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 ARF-5055 ring as an engine block.

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 fins is shown in the picture above. For series 1, 11, 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 secure the engines together, but it is desirable 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 it easier to reassemble the rocket after flight.
**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

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**Space Frontier**

By Wernher Von Braun

A fascinating survey of what is happening and what we expect to achieve in our space program, all illustrated with diagrams and photos, it provides a proper understanding of the many facets of space-flight today. And in the near future. 32 pages, weight 1 oz.

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

**Wind Meter**

Perfect for studies of parachute, wind speed, and other wind-caused model rocket performance variations. The SOLBERG wind meter is easy to read, for general weather studies. Check the wind before each launch. You'll know when to try long duration models, when to fly short distance ones and when it's too windy to fly at all.

In instrument precision molded of acrylic plastic and should last indefinitely, indicating accuracy in plus or minus 1 mph on the wind scale. Pocket size makes it extra convenient to carry in the field. Shipping weight 5 oz.

Cat. No. 693-WM-1 . . . . . . . . 75¢ each

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**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

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**Power**

**First True Competition Model**

*Parachute Recovery*

*High Performance*

*Quick-Change Engine Mount*

*Die Cut Fins*

*Custom Decal*

**Fly It Single-Stage**

**Fly It Multi-Stage**

**Easy to Build**

Recommended Engines:

| Single or Upper Stage: | VÆR-2B, VÆR-4S, A5-4S |

**ONLY**

**$1.75**

**Big-29" Inches Long**

**High Performance**

**See-Through Payload Section**

**Two Stage**

**New Pop-N-Go Staging**

**Just Plug Stages Together**

**ONLY**

**$9.75**

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**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!
**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, multipurpose 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. 694-K-47 . . . $2.75 each
Cat. No. 701-K-49 . . . $1.75 each
Cat. No. 692-K-45 . . . $1.00 each

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**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 Cherokees 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.

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**Astron Sprint**

An impressive altitude model designed for 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 1000 feet are possible using the 'D' engine.

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 decals and complete illustrated assembly instruction sheet. (Engines are not included.) Shipping weight: 14 oz.

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

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**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 paintable 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 tapering, 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

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Penrose, Colorado 81240

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**Estes "D" Power Introduces A New Era in Model Rocketry**
# D" Power for the Advanced Rocketeer

## Estes "D" Power

### For High Altitude Performance

For large payload capacity, a single D-Shaped engine gives you the performance and reliability which have made over 20,000 Estes-powered launches successful. See the "Launch Notes" for information on building and flying "D"-power birds.

<table>
<thead>
<tr>
<th>Cat. No. and Engine Type</th>
<th>Initial Weight</th>
<th>Thrust Duration</th>
<th>Maximum Lift-Off Weights</th>
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<td>D13-0</td>
<td>1.44 oz</td>
<td>2.75 sec</td>
<td>40.9 oz</td>
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<td>D13-3</td>
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<tr>
<td>D13-7</td>
<td>1.55 oz</td>
<td>2.75 sec</td>
<td>44.0 oz</td>
</tr>
</tbody>
</table>

### Phantom Electro-Launch

Now available without the 8 photoflash cells. Shipping weight: 10 oz.

- **Cat. No.: 1322-FS-4B**
  - **Price:** $4.95
  - **Launch System:** Electro-Launch
  - **Ignition:** Instantly visible, high-power 12 volt circuit for instant ignition after flight. Kit comes complete with all parts, instructions, and through manual instructions. Shipping weight: 12 oz.

### Centurion Rings

Easy to use, mounting is 1/32"-320. Weight only 0.16 oz. Shipping weight: 0.06 oz. ea.

- **Cat. No.: 1105-0**
  - **Price:** $0.25 each

### EM-2050 Engine Mount Adapter for Series IV (10 Bird or II Engine)

Launch your Saturn-V the easy way. Complete adapter includes 5 oz. engine and mounting ring. Shipping weight: 5 oz.

- **Cat. No.: 1105-0**
  - **Price:** $5.99 ea.

### Save! Buy Now! Before April Price Increases

- **Cat. No.: 1105-0**
  - **Price:** $5.99 ea.