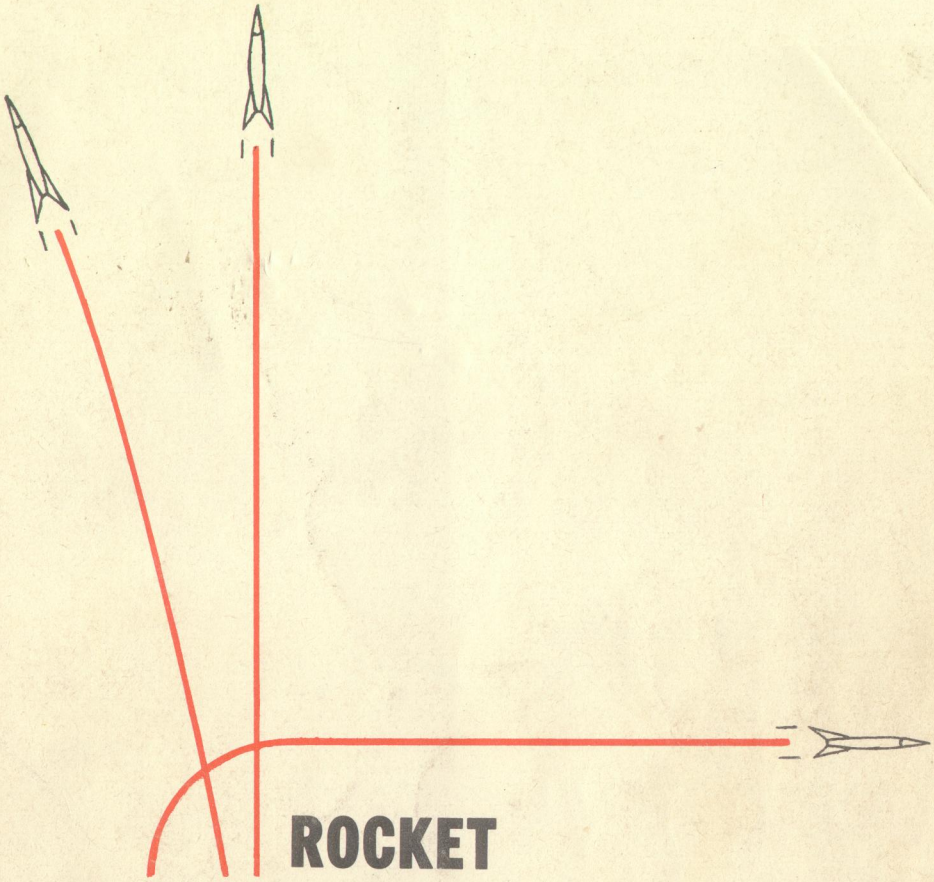


ROCKET DEVELOPMENT CORPORATION

ROUTE 3 – SEYMOUR, INDIANA
47274

Model Rocketry the Space Age Hobby

R ---------- D ---------- C

MODEL ROCKETRY is that exciting new hobby of building and flying model rockets. MODEL ROCKETRY takes the thrill of a rocket launching off the TV screen and brings it "live" direct to you. Model rockets are made from light-weight, non-metallic materials and are powered by commercially manufactured model rocket engines.

For you, MODEL ROCKETRY can be - - -

—A Hobby

Now enjoyed by many thousands, the hobby of MODEL ROCKETRY, like the hobbies of model airplanes, model boats and model cars, has grown rapidly in recent years. You build your own model, conduct your own countdown, press the button and watch your model travel swiftly hundreds of feet into the sky. And that isn't the end - you watch the ejection system deploy the recovery device and return the model to earth safely.

—An Educational Program

MODEL ROCKETRY readily fits into the educational field and has been the basis for many successful science fair projects. Theories and principles from the fields of physics and mathematics can be visually demonstrated and directly related to MODEL ROCKETRY. Electronics also may be worked into your program. You can perform projects to study aerodynamics, nose cone design, fin design, rocket stability, tracking systems, recovery devices, staging and separation techniques and ignition systems. Through the use of static test equipment designed especially for model rocket engines, you can study first hand how a rocket engine performs. By recording the thrust, you can calculate the total impulse, specific impulse, etc., of the propellant charge.

—A Competitive Sport

MODEL ROCKETRY is nationally organized, and competitive events are held at local, regional and national levels. Once a year the National Association of Rocketry schedules an annual meet at which contests are held to determine the national champions. Winning a beautiful trophy at the annual NAR meet is a real challenge to your ability and knowledge of model rockets.

—The NAR Way

The National Association of Rocketry (NAR) is a non-profit organization which is largely responsible for the existence of MODEL ROCKETRY as it is today. The NAR has established a safety code and booklet of rules and regulations. A Newsletter is published regularly to keep the members informed on the latest happenings in the field. For more information on becoming a member of the National Association of Rocketry, write NAR, 1239 Vermont Avenue, N.W., Washington, D. C., 20005.

Index

R ---------- D ---------- C

Rocket Development Corporation

ROCKET DEVELOPMENT CORPORATION was organized in 1961 in Utah to develop and market static testing equipment for the model rocketeer.

Professional missilemen always static test their motors previous to free flight firings to obtain the necessary information to determine how their "birds" will react in the air. ROCKET DEVELOPMENT CORPORATION's static test equipment is patterned after the experienced and safe professional units employed by the missile industry.

Irving Wait, president of the Company, who guides the product development program, began work in the professional rocket field in 1955 and has had experience in solid propellant research and development programs, in the design and development of rocket motors and related hardware and in the static testing and ballistic analysis field.

In 1963 the Company relocated in Indiana and added flight kits and accessories to the product line.

Safety

R ---------- D ---------- C

The excellent safety record of model rocketry is no accident - this new hobby was designed for those interested in a responsible enjoyment of activities initiated by the current world-wide interest in aerospace.

The most important safety factor in model rocketry, however, is beyond our design - that part is YOU, our customer.

Our safety code is for the purpose of protecting YOU. Only YOU can keep model rocketry safe. We ask you to read and observe all of the RDC Safety Code so that you may continue to enjoy this exciting, new space age hobby.

RDC Safety Code

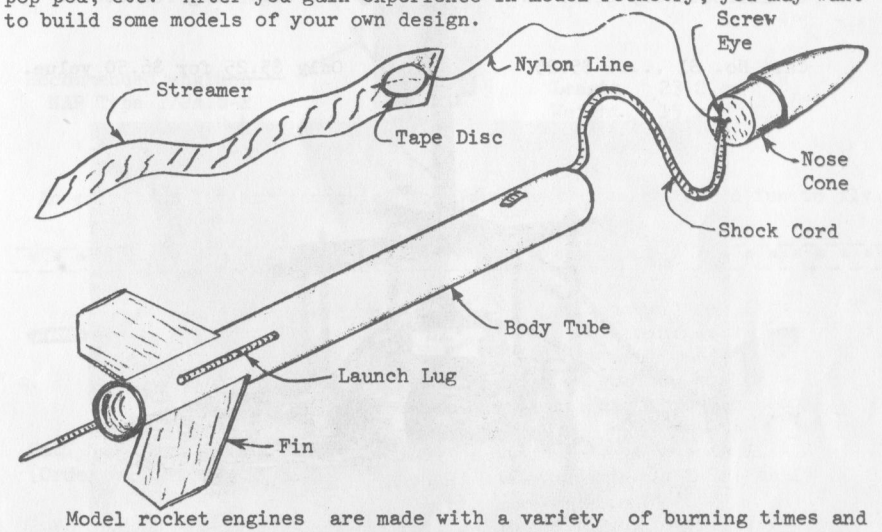
1. I will use only commercially manufactured rocket engines.
2. I will not tamper with, or attempt to alter, the commercial model rocket engines.
3. I will not use any major metal parts on my model rocket; I will not use any metal parts near the rocket engine.
4. I will always use electric ignition, keeping myself and others at least 12 feet away from the launcher.
5. I will always launch my rocket vertically, not to exceed 30° from vertical under any circumstances.
6. I shall not fly a rocket whose flight weight exceeds one (1) pound.
7. I shall not use over four (4) ounces of propellant in any rocket.
8. I shall fly my models in an open area, away from buildings, power lines, highways, etc.
9. I shall always use a recovery system to insure a safe, soft landing of my rocket.
10. I will carefully follow the manufacturer's instructions and recommendations.

Getting Started

R ---------- D ---------- C

The building and launching of a model rocket is not difficult nor dangerous. A little common sense, observance of the RDC Safety Code - and preferably adult supervision - are the main requirements.

The beginner should start by building a simple, single stage model rocket of proven design such as are readily available in kit form. Once you have mastered the single stage, you can take on more sophisticated models such as multi-stage rockets, boost gliders, clustered engines, a pop pod, etc. After you gain experience in model rocketry, you may want to build some models of your own design.



