

RCM



49115

DECEMBER 1976 \$1.50



radio control MODELER

THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



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The Futaba FP-3S provides precise, single-stick control of rudder and elevator.

RC glider and 1/2A pilots rejoice. The long anticipated single-stick version of our popular dual-stick 2E is now available. Plus, we've added something extra... a third channel. That makes our new FP-3S system ideal for additional throttle, flap or spoiler control.

And each 3S system

includes a matched set of our incredible S20's, the micro-mini servos that proved good things (and high performance) come in very small packages.



Three channels. Dual S20's. Single-stick. And just \$149.95. The FP-3S. It's our formula for soaring.



The 3S system sports two tiny S20 servos and a double-tuned, RF amplified 3 channel receiver.

Futaba

Futaba Industries, U.S.A.
630 W. Carob Street
Compton, CA/90220

The FP-3S. Worth the wait.





VOLUME 15

NUMBER 12

DECEMBER 1978

MODELER

EDITORIAL

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**This Month's Cover**

features Joe Hughes full scale Pitts S2A alongside Robert Brantley's RC model of the same aircraft. Bob's Pitts S2A is featured as a full size construction article this month on page 40. The Ektachrome transparency by Art Linaschke was shot at the Meadowlark Airport in Sunset Beach, California.

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From The Shop

DON DEWEY



75th ANNIVERSARY OF POWERED FLIGHT

The Diamond Anniversary of powered flight will be celebrated on December 17, 1978. The accomplishments of Orville and Wilbur Wright on that memorable day in 1903 has, in many ways, affected the lives of mankind. The success of their powered flight was a result of their man-carrying glider experiments which, in turn, came from the numerous models they designed, built and flew. Yes, Orville and Wilbur were, indeed, pioneer modelers.

The Wright Brothers contracted for, and delivered, the first military "heavier than air" flying machine to the Signal Corps, U.S. Army, United States of America. The following is a clause from that contract:

ART. IV. That for and in consideration of the faithful performance of the stipulations of this contract, the contractor shall be paid at the office of the Chief Signal Officer of the Army at Washington, D.C. for all supplies and materials delivered in conformity with the requirements of this contract, on or before the dates above specified (Article II, *supra*) and accepted, the following prices, viz:

One (1) heavier-than-air flying machine at a total cost of twenty five thousand (25,000) dollars.

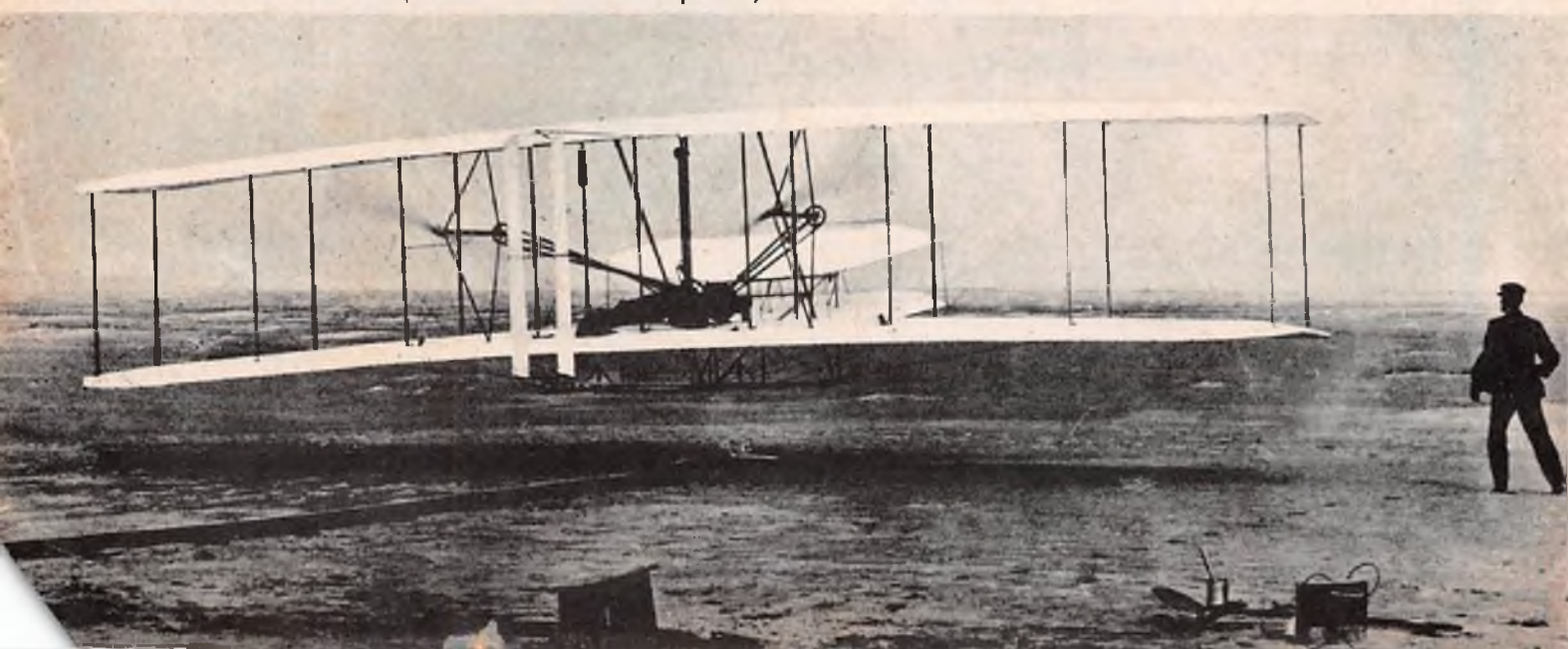
to be paid as soon as practicable after the acceptance of the same, in funds furnished by the United States for the purpose, reserving _____ per cent from each payment until final settlement, on completion of the contract or otherwise.

In today's worth, a contract for a new aircraft runs into millions and even billions of dollars. It all goes together under the heading of progress.

Unfortunately, just as that cost of the original aircraft went from \$25,000 into the multi million dollar mark, so are costs increasing for all of us. Effective with the February issue of R/C Modeler Magazine, it will be necessary to raise the individual copy cover price to \$2.25 per copy. I would never have believed, back in 1963, when I first started R/C Modeler Magazine and it had a cover price of 40¢, that any model magazine would have reached such an astronomical price per copy. But, by the same token, we had no idea fifteen years ago, of the ever spiraling cost of the economy and the cost of producing a publication such as RCM. As an example, the printing cost alone for RCM is approximately \$80,000.00 per month. And, due to paper and labor cost on the part of the printing industry that figure is raised 6% four times per year, for a total of 24% per year. It will only take a few moments of punching your handy calculator to see what that \$80,000.00 figure will be at the end of another twelve months. Add to this the ridiculous increases in postage averaging many, many times over what we paid just a year or two ago, and the cost of magazine production has become virtually prohibitive. As a matter of fact, virtually hundreds of magazines have gone under in the past few years. We have increased the advertising rates proportionately and are now forced to increase the individual cover price and the annual subscription rates. Despite the fact that RCM carries a large percentage of advertising, and that those advertising rates have been periodically increased, the production costs at this time, still are greater than the income from subscriptions, bulk sales and advertising. Thus, although it is as disagreeable to me as an individual modeler, as it is to you, the cover price must be raised as a simple economic factor of existence. I'm passing

to page 185

Just before Orville Wright took his place at the controls of his aircraft on December 17, 1903, he set up a camera on a tripod and focused it on a spot just a few feet short of the end of the launching rail. He asked a by-stander to snap a picture of the aircraft as it took to the air on its first historic flight. The flight, made at Kitty Hawk, North Carolina, lasted 12 seconds and covered about 120 feet. (Smithsonian Institution photo.)



15,000 choosy RCers studied this very special radio and decided it was the one to buy.

American design and engineering.

The range is so extreme that many HL6 radios can be flown reliably with partially extended antennas.

Hobby Lobby radios have very low current drain . . . they fly longer on a charge and you'll never need a field charger. A battery condition meter shows remaining capacity.

There is a 6 month guarantee. Repairs are done right here at Hobby Lobby.

Beginning RCers need a strong stick centering tension; experts want lighter tension. Our control sticks have ADJUSTABLE centering tension.

You are NEVER the test pilot for a new Hobby Lobby radio design. Our circuit design is so well-proven we've never needed to change it.

The servo electronics are located inside the receiver case instead of inside the servos. This contributes greatly to reliability because servos, which are tightly mounted to the vibrating airframe, are the worst place to put delicate electronics.

Airborne weight with 4 servos is only 11½ oz. Yet, this lightweight system has enough servo power to fly the biggest 1/4 scale RC planes.

Because our 4 main servos have no electronics inside them they are very low priced . . . only \$14 each! You can equip a second four channel plane with 4 servos for just \$56!

Did you ever need a servo that rotated in the opposite direction? You can change the direction of rotation of our servos in less than a minute!

Our radio is so precise that the servos center within 1/2° of the same center every time.

We use Deans Gold-plated connectors. They're more reliable because you can retighten them.

How about making that 15,001 at these SPECIAL CHRISTMAS PRICES...

until Dec. 25, 1978

☐ HOBBY LOBBY 6 DIGITAL PROPORTIONAL . . . ~~\$209.00~~ \$219.00

(Includes Transmitter, Receiver, 4 servos, Rechargeable nicads for transmitter and airborne, Charger, 6 month limited warranty, extra servo outputs, mounting grommets, Illustrated Owner's Manual. Available on all 27 mhz. and 72.75 mhz. frequencies.

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☐ Would you like a copy of Hobby Lobby 6 Illustrated Owner's Manual? Send \$1.00 and we'll send you one by First Class return mail.

NEW! *The engine for giant RC aircraft!*

DESIGNED SPECIFICALLY
FOR RC AIRCRAFT --

You no longer have to convert an industrial or chain saw engine to power a giant RC plane.

Hobby Lobby-EVRA 190

\$97.50

List price \$139.95

Engine made in U.S.A.

REAR EXHAUST PIPE --
Specially designed for easy ducting of exhaust from large cowlings.

PUMP PRESSURE CARBURETOR -- *You can put the fuel tank five feet away from the engine and still get proper fuel feed.*

CARBURETOR
has low speed and high speed mixture adjustments and idle stop screw.

INSIDE: 2 roller bearings on con rod, 2 ball bearings on crankshaft

INSIDE: Loop charging for maximum power and easy starting.

ELECTRONIC IGNITION --
No points to foul or cause radio interference problems. Electronic spark advance.

CANTILEVERED CRANKSHAFT --
No useless shaft sticking through the rear of engine.

GIANT PROP DRIVE UNIT
for giant props. No more crushed prop hubs.

BEAM MOUNTING FLANGES -- *For easy mounting in aircraft that have wood engine mount rails. AND, there is a cast aluminum FIREWALL ENGINE MOUNT also available.*

The Hobby Lobby-Evra 190 is a 2 stroke cycle ignition engine designed specifically for very large RC aircraft. It is 1.9 cu. in. displacement (31 cc.)—roughly 3 times bigger than a .60 engine. We have run 18 to 22 inch props on it at top RPMs of 7000 to 5000. It idles at 1500 to 2000 RPM depending upon the prop used. It runs very economically on regular leaded gasoline mixed 20 to 1 with 2 cycle oil.

The Hobby Lobby-Evra 190 is a model airplane engine and not a lawn trimmer or chain saw engine: The cantilevered crankshaft does not have a protruding rear shaft; the carburetor is accessibly mounted on

the rear of the engine; the engine has conventional beam mounting flanges. We also have a cast aluminum firewall mount available for it.

The Hobby Lobby-Evra 190 was designed to withstand sustained full-power running. It has large cooling fins, 4 ball or needle bearings, and a very strong conrod and crankshaft. Even the extra large prop drive unit and large prop washer were designed with giant RC aircraft in mind.

There is no sensation in RC quite like flying a giant RC plane. Here at last is the engine that was made for these giant aircraft.

☐ Send me ____ Hobby Lobby-EVRA 190 engine(s) at \$97.50 ea.

☐ Send me ____ Firewall Mount(s) for EVRA 190 at \$15.00 ea.

() I enclose check for \$____, plus \$1.80 handling. () Charge to my BankAmericard No. _____ Expires _____

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Hobby Lobby
INTERNATIONAL

You won't believe this until you open the box, *but . . .* all these beautiful balsa and Polyflite planes are A-R-F's!

(Almost-Ready-to-Fly)

HERE'S WHAT'S IN THE BOX:



The wings are made of cut foam or injection-molded foam, and are already sheeted with balsa. The tip blocks are in place and then the wing is sanded smooth. You only need to sand the edges and apply the finish. (Try Superkote and your wing will look like it was painted.)

The stab, fin, elevator and rudder are all balsa and are nicely pre-cut. You just sand the edges, finish with Superkote or paint, and install hinges.

The fuselages are fully built with wood bulkheads, and doublers. Originally all the J.L. Modelcraft kits had fiberglass fuselages. But, J.L.M. discovered a better material than fiberglass. They call it Polyflite. You might think that it's fiberglass when you see it (it paints and glues like fiberglass) but it's better. No pin holes to fill, no uneven thicknesses, no brittleness. You just sand the seam (if you like) and spray paint it—it's done.

Just a few hours after you open the box you can have the best looking most durable RC airplane you've ever seen. You can fib to your friends that you built it—we won't tell on you.



Hobby Lobby—J.L. Modelcraft A-R-F
Harpoon Flying Boat \$88.00

List Price
\$110.00

Did you ever see a better looking seaplane? Here's the easiest way for you to start flying off the water. 57" span, 540 sq. in. wing area for .35-.40 engines and 4 RC channels. A nice feature is that the pre-built polyflite fuselage is automatically water tight.



Hobby Lobby—J.L. Modelcraft A-R-F
CF-5 Tiger \$99.00

List Price
\$125.00

Very, very swift! This is an all-out large pattern plane with a very low drag factor. CF-5 Tiger is 61" wing span, 660 sq. in. wing area. Fuselage is 48" long! For 4 channels and hot .60 engine.



Hobby Lobby—J.L. Modelcraft A-R-F
Easy Flyer \$77.00

List Price \$95.00

This is a 4 CHANNEL beginner's plane—a very gentle flyer that's stable, recovers quickly from unusual attitudes and is very EASY to assemble. 57" span, 540 sq. in. wing area, for .35 to .40 engines. The very clear plans are ideal for a first-time RC'er.



Hobby Lobby—J.L. Modelcraft A-R-F
Mini Star \$77.00

List Price \$95.00

A very hot performer! 50" span, 460 sq. in. wing area, for .35-.46 engines. A mid-sized pattern-sport plane in the European style. For 4 channels.



Hobby Lobby—J.L. Modelcraft A-R-F
Gemini Bipe \$99.00

List Price
\$125.00

Designed by Jim Newman. Gemini is a spectacular performer. J.L.M.'s clever engineering solves a host of biplane building problems: Fuselage and cabane strut—completed; wings—4 panels all sheeted with tip blocks in place; wheel pants mounting plates—soldered in place! 46" span, 740 sq. in. area. For .60 size engines and 4 channels.



Hobby Lobby—J.L. Modelcraft A-R-F
Cessna Skyhawk \$88.00

List Price
\$110.00

B1G—the fuselage is 6" wide at cabin! Near scale model that makes a great beginner's plane or beautiful expert model. 66" wing span, 680 sq. in. wing area, for 4 RC channels and .40-.60 engine.

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List price \$67.95



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List price \$37.95

Brand new injection molded oil foam kit. Clear canopy and molded radiators. Decal sheet, 50" span, 450 sq. in. wing area. For 2 to 4 channels, 29-40 engine.



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List price \$37.95

For 15-19 engine, 53" span, 420 sq. inch area, 2 to 4 channels. Steerable nose gear, 2 hour assembly.



PIPER J-3 CUB FOAM ARF \$24.88
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For 15-18 engine, 52" span, 442 sq. inch area, 2 to 4 channels. Includes semi-scale engine cylinders, vinyl numbers, stripes. Cub decals, steerable tail wheel.



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10 ROLLS OF SUPERKOTE
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in white box with Christmas ribbon!



2 rolls of most popular colors
1 roll each of others. **\$34.95**

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Would you ever believe it's possible to balance not only a prop, but also the prop NUT? Don't laugh—this thing'll do just that. It'll also balance spinners, flywheels, boat props—anything that's got a 1/8" to 3/8" hole in it. Beautifully made.

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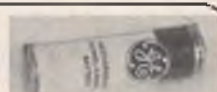
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G.E. Nickel-Cadmium Batteries

1.2 volt 500 mah. Pencil size

4 for \$9.99

(Regular \$3.20 each)



This is the high quality G.E. cell that's original equipment in the best radio outfits. Cells have solder tabs.

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GREAT BEGINNER'S OUTFIT!

Hobby Lobby Recruit



Cox Babe Bee Engine

Hobby Lobby 3 Radio

Buy before Dec. 25, 1978 for only **\$144.00**

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Assembles in an evening—fly it the next day. Ready-built fuselage, foam wings that only need joining. Designed to be flown by a beginner with NO HELP FROM AN EXPERIENCED RCer. 2 channels required and a Cox Babe Bee.

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MIDWEST



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14 DIFFERENT BAGS of our BULK PACKAGED HARDWARE in a Christmas gift box!

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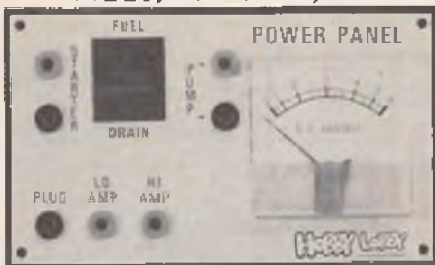


Our regular price \$54.23

About \$110 worth compared to usual list prices.

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STARTS, CHARGES, LIGHTS, FILLS, DE-FUELS, TESTS!



Hobby Lobby POWER CENTER. **\$15.88**
List price \$29.95

Revolutionary! Variable Pitch Prop!



This is the most revolutionary model airplane prop we've ever seen. It is 10 inches in diameter and comes with 3 blades. Extra or replacement blades are available from open stock for 99 cents each. You can set it up as a 2, 3, or 6 blade prop. It is scale in appearance—both the blade shape and the hub. The 3 blade version runs noticeably quieter than a conventional model airplane propeller. It's made of glass fiber filled black nylon.

It will run on engines from .29 to .60 displacement because it can be adjusted to any pitch you want! With 3 blades the prop looks like a Hamilton Standard with the hydraulic pitch control type of hub. With 2 blades it looks like most private plane props. With 6 blades it looks unearthly! Since the pitch can be minutely adjusted through a range of about 4 to 10 pitch it is capable of getting the absolute maximum out of any engine you put it on. You can't imagine what happens to engine performance when you can adjust prop pitch to any value you select.

If you haven't tried MULTI-PROPS yet... you can save \$ by trying them NOW!

Special prices in effect until December 25, 1978

Hobby Lobby-S.L.E.C. 10" MULTI-PROP List \$14.50 **SALE! \$7.99**

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Spare 10" Blade for Multi-Prop 99¢

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Sig Kadet \$26.88
List price \$34.95

MIDWEST



Chipmunk ARF \$21.88
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Nosen P-51D \$129.88
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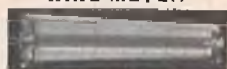
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SULLIVAN

WIND METER



Sullivan Electric Starter.... \$22.88
List price \$36.95



Wind Meter \$8.88
2 ranges: 2-10 mph, 4-66 mph.
Very accurate. White ball in tube
indicates wind speed.

SAVE \$45.90!
on this group



Senior Telemaster

Fox Eagle 60 RC
with Perry Carb

Fox Muffler

Worth \$174.40. Buy
before Christmas for ...

\$128.50

SAVE OVER \$100.00!



Senior Telemaster

Hobby Lobby
6 Radio

Fox Eagle 60
with Perry Carb
and Muffler

\$433.60 worth! Buy before
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\$333.00

Clean engine parts quickly!
SONAC CLEANER \$24.95



SONAC vibrates at a low frequency. It uses R&S Engine Cleaning
Solution as the cleaner (odorless, water soluble, and not harmful
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R&S Engine Cleaning Solution, 8 oz. \$2.50

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Assortment**

in Christmas Gift boxes!

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20-1/16x4x36

20-3/32x3x36

15-3/32x4x36

10-1/8x4x36

10-3/16x4x36

10-1/4x3x36

There are three things wrong with
this wood: It still has the sawdust
on it; it's a little longer than 36";
It doesn't have anyone's name
stamped on it.

\$66.00

Our regular price - \$85.65. Equivalent value of
brand-named - \$122.00

CHRISTMAS SPECIAL!

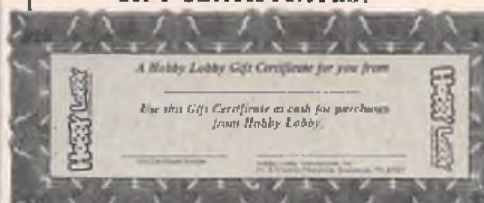
FREE! \$36.75 MILLING
ATTACHMENT

Included with Lathe until
December 25, 1978



Hobby Lobby/TAIG
MICRO LATHE II \$199.95

Are you wondering what to buy
your favorite RC nut for Christmas?
**HOW ABOUT HOBBY LOBBY
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These are in \$20 denominations and are printed
on heavy embossed paper to make a fancy
appearance when opened up for Christmas.

Hobby Lobby Gift Certificate \$20.00 each

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CRAFT AIR



DAE Series IV Power
Panel \$22.88
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List price \$29.95

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OUTFIT!



Junior Telemaster

Fox 15 Schneurle RC
and Muffler

\$85.85 worth! Buy
before Christmas for ...

\$59.00

SAVE \$53.75!

GREAT BEGINNER'S
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Junior Telemaster

Hobby Lobby 6
Radio

2 rolls Superkote

\$319.75 worth! Buy
before Dec. 25, 1978
for only ...

Fox 15 Schneurle RC
and Muffler

\$266.00

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"Having placed at least a half dozen orders with Hobby Lobby in the last six
months, I feel we're approaching your fantastic and phenomenal service. Enough
superlatives cannot be used. Only once have I had an item back ordered and then
it arrived within a week. If there is a better organization than Hobby Lobby,
I have yet to find it." M.A. Mountain Home

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Once again the seasons are changing --- seemed like a short summer didn't it? Hope that this winter will not be as rough as the past couple have been. I always begin to wonder, when winter begins to set in, what all of the other guys are doing. Not you other guys, but the people who are not model builders. Just this morning I was reading the daily funnies and Dagwood was thinking about taking up a hobby and Blondie commented that what he needed was one that he could do in his sleep. Have you ever tried to get one of your non-model building friends interested in the hobby. Once in awhile you can get one hooked, and then sit back and watch his enjoyment grow and grow. We know how much fun it is to keep active in this hobby/sport, and how much enjoyment we get from participation. So, why not try and "hook" a few more people into it. There is a growing trend all over the country for Fly-Ins rather than contests, or Fun Fly contests. In many major cities, trade shows are being held. But, how about bringing R/C modeling to the grass roots. How about static displays of RC models in shopping centers and malls during the non-flying season. Sure, I know that lots of clubs do this, but a lot more do not. What better way is there to acquaint the public with our efforts than to show them off. Every major shopping center or mall has a full time public relations man who is just dying to come up with new ideas to bring people into his establishment. Bet it won't cost your club anything but time and effort and, who knows, perhaps the next P.R. man that you hook may turn out to be a top pattern pilot or racer, or may know where you can locate a new flying field.

All clubs must grow from input of new people. If you do not keep a steady flow of new people, then the club will begin to die. Most of us rely on newcomers wandering out to the flying field (often dragged there by their young children) to become our newcomers; or someone who has been influenced by a friend to give it a try. Too often we really ignore the true public relations aspect of our hobby/sport and as a result we lose flying fields and generally do not have a good public image, usually due to the public's idea of "grown men playing with little plastic toys flown about on a string." In other countries modelers enjoy a

large amount of respect. It's time that we began to really work on our share of public respect. The best way is by education. Expose the public to what we do, and why. Show off that pattern plane, that Formula One racer, that beautiful scale bird. Let them stand in awe of a jumbo, remark over a graceful soaring aircraft. Show good movies of action at the field --- not just shots of something dashing back and forth way up in the sky, but take-off and landing pictures, pictures in the pits, maybe even some photos taken during construction --- anything that would be of interest to people. Show static displays of aircraft under construction, show the framework, show how the radio fits inside, and show 'em how the radio works. Show what a semi-covered wing looks like with one panel covered in unshrunk plastic film, the other panel completed, shrunk and trimmed.

The possibilities are endless, but the point is, we really need to work on our presentation to the public. Don't try to stage a show in some "hall for hire" with publicity, admission, etc. Take your show where the public is --- to the shopping centers and to the malls. Both your club, and the malls will be happy at the results. And, while you're at it, have on display some kits, as well as the finished product so people can see what they can create. Also, display model magazines, both RCM and the others (Okay, just display RCM). The model magazines are the best source of information available to anyone on this great hobby/sport.

Now that you've got something to do this winter (besides working on that new bird) to keep you off of the streets and out of the pool halls, let's get on to other things.

Last month I was talking about Old Timers and Antiques, and forgot to mention one of the glaring errors on the plans for these birds. Where the heck is the balance point? I'm really not sure where the balance was located on them at the time that the plans were drawn, or where anyone balanced the aircraft after he built it from old magazine plans, but I'll bet that this one rather large omission accounted for more crashes than did any other factor back in the "Golden Age" of free-flight. Today, almost all magazine plans and kit plans indicate the C.G. of the aircraft. Also, today,

many builders disregard this very important bit of information, and return new aircraft to kit form or wander off calling the aircraft a "dog" simply because they do not balance the model where the designer intended.

If you're building an Antique from ancient plans, then start out by balancing it about 1/3 of the central wing chord back from the leading edge of the wing. For example, if the chord of the wing is 12" wide at the cabin, or pylon, then balance the aircraft at a point 4" back from the leading edge. This will be the safe place to begin. Once the aircraft is flying, you can fine-tune the balance by adding lead to the tail or nose as needed (Prather stick-on weights are excellent for this). You can add small amounts at a time. Once you have balanced for the best glide, you can cut into the structure and epoxy the weight on the inside, so that your pretty bird isn't glopped up with weights. I usually add the weight to the fuselage just under the horizontal stab. This is out of sight, but an easy place to get to and, being a bit lazy, I usually leave the weights on the outside. If you're a real purist, you can mark the new balance point on the aircraft, then remove the weights and shift around the radio or the battery until you have achieved the balance location that is best for your aircraft.

Another little tip in building these aircraft is to put in extra braces at the cabin area. Extra upright braces that is. Most of these old, lovely birds have open cabin structure with windows. Add an extra upright at each location to keep the cabin from crushing down due to the pull of the rubber bands used to keep the wing on the fuselage. You will be surprised at just how much "crushing" does occur during a day of flying, and this crushing changes the wing incidence with relation to the stab, which will, in turn, change the manner in which your aircraft flies.

Even though the flying season has rapidly departed in many parts of the country, I would like to close out this month by doing a little thinking about flying. Not about how to fly, or what to fly, but what to do when you get into trouble while flying. You old hands can take a break if you want, but perhaps you may come across a thought that would interest you too. First, let's begin with the

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Dear Mr. Lee,

I read your column every month in RCM and find them quite informative even though they don't always apply to my particular interests. Perhaps you might be able to help me with a problem I am having.

As the owner of a number of S.T. G15 FI engines used primarily for free-flight, I am having a great deal of difficulty obtaining rear crankcase bearings. World Engines hasn't had any in 8 months or more and has no idea if they will ever.

Perhaps you might know the name and address of a company here in the states making such a metric bearing — the actual size of which I am uncertain. Maybe there is someone besides World Engines who might be importing such a bearing. This also is the same bearing used in the G15 R/C, 23 R/C, and the G15/19 engine, so a lot of people are in the same fix as I am. Perhaps you might make mention of a solution in your engine column.

Anyway, that you may be able to help me would be appreciated.

Thank you,

F. X. Ryan

Amenia, New York

I receive several letters every month from fellows with the same problem as yours — where to find replacement bearings for the foreign engines when the manufacturer does not have them in stock. Actually the solution is quite simple. All U.S. ball bearing manufacturers make bearings in both fractional and metric sizes. You have only to look up Ball Bearings in the yellow pages of the telephone directory in any large city and you will usually find several ball bearing supply houses listed. They will need a bearing number or dimensions. The Los Angeles yellow pages for example list several pages of bearing supply houses. Although an ordinary rule can be used to take measurements, it is better to use a micrometer or vernier calipers. You can pick up inexpensive vernier calipers made of plastic for only a few bucks. In lieu of any measuring devices you can always take the bearing to the bearing supply house. Incidentally, Fafnir makes the best bearings so always try to obtain one of these. New Departure, MRC, etc.,

are not nearly as satisfactory for model engine use.

Mr. Lee,

I am flying a Super Kaos .40 with an O.S. .40 Schnuerle in it. I broke this engine in per your instructions and it had about eighty flights on it when it started to act up. I thought it might need a cleaning, so I broke it down and found a bad rear bearing, due to rust, also in the combustion chamber there was rust on the cylinder walls.

Why the rust problem, I put 3-In-1 Oil in the engine after each flying session?

I store my fuel in the garage on a wood platform out of the sun, and tightly closed.

Also the connecting rod pin on the crankshaft was worn on one spot. Could this be due to lack of oil? I am using nitro methane fuel.

I hope you can give me an answer to these problems.

Thank you,

Donald L. Wittmayer

Wheaton, Illinois

As long as we use nitro methane in our fuels there is going to be a problem with rusting. This is why it is most important to pull the fuel line and let an engine run out dry after the day's flying session. Then really load the engine with 3-In-1 or one of the model engine oils now being marketed by Prather Products, Howard Reed's Hobby Products, etc. Squirt the oil down both the venturi and in the exhaust. If the engine has a muffler, then remove the glow plug and apply the oil to the cylinder here.

I would guess that at some time you allowed raw fuel to remain in the engine if there is rust in the combustion chamber. Alcohol draws moisture like a sponge and this, in conjunction with the corrosive action of nitro methane, results in the rust formation.

Also be very careful about exposing your fuel to air at the flying field. It seems to be common practice to let fuel cans sit around with the lids off drawing water and letting some of the volatiles evaporate. Always use some sort of pump system that keeps the can closed. This is extremely important in cold or humid weather.

Hard to say what has caused the worn spot on the crankpin. It is normal for the

top of the pin to show more wear than the bottom so what you see may be normal wear. If the shiny spot has a slight blue discoloration, it would indicate lack of lubrication and/or heat.

Dear Sir,

I recently acquired a Kraft .61 RC engine from a friend. The engine is about 1 year old and appears to be in good condition (good compression, clean, etc.). I have several problems with the engine that I hope you can help me with.

(1) On all other engines I've had, the engine will idle properly when the carburetor barrel is almost closed. On my Kraft, it idles properly when the barrel is almost halfway open, and will quit when it is closed further (idles at 3000 rpm with barrel almost one half open). (2) I have used several tachometers on my engine and with a 11/7 1/2 prop, I can only get 12,000 rpm. I have fished several other comparable engines (OS .60 FSR, Webra Speed .61, and another Kraft) at around 13,000 to 14,000 rpm.

In reference to item #1, I am using the original Kraft carburetor with the top end needle valve set properly and the low end needle valve set per instruction manual.

In reference to item #2, I am wondering if the Kraft .61 should achieve more rpm than mine does.

I would like to know if a replacement carburetor may solve my problems or if you could offer suggestions on adjusting my carb to solve the problem (fuel system is okay and carb has been cleaned out). Any other suggestions would be appreciated.

Thank you so much,

Forrest Suggs,

Scottsdale, Arizona

One of the big problems with buying a used engine is that you often take on someone else's problems. After a year's running, the engine could well be in need of rebuilding. Without inspecting the engine, I have no way of knowing if it is over the hill or not. The loss of idle and top end would indicate this. You should be able to get the engine to idle in the 2,500-2,700 rpm range and the engine should be turning at least 12,800 with an

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11. I certify that the statements made by me above are correct and complete.

Patricia E. Crews

ENGINE CLINIC

from page 10

117½ and a strong engine even more. You did not say what make of prop you are using which does make a difference. Even two props of the same manufacture will vary several hundred rpm and often as much as 500.

Although Perry does make a replacement carburetor for the engine, I do not believe changing carburetors is going to solve your problem. Be sure to check for an air leak around the carburetor neck and make sure the back cover is not leaking. If everything is okay in this respect, then the engine is probably just worn out and in need of an over-haul.

One final point — you did not say what you are using for fuel, and this does make a big difference. Many home brews will exhibit the characteristics you are experiencing, especially if it has low nitro content. Try a good commercial fuel such as K & B 500, Duke's, Cool Power, etc., and see if there is an improvement in performance.

Dear Sir,

I have a K & B .61 RC glow plug engine (Series 75 #6535 with Perry pump and carb).

This engine is installed in a model boat and the vibration tends to either close the needle valve and stop the engine or open it for a too rich mix for speed. I have tried all ways to prevent this from happening and to no avail.

Do you have a different carb for the engine similar to the carb arrangement on the OS Max engines and others?

Thank you for your information.

