

Now... TWICE the power in a single engine!



ESTES INTRODUCES...

BUILDING "D" POWERED MODELS
Estes "D" engines open a whole new world of performance to the model rocketeer. Its greater total impulse and higher initial thrust make it easy to fly larger, more advanced designs.

Although most conventional model rocket building and flying techniques can be used, there are a few important differences to remember when building models for "D" power. Special attention is important in three areas — stability, engine mounting and multi-staging.

STABILITY

A "D" engine weighs about twice as much as a conventional Series I or II engine. This results in a rearward concentration of weight in a rocket that must be allowed for in designing the model to make sure it will be stable.

Don't just stick a "D" engine mount in a standard model and expect it to fly. Always string test your model before flying it (see the technical section of your Estes catalog). If necessary, add nose cone weights or enlarge the fins until it does pass the string test.

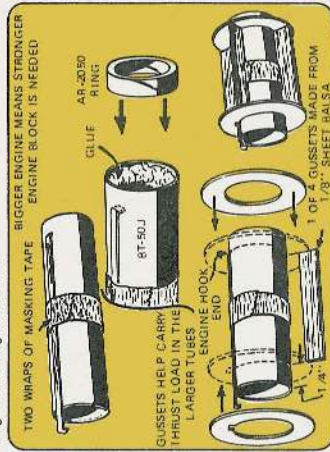


Fins for a "D" bird should be made extra strong to withstand the higher acceleration and speed the model

will encounter. One-eighth inch thick balsa sheet is generally the best fin stock to use.

ENGINE MOUNTING

A Series IV (D) engine will mount inside a BT-50 body tube much the same as a standard engine fits a BT-20. However, the engine mount in a "D" bird must be made extra strong. For best results use an EH-2 engine holder to retain the engine and use an AR-2050 ring as an engine block.



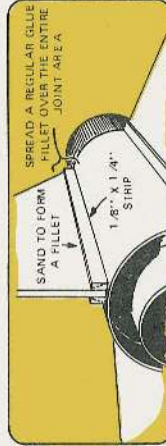
If this assembly in turn goes into a larger body tube, the adapter system must be extra strong. For a BT-55 size rocket the AR-5055 rings should be used. In larger tube sizes the rings should be reinforced with gussets as shown. Always use plenty of glue and let it dry completely.

DESIGN NOTES

MULTI-STAGING

The greatest difficulty in multi-staging with "D" engines comes in keeping the fins on booster stages. The problem arises when booster and upper stages separate — the booster starts to tumble at high speed, causing extremely high forces on the fins. The result is that the fins will break off at staging unless they are attached very strongly.

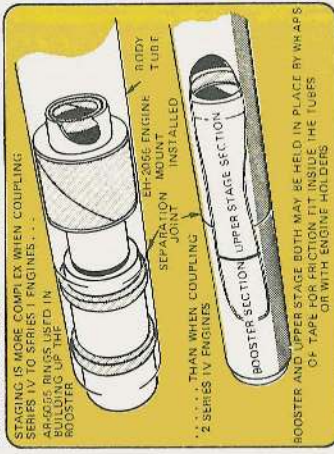
Booster fin material must be strong. One-eighth inch thick balsa is best. Don't make the fins excessively large. Generally, booster fins on D birds shouldn't need to be more than 1-1/2 times the size of upper stage fins. Attach the fins securely. One method of reinforcing the



fin foot is shown; the inventive rocketeer should be able to come up with other, equally good methods.

It isn't necessary to tape "D" engines together when multi-staging. However, the rocket must be built so that the stages slide apart in a straight line when they separate. The engines must be positioned so the nozzle of the upper stage engine is directly in line with the top of the booster engine.

If a Series I, II, or III upper stage engine is used it should be positioned so its nozzle end touches the top end of the booster engine. Again, it is not necessary to tape the engines together, but it is necessary to make sure that the stages will slide apart in a straight line.



Regardless of the size of the upper stage engine, the stage coupling should be designed so the stages slide apart in a straight line for at least 3/4" before they separate. This helps the upper stage continue a straight flight and makes ignition more reliable.

Whether your "D" bird is a single or multi-stage model, fly it on a calm day when there's good visibility so you don't lose it. Always follow the safety code — you'll find it makes rocketry more enjoyable, too.

MODEL MARKINGS DECAL

Dress up your models with this convenient collection of markings, numbers, patterns, etc. Black decal is printed on clear backing—cut out the part you want to use, dip in warm water for 30 seconds and slide off backing paper onto your model. Measures a big 4" x 9". Shipping weight: 1 oz.