Model rocket engines are made with a variety of burning times and delay elements. Engines for single stage use have a delay element which allows the rocket to coast upward for several seconds after the thrust stops before the ejection charge pops out the recovery device.

These commercially manufactured engines are safety-certified by the National Association of Rocketry and are of non-metallic construction. The manufacturer's recommendations should be followed in the care and handling of the engines. All rocket engines should be ignited electrically according to the instructions supplied with each package.

A new rocket engine must be used for each flight; however, the model rocket itself should last for many, many flights.

Model rockets are launched from rod type launchers. The model rocket should be launched vertically, or nearly straight up - never horizontally.

First Flighter

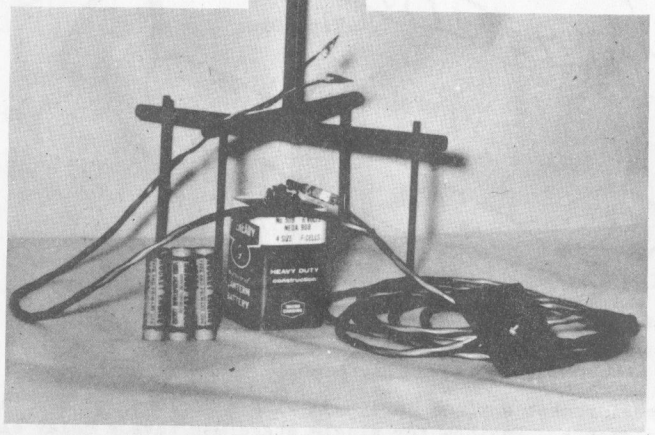
R ---------- D ---------- C

For that first flight launch, try RDC's FIRST FLIGHTER !

The FIRST FLIGHTER is a combination of standard catalog items especially selected and priced for an introductory offer to the beginning rocketeer.

Cat. No. S1 ..... $5.25

Only $5.25 for $6.50 value.



Included in the FIRST FLIGHTER are:

Rawhide Rocket Kit Cat. No. F3
(See Page 5 for the description.)

Three 1/2 A.8-2 engines
(See Pages 18-19 for the description.)

Sta-Put Launcher Cat. No. G44
(See Page 11 for the description.)

Electric Launching Kit Cat. No. E4
(See Page 11 for the description.)*

Three Flight Data Sheets Cat. No. G61
(See Page 23 for the description.)

*battery not included

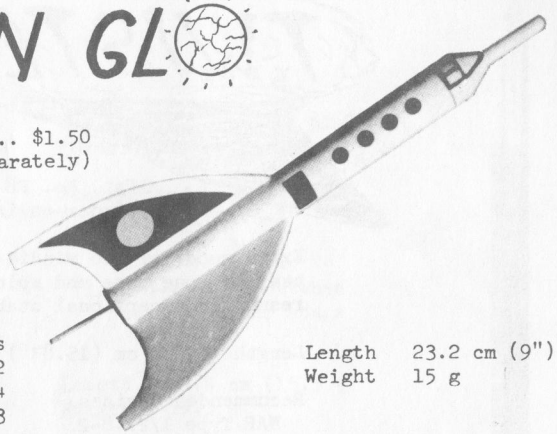
Single Stage

R ---------- D ---------- C

MOON GLO

Cat. No. F1 ..... $1.50
(Order engines separately)

Streamer Recovery



Recommended engines
NAR Type 1/2A.8-2
B.8-4
A.8-3

Length 23.2 cm (9")
Weight 15 g

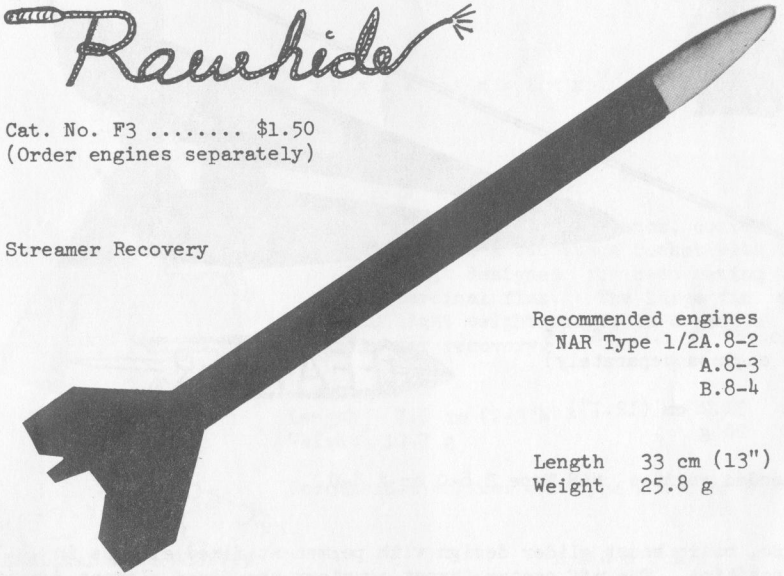
An excellent kit for beginning modelers - easy to build and fun to fly.

* *

Rawhide

Cat. No. F3 ..... $1.50
(Order engines separately)

Streamer Recovery



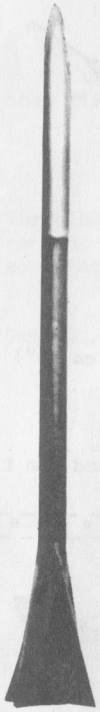
Recommended engines
NAR Type 1/2A.8-2
A.8-3
B.8-4

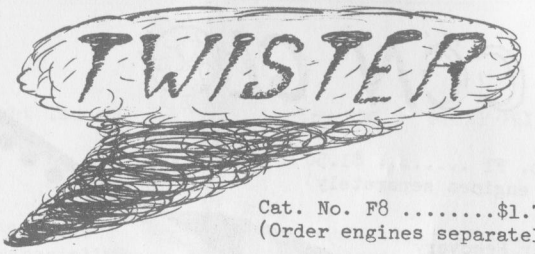
Length 33 cm (13")
Weight 25.8 g

Get 'em up, move 'em out with RAWHIDE. Nothing fancy about this rocket; just rugged, reliable and excellent for the beginner.

Spin Fin—Boost Glider

R ---------- D ---------- C



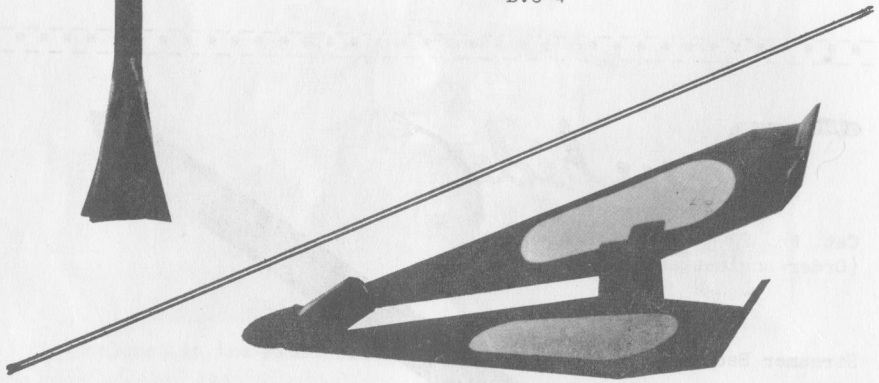


Cat. No. F8 .....$1.75
(Order engines separately)

Extra good for the windier days. The heavier nose cone and spin fin design result in exceptional stability.

Length 40.2 cm (15.83") Weight 36.7 g

Recommended engines
NAR Type 1/2A.8-2
A.8-3
B.8-4



Cat. No. F7 ..... $1.45
(Order engines separately)

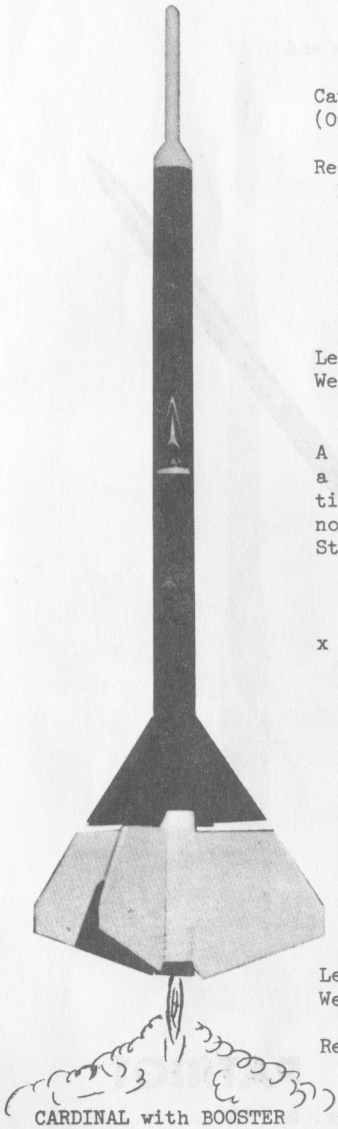
Length 32.2 cm (12.7")
Weight 20 g

Recommended engines NAR Type B.8-0 or A.8-0

A unique, basic boost glider design with permanent fixed elevons in glide position. The off center thrust counters the fixed elevons during powered flight. The FEATHER goes into glide at burnout. No ejection charge is required. Especially appealing to the careful craftsman who enjoys precise assembly.