T.M. Stanley
Hialeah, Florida

Although both Kavan and Tarno make replacement carburetors that will fit the K & B/Veco .61, your problem is due to vibration and eliminating the vibration will cure the needle changing problem. Since the K & B .61 was intended for aircraft use, it has a replaceable prop stud that does not make for accurate flywheel mounting. Chances are pretty good that your flywheel is not tracking true or is out of balance. There is no simple answer for the problem because, as I said, the engine was designed for aircraft use. If you have access to a lathe, a screw-in stud can be made that is slightly over-size and screwed into the crank. Then a final lathe cut taken to size making the stud dead true with the bearing journals of the crank. Then a collet/flywheel type assembly can be used. In lieu of a lathe to make the stud, you will just have to center the flywheel on the threaded stud as best as possible and, if there is any wobble, use pieces of

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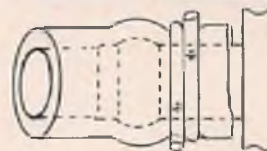
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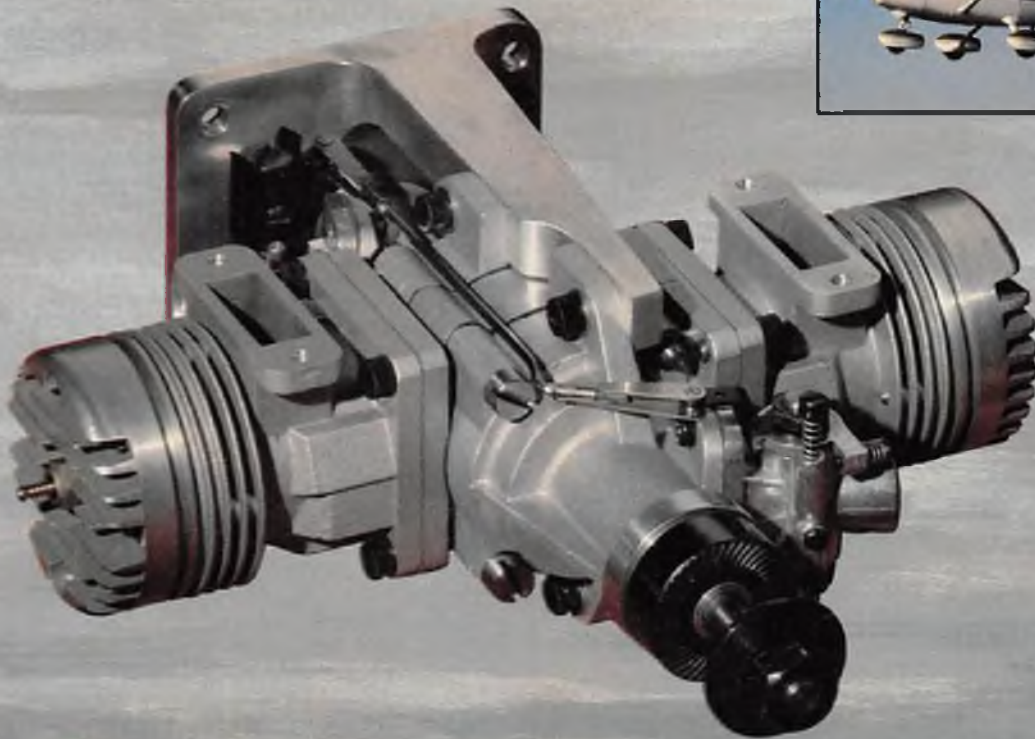
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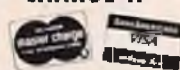


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Some twenty years ago, when I was flying at Sepulveda Basin in Los Angeles (officially, it was named the "Los Angeles Model Airport" when the old LARKS club donated the runway to the city, but the name never caught on), there was a fellow modeler flying with me, name of Norm Anderson. Then I moved up to the Bay area, and didn't see Norm again until the Quarter Scale Fly-In at Morgan Hill. Norm was always partial to Cubs - - he worked on the full scale ones, and he showed up with his latest version. And that wasn't all. In the intervening years since I saw him, he collaborated with Mrs. Anderson and came up with the best looking "mechanics" that any of the modelers



had at the event. They were his daughters, Dedra Jo and Karen. Picture #1 shows Norm, with Dedra Jo on his right, and Karen on his left. And oh, yes - - that's his Quarter Scale Cub in the foreground. I wish I could build like that. The Cub, I mean.



Picture #2 shows the assembled multitude of Quarter Scale models with their pilots. This was the First Annual Fly-In. You can be sure that next year there will be many more planes at the Second Annual event. Who knows? I might even succumb to the fascination

and show up with one! In any event, I'll be there to watch. It's fun - - and that's what R/C modeling is all about.

Speaking of what modeling is all about, some time ago I received a letter from Louis Lopez of Sherman, Texas. Louis writes:

Dear Mr. Willard,

The purpose of this letter is to suggest an essay contest. This would provide an outlet for some of us would-be writers. It certainly would be entertaining and perhaps even informative. Since there are many levels of age and experience, the entries could be sub-divided in some appropriate manner so that the writers would be compared to their peers. The suggested subject matter could be "What Radio Control Means To Me."

Enclosed is my first essay entry.

Sincerely,

*Louis Lopez
Sherman, Texas*

What Does "Radio Control" Mean To Me

I have been into modeling for some 35 years. I can still fondly recall those spectacular air combat films with WWI biplanes doing their thing. Then one day I received a small box which contained a rubber powered stick and tissue model with a rolled paper propeller. The box contained the words "Gillow" and "10¢ glue included." It was never finished, the flow of blood from my cut finger over the printed balsa sheet was the first of many disasters that were to follow. For the next 35 years, modeling has been (and is) an integral part of my existence except during military and other intervals. After a long history of disasters, I finally achieved a few successes with U-control and free-flight. Then along came "single channel" and again I dropped down to ground zero! The R/C information explosion was still over the horizon. Then one beautiful spring day when my vinegar was still flowing, love, bees and blossoms were in the air, I took a new Mambo trainer with a brand new gadget - - a "magnetic actuator" to a nearby park. With the engine fired up, my senses fired up, the rudder clacking madly in time with my racing heart, I ran and heaved the beast into the fresh spring breeze. My gosh - it's flying! It's climbing. Left button - left bank, right button - right bank! On that golden day, others were playing ball and

making love, but I was in heaven!

The future held many more disasters and some successes as I continued to climb my own particular learning curve. My early beginnings with proportional were discouraging, but during those dark days my new bride, a new child, and my old single channel rig, brightened the weekends considerably.

Finally, finally, I learned to tune and range check the receiver, align the encoder and servos, check the batteries, balance the plane! I learned to "read" the plane in flight and anticipate the right command - at last I knew I was in control.

A daydream, a doodle of an idea on my desk pad, I visualize a concept for a glider to achieve a particular purpose. Planning, calculating, wing load, wing span, power, control surfaces, moment of inertia, strength to weight ratio, cost/time factor, does it look pretty?, will it work?, will it fly? I'll try it!

I carve, sand, shape, sweat - "Honey - are you going to stay out there all night again? Can't you at least shake the sawdust out of your hair? Can't you see I just changed pillow cases? Some day I am going to bust up all your dang toys! You don't love me anymore, etc., etc."

And, finally, the acid test. A disaster? So-so? An outstanding performer? Only in this medium can I convert pieces of wood, cement, wire, paint mixed well with sweat, heart and soul and successfully climb up to the skies where hawks, angels - and my spirit can truly find beauty and freedom.

I'm not sure I would want to start an essay contest, Louis. But I do know that your description of your experiences with radio control is probably typical of the trials and tribulations of all the Sunday fliers who find such pleasure in designing, building, and flying radio controlled airplanes - - and you did a good job of describing the thoughts that pass through the minds of so many of us. Thanks for a very good word picture.

★

In closing this month's column, I want to get back to the concept that modeling is fun. Somehow, I tend to get turned off when I read an ad which says, "For the serious modeler." Serious? Wouldn't "dedicated" be a better word? Dedicated to excellence, to safety, and to fun.

A couple of weeks ago the Pioneers had the Annual Kosby Fun Fly. The

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DIGITAL COMMANDER THREE CHANNEL SYSTEM KIT

SINCE ITS INTRODUCTION LAST SUMMER, our Three Channel System Kit has gained tremendous popularity in the field. Its flawless performance, easy assembly, sensible mechanical layout, and low price all have combined to make a radio system kit that is one of the best bargains in the industry today.

Now we are adding another dimension to this concept: transmitter conversion kits so the Three Channel System can be upgraded to five or seven channel operation . . . the builder can start at an economical novice level with a Three Channel System and, as he gains competence, he can add functions at a minimum of expense; none of his equipment is obsoleted.

The conversion contains an additional stick assembly, a new case, and complete instructions for performing the conversion. All existing electronics and hardware are utilized.

Since the receiver has eight channel capability, all that needs to be added is more wires and connectors plus additional servos for each additional channel.

If you didn't buy a Three Channel before because you knew you would want to go to more channels later, you no longer have any excuse.



THREE CHANNEL SYSTEM KIT WITH STANDARD FLITE PACK
10G30 \$119.95



THREE CHANNEL SYSTEM KIT WITH MICRO FLITE PACK
10G30M \$124.95



FIVE CHANNEL
TRANSMITTER
CONVERSION
11G35 \$21.95

SEVEN CHANNEL
TRANSMITTER
CONVERSION
11G37 \$26.95

TRANSMITTER

- * Expandable to more than three channels.
- * Open gimbal two axis stick.
- * Quality throttle stick with trim.
- * Battery condition meter.
- * Uses 9V dry battery.

RECEIVER

- * Double deck design for small aircraft.
- * CMOS Decoder for low current drain
- * Eight channel capability.
- * Light weight

AIRBORNE BATTERIES

- * GE 450 mah or 100 mah Ni-cds.
- * Charger furnished.

SERVOS (TWO FURNISHED)

- * Quality D & R Bantam or Dunham Micro mechanics.
- * High performance Signetic 544 amp.
- * One comes assembled.

AVAILABLE ON ALL AMERICAN R/C FREQUENCIES.

ACE R/C, Inc.

NEW!

A BREAKTHROUGH IN SERVOS!

Ace R/C is proud to announce a new member to the family of servos in the popular Digital Commander line of radio equipment kits, the Bantam Midget.

A brother to the Bantam servo (which has been a respected name in servos for years), the Bantam Midget is considerably smaller and lighter, but boasts the same torque and gear strength as its big brother with even a bit more speed. Notice the extremely low profile--important when interfacing the elevator and rudder servos with the aileron servo and linkages.

Reread the above paragraph then consider the fact that the Midget offers a servo that is in the micro-miniature category but also has the power and strength for .60 powered pattern ships! Truly a universal servo.

A Signetics 544 IC, external driver transistors, quality plastic conductive element pot and other components make a combination that has become synonymous with Ace R/C and Digital Commander servos. Servos that have "Competition Grade" performance with an economical price tag.

The Bantam Midget will work with any modern positive pulse system. For negative pulse systems (ProLine, etc.) a pulse inverter (14G18--\$2) is required for each servo.

A rotary wheel, extended arm, and an adjustable arm are furnished. No connectors are furnished with servo kits.

All of our flite packs and complete systems are available with the Midget option; please write for details.



Bantam Midget

Size: Height--1.125" Length--1.43" Width--0.705"

Weight: .85 oz. (24 grams)

Thrust: 20 in. oz.

Transit Time: Under .5 sec. for 90°

14G20R--Bantam Midget, Kit \$23.95

14G20RC--Bantam Midget, Assembled \$28.95

PLEASE WRITE FOR DETAILS ON FLITE PACKS AND COMPLETE SYSTEMS INCORPORATING THE BANTAM MIDGET.

NOW, WHAT EVERYONE'S BEEN WAITING FOR!

DIGIPACE I



A sophisticated piece of lab quality equipment for cycling ni-cd batteries. Accurate, dependable, and attractive.

--Automatic discharging and recharging of both receiver and transmitter batteries, simultaneously or independently.

--Switch for three different transmitter voltages, (6V, 9.6V or 12V).

--Switch for two different receiver charge rates, (20 ma or 50 ma).

--Four digit LED readout; no mechanical clock motors.

--Modern design and tight tolerance components insure total accuracy down to 1% and 1/10 of a minute.

--Available in kit form or assembled and tested.

34G15 Ace Digipace I, assembled \$94.95

34G16 Ace Digipace I, kit 79.95

Please send me your complete catalog. Enclosed is \$1.00 which is refunded on my first order. (Add \$.50 for 1st class mail return; add \$1.00 handling on all other orders.)

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

ACE R/C, Inc.

BOX 511B, HIGGINSVILLE, MO. 64037

Electric Fuel Pump

with self-contained power

\$12.95

Ideal for portable field use, this compact, yet powerful pump handily attaches to the side of your fuel container. It uses 4 pencil batteries* or may be modified for external power sources. Just flip a switch for instant fueling or defueling operation.

* Not included

Steerable Tail Wheel Assembly

Easily attached and complete with hardware and wheel.

Small or Large

\$2.69

Control Horns

Unique taper design compensates for slant in conventional control surfaces. Complete with mounting plate and hardware.

Large or Medium

\$.39 per pair

Nylon Accessory Package



An excellent value and a handy addition to any workshop.

\$.95

Nylon Fuel Filter



Help eliminate air bubbles in the fuel line, as well as foreign objects.

2 For \$.89

ROYAL



INNOVATIVE YET ECONOMICAL ACCESSORIES

790 W. TENNESSEE
DENVER, CO 80223

New Improved Glow Plug Starting Socket



\$2.79

This positive locking starting socket delivers battery starting power to your engine's glow plug conveniently and efficiently. A new alloy in the socket's gripping prongs offers a more positive hold over continued usage.

Wind Sock

Ideal for Field Use



\$3.95

Determine wind direction quickly and easily. Handy clip allows sock to be attached to a car radio antenna or similar base post for easy viewing.

30 INCHES LONG

R/C Gloplug

Competition Design

Unique "L" shaped idle bar gives support to element and acts as a heat sink for hot high speed running.

R/C Long \$.98

R/C Short \$.98



Battery Starter Holder



This unit hangs on the glow plug and the engine's cylinder to provide quick, convenient starting power. Length is adjustable for different sizes and the unit holds a standard "C" cell battery.

\$1.79 *Not included

Exit Guides



4/Pkg. \$.49

RC FLYING AND THE LAW

Part VI

ORGANIZING YOUR CLUB AS A NOT FOR PROFIT CORPORATION

When you enter the world of R/C modeling, you begin to get a lot of advice, some of it good and some not so good. One very good piece of advice that you will almost invariably receive is to join an R/C club. The benefits are obvious and manifold. You get to meet other modelers, have the benefit of their knowledge and experience, join in club contests and events, and generally acquire a new bunch of friends, sharing in the community of your local R/C fellow

modelers. The chances are that if the club has been around for a long time, should you become a member, you will be joining a **not for profit** corporation established under a state law in which the club operates.

Once you have made application for membership and you are accepted and begin attending meetings, you will note a certain amount of formal organization; there will be a president, a secretary, a treasurer, and a board of directors for the club. All of this "formality" is necessary and proper for a functioning not for profit corporation.

On the other hand, you may find

yourself associated with a bunch of fellow modelers who have no formal organization, yet meet regularly and perhaps schedule static shows, "fun flies" or contests. There are many hundreds of R/C clubs, most of which started as such informal groups and then have taken the necessary steps to formalize their organization as a not for profit corporation. Most groups, whether incorporated or not, have associated themselves with the Academy of Model Aeronautics in order to obtain the benefits of club insurance and for the purpose of having their flying contests

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By Arthur J. Sabin
Assoc. Prof. of Law

Filing Fee \$25.00

FORM NP-25
SAMPLE
ARTICLES OF INCORPORATION
UNDER THE
GENERAL NOT FOR PROFIT CORPORATION ACT
(These Articles Must Be Filed in Duplicate)

SECRETARY OF STATE, SPRINGFIELD, ILLINOIS

WE, the undersigned, (Do Not Write in This Space)

Name	Residence	Address	City	State
Sam Speedy	1234 Argyle St.,	Chicago, IL		
John Balise	4321 Union St.,	Chicago, IL		
Edward Crash	2101 W. 5th St.,	Chicago, IL		

being natural persons of the age of twenty-one years or more and citizens of the United States, for the purpose of forming a corporation under the "General Not For Profit Corporation Act" of the State of Illinois, do hereby adopt the following Articles of Incorporation:

- The name of the corporation is: R/C Eagles Club of Chicago
- The period of duration of the corporation is: Perpetual
- The address of its initial Registered Office in the State of Illinois is: 300 W. 12th
Street in the City of Chicago, County of Cook and State of Illinois
- The name of its initial Registered Agent or his address is: Arthur J. Attorney
- The first Board of Directors shall be: Sam Speedy, John Balise, and Edward Crash

Name	Residence	Address	City	State
Sam Speedy	1234 Argyle St.,	Chicago, IL		
John Balise	4321 Union St.,	Chicago, IL		
Edward Crash	2101 W. 5th St.,	Chicago, IL		

5 The purpose or purposes for which the corporation is organized are:

A social organization of Radio Control Modelers to promote the building and flying of radio controlled models; to share experience and information in this field of avocation; to seek out and purchase, lease or obtain permission to use a site for flying of models; to regulate, in the interests of safety, the flying of models; to organize and promote contests relating to modeling and/or flying proficiency; to secure appropriate insurance for the club and its members; to publish and distribute a newsletter of its activities and share experience and information; to purchase for the use of club members, materials and devices to be used in modeling activities; to do all acts necessary and appropriate to promote the interests of the club and all of its activities.

CONTINUED - OTHER SIDE

NOTE: Any special provision authorized or permitted by statute to be contained in the Articles of Incorporation, may be inserted above.

(INCORPORATORS MUST SIGN BELOW)

Sam Speedy
John Balise
Edward Crash

INCORPORATORS

ACKNOWLEDGMENT

STATE OF ILLINOIS
County of Cook

I, ARTHUR J. ATTORNEY, a Notary Public do hereby certify that on the 1st day of September, 1978, Sam Speedy, John Balise and Edward Crash personally appeared before me and being first duly sworn by me severally acknowledged that they signed the foregoing document in the respective capacities therein set forth and declared that the statements therein contained are true.

IN WITNESS WHEREOF, I have hereunto set my hand and seal the day and year above written.

PLACE NOTARIAL SEAL HERE

FORM NP-25
ARTICLES OF INCORPORATION
under the
GENERAL NOT FOR PROFIT
CORPORATION ACT
of
R/C Eagles Club of
Chicago

SECRETARY OF STATE
CORPORATION DEPARTMENT
TELEPHONE (312) 782-7885
Filing Fee \$25.00

Presenting . . .

STERLING MODELS' BIG BEAUTIFUL "Mk. II" Puddle Jumper

R/C Air Boat/Amphibian
for .15-.35's



For Sport
or
Coast Guard Version

Run it on land Or in the water

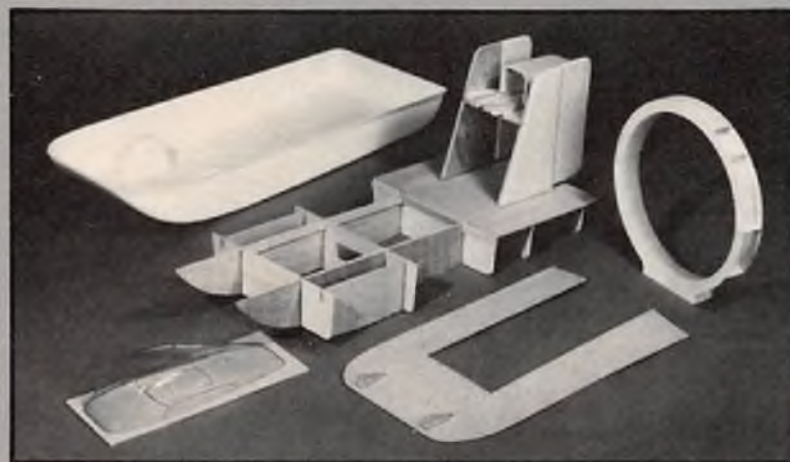
Kit B-27

Length 30" Beam 11"

\$39.95

About The Kit:

Designed for 2 channel R/C or tether control and .15 to .35 engines. Maintaining top quality and simple construction. All Balsa and Plywood parts are accurately die-cut, with precision vacuum formed Plastic hull and cabin. Hardware package including R/C hardware. Full sized Plans, plus Decals for Sport model or Coast Guard version.



Frame Photo Reveals Simple-Rugged Construction.

STERLING MODELS • 3620 "G" ST. PHILA. PA. 19134
(If no dealer available, direct orders accepted — with 10% additional charge for handling and shipping (60¢ minimum in U.S., \$1.25 minimum outside U.S.))

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 50¢ enclosed.
 - ☐ "Secrets of Model Airplane Building" including design, construction covering finishing, flying, adjusting, control systems, etc. 25¢ enclosed.
 - ☐ "Secrets of Control Line and Carrier Flying" including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions 25¢ enclosed.
- No checks. Only U.S. money orders or currency accepted.

Name _____

Address _____ City _____ State _____ Zip _____

from page 19

sanctioned by the AMA.

The purpose of this article is to explore the advantages and disadvantages involved in moving from a non-incorporated status into a legally organized entity called a not for profit corporation. An immediate and very real warning must be stated. Even though the creation of such a corporation is not particularly difficult, in order to do it right, understand what is being done and what the benefits, possibilities, and obligations are with respect to forming an incorporated association, you are always advised to retain the services of a local attorney. Given a group that presently exists in an unincorporated status or even a small number of people who would like to form a not for profit corporation, the chances are that someone will know or be related to an attorney who will be pleased to assist the group either without fee or for a nominal charge. The descriptions that are contained in this article relate to forming a not for profit corporation in Illinois; laws differ from state to state and even some of the basic terminology may vary so, again, do it right and have an attorney advise and take you through the incorporating process. Furthermore, you are going to want to have that attorney's counsel from time to time on the operation and activities of your incorporated association so it is certainly worthwhile to begin right and to have the continued involvement of an attorney as may be necessary.

If a group of people associate themselves for some common object or purpose such as engaging in R/C modeling and flying, so long as their association is unincorporated, there is a lack of clarity as to exactly who is who in terms of authority and whether an organization actually exists. Furthermore, if the group is unincorporated and without insurance, there is the potential liability of the entire group for the actions of any one member of the group. It is roughly akin to having a partnership in which all of the club members are in effect "partners", each responsible for any action by the other within the scope of the "partnership", such as participation in club flying. In the event that a group or club wishes to remain in loose association of simply friends engaging in modeling and chooses not to incorporate, then certainly that group should obtain the insurance coverage as a group or club available to it through the Academy of Model Aeronautics; put another way, you don't have to be incorporated in order to get the AMA insurance coverage. The AMA coverage is, however, contingent on all members of



PHOTOGRAPHY

by
FRED HOUSE

PRESENTS

THE 1979 R/C Model Calendar

FEATURING TWELVE 8x10 SIZE,
FULL COLOR PHOTOGRAPHS OF
AIRCRAFT, SUITABLE FOR
FRAMING.

(SEND YOUR CHECK *OR MONEY ORDER 311)

Photography by Fred House

9032 90th Northwest
Oak Harbor, Washington 98277

Call (206) 675-7311, 10 to 5 Monday
through Friday and use your Visa or MasterCard
Charge for faster delivery.

- Washington State residents add 5% state sales tax.
- Personal checks will require bank clearance and may cause a slight delay in shipment.



- Printed on high quality enamel-coated semi-luster paper.
- 100-pound-density paper stock used throughout.
- Full calendar measures 10-inches wide by 18-inches long!
- Special vertical format on calendar with space for notating contests, meetings, and other events important to you as an R/C modeler.
- Twelve professional full-color photographs.
- Photographed models range from scale models, such as an F4U-4 Corsair, first place winner in RCM's April 1978 Model-of-the-Month contest, to biplanes, the Sunray a beautiful example, pattern formula 1, and more!
- Perfect gift for Christmas for the modeler who has everything!

Dealer/Distributor Inquiries invited

Price **\$4.95** plus 75 cents postage and handling



Airflo Engine Mount fits .049/.051

The latest development in engine mounts by Fourmost Racing Products is the **AIRFLO ENGINE MOUNT**. It is molded from glass filled nylon to fit .049 to .051 engines, with other sizes to follow. This new mount is the first to be designed with a wrap-around feature that provides super strength to the mount and reduced drag around the engine.

Other features of the **AIRFLO MOUNT** are: it can be painted with epoxy paints; weighs less than one ounce; and provides automatic engine alignment and simple thrust adjustment.

PRICE: \$2.50
(including mounting screws)

FOURMOST RACING PRODUCTS

4040 24th Ave., Forest Grove, Oregon 97116

SHIFT/LESS?

YOU WON'T BE! WITH M.A.C.K.'s TRANSMISSION MODEL 1000

It has:

- a built-in water pump to cool your hot gas engine
- neutral for start-up and tuning
- positive forward for full motor output.



M.A.C.K. Products

Model Marine Division

Dept. RCM

P.O. Box 33A

Rahway, New Jersey 07065

Send 25¢ for further information and full specification sheets.

N.J. residents add 5% sales tax.

Dealer inquiries invited.

\$41.95
U.S.A.

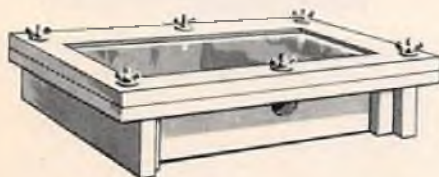


The heat warning indicator!

Hot-Hed takes the guesswork out of engine settings and cowling air flow—A visible heat indicator applied in dots, Hot-Hed changes color when engine gets too hot.

\$3.00 per half oz. bottle
(Comes with instructions)

FORMICATOR



Vacuum former for plastics—Easy to make your own cowls, wheel pants, canopies, etc.—Works with home oven and hose type vacuum cleaner.

\$39—(Includes Asst. Pack of ABS)
(Instructions for assembly and use included)

PLASTIC—Bulk Packs

ABS Plastic Sheets for the Formicator—
All sheets 8½" x 17"—Packs Only

THICKNESS	PCS. PER PACK	PACK PRICE
.020 (1/50")	30	\$13.00
.030 (1/32")	20	13.00
.045 (3/64")	13	13.00
.060 (1/16")	10	13.00
.090 (3/32")	6	13.00
Assortment Pack (see below)		13.00

Assortment Pack contains: 6-.020/ 4-.030/ 3-.045 2-.060/ and 1-.090 sheets. Any pack \$12.00 when ordered with the Formicator. ALL ABS is white only.

Over 3½ lbs. per pack

*** ALL U.S. ORDERS SHIPPED
POSTPAID SAME DAY RECEIVED**

**QUALIFIED DEALER
INQUIRIES INVITED**

Send self addressed stamped envelope
for further info on products



LID

Trouble getting it together?

Stik-it! is an adhesive that's moldable, reusable, fuelproof—a million and one uses for field and bench. Won't let go until you want it to. Residue easily removable with lighter fluid.



\$2.00 per two foot roll
(A lifetime supply!)



HYDRALOCKS

Hydraulic unit converts air driven retract to hydraulic operation. Adjustable to give realistic retract speeds—stops gear "sag-out" and landing collapse. Use one for two wheel ships, two for three wheel type planes.

\$8.00 per unit
(Complete instructions included)



**Now... A PVA
you can
obtain!**

One of the hardest things for the hobbyist to find is PVA—(Polyvinyl Alcohol)—the only suitable mold release for fibre-glass and epoxy. A dry PVA that is mixed with water, Kant-Stik is a superior mold release of highest quality.

\$4.00 per one pint mix
(Complete instructions
for mixing and use)

At Your Dealers, or
Order Direct From

Idea Development, Inc.
P.O. Box 7399
Newark, Delaware 19711

the club being AMA members or the payment of a \$.50 per member fee in order to obtain the AMA charter and insurance coverage for the members of the club. The same assessment of fees, per person and per year, plus a flat charge for obtaining a charter applies to those who take the step of forming a not for profit corporation.

The advantages of incorporating are many. A not for profit corporation is distinct from the ordinary business corporation in the sense that the ordinary corporation is for just that ... business --- which means (hopefully) profits through dealing with services, merchandise or land. Each state recognizes that groups need the formality of corporate existence and its benefits though the purpose is other than business. Generally the non-profit corporation is one directly engaged in charitable, educational, scientific, social or religious endeavor. Such a corporation must eliminate from its intended purposes the production of financial gains to any of its members, directors, or officers, though it can compensate directors or officers as well as third parties for services rendered to the corporation. The not for profit status depends on what is done by the corporation with its income. If that income is employed solely to further the purposes permitted by the not for profit statutes of the state, then it will qualify for not for profit status, though your R/C club, as a non-profit corporation, can create a surplus through its operation (dues, contests and the like) and it can use that money to maintain or improve the not for profit activities. Again, the crucial factor is not that a profit is made but the use to which that profit is put.

High on the list of benefits for incorporating your R/C group is the continuity of existence. You've got a corporate charter issued by the state; there is a board of directors, and there are members of the club (which means they're members of the corporation). While certainly a not for profit club can fold, the chances are that having a corporation with an elected board of directors and elected officers, with a regulated membership, minutes of meetings, and the like, gives the entire activity a formality that generates a continuity of existence. In fact, throughout our nation there are R/C clubs that have been in existence for a number of decades.

Just as in a business corporation where the shareholders, officers, and directors are, under normal circumstances, free from personal liability, the same is true in the not for profit corporation. It isn't like a "partnership"; when the group does something as a group, then the corporation itself is responsible for the activities of its officers, directors and

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THE EXCITING 1.2 c.i. KENDEL TWIN

A POWER PLANT WITH MORE THAN ENOUGH MUSCLE TO DO THE JOB

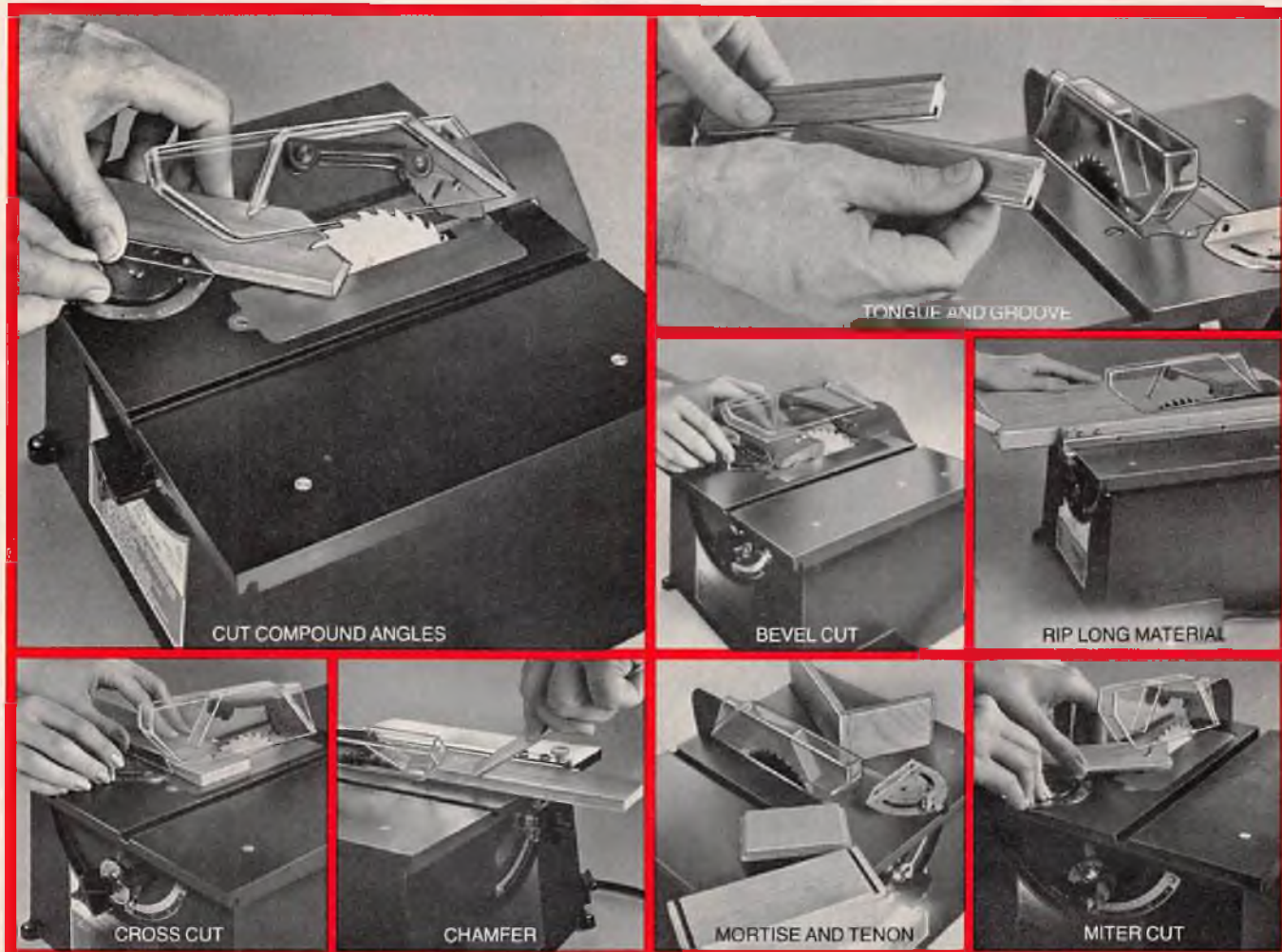
- 1 PIECE STRESS PROOF BALL BEARING CRANKSHAFT
- CHROME LINERS - FORGED RODS
- OVER 13000 RPM WITH SMOOTHNESS ONLY A TWIN CAN ACHIEVE
- EASILY TUNED DUAL CARBS FEEDING CYLINDERS THROUGH "SEPARATE" CRANKCASE CAVITIES
- EASILY FITS IN MOST ".60" COWLINGS



KENDEL MODEL ENGINES
43443 TELEGRAPH RD.
ELYRIA, OHIO 44035

\$325.00
(OHIO RESIDENTS ADD TAX)

Give wings to your ideas faster.



