D-3 ..... \$ .15 each

**1/4" LETTERS AND NUMBERS:** Ideal for code markings and identification on smaller rockets. Sheet contains 65 characters 1/4" high. Available in black or white. Specify color when ordering. Shipping weight 1 oz.

Cat. No. 651-D-4 ..... \$ .15 each



**GOLD MINE SPECIAL:** A real gold mine of decorative decals for your models. Lettering, vents, hatches, rivets and more, all one big 3 1/2" x 8 1/2" sheet. Printed in brilliant red, white and black to add extra color. Shipping weight 1 oz.

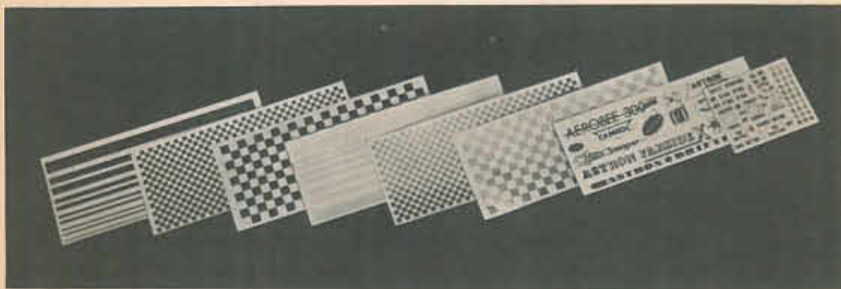
Cat. No. 651-D-5 ..... \$ .25 each

**#1 KIT NAMES DECAL:** Dress up models with these special kit names decals. Identify and decorate — easy to apply. Comes in black or white. Specify color when ordering. Shipping weight 1 oz.

Cat. No. 651-D-6 ..... \$ .25 each

**#2 KIT NAMES DECAL:** New and extra-colorful, this decal sheet has names for the latest Estes models on a big 3 1/2" x 8 1/2" sheet. Printed in stand-out colors of red, yellow, white and black, you'll have the extra touch for good looking models when you use this sheet. Shipping weight 1 oz.

Cat. No. 651-D-11 ..... \$ .25 each



**1/5" CHECKERBOARDS:** Glossy, colorful 1/5" square checks on clear background. Add color contrast to model for easy tracking and eye appeal. Extra-large sheets, 9 1/2" x 4", available in red, black, gold or white. Specify color and check size when ordering. Shipping weight 1 oz.

Cat. No. 651-D-7 ..... \$ .25 each

**3/8" CHECKERBOARDS:** Big 3/8" square checks for your large models. Cut out special patterns for even more striking effects. Large 9 1/2" x 4" sheets, available in red, black, white, gold or silver. Specify color and check size when ordering. Shipping weight 1 oz.

Cat. No. 651-D-8 ..... \$ .25 each

**COLOR STRIPES:** Put vertical stripes and horizontal rings on models the easy way. Each sheet has ten stripes, 1/32" through 1/2" wide and 9 1/2" long. Available in red, black or yellow. Specify color when ordering. Shipping weight 1 oz.

Cat. No. 651-D-9 ..... \$ .25 each

**LAUNCH PANEL DECAL:** Identify controls and circuits on your launch panel with this easy-to-apply, pressure sensitive decal sheet. Aluminum letters on black background are easy to read, add extra eye appeal. Self-adhesive, just cut out and press in place. Extra-strong mylar sheet measures 3 1/2" x 4 3/4". Shipping weight 1 oz.

Cat. No. 651-D-10 ..... \$ .50 each

**DECORATING TAPE:** Thin, tough, black pressure sensitive plastic tape is perfect for stripes, bars and other decorations. Easy to apply and only 0.0015 inch thick, decorating tape comes in 1/2 inch wide and 144 inch long rolls, can be cut with knife and straightedge for special sizes. Shipping weight 5 oz.

Cat. No. 651-DT-1 ..... \$ .25 each

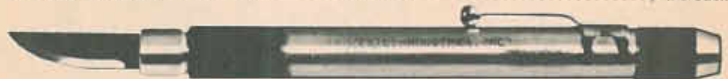


## MODELING TOOLS



**PRECISION KNIFE SET:** Includes one 4¼" long #1 aluminum handle and one each #1A cutting blade, #1B punch blade, and #1C gouge blade. Recommended for precision work. Shipping weight 2 oz.

Cat. No. 651-KNS-1 ..... \$ .75 each



**RETRACTABLE BLADE KNIFE:** Heavy duty #2 aluminum handle, 4¾" long, with one double ended #2D blade. Blade retracts into handle for safe carrying. For general cutting. Shipping weight 4 ounces.

Cat. No. 651-KNS-2 ..... \$1.00 each



**UTILITY KNIFE:** Includes 5¾" long #3 steel handle and one #3E general purpose blade. Shipping weight 3 ounces.


Cat. No. 651-KNS-3 \$ .30 each

**HEAVY DUTY KNIFE:** Set of one 4¾" long #4 plastic handle with metal chuck and one general purpose knife blade similar to #4G. Shipping weight 6 ounces.