2-Stage

R ---------- D ---------- C



CARDINAL with BOOSTER
Length 46.4 cm (18-1/4")
Weight 30.2 g

CARDINAL

Cat. No. F2 ..... $1.75
(Order engines separately)

Recommended engines
NAR Type 1/2A.8-2
A.8-3
B.8-4
1/2A.8-4 or A.8-4 when used as upper stage

Length 39.4 cm (15.5")
Weight 19.5 g

A trim beauty that turns in a rewarding flight every time. Special sub-sonic nose cone reduces drag. Streamer recovery.

x x x x x x x x x x x x x

For high flying performance, convert the Cardinal to a two=stage rocket with this BOOSTER, designed for even mating with the Cardinal fins. The large fin area and light weight result in a gentle flutter recovery.

Length 7.0 cm (2-3/4")
Weight 10.7 g

Recommended engines NAR Type A.8-0 or B.8-0

B O O S T E R
Cat. No. F2B ..... 75¢
(Order engines separately)

3-Stage

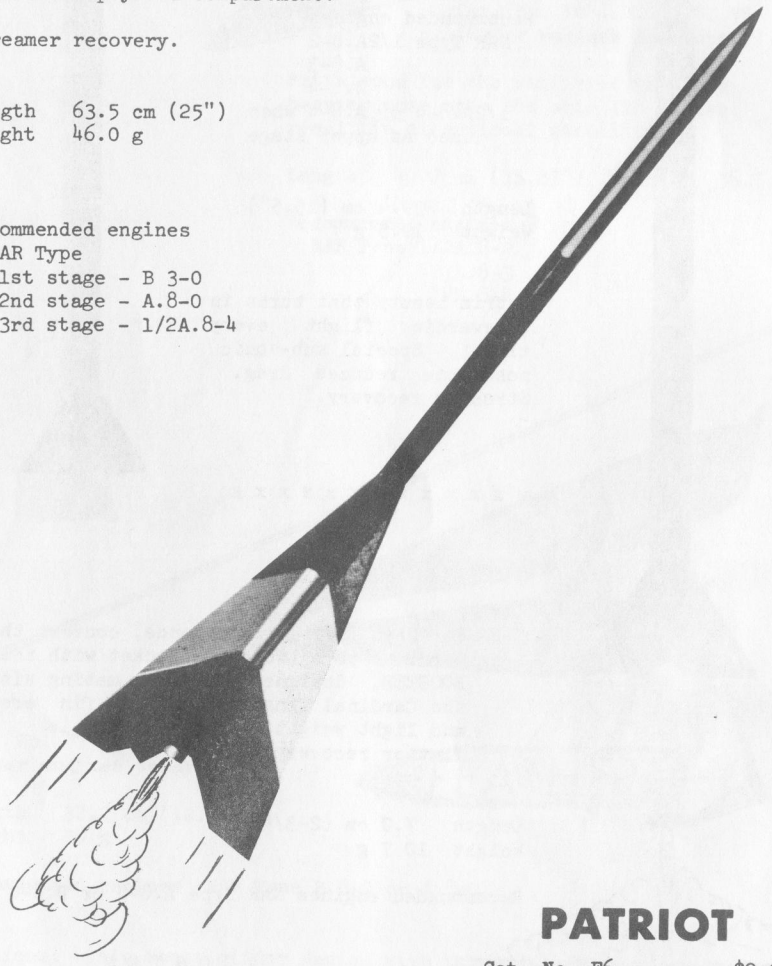
R ---------- D ---------- C

A three-stage rocket streamlined in appearance and performance. An excellent choice for high altitude research projects, the PATRIOT has a nose cone section of over five inches for payload compartment.

Streamer recovery.

Length 63.5 cm (25")
Weight 46.0 g

Recommended engines
NAR Type
1st stage - B 3-0
2nd stage - A.8-0
3rd stage - 1/2A.8-4

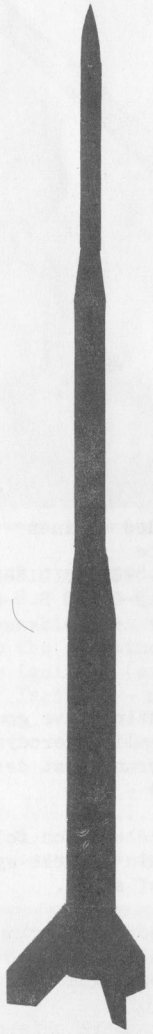


PATRIOT

Cat. No. F6 ..... $2.95
(Order engines separately)

Clustered Engines

R ---------- D ---------- C



SAMPSON

For those who want a big rocket with big power! This model, over 30 inches tall, is powered by a cluster of three rocket engines. If you haven't had experience with clustered engine rockets, try the SAMPSON. If you have had experience with clustered engines, you'll appreciate this one all the more.

Roomy payload compartment of approximately 1-1/16" I.D. by over seven inches long.

The key to success with clustered designs is uniform, dependable engine ignition. The new RDC Ignitrite provides a break-thru in clustered engine ignition.

See Page 20 for igniters and
Page 11 for cable kit.

Parachute Recovery

Length 85.7 cm (33.7")
Weight 90 g app.

Cat. No. F9 ..... $3.50
(Order engines separately)

Recommended engines
NAR Type
three A.8-3 or
three B.8-4

Pop Pod

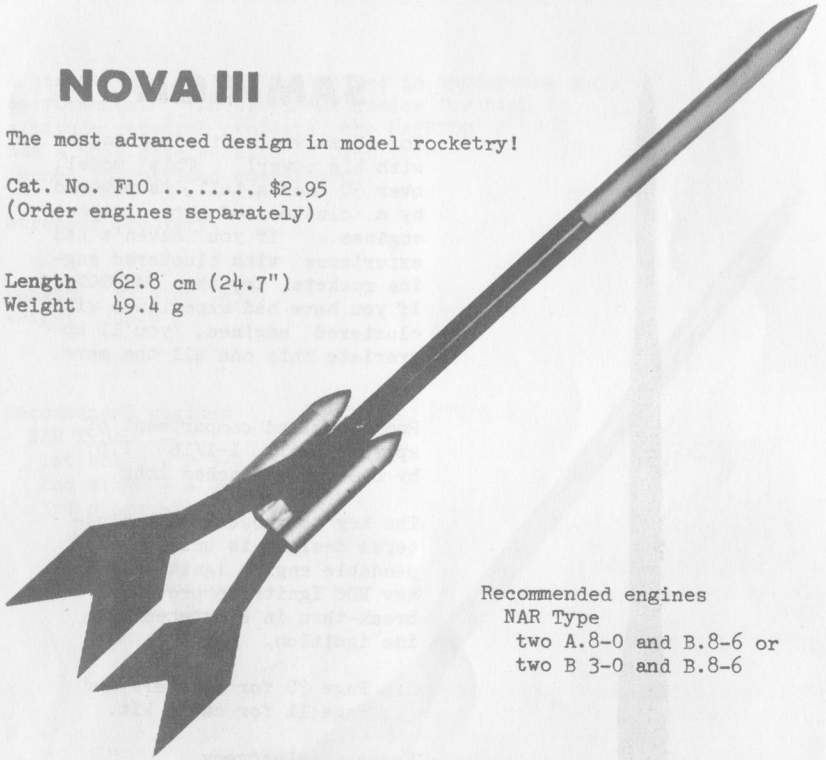
R ---------- D ---------- C

NOVA III

The most advanced design in model rocketry!

Cat. No. F10 ..... $2.95
(Order engines separately)

Length 62.8 cm (24.7")
Weight 49.4 g



Recommended engines
NAR Type
two A.8-0 and B.8-6 or
two B 3-0 and B.8-6

A star performer! Years of planning and testing have gone into this high velocity super-model rocket. The streamline aerodynamic design is accompanied by a twin engine "pop pod" arrangement designed by Pat Artis of the RDC products development staff.

The "pop pod" system provides tremendous acceleration followed by a single, long-burning sustainer engine in the main vehicle system. A slightly altered version has exceeded the speed of sound.