NEW DREMEL® TABLE SAW

A great addition to any home workshop. Delivers big table saw performance with quality features like adjustable miter and cutting depth gauges, self-aligning rip fence, blade guard and a saw dust chute that accommodates an optional saw dust bag to help keep work areas neat and clean. Dremel's 4-Inch table saw gets your projects into the air fast. Buy it today at your favorite hobby shop or wherever fine power tools are sold.



Model 580
motorized 4-Inch
table saw

DREMEL®

If you're really serious about flying.

Dremel, A Division of Emerson Electric Co., Dept. A1022 Racine, Wisconsin 53406

Hobby Shack® CHRISTMAS SALE

Savings To
50% OFF

SALE

You get all this
in one box---

- QB 15H KIT • THUNDER TIGER .15 R/C (with muffler)
- COVERING FILM
- PARTS PACKAGE

In this great package deal you get the Q.B. 15H, the Thunder Tiger .15 R/C with the muffler and the covering film. Also, the accessory package contains the fuel tank, spinner, adjustable linkage with clevises, wire linkage with retainer, wheels, wheel collars, nylon hinges, sponge rubber for radio insulation, wing hold down rubber bands, silicone fuel tubing and pushrods. About the only thing left to purchase is the cement.

LESS THAN MOST .15 ENGINES ALONE!

HOBBY SHACK-PILOT

RADIO CONTROL
MODEL AIRPLANE GIFT SET

50% OFF

Retail Value \$70.00
Save **\$35.34⁹⁹**

OUR LOWEST PRICE EVER

SALE

HOBBY SHACK
INJECTION MOLDED
ALL FOAM

Beechcraft **STAGGERWING BIPLANE KIT**

40% OFF
22⁷⁷

SPAN: 39½ in.
AREA: 450 sq.in.
ENGINE: .15 - .25
RADIO: 2 - 3 channel

RETAIL \$37.95

SALE 42% OFF

HOBBY SHACK
POWER PANEL



RETAIL \$28.95
16⁷⁶

SALE 60% OFF

HOBBY SHACK
THUNDERBOLT R/C LONG GLOW PLUGS



\$9.00 VALUE
6/ 3⁵⁰

SALE 34% OFF

HOBBY SHACK
CESSNA 150



Molded Foam
RETAIL \$29.95
19⁷⁶

SALE 44% OFF

HOBBY SHACK
HANDIPUMP



- Easy to use
- No batteries
- Nylon gears
- Strong plastic case

RETAIL \$8.95
4⁹⁹

SALE 40% OFF

THUNDER TIGER
.25 R/C WITH MUFFLER



RETAIL \$34.95
20⁹⁷

SALE 50% OFF

SURE FLITE **Baby Birdie ARF**



RETAIL \$49.95
24⁹⁷

- Vacuum formed fuselage
- Wings built & film covered

SALE 37% OFF

HOBBY SHACK-PILOT
Junior 100

Span: 44 in.
Area: 330 sq.in.
Engine: .09 - .15
Radio: 2 - 3 ch

RETAIL \$26.95
16⁹⁵

SALE 35% OFF

SPIRIT of 76
All foam glider

Span: 72 in.
Area: 504 sq.in.

RETAIL \$37.95
24⁹⁹

SAITO Cervia

Steam Powered Harbor Tugboat FOR SINGLE CHANNEL R/C

LIVE STEAM AT A PRICE YOU CAN AFFORD!



- FIBERGLASS GEL COATED HULL
- ALL RUNNING HARDWARE INCLUDED
- COMPLETE HARDWARE PACKAGE INCLUDED
- OE1 STEAM ENGINE & OB1 BOILER & BURNER

The new Saito OE1 Steam Engine is beautifully factory built and ready for installation. The OB1 Boiler is made of brass, and is housed in a metal shell. The burner is a simple alcohol burning type which slides in under the boiler. Once fired up, the engine will run for 12 - 15 minutes. Complete directions are provided for both installation and running the Engine/Boiler set up in the Cervia boat.

CERVIA HARBOR TUGBOAT

Retail \$90.00 SALE **\$59.99**

OB1 BOILER & OE1 ENGINE

Retail \$36.95 SALE **\$27.99**

SPECIFICATIONS
Length: 600 mm
Height: 310 mm
Boiler: OB1
Beam: 160 mm
Engine: OE1
Radio: 1 channel

Combination Deal- Retail \$126.95
Cervia • Engine, Boiler & Burner
\$79⁹⁹



SHOP BY PHONE
Area 714 **963-9881**

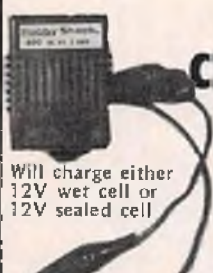
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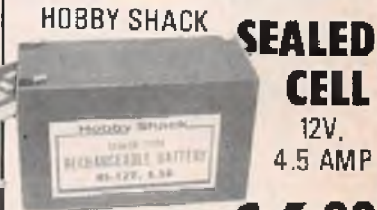
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BIG is Beautiful

BY DICK PHILLIPS



A couple of letters this month to get the ball rolling; the first from Ed Harrison of Tampa, Florida. I won't reproduce the entire letter, but Ed made a couple of good points which bear repeating. The pertinent paragraphs of Ed's letter are as follows:

Dear Dick,

I have an 8' span Cessna 190, taildragger, built of spruce and balsa and covered with MonoKote. It weighs 14 lbs., wing loading is 24 oz./sq. ft. and it's powered with an OS Blackhead .60 using a 12/6 prop. A servo was used for each aileron and I had none for the flaps so they were taped in a fixed position, 3 degrees down, to assist take-off and prevent tip stall.

First, a word about those who know better but do dumb things. Three of us were clustered around the plane checking the thrust of various props. We had no 12/6 wood props so decided to try a plastic one as an interim measure. Yep, one blade flew off during run up and only a miracle spared one of us from serious injury. We searched a 50' radius of grassy area for the separated blade but never did find it!

The test flight was hairy, the ship was way out of trim and there was excess flexing of the NyRod rudder and elevator controls. Aileron response was poor and the Cessna wallowed around in 20 mph gusty winds in a very disconcerting manner. Our test pilot stuck with it and managed a creditable landing.

Sincerely,
Ed Harrison
Tampa, Florida

Ed's second paragraph was the main reason for wanting to include his letter here. How many times have you stood in the path of the prop arc, or seen someone else do so? As Ed says, we all know better, but we still do dumb things. Often the result is that someone gets hurt, or worse. At full rpm, I hate to think how fast that prop tip was moving when it parted company. Had there been someone in its path, it could have been disastrous. I'm sure there is no need for me to propound a moral to the story.

Ed mentions in his third paragraph that some problems were experienced

with pushrod flexing and that bears out my own experience. Flexing is darned hard to get rid of in the longer runs which are required when we place the radio in the traditional cabin area of a model and then have to reach three or four feet aft to the rudder and elevator.

If we are to use NyRods or similar pushrods, we'll have to support them almost throughout the entire length of the run in order to minimize flexing in the air. Don't forget that the force of the air moving across these large surfaces in flight exerts considerable pressure, causing pushrods to flex and probably placing a heavy load on servo and battery.

To minimize this flexing, we can place the servos in the tail area, providing for access to them, and use long extension cords to get the signal from the receiver to the servo. If you choose this method, be sure that you keep the antenna away from these long extensions, or else shield them so as to avoid any interference being fed back into the receiver. Placing the servos close to the control surface will mean we can then use short, stiff pushrods between the servo and the horn minimizing any potential 'give' in the pushrod.

Alternatively, we can use full scale practice, using a double horn on the control surface and connecting the horn ends to each side of the servo arm so as to provide positive movement in both directions, as I have mentioned here before. There will still be some flex, but it will be of a lower order than with conventional model pushrod installations.

Second letter this month was from Earl Hoffman who is with Aramco in Saudi Arabia. Again, I'll only reprint part of Earl's letter:

Dear Dick,

I haven't been the same since I read "Big Is Beautiful" in the May '77 issue of R/C Modeler. I have been out of R/C for several years and up to the appearance of your article, I couldn't seem to stir up any interest in getting back in to the hobby.

Arabia isn't a bad place to fly except

that castor oil and sand don't make a very good mixture and the wind does blow a lot. This past year an active group has formed and they recently built a small hardtop runway out in the desert. But still, I ain't moved. I am building a small electric (for something different) and have an unfinished Kaos (started in 1971), but news on advances in electric flight have all but disappeared, and pouring fuel into a .60 on the nose of another pattern ship doesn't appeal to me, especially when I have to make my own fuel (when I can scrounge the ingredients).

So "Big Is Beautiful" appeals to me. This is the answer, I say to myself. A big stable flier, using relatively clean, cheap, easy to get fuel, with 6" or so wheels to enable me to fly off our numerous salt flats and, if built heavy enough, able to handle a good bit of wind.

Sincerely,
Earl Hoffman
Saudi Arabia

Naturally, I'm pleased that the 'Big Is Beautiful' article had such far reaching effects and inspired Earl to get into the Super Scale field. That few pages in RCM a year ago last May sure sparked a lot of interest and a lot of correspondence.

Earl's letter was written in May of '78 and I'm sure he, too, has seen what has been happening in the model press lately.

Millmount Enterprises of RR #1, Chatham, Ontario, N7M 5J1, is now producing both a muffler and a motor mount intended for the Quadra. I must admit I haven't actually flown either of these new items yet, but as you can see by the accompanying pictures, they look pretty fine and the fit is very good. Charlie Mills, who makes these items uses a vacuum forming molding process which brings the cost of the items down to a reasonable level which would not be the case if they were injection molded by pressure.

The tubing exiting the muffler is quite a bit larger than the minimum required by the Quadra and it is a great deal more solid than the original delivered with the

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Fine points that can make a Big difference!

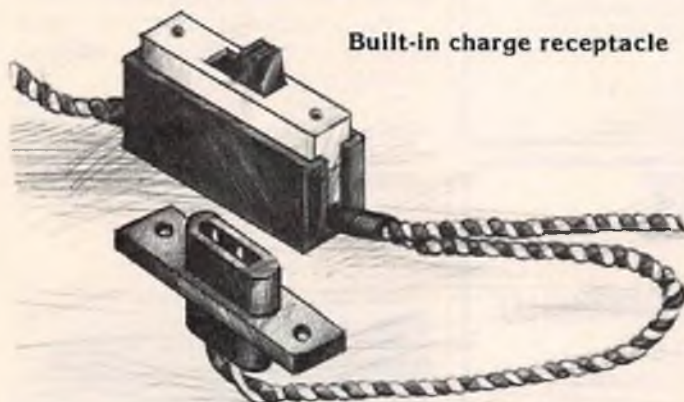


If you are considering the purchase of a Kraft radio control system, you may be impressed with our obvious quality and superior performance. However, you may not be aware of the many little features of our systems that make a big difference in their utility, convenience, and accuracy.



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For example, we manufacture our own connectors which feature gold-plated beryllium copper pins and sockets for long life and corrosion and vibration resistance. Wires are crimp connected rather than soldered to minimize wire lead breakage.



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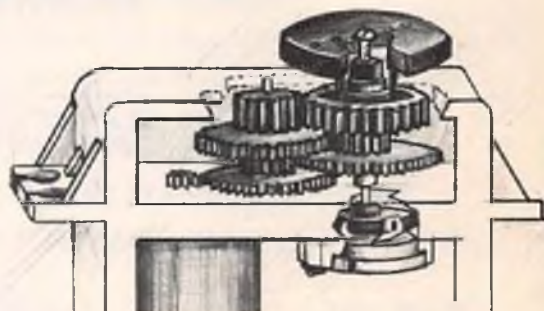
A charge receptacle is wired into our switch harness so that you may charge your model without the inconvenience of disassembly. Other systems require that the battery pack must be disconnected from the receiver and be connected directly to the charger.

Plug-in receiver antennas



A plug-in receiver antenna is standard with all receivers. This means that you may mount the antenna permanently in your model. Extra antennas are available in standard and special RF loaded short lengths. The short antennas are especially convenient for small aircraft, cars, and boats.

Direct drive servo mechanics



Our servos are molded of long wearing rugged nylon rather than the cheaper short life materials used in competitive servos. For accuracy, our servos have their reference potentiometers actuated directly from the output drive rather than indirectly through a gear which, because of gear teeth backlash, adds to centering error.

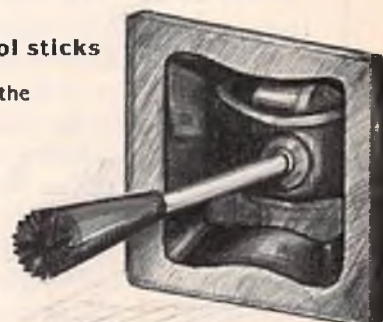


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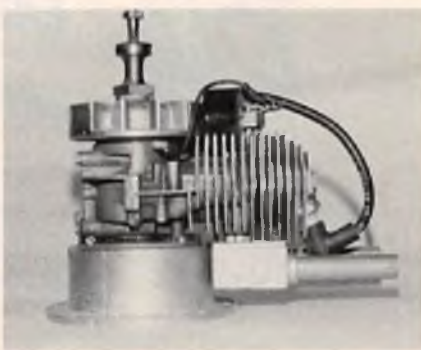
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BIG IS BEAUTIFUL

from page 28



Millmount Quadra mount and muffler. Muffler is currently available direct from Millmount at 13.95 (Cdn) Mount to be released soon.

engine. In addition, Charlie has used both screws to attach his muffler rather than the single screw originally fitted to the engine. One of these is a self-tapper which uses the un-tapped hole, the other fits into the hole tapped for the screw shipped with the original muffler.

Charlie tells me that the muffler has all kinds of room for extension tubes or baffling, or whatever you like.

The mount is circular as is obvious from the picture, it stands off 1-11/16" from the mounting surface. This leaves plenty of room for the muffler to clear the firewall.



Quarter scale J-3 Cub from Practical Scale in Germany, model by R.H. Jacquot.

Maj. Bob Jacquot (Ret.), who now lives in Germany, has recently completed Toni Clarke's Super Scale J-3 from one of the first kits produced. Bob sent me a couple of pictures of the J-3 and it is obvious from them that the kit is a good one and the Major is a pretty fine craftsman. It is available through

to page 164

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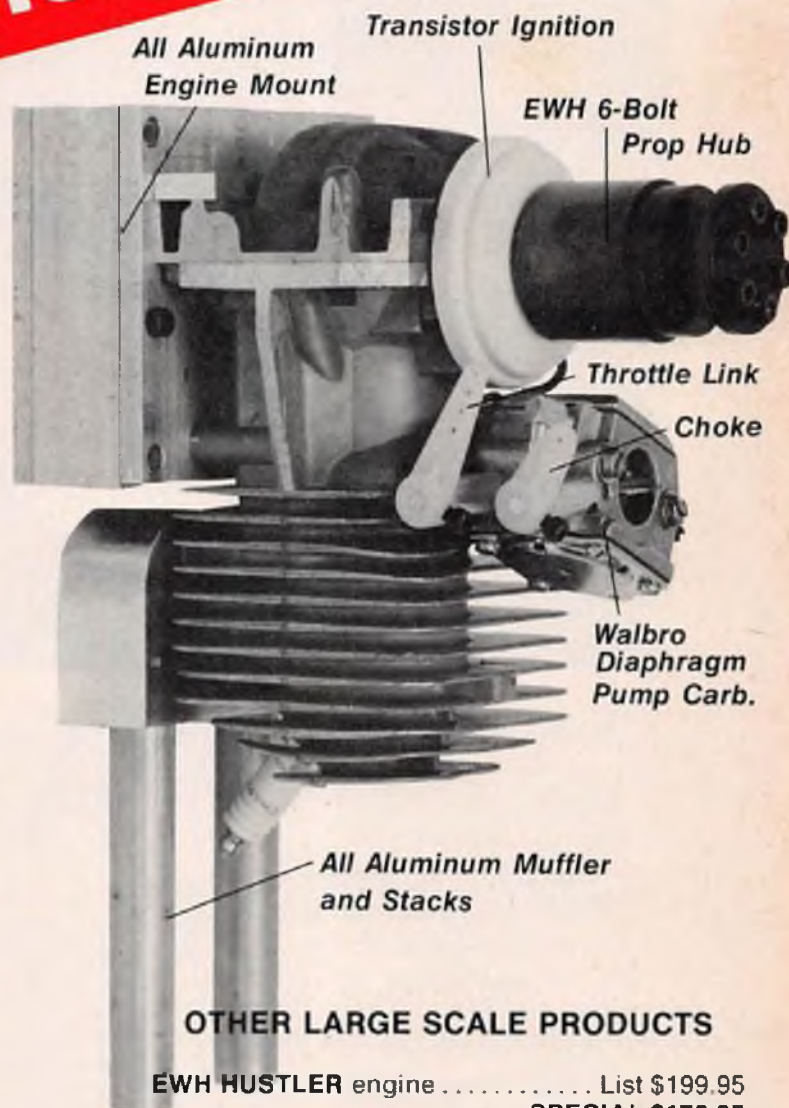
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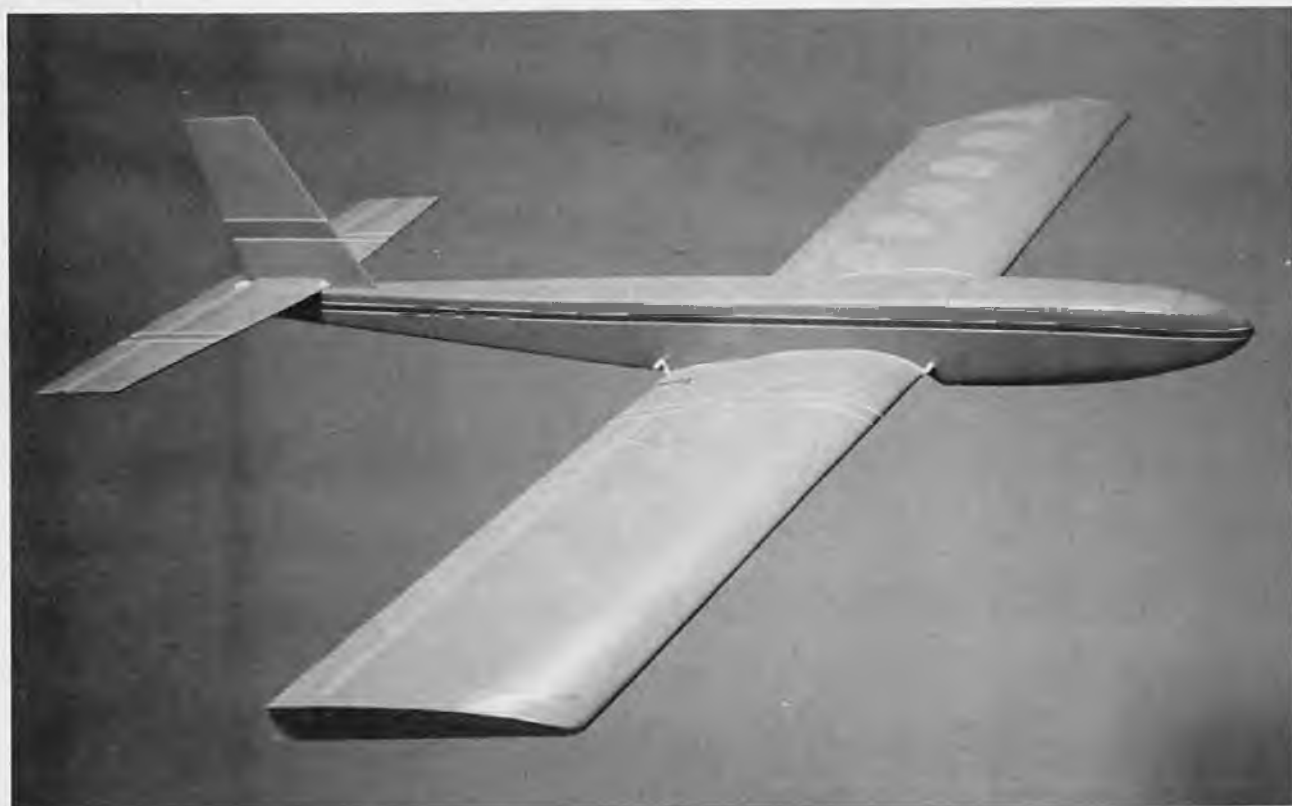
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RAT

By Ed Slobod

This is a construction article for an R/C sailplane designed for slope (or ridge) soaring, so if slope soaring is not your bag, pass us by and pick up on the "lotsa" other good stuff in this month's issue. However, if you are a slope nut, stick around. This just might be what you have been looking for. Now we all know that if the slope is a good one, and if the wind blows hard enough, just about anything will fly. If you've spent any time at all on the slopes, you know what I mean. It is also true that some machines fly better than others. If you have the capability to design and scratch-build your own, you can tailor the ship to your needs. If, however, your experience in these areas is limited, you are stuck with what is available on the market. When I say stuck, I am not maligning the many fine kits available but if you look on your dealer's shelves, you will find that most are thermal sailplanes, and the very few slope sailplanes available are usually too expensive, too hard to fly, or are compromise sailplanes that won't do much more than the thermal ships. What

has been needed for some time is an easy to build and fly aileron-elevator slope machine and we feel the Ridge Rat should fill the bill. It was designed for the slope flyer who has been flying a thermal machine on the slope and would now like to step up to a machine that will do more than turn and loop, yet is not too fast or tricky for him to handle. The Ridge Rat was designed with you in mind.

It is light enough to fly in 6 mph wind, will fly inverted easily, does inside and outside loops, rolls, etc., but is docile enough for the transition from rudder-elevator to aileron-elevator to be an easy one. To verify this, we had a number of people who had never flown an aileron ship before try it out and all managed very well. Interested?

Okay, the first step is to send to RCM for a set of full size plans. While you are waiting for the plans, you can check the magazine plans for the materials that you will need. Clean off your workbench and put fresh sandpaper on your sanding blocks. A building aid that I find useful when scratch-building a new ship is to get a few square feet of drafting

mylar (the transparent frosted kind) from the local drafting material shop. If I want to copy something from the plans without tearing them up, I just tape the mylar over the object to be copied, carefully trace it on the mylar and then cut it out with scissors. The mylar is thick enough to be traced around and if you make up a supply of mylar templates you will always have them if you should ever want to build another or replace a broken part.

The Wing:

(1) Cut the wing portion of the plan away from the rest of the plan. Tape it to your flat building board, and cover it with Saran Wrap or equivalent.

(2) Place 1/16" spacers on the location for the spar. Put the spars for both wings down on top of the spacers and hold them in place with pins. Don't pin through the spars!

(3) Glue all W-2 ribs to the spar, straight and vertical, with the rear half of the ribs flush with the building board.

(4) On top of 1/16" spacers, glue the outer two W-1 ribs in place.

(5) Glue in the top spar, flush with the forward top surface of the rib.

(6) Glue the rear spar and the leading edge on, using pins and rubber bands, as in the photo, to hold everything tight. Make sure at this point that the ribs are still flush with the board.

(7) Remove the wings from the board, and trim by cutting and sanding the ends to the proper angle. Make sure that the wing has no sweep to it.

(8) Glue the wing halves together, using the ply dihedral braces as a dihedral guide. Glofespins make an excellent clamp here.

(9) Glue in the partial center ribs per plans, forming a box for the aileron servo.

(10) Tack one panel down flat. Glue a pre-cut leading edge sheet to the leading edge only. Pin it if it is necessary. Let this joint dry completely.

(11) Put glue on the rib tops and the spar and roll the sheeting down. Hold it with drafting tape, two pieces per bay, or, lay a spare piece of say 1/4" square along the sheeting above the spar as a pressure distributor and clamp the arrangement down with model clamps.

(12) Do the top of the other wing.

(13) Remove the wing from the board, and do the bottom sheeting in similar fashion. Try to watch out for building in twist at this point, but don't worry, it is easy to get it straight.

(14) Shear the center section top and bottom, covering over the servo box for the time being. Do mark the approximate corners of the box on the sheeting so that after the center is glassed, it will be easier to cut the box open.

(15) Glue on the fixed trailing edge pieces at the wing center.

(16) Glue on the 1/8" ply tip ribs (W-3).

(17) Glue the 1" triangle stock on to the ply tip ribs. Plane and sand to shape

when dry.

(18) Shape the leading edge and the rear spar with a razor plane and 100 grit.

(19) Notch the wings as per plans for aileron torque rods. A Dremel tool is ideal for this.

(20) Bend the torque rods as per plans with the plastic tube in place.

(21) Rough up the plastic tubes and press fit the assembly into the notches, without getting too much skin oil on the tubes.

(22) Mask the ends of the tube to prevent resin from fouling the action.

(23) Cut 2 oz. glass for the top of the center, leaving holes for the torque rods to emerge.

(24) Apply the glass to the top side using your favorite resin.

(25) When hard, trim, and glass the bottom. When dry, trim, and sand the top and bottom lightly. If you apply the resin out past the glass an inch or so, then the edges of the glass can be feathered in without sanding a dent in the balsa.

(26) Prepare the ailerons. Cut them to length, and bevel the "leading edge" to allow them to pivot from the top edge. A razor plane does the job beautifully. Notch the inner end for the plastic receiver tube. Rough up the tube and epoxy it accurately in place.

(27) Open a hole in the wing center sheeting where the servo box is to be. Carve away at the sheeting until it is flush with the walls of the box.

(28) Smear epoxy on the bottom of the servo box so that the servo tape will stick better.

(29) Finally, sand the wings to your standards.

(30) Cover with your favorite material. If your slope has a nice grassy area to land in, you may safely use MonoKote on the wing. If, however, your landing area is rough, as most are, you should cover the wing with Coverite. It is much tougher and your wing will not require frequent puncture and rip patches. Cover the bottoms of the wing and ailerons first, and fold the covering over the rear spar and the leading edge of the aileron. Do likewise with the top covering. This will prevent the tape hinge from peeling the covering off.

(31) Slide the aileron over the torque rod stub, and apply the tape hinge as per plans.

(32) A note on color selection: If you often fly in front of the sun, it is prudent to make the top of the wing a different color from the bottom so that you can tell the top of the plane from the bottom. I would recommend a light color on top and a dark color on the bottom.

Fuselage:

(1) Cut out all the parts.

(2) Glue the fuselage doublers to the fuselage sides. Position accurately since the doublers locate the bulkheads which determine the alignment of the fuselage. Trim the doubler to size after the glue dries.

RIDGE RAT

Designed By: Ed Slobod

TYPE AIRCRAFT

Slope Soarer

WINGSPAN

49 3/4 Inches

WING CHORD

8 3/8 Inches

TOTAL WING AREA

430 Square Inches

WING LOCATION

Low Wing

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

1 Inch

O.A. FUSELAGE LENGTH

36 Inches

RADIO COMPARTMENT AREA

(L) 6 1/2" X (W) 2 1/8" X (H) 2"

STABILIZER SPAN

20 1/2 Inches

STABILIZER CHORD (incl. elev.)

4 5/8" (Avg.)

STABILIZER AREA

93 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

6 1/4 Inches

VERTICAL FIN WIDTH

4 1/8" (Avg.)

REC. NO. OF CHANNELS

2

CONTROL FUNCTIONS

Elevator and Ailerons

BASIC MATERIALS USED IN CONSTRUCTION

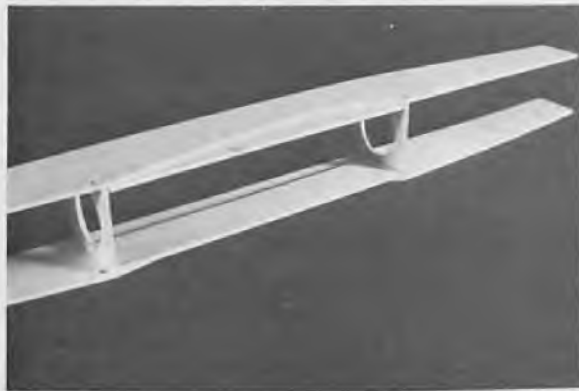
Fuselage Balsa and Ply

Wing Balsa and Ply

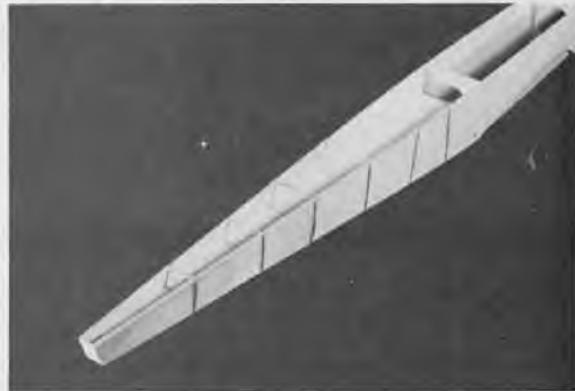
Empennage Balsa and Spruce

Weight Ready-To-Fly 31 Ounces

Wing Loading 10.38 Oz./Sq. Ft.



Fuselage sides shown with doublers and F-2 and F-3 glued in position. Make sure sides are aligned precisely.



View showing fuselage being aligned by using a simple cardboard template of the fuselage interior from F-3 rearward.



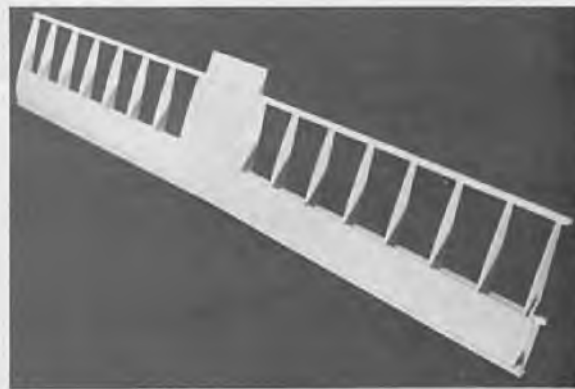
Shows the use of pins and rubber bands to hold everything tight. Note 1/16" spacers to raise spar and ribs for sheeting.



Panels are joined with ply dihedral braces which are used as dihedral guides. Pre-cut L.E. sheeting is pinned and glued to L.E. and left to dry.



L.E. sheeting shown pulled down and held in place to dry with drafting tape.



Wing panels sheeted top and bottom with fixed trailing edge pieces at center.

(3) Glue F-2 and F-3 to one of the fuselage sides. They should be perpendicular to the surface. Try to arrange the fuselage sides so that the best sides are facing outwards.

(4) When the bulkheads are dry, glue the other fuselage side on. To assure good alignment, place the dry side on a flat surface. Once the second side is in approximate position, go around the perimeter with a right triangle to align the

sides precisely.

(5) When dry, glue in F-1, and clamp with tape. Try to eyeball the alignment and if it is skewed to one side, put some pieces of tape on diagonally to pull it into shape.

(6) Glue in the 1/4" ply ballast platform.

(7) Sheeting the fuselage top and bottom may be complicated by warps in the ply fuselage sides. If this is the case,

make a simple cardboard template (from ordinary corrugated box cardboard) of the fuselage interior from F-3 rearward. Place this template between the fuselage sides, and clamp the sides with rubber bands. Check for alignment. Glue 3/32" sheet on, crossgrain. Be sure to leave a gap near F-3 so you can pull out the template.

(8) Install 1" triangle stock at F-1.

(9) Notch the 1/2" balsa block for the



Wing tip with 1/8" ply tip rib W-3 and 1" triangle stock glued in place and sanded to shape.



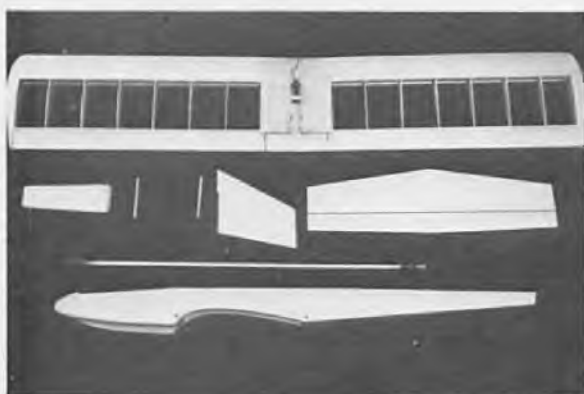
Wing center section shown with torque rods held in place by glass cloth and resin.



Servo installed in wing and connected to torque rods.



Bottom view of completed wing center section.



Completed Ridge Rat sanded and awaiting your favorite covering material.



Ridge Rat doing its favorite thing it was designed for.

nose skid.

(10) Complete fuselage top and bottom sheeting. Tack glue the 3/8" radio hatch at the corners only.

(11) Sand the front of the fuselage flush with F-1.

(12) Glue the noseblock on, being careful to avoid gluing it to the radio hatch.

(13) Shape the noseblock with a saw. Trim the nose further with a razor plane,

then rough sand the whole fuselage.

(14) Pry loose the lightly glued hatch, and glue the canopy hold-down gizmos to it and the fuselage.

(15) Make up the elevator pushrod from 3/16" square balsa.