Cat. No. 651-KNS-4 ..... \$1.20 each


### REPLACEMENT BLADES

 Fits #1 handle only: For cutting balsa and paper.


Cat. No. 651-KNB-1A \$ .10 each 3 for \$ .25

 Fits #1 handle only: Punch and scriber.


Cat. No. 651-KNB-1B ..... \$ .25 each

 Fits #1 handle only: Gouge for hollowing balsa nose cones, adapters, blocks, etc.

Cat. No. 651-KNB-1C ..... \$ .25 each

 Fits #2 handle only: Double ended, for general cutting.

Cat. No. 651-KNB-2D ..... \$ .35 each


 Fits #2 and #3 handles: Double ended, for general cutting.

Cat. No. 651-KNB-3E ..... \$ .15 each


 Fits #4 handle only: 1" wide x 5" long razor saw blade for balsa and body tube cutting.

Cat. No. 651-KNB-4F ..... \$ .45 each


Shipping weight on saw blade is 6 oz. all other blades, 1 oz.

 Fits #2 and #4 handles. For general cutting and carving.


Cat. No. 651-KNB-4G ..... \$ .15 each  
3 for \$ .40

 Fits #2 and #4 handles. For general cutting and trimming.

Cat. No. 651-KNB-4H ..... \$ .15 each  
3 for \$ .40

 **WHETSTONE:** Keep knife blades extra sharp for easy cutting. Pocket size, 3½" x ¾" x ¾". Use with oil for best results. Shipping weight 3 oz.

Cat. No. 651-W-1 ..... \$ .25 each

 **EMERY BOARDS:** Perfect for cleaning micro-clips, shaping airfoils, turning nose cones, etc. 4½" x ½", medium abrasive on one side, fine abrasive on other. Shipping weight 1 ounce.

Cat. No. 651-BE-1 ..... 3 for \$ .10

 **TWEEZERS:** For 1,001 uses in handling small parts, attaching shock cords, etc. Steel, 3" long, ⅛" jaw. Shipping weight 2 ounces.

Cat. No. 651-T-1 ..... \$ .20 each

## MODELING KITS



**KNIFE CHEST:** Small, medium and heavy duty knives plus 9 assorted extra blades — one for practically every cutting job. In a handy, natural finish wood chest. Shipping wt. 1 lb. 8 oz.

Cat. No. 651-KNS-82 ..... \$ 4.50 each

**KNIFE AND TOOL SET:** Contains small, medium and heavy duty knives and an entire assortment of blades, gouges, routers, and punches. Has planer, 1" sander, spokeshave and balsa stripper. In wooden box, complete with see-through cover and fitted plastic tray insert that holds and shows every tool. Shipping wt. 2 lbs.

Cat. No. 651-KNS-84 ..... \$11.00 each



**COMPLETE HOBBY DEN TOOL CABINET:** A truly complete tool set for the model rocketeer. Has a full assortment of hobby tools, knives and blades against a blueprint silhouette background of each tool for easy replacement. Comes in a sturdy wooden fitted cabinet with a sliding, see-thru cover. (Size 13⅛ x 21¼ x 3") Shipping weight 9 pounds.

### CONTENTS

6 Extra Blades	1 Planer
6 Assorted Gouges	1 Hammer (with extra heads)
4 Assorted Routers	1 Bench Vise — imported
2 Punches	1 Pair Pliers — imported, service quality
3 Knives (with blades)	1 Drill Bit, 2 Screw Driver Bits
1 Hobbycraft Saw (with extra blade)	2 Razor Saw Blades
2 Screw Drivers	2 Chucks
2 "C" Clamps	Complete — \$25.00
1 Tweezer	Plus Free copy of the 35¢ "PROJECT HANDBOOK AND HOBBY TOOL GUIDE" by X-Acto
1 Sander	
3 Tweezer Clamps	
1 Hand Drill	
1 File	

Cat. No. 651-KNS-88N ..... \$25.00 each

## LITTLE ITEMS THAT GIVE BIG RESULTS IN ROCKETRY



**PHANTOM ENGINE:** For display and demonstrations, here's 1/2 an engine, cut the long way to show placement of nozzle, propellant, etc. Helps explain model rocket operation. Safe, uses only non-combustible materials. Shipping weight 1 oz.

Cat. No. 651-CE-1 ..... \$ .50 each



**ENGINE HOLDER:** Flat spring steel design gives easy installation and low drag. Recommended for sport and demonstration models built from BT-20 and BT-30, the engine holder is 2.8" long, 0.1" wide and only 0.025" thick. Mount it on the model with gauze and glue as shown on page 51. Net weight 0.032 oz. Shipping weight 1 oz.

Cat. No. 651-EH-2 ..... \$ .15 each 3 for \$ .30



**SHORT ENGINE HOLDER:** Specially designed for use with Series III engines and BT-20 and BT-30 body tubes, this holder is 1.8" long and 0.1" wide for the same easy installation and low drag as the standard model. Net weight 0.022 oz. Shipping weight 1 oz.