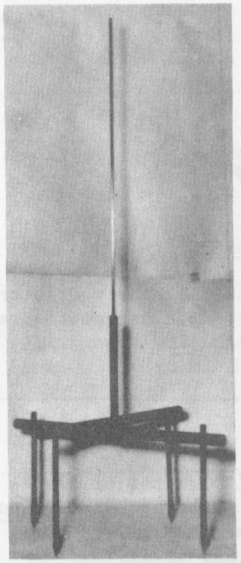
Definitely for the experienced rocketeer - not the beginner. Due to the tremendous acceleration of the Nova III and the resulting high stresses on the model, construction must be of the highest quality.

The acceleration and resulting high altitudes make this an excellent payload and research rocket.

The heart of any clustered engine system is the ignition system. It is mandatory to get all engines going at the same time. See Page 20 for the RDC Ignitrite and Page 11 for the special cabling kit.

Launch

R ---------- D ---------- C



A sturdy launcher that stays put on windy days. Four pointed legs press into the earth.

The long launch rod holder keeps exhaust away from launcher frame; no flame deflector necessary.

All parts press fit together. Folds up for compact storage.

15" steel launch rod, 1/8 " diameter.

Sta-Put Launcher

Cat. No. G44 ..... $1.25

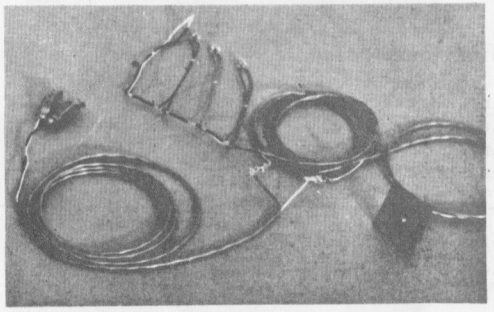
==========

ELECTRIC IGNITION KIT - Single engine

An indispensable item for the beginning modeler or the old-timer. All that is needed for ignition (except the 6-volt battery.) Includes - mounting panel
- 15' cable
- pushbutton switch
- two crocodile clips
- two micro-gator clips

Cat. No. E4 ..... $2.95

==========



ELECTRIC IGNITION KIT - Clustered engines

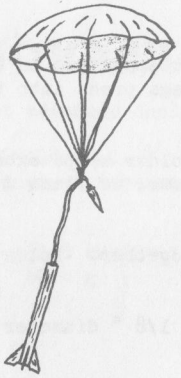
Will handle up to four engines at once - must be powered by a car battery. Use with the RDC Ignitrite for instantaneous ignition.

Kit contains 30' cable, 2 car battery clamps, 8 micro-gator clips, 2 crocodile clips, push-button switch, mounting panel, lead wire.

Cat. No. E5 ..... $6.95

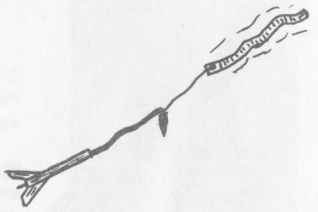
Recover

R ---------- D ---------- C



PARACHUTES

For big payloads and the heavier models.



STREAMERS

For the lighter models or where rapid descent is required. Low wind drift.

Streamer Material
2" x 36" lengths of flameproof, textured paper. One each red, blue, yellow.
Cat. No. G39 ..... 25¢

Parachute Canopy Material
Tough bamboo paper. Won't weld (like plastic) with heat from ejection charge. Big 21" x 31" sheet - makes up to eight parachutes. State choice of red, blue, yellow, black.

Cat. No. G36 ..... with instructions ..... 35¢

Shroud Line
White 20-lb. test nylon lines cut to length and knotted on one end; other end ready to fasten to canopy.

Cat. No. G37 ..... eight lines 18" long ..... 20¢
Cat. No. G38 ..... eight lines 24" long ..... 25¢

Tape Discs
Sheet of 35 pressure sensitive tape discs.

1/2" diameter for attaching shroud lines to canopy.
Cat. No. G34 ..... 35 to sheet ..... 20¢
3/4" diameter for attaching nylon line to streamer.
Cat. No. G35 ..... 35 to sheet ..... 25¢

Snap Swivels
For hooking recovery device to nose cone, for easy change from chute to streamer. Also reduces shroud line twisting.

Cat. No. G40 ..... 6/20¢

Recover

R ---------- D ---------- C

Screw Eyes
Insert in nose cone for attaching shroud line, shock cord.

Cat. No. G33 ..... 5/8" long ..... 3/15¢

Shock Cord
elastic cord to connect nose cone and body tube to absorb shock on ejection of recovery device.

Cat. No. G41 ..... 1/8" x 18"..... 3/20¢
Cat. No. G42 ..... 3/16" x 18"..... 3/20¢

Parachute Kit
Enough material to make at least three parachutes. Tough bamboo paper (21" x 31"), black for good visibility. 24 nylon shroud lines 18" long, 35 tape discs, 1/2" dia., 3 snap swivels.

Cat. No. G46 ..... instructions ..... 75¢

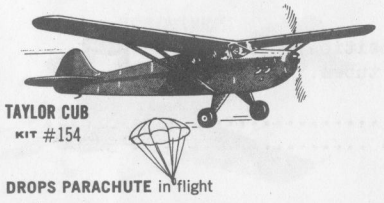
Recovery Kit
The ideal kit for the active modeler. Contains enough material to make six or more parachutes and up to nine streamers. Two 21" x 31" sheets of bamboo paper (one red, one blue). Three 2" x 36" lengths of streamer material (one red, one blue, one yellow). 48 shroud lines 18" long. 6 snap swivels. 77 tape discs, 1/2" dia. 10 tape discs, 3/4" dia. 12 recovery device protectors. Instructions.

Cat. No. G43 ..... $1.65

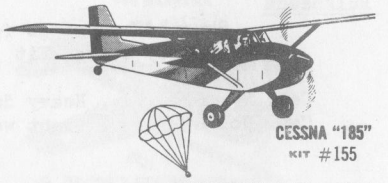
Airplanes

Easy to assemble balsa wood scale flying models. Big 18" wingspan. Rubber-powered. A beginner can learn basic model construction technique and gain experience in aerodynamics that will prove useful when flying and designing your own rockets, especially boost gliders.

Cat. No. S3 ..... State kit number $1.00



TAYLOR CUB
KIT #154
DROPS PARACHUTE in flight



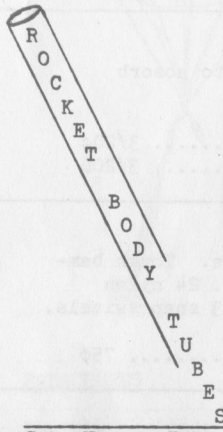
CESSNA "185"
KIT #155
DROPS PARACHUTE in flight

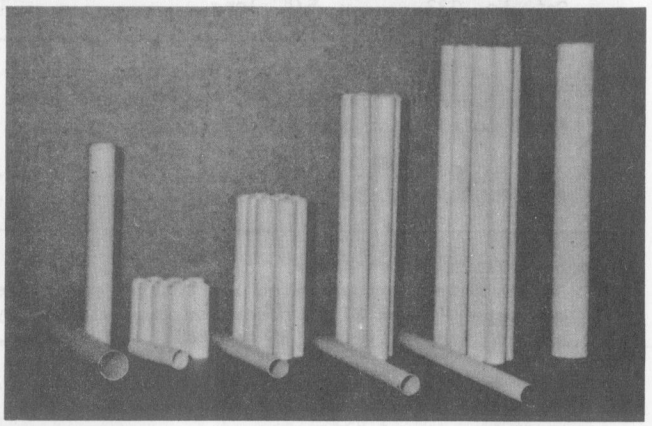
See Page 15 for additional airplanes.

Design

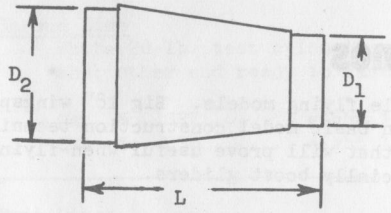
R ---------- D ---------- C

RDC presents a selection of quality components for those interested in building model rockets of their own, original design.





Cat. No.	I.D.	O.D.	Length	Each	Three For
G13	0.710	0.750	2-3/4"	10¢	20¢
G14	0.710	0.750	6 "	15¢	30¢
G17	0.710	0.750	10 "	20¢	50¢
G18	0.710	0.750	12 "	25¢	55¢
G15	1.070	1.120	8 "	25¢	50¢
G16	1.625	1.685	12 "	45¢	1.00



BODY TUBE ADAPTERS

Cat. No.	Length (L)	D_1 to D_2		Each
G50	2"	.710	1.070	50¢
G51	3"	1.070	1.625	75¢

Use these wood adapters to join body tubes of different diameters.