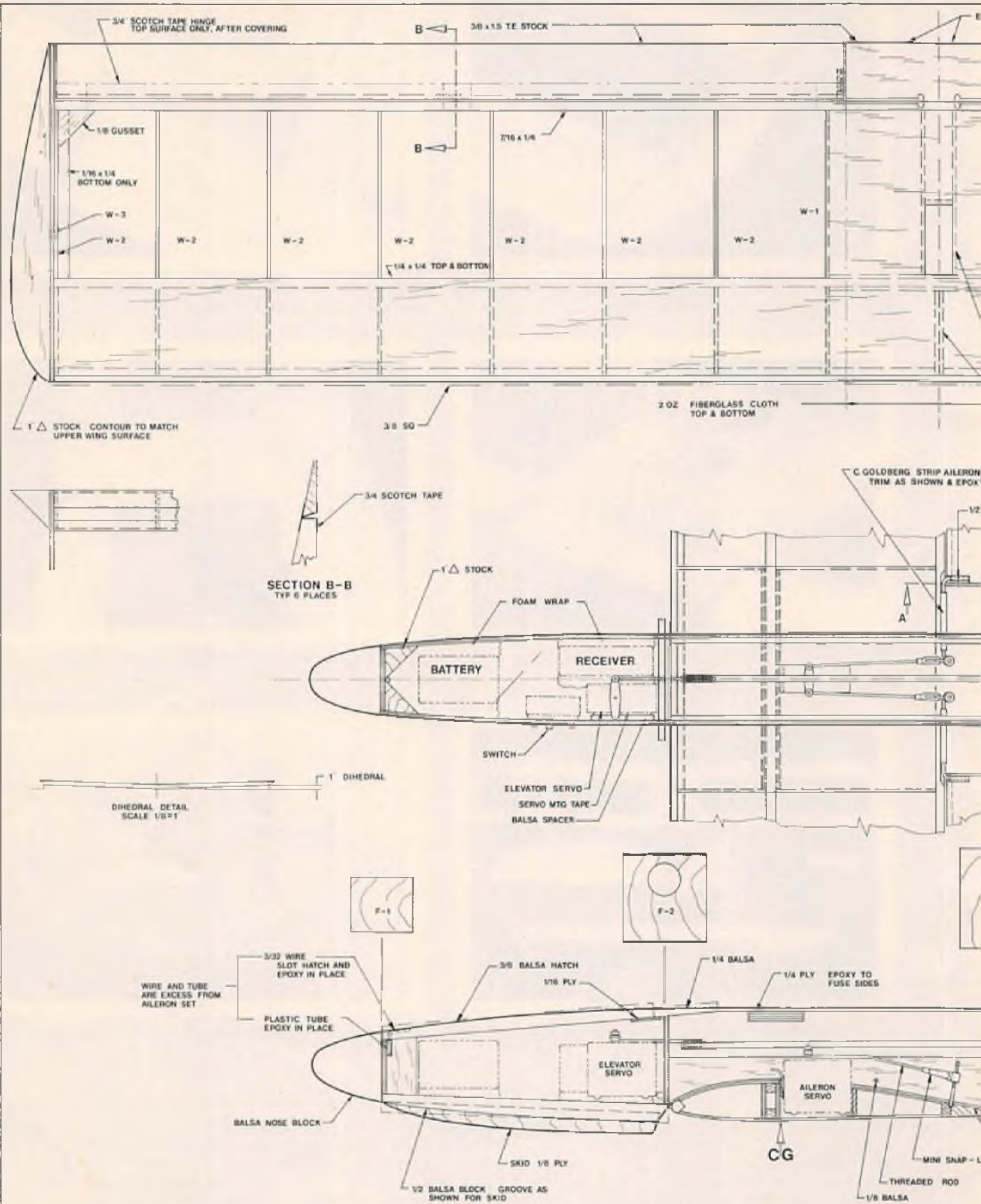
(16) Make and glue in the elevator servo spacer.

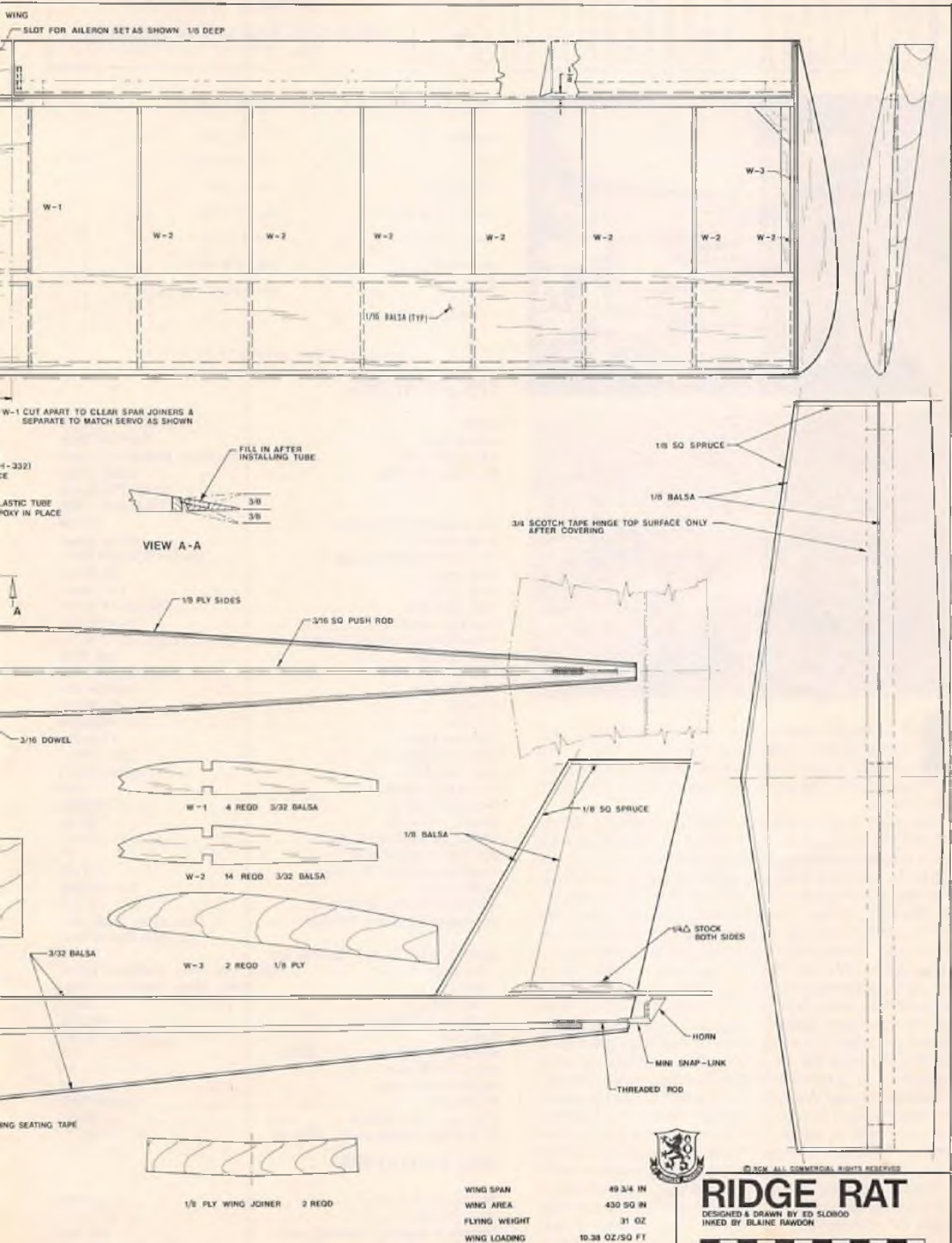
(17) The finished fuselage may be primed and painted or covered with plastic iron-on material, but if your

landing area is rough, you should at least cover the bottom of the fuselage with 2 oz. fiberglass. I use 2 oz. fiberglass on my entire fuselage. The weight won't hurt and it makes the fuselage much stronger and scuff resistant as well as providing an excellent paint base.

(18) Install the radio and the elevator pushrod. Run the antenna out the rear of

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RCM PRODUCT TEST

Hobby Lobby HAWKER TYPHOON



RC modelers who have an interest in World War II fighter aircraft (are there many who don't?) will welcome this kit. Especially those who are looking for something different from the current crop of P51's, FW-190's, Corsairs, etc.

A Stand-Off Scale version of that controversial British fighter, the Hawker Typhoon is kitted by Ray Prime Models for the True Line Model Aircraft Company of Notim, England. It is designed for .40 cubic inch size engines, and is available in this country from Hobby Lobby of Brentwood, Tennessee.

Like the P51, Spitfire, Messerschmitt 109, and a few other World War II fighters; the Hawker Typhoon possesses that special "look", that mystical ingredient that set some fighters types apart from the rest. The Typhoon simply "looks" like a fighter. As a point of interest, the full size Hawker Typhoon was an abysmal failure as a fighter. It did eventually evolve into an adequate low level, ground support aircraft, although it remained an aircraft that was harshly unforgiving of pilot error. Of the 142 Typhoons first issued to Royal Airforce Squadrons, no less than 135 of these aircraft suffered serious accidents, which were attributed to engine or airframe failures. No enemy action was involved in any of these accidents. The Typhoon had a nasty habit of catching fire during engine start-up and the carbon monoxide problem in the cockpit was so severe that RAF pilots wore their oxygen masks at all times, while in the cockpit. The early model Typhoons also suffered from a structural weakness which resulted in the entire tail assembly breaking off of several aircraft during dive recovery. It was often cynically stated that early model Typhoons were the best aircraft that the "Luftwaffe" had. Pilot morale became so low within the RAF squadrons equipped with Typhoons, that

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IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts		●			
Plans				●		Parts Match to Plans		●			
Written Instructions				●		Overall Parts Fit		●			
Quality of Hardwood		●				Ease of Assembly		●			
Quality of Fiberglass			NA			Fidelity to Scale		●			
Other Materials		●				Flight Performance		●			
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

SPECIFICATIONS

Name	HAWKER TYPHOON
Aircraft Type	Stand-Off Scale
Manufactured By	Ray Prime Models in England
Available Only From	Hobby Lobby Rt. 3, Franklin Pike Circle Brentwood, Tennessee 37027
Mfg. Suggested Retail Price	\$88.00
Available From	Hobby Lobby
Mfg. Recommended Usage	Sport or Stand-Off Scale
Wing Span	53 Inches
Wing Chord	9½" (Avg.)
Total Wing Area	503 Square Inches
Fuselage Length	44½ Inches
Radio Compartment Dimensions	(L) 3¼" x (W) 3½" x (H) 7"
Wing Location	Low Wing
Airfoil	Semi-Symmetrical
Wing Planform	Double Taper
Dihedral	1½ Inches
Anchored	1/4" 1st panel
Stabilizer Span	20 Inches
Stabilizer Chord (incl. elev.)	5½" (Avg.)
Total Stab Area	110 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	7 Inches
Vertical Fin Width (incl. rud.)	6½" (Avg.)
Mfg. Rec. Engine Range	.40
Recommended Fuel Tank Size	8 Oz.
Landing Gear	Conventional
Recommended No. Of Channels	4 or 5
Recommended Control Functions	Rud., Elev., Throt., Ail. Optional Retractable Gear

Basic Materials Used In Construction:

Fuselage	Balsa, Ply, Foam, Hardwood Veneer
Wing	Balsa, Foam, Hardwood Veneer
Tail Surfaces	Balsa
Hardware Included In Kit	See text
Plan Size	30" x 45" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	86 Oz.
Wing loading based on rec. flying wt.	24.6 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	91 Ounces
Wing Loading	26 oz./sq. ft.
Covering & finishing materials used	See Text
Engine Make & Disp.	O.S. Schnuerle .40
Muffler Used	Semco
Radio Used	Westport Int. Variant
Tank Size Used	8 Oz.

RCM PRODUCT TEST

**Jack Stafford Models
E.A.A. ACRO-SPORT**



The E.A.A. Acro Sport biplane kit from Jack Stafford Models is a 2-9/16" Sport Scale model of the full size aircraft from Oshkosh. The kit was received in good condition in a box that does more than just protect the contents during shipment.

The instructions are very complete and easy to follow. The instructions also include a shopping list that tells you what "else" you need to complete the kit. To start the building sequence, I followed the instructions by reading them all the way through once then I started building the fuselage. The kit box top comes into play as a building fixture which insures a straight fuselage. Jack says to use masking tape to hold the parts during the building process — I agree — the only thing I want to caution you about is to remove all the tape when the structure has cured. I did not remove some of the tape for several days and I had an additional job of trying to get the tape's glue off my fuselage (dumb, really dumb!).

The fuselage is really good looking when you get it completed — it's as curvy as a fiberglass fuselage and, to my way of thinking, just as good. By the time I had reached Step 34, I had a complete fuselage with the fin installed, the cabane strut holes drilled, the plastic cowl assembled and fitted to the fuse; the wheel pant halves are even assembled. Now to the wings!

As I started the built-up wings I became a little discouraged at one comment I read. Jack says that it takes 480 glue joints and 80 capstrips to build these wings — he is right?! The kit is also offered in a foam wing version for those modelers wishing to build that way. I don't have very good luck with foam so I elected to go ahead with the built-up version. There are no tricky areas in my estimation, in fact, the wings went together very quickly. There is one comment I would like to make about the spruce spars. Please sand them before you start to build your wing. I found a lot of wax or oil or whatever spruce gives off and I'm sure it would cause a poor glue joint if you don't get it clean. One other thing on the wing — make sure that your spar notches in the ribs are deep enough before you start building. I know you would check that but I was in a hurry and

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IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts		●			
Plans		●				Parts Match to Plans		●			
Written Instructions	●					Overall Parts Fit		●			
Quality of Hardwood		●				Ease of Assembly		●			
Quality of Fiberglass			NA			Fidelity to Scale		●			
Other Materials		●				Flight Performance		●			
Accessories		●				Overall Appeal		●			
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

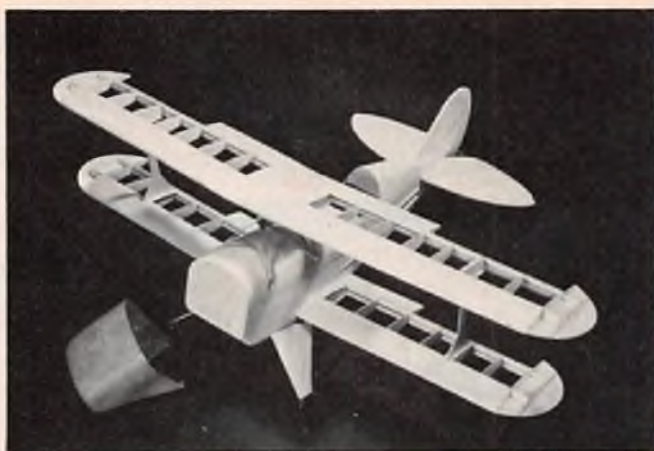
SPECIFICATIONS

Name	E.A.A. ACRO-SPORT
Aircraft Type	Aerobatic Biplane
Manufactured By	Jack Stafford Models 12111 Beatrice St. Culver City, California 90230
Mfg. Suggested Retail Price	\$64.95
Available From	Both Mfg. & Retail
Mfg. Recommended Usage	Sport and Competition
Wing Span	50 Inches
Wing Chord	8 Inches
Total Wing Area	770 Square Inches
Fuselage Length	43 Inches
Radio Compartment Dimensions	(L) 8" x (W) 3½" x (H) 3½"
Wing Location	Biplane
Airfoil	Semi-Symmetrical
Wing Planform	Constant Chord
Dihedral	¾ Inches
Stabilizer Span	18 Inches
Stabilizer Chord (incl. elev.)	6" (Avg.)
Total Slab Area	108 Square Inches
Slab Airfoil Section	Flat
Stabilizer Location	Mid Fuselage
Vertical Fin Height	9¼ Inches
Vertical Fin Width (incl. rud.)	8¼ Inches
Mfg. Rec. Engine Range	.45-.60
Recommended Fuel Tank Size	12 Ounce
Landing Gear	Conventional
Rec. Number of Channels	4
Recommended Control Functions	Rud., Elev., Throt., & Ail.
Basic Materials Used in Construction:	
Fuselage	Balsa, Ply & Hardwood
Wing	Balsa & Hardwood
Tail Surfaces	Balsa
Hardware Included in Kit	See last Plan Size
Plan Size	36" x 62" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (12 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	112 Oz.
Wing loading based on rec. flying wt.	20 Oz./Sq. Ft.

RCM PROTOTYPE

Weight, Ready To Fly	96 Ounces
Wing Loading	17 Oz./Sq. Ft.
Covering & finishing materials used	See Text
Engine Make and Disp.	K & B .61 Pumper
Muffler Used	Talone
Radio Used	Kraft Series 78
Tank Size Used	12 Ounces

PITTS



S2A

ABOUT THE AUTHOR

Robert Brantley, age 31, has been interested in modeling for the past 22 years and has built everything from free-flight to control line and radio control models. After a few years away from building models, he has re-entered the hobby with his main interest in Stand-Off Scale. The Pitts S2A is his first design but he is planning others. Robert is a member of the Radio Control Bee's in North Orange County, and is the publisher of their newsletter. He and his family reside in Brea, Calif., and he is a real estate broker in that area.

The design of the Pitts S2A started some two years ago when I wanted a good looking, snappy flying .40 powered biplane. I chose a .40 powered biplane because it can be carried assembled to and from the

flying field in the trunk of a medium sized sedan. Being a real estate broker, most of my flying is done on a weekday morning, then back to the office. I can't afford to waste time at the flying field setting up to fly.

During the long wait for someone to come up with a design to fit my preferences, thoughts of designing my own kept cropping up. Why not? Nothing to lose if it doesn't fly, right? Finally I started to put thoughts on paper. This being my first, and so far, only design, why not do it right and try for something fast and easy to build? After reading and re-reading several "how to design" articles that have periodically appeared in RCM, work began.

Admittedly the design of an airplane with the name Pitts has not been one of the easier designs to accomplish. Being a short coupled airframe to begin with, combined with a small model, causes

not only ground handling problems but very, very quick control responses. The S2A was chosen over the Pitts 1A design because of the better moments which I hoped would produce a better flying airplane. That decision has paid off in an excellent flying sport aircraft and one that can be flown by anyone except a rank beginner. Control response is very smooth and predictable. The stalls, if you can call them that, are gentle with only oscillations occurring. The plane's slow speed ability makes for effortless low passes and landings. In fact, the slow inverted flying ability of the S2A has astounded everyone who has had the opportunity to fly her. If you are an experienced flyer, you might want to move the Center of Gravity rearward to facilitate spin entry. I do feel the challenge of designing a good model of a Pitts airplane was well worth the effort. The model captures all of the real

The Pitts S2A is a .29 to .45 powered Stand-Off Scale biplane that can be carried assembled to and from the field in the trunk of a medium sized sedan. And, once at the site, its aerobatic performance and low speed characteristics will put the rest of the planes in the pit area while the other flyers stand around and watch with envy.



By Robert Brantley
Ektachrome transparency by
Art Linaschke

plane's lines and appeal. At the flying field the model is easily identified as a Pitts. If weight is kept around the 80 ounce mark any good .29-.40 engine will give all the performance you would want.

The original plane used a standard K & B .40. In addition to the fine flying ability of the Pitts S2A, other design features were incorporated to improve overall performance and ease of construction. These included the landing gears wide stance, for great ground handling, and novel wing attachment. The aluminum cabane struts are no harder to fabricate than bending and soldering the customary wire struts. In fact, the sets made look about 15 minutes per set. Since the

windcreens, if desired. If scratch-building is not your cup of tea, a kit of the S2A should be available from the above manufacturer in early 1979.

Bottom Wing:

Pin 1/4" sq. x 36" balsa bottom rear spar to building board. Trim one piece of 1/16" x 2" x 36" balsa to 1 7/8" wide in order to have one straight edge. Cut four pieces 8" long to be used for the lower wing trailing edge sheeting. Pin the trailing edge sheeting to the plan and glue the forward edge to the spar. Use the ribs to locate the front spar. Pieces of 5/16" sq. balsa are used to elevate the front spar to proper height. Locate and glue ribs #2, #3, and #4 to the trailing edge and spars. Use a piece of 1/8" balsa scrap to space the distance

Install the upper 1/16" x 2" x 36" balsa leading edge sheeting with Titebond. This sheeting is glued over the front spar and against the wing ribs. Install the top center section sheeting. When dry, remove the wing from the building board. Turn over and install the front sheeting and remaining center sheeting. Trim the leading edge sheeting flush with cap, and install 1/4" x 1/2" x 36" balsa leading edge and sand to shape. Cap between rear spars with 1/16" x 3/8" balsa.

Carefully cut through the center sheeting and the spars, cutting the panels apart. Trim overhanging spars and sheeting; and sand flush to rib #1 and wing tip ribs #3.

Temporarily install ailerons using two



cabane struts are not attached until after building is complete, finishing is a snap. As with any short nosed airplane, keep the tail light. Choose your balsa carefully to prevent adding excessive nose weight for balance. Before starting, if you will first pre-cut all parts and make a custom kit, your actual building time will be reduced. You can make one of three S2A versions: front cockpit covered with rear bubble canopy; front cockpit open with windscreen and rear bubble canopy; or windcreens on both cockpits. A fiberglass cowl, wheel pants, and two bubble canopies will be available from House of Balsa as a set. For prices, you can write them at 20134 State St., Cerritos, Calif. 90701. The canopies can be cut and used as

between #4 ribs. Add center rib #1 and, using a rib angle guide, glue to the spars; also glue the rib angle guide to the spar flush with the bottom. Glue the remaining #1 rib against the angle guide. Install #5 ribs centered between ribs #1. Add 1/4" sq. top spars. Glue the 1/16" x 3/8" balsa leading edge cap in place, centered on ribs.

Make up and install the torque rods at this time. Use 1/8" O.D. brass or aluminum tubing and 3/32" music wire. Epoxy to rear of spar. Make sure the torque rods are bottomed in slots and are 1/16" below the top of the spar. Glue 1/2" x 1 1/2" trailing edge stock between ribs #1 as support for wing mounting bolts. Notch the trailing edge sheeting for the torque rods and glue in place.

hinges per aileron. Glue on 1/8" balsa wing tips making sure they are centered and at 90° to rib #3. Glue 1/8" balsa wing tip ribs using aileron to center rib. Add the remaining tip pieces. Using epoxy, join panels blocking up one panel 1 1/2" under tip rib #3. Wrap center section with 1" wide glass tape, using epoxy or polyester finishing resin. Cut two pieces of 3/16" dowel and glue to the top rear spar across #4 ribs in each panel. Add 1/16" x 1/4" balsa cap strips as follows: cover the slot on the bottom of the wing between #4 ribs with one strip; glue one cap strip each side of #4 ribs on the upper side of the wing. These cap strips are used to strengthen the inter-plane strut mounting area and to give a base for the wing covering. Cap strips are not

used over any other ribs.

Top Wing:

Construction is basically the same as the bottom wing except it is built inverted on the building board. It also has no dihedral. After installing the bottom spars, add 1/8" plywood center rib with strut mounting tabs pointing upward. Glue a piece of 1/4" x 1/2" balsa, trimmed to size, between #1 ribs against ply rib. Install the 1/2" x 1 1/2" trailing edge stock filler between #1 ribs. Cut radius after the bottom sheeting is installed and the wing is off the building board. Cut two pieces of 1/4" dowel and glue to the bottom rear spar across #4 ribs.

Finish by adding 1/16" x 1/4" balsa cap strips as follows: cover the slot between #4 ribs on top of the wing; add one cap strip on each side of #4 ribs on the bottom.

Fuselage:

Mark the firewall centerlines. Drill holes and install blind nuts to suit your mount. Make a right and left hand fuselage side as follows: glue 1/16" plywood fuselage doublers to 1/8" balsa sides using contact cement. Index against bottom of sides 1/4" in from the front. Make sure you leave a 1/16" space at the top edge of the fuselage for the top crutch. Add the top 1/4" sq. longeron and the 1/8" sq. bottom longeron. Cut out the wing saddle with a #11 blade.

Using plan, mark location of bulkheads #4, #6B, #7, #8, #7A, and #8A, on the fuselage sides. Pin the top crutch on the top view of the plan. The forward edge is even with the rear edge of the firewall. Mark the location of bulkhead #2 on the crutch. Glue the fuselage sides to the crutch, indexing the front of the crutch even with the edge of the 1/16" ply doubler. Add bulkhead #2 and #3 to the crutch and the fuselage sides. Bulkhead #3 is glued to the rear edge of the crutch. Glue the rear of the sides together.

Using epoxy, glue the 3/16" ply landing gear block and the 1/4" ply wing mounting block in position. Remove the fuselage from the building board and install the firewall using epoxy. Add 1/2" triangle stock to the firewall-fuselage joint for added support.

Install top bulkheads #6B, #7 and #8; and 1/16" turtledeck sheeting; sand flush at the top and install 1/2" top block. Carve and sand to final shape.

Install bulkhead #6A against #6B. Score bulkhead #5 and glue to the cockpit floor. Glue #6C to rear of the floor. The cockpit can now be detailed if you wish with instruments and a pilot. A Williams Bros. 3" pilot will work if the shoulders and height are trimmed. The cockpit floor is glued against bulkhead #6A and top of the fuselage. Add bulkhead #4 and 1/4" sq. top longeron. Install 3/32" front sheeting by first gluing bottom edge to 1/8" side, then apply

water to the top surface of the sheeting. With this method the top sheeting can be done in two pieces. Mark and cut slots for the cabane struts using slots in ply doubler as a guide. Using template, cut out the cockpit opening.

Glue bottom former #3B to the rear of former #3A and glue to the bottom of the fuselage across former #3 at a 30° angle. Add formers #7A and #8A.

PITTS S2A

Designed By : Robert Brantley

TYPE AIRCRAFT

Stand-Off Scale Biplane

WINGSPAN

Top 41" — Bottom 39"

WING CHORD

7 1/4 Inches

TOTAL WING AREA

580 Square Inches

WING LOCATION

Biplane

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Constant Chord — top wing swept

DIHEDRAL, EACH TIP

Top 0" — Bottom 3/4"

OVERALL FUSELAGE LENGTH

37 Inches

RADIO COMPARTMENT AREA

(L) 7 1/4" x (W) 4 1/2" x (H) 2 1/2"

STABILIZER SPAN

17 Inches

STABILIZER CHORD (Incl. elev.)

7 3/4 Inches

STABILIZER AREA

85 Sq. In. (approx.)

STABILIZER AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

5 3/4 Inches

VERTICAL FIN WIDTH (Incl. rudder)

8" (Avg.)

REC. ENGINE SIZE

29-45 Cubic Inch

FUEL TANK SIZE

8 Ounces

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4 (5 with smoke)

CONTROL FUNCTIONS

Rud., Elev., All., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Wt. Ready-To-Fly	72-96 Ounces
Wing Loading	18-24 Oz/Sq. Ft.

Install 1/8" x 1/4" balsa bottom stringers. Use a piece of 1/4" balsa scrap at the fuselage tail.

Mount the lower wing, mark and drill for 1/4" dowel by using a piece of 1/4" outside diameter brass tubing. Install dowel using epoxy.

Attach the wing with 6-32 socket head bolts and blind mounting nuts. Sand bevel to former #3C and glue to the wing

trailing edge. Do the same with former #2A and attach to the leading edge of the wing. Add 1/16" sheet side pieces. Remove the wing and cap the side pieces with 1/4" sheet. Sand to final shape. Back drill mounting holes through 1/4" sheet. Re-mount the bottom wing. Glue 1/4" sheet to the front of the fuselage bottom. This sheet forms a lip to hold the bottom hatch in place. Make up the hatch from 3/8" balsa block. Tack glue to the fuselage sides and blend to the belly pan and the front 1/4" sheet. Use 1/8" dowel to hold the rear of the hatch by gluing two short pieces to the hatch and putting matching holes in bulkhead #2A. You can permanently glue the hatch on after the landing gear is attached if you prefer, but the landing gear will not be removable. The removable hatch is nice when installing the fuel tank and hooking up the fuel lines.

Make up the landing gear and cabane struts from medium soft (T2-T3) .063 aluminum. Make the landing gear clips from strip brass and bend the landing gear spreader from 3/32" music wire. Mount to the landing gear block with (4) 4-40 bolts and blind nuts. You will have to relieve the bottom hatch block for clearance of the wire retainer clip.

Cut the empennage from 1/4" sheet balsa. Use soft balsa blocks for the aft fairing blocks. Use scraps of 1/4" balsa as spacers for the stab and vertical fin; blend blocks to turtledeck. Add 1/8" sq. balsa side stringer and blend to the fuselage sides. Make up the landing gear fairing from 1/32" ply and 1/16" x 1/4" balsa. Use epoxy and affix to aluminum gear. Cut two inter-plane struts from 1/8" lite-ply. Complete sanding the fuselage and wings in preparation for covering and finishing.

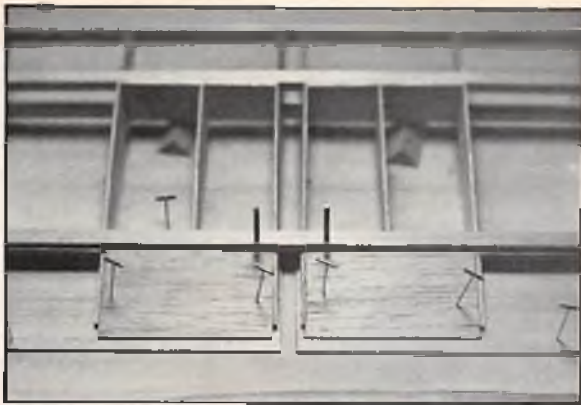
Finishing:

The choice of covering materials is up to the individual builder. The original prototype S2A has MonoKote wings with Silkspun Coverite and acrylic lacquer on the fuselage.

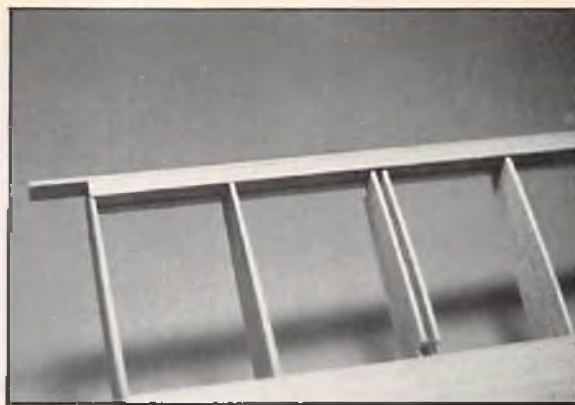
If you plan to use MonoKote for the whole ship, it is easier to cover the fuselage and tail surfaces before final assembly.

If you choose to go with the Silkspun Coverite, here is my method: Glue on the stab and the vertical fin prior to finishing. I used Coverite over the fuselage side stringers from the leading edge of the wing to the tail and from the centerline of the fuselage down and over the bottom. Coat the bare wood with a coating of polyester resin removing the excess with a paper towel. When dry, lightly sand, then spray on a coat of lacquer primer. Remove most of this first coat of primer. A second coat may be needed to fill the grain. The Coverite is usually filled by the first coat of primer. Color coats can now be added. I use Ditzlers acrylic lacquer plasticized with

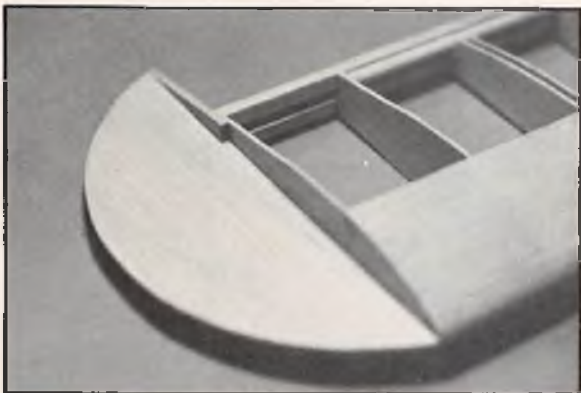
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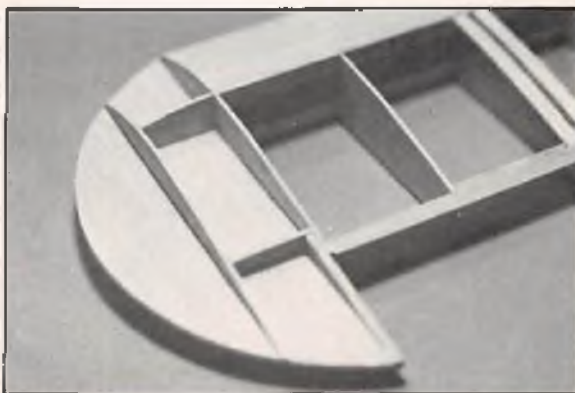
Basic wing construction showing installation of torque rods on bottom wing.



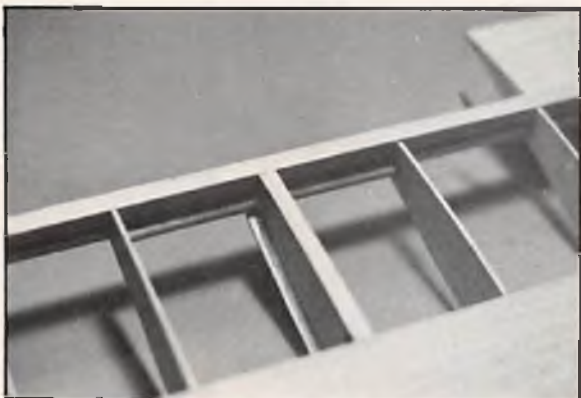
1/16" x 3/8" balsa end cap fits against bottom rear spar to fill gap.



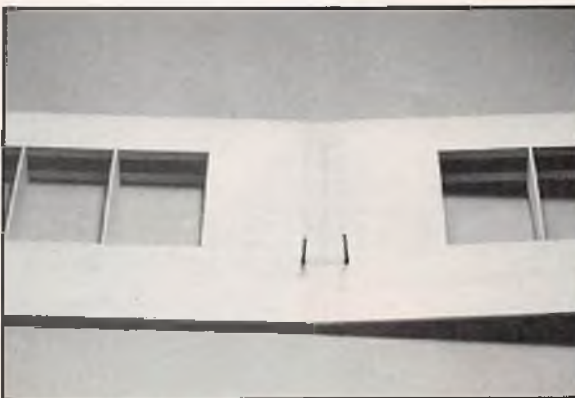
Wing tip prior to adding tip pieces.



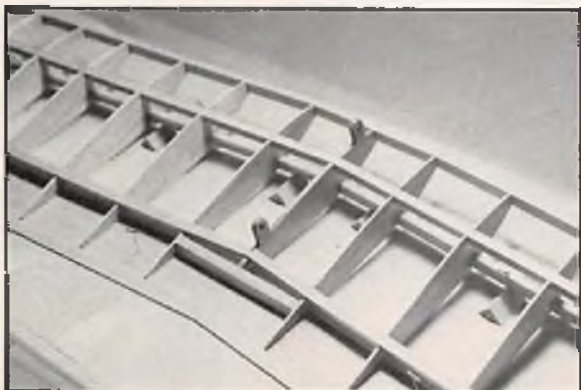
Wing tip pieces added to finish tip.



Cap strip on bottom to cover slot between #4 ribs.



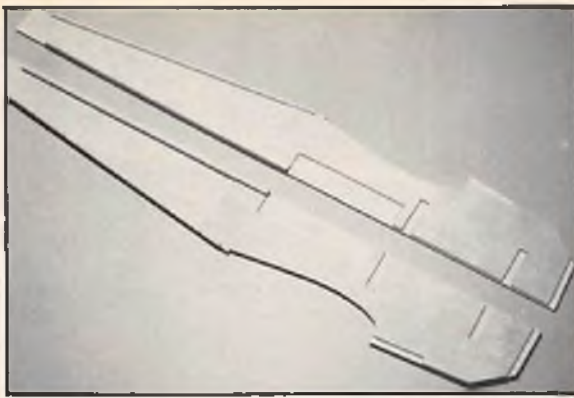
Panels joined and 1" wide nylon tape applied to center joint.



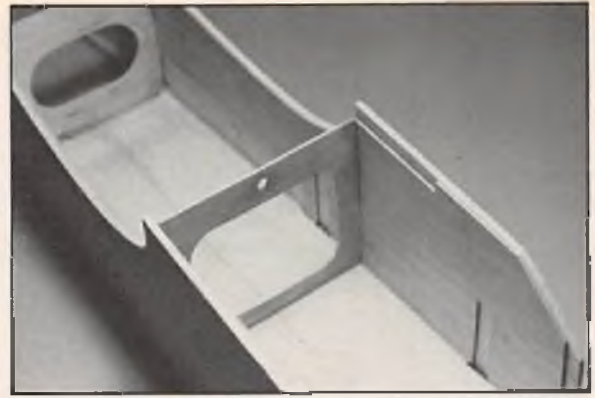
Top wing showing that it is built inverted and position of center plywood rib.



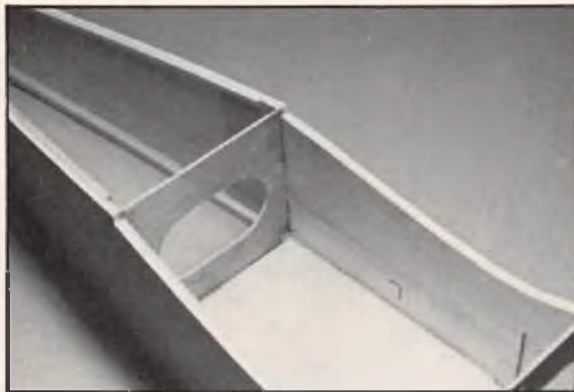
Bottom of top wing showing center section sheeting and wing mounting tabs. Also 1/4" x 5/8" balsa center leading edge cap applied over the 1/4" x 1/2" top wing leading edge.



Right and left hand fuselage sides.



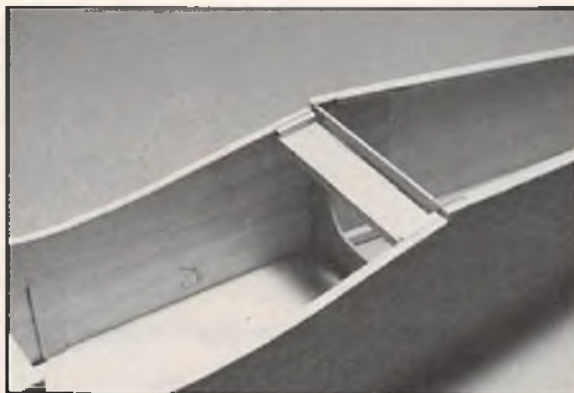
Formers #2 and #3 installed between fuselage sides.



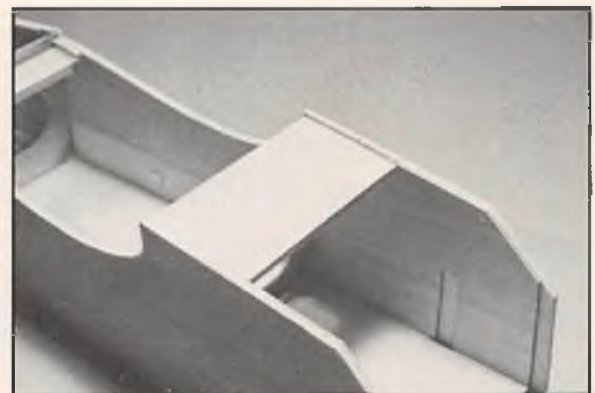
View of former #3 showing position at aft end of wing cutout.



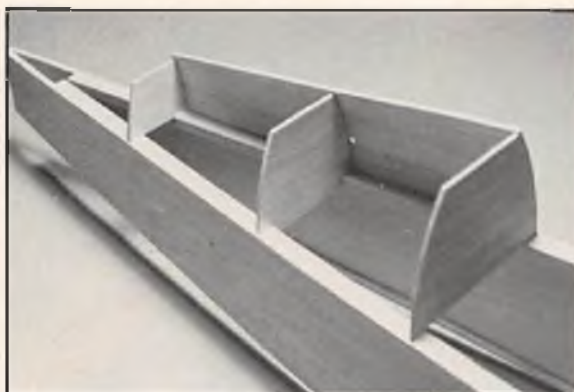
Fuselage pinned to building board and using top crutch as a building aid.



Wing mounting block shown installed between fuselage sides.



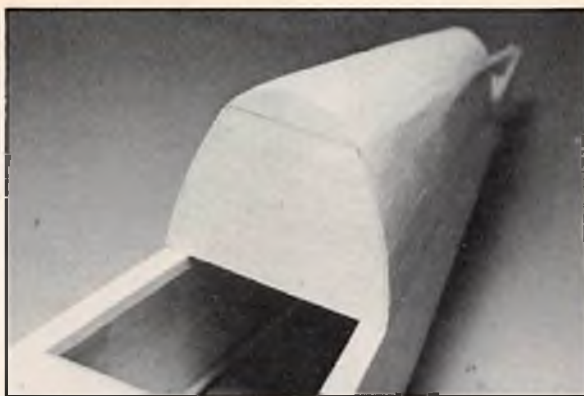
Landing gear block installed.



Turtledeck construction showing formers #6B, #7, and #8 with 1/16" balsa sheeting.



1/2" balsa top block installed to top of turtledeck.



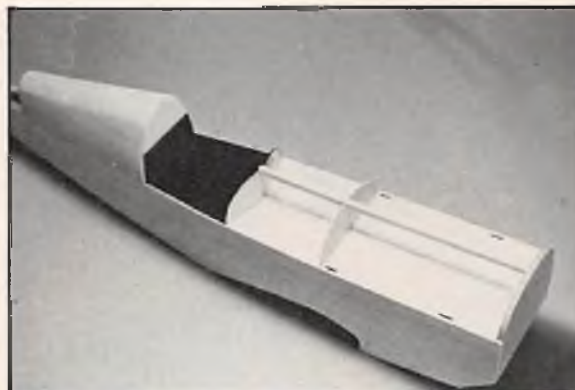
Shaped top block.



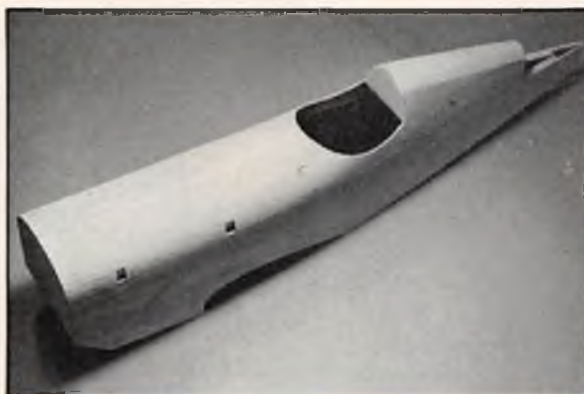
Rear of firewall showing 1/2" triangle stock for added support.



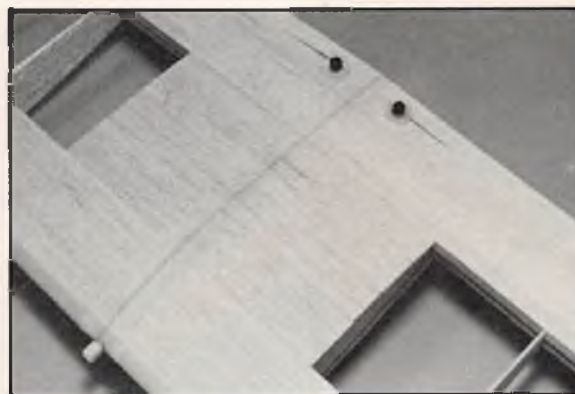
Assembled cockpit section with instrument panel prior to installation.



Cockpit section installed with former #4 and 1/4" square top longeron. Note that cockpit section is painted black.



Top 3/32" balsa sheeting installed to forward fuselage.



Bottom wing drilled for mounting bolts. Note nylon washer to protect wing.



Former #3A and #3B glued to fuselage bottom across former #3 at a 30° angle.



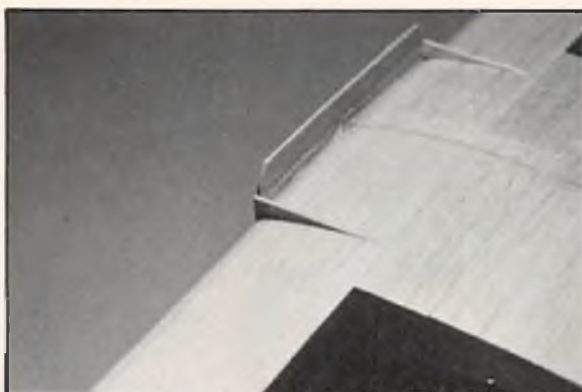
Formers 7A and 8A installed along with 1/8" x 1/4" balsa stringers.



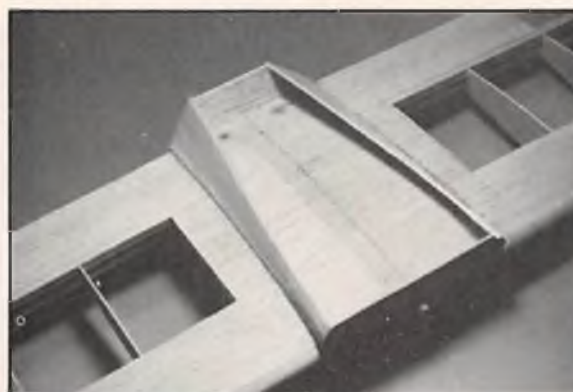
Piece of 1/4" balsa scrap used at tail.



Former #3C glued to T.E. of wing. This can be done with wing installed to fuselage and using wax paper to prevent former #3C from sticking to #3A.



Former #2A installed along with #2B side pieces to leading edge of wing.



Under wing fuselage side pieces installed to bottom of bottom wing.



1/4" balsa sheet installed over side pieces and shaped to match fuselage bottom.



1/4" balsa sheet used for front of fuselage and 3/8" balsa hatch block.



Hatch block installed and contoured to match belly pan.



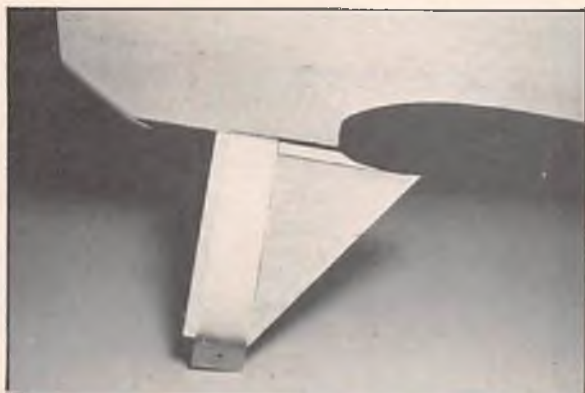
Landing gear installed with brass retaining clip.



3/32" music wire spreader and axle wire installed; note hole in hatch block for clearance.



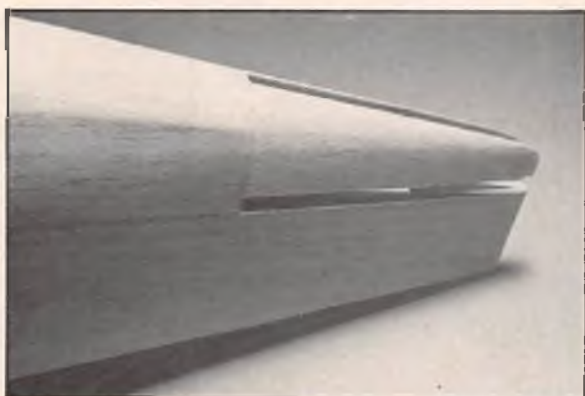
1/8" dowel used for retaining hatch block.



Landing gear flaring using 1/32" plywood and 1/16" x 1/4" balsa.



Top 1/32" plywood flaring installed.



Tail blocks installed and shaped.



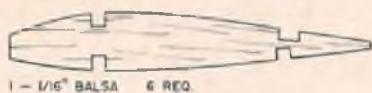
1/4" balsa empennage installed.



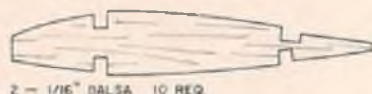
Installing inter-plane strut to top wing.



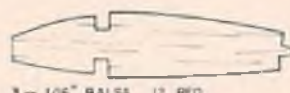
Installing inter-plane strut to bottom wing.



1 - 1/16" Balsa 6 REQ.



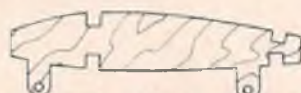
2 - 1/16" Balsa 10 REQ.



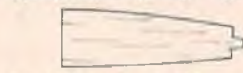
3 - 1/16" Balsa 12 REQ.



4 - 1/16" Balsa 8 REQ.



CENTER RIB - 1/8" PLY TOP WING ONLY



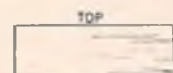
5 - 1/16" Balsa 2 REQ.



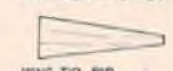
1/16" X 3/8" Balsa



BASIC SECTION



DIHEDRAL GAUGE
1/16" Balsa - 2 REQ.



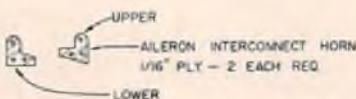
WING TIP RIB
1/8" Balsa - 4 REQ.



1/16" Balsa



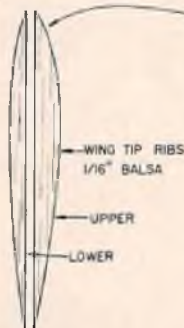
AILERON CROSS SECTION



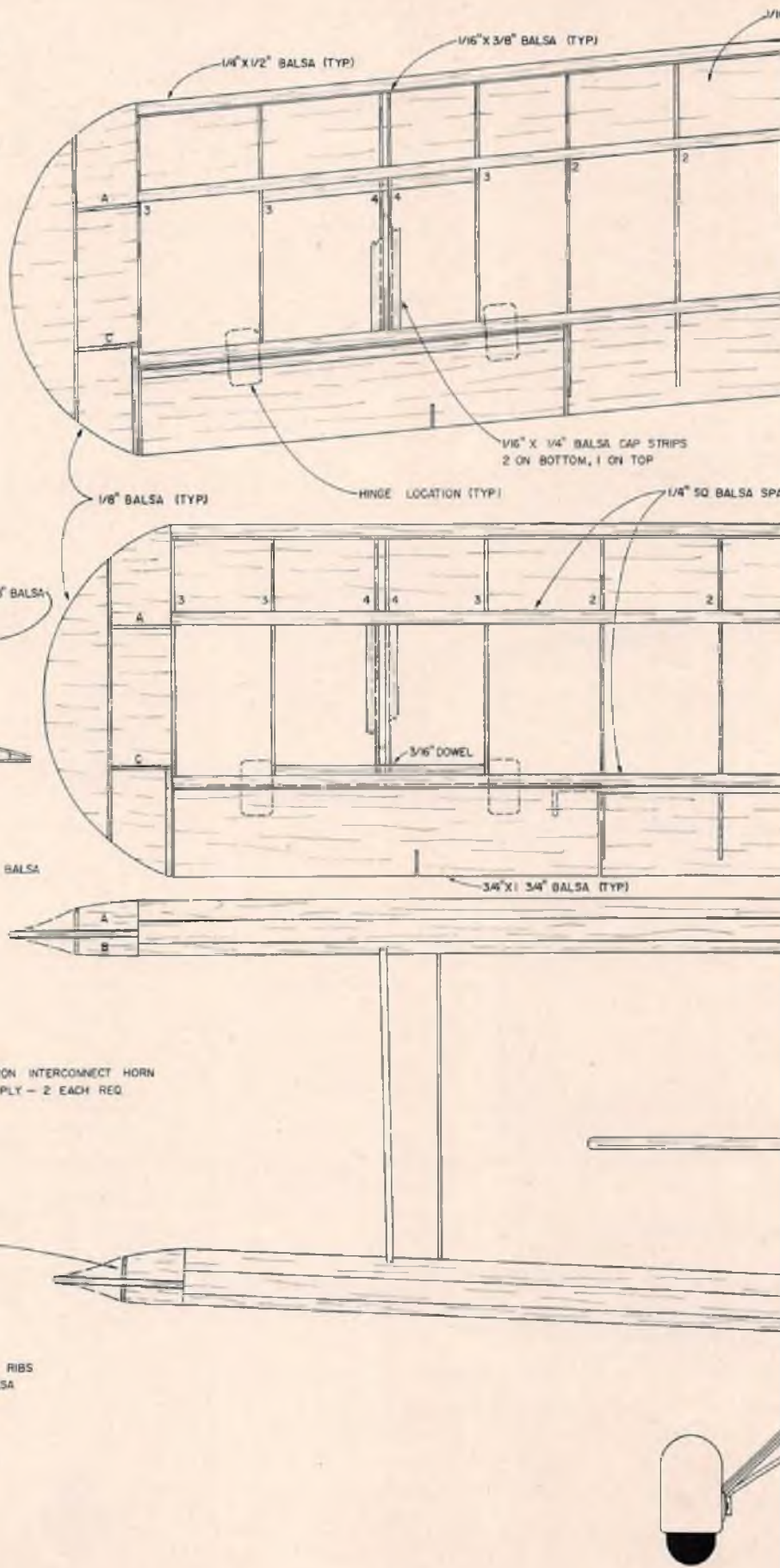
UPPER
AILERON INTERCONNECT HORN
1/16" PLY - 2 EACH REQ.
LOWER

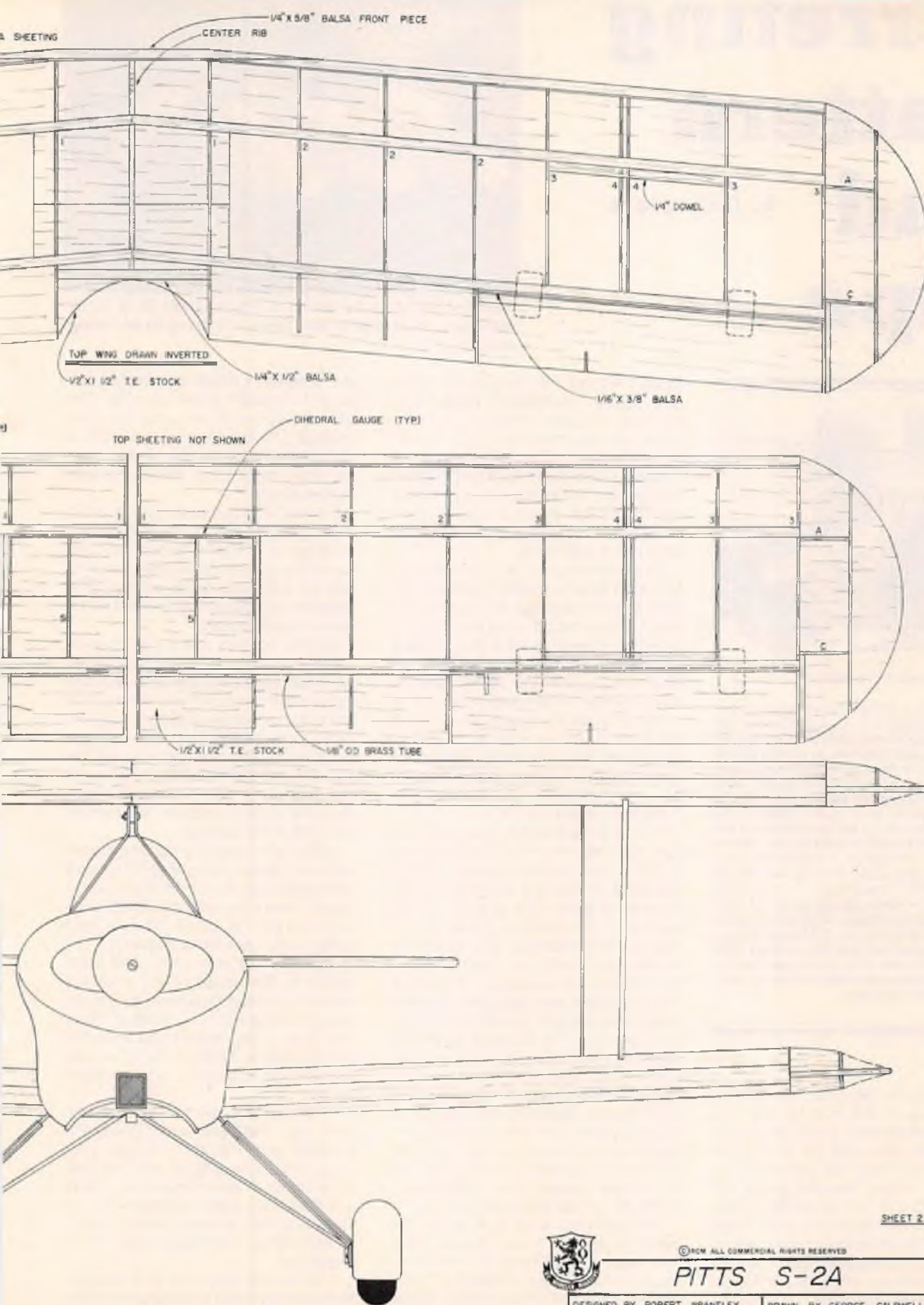


INTERPLANE STRUT
1/8" PLY
2 REQ.



WING TIP RIBS
1/16" Balsa
UPPER
LOWER





SHEET 2 OF 2



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PITTS S-2A

DESIGNED BY ROBERT BRANTLEY

DRAWN BY GEORGE CALDWELL



PLAN NO. 746(2)

ferreting pattern and pipe

by jack aycock



Fred the ferret looks over the epoxy glass Dirty Birdy fuselages. Be it help or hindrance, it's going to be a long winter!



ABOUT THE AUTHOR

Jack Aycock is a long time builder (remember the Mirror Meets?) and filer of U-control, free flight and radio control. Presently residing in Colorado Springs, Colorado, he is twice retired — once as an Air Force jet pilot of twenty years and then as hobby shop owner. He and wife, Diana, share the blessings of five children, one granddaughter and the ultimate in inquisitiveness, Freddy the ferret! Active in the AMA, Jack is a contest director and area VP for NMPRA. As an author, his articles have appeared in R/C Scale Modeler and Model Aviation. With entrance into contests throughout the years, he has advanced from Novice to Expert in Pattern, while still enjoying Sport Scale and his favorite, 1/4 Midget Racing! Though he's been into radio control since 1950, an occasional break on the Arkansas River for brown trout brings a welcome "out fishing" sign on the building room door.

Webster defines "ferret" as searching out by careful investigation, and that was to be my exact approach on this winter project. With Fred, my pet ferret, as companion helper, my work began on three Dirty Birdys. I chose the Dirty Birdy because I found it to be an honest, easy to build and fly airplane, akin to the Kaos. Why three? Aside from pure selfish motives (summer is my flying and fishing time) I reasoned that "when" and not "if" I pranged one, there would still be two left to see me through the contest

season without returning to the balsa factory. Also, comparison notes could be made on each, pertaining to tuned pipe performance and other modifications. Two aircraft were finished, painted and flown and the third was primed and ready for paint at this writing. As will become evident later, there was a method in my madness to not paint the third ship.

This is not meant to be a "we build and fly" type article, but rather an information source for the average R/C builder and flier. You may not go along with all of the poop but at least read it over. If you pick up just one new idea, this project will have been worth the effort. Specific brand names will be mentioned at times . . . all of which are readily available off the shelf of your local hobby shop as I purchased mine. Personal preference had a large part to play in my choice of brands, but you may feel free to substitute as you see fit.

The Dirty Birdy comes quite complete right out of the box. All of the sheeting is included but I would recommend that you weigh it. I found a weight difference between the kits with as much as six ounces in the sheeting alone. Try to average the wood as you sheet the surfaces and it will save you time later on balancing the airplane. All three fuselages were average in workmanship with numerous pin holes that had to be filled later on. The fuselage seams on one kit were rather crude, too. The use of epoxy glass rather than polyester resin presents no problems if the instructions are followed. Speaking of instructions, those supplied in the kit are excellent. An engine mount and most of the necessary hardware is supplied but, remember, it is for a fixed landing gear. I went with Rhom-Air for retracts in my set-up.

The airplanes were built as per the plans except for a few modifications which are outlined here. A Rhom belly mount nose gear was installed in lieu of the firewall mount, which is shown on the plans. Use of this mount allows you to place the fuel tank closer to the engine

and, in addition, a bellcrank can be used for more positive wheel steering. The nose wheel still retracts into the fuselage. Use two pieces of 1/2" x 3/8" x 1 1/2" maple mount for the rails to mount the gear, reinforcing the epoxy and micro-balloons.

For the bellcrank steering arm, a Sig #480, 3" nylon bellcrank, cut down and mounted on a 1/16" plywood fuel tank support, was used. Nose wheel tracking can be adjusted quite easily. This method has proven to be a winner and is highly recommended.

Another addition was a 1/4" plywood engine mount support at the front end of the nylon engine mount. It is fit to the inside of the fuselage flush with the front end of the mount and epoxied into place on the fuselage. Drill and tap (4-40) from the front of the fuselage through the plywood, into the mount, to tie down the front end of the mount. This will greatly reduce and dampen vibration throughout the fuselage.

I left a rather large cut-out for the nose gear so that everything would be readily accessible but, if I could do it over, I wouldn't make the nose wheel well quite that large. It does not effect performance, just looks ungainly.

Another item was glass matt cloth added to the inside of the fuselage where the tuned pipe rear hold-down would be. Use a 2" x 2" patch of heavy matt cloth in this area if you intend to pipe the engine. Since pipe lengths vary, you will have to come up with the exact location.

A very simple way to make the stab fillets was tried and works great! Put 5-minute epoxy in the joint, wet your finger with water and go over the fillet area, wiping off the excess on each pass until the epoxy starts to harden. Once it starts to set up, do not go over it. Instant no sand fillets, size depending on your finger tips!

Another hint is the use of a heat gun on the epoxy when penetration of glass cloth or matt is desired. It makes the

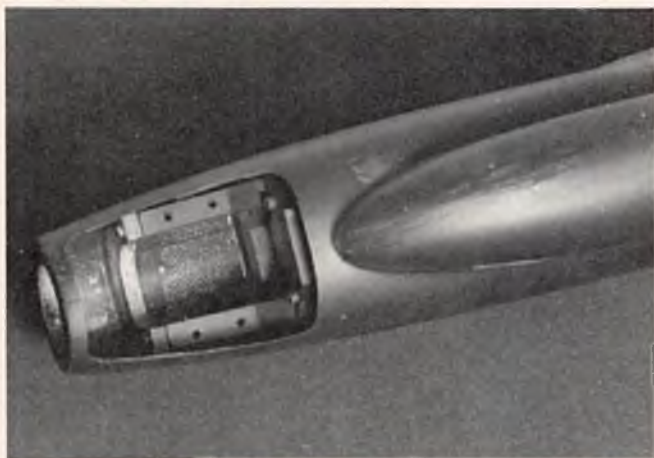
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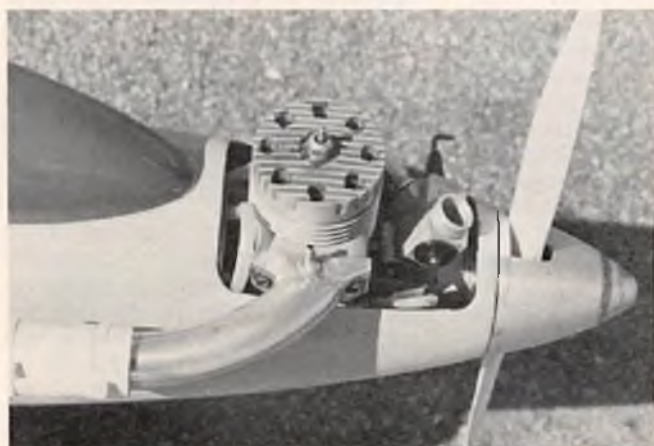
The Dirty Birdy kit as it comes out of the box. A very easy airplane to build and comes with most of the necessary hardware.



Bottom view of fuselage showing Rhom belly mount hardware rails, nose wheel steering bellcrank pivot point and plywood plate for retract servo and valve.



1/4" plywood front mount brace installed. Cuts down on vibration. Note filler material on fuselage pin holes and seam. Takes quite a bit of sanding.



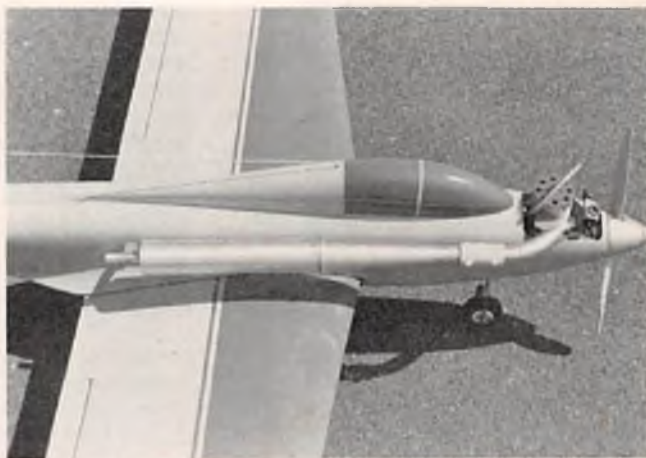
Method used to install a pressure tap for the fuel tank on the header pipe. Adds consistency to the needle valve setting plus an overall boost in rpm. Complete information in the text.



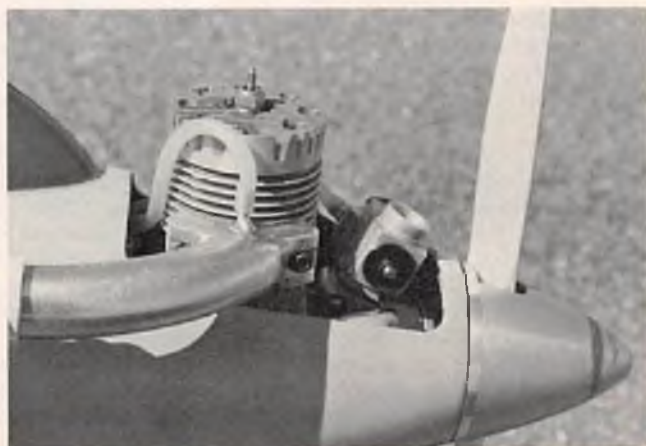
Wing waiting for primer. Fibreglassed and complete weight at this stage is two pounds even.

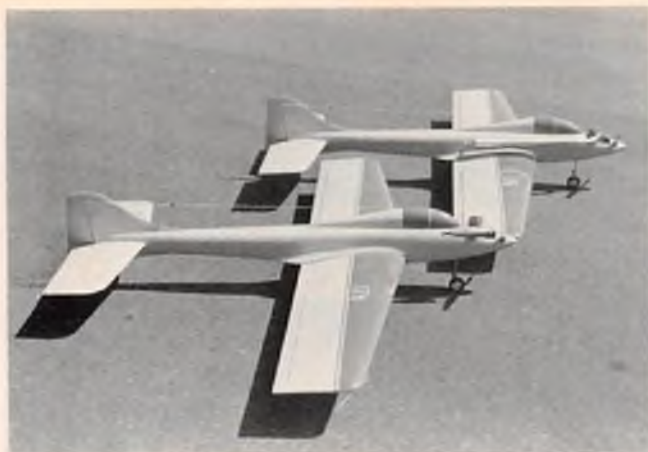


Use of epoxy and wet fingers form no sand fillets. Procedure is described in the article.

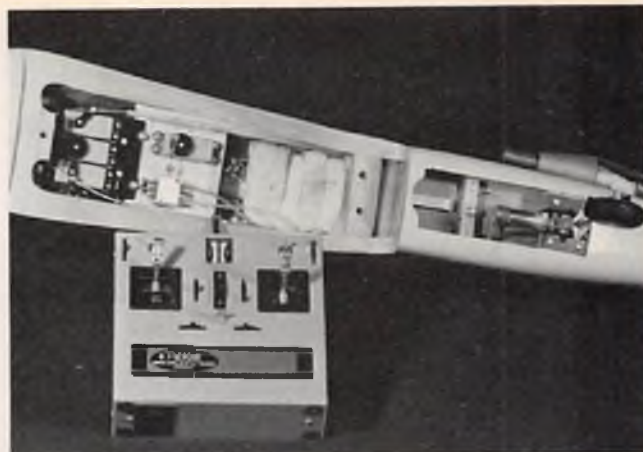


Good view of the overall pipe installation. An OPS SS-60 pipe and Mac's Products header pipe used. Interconnect tubing and clamps supplied with header.





Two of the three Dirty Birdys just itching to get airborne. Everything was kept simple and functional.



Complete radio installation. The old reliable Kraft Signature system used with two airborne packs. Everything out in the open with the wing removed. Nose wheel well could be a little smaller.

epoxy quite thin and it goes right through the material. I use 15 minute epoxy for this chore.

Follow the instructions on installing and setting up the landing gear on either the fixed or retract version. Proper placement will insure those pretty take-offs where the airplane rises from the ground, rather than jumping into the air. Landings will also tend to be the no bounce glue down type. A Kraft wheel was used on the nose which also helps. Slight toe-in of the main wheels will provide some braking action, but more important, insure straight tracking during take-off and landing. Try it!

Kraft KPS-14 servos were used allowing a three abreast installation. The retract servo was mounted on a plywood plate just in front of the servo tray. The shuttle valve was installed on this plywood too, producing a very neat radio installation. All servos and retract goodies were accessible with the wing removed. A 14 oz. tank was installed in the airplane that would have the tuned pipe and a 12 oz. tank in the other. There is plenty of tank space.

A Robart Incidence Meter was used on the engine, stab, and wing, to insure proper thrust and decalage. The meter makes setting these important items up a snap, with no guesswork. If you don't own one, follow the kit instructions for measuring these items. The airplane will fly only as straight as you build it. Take your time and don't rush this step.

Finishing was with the standard lightweight fiberglass cloth (T.M.B. .6 oz.) and resin (Sig) method over all the wood surfaces. Auto primer (Acme) was then sprayed on; all the holes filled with auto glazing putty, and a good 320 wet sanding followed. Acme acrylic lacquer color was used (don't forget the plasticizer!) followed by a wet coat of clear, sprayed on. This finishing technique gives you a high gloss finish with a minimum amount of work. The overall weight gain was only seven

ounces, which is not bad for airplanes of this size. Watch the primer though as it is heavy.

The rather simple paint scheme was no fluke or lack of masking tape. With the horizontal lines across the wing, I felt the vertical maneuvers would be easier on the pilot and judges, and small correction could be made while the aircraft was in a vertical climb and go unnoticed. Every little bit helps! Slight attitude changes can be made which do not seem evident from the ground and has been proven true with the extensive flying of the airplanes. Quite a few local club members have commented on how good they show up in the air, even on a cloudy, overcast day. Why not keep things simple and functional. Now I can paint the third airplane!

Weight of the finished airplanes complete was 8¼ lbs. dry. As one airplane weighed 3½ ozs. less than the other, it was used for the pipe installation so that they all weighed the same.

I had two Kraft .61 engines which had been flown and broken in last season so they would provide the power for the airplanes. Because they had been used, it would be possible to run them full bore right from the start. In my opinion, there was not enough information available on tuned pipes, so I decided to see for myself what, if any, performance gain could be had with one. All of the readings should be taken as relative because of our 7200 feet altitude. You should expect a higher RPM reading at lower altitudes. In fact, when I fly at contests I'm amazed how much better our engines and airplanes perform at the lower altitudes.

All tests and flying were done with Sig 15% fuel, Fox long idle bar glow plugs and Top Flite 11/7 Super M power props. A standard Kraft muffler was installed on one engine and an OPS SS 60 pipe with a Mac's Products header installed on the second aircraft.

An initial pipe length of 13" was used

which was from the glow plug to the maximum diameter of the tuned pipe. This meant cutting off 2" from the header pipe and 2¼" off the pipe front end. Mac's supplies a heat resistant tubing and clamps to join the pipes. The unit was then attached to the fuselage side with a home-made metal (brass) strap in the middle of the small exhaust tube so that the pipe could be moved fore and aft for adjustment.

My choice of Sig 15% fuel might be questioned by some readers. I have been using this fuel for years and feel that it is one of the best on the market. After landing, the airplane is wet with oil which must mean lubrication. Right, Mr. Lee? Being just an average pattern and sport pilot, I'm not after that extra 1,000 PRM (nice, no doubt!) at the expense of my engines. They cost too darn much. I can average two years or more of flying pattern with the same engine and no repairs. I try to stay on the rich side in all my flying and it has paid off in longer lasting engines. Enough said.

A Royal Pro-Tach was used for all the RPM readings. These readings and other data were done over a period of four weeks and the airplanes were flown extensively during that time. RPM figures do not reflect the maximum RPM that was recorded on the ground. As most of us know, that would be too lean of a needle setting to try flying. All readings were made as the airplanes were set-up to fly.

The first run with the pipe was 12,500 RPM but the needle was very critical and it would go lean in the air. I added a pressure tap to the header and this solved the critical needle problem but RPM fell to 11,700 — enough to fly the airplane, but I felt there was room for more power. I shortened the pipe in ¼" increments (you have to cut the pipe and/or header and slide it in the tubing) until the RPM rose to 12,800 and then started to fall off. Pipe length at this point was 12" from the glow plug to the

maximum diameter of the pipe. At this optimum RPM, the needle valve is not critical and does not have to be run in and out each flight. In fact, it is seldom that I have to change mine. In flying, the pipe can be heard to "come on" and the aircraft performance is amazing, especially in the vertical climbing maneuvers. Idle was not affected by the pipe and if anything, seemed better.

In comparison, the other aircraft with the stock Kraft muffler reached 11,900 RPM. Remember, these RPM readings are what the ships were flown at, not the flat out max that could be achieved on the ground. The non-piped airplane does not have the power of the other ship but will, and does, fly with adequacy.

Fuel consumption with a pipe could be a problem as the 14 oz. tank will just allow you to fly the 1978 "expert" pattern with no dilly-dally. I will install a 16 oz. tank for contests. In all fairness, though, the increase in power available with the pipe is well worth it. Another big plus for the pipe is that it is an extremely effective muffler. As a side thought . . . in the couple of dozen flights of the piped airplane, I have yet to blow a glow plug, so I must be doing something right!

After trial and error (no other way!) on pipe length and you achieve the RPM best suited, I would suggest you anchor

the rear pipe bracket firmly. I used silicone rubber. The rear end will vibrate quite a bit and with the long moment arm could cause the strap to fail if it is not secured.

The pressure fitting was installed ala the Kraft muffler style. A piece of 1/8" brass tubing was cut 1 1/4" long and 30 degree angle filed on the end. A 1/8" hole was drilled in the header, midway between the mounting bolts. Face the angle cut towards the exhaust of the engine, adding a washer on each side of the tubing and soldering them in place. With the tight fit of the tubing and the washers on either side, the pressure fitting will stay in place.

Once you have found the proper pipe length, stay with the same brand prop size and pitch. Any change here will necessitate moving the pipe. The same holds true for fuel. I have used 11/7 props over the years and find they perform best at our altitude, but perhaps not where you fly. Do not be afraid to try other sizes, pitches and brands. Use what gives you the best performance in the air.

Be careful with the pipe as it is easy to get a lean run in the air and not realize it. It is an effective muffler. Use the tach (not your ears) to check RPM! After checking RPM in the normal three point attitude on the ground, hold the nose up

and check it again. There should be no RPM drop. If you do experience an RPM drop, it is most likely lean, so back out the needle valve. I have found there is no super secret to the pipe, just the fact that it has to be tuned to the engine, prop and fuel with a tach used to garner RPM information.

Both airplanes flew off the board with little or no trim required. The CG's came out right on the button with the battery pack over the fuel tank, the receiver just aft of that, and the Rhom-Air tank in the canopy area. I had thought that the pipe hanging out there in the air would cause some trim problems, but with the exception of power, both ships flew the same. Perhaps, I am not masterful enough of a flier to recognize the aerodynamic changes with the pipe, but who cares, as long as the airplane flies well.

In the long run, I was quite satisfied with the whole project. I've explored the tuned pipe business and it no longer scares me or holds deep, dark secrets. In addition, I have three excellent "ready to go" airplanes to fly this summer in-between fishing.

I would be happy to answer any and all inquiries as to the article and perhaps in the process we can all learn.

□

RCM CONTEST THE UBIQUITOUS PULL RING

**Prizes For The Largest Number Of
Uses Of Pop-Top Pull Rings As
Related To R/C Modeling.**

USES CAN BE:

- In The Shop
- In The Model
- In The Field



SEND YOUR LIST IMMEDIATELY!!

All entries must be received at RCM no later than December 1, 1978. Winners will be announced in the February, 1979 issue of RCM.

- 1ST PRIZE K & B .40 engine
2ND PRIZE 1 year subscription to RCM
3RD PRIZE 2 plans of your choice
from RCM Plan Service
4TH & 5TH PRIZES ... 1 plan of your choice
from RCM Plan Service

Judges Decisions Will Be Final
No Entries Will Be Returned
Void In States Where Prohibited By Law



This 1/2A version of the ever popular .19 powered RCM Basic Trainer was a logical answer for a desirable trainer for anyone wanting to start with the smaller models. This rugged model can withstand the abuse of both rough fields and beginners mistakes while providing the novice with stable and forgiving flight characteristics and the ability to perform well with the varying power outputs of the assorted small engines currently available.

RCM 1/2A BASIC TRAINER

By Dick Tichenor

One of the most popular R/C trainers that RCM has ever published was the .19 powered RCM Basic Trainer presented in our Flight Training Course, Vol. I. Thousands of modelers have enjoyed that easy to build and easy to fly little bird.

A 1/2A version of that design seemed to be the logical answer for a desirable trainer to assist anyone wishing to start with the smaller models. To properly perform its mission, the flight characteristics should be stable and forgiving. It should be tough enough to endure the abuse of a beginner's mistakes, but the weight should be kept as low as practical. Ample wing area

must be provided with a high lift airfoil to allow safe performance at lower flying speeds. Also, it must be able to fly well with the varying power outputs of the assorted small engines that are available.

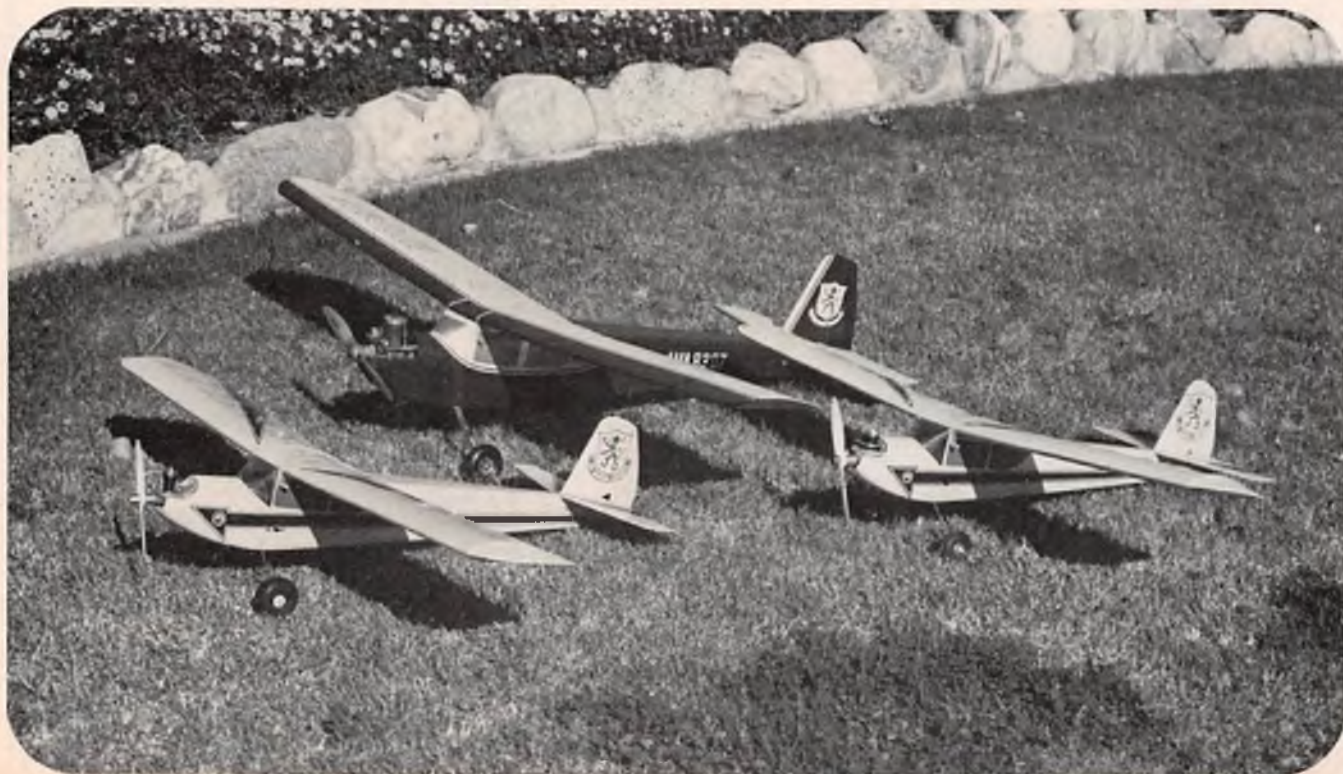
When considering all of the above requirements, the natural reaction would be to forget it. Well, some of us are slightly hard-headed and the project became a challenge. Two models, identical except for engine mounting provisions, were built at the same time. Following the family portrait photos (yes, the original .19 powered RCM Basic Trainer is still alive and healthy), came the moment of truth, the flight testing.

What do you say when Murphy's Law

strikes in reverse and everything you were attempting came out better than expected? Such was the flight testing of the RCM 1/2A Basic Trainer. We have not found any undesirable characteristics in either the flying or the durability of this aircraft.

One model was set up for a Cox .09 Medallion with a Cox muffler and mounted on a Tatone beam mount with a one ounce round Sullivan Fuel tank inside the fuselage. The other prototype used the .049 Medallion on a Tatone tank mount. It was also flown with the .049 Baby Bee and .049 Golden Bee reed valve engines. We even used the Davis Diesel conversion head on the .049 Medallion for a few flights. We did

The family portrait, the original .19 powered RCM Basic Trainer stands behind a pair of 1/2A Basic Trainers.





RCM 1/2A BASIC TRAINER

Designed By : Dick Tichenor

not bother with tachometers or any type of data gathering instruments; we were just having fun flying the birds. We didn't even record the prop sizes. As a result, we only have opinions as to how they flew. The different combinations all flew pretty much the same . . . same airspeed, same rate of climb and same maneuverability.

It must be noted that even Don Dewey flew them and was happy with them. Mr Dewey has a sadistic streak when it concerns the latest creation by one of his staff members; he delights in trying to destroy the model with wild airborne gyrations. We are proud to say that the RCM 1/2A Basic Trainer came through the Dewey torture test unscathed. To sum it up, we consider this design to be a great little airplane for both the beginner and the sport flyer.

CONSTRUCTION

Some of us do not like to build wings so we build the wings first and then go on to the good stuff. After you have cut out the ribs, notch the trailing edge for the ribs. Now, cover the plans with plastic food wrap, position the spars and trailing edge in their respective places, and slip the ribs into their proper locations. Note the slight angle between the center ribs for dihedral as shown in the photo. If you have made snug fitting notches, you can secure the ribs with instant glue (Jet, Zap, Hot Stuff, etc.). If not, get out your tube of butyrate cement. It takes only a few seconds to attach the 3/16" square leading edges.

With a Zona saw, or X-Acto, cut the two wing panels apart between the center ribs. Cut the center ribs to accept the 1/16" plywood spar braces. With one panel laying flat on the building board, block up the opposite wing tip 1 3/4" and

TYPE AIRCRAFT

1/2A Sport Trainer

WINGSPAN

38 3/8 Inches

WING CHORD

6 Inches

TOTAL WING AREA

224 Square Inches

WING LOCATION

High Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

7/8 Inches

OVERALL FUSELAGE LENGTH

28 3/4 Inches

RADIO COMPARTMENT AREA

(L) 8 1/2" x (W) 2" x (H) 3"

STABILIZER SPAN

13 3/8 Inches

STABILIZER CHORD (incl. elev.)

3 3/4" (Avg.)

STABILIZER AREA

54 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

4 1/2 Inches

VERTICAL FIN WIDTH (incl. rudder)

4 1/4" (Avg.)

REC. ENGINE SIZE

.049 Cubic Inch

FUEL TANK SIZE

Tank Mount

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

2 (3 with throttle)

CONTROL FUNCTIONS

Rud., Elev., (Throt. opt.)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa and Ply

Wing Balsa and Ply

Empennage Balsa

Wt. Ready-To-Fly 19.5 Ounces

Wing Loading 12.2 Oz/Sq. Ft.

epoxy the spar braces in position. Spring type clothespins are handy for clamping the parts together while the glue dries. Next, apply the 1/16" sheeting to the bottom surface, then apply the upper sheeting. A thin film of epoxy spread across the center sheeting joint (about 1/2" on each side) will provide ample reinforcement in that area.

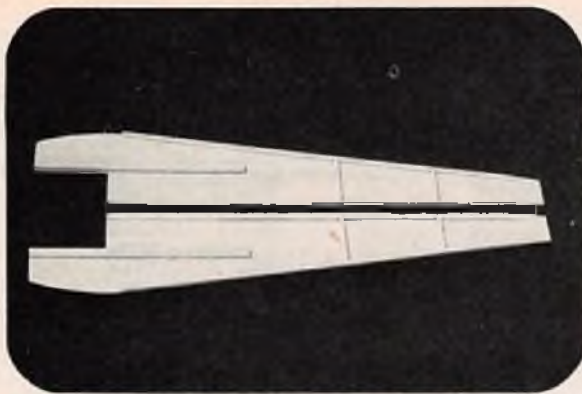
The wing tips are glued across the tip ribs and are aligned with the center of the leading edge and the bottom of the trailing edge. Sand out any unevenness with medium grit sandpaper and finish sand the entire wing with fine sandpaper.

Select two medium weight 3/32" x 4" balsa sheets for the fuselage sides. Cut out sides per plans and assemble longerons, uprights, and 3/16" x 3/8" strips. Be sure to make a left and a right side.

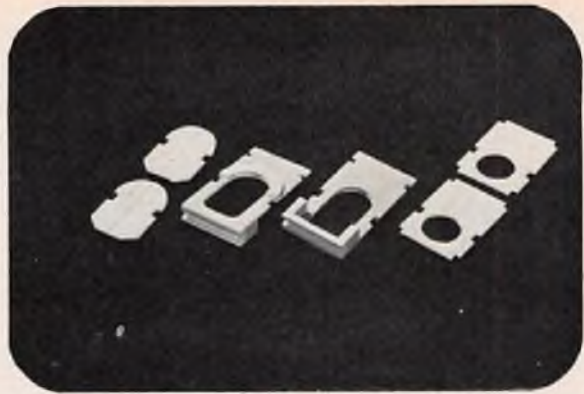
After cutting out the 1/8" ply bulkheads, assemble the landing gear mounting parts and former F1A to bulkhead F2. Glue F2 and F3 to one fuselage side making sure they are square to the side. When dry, glue the other side into position. Next, the aft end is glued together. Then pull the front end together and epoxy the firewall (F1) in place. Make sure the firewall is positioned as shown on the plans. Fit and install the 1/2" triangular pieces in the bottom of the nose. The remaining sheeting can now be attached. Final fuselage detailing and shaping can now be finished as shown.

The tail surfaces are cut from soft 3/32" sheet and the elevators are assembled with the 3/32" ply joiner. Sand the flat surfaces smooth and sand a radius on all edges using fine grit

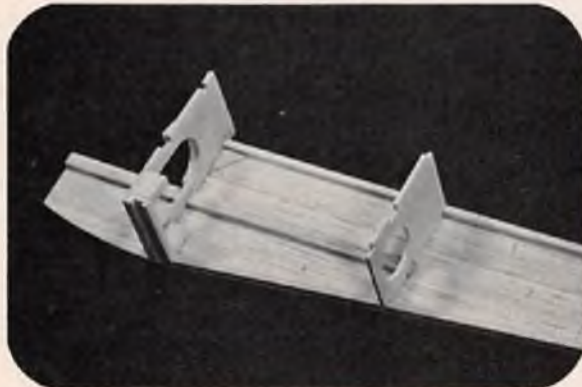
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First assembly for fuselage. Note left and right hand sides.



Fuselage 1/8" plywood bulkheads with landing gear mount assembled on F2. Two ship sets shown.



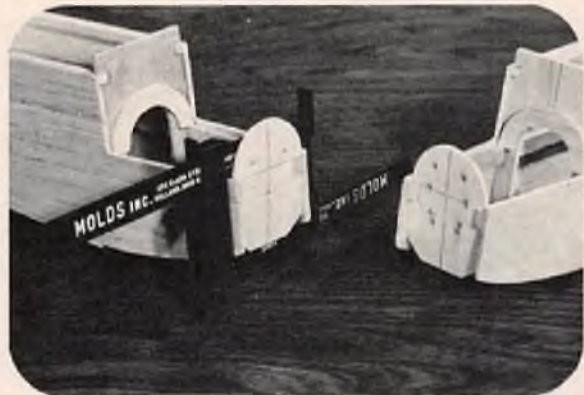
Bulkheads installed on R.H. side panel.



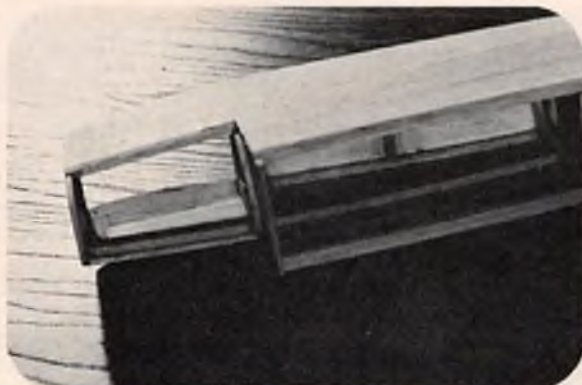
Left panel clamped in position while epoxy sets.



Aft end is glued together.



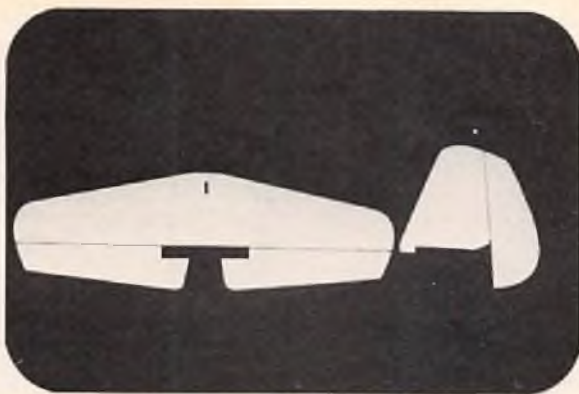
Engine mount bulkhead is clamped in place. Make certain that proper right and down thrust provisions are made. Surplus edges are sanded flush after epoxy sets.



Bottom nose triangular stock is shown fitted into position.



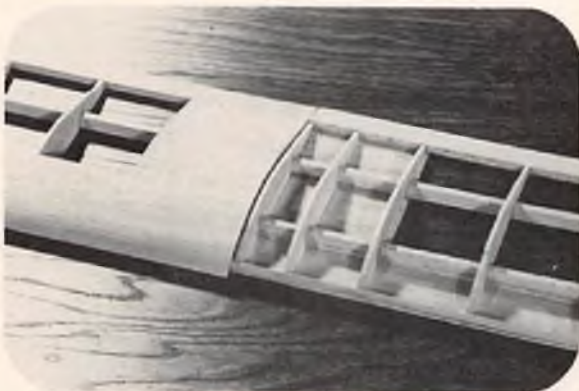
Top nose sheeting is water soaked and formed around a can to dry. Trim to fit and install when dry.



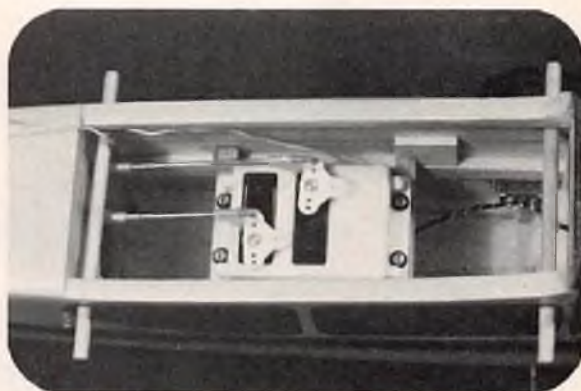
Tail surfaces are cut from soft 3/32" sheet balsa.



Note angle on center ribs in first wing assembly sequence.



Sheeting installation sequence shown.



Cannon Tiny Twin Block installation. Locate servo mounting rails to suit servos of your choice.



Striping tape trim details.



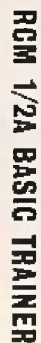
Cox .049 Medallion shown on left aircraft and .09 Medallion with muffler on right.



The old Don Dewey launching trick.



Dewey claims airplane eating tree always moves out to his landing approach.



RCM PRODUCT TEST

Model Rectifier Corp. ELECTRA-FLI



The MRC Electra Fli is the ideal airplane where noise restrictions prevent flying internal combustion engines. This airplane can be flown in parking lots or school ground with no one inside the buildings even being aware of the flight. As shown in the photograph, the kit comes complete with all necessary equipment minus the radio. This includes landing gear, wheels, pushrods which are already installed, control horns, prop, spinner, micro-switch, charging jack for battery pack, rubber bands and decal sheets. The hinges are installed along with the electric motor. There is very little time required to get airborne with the Electra-Fli.

On our prototype we would recommend one slight modification. We installed 1/16" ply plates on the inside of the fuselage at the front wing dowels. This adds sufficient strength to keep the power from tearing loose over a period of time.

We have been able to get 4 minute flights on a battery charge of 8 minutes. This time has been when the outside temperature has been 85 plus degrees. We feel that as the weather cools and the air gets denser, that even longer flights are possible due to the better lift and higher altitudes. The glide is good and with sufficient altitude, the glide time would be equal to or longer than the engine run.

The Electra-Fli can loop and do barrel rolls with ease. The loops must start from a slight dive to build speed.

The instructions say that the motor will turn 8500 rpm's. In checking with a thumb tach, we had a reading of 9800 rpm's. This should increase in the air as the motor unloads.

When the engine quits, you should go to the off position on your throttle control of your transmitter if you are using 3 channels. This will let the batteries build up slightly and you can get about 5 seconds of engine run if you need it on final approach to make the field.

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IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging			●			Pre-Shaped Parts	●				
Plans			NA			Parts Match to Plans			NA		
Written Instructions		●				Overall Parts Fit	●				
Quality of Hardwood		●				Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		●				Flight Performance		●			
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

SPECIFICATIONS

Name	ELECTRA-FLI
Aircraft Type	Electric Trainer
Manufactured By	Model Rectifier Corp. 2500 Woodbridge Ave. Edison, New Jersey 08817
Mfg. Suggested Retail Price	\$189.95
Available From	Both Mfg. & Retail
Mfg. Recommended Usage	General Sport
Wing Span	48½ Inches
Wing Chord	8½ Inches
Total Wing Area	414 Square Inches
Fuselage Length	30½ Inches
Radio Compartment Dimensions	(L) 8" x (W) 2" x (H) 3"
Wing Location	High Wing
Airfoil	Semi-Symmetrical
Wing Planform	Swept T.E.
Dihedral (each tip)	2 Inches
Stabilizer Span	19 Inches
Stabilizer Chord (incl. elev.)	5¼ Inches
Total Stab Area	109 Square Inches
Stab Airfoil Section	Semi-Symmetrical
Stabilizer Location	Mid-Fuselage
Vertical Fin Height	6 Inches
Vertical Fin Width (incl. rud.)	4 Inches
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Landing Gear	Conventional
Recommended No. Of Channels	3
Recommended Control Functions	Rud., Elev., Electric motor off-on
Basic Materials Used In Construction:	
Fuselage	Foam and Ply
Wing	Foam
Tail Surfaces	Foam
Hardware Included In Kit	See text
Plan Size	NA
Building Instructions on Plan Sheets	NA
Instruction Manual	Yes (18 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts (Foam)
Mfg. Rec. Flying Weight	Not Given
Wing loading based on rec. flying wt.	Not Given

RCM PROTOTYPE

Weight, Ready To Fly	46 Ounces
Wing Loading	16 Oz./Sq. Ft.
Covering & finishing materials used	Decal sheets
Engine Make & Disp.	Electric
Muffler Used	NA
Radio Used	Cox Sanwa
Tank Size Used	NA

THE 1978 INDY UNLIMITED



By Mary Woodard

The winners: L to R bottom, Len Skwieria 1st, Connie Cupit 3rd, Jim Fellers 4th, Mike Bryan 5th, Top row: Don Bilsky 6th, Dee Hughey 7th, Rip Holdridge 8th, Randy Vitek 9th, and Leroy Peterson 10th. Missing was Jim Saunders, 2nd Place.

NAME	HULL	ENGINE	RADIO	PRIZE
1. L. Skwieria	Crapshooter	OPS 60	Futaba	OPS 60 ABC engine
2. R. Saunders	Wardcraft	OPS 60	Futaba	Rossi 65 ABC engine
3. C. Cupit	Crapshooter	K & B 3.5 cc	Futaba	Competition 40 Crapshooter kit
4. J. Fellers	Orig. Design	Veco 61	Citizenship	Futaba Radio 2 ch.
5. M. Bryan	Crapshooter	OPS 60	Futaba	Futaba Radio 2 ch.
6. D. Bilsky	Crapshooter	2-K & B 6.5 cc	Futaba	Sherline lathe
7. D. Hughey	Crapshooter	K & B 6.5 cc	Futaba	OPS 40 ABC engine
8. R. Holdridge	Wardcraft	OPS 60	Futaba	Hughey 21 Rigger kit
9. R. Vitek	Wing Ding	OPS 60	Proline	Robyn 40 ch. C.B.
10. L. Peterson	Wing Ding	OPS 60	MRC 700	Dial-A-Prop kit

The most unique model boating event in the world is held annually in Indianapolis, Indiana, on the first weekend in June. This year the sixth "Indy Unlimited" was run; a gala affair for enthusiasts nation-wide.

Years ago the Indy Model Boat Club came up with the revelation that a contest should be held and the entry could be any radio controlled water prop driven model boat that the contestant felt would outrun the entire field. Thus the "Unlimited" or "Run What You Brung."

Contestants from as far away as Florida, Louisiana, Texas, California, and Canada, flock to this event yearly to

bid for a portion of the largest prize list of any event world-wide on an amateur basis in R/C modeling. The IMBC offered over \$5,500 in prizes, including radios, lathes, engines, boat kits, fuel, and glow plugs, plus all types of usable accessories for the hobby. The bulk of the prizes are bought with the entry fees, but we must thank those manufacturers, distributors, and retailers who so graciously donated several wonderful prizes to enhance the list.

Due to the magnitude of the event, only fifteen entries per legal frequency are accepted by pre-registration. This allows for only 125 or so entries and guarantees 5 rounds with 6 laps of the

most furious boats per heat racing seen anywhere.

Hull selection is interesting if you poll the entries; everything from outboard powered tunnel hulls powered by 3.5 cc K & B engines to 54" long twin screw, twin engined hydros. Several Deep Vee hulls have placed as high as second place overall by being consistent, as well as possessing the ability to run in lane 1 at 55 to 60 mph all day.

The entry list included all but two of the present 80 mph patch holders plus five national champions and eight world record holders.

At the end of Saturday's racing, which included 50 heats and three complete rounds with nearly 400 boats running, the IMBC offered its usual free weiner roast to the contestants and their families. Over 350 hot dogs, 20 gallons of Brew, bags of chips, and gallons of baked beans were provided to all.

The Octura Wind Ding has been King here in the past, was losing ground as the Crapshooter outriggers dominated the top 20 places this year (several with the new "Trick" anhedral front sponsors). Another hull that is always tough is the Wardcraft Formular V Deep Vee. OPS 60 engines generally control the higher places, although there were nearly an equal amount of K & B 6.5's in the top 20. One real surprise was a Competition 20 series Crapshooter powered by a K & B 3.5 cc engine, which finished 3rd overall. This "Trick" hull was undefeated in 5 rounds and out-ran twins, 60 and 40 powered hydros all day. The driver was the highest finishing junior ever at the Indy Unlimited — Connie Cupit from New Orleans, Louisiana. The only reason he didn't tie for first place is that he cut 4 buoys at a penalty of 50 points per buoy or 200 less than perfect.

The winner for 1978 was Len Skwieria, the current IMPBA, President. Its been a long dry spell for Len, so we all shared in his victory. He scored zero points in 1977, and won the "Fickle Finger of Fate." This award is given to the boat club member with the poorest showing

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Highest finishing twin of 9 entered belonged to Don Bilsky. K & B 6.5 engines drove two 1465 props. The hull was recently clocked at 79 mph. The hull "Big Foot" to the right is a Jack Bucknell design driven by Chicago's Marianne Pruesse.



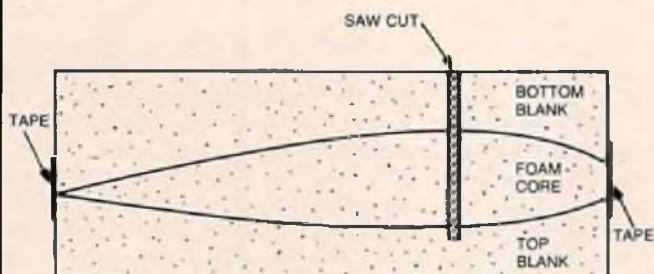
One of the many ultra fast Crapshooters that dominated this year's classic event. OPS 60 powered driving an Octura blade. This set up is good for near 65 mph. With an Octura 2.8 prop they pushed 80 mph.

A BETTER WAY

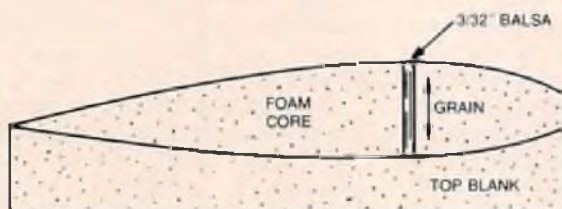
By David L. Peltz

"I-Beam" spars are very strong and desirable in R/C sailplane wings, especially those built using foam cores. Here is a step-by-step method for easily building them into the foam cores:

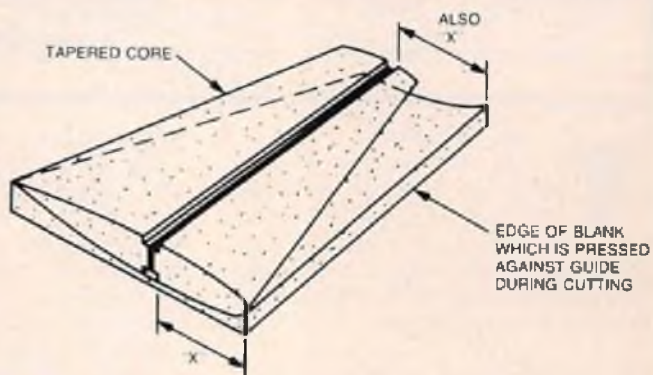
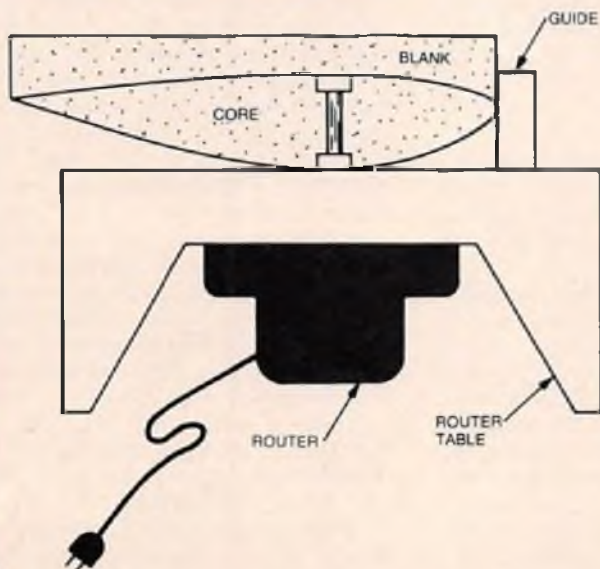
(1) Tape core to blank and cut a slot clear through core using a thin ($3/32$ ") thickness circular saw blade (Sears "Thin-Rim Satin Veneer Blade" for example).



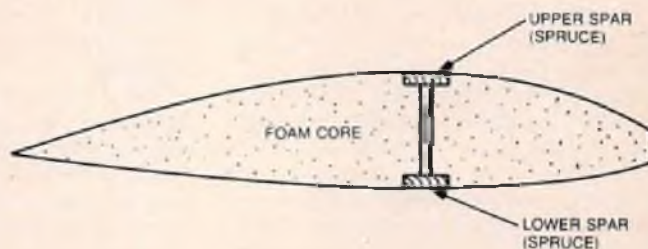
(2) Install $3/32$ " vertical grain shear webbing along entire length of core: use Wilhold or other aliphatic resin type glue.



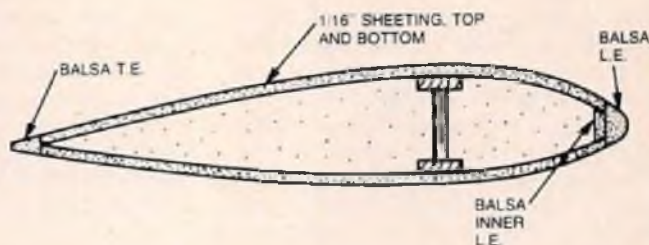
(3) Mount router on router table and cut slots on top and bottom of core. Width of slot equals width of spar ($1/4$ " - $3/4$ "). Depth of slot equals depth of spar (usually $1/8$ "). **Note:** On tapered cores, tape core to blank in a manner which keeps the slot position equally distant from the edge of the blank which is pressed against the guide during cutting.



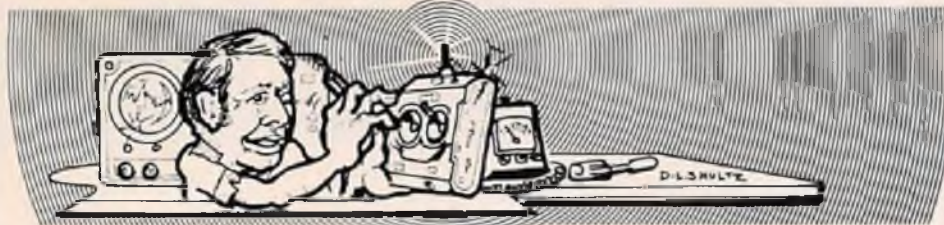
(4) Glue in spars with Wilhold or other aliphatic resin type glue. **Note:** Place core back into blanks while glue is drying.



(5) Cover core in usual manner (sketch shows method successfully used on 14' wings — $1/16$ " balsa sheeting).



(6) Now — try to bend the wing - - - it probably can be used as a surfboard. □



RF CIRCUITS

The article we did on RF Amplifier Circuits a few months ago brought a few comments from both ends of the spectrum. First we'll start with bad news. The following is an excerpt from a letter that contained a number of other subjects:

What percentage of RCM readers and other modelers understand electronics sufficiently well to design and build their own electronic devices? I would expect an even smaller percentage could understand RF circuits employing semiconductors as the active elements per Mr. Oddino's article starting on page 82 of the August, 1978 issue of RCM. Just imagine the interference and off frequency signals with the resultant potential loss of R/C craft if experimentors with insufficient education and experience start playing with the RF circuits and portions of R/C transmitters! The sad part would be that the R/C planes that fly off or crash would not be theirs, but others with whom they interfered.

T.J. Maxey
Los Angeles

As I mentioned in August, the article was written for the minority and I didn't expect many readers to even bother with it. It surely was not intended to motivate anyone to go out and design their own RF section based on the information printed. When auto magazines describe the fine points of the latest Formula 1 racers, they don't expect to have anyone design a car and hit the Grand Prix circuit, based on information in a magazine article. And yet the few people who will someday try Grand Prix racing are probably reading everything they can get their hands on right now. I believe the same thing is happening in R/C. The people who will replace the Jerry Pullens, Don Matheses, Doug Sprengs, Jim Fosgates, etc., may just be getting into R/C and starting to think about a "better mousetrap." Many youngsters are discouraged very early in life because some adult told them about all the difficulties associated with reaching their goals. My intent in the August issue was to show that RF circuits are not all that mysterious and someone who wants to dedicate himself to building a better R/C system, should

not give up because of the RF design. If you get to a good technical library and do a lot of digging, and then spend a lot of time in the lab with some good instrumentation, you, too, could build your own RF section and be assured that it will be on frequency and will not interfere with anyone else.

While the number of people with this ambition is admittedly small compared to the numbers that read RCM, I'd bet that there are literally hundreds in various stages of trying to build a better R/C system. Maybe a magazine article will trigger some young guy to go to MIT and get "sufficient education and experience" to design and produce a better system for the benefit of all modelers.

One could argue that most of the pioneers of R/C did not have sufficient education and experience when they started. I bet most of them would have got there faster if they had the benefit of an article like the one we published. I managed to get FCC type acceptance on a transmitter back in 1971 after a lot of hard work. If I had the August issue of RCM when I was working on the transmitter, I could have saved a lot of time and effort.

So, take it for what it is worth. If you're interested, hopefully it will tie some loose ends together or trigger some questions that will lead to an improved design. Who knows, maybe someone has a better way right now and would be willing to share it with the rest of us. If we never talk about these things, how are we ever going to improve?

Dear Mr. Jim Oddino,

I was very pleased, that you explained in simple and understandable manner the basics of designing RF circuits. Let's give the minority also some bread!

Regarding the described subject, I would have a silly question: how to boost the existing RF output stage especially done in a simple way adding or paralleling the output transistor. What could we expect if the output stage will not be modified for matching, just tuning will be provided. Please consider this question in larger aspect, because different systems work at 100 mW level or less, like auto alarm, garage opener, soaring indicator, data transmission from airplane to ground, etc., and

boosting would be helpful.

I am wondering, if you would like to bite into this subject.

G. Korbell
Mentor, Ohio

I guess this is what Mr. Maxey was worried about, and I sure don't want to bite into it. I definitely recommend that you do not try to modify your existing transmitter to try to get more power. I won't say that it can't be done, but you are asking for a lot of trouble. It reminds me of an old routine Bob and Ray used to do on radio. The theme was making your own light bulbs. If you wanted to bad enough you could build your own light bulb, but it makes more sense to buy what you want. If your transmitter puts out inadequate power, I would suggest buying one that is adequate. Also, keep in mind that modifying transmitters that have been type accepted by the FCC is illegal.

However, let's assume you are a ham and your equipment is on 6 meters and you have access to some test equipment. Generally speaking, changing the output transistor or paralleling it will not give much improvement in power providing the original one was adequate to handle the power the circuit was designed for. As we pointed out in August, the power is a function of the supply voltage and the load on the transistor, and the load is provided by the matching network. Therefore, the matching network will have to be modified. The next problem might be a lack of drive. If you solve all those problems, you still have to worry about spurious outputs which can be caused by physical construction. To be sure everything is working right, you really need a spectrum analyzer and a frequency counter.

The bottom line is pretty clear. Buy a product from someone who can spread these engineering costs over many sales, unless you want to do it just for the joy of doing something for yourself. After all, that's what modeling used to be, and to some degree still is. So, if making RF circuits is your bag, have at it. Somebody out there got a Class F amplifier working on six meters?

SERVOS

Last May I got a most interesting letter from a fellow in Scotland whose club was going to build about 120 servos. He asked a lot of questions about the

integrated circuits and mechanics available and my recommendations. Unfortunately the letter got lost in my mess of correspondence, but being a persistent type, he wrote again in August. His questions are a little different this time and I think should be most interesting to everyone.

Dear Jim,

I am a home builder of R/C gear here in Scotland, and enjoy your 'Radio Spectrum' column very much, and have written to you before. I have some questions which may be general enough interest for you to answer in your column. First, regarding servo pots:

(1) A few years ago plastic film pot elements were much heralded for use in servos giving longer life and greater reliability than ceramic. I now believe that most manufacturers have reverted to ceramic as plastic film does not stand up under conditions of vibration. What is the current position, and what is the most reliable pot element available at reasonable cost?

(2) Linearity is another problem with pot elements. A pot can have a $\pm 5\%$ linearity specified but this is over the whole track length of 270° rotation. This becomes $\pm 15\%$ over our 90° rotation. It appears that pot manufacturers are just not interested in selecting pots for linearity. Can you suggest a simple rig to check linearity?

(3) Are different wiper assemblies & materials required for plastic film and ceramic pots?

(4) What wiper contact pressures are recommended for plastic film and ceramic, and how can these be easily set?

(5) Are lubricants necessary for the pot tracks? If so, what?

(6) What is the Giezendanner Wiper and why is it an improvement?

(7) Can you give advice on the method and frequency of pot maintenance?

My other questions relate to servo motors and are as follows:

(1) With the exception of batteries, servo motors are my biggest reliability worry and you have said very little about them (as yet) in your column. For years I have been using 20mm Mitsumi motors which have been extremely reliable when occasionally stripped and the commutators cleaned. I notice that the current 16mm motors are sealed and are not easily opened for servicing. Is there any method of obtaining an early warning of motor trouble?

(2) What kind of life should be expected from a motor before routine replacement? I know this is a difficult one.

(3) Is any maintenance possible on these sealed motors, apart from oiling the bearings?

(4) How do you approach the

problem of motor reliability?

(5) Can more money buy better motors? If so what are they?

I have one other question regarding servo amps. I notice that a Kraft KPS 14II servo draws no less than 25 ma at idle, when the amps, I am building, draw 6 or 7 ma at idle. Is there any special reason for this high drain which becomes appreciable when using say six servos plus a receiver?

I trust the above may be material for your column.

Yours sincerely,

Alan G. Hood

Scotland

Sorry I didn't answer your first letter in May, Alan, but you should have the answer by the time you read this. Your questions are excellent. One of the reasons I haven't discussed these items too much, is the fact I'm not sure I have the answers. However, let me try and, hopefully, we will get some additional answers from readers if I stray too far from reality. I know that all the big R/C manufacturers have probably performed a lot more systematic and organized tests on such things as pots and motors than I have, but I have seen some of them come out with new equipment that was obviously never evaluated very thoroughly. A good example was the Cermet pots that were advertised as the answer to a modelers dream. In about twenty minutes you could see a build up of brass from the wiper on the Cermet element. It would eventually wear a hole right through the wiper. Some people tried new wipers but I think eventually they all gave up on Cermet. Conductive plastic was the next "breakthrough" and I'm not sure the verdict is in yet.

I've been using conductive plastic pots for some time now with good success. However, I've never had a lot of pot problems, a fact which I've always attributed to the EK servo mechanics with the decoupled (through gears) feedback pot.

If you've been reading this column, you know I've been spouting this for years. I notice that many manufacturers are now incorporating this principle. You will get a little more backlash but to me it is tolerable. By gearing the pot there is another improvement. The pot can go 180° instead of 90° , thereby reducing the linearity problems discussed in question 2. But first, let me answer the first question.

Question 1: I use and recommend either the Clarostat conductive plastic or CTS carbon pots in servo mechanics with decoupled pots. I believe the plastic will require less cleaning and would probably lean towards them. However, I have seen some signs of the plastic pots being damaged by vibration as Mr. Hood suggests. This is evidenced by a slight indentation in the element right at neutral. Therefore, in a conventional

servo with the pot wiper connected directly to the output shaft, I would be inclined to use the CTS carbon pot. I have not run plastic pots in this type servo so I really can't say how well they would hold up.

Question 2: Linearity is a problem even with the 180° pot rotation. In fact, on the EK mechanics with the dual racks, it becomes more apparent because it is so easy to visually measure how close the rack comes to the end of the travel. Inconsistent feedback pots cause both linearity and travel problems and I'm sure most R/C manufacturers throw away a significant number of pots because of these problems. Pot linearity can be checked if you've got a protractor and an accurate ohmmeter or voltmeter. The best way would be to construct a large protractor on cardboard, place the pot centerline at the origin and put a long pointer on the pot shaft. See Figure 1. Measure the pot resistance vs. shaft angle and plot the data which should result in a straight line as shown in Figure 2.

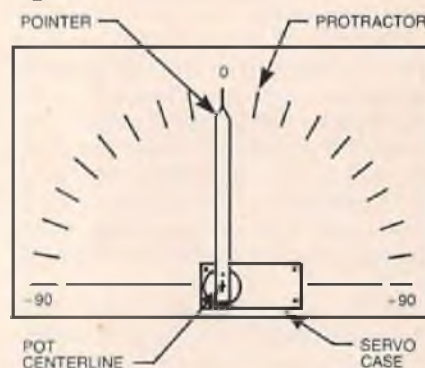


FIGURE 1

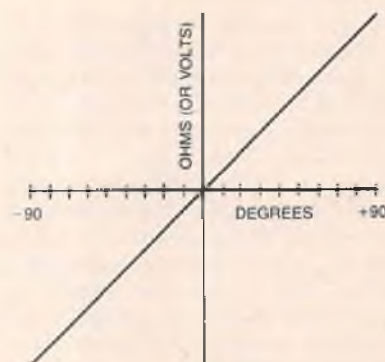


FIGURE 2

You can use a voltmeter if you put a fixed, constant voltage across the entire pot.

Rather than set some acceptance criteria, I would be inclined to go through a batch and select the best ones for aileron and elevator. Things like throttle, mixture, flaps, etc., don't really need great linearity, one thing that I have seen and to me is intolerable is an actual change in polarity of the slope. That is, with an increasing angle causing an increasing resistance, the resistance actually started decreasing at one spot

before continuing up. This could drive you crazy when trying to fly precisely.

Question 3: Different wipers are used with the conductive plastic and is the main reason I haven't run these in rotary servos. I don't have a wiper holder that fits in these mechanics.

Question 4: I must admit that I set the wiper pressure by setting the angle of the wiper. The pressure is, of course, a function of the materials and clearances. My experience indicates this is not critical but I'd be interested to hear what others have to say about it.

Question 5: I'd recommend some lubricant, but very, very little. We've used some supplied by Clarostat and we've used products like Lubriplate. Quite often there is enough oil on your finger tips to do the job. Once again, I don't feel that it is critical.

Question 6: Bruno Giezendanner came up with a wiper with a carbon point instead of the normal metal wipers. I have no experience with them, but many people feel the single point contact is an improvement. Again, I would like to hear from some users.

Question 7: Pots normally degrade very slowly and do not cause catastrophic problems. Therefore, you can eyeball servo performance and perform maintenance when required. My experience indicates that after about 200 flights (which is a long time for me), you should open up the servos, clean the pots and gears, and inspect all the wiring.

As you can tell, I haven't had much in the way of pot problems and, therefore, I'm afraid I haven't learned very much. So, if anyone has some better answers, get them in here.

On the subject of servo motors, I would say they are the biggest reliability worry, including batteries. Batteries can be tested, but I don't know of any way to get an early warning of an impending motor failure. I have noticed that some lose torque before quitting and maybe periodic measurement might give one a clue. I don't know what kind of life to expect but I know the military has trouble getting 1000 hours in a much less severe environment. I would like to see everyone keeping log books and compiling reliability data but most people fly R/C for relaxation and don't want to work at it. I have never had any luck trying to tear servo motors down for maintenance. Now that the prices are climbing it would probably be a good time to learn. This would make a good article by itself if anyone has some proven techniques.

Luckily the Mitsumi and other Japanese motors have been pretty reliable, but I still think this is the weak link in the system. My approach is to periodically change them whether they need it or not.

In his previous letter, Mr. Hood asked a number of questions on servo IC's. He

felt the SRC 419P made by Ferranti was superior. I was aware of this circuit, but have never played with it. He asked if the NE 544 was repeatable and if it offered any advantages. Signetics had some problems early but the last batch really looks good. I feel the linear ramp is an advantage in the servo just as it is in the encoder. I also like the fact I don't have to put a tantalum capacitor across the motor. I have seen these fail and take out a whole system.

The high current is a drawback to the Kraft IC but the Kraft is probably the most consistent servo IC I have seen. The current is tolerable if you keep an eye on your batteries.

HEATHKIT PROBLEMS?

Jim Oddino:

Mr. Oddino, I would like to ask a few questions about my Heath receiver model 1205-2. It has the modular unit to change frequencies. I have four receivers and modules.

The problem is this. At times, with my receiver and transmitter on, say 72.080 and someone turns on a transmitter on another frequency within 10 to 12 feet of my unit, it may cause mine to chatter or go completely crazy and the motor control will go to full throttle. A bad situation with just a few people around, worse in a crowd.

Now Heath came out with a capacitor to go across T-1 in the module to help prevent this. I was told over the phone that it would reduce the effect to about three feet. I put the capacitors across all my modules and it did help. But lately, it's been happening again. Not always, but at times. At first I thought 72.080 and 72.320 would react to 72.960 more than the other frequencies, but I had 75.640 hit my 72.320 at about ten feet.

Now Heath tells me it's normal for a receiver to act this way at less than 12 feet. So far, in two years at two fields with Kraft, EK, Pro-Line, etc., I have yet to see another one do this.

I have enclosed a schematic of the receiver. If you can help me with this, I would be grateful.

*Thanks,
D.G. Caskey
Charlotte, N.C.*

The problem described is one that has haunted all R/C manufacturers at one time or another. We are asking our small, lightweight, inexpensive receiver to be very sensitive on one hand so that it works at long range and also to be able to handle very strong signals. I remember having a Bonner system back in the sixties that had exactly the problem as described above. They were able to fix it but I don't know what they did.

Jim Fosgate at Pro-Line went to great extremes to solve this problem. He added a "front end AGC" which effectively desensitizes the receiver

when it is receiving strong signals. This takes considerable circuitry to accomplish but in my opinion, works very well. Pro-Line receivers are probably the best available from this standpoint. I suspect that receivers with RF amplifiers such as Pro-Line and Heathkit are more prone to having this problem because the incoming signals are amplified before going to the mixer. My observations are that receivers with ceramic IF filters are also more subject to the problem. Modular type receivers normally have slightly wider passbands to account for crystal tolerances, but what is really noticeable is how the bandwidth increases when very strong signals are applied. You need to run what is called a two tone dynamic range test to really evaluate this performance parameter of a receiver and this is beyond the normal testing done by most R/C manufacturers. In previous articles we've discussed how distortion in an amplifier will cause outputs not only at the desired frequency, but also at $2f_1 - f_2$ and $2f_2 - f_1$, when two strong signals are received. In essence the two tone dynamic range test, measures how strong the two incoming signals can be before intermodulation distortion causes unwanted outputs over the threshold of the receiver. If you were going to market a new system you would probably want to run these tests on a receiver you know works in the field and then make sure your receiver is at least that good. However, if you have a receiver that doesn't work in the field testing, it isn't going to help unless you suspect that it is not typical of the design.

From a practical standpoint, I would try to find out if the problem is inherent in the design, or is it perhaps a function of how you routed wires or located components. If other guys with the same model are not having problems, look for some construction differences because I doubt that you would have got four kits that all had components that could cause this problem if the other guys didn't get any. If all your buddies are having similar problems, I would be tempted to add some RF bypass capacitors (.001 μ f) to the AGC line in the RF module just to make sure you are not picking up signals there. (This may be what you have done already. I can't tell where the capacitor was added.) Another thing that has been known to cause this sort of problem is excessive wiring. Long servo or battery/switch harnesses can add to the problem. If you have extensions you may need RF chokes in the leads.

I put a question mark on the heading because I'm not sure you have a unique problem that is solveable without re-designing the receiver. Hopefully, there is something unique about your particular receivers or installation that can be changed to solve the problem.

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RCM PRODUCT TEST

**Champion Model Mfg.
BUCKEYE**



The Buckeye is a 3-channel power trainer manufactured by Champion Model Mfg., P.O. Box 204, Cortland, Ohio 44410. The wing span is 49", chord 9½" and a wing area of 450 square inches. The kit is of conventional balsa construction except for the foam ribs. The foam ribs are about 3/8" thick which helps to keep the ribs perpendicular when building the wing. The hardware in the kit is quite complete in that it includes the pre-formed landing gear (tricycle), control horns, and screws, nylon clevises, plastic pushrod keepers, pushrods for rudder, elevator, throttle and nose gear steering, mounting bolts with blind nuts, and threaded pushrod wires. It's a welcome change to have all the little "goodies" in a kit.

The Buckeye is very simple in construction and easy to build. The fuselage has plenty of room for radio gear.

The prototype was covered with orange MonoKote on the wing and tail surfaces and white MonoKote on the fuselage. MonoKote trim was used for the trim. Power was an O.S. .35 and a Heathkit was utilized for rudder, elevator and throttle controls.

In conclusion, the Buckeye is an excellent first airplane. The plane will loop, spin and fly inverted. With the tricycle landing gear, ground handling will be no problem for the beginner. □

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	■					Pre-Shaped Parts		●			
Plans		■				Parts Match to Plans		●			
Written Instructions		●				Overall Parts Fit		●			
Quality of Hardwood		●				Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		■				Flight Performance		●			
Accessories	■					Overall Appeal		●			
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

SPECIFICATIONS

Name	BUCKEYE
Aircraft Type	Power Trainer
Manufactured By	Champion Model Mfg. P.O. Box 204 Cortland, Ohio 44410
Mfg. Suggested Retail Price	\$39.95
Available From	Both Mfg. & Retail
Mfg. Recommended Usage	Basic Powered Trainer
Wing Span	49 Inches
Wing Chord	9½ Inches
Total Wing Area	450 Square Inches
Fuselage Length	36 Inches
Radio Compartment Dimensions	(L) 9½" x (W) 3" x (H) 4½"
Wing Location	High Wing
Airfoil	Flat Bottom
Wing Planform	Constant Chord
Dihedral	3½ Inches
Stabilizer Span	19 Inches
Stabilizer Chord (incl. elev.)	4¼ Inches
Total Stab Area	90¼ Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Mid-Fuselage
Vertical Fin Height	5½ Inches
Vertical Fin Width (incl. rud.)	5 Inches
Mfg. Rec. Engine Range	.25-.46 (w/floats)
Recommended Fuel Tank Size	4-6 Ounce
Landing Gear	Tricycle
Rec. Number of Channels	3
Recommended Control Functions	Rud., Elev., Throt.

Basic Materials Used in Construction:

Fuselage	Balsa and Ply
Wing	Balsa and Foam Ribs
Tail Surfaces	Balsa
Hardware Included In Kit	See text
Plan Size	39" x 36" (1 sheet)
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (7 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	56-80 Oz.
Wing loading based on rec. flying wt.	17-26 Oz./Sq. Ft.

RCM PROTOTYPE

Weight, Ready To Fly	56 Ounces
Wing Loading	17.9 Oz./Sq. Ft.
Covering & finishing materials used	See Text
Engine Make and Disp.	O.S. .35
Muffler Used	No
Radio Used	Heathkit
Tank Size Used	4 Ounces



The Nationals at Lake Charles and the LSF contests that were held around the country are history now. Results from the Nationals are spotty and verbal so I won't comment until I have the written results. The only item that I know for sure is that California's Tom Williams is very pleased.

Competing in the LSF has always been something to look forward to, and this year was no exception. Flying skills were sharp, new sailplanes made the scene, and new champions were crowned. What made the competition so keen this year was that the area winners will be eligible for the 1979 Championships to be held at Lewis College in Lockport, Illinois, next summer.

I attended the LSF at Los Angeles along with seventy-one other pilots.

Saturday started hot with good thermals. The eight minute Precision Duration task seemed like an eternity, but most everybody maxed until early afternoon when the wind of 5 to 10 knots started and then, of all things, at the Dominguez site, dust devils came through and took their toll of bent airframes, punctured covering, and sun tents maxing. The day finished with everybody flying their four rounds with no flying problems other than the wind.

Sunday started earlier than Saturday, and so did the wind. Maxes were very hard to come by and the most depressing problem was that all frequencies were bothered by interference. This went on all day and at least once in each round, one could hear a pilot yell his colors and could be seen racing across the field trying to recapture control of his sailplane. Tim Renaud, who was doing a superb job of flying his dad's new 2-meter ship, was leading by a substantial margin at the end of four rounds, but his first flight Sunday dashed his hopes to pieces as he spun in from launch height in an uncontrolled death spiral. Sure every pilot was allowed a back-up ship, but this did not bring back the points of the lost round. This is just one of the **too many** interference problems we suffered. I know it hurts because I was one of the unfortunate pilots who crashed my Standard Class ship due to radio interference. Before I list the results of the LSF-Los Angeles, I will say one thing. With a contest of this



LSF Winners, Los Angeles. See text for Place and Name.

caliber and flying skills in presence, the scale and beautifully built sailplanes should be rewarded the courtesy of some type of frequency monitoring. One



CD Don Simon, kept flying, moving fast. LSF Los Angeles.



Peter Parzik with his 1st Place 2 Meter, Monarch.

of the prerequisites of the host club or clubs that the LSF should require, is proof of monitoring equipment.

Results — LSF-Los Angeles **Scale — 7 entrants**

1st	Chris Adams
2nd	Don Edberg
3rd	Willy Richards

Unlimited — 29 entrants

1st	Ed Kennedy
2nd	Jim Smith
3rd	Larry Pettyjohn

Standard — 17 entrants

1st	Robert Anderson
2nd	Dave Fredericks
3rd	Larry Fogel

Two-meter — 19 entrants

1st	Peter Parzik
2nd	Al Kindrick
3rd	Keith Kindrick

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Scale winner, Chris Adams with his Caproni — only Scale ship to max. Chris also was awarded Best Technical Achievement.



Different strokes for different folks. How many times have you heard that? Well helicopter pilots are just like any modeler, in as much as their tastes vary from one extreme to the other. In other words, beauty is in the eye of the beholder. Last winter, while in Germany, I had the pleasure of meeting Mr. Leopold Köppl from Hallein, Austria. It was my pleasure because, although he is a helicopter lover, he is a total modeler. He not only builds and flies helicopters, he scratch-builds everything for his machines including the engines. And

what a job he does! The pictures shown here are an example of his work and I must say the pictures don't do the models justice. But maybe you can get some sort of idea of some of the love and work he has put into his models.

The Alouette was finished in 1973 after 950 hours of work. Rotor diameter is 65", weighs 13.67 lbs., and is powered by his own .60 engine.

The Hughes 300 he has just completed this year after 800 hours, has a rotor diameter of 45 1/4", weighs 8.38 lbs., and is powered by a .48 cu. in. engine.

Leopold is a Body and Fender man by trade and these beautiful models aren't just mantel pieces - - he really flies them and to see some of the pictures he has of some unfortunate crashes is enough to make you sick. You just don't order new parts for a scratch-built. People like this are a true inspiration to me and I hope to everyone else who is reading this column.

I just received a beautiful epoxy glass Baby Jet Ranger fuselage from ever-active Charlie Gilbert. The Baby Ranger is a 40 size for Rev-olution or to page 130



Leopold Köppl's beautiful scratch-built Alouette II. Finished after 950 hours in 1973. Machine totally scratch-built including the .60 cu. in. engine.



The pilot adds so much to the appearance.



ABOVE: Close up shot of tail rotor assembly of Alouette II. RIGHT: Detail shot of Alouette showing scale supports, etc.



Beautiful Hughes 300 scratch-built .48 cu. in. powered, 45" rotor diameter, 8.38 lbs.



Looks like a for real Alouette doesn't it?



Scale even down to the belt drive.

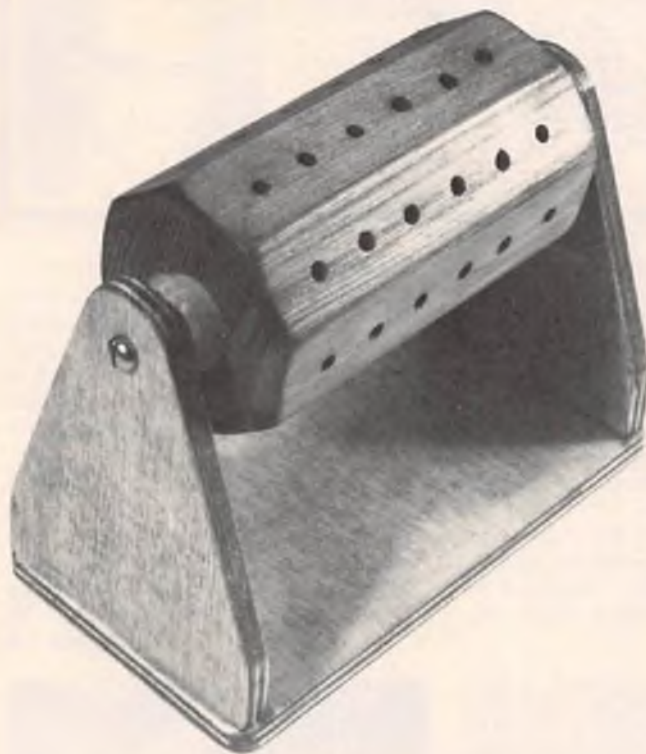


Main rotor hub of Alouette, 65 inch rotor diameter.



Leopold goes so far as scratch-building his own engine. The only part he didn't make was the needle valve.

HERE'S HOW



Simple, convenient, Moto-Tool rotary file. Can easily be built in one evening from scrap pieces of wood.



Rotary file holds many bits and wheels. Permanent magnet through center keeps them in place. Small magnet hot-stuffed to end retains wrench in easy to spot place. Your Moto-Tool never had it so good.

A nice clean and orderly workshop is something most of us don't try to maintain. Guess I'm speaking for myself rather than most of you out there, because I know your work benches are the essence of organization. Any particular tool can be located within seconds and modeler friends are always amazed when they see where your latest creations are born. Right? However, there are a few of us, a minority of course, who need help in that direction.

Mike Kobel of Greeley, Colorado, had the problem of constantly losing the tool bits on his Moto-Tool. Since necessity is usually the mother of invention, like any good thinking modeler, it wasn't long before Mike found a way to keep all his tool-bits together in one place with this easy to build, nifty little Moto-Tool rotary file. It can easily be built in one evening and the end product is absolutely fantastic! The real innovation in Mike's idea is the magnet in the center which does a great job of retaining the tool bits. The magnet can be purchased from most any large veterinary supply store (cost of approximately \$1.50) under the brand name of Glo-Jet Perma Mag. It has rounded ends and is approximately 3 1/4" long. Fleet Farm or Walco International Inc. stores are a good

source.

The sketches shown along with the following directions should enable you to accurately reproduce Mike's idea.

First, for the body or rotor, cut a piece of wood 2" x 2" x 3 1/2" long. Set a table saw to 60 degrees and cut the corners off lengthwise to make the rotor six-sided.

Find the center on one end and drill a 1/2" hole the full length of the rotor. Measure in from each end of the rotor 3/8" and mark; (do this on all six sides). Next mark the rest of the tool holes at 1/2" intervals from your first marks. Do this also on all six sides.

Now drill 1/8" holes on all 36 marks. Be sure to drill completely to the center of the rotor.

Install the magnet into the rotor and center it. This magnet can be purchased from a veterinarian supply store. It is used for cattle. (Glo-Vet Perma-Mag). For the end caps use a 3/4" dowel cut 5/8" long and 1/2" dowel cut 4" long.

White glue together. Two sets required.

Glue caps in place.

Find the center on the end caps and drill a 3/32" hole in each one.

To make a stand for the rotor use 1/4" aircraft plywood. Cut two pieces 2 3/4" wide and 3 1/4" long. Then trim to pattern

for side supports. See full size end view.

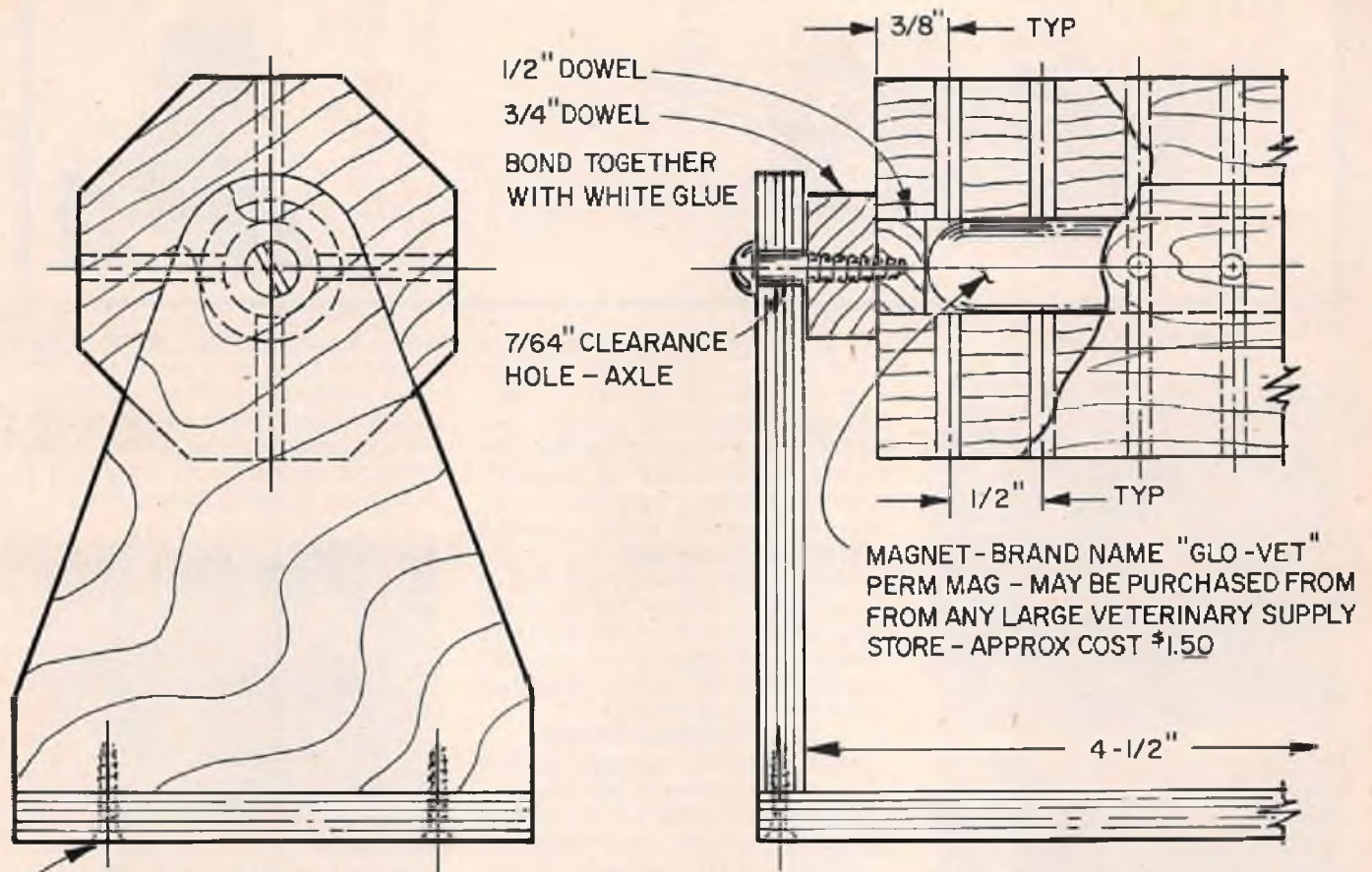
The base is 2 3/4" wide and 5" long.

Sand all edges and mount the side support on the base using #3 x 1/2" long wood screws, 2 in each side; also use glue. Space side supports 4 1/2" apart. Drill a 7/64" hole in each side support 1/2" down from the top.

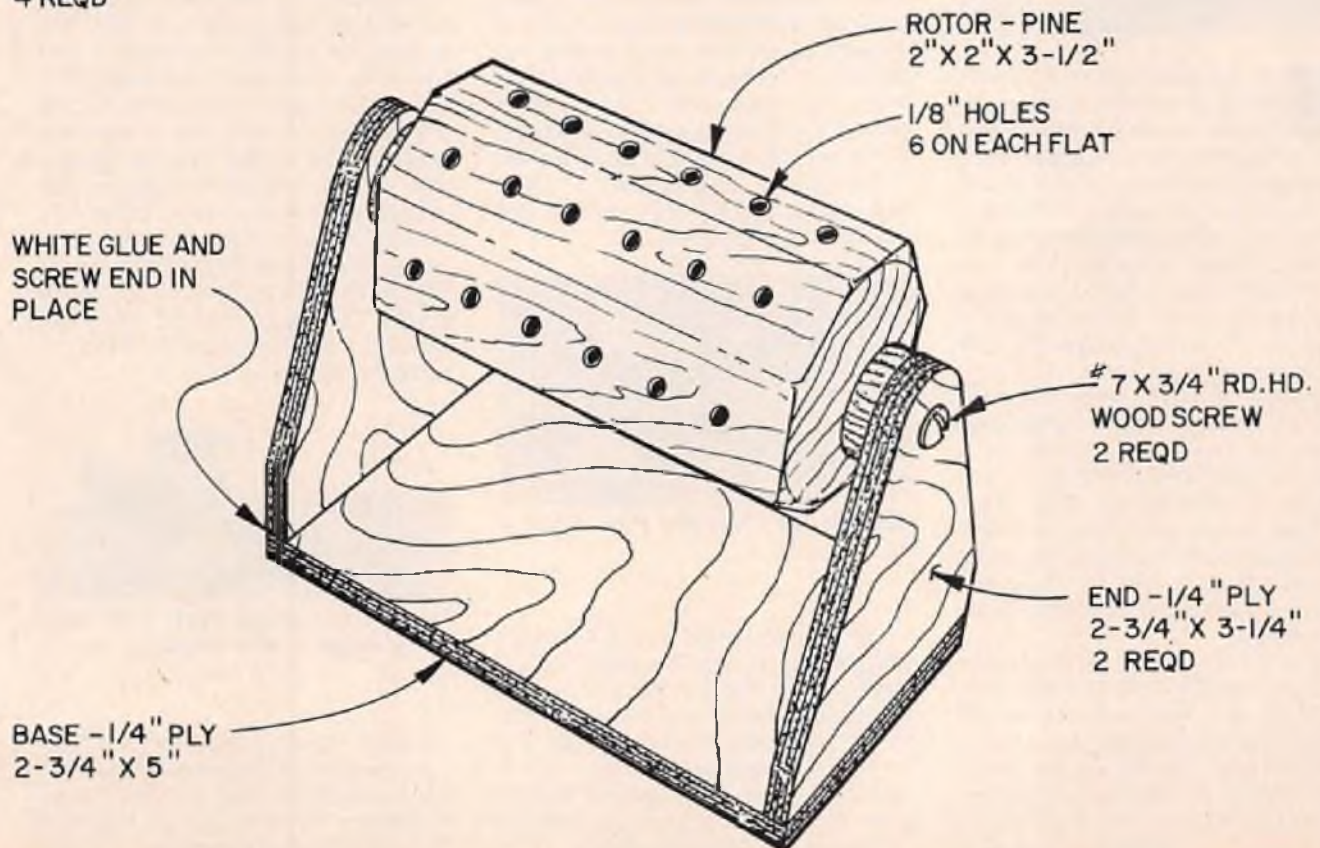
Finish the complete tool holder with stain or varnish.

Mount rotor to base using #7 x 3/4" round head wood screws. Just tighten enough so rotor moves.

If you let your mind wander a little, it is possible to add some additional conveniences to Mike's rotary file. For example: I am always misplacing the wrench used for tightening the collet nut on the Moto-Tool. A small magnet, Hot Stuffed to the side, makes a good place to park this item. Or, the rotary file could be mounted on the wall with a hook installed on the end on which to hang the Moto-Tool. Or, additional storage space for cut-off wheels, collets, etc., could be provided by adding a small drawer in the base. It's up to you to provide your own desirable convenience. However, the basic idea shown will provide plenty of organization. Many thanks to Mike Kobel, for sharing a great idea with us!



MOTO - TOOL ROTARY FILE
FULL SIZE





SCALE SPOTLIGHT



With the standards of Precision Scale continually rising, many scalers unable to find the 1,000 hours of building time required for a serious effort, are turning to Sport Scale. So it was a pleasure to see Vito Tomeo's fine Focke Wulf 190A7 appear at the '78 Nationals in Lake Charles. A 2" = 1' version (69.9" span, 788 sq. inch wing area), the 13 pound beauty used the Webra .91 --- an engine gaining swift acceptance in scale ranks. The long landing gear is hauled up by Rhom-Air units. In keeping with a developing trend, the tires were made in a basswood mold from silicone rubber and installed on lathe-turned nylon hubs. The scale judges went along with this higher expectation in detailing by noting the absence of correct tire tread and wheel hubs on other Precision Scale score sheets.

Many items which are usually simulated actually work on Vito's FW. Small hatches pop open to reveal detailed interiors containing a first aid kit, engine crank, oxygen tanks, radar equipment, etc. One of the fuel hatches is connected to the model engine tank and is used for refueling. The step

retracts and the seat height is adjustable. As is usually the case with Precision Scale entries in their introductory year, there had not been time to get all of the details installed. The big hatch cover in front of the windshield over the machine guns was nicely made, with tiny operating latches, but the interior wasn't completed.

Vito had some trouble on take-off on his first flight, damaged the model and didn't get in a flight score. When he gets it finished and checked out, the 1979 contenders for the Sterling Award had better look to their details.

THE PROVING GROUND

A standard part of the public relations pitch for the Indianapolis 500 Race has always been claims that the annual competition was the place where the manufacturers and designers checked out the newest developments in automotive science. Looking at the far-out type of specialized car that has evolved, it's a little hard to connect all this with your own vehicle. Not so with the Sport Scale Event at Lake Charles. A number of entrants were putting the reputation of present and future kits, with which they have some connection, on the line for all the modeling world to see. In this hot bed of the best Sport Scalers in the country, they couldn't all place high, but the flyability of the designs was emphatically registered.



Ralph White's winning P-51. 9 lbs. 4 oz., S.T. .60.

The winner turned out to be Ralph White, using his own Fliteglass P-51 kit. Ralph proves that the cynics who claim you have to have a super detailed model to get anywhere in Sport Scale are wrong. His Mustang is just well built and neat and received the second highest static score. On that basis, he added a competent, consistent flight score. (With

score averaging back in the rules, consistency is very important.) My observation was — it did no harm that he was thoroughly familiar with his airplane. He performed with a finesse that no one flying the second or third flight on a brand new model could ever muster.



Bob Violett unzips the hatch cover over the Scozzi fan unit in his A-4.

Right on his heels (trailing by only 1/2 point) was Bob Violett, with a convincing demonstration of the practicality of his A-4 ducted fan design. In fact, his professional performance made it look easy to fly. The buried power plant in the Scozzi unit posed no problems and he graphically showed that it can idle indefinitely by taxiing from the runway, after landing, on back through the long pit area to his parking spot. It flies very fast, and was one of the few entries that really looked scale-like while doing so. The wing span is only 47 1/2" and it weighs 8 3/4 lbs. on 660 sq. inches of area, but this doesn't seem to harm the aerobatic qualities a bit.



The kit for Dave Platt's Bucker Jungmeister is now available.

Dave Platt had the Bucker Jungmeister kit prototype model on hand, which he flew in Sport Scale in-between his flights with his Precision Scale and Sterling award winning SBD.

The biplane is a reasonable sized Quarter Scale and is just right for its Webra .90 power plant. Look up the Jungmeister in the September issue of RCM, a full construction article appears there.



Larry Jensen with his model of Glen Sigafoose's full size Bonanza.

The Beechcraft Bonanza fielded by Larry Jensen is an experimental Sig design. Pre-production trials of new kits are a good way to get the bugs ironed out and to also sample model reactions. This model gets by the difficult part of the Bonanza — the cabin area — by having a molded plastic top and cabin windows attached to a basic balsa box lower fuselage. The wing is sheet covered foam, and the tail surfaces are solid sheet.



1/2A gem --- Don Downing's F-4 Phantom.

One model that was a little overshadowed by all the big jobs proved to be an interesting effort upon closer examination. This was Don Downing's 1/2A F-4 Phantom, the pre-production model for the new Model Merchant kit. I got down on my knees to this little dickens in the scale cage and found it had a lot of vacuum formed plastic parts and molded foam that should be a snap to assemble. Weight was only 25 ounces and that wide chord, 30" span wing, packs a lot of area. It just looked like a flyable model and this was soon confirmed on the flight line. Aerobatics were outstanding and handling qualities look fine --- quite the best 1/2A I've ever seen. You think I exaggerate? Then consider this — in all of that high voltage company, this little bird turned in a 94 flight score, the best flight score (tie between four fliers) that the judges awarded at the Nats!

The nine year old prototype of the Sig Liberty Sport kit still does well for



Leonard McCoy helps Dick Graham start up his Liberty Sport, still going strong.

designer Dick Graham. He has been out of competition for several years, building his dream house in the woods. After attending the Sig IMAC Championships in June, as a spectator, he caught the bug again, went home, blew the dust off, installed a new Webra Speed .61, and got in a few practice flights. Dick tied with Jerry Bugni's Seneca for 8th place at Lake Charles.

I hope we don't hear a lot of hula-balo about "professional modelers" from my pointing out some commercial connections. All of the good things that we enjoy in the hobby were worked out and refined by dedicated enthusiasts at contests. This is the kind of test program that really counts. Besides --- what meaning would a National Championship win really have if you didn't beat the best pros as well as the best amateurs? As a matter of fact, there are amateurs who have more modeling and flying time --- the really indispensable advantage in competition --- than many pros have.

PRECISION SPORT SCALE

Even though the AMA rules say that cockpits, 3-dimensional surface details, etc., "deemed not visible in flight" are not to be considered in scoring the model, some Sport Scale contestants still get edgy when they see entries that have these things. There are calls heard for rules to "keep AMA Precision airplanes out of Sport Scale." But no one has yet come up with any reasonably



No question about this dummy engine being "deemed visible in flight"! Al Kretz's attractive Pitcairn Mailplane had the highest static score. The model was hard to handle on take-off --- wanted to ground loop at the slightest provocation. Some of the most interesting prototypes are difficult to fly.

worded rule that can accomplish this without causing endless hassles at contests about what exactly is an AMA Precision model. The fact is --- you cannot force scalers to keep their models at a certain level of development. Despite claims that Sport Scale would be the training ground for beginners who would soon move on to the bigger challenges of Precision Scale, the truth is the event has developed its own class of experts who have no interest in doing anything but building an even better Sport Scale next year than the one they have this season. This situation always happens to "simplified" and "beginners" events, so consistently it must be regarded as inevitable.

There were some entries at Lake Charles which had extra detailing. I examined them at close range in the scale cage but didn't find one that could really be classed as a Precision Scale entry supposedly "unfairly" (though not illegally) entered in the wrong event. Some of them might have been considered of AMA Precision Scale quality 10 years ago, but certainly not today. My view is that the owners, like most scale builders, take pride in their work and get a charge out of a few extra scale and beautifying touches — even if they don't qualify for points. A pilot looks a little lost in the cockpit without a seat to sit on and an instrument panel — however rudimentary — can be appreciated by the public and the builder's relatives, if not by the judges.



Veteran pattern flier Ed Izzo's canopy opened to show the cockpit details. Panel lines are partly inked on, partly three dimensional. Sliding canopies are becoming more common in Sport Scale.

Having a few details does not make an AMA Precision Scale. And let's not pick on the odd actual Precision Scale that turns up occasionally in a Sport Scale event (usually because there is no Precision Scale event at that contest) as a whipping boy for not winning. If the Precision Scale entry gets an unfair portion of static points, then the judges are not competent. Rules will never remedy that problem. The sure way to win is to build a better model, not design a restrictive rule.

I wonder if this particular area of disagreement isn't slowly fading into the



Mike Grady's A4F had a lot of small cockpit detail and an aged, damaged Israeli color scheme. His static score was 2 points less than Violett's new-looking, undetailed A-4. Weight was 1 1/4 pounds more. Something to think about before putting extras on a Sport Scale.

sunset. Despite the fact that something like 60 proposals have been submitted to the AMA Scale Contest Board for rule changes in the 1980-81 rule book, only one really aims to lower the boom on so-called "Precision Sport Scales" and it is a limited restriction. Oliver Moses wants to bar any airplanes which have won 1st, 2nd, or 3rd, at the Nats or Internationals, or have won 3 trophies from smaller meets in Precision Scale, from entering Sport Scale events. This idea at least has the advantage of a fairly understandable categorization of which models would not be eligible.

One interesting approach was sent in by John Preston, who served as Scale Category Director at the Nats. He proposes to delete paragraph 6.3 (which refers to "details deemed not visible in flight") entirely and increase the judging distance to either 12 1/2, 15, or 20 feet (to be selected by the Scale Contest Board). John says this will eliminate arguments about what is "deemed visible". He went on, "If the objective of this requirement (6.3) is to encourage models without details while, at the same time, permit the more skilled builder some freedom of expression, then an obvious solution appears to be to increase the distance from which the static judging is performed. In theory, if the correct distance is chosen, Sport Scale models should be capable of competing with Precision Scale models



The Top Flite P-39 Dave Duderstadt entered, featured a cockpit, 3-dimensional panel lines and a colorful paint job. Weight 8 1/2 pounds.

on an even basis in the Sport Scale Event."

Art Johnson is in favor of removing all of the restrictions from paragraph 6.3 except the one pertaining to cockpit interiors. He thinks that "details deemed not visible in flight" and the judging distance of 10' are contradictory, since a model in flight can't be safely observed closer than 100'. He feels much confusion will be eliminated by striking out the references to things like dummy engines. "If they are hidden, they cannot be inspected by the Sport Scale judges from 10'. If they are not hidden, they should be judged as any other detail of the aircraft." Art also said, "The statement with respect to 'fine 3-dimensional surface details' - - - etc., is difficult to administer and is almost universally ignored by contestants and judges. We should not try to legislate the quality of a model as this statement currently attempts to do."

Brian Crossley wants to change the maximum possible flight score to 200 points, making flying worth 2/3 of the points and static worth 1/3. He thinks this would put emphasis on building a good flying model rather than adding details such as rivets, panel lines, cockpits, etc. "... things that theoretically are not judged; but the judges, being only human, cannot ignore."

There are many more items to consider for the next rule change cycle. I hope you active fliers out there will take a little time off to put your two cents worth into the discussions. Don't wait until the voting deadlines have gone by to sound off. The Contest Board members want and need expressions of opinions to guide their voting.



A superb job of flying put Art Johnson's 18 lb. F-82G Twin Mustang into 3rd place. OS .60's powered the realistically performing model.



VARIETY IS THE SPICE OF MODELING

The Nats had quite an assortment of types of aircraft represented. Here is a list of the entrants with the prototype they were using. Compare it with the photo of the scoreboard to check on the relative outcome of your favorites.

SPORT SCALE

Dick Graham	Liberty Sport
Larry Jensen	Beechcraft Bonanza
Ernie Kraft	Bucker Jungmeister
Marcial Davila	Waco YMF
Jerry Bugni	Piper Seneca
Ralph White	P-51 Mustang
Phil Hulbert	EAA Acro Sport
Louis Castaneda	Waco YMF
Jim Scroggins	Westland Lysander
Art Johnson	F-82 Twin Mustang
Tom Czikk	P-47
John Pagan	Chipmunk
Bob Violett	A-4 Skyhawk
Stephen Lelito	Yak 18P
Col. Bob Thacker	Hughes H-1
Bill McCallie	FW-180
Don Downing	F-4 Phantom
Wayne Owens	B-26
Howard Keith	Waco
Frank Thomas	Spitfire
Don Snull	Dornier 23G
Dave Platt	Bucker Jungmeister
Mario Yederlinc	Piper J-3
Ed Izzo	FW-190
Matt Smith	PT-19
Albert Kretz	Pittcairn Mailwing
Terry Foote	P-51 Mustang
Francis McCracken	B-25 Mitchell
Bud Atkinson	Savoia-Marchetti SM-79
Joe McDermott	AT-6
Eric Watterman	Stinson SR-5
David Noll	Decathlon
Hal Parenti	P-39
Tom Cook	ME 262
Gary Palmateer	Waco YMF
Leonard McCoy	Zero
David Duderstadt	P-39

PRECISION SCALE

Dave Platt	Douglas SBD
Tom Stark	Bird Biplane
Claude McCullough	Shinn 2150
Vito Tomeo	FW-190

AMA SCALE

NAME	STATIC	FLT 1	FLT 2	FLT 3	TOT. FLAT
PLATT	432	67	357	PASS	785
STARK	306	192	296	327	633
MCCULLOUGH	393	86	0	144	537
TOMEIO	388	0	43	PASS	423



Cap'n Dicks Cockpit BY DICK BRADFORD



An old workhorse ready for action --- Hurlman.

Tether Line R/C! Tether Line What? That's right --- tether line R/C ... It all started last month when I suddenly had a lot of spare time on my hands. I was moping around pondering how best to put my superior (?) intellect (?) to work, and get out of the doldrums caused by a work stoppage that had a lot of us grounded. A couple of piles of virtually unrepairable R/C junk stared up at me from the old work bench and, in fact, the only thing left in the shop which was flyable was an old control-line clunker with patches on its patches. Didn't do much for me in my depressed mood --- that's when the idea struck. Why not tear out that old worn bellcrank --- insert a two channel

rig --- hook up some sort of a tether set-up --- and fly R/C on a line. Crazy! Yes, but that's about how I felt --- so I did it. Within a couple of hours the old bird was converted to R/C --- complete

with elevator, throttle, and single line tether hook-up.

I found a stalwart soul to hang on to the line from the center of the circle (I am now formulating a free wheeling pylon to pound into the sod), and we headed out to the park for a test flight. The results showed some potential --- but were less than satisfying --- and as I was replacing the 'divot' in the turf, new resolve was born to try it again with a good ship specially built for tether line.

In 1951 and 1952, I flew Hal deBolt's All American Senior's almost exclusively in control-line stunt. They grooved beautifully, were extremely stable, durable, and easy to build. Since I enjoy old timers, the All American looked to me like a good choice. I obtained a set of plans from Fran Ptaszkiewicz. Fran stocks most of Hal deBolt's old Dmeco plans. His address is: 23 Marlee Dr., Tonawanda, N.Y. 14150.

For an engine, I selected an old sandcast Fox .35 that had been sitting idle for 27 years. A K & B Allyn throttle from a vintage Green Head was

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Skip Tracy with a nice group of 'oldies' at Sat. nite's MECA Collecto.



Some of the MECA gang admiring Carter Watts' super diesel collection.



Quite a few O & R .23's were seen at the meet.



Part of Tim Dannels' fine collection --- hails from Denver.



Mark Fechner displayed about 60 new in the box old timers.



The 1978 ROAR Nationals was held at Rattey's Raceway in No. Attleboro, Mass. The custom built track has a very challenging layout that is popular with the drivers.



Start of a G.T. Class qualifying race. The track is wide enough for safe passing without nerfing.



Due to the many entries, some of the pit areas were a little crowded, but it all worked out okay.

1978 ROAR NATIONALS

The 1978 ROAR Nationals was held at Rattey's Raceway in North Attleboro, Mass., July 27th to August 6th. With 513 total entries from 1/8 scale and 1/12 scale, this was the largest Nationals ever. Rattey's Raceway is a permanent custom-built 1/8 scale raceway with a challenging course that is popular on the East Coast. Last year Bill Rattey made an addition to his raceway, by building an indoor track for 1/12 scale electric cars. Now the racers in his area can race the year round.

The 1975 ROAR Nationals were also held at Rattey's Raceway, and we looked forward to again running on the super smooth, high bite track. We arrived on Saturday in the middle of a heat wave. It was 97 degrees with 95% humidity and Boston was in the midst of a smog alert! It didn't seem right that Boston should have a smog alert, because I had always thought smog alerts were an exclusive feature of So. California. Oh well. We went to the track to practice and found we had the whole track to ourselves. I guess the local racers were smart enough to figure out it was just plain too hot to be running, but we came to run and run we did. After a few minutes running with our sports cars, it was apparent this was not the same track we had run on in 1975. Apparently three New England winters took their toll on the track. The once smooth surface was now fairly rough, causing the cars to jump all around the track and to become completely airborne on the straightaway. Bill Rattey had intended to repave the straightaway

and roll out the rest of the track, but the cost was prohibitive. Expecting a smooth, high bite track, we brought horsepower motors with tuned pipes, but we soon found out this wasn't going to work and the guys took the tuned pipes off to de-tune the engines.

Arturo Carbonell and Georgia Campbell came to Rattey's Raceway two weeks before the Nationals, to run in a club race for practice. Arturo came to the same conclusions we did. Arturo also had a piped K & B in his Delta car, but he said it was too hard to drive with that much horsepower on that track and so he raced with an OPS. He had a couple of problems in the race, but Georgia Campbell came through to win with her Delta car. Congratulations, Georgia!

By Monday, the heat wave had passed and there were quite a few people out practicing. There was generally a mixture of Can Am and GT cars on the track at the same time, which was interesting. Arturo seemed to be the fastest with the Can Am cars, although Jeff Rold and Bill Jianas were close. Bill Jianas and Rick Davis looked the fastest with the GT cars.

NOVICE GT CLASS

The Nationals started off with the 1/8 scale Novice GT Class. Mike Reedy was Top Qualifier among the 28 Novices. In the Main Event it was George Anderson and Mike Reedy battling it out for 1st Place with George winning, Mike taking 2nd, and Phil Goodwine in 3rd.

- | | |
|-----------------------|------------------|
| 1. George Anderson | 6. Bruce McVetty |
| 2. Mike Reedy | 7. Jim DeVito |
| 3. Phil Goodwine | 8. Ken Walsh |
| 4. Jack Benas | 9. Mark Parus |
| 5. Virgilio Gonzalvez | 10. Jim Nelson |

AMATEUR GT CLASS

One of the most exciting race finishes, was in the Amateur GT Main. Bill Watson had built up a comfortable 1 lap lead, but with only a few laps left, Bill Klingbeil had cut Watson's lead to 50' and he was closing fast. Klingbeil tried a little too hard and ended up in the boards with the smooth driving Watson winning, Klingbeil 2nd, and Sim Picheloup in 3rd.

- | | |
|-------------------|-----------------------|
| 1. Bill Watson | 6. Felix Galaviz |
| 2. Bill Klingbeil | 7. Oswaldo de la Rosa |
| 3. Sim Picheloup | 8. John Hunt |
| 4. Jerry Thompson | 9. ? |
| 5. Louis Przybyla | 10. Mark Major |

EXPERT GT CLASS

Bill Jianas was Top Qualifier of the 38 entries in this class with his muffled Veco-McCoy, with Rick Davis right behind with his piped Veco-McCoy. With the lower horsepower in this class, the cars looked a lot smoother on the track and some good tight racing was possible. The Main Event belonged to Jianas all the way, but Rick Davis was never very far behind to take 2nd, with Jeff Rold taking 3rd. This makes two years in a row Jianas is National GT Champion, as well as being a former National Road Champion.

- | | |
|---------------------|------------|
| 1. Bill Jianas | Associated |
| 2. Rick Davis | Associated |
| 3. Jeff Rold | Associated |
| 4. Eric Hahn | MRP |
| 5. Bob Titterington | Associated |
| 6. Bob Welch | MRP |
| 7. Gene Husting | Associated |
| 8. Chuck Hallum | HRE |
| 9. Ken Campbell | Delta |
| 10. Curtis Husting | Associated |

NOVICE CAN AM CLASS

Although Jim Nelson has only been

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Ratley's indoor R/C car track is just fabulous. It's a whole lot of fun racing on a track like this.



1/8 scale Competition Concourse was won by Earl Campbell's Porsche 30 KL. Paint is by Al Chuck.



1/12 scale Competition Concourse was won by Midge Husting's Ferrari Boxer. Paint job was also by Al Chuck.



Bill Watson



Bill Jianas



Rick Davis



Jim Nelson



Mike Kimrey



George Anderson



Jeff Rold



Bob Welch



Gary Kyes



Arturo Carbonell



Curtis Husting



Re-Pete Fusco

racing for six months in So. Calif., he sure turned in a fantastic qualifying race to become Top Qualifier among the 46 Novices, with a time of 22.56. Jim also dominated the Main Event leading from start to finish with Virgilio Gonzalez from Venezuela 2nd, and Steve DeVito 3rd.

- | | |
|----------------------|------------------------|
| 1. Jim Nelson | 6. Diane Moody |
| 2. Virgilio Gonzalez | 7. Barry Grossenbacher |
| 3. Steve DeVito | 8. Jack Banas |
| 4. George Anderson | 9. Mark Parus |
| 5. Donn Bryans | 10. Michael Olas |

AMATEUR CAN AM CLASS

Mike Kimrey, from So. Calif., was Top Qualifier among the very competitive 36 Amateurs racing. The Main Event lead was hotly contested by a number of drivers, but at the end it was Mike Kimrey winning, with Oswaldo de la Rosa, from Venezuela, running a Veco-McCoy in 2nd, with Jerry Thompson taking 3rd.

- | | |
|-----------------------|-------------------|
| 1. Mike Kimrey | 6. Sim Picheloup |
| 2. Oswaldo de la Rosa | 7. Tom McGarry |
| 3. Jerry Thompson | 8. Bill Klingbeil |
| 4. Dana Smeltzer | 9. Louis Przybyla |
| 5. Don Shreve | 10. Mark Major |

EXPERT CAN AM CLASS

This is the premiere event of the Nationals and the one event everyone would most want to win. With 48 Experts trying for it, the job wouldn't be easy. After the first round of qualifying, Arturo Carbonell was on top with a picture perfect qualifying run of 20.78. But then all of Arturo's runs are picture perfect. Right behind Arturo was Jeff Rold, with a close 20.88. There's a certain amount of prestige that goes along with being Top Qualifier. Racers know that qualifying times are a pretty fair indication of a racer's driving ability, car handling and reliability.

In the second round of qualifying, Arturo again had a good run with a time of 21.01, but it was not quite as good as his first time. Only two drivers looked like they had a chance to beat Arturo. Bill Jianas was burning up the track as usual, but his engine died during pit stops in both of his heats. Jeff Rold was then up for his last run. Jeff was driving perfectly. He's one of those smooth drivers who makes it all look so easy. He was doing very well, until about halfway through when he came into contact with Hallum, and Jeff ended upside down on the track. He only lost a few seconds before a turn marshal flipped him over, but when you're trying to beat Arturo's time, you can't afford to waste any time. He finished the run and got his time of 20.70 which gave him the well deserved Top Qualifier spot! For myself, just to be able to qualify for both the G.T. and Can Am Main Events, against the 48 Expert drivers, was a great deal of satisfaction.

In the Main Event, Jeff and Arturo both got off to a great start, with Jeff in the lead and Arturo right behind. Jeff started opening up a lead, a little at a time, about 10' a lap, over Arturo. The rest of the field

was getting farther behind these two. Jeff was still in the lead after the first pit stops, when Arturo had to make an extra pit stop to replace his batteries. This moved Chuck Phelps into 2nd Place, about 1 lap behind Jeff. After the 2nd pit stops, Jeff was still opening up his lead, when the bumps on the straightaway took its toll and Jeff lost a gear dropping him out. Phelps took the lead, but lost it after a few laps, when he had an extra long pit stop. Rick Davis then took the lead for a short time, but Arturo came back to take the lead. Arturo held the lead to the finish with Davis 2nd, and Phelps 3rd.

This is the second National Road Championship for Arturo. There are many who believe Arturo is the greatest R/C car racer ever, and I'm sure not going to argue with them. There are quite a few different brands of R/C cars, and there are 3, 4, 5, or more, really exceptional drivers for each brand of car, and we could argue all day long over who is the best overall driver. But when it comes to a Delta car, there is just no one else driving a Delta car, who can even come anywhere near close to Arturo. He really is in a Delta class by himself.

- | | |
|---------------------|------------|
| 1. Arturo Carbonell | Delta |
| 2. Rick Davis | Associated |
| 3. Chuck Phelps | Associated |
| 4. Ken Campbell | Delta |
| 5. Gene Hustling | Associated |
| 6. Bob Welch