Cat. No. 651-EH-3 ..... \$ .15 each 3 for \$ .30



**PAYLOAD:** How high can your rocket lift an ounce of lead? This 1 oz. payload weight, 3/4" in diameter, is used in some altitude competition events. Shipping weight 2 oz.

Cat. No. 651-PL-1 ..... \$ .50 each 3 for \$1.00



**NOSE CONE WEIGHT:** Balance rockets for perfect stability with these 11/16" diameter lead weights. Center hole for easy attachment and alignment. Stack several for more weight, cut with scissors for less. Each weighs 0.12 oz. Shipping weight 1 oz.

Cat. No. 651-NCW-1 ..... 3 for \$ .25



**NOSE CONE WEIGHT:** 7/16" diameter brass washers for delicate balancing. 1/8" center hole, weighs 0.023 oz. Attach up to four weights to nose cone by threading them on the screw eye. Shipping wt. 1 oz.

Cat. No. 651-NCW-2 ..... 10 for \$1.15



**BALANCING WEIGHT:** Flexible lead strip makes glider trimming a snap. Great for other balancing purposes too. Comes in 3" x 1/4" x 0.02" strips, net weight 0.085 oz. Shipping weight 1 oz.

Cat. No. 651-NCW-3 ..... 5 for \$ .10



**FOAM PADDING:** Protect payload specimens, pad payload capsules with plastic foam. Pieces are 6" x 6" x 1/4". Can be cut and secured in place with white glue. Net weight 0.08 oz. Shipping weight 1 oz.

Cat. No. 651-PSP-1 ..... \$ .20 each 3 for \$ .50

**LAUNCH LUGS:** Super strength laminated launch lugs feature mylar plastic core for durability, paper outer layer for easy gluing. Inside diameter 5/32", fit 1/8" rod. Shipping weight 1 oz.

1 1/4" long: Cat. No. 651-LL-2A ..... 5 for \$ .10

2 3/8" long: Cat. No. 651-LL-2B ..... 5 for \$ .15

5" long: Cat. No. 651-LL-2C ..... 3 for \$ .15

8' long: Cat. No. 651-LL-2D ..... 2 for \$ .15

**GAUZE REINFORCING:** Attach shock cords, reinforce fin joints with unmarked gauze. Comes in 3" x 12" sheets. Apply by spreading a thin layer of glue over the area to be reinforced, smooth gauze down over the glue and spread one or more layers of glue over the gauze. Shipping weight 1 oz.

Cat. No. 651-GR-2 ..... \$ .15 each 3 for \$ .30

**PAPER REINFORCING:** Double fin strength with this easy to use self-adhesive treated paper. Cut to shape, strip off protective backing and press on the balsa. Apply to both sides of the balsa for best results. Provides smooth white surface for painting. In 3" x 9" sheets, shipping weight 1 oz.

Cat. No. 651-PRM-1 ..... \$ .10 each 3 for \$ .20

**TAPE HINGES:** Easy to use elevon hinges for boost-gliders. Treated paper, 4 1/2" x 3/4", adhesive coated on one side. Strip off protective backing, apply to wing. Shipping weight 1 oz.

Cat. No. 651-TH-1 ..... 2 for \$ .10

**ELASTIC THREAD:** Strong elastic thread, use as a spring to actuate elevons on boost-gliders. Each thread is 8" long, 1/32" diameter. Shipping weight 1 oz.

Cat. No. 651-ET-1 ..... 3 for \$ .10

**NYLON SCREWS:** Extra light, high strength screws for elevon adjustment on boost-gliders. 1/2" long, 1/16" thread diameter. Read TR-4 for information on gliders and their design. Shipping weight 1 oz.

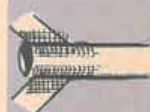
Cat. No. 651-AS-1 ..... \$ .10 each

**STYROFOAM BALLS:** Featherweight 3" diameter styrofoam balls for "odd ball" designs. Use white glue for best results in attaching legs, antennas, stabilizers, etc. Net weight 0.2 oz., shipping weight 5 oz.

Cat. No. 651-SB-3 ..... \$ .25 each

**DOWELS:** Extra strong, light weight 1/8" x 18" seasoned maple dowels. Shipping weight 5 oz.

Cat. No. 651-WD-1 ..... 4 for \$ .20



## LAUNCHING SUPPLIES



**BATTERY PACK:** Durable plastic cased 12 volt battery pack, ideal for use as a booster for the Electro-Launch, a power supply for other launchers, phone systems or any other range power application. Can be set up to deliver 3, 6, 9, or 12 volts, requires 2, 4, 6, or 8 size D cells (not included) depending on voltage desired. Comes in kit form with complete instructions. Shipping weight 1 pound.