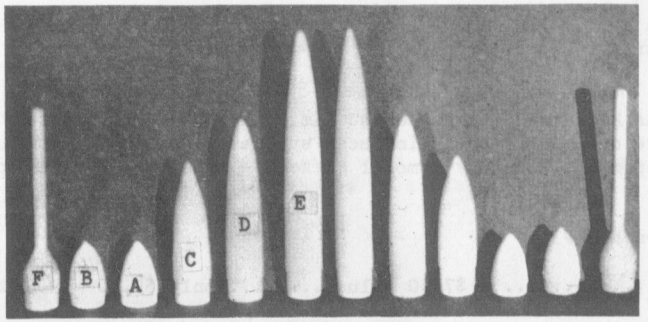
Bulkheads

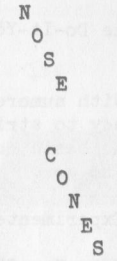
Short fiber rings for positioning engines in body tubes. Fit .710 tubes.

Cat. No. G31 ..... Heavy duty.....3/25¢
Cat. No. G32 ..... Light weight ..... 3/20¢

Build

R ---------- D ---------- C





Catalog No.	Fits Tube I.D.	Shape	Length	B-balsa Hd-hardwood	Each	Set of 3
G24	.710	A	1-1/4"	B	20¢	50¢
G29	.710	B	1-1/4"	Hd	15¢	35¢
G26	.710	C	2-12/16"	Hd	25¢	60¢
G27	.710	D	3-1/2"	Hd	30¢	75¢
G28	.710	E	5-1/2"	Hd	50¢	1.35
G25	.710	F	4"	Hd	25¢	60¢

Balsa Sheet

Big 3" x 12" balsa sheets for making your own stabilizer fins, wings for boost gliders, etc.

Cat. No.	Thickness	Price
G1	1/32"	16¢
G2	1/16"	18¢
G3	3/32"	20¢
G4	1/8 "	22¢

Balsa Blocks

Can be used for nose cones, engine blocks, etc.

Cat. No. G5	1" x 1" x 3"	4¢
Cat. No. G7	1" x 1" x 6"	8¢

Cat. No. S3 .....State kit number $1.00

Special Assortments

R ---------- D ---------- C

For the Do-It-Yourself Rocketeer

With numerous kits and firings behind him, the advanced rocketeer is ready to strike out on his own. In these specially priced assortments are the basic components for many a model rocket -- this time the design is up to you.

Experimenters Kit #1

Cat. No. S8 ..... a $7.00 value ..... only $4.50

Contents:

Body Tubes .710 I.D.	Balsa Sheet 3" x 12"
2-3/4" (two)	3/32 " (three)
6 " (two)	1/16 " (one)
10 " (two)	1/8 " (one)
12 " (two)	

One each of nose cones A - F (six)

Bulkheads (six) Launch Lugs (six)
Shock Cord 1/8" x 18" (six)
Recovery Kit
Screw Eyes (six)

Experimenters Kit #2

Cat. No. S9 ..... a $12.79 value ..... only $9.25

Contents:

Body Tubes .710 I.D.	Balsa Sheets
2-3/4" (six)	3/32" (six)
6 " (four)	1/16" (two)
10 " (four)	1/8 " (two)
12 " (four)	Body Tube Adapter G50
1.07 I.D.	
8 " (one)	Recovery Kit

Two each of nose cones A - F (twelve)

Bulkheads (15) Launch Lugs (12)
Screw Eyes (12)
Shock Cord 1/8" x 18" (10), 3/16" x 18" (2)

Finishing Supplies

R ---------- D ---------- C

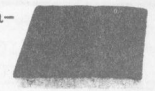
Sandpaper

Assortment of quality sandpaper, coarse, medium, fine.

Cat. No. C11 ..... 8 sheets..... 15¢

Slick-Sand

Pad of plastic foam coated with a fast cutting abrasive. Easy to hold, shapes to surface.



Cat. No. C9 ..... 3" x 3" x 1/2" ..... 10¢

Sigment

Dual purpose model cement featuring super strength for construction and fast drying for field repairs.

Cat. No. C12 ..... 2 oz. tube ..... 25¢
Cat. No. C14 ..... 4 oz. tube ..... 40¢

Masking Tape

Narrow tape in 12-foot rolls.

1/8 and 1/4 widths excellent aids for fine trim finishing. Seal tightly for clean edges, strips off clean.

3/8" size ideal for taping Ignitrites to engines.

1/2" good for wrapping engine casings for snug fit in body tubes.

Cat. No. C1 ..... 1/8".... 15¢ Cat. No. C2 ..... 1/4"..15¢
Cat. No. C3 ..... 3/8".... 15¢ Cat. No. C4 ..... 1/2"..15¢

Decal Sheets

Big 4" x 11" sheets of fuel-proof decal from which hundreds of original designs can be cut. Indicate color choice of red, white, blue, black, yellow, green, silver, orange, copper, gold.

Cat. C10 ..... 20¢

Fiberglass Kit

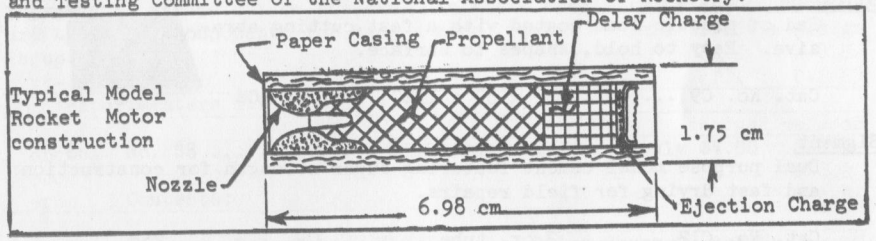
Complete kit for making fiberglass parts. Try making fins, rocket bodies, etc. The kit contains can of resin and hardener, 28" x 38" glass cloth, release agent, mixing cups and rods, directions.

Cat. No. C8 ..... $2.65

Power

R ---------- D ---------- C

These small model rocket engines were designed and manufactured to the particular requirements of model rocketry. The engine is a small solid propellant rocket engine constructed of non-metallic materials. All of these engines conform to specifications set up by the Standards and Testing Committee of the National Association of Rocketry.



Model rocket engines are classified according to the NAR Type which is clearly marked on each engine.

First, engines are grouped according to total impulse or energy; then average thrust, in pounds is stated and lastly, delay time, in seconds, between the end of thrust and actuation of the ejection charge.

NAR CLASSIFICATION

NAR Type	Total Impulse
1/2 A	0.01 to .35
A	0.36 to .70
B	0.70 to 1.20
C	1.21 to 2.00
D	2.01 to 4.00
E	4.01 to 8.00
F	8.01 to 16.00

For example:
A B.8-4 engine would have a total energy output of .7 to 1.2 lb.-sec [B]
-an average thrust of .8 lb.[.8]
-and a delay of four seconds between engine burnout and ejection charge firing [-4]

There are three basic model rocket engine divisions -

Single Stage Engines - These contain delay and ejection charges. The delay charge is designed to operate the recovery system ejection charge near the peak of trajectory.

Booster Engines - These have no delay charge or ejection charge and are used to boost multi-stage rockets and ignite the stage above the booster stage. Some boost gliders also use a booster engine.

Upper Stage Engines - Similar to single stage engines except they have delay charges of a longer burning time. The upper stage rocket will travel at a greater velocity than the single stage rocket due to velocity imparted by the booster stage. Because of the higher velocity of the upper stage, a longer "coasting" time is required to reach peak altitude. An upper stage engine may be used in single stage rockets of exceptionally light weight and clean design.

Performance

R ---------- D ---------- C

Engine Type	Total Impulse (lb-sec)	Maximum Thrust	Thrust Duration (sec)	Pre-Firing Weight (grams)	Propellant Weight (lb)	Time Delay (sec)
Single Stage Engines						
½A.8-2	0.35	23 oz.	.40	15.2	0.00422	2-2½
A.8-3	0.70	23 oz.	.90	16.6	0.00844	3-3½
B.8-4	1.15	23 oz.	1.40	19.7	0.0139	4-4½
B 3-5	1.15	9 lb.	.35	19.9	0.0139	5-5½
Booster Engines						
A.8-0	0.70	23 oz.	.90	16.4	0.00844	none
B.8-0	1.15	23 oz.	1.40	17.7	0.0139	none
B 3-0	1.15	9 lb.	.35	19.5	0.0139	none
Upper Stage Engines						
½A.8-4	0.35	23 oz.	.40	15.3	0.00422	4-4½
A.8-4	0.70	23 oz.	.90	17.3	0.00844	4-4½
B.8-6	1.15	23 oz.	1.40	20.6	0.0139	6-6½

****

ROCKET ENGINE PRICE LIST

(Igniters for electric ignition included with all engine orders. See Page 20 for description of the new RDC Ignitrite.)