Cat. No. 692-D-12 25¢ each

'20' DECAL

Just right for that BT-20 model! A convenient collection of markings to dress up your model. Printed black on a clear backing, this decal sheet measures 3" x 4½". Shipping weight: 1 oz.

Cat. No. 693-KD-45 15¢ each

'50' DECAL

Brilliant four color decal provides the perfect finishing touch for any BT-50 size model. A big 4" x 9", this decal gives your models that professional look. Easy to use. Shipping weight: 1 oz.

Cat. No. 693-D-13 50¢ each

SAVE!

For over 11 years we've managed to provide the same high quality products with very few increases in price. Although material, postage and labor costs kept going up, we were able to improve the efficiency of our operation so that we could continue to offer the same low prices on our kits, engines and other supplies.

In the last year, though, the increase in costs has finally reached the point where we have no other choice: we're going to have to raise prices on many of the items offered in our next catalog. Until the catalog comes out (in April), we'll honor the old prices. So if you want to save money, better get your orders in now—BEFORE THE PRICE INCREASE!

FLY IT SINGLE-STAGE

FLY IT MULTI-STAGE

EASY TO BUILD

RECOMMENDED ENGINES:
SINGLE OR UPPER STAGE:
½A6-2S, ½A6-4S, A5-4S

SPACE FRONTIER

By Werther Von Braun

A fascinating survey of what is happening and what we expect to achieve in our space program. Well illustrated with diagrams and photos, it provides a proper understanding of the many facets of space flight today and in the near future. Shipping weight: 10 oz.

Cat. No. 693-BK-13 \$1.20 each

WIND METER

Perfect for studies of parachute drift, weathercocking, and other wing-caused model rocket performance variations. This accurate wind meter is also great for general weather studies. Check the wind before each launch; you'll know when to fly long duration models, when to fly short duration ones and when it's too windy to fly at all.

Instrument is precision molded of acrylic plastic and should last practically forever. Indicating accuracy is plus or minus ½ mph on the low scale, plus or minus 3 mph on the high scale. Pocket size makes it extra convenient to carry in the field. Shipping weight: 5 oz.

Cat. No. 893-WM-1 \$7.25 each



2/3 ACTUAL SIZE APOLLO ARM PATCH

As an American and a model rocketeer, you'll be proud to wear or display this colorful memento of the first manned moon landing. Measuring 3 inches in diameter, the Apollo 11 arm patch is embroidered in full color on a heavy fabric backing. Wear it on your jacket or display it on your wall. Shipping weight: 2 oz.

Cat. No. 692-AD-1 \$1.00 each

FIRST TRUE COMPETITION MODEL



**ONLY
\$1.75**

D POWER

PARACHUTE RECOVERY

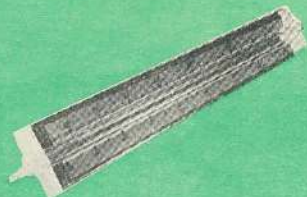
HIGH PERFORMANCE

QUICK-CHANGE
ENGINE MOUNT

FLY FROM ROD
OR RAIL

DIE CUT FINS

CUSTOM DECAL



**BIG--29% INCHES LONG
HIGH PERFORMANCE**

**SEE-THROUGH
PAYLOAD SECTION
TWO STAGE**

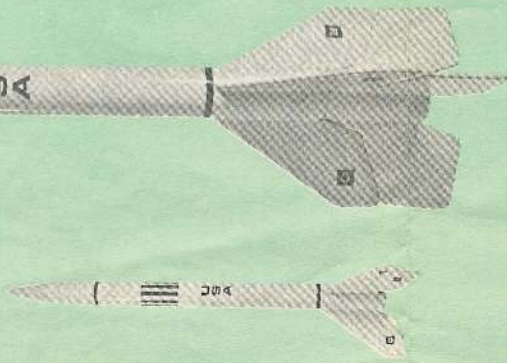
**NEW
POP-N-GO STAGING**

**JUST PLUG
STAGES TOGETHER**

**ONLY
\$1.75**

SPECIFICATIONS:
 Body Diameter: 0.736 in.
SINGLE STAGE:
 Length: 12½ in.
 Weight: 0.55 oz.
TWO STAGE:
 Length: 13½ in.
 Weight: 0.75 oz.

**ONLY
 \$1.00**



**USES SERIES III
 (SHORT) ENGINES**

ASTRON BETA

An ideal model for any rocketeer, the Astron Beta, gives king size performance with Series III (short) engines. Easy to build and fun to fly, this kit features low weight, streamlined design and parachute recovery. The Astron Beta is a real double duty, multi-purpose model. You can fly it time after time as a high performance single stage model—add the booster stage and you have a two-stage model that really scats. Kit comes complete with all parts and instructions (but no engines). Shipping weight: 5 oz.