Cat. No. 651-BP-2 ..... \$1.50 each



**TWO PIECE ROD:** Handy collapsible two piece rod for portable launchers. Pieces slip together to make a 36" long rod. Base rod has a diameter of 1/8". Shipping weight 6 oz.

Cat. No. 651-RLR-1 ..... \$ .35 each      3 for \$ .70



**ADD-ON ROD:** Sturdy 1/8" diameter, 18" long launch rod section expands two piece rod (see above) to 53" length, gives extra control of flight path — especially with heavier models. To assemble, separate two piece rod, insert tapered end of add-on rod into hole in lower rod, insert upper rod into hole in add-on section. For a constant 1/8" diameter launch rod, join two or three add-on sections together. Shipping weight 6 oz.

Cat. No. 651-RLR-3 ..... \$ .20 per section



**DELUXE BLAST DEFLECTOR:** Durable pressed steel plate deflects engine blast out and away from launcher. Two inches wide, five inches long. Ideal for launchers that receive extensive use. Shipping weight 5 oz.

Cat. No. 651-BD-1 ..... \$.60 each



**BLAST DEFLECTOR PLATE:** Slip-on metal deflector plate fits any launcher using 1/8" rod, protects launcher base from rocket blast. Four inch diameter. Shipping weight 5 oz.

Cat. No. 651-BD-2 ..... \$ .35 each



**PIVOT:** Adjustable launch rod mounting pivots up to 25° to compensate for tilt of launcher base, windage, etc. Easy-to-assemble, mounts to launcher base with 2 #4 screws. (Rod not included.) Shipping weight 2 oz.

Cat. No. 651-LP-1 ..... \$ .35 each



**IGNITERS:** Easy-to-use, extra reliable igniters — the same as are supplied with all Estes engines. Suitable for ignition systems using 6 volts or more, see engine instructions for installation procedure. (Patent pending.) Shipping weight 1 oz.

Cat. No. 651-NWI-1 ..... 6 for \$ .15

**NICHROME WIRE:** Electrical heating wire for model rocket ignition. #30 recommended for use with car batteries, #32 for use with other power supplies. Shipping weight 1 oz.

#30, 15 FOOT ROLL: Cat. No. 651-NW-30A ..... \$ .50 each

#32, 15 FOOT ROLL: Cat. No. 651-NW-32A ..... \$ .50 each

**BATTERIES:** Extra powerful size D photoflash batteries pack the energy needed for rocket launching. These are the type specified for the Electro-Launch, deliver up to 16 amperes of current on a complete short when fresh. Shipping weight 4 oz. each.

Cat. No. 651-PFB-1 ..... \$ .30 each

**MASKING TAPE:** Use to secure engines in models, mask for painting, etc. Strong, flexible 1/2" wide tape comes in 30' rolls. Shipping weight 5 oz.

Cat. No. 651-MT-1 ..... \$ .30 each

**MICRO-CLIPS:** Equip your launcher with the best. Spring-loaded solid copper clips attach lead wires to igniters. Easy to clean and highly conductive with flat contact surfaces. Only 1.1 inches long, attach to leads with or without solder. Shipping weight 1 oz.

Cat. No. 651-MC-1 ..... 2 for \$ .25

**GIANT BATTERY CLIPS:** Heavy duty clips connect to battery terminals up to 1" in dia. Clips are 3" long, available with red or black insulators. Specify color when ordering. Shipping weight 5 oz.

Cat. No. 651-BC-1 ..... \$ .40 each      2 for \$ .75

**BATTERY CLIP:** Spring brass battery clips for special battery installations, replacement part for the Electro-Launch. Fit size D cells, can be trimmed to fit smaller batteries. Shipping weight 1 oz.

Cat. No. 651-BC-2 ..... 2 for \$ .20

**LEAD WIRE:** Flexible, durable size 18 two conductor insulated wire. Ideal as a lead from firing panel to launcher, zip the conductors apart for wiring inside the panel. In 12 foot lengths. Shipping weight 5 oz.

Cat. No. 651-LW-12 ..... \$ .70 each

Same quality lead wire as above, in 250 foot spools. Shipping weight 6 lb. Specify length when ordering.

Cat. No. 651-LW-250 ..... \$7.50 each

**TERMINAL LUGS:** Tiny 1/2" long solderless lugs make electrical connections a snap — insert bare wire into the end of the lug and crimp in place with pliers. 1/8" hole for terminal. Shipping weight 1 oz.

Cat. No. 651-TL-1 ..... \$ .05 each      3 for \$ .10



Second insulator  
added to show  
construction.



## Electrical EQUIPMENT



**PILOT LIGHT HOLDER:** Add visual control to your launch panel by wiring in an arm or continuity check pilot light. Holder is steel with 1/2" red plastic jewel, mounts in 7/16" hole. Takes either 6 or 12 volt bulbs, bulb not included. Shipping weight 4 oz.

Cat. No. 651-LH-1 ..... \$ .45 each



**6 VOLT BULB:** Fits holder No. LH-1. Shipping weight 1 oz. (Type 51.)

Cat. No. 651-AL-6 ..... \$ .20 each



**12 VOLT BULB:** Fits holder No. LH-1. Shipping weight 1 oz. (Type 53.)

Cat. No. 651-AL-12 ..... \$ .20 each



**KEY SAFETY SWITCH:** A must for every control panel. Prevents accidental launching of rockets. SPST, turns on with key, must be turned off to remove key. Mounts in 1/2" hole. One key included with switch. Shipping weight 4 oz.

Cat. No. 651-KSW-1 ..... \$2.05 each

**EXTRA KEY:**..... Cat. No. 651-KSW-1K ..... \$ .25 each



**PUSH BUTTON SWITCH:** Heavy duty construction momentary type, SPST, normally open. Excellent for use as a firing switch. Mounts in 1/2" hole. Shipping weight 4 oz.

Cat. No. 651-SWM-1 ..... \$ .90 each



**ROTARY SWITCH:** Twelve position single pole rotary switch — just right for use as a selector switch with firing systems using more than one launcher. With twelve positions, this switch should handle almost any need. Non-shorting, mounts in 3/8" hole. Shipping weight 5 oz.

Cat. No. 651-SWR-1 ..... \$1.35 each



**DIAL PLATE:** Numbered 12 position plate for use with rotary switch No. SWR-1. Mounts on panel with same nut used to hold switch. Etched aluminum on black background. Shipping weight 1 oz.

Cat. No. 651-DP-1 ..... \$ .25 each

## DRAFTING AND DESIGNING EQUIPMENT



### TRIANGLE SET

Clear plastic triangles are perfect for drafting and designing work. Set includes one 6" 45° triangle and one 8" 30°-60° triangle. Beveled edges — accurate — precise. . . recessed lifts from both sides permit clean, easy pick-up. Shipping weight 6 oz.

Cat. No. 651-DT-2 ..... \$ .65 per set p.p.



### FRENCH CURVE

Precision-made with sleek-finished edges of hairline accuracy. Perfect for designing nose cones, plotting curves, etc. Shipping weight 4 oz.

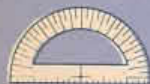
Cat. No. 651-DC-1 ..... \$ .25 each p.p.



### SCALE

Precision 12" clear plastic scale is graduated in 1/32" on one side and in .050" on the other for easy, accurate measuring. Ideal for scale model and design work. Shipping wt. 11 oz.

Cat. No. 651-DR-1 ..... \$ .75 each p.p.



### PROTRACTOR

Large 6" clear plastic protractor makes angle measurements a "snap." Features sharp graduations, accurate 6" ruler at the base. Shipping weight 4 oz.

Cat. No. 651-DP-6 ..... \$ .15 each p.p.



### 12" T-SQUARE

Precision-made, clear plastic 12 inch T-square is accurate and easy to use. Smooth straight edges are marked in inches and millimeters. Shipping weight 11 oz.

Cat. No. 651-DR-2 ..... \$ .30 each p.p.



### METAL COMPASS

Sheet metal German tool does double duty — can be used as pencil compass or divider. Includes metal capsule of leads. Shipping weight 4 oz.

Cat. No. 651-DC-2 ..... \$ .35 each p.p.



### BOW COMPASS

Giant bow compass features thumb screw adjustment, interchangeable points for use as divider, ink or pencil compass. Heavy gauge nickel plated steel. Shipping weight 6 oz.

Cat. No. 651-DC-3 ..... \$1.10 each p.p.

## BOOKS AND LITERATURE

### DESIGN BOOKLET

Make sure you have this up to date and authoritative model rocket design and plan booklet. Contains complete plans for the Arrow-C, Orange Bullet and many other well-known and much-flown model rockets. Also includes basic tech reports and lots of information on rocket construction. Thoroughly illustrated, this is a "must" for all beginners and a good review and reference book for experienced rocketeers. Shipping wt. 4 oz.

Cat. No. 651-P-1 ..... \$ .50 each 3 for \$1.00

### WHY MODEL ROCKETRY?

A 28 page booklet presenting clearly why model rocketry was developed. An ideal aid to explain your activities to a non-modeler. Shipping wt. 2 oz.

Cat. No. 651-BK-1 ..... \$ .20 each

Note: HB-1, HB-2, and HB-3 may not be included in discount orders.

### SPACE VOLUNTEERS By Terrence Kay

A fascinating introduction to Space Medicine. Tells the story of the tests leading up to the first manned flights into space, of the unsung heroes who risked their lives to make space travel safer. Shipping weight 1 lb., 6 oz.

Cat. No. 651-HB-1 ..... \$3.20 each

### ROCKETS AND YOUR FUTURE By Stanley Beitler

Looking for a space-age career? *Rockets and Your Future* is an information-packed career guide and an easy-to-read manual on basic astronautics. You'll want this one on your bookshelf for sure. Shipping weight 1 lb., 6 oz.

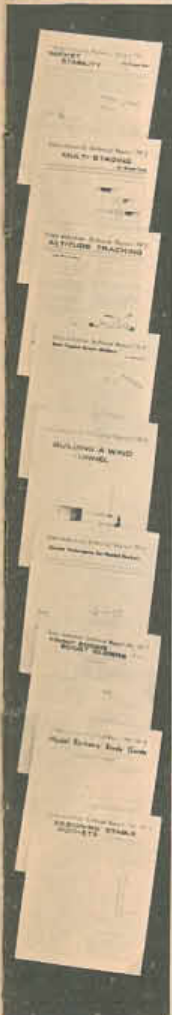
Cat. No. 651-HB-2 ..... \$3.75 each

### GUIDE TO ROCKETS, MISSILES AND SATELLITES

By Homer E. Newell

Written by the Director of the Office of Space Sciences, NASA, this book tells all about the big birds, Aelus to Zuni, and over 160 in between. Filled with clear pictures and basic information on size, thrust, range, etc., this book is a must for the scale model builder and the student of astronautics. Shipping weight 1 lb., 6 oz.

Cat. No. 651-HB-3 ..... \$3.50 each



## TECHNICAL REPORTS

**ROCKET STABILITY:** All about rocket stability. Easy to read, tells how to design your rockets to fly properly. No rocketeer will want to miss this one. Shipping weight 1 oz.

Cat. No. 651-TR-1 ..... \$ .25 each 3 for \$ .50

**MULTI-STAGING:** New, revised version tells all about the latest discoveries in multi-staging technique. Complete, easy-to-understand and well illustrated. A necessity for designing, building and flying multi-stage birds. Shipping weight 1 oz.

Cat. No. 651-TR-2 ..... \$ .25 each 3 for \$ .50

**ALTITUDE TRACKING:** The classic work on simple altitude tracking for model rocketeers. Covers thoroughly tracking and altitude computation. Easy to understand and apply. Shipping weight 1 oz.

Cat. No. 651-TR-3 ..... \$ .25 each 3 for \$ .50

**REAR ENGINE BOOST-GLIDERS:** Basic information to help you understand the operation of rear-engine boost-gliders and design your own. Covers design and construction for proper upward flight and good glide characteristics. Shipping weight 1 oz.

Cat. No. 651-TR-4 ..... \$ .25 each 3 for \$ .50

**BUILDING A WIND TUNNEL:** Full plans and information for building a wind tunnel to study rocket stability. Covers motor and handpowered versions, finding center of pressure, checking multi-stage rockets, etc. Great for clubs and experienced modelers — science fair projects too. Shipping weight 2 oz.

Cat. No. 651-TR-5 ..... \$ .25 each 3 for \$ .50

**CLUSTER TECHNIQUES:** The complete report on clustering engines in model rockets. Thoroughly illustrated, easy to understand. Especially valuable for the modeler who wishes to loft larger payloads. Shipping weight 1 oz.

Cat. No. 651-TR-6 ..... \$ .25 each 3 for \$ .50

**FRONT ENGINE BOOST-GLIDERS:** Valuable information on designing, building and flying front engine boost-gliders. Fully illustrated, recommended reading for anyone who wishes to build better gliders or get the best performance from the ones he has. Shipping weight 1 oz.

Cat. No. 651-TR-7 ..... \$ .25 each 3 for \$ .50

**MODEL ROCKETRY STUDY GUIDE:** Presents a logical program for model rocketeers who want to get the most good from their activities. Includes a listing of recommended books on subjects relating to model rocketry. Shipping weight 1 oz.

Cat. No. 651-TR-8 ..... \$ .25 each 3 for \$ .50

**DESIGNING STABLE ROCKETS:** Based on standard engineering practices, this report presents a method of designing rockets for proper stability on paper before any cutting or gluing is done. Worthwhile reading for beginner and experienced rocketeer alike. Shipping weight 1 oz.

Cat. No. 651-TR-9 ..... \$ .25 each 3 for \$ .50

## MODEL ROCKET NEWS

Here's the number one source for valuable information and ideas on model rocketry. Get these back issues for useful tips 'n' hints, rocket plans, technical reports and interesting and enjoyable reading. Sorry, separate issues from Volumes 1 and 2 are not available. Shipping weight on each MRN is 2 ounces.

Sixteen pages packed with the best in ideas, plans and information from Volumes 1 and 2. Includes plans for the Bug-A-Bye, Dirty Bird III and Cloud Buster, stories on the Crickenauts and "Guppies into Inner Space," Model Rocket Glossary, two full pages from the Idea Box and info on underwater rockets. Shipping weight 3 oz.

Cat. No. 651-MRN-1 ..... \$ .50 each



**VOLUME 3, NO. 1:** Features science fair projects, plans for Buchanan Buster, Idea Box and parachute cutting info. Cat. No. 651-V3-N1 ..... \$ .25 each

**VOLUME 3, NO. 2:** Includes information on Estes Industries and plans for Big Bertha, demonstration rocket. Cat. No. 651-V3-N2 ..... \$ .25 each

**VOLUME 3, NO. 3:** Carries basic info on fins, Idea Box, Safety Report, plans for Moanik-I and Sputnik-Too, Technical Report TR-4. Cat. No. 651-V3-N3 ..... \$ .25 each

**VOLUME 3, NO. 4:** Contains information on science fair projects and booster recovery, Idea Box, plans for Sky Hook and Cobra, Technical Report TR-6. Cat. No. 651-V3-N4 ..... \$ .25 each

**VOLUME 4, NO. 1:** Features 'chute recovery, plans for Loadlifter 1-A and MMSV-II (2 stage altitude rocket), TR-2, Idea Box and crossword puzzle. Cat. No. 651-V4-N1 ..... \$ .25 each

**VOLUME 4, NO. 2:** Features articles on sectional construction, rocket math and how not to get started in model rocketry, plans for Flying Jenny and Tiger Shark, Idea Box and solution to V4, N1 crossword puzzle. Cat. No. 651-V4-N2 ..... \$ .25 each

**VOLUME 4, NO. 3:** Includes articles on basic construction and rocket math, plans for Sly Bolt and Deacon, Technical Report TR-7 and Idea Box. Cat. No. 651-V4-N3 ..... \$ .25 each

**VOLUME 5, NO. 1:** Carries articles on displaying models, rocket safety and the moon race, plans for Commuter and Aerobee Hi, Idea Box. Cat. No. 651-V5-N1 ..... \$ .25 each

**VOLUME 5, NO. 2:** Contains winning pictures from E.I.'s 1965 Photo Contest, information on streamers, plans for Vertex and Whee II, Technical report TR-9 and Idea Box. Cat. No. 651-V5-N2 ..... \$ .25 each

**MRN COLLECTION:** Get the complete collection of available MRN back issues for one reduced price. Includes old issues listed above plus "The Best from Volumes 1 and 2". Shipping Wt. 1 pound.

Cat. No. 651-MRN-10 ..... \$2.00 each

## AN EXAMPLE OF HOW TO ORDER

Quan.	Cat. No.	Description	Unit Price	Total
1	651-MN-53	BALSA NOSE CONE	.25	.25
3	651-MN-20X	" " "	3 for 90	.90
2	651-BT-20B	BODY TUBE 8.65"	.15	.30
1	651-BT-50	" " 18"	.40	.40
3	651-EB-20A	ENGINE BLOCK, PAPER	3 for 20	.20
12	A. 8-3	ROCKET ENGINE	.26	3.12
12	651-B. 1X	" "	.30	3.60

### ORDER FORM

PLEASE TYPE OR PRINT PLAINLY IN INK  
(If additional space is needed,  
use a separate sheet of paper.)

Date: 7/15/65

Enclosed is \$ 8.77 (Money Order)

PLEASE WRITE THESE ITEMS TO:

L. B. JOHNSON

850 MOUNTAINVIEW

BRIGHTON CITY, UTAH 84302  
CITY State Zip Code

ORDER THIS ORDER

State Sales Tax 7% (Calif. orders only)

Balance Due \$ 8.77

From Prev. Order

Amount Enclosed

IF Desired

TOTAL ENCLOSED → 8.77

**ESTES Industries, Inc.**  
Dedicated to Safety and Education in Rocketry

If you have mail when your mail order, please write your old address below.



# ORDERING INFORMATION

## EFFECTIVE DATE

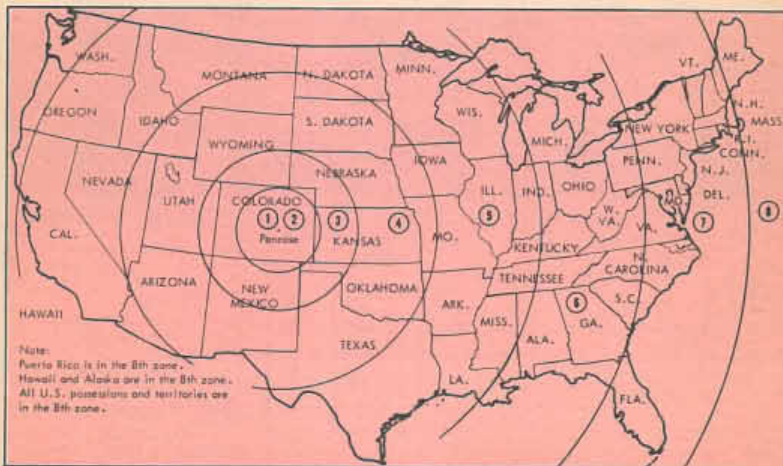
This catalog takes effect as of August 23, 1965 and replaces all previous catalogs. Please be sure that you use the correct and full catalog number for each item you order. All prices subject to change without notice.

## POSTAGE

Estes Industries ships all orders postpaid in the U.S. by regular land mail unless the purchaser specifies otherwise or in case the order is a discount purchase or includes over 50 engines. For further information on the shipping of quantity purchases and large numbers of engines, see the **Quantity Purchases** section below.

## AIR MAIL SERVICE

While Estes Industries specializes in fast service, sometimes extra speed is necessary. For orders on which you desire extra rapid delivery, Air Mail postage may be included. Shipping weights are given on all items. Total up the shipping weights on the items you are ordering, then find the difference between surface and air rates using the map and charts. Send only this difference. For example, on a two pound order to zone 8, subtract \$.72 (the surface amount) from \$1.68 (the air rate). The difference would be \$.96 and you would send this amount. For orders under 8 ounces, send 6¢ per ounce. All orders which include engines require 6¢ per engine. Any excess will be returned with your order.



## PAYMENT ON ORDERS

Full payment must accompany all orders. Please send all remittances by either check or money order, for your protection and our convenience. If you do send currency, be sure your envelope has sufficient postage, is properly sealed, and is addressed correctly, so we will receive your order. Coins should be attached to a separate sheet of paper, not to the order blank. Use a single strip of masking tape to hold the coins in place. Avoid the mailing of coins, as they are easily lost in the mail. We cannot assume

responsibility for the loss of coins, currency or orders in the mail. Remember to include sufficient funds with your order. For your protection, we do not ship orders COD. Proper attention to these details will result in speedier service for you.

## QUANTITY PURCHASES

Quantity discounts are available to all individuals, clubs and other organizations who wish to buy rocket engines and rocket supplies in bulk. For discounts and shipping terms see table below.

Amount of Purchase Before Discount	% of Discount	Shipping Terms	Terms
Up to \$25.00	none	Prepaid	Cash with Order
\$25.00 to \$50.00	20%	F.O.B. Penrose	Cash with Order
\$50.00 to \$100.00	30%	F.O.B. Penrose	Cash with Order
\$100.00 and up	40%	F.O.B. Penrose	Cash with Order

Orders including 50 or more rocket engines must be shipped by air express, bus, railway express, truck or other common carrier. Consult your local office for rates before ordering. **Shipping Charges** may be made on a collect basis on quantity orders if you desire.

## CAUTION

We believe that we have the safest program offered in the field of rocketry today. However, it is still important that the utmost care be exercised in the use of our products. We DO NOT assume any responsibility for accidents. No warranty is either made nor implied as to reliability or performance. We assume no liability beyond the cost of replacement of a product, if any, which misfunctions or is found defective.

## POSTPAID PRICE

On certain items our price is slightly higher than the normal list on the item. The difference in prices is due to our policy of paying postage on all items. When you place an order for rocket supplies totaling \$4.00, you can be sure there are no hidden charges: All you pay is \$4.00, no extra postage, no handling and no service charges.

## POSTAL REGULATIONS

Postal regulations permit us to ship only 3 rocket engines per parcel. If all of your order does not come at the same time, please be patient — give Uncle Sam a few days to mix things up and sort them out again.

**NOTE** All foreign orders require additional postage.

SURFACE PARCELS

Weight 1 lb. and not to exceed	Local	Up to 150 miles	150 to 200 miles	200 to 300 miles	300 to 400 miles	400 to 1,000 miles	1,000 to 1,400 miles	1,400 to 1,800 miles	Over 1,800 miles
	Zone	1	2	3	4	5	6	7	8
2	\$0.29	\$0.40	\$0.42	\$0.46	\$0.52	\$0.59	\$0.66	\$0.72	
3	.31	.46	.49	.55	.64	.73	.83	.93	
4	.33	.51	.55	.64	.75	.86	1.01	1.15	
5	.35	.57	.62	.72	.87	1.02	1.18	1.34	
6	.37	.62	.68	.80	.97	1.15	1.34	1.53	
7	.39	.68	.75	.88	1.07	1.28	1.50	1.72	
8	.41	.73	.81	.95	1.16	1.41	1.66	1.92	
9	.42	.78	.87	1.02	1.26	1.53	1.82	2.12	
10	.45	.83	.92	1.10	1.38	1.66	1.99	2.31	

\*Third class rates apply up to but not including one pound.

AIR PARCELS

Weight in lbs. over 8 oz. to	Zone	1-3	4	5	6	7	8
	1	\$0.68	\$0.73	\$0.78	\$0.83	\$0.88	\$0.93
2	1.18	1.23	1.34	1.47	1.55	1.68	1.81
3	1.64	1.73	1.90	2.11	2.27	2.48	2.68
4	2.12	2.22	2.46	2.73	2.99	3.28	3.58
5	2.60	2.73	3.02	3.39	3.71	4.08	4.45
6	3.08	3.23	3.56	4.03	4.43	4.85	5.28
7	3.56	3.73	4.14	4.67	5.15	5.68	6.21
8	4.04	4.23	4.70	5.31	5.87	6.48	7.11
9	4.52	4.73	5.26	5.95	6.59	7.28	7.98
10	5.00	5.23	5.82	6.59	7.31	8.08	8.88

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*Jeff Flygare*

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