NAR Type	Each	Set of three
1/2 A.8-2	.30	.70
1/2 A.8-4	.30	.70
A.8-0	.35	.80
A.8-3	.35	.80
A.8-4	.35	.80
B.8-0	.40	.90
B.8-4	.40	.90
B.8-6	.40	.90
B 3-0	.50	1.00
B 3-5	.50	1.00
Three-stage Special (B 3-0, A.8-0, 1/2 A.8-4)	--	.90
Nova Special (two A.8-0's, one B.8-6)	--	.90

(When ordering, use NAR Type as catalog number.)

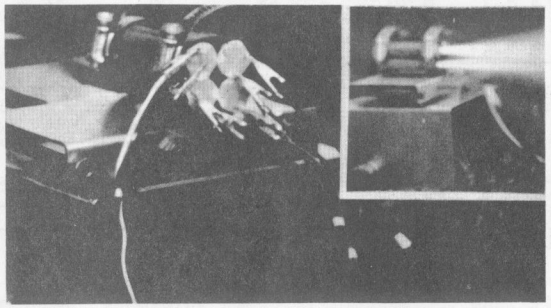
Igniter

R ---------- D ---------- C

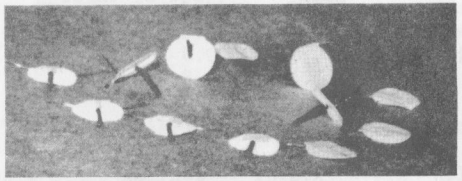
HERE AT LAST - AN IGNITER AS RELIABLE FOR A CLUSTER AS FOR A SINGLE ENGINE - the new RDC **I G N I T R I T E***

(pronounced Ignite - right)

is the answer to your ignition problems, now you can have positive, reliable rocket engine ignition every time, be it a single engine or a cluster of up to four engines. That's right, a cluster of four can be ignited as dependably as a single engine. The hook-up of a cluster of four on a test stand is shown at right with subsequent simultaneous firing in inset.



(See Page 11 for the cable kits to use with the IGNITRITE.)



Simple - glue or tape IGNITRITE to nozzle end of rocket engine and you're ready for the count-down.

No rocket engine system is any better than the igniter - use the best. Glueing or taping the igniter to the rocket engine creates a miniature pressure vessel inside the nozzle cavity. Increased pressure increases the burning rate and ignites entire propellant surface instantaneously.

The IGNITRITE comes in kit form - you can assemble your own in seconds.

Cat. No. E2 ..... kit to make one dozen ..... 35¢

* patent pending

Ignition Supplies

R ---------- D ---------- C

ALWAYS USE ELECTRIC IGNITION - Safety protects YOU!!!

Nichrome Wire

Resistance wire used in electric ignition systems.

32-gauge wire (.0080" dia.) for low power ignition systems (two size "D" batteries up to a 6-volt lantern battery.) Resistance of 10.55 ohms per foot at 68 degrees F.

Cat. No. G22 ..... 3 feet ..... 25¢

26-gauge wire (.0159" dia.) for electrical ignition with 12-volt firing systems such as a car battery. Resistance of 2.670 ohms per foot at 68 degrees F.

Cat. No. G23 ..... 3 feet ..... 35¢

Crocodile Clips

For heavy-duty positive gripping, use these to attach to cable wire, 6-volt lantern battery terminals, etc.

Cat. No. G20 ..... one pair ..... 25¢

Alligator Clips

Provide a firm grip on fine nichrome wire.

Cat. No. G19 ..... one pair ..... 25¢

Micro-gator Clips

Tiny clips especially handy for systems of limited space.

Cat. No. G21 ..... one pair ..... 20¢

Push Button Switch

For use as a firing switch. Mounts in 3/8" hole.

Cat. No. B8 ..... Normally open (off) ..... 90¢

Battery Clamps

Use to attach cable to car batteries. 25 amp capacity.

Cat. No. E6 ..... one pair ..... 45¢

Ignitacord

Burn rate 8-10 sec. per foot. Dia. 1/16" This ignition cord is a means of transmitting fire from one engine to the next in multi-staging when the 2nd stage engine is too far for ignition from burn-out gases.

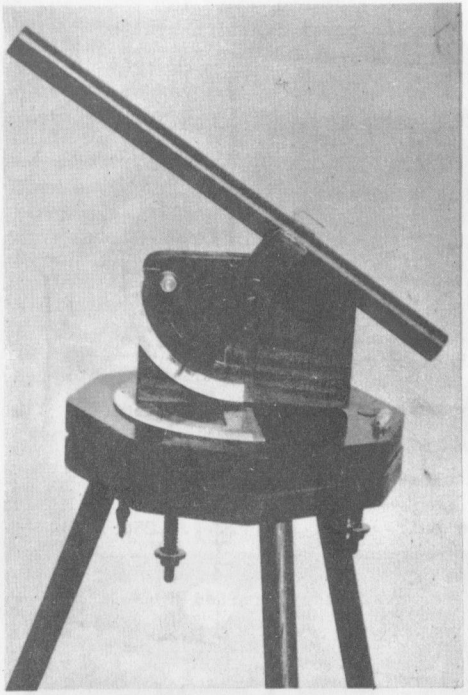
Cat. No. E10 ..... five foot coil ..... 40¢

Track

R ---------- D ---------- C

Another "First" by RDC - The

Sta-Put Tracker



MEETS ALL REQUIREMENTS FOR NATIONAL ASSOCIATION OF ROCKETRY SANCTIONED CONTEST MEETS

The Sta-Put Tracker features:

- sturdy, tipped, tripod legs
- thumb screw leveling
- three bubble levels
- easy to read azimuth and elevation
- optimum vision sighting tube

The Sta-Put Tracker is more than just a highly accurate tracker for contest use. You can also use this instrument to study and compare the drag of various fin designs and nose cone shapes. The less the drag the greater the altitude. Which nose cone shape and fin pattern is best for your rocket? Don't guess - track and know for sure.

Range Tracking Unit - two Trackers, one Plotting Chart and instructions

Cat. No. G7 ..... $29.95

Record

R ---------- D ---------- C

Record keeping is one of the most important parts of a serious model rocketeer's program. For the modeler who is planning on a career in rocketry or any of the sciences, it is excellent training.

With the Flight Log, record keeping is easy. All your papers are kept in one convenient binder for handy reference. Keep other valuable model rocket plans, data, pictures in the binder also.

Flight data sheets are loaded with spaces for you to fill in on data on weather conditions, description of rockets, engine types, ignition system, payload data, tracking data, recovery data and much, much more.

Flight Log Binder and 24 flight data sheets
Cat. No. G60..... $1.00

Extra flight data sheets for your Flight Log
Cat. No. G61 .....dozen..... 50¢

Don't guess - Record and Know!

Flight weight?
Mass Ratio?
Thrust-Weight Ratio?
Altitude?
Type Rocket Engine(s)?
Temperature?
Atmospheric Pressure?
Model Rocket Designation?
Windy?
Type Ignition System?
Date?
Range Location?
Azimuth?
Calm?
Firing Voltage?
Recovery Time?
Elevation?
Glide Time?

Measure

R ---------- D ---------- C

In professional rocketry, static testing is sub-divided into two types: (1) propellant evaluation and (2) rocket engine evaluation.

Propellant Evaluation -

Evaluation of the propellant is necessary and prerequisite to the design and testing of the completed rocket engine. Every propellant has its own particular characteristics which must be known and understood before that propellant can be used in a rocket engine. Some of the more important characteristics are 1] burning rate, 2] specific impulse, 3] K ratio or ratio of burning surface of propellant to throat area of the nozzle and 4] exhaust velocity.

Samples of propellant are normally tested in rather small engines because it is not yet known how they will react. If a new propellant is under test and the results are uncertain, very small samples are used. If the propellant should detonate, a disaster could easily occur if the sample were large. It is also much more economical to use small samples and small test engines.

Test engines are equipped with safety devices such as a blow-out port or similar rupture device. The testing is performed in barricaded or shielded test bays and performed by remote control to protect the operators. Chamber pressure and thrust are the two most common parameters for which tests are made. From pressure and thrust curves, much can be learned about the propellant.

Rocket Engine Evaluation -

The completed rocket engine is tested statically to confirm the design of the engine and demonstrate its reliability. Does the design of the propellant charge give the results expected? Only after a given rocket design has proved itself reliable on the test stand do the missile companies make any attempt to fly it. Again, pressure and thrust are the most important parameters to be measured, with the temperature at critical points (such as the nozzle) often included.