Cat. No. 692-K-45 . . . \$1.00 each

**ONLY
 \$2.75**

RECOMMENDED ENGINES:
 D13-5, D13-7
 WITH ADAPTER EM-2050:
 B6-4, C6-5

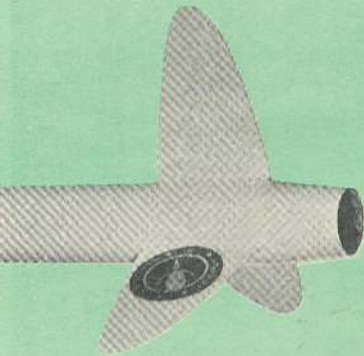
SPECIFICATIONS:
 Length: 16.6 in.
 Weight: 2.75 oz.
 Body Diameter: 1.325 in.

CHEROKEE-D

The perfect model for getting started on the high performance world of Estes "D" power. Your Cherokee-D will roar to amazing altitudes—parachute recovery brings it back safe so you can launch it again and again. Sleek design and low weight combine to give the Cherokee exceptional flight characteristics. Other kit features include die-cut fins, quick change engine mount, colorful decal and heavy duty construction. With all this, it's the perfect bird to start your "D" fleet. Shipping weight: 11 oz.

Cat. No. 694-K-47 . . \$2.75 each

**ESTES "D" POWER INTRODUCES A
 NEW ERA IN MODEL ROCKETRY**



RECOMMENDED ENGINES:
 ½A6-2, A8-3, A5-2, B6-4, B6-6,
 C6-7, B14-7

SPECIFICATIONS:
 Length: 13.8 in.
 Weight: 1 oz.
 Body Diameter: 0.976 in.

ASTRON SPRINT

An impressive altitude model! Designed to give the highest performance in its class, the Astron Sprint incorporates the most efficient aerodynamic shapes for the velocities it will encounter. Altitudes of up to 1600 feet are possible using C6-7 engines.

This model is perfect for the advanced rocketeer, yet simple enough for the beginner to build.

Kit features include pre-cut fins and tail cone, two color Sprint emblem decal, one color trim decal and complete illustrated assembly instruction sheet. (Engines are not included.) Shipping weight: 14 oz.

Cat. No. 701-K-49 . . \$1.75 each



RECOMMENDED ENGINES:
UPPER STAGE:
 A8-5, B6-6, B14-7, C6-7
BOOSTER STAGE:
 B6-0, B14-0, C6-0

SPECIFICATIONS:
 Length: 29.5 in.
 Weight: 2.25 oz.
 Body Diameter: 0.976 in.

ASTRON SHRIKE

Attractive new two stage high performance payload rocket comes in a truly deluxe kit. Includes two beautiful multi-color decal sheets—six colors in all; completely pre-cut fins; pre-cut and embossed nozzle parts; pre-cut and embossed body wrap-on; transparent payload section with foam end pads. Uses new easy "pop and go" staging method, no taping. Just insert engines and plug stages together. Two parachutes included: an 18" chute for normal flying and a 12" chute for windy weather—plus snap swivels for quick and easy changes. Easy to follow step-by-step instructions. This is a bird you'll really enjoy. Shipping weight: 11 oz.

Cat. No. 693-K-46 . . . \$3.50 each

ESTES INDUSTRIES

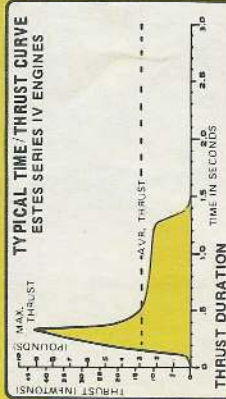
Box 227

Penrose, Colorado 81240



ESTES "D" POWER

FOR THE ADVANCED ROCKETEER



D FOR HIGH ALTITUDE PERFORMANCE D FOR LARGE PAYLOAD CAPACITY

Now a single engine gives you the performance previously available only from clusters. The big "D" provides twice the power of the largest Series I engine—with the same quality and reliability which have made over 20 million Estes-Powered launches successful. See the "Design Notes" for information on building and flying "D" power birds.

TOTAL IMPULSE: 4.48 pound seconds
20.00 newton seconds
MAXIMUM THRUST: 9 pounds
PROPELLANT WEIGHT: 0.05496 pounds
24.93 grams
LENGTH: 2.75 in.
DIAMETER: 0.945 in.
SHIPPING WEIGHT: 2-1/3 oz. per engine

Cat. No. and Engine Type	Prices		Recommended Use	Time Delay (±15%)	Maximum Lift-Off Weights w/engines	Thrust Duration	Initial Weight	
	ea.	3 For					oz.	gr.
D13-0	\$.75	\$2.00	BOOSTER ENGINE	NONE	13 OZ.	1.48 SEC.	1.44	40.9
D13-3	\$.75	\$2.00	SINGLE STAGE	3 SEC.	13 OZ.	1.50 SEC.	1.49	42.2
D13-5	\$.75	\$2.00	SINGLE STAGE	5 SEC.	10 OZ.	1.50 SEC.	1.52	43.1
D13-7	\$.75	\$2.00	SINGLE OR UPPER	7 SEC.	8 OZ.	1.50 SEC.	1.55	44.0

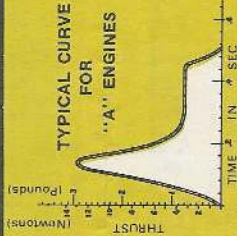
"D" ENGINE
SHOWN
ACTUAL SIZE



SHORT "A" HIGH ALTITUDE PERFORMANCE IN A "SHORT" ENGINE

Fly short engine models such as the Astron Sprite, Midget, Beta, etc. to amazing altitudes with these new engine types. The greater total impulse of 2.50 newton-seconds lets you fly efficient models to altitudes approaching 1,000 feet.

TOTAL IMPULSE: 0.56 Pound Seconds
2.50 Newton Seconds
MAXIMUM THRUST: .46 oz.
PROPELLANT WEIGHT: 0.11 oz.
(3.12 grams)
LENGTH: 1.75 in. DIAMETER: 0.69 in.



Cat. No. and Engine Type	Prices		Recommended Use	Time Delay 15%	Maximum Lift-Off Weights w/engines	Thrust Duration	Initial Weight	
	ea.	3 For					oz.	gr.
A5-0S	\$.35	\$.80	Booster Engine	None	3.0 oz.	0.48 sec.	0.42	11.9
A5-2S	.35	.80	Single Stage	2 sec.	3.0 oz.	0.50 sec.	0.47	13.3
A5-4S	.35	.80	Single or Upper Stage	4 sec.	1.5 oz.	0.50 sec.	0.52	14.7

Now one launcher does double duty. It's a completely functional launcher for heavy duty use in flying model after model -- clear plastic construction makes it perfect for science fairs and other rocketry displays. Transparent high strength base and control unit make the mechanical and electrical features of the launcher instantly visible. High-power 12 volt circuit comes complete with 8 size D photoflash cells for instant ignition flight after flight. Kit comes complete with all parts, instructions, and a thorough, informative manual on launch system design and operation. Shipping weight 62 oz.

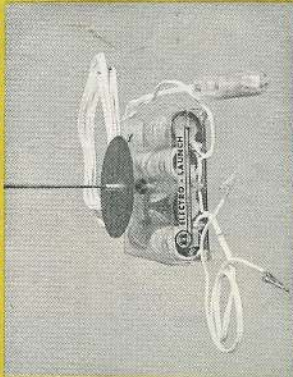
Cat. No. 692-FS-8B

Only \$7.00
Also available without the 8 photoflash cells. Shipping weight: 30 oz.

Cat. No. 692-FS-8

Note: Regular Electro-Launch models (FS-4 and FS-4E) are still available.

PHANTOM ELECTRO-LAUNCH



46 D POWER FOR SATURN-V

WEIGHS ONLY **50¢**
0.4 oz. (11.3 grams)
Launch your Saturn V the easy way—use a single D13-3. Complete adapter kit fits your Saturn's present engine mounting system, holds the engine securely in place. Shipping weight: 5 oz.

Cat. No. 694-EM-5063

\$.50 each

EM-2050

ENGINE MOUNT ADAPTER

FLY YOUR SERIES IV (D) BIRD WITH A SERIES I OR II ENGINE

Featuring quick-change engine mounting and heavy-duty construction, this adapter weighs only 0.19 oz. (5.3 grams). Shipping weight: 5 oz.
Cat. No. 694-EM-2050 \$.35 each

CENTERING RINGS

Easy to use for mounting a BT-50 tube in a BT-55 body tube. Extra strong for "D" engine mounts. Weight 0.062 oz. ea. Shipping weight 2 oz.
Cat. No. 694-AR-5055 4 for \$.25

SAVE! BUY NOW BEFORE
APRIL PRICE INCREASES