Instrumentation -

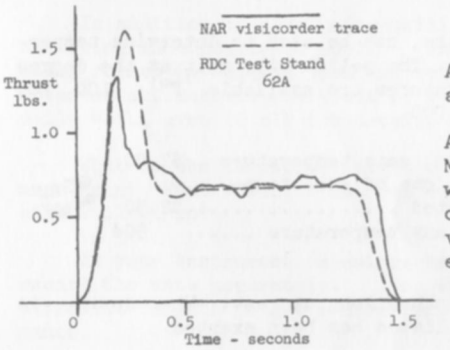
The selection of instrumentation for testing rocket engines is simple - cost is usually the biggest factor - the greater the degree of accuracy required, the greater the cost. In professional rocket testing nearly all instrumentation is electronic for greater accuracy, as compared to mechanical or semi-mechanical systems which cost far less.

In the electronic system, transducers are used as the measuring devices. In transducers the electrical output signal is proportional to the input (pressure, thrust, etc.) The transducer may contain a strain gage or potentiometer. As the pressure or thrust changes, the resistance of the transducer changes. This change in electrical output of the transducer is fed to an amplifier where the output signal (resistance) is enlarged or strengthened. The strengthened signal of the amplifier is fed into a recorder where the data finally becomes visible and useful.

Thrust

R ---------- D ---------- C

The best recorders are optical (oscillographs) because they have a very fast writing speed and no stylus friction. The oscillographs have optical writing arms. That is, the stylus or the writing element is an intense beam of light aimed at the light-sensitive chart paper. The pen or ink stylus has considerable friction as it drags across the chart paper and cannot write as fast as an optical system that has no physical contact with the chart paper. An optical system will pick up rapid pressure or thrust changes that cannot be recorded with a pen stylus. For instance, in the figure below, note the visicorder records minor variations not picked up by the RDC mechanical system. The cheapest oscillograph systems, with amplifiers, power supply, etc., start out at about $5000 and go up from there.

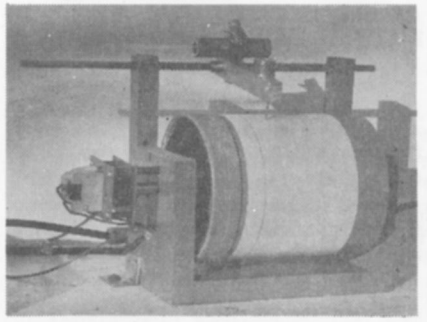


An example of the degree of accuracy may be seen here.

A thrust-time curve from a Model 62-A Stand is compared with the thrust-time curve obtained from a load cell-visicorder system worth several thousand dollars.

For the obvious reason of cost, Rocket Development Corporation has gone to the mechanical system of instrumentation. High quality compression springs are the heart of RDC measuring instruments. The force to be measured (thrust or pressure) compresses the spring. The amount of compression is recorded directly on the pressure-sensitive chart paper. By calibrating the springs (applying a known load or weight and measuring the amount of compression) very accurate data can be obtained

The Model 62-A Static Test Stand was designed for the small model rocket engine with peak thrusts under two pounds.



The rocket engine is held firmly on the Stand by an adjustable clamp. Thrust from the rocket engine compresses the specially made springs. The amount of compression is recorded on chart paper by means of a stylus arm. Incorporating the stylus arm, motor mount and spring rod into a single assembly provides a highly accurate and sensitive recording system. The chart drive is powered by a small DC motor and gear train. The speed of the chart drum

Test Accessories

R ---------- D ---------- C

varies with the voltage applied to the motor. A 6-volt battery will give a chart speed of about three inches per second.

Cat. No. A2 .... With three strips of chart paper ... $12.95

Chart Paper

clear, sharp thrust-time curves are produced on this pressure-sensitive chart paper. 4" wide. An 18-inch strip is used each test.

Cat. No. B1 ..... 12 strips, each 18" long $1.00
Cat. No. B2 ..... 150-foot roll $4.00

Temperature-Indicating Pellets

These pellets, about aspirin size, can be used to determine temperatures reached during a firing, etc. The pellet will melt at the degree listed for it. The following temperatures are available (F°): 100, 200 300, 400, 500, 600, 700, 800, 900, 1000.

Cat. No. B13 ..... Three pellets, same temperature . $1.00
Cat. No. B14 ..... Ten pellets, one of each temperature listed $2.50
Cat. No. B15 ..... One pellet, any temperature ..... 50¢

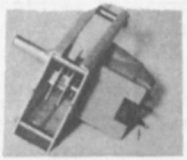
Springs

Fits over 1/4" dia. rod; four inches long at rest. When spring is fully compressed, the maximum force listed has been exerted.

Cat. No. B19 ..... 0-5 lbs..... 25¢
Cat. No. B20 ..... 0-12 lbs. ..... 30¢
Cat. No. B21 ..... 0-25 lbs. ..... 35¢

Electric Motor

DC. 14 rpm at 6 volts, 7 rpm at 3 volts. 1/4" diameter output shaft. Use as chart drive on test stands, etc.



Cat. No. B22 ..... $7.95

Mini Plug & Socket

Use as safety disconnect plug on electric ignition systems.

Cat. No. B9 ..... Mounts in 1/4" hole $1.50

Foam Rubber

Lightweight foam rubber is ideal for protecting electronic payloads instruments, etc.,

Cat. No. C7 ..... 8" x 12" x 1/2" ..... 45¢

Learn With Rocketry

R ---------- D ---------- C

Rocket Development Corporation has developed an educational program around model rocketry which involves more than skill at building models and enjoying the thrill of a launching. The RDC program is even more than designing your own rocket and learning what makes it fly. It includes a basic technical background in rocketry and helps you utilize the information you gain to improve your abilities as a rocketeer and as a scholar.

Model building is a skill - the more you do it, the more skillful you become. Doing fine, careful hand work is necessary for many professions outside the rocket field; for example, the surgeon, dentist watchmaker, repairman and the builders of the many miniature electronic devices all possess skillful trained hands.

In addition to developing skill, the model rocket builder is constructing an educational tool. When you observe the behavior of the model rocket in flight, you are getting information. A good scientist observes and records every bit of information in his experimentation and daily work, even if all the details may not seem important at the time.

What is the thrust to weight ratio? What is the mass ratio? How much drag? What velocity can you expect? What's the acceleration? How high will it go?

As your instrument (model rocket) supplies the answers, you should record the data accurately. You will also want to compare data from different flights to get a more complete picture of model rocket performance.

THE PROGRAM

1. Construct and fly one of our single stage rockets with streamer recovery. The Rawhide and Cardinal are excellent choices for your initial step. Fly these rockets with 1/2A.8-2, A.8-3 and B.8-4 engines.

2. Design and build your own single stage rocket. Study the flight ballistics section of the RDC Ballistics Manual, especially that chapter on stability.

3. Construct a parachute and use instead of the streamer. Make enough flights with chutes to become totally familiar with parachute recovery. Start a record of your flights in the RDC Flight Log.

4. As your introduction to multi-stage rockets, build the Cardinal and Booster. Fly this with streamer and parachute recovery systems. Start with A.8-0 booster and 1/2A.8-4 engines; progress to a B 3-0 booster and B.8-6 upper stage combination. Remember, keep those records and be observant of performance. Start tracking your rockets with the RDC Sta-Put Trackers. Accurate altitude data is a must for your records. Study altitude determination and tracking in the RDC Ballistics Manual.

Learn With Rocketry

R ---------- D ---------- C

5. Design and build your own two-stage rocket.

6. Using data from your Flight Log and the RDC Ballistics Manual, make graphs of altitude vs. mass ratio.

7. Construct the three-stage Patriot. Track and record all data in the Flight Log.

8. Design and build your own three-stage rocket. Compare altitude of your rocket against that of the Patriot.

9. Build and fly the Sampson. This is your introduction to clustered rocket engine systems. Keep your Flight Log up-to-date with each flight. How does the altitude of a three-stage rocket compare to the altitude of three engines in a cluster? Why? What is the mass ratio of each type?

10. Build and fly the Nova III, the most sophisticated high-performance model rocket in the market today. This will be a true test of what you have learned so far. Be sure to keep flight data on this one. Compare altitude to that of the Sampson and Patriot.

11. Build and fly the Twister, a highly stable spin-fin model. Try this one in a moderate wind - compare it's trajectory to other single stage rockets without spin fins.

12. Build and fly the unique Feather boost glider.

13. Design and build your own boost glider. How long did it glide? Make a graph of glide time vs. mass ratio.

14. You have now constructed a fine selection of model rockets to use as instruments in your continued educational program. If you haven't done so yet, read Section II, Internal Ballistics of the RDC Ballistics Manual.

15. Run drag experiments on rockets of your own design. Use nose cones of different shapes and compare altitude of each - do same with fins. What fin design gave you the best altitude? What nose cone shape gave the lowest drag (the best altitude)?

16. Look through the RDC Book Section. Select books on your special interests in the rocket field. Read carefully to see how professional rocketry operates on the same basic principles you have learned as a modeler. If you are planning a career in the aerospace field, you may be especially interested in Cat. No. H12, Careers in Astronautics and Rocketry.

Metric System

R ---------- D ---------- C

The metric system of weights and measures is the predominant system in use throughout the world. In the United States, the metric system is used primarily by scientists with little, if any, use by industry and in the home.

Here, at RDC, we feel that it is just a matter of time before model rocket competition becomes international; and international competition will, undoubtedly, use the metric system in data and performance records.

To assist the American model rocketeer in preparing for international competition and for a possible future career in science, RDC is beginning a conversion to the metric system. In our flight kit section, you will note that length and weight of model rockets is given in metric units. You will see further use of the metric system in the future; so become familiar with the system and use it; it will assist you in your scientific work.

Table of the Metric System

Length	10 millimeters (mm)	=	1 centimeter (cm)
	100 centimeters (cm)	=	1 meter (m)
	1000 meters (m)	=	1 kilometer (km)
Capacity	1000 milliliters (ml)	=	1 liter (l)
Weight	1000 milligrams (mg)	=	1 gram (g)
	1000 grams (g)	=	1 kilogram (kg)
	1000 kilograms (kg)	=	1 metric ton (t)

Following are metric equivalents of measuring standards used in the United States:

Inch	= 2.54 cm		Fluid Ounce	= 29.573 ml	
Foot	= 0.3048 m		Pint	= 0.473 l	
Yard	= 0.9144 m		Quart	= 0.946 l	
Mile	= 1.609 km		Gallon	= 3.785 l	
Ounce	= 28.350 g	Pound	= 453.592 g	Ton	= 0.907 t

Equivalent American measurements to some basic metric standards are

meter	= 39.37 inches	gram	= 0.035 ounce
kilometer	= 3,280.8 feet	kilogram	= 2.205 pounds
liter	= 1.056 quarts	metric ton	= 2,204.623 pounds

Ballistics Manual

R ---------- D ---------- C

Ballistics Manual, for the Model Rocketeer - Rocket Development Corp.

The Ballistics Manual was prepared by RDC as part of our educational program for model rocketry. The serious rocketeer will quickly discover the value of this manual.

Mathematics in the manual is of a pre-college level for the benefit of the thousands of young rocketeers. Formulae in the manual are illustrated with working examples, using model rockets and model rocket engines where-ever possible.

Subjects covered include: Cat. No. H1 .....75¢

External Ballistics -
- Center of Gravity
- Center of Pressure
- Aerodynamic Testing
- Velocity Determination
- Drag
- Tracking

Internal Ballistics
- Fundamental of the Rocket Engine
- Propellant Characteristics
- The Solid Propellant
- Static Testing
- Thrust Calculations
- Grain Design

****

Example of the problems you can solve using the formulae explained in the RDC Ballistic Manual -

Problem - Calculate the theoretical altitude of the Cardinal rocket powered by a B.8-4 engine.

V_b = Isp g 2.303 log n
or
V_b = 80 32.2 2.303 log 1.1046
or
V_b = 5932 log 1.1046
or
V_b = 255 fps

Flight weight = 0.11875 lb.
Propellant weight = 0.01125 lb.

mass ratio (n) = $\frac{0.11875}{0.11875 - 0.01125}$

or n = 1.1046

where V_b = burnout velocity
n = mass ratio and
Isp = propellant specific impulse

$h = \frac{V_b}{2g} = \frac{255}{64.4}$ or h = 1.009 ft.

The answer is: theoretical altitude is 1,009 ft.

Read About Rockets

R ---------- D ---------- C

The serious rocket student will find interesting supplementary reading in the following selections of aerospace literature. These will prove valuable additions to the individual or club library.

Rocket Propellants - Warren
Liquid and solid fuel propellants, propellant burning, ignition and igniters.
Cat. No. H2 ..... $6.50

Fundamentals of Rocket Propulsion - Wiech and Strauss
All-inclusive review of the rocket engine - its history, fundamentals of operation, design of components and method of application at a level that bridges the gap between the popular and the highly technical. 151 pages.
Cat. No. H3 ..... $5.50

Rocket Propulsion Elements - Sutton
Comprehensive description of the physical mechanisms, application and design of rocket propulaion systems. 764 pages.
Cat. No. H4 .....$10.50

Space Age Dictionary - McLaughlin
In non=technical language, an illustrated dictionary with basic, up to date information on rockets, satellites.
Cat. No. H5 ..... $7.95

Exterior Ballistics of Rockets - Davis, Follin and Blitzer
Basic theory of the exterior ballistics of rockets.
Cat. Ho. H8 .....$12.75

Rocket Encyclopedia Illustrated - Herrick and Burgess
Definitions of rocket terms, principles, theory, development and progress of the industry with discussions about rocket power, rocket propulsion applications, rocket engines, testing. 600 pages, 450 illustrations.
Cat. No. H10 ..... $12.50

Fundamentals of Stress Analysis - Deyarmond and Arslan
Thorough coverage of the beginning phases of stress and analysis including principles, formulae, tables, charts.
Cat. No. H11 ..... $5.75

Careers in Astronautics and Rocketry - Adams, Von Braun and Ordway
Lists personal qualifications, educational requirements, the training programs and specific job opportunities in space flight and space exploration. 248 pages.
Cat. No. H12 ..... $6.95

Read About Rockets

R ---------- D ---------- C

Express to the Stars - Newell
A picture of modern rocketry in theory and action by the director of the office of space science of the National Aeronautics and Space Administration (NASA). A clear explanation of the essential ideas and concepts in rocketry, the physics underlying the exploration of space and those conditions which man will have to overcome in space travel. Covers satellites and space probes that have taken place and those planned for the future. 318 pages.
Cat. No. H6 ..... $5.75

Guide to Rockets, Missiles and Satellites - Newell
American and foreign rockets, missiles and satellites with a quick reference chart of satellites and space probes. 95 pages.
Cat. No. H7 ..... $3.25

Space Book for Young People - Newell
Material on rockets, artificial space satellites and space probes.
Cat. No. H9 ..... $2.95

Space...the new frontier - compiled by NASA
A history of space flight, the solar system, space probes and satellites and manned space exploration illustrated with official photos, some taken from spacecraft. 72 pages
Cat. No. H15 ..... 50¢

What's Up There - compiled by NASA
A source book in space oriented mathematics for grades five - eight. Available in student or teacher edition. 144 pages.
Cat. No. H16 .....Student..... $1.00
Cat. No. H16-t.....Teacher..... $1.00

NASA Facts
Illustrated pamphlets which can be unfolded for bulletin board display or inserted in a looseleaf notebook - 8 pages.
Cat. No. H20.....Mariner IV..... 15¢
Cat. No. H21.....Tiros..... 15¢
Cat. No. H22.....Biosatellites..... 15¢
Cat. No. H23.....Orbiting Solar Observatory..... 15¢

==========

A book of interest to modelers will be the Handbook of Model Rocketry - G. Harry Stine, president of the National Association of Rocketry

Over 300 pages, with pictures and diagrams. The book covers model rocketry from simple beginner's models to sophisticated multi-stage rockets and boost-gliders.

The book is available at a special discount rate of $4.00 from Handbook, NAR Technical Services, 1239 Vermont Avenue NW, Washington, D. C., 20005.

How To Order

Print or write your name and address clearly, including zip code, on the order blank.

Be sure to list catalog number, description and price of items desired.

Payment in full should be enclosed. For your own protection, it is better to remit by check or money order, as we cannot be responsible for currency or coins lost in the mails.

Orders will be shipped postpaid via regular mail to the United States or its possessions and to Canada. Postal regulations permit the shipment of only three rocket engines per package. It is possible for an order of more than three engines (at least two packages) to become separated in transit and they may not all arrive at the same time.

United Parcel Service - In the following states orders will be shipped via delivery truck to your door with no limit on the number of engines that can be included in one package or order. UPS service is very fast and dependable. Our UPS delivery area covers the states of Indiana, Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Customers in these states who live on rural routes will receive faster service if they include specific directions for reaching their homes and their telephone numbers.

Signature needed - No order will be shipped without the signature of the buyer (or in the case of a minor, the signature of the parent or legal guardian.) The signature of the buyer releases ROCKET DEVELOPMENT CORPORATION, any employee or employees or relatives thereof, from any responsibility pertaining to the use or misuse of said merchandise. The merchandise advertised in our catalog is intended for research and educational purposes. It is the responsibility of the buyer to observe the laws in his area pertaining to the use of such equipment.

Keep the catalogs coming -- Anyone who places one or more orders totaling $5 from this catalog will be placed on the mailing list to receive the next general catalog. Your friends can also qualify by ordering from this book.

Foreign orders - Shipments to foreign countries will be made FOB Seymour. Include an amount for estimated postage with your order. Any unused portion will be refunded. To avoid delay, payment should be made in U. S. funds or by an international postal money order.

Prices in this catalog become effective January 7, 1966, and are to replace those in previous catalogs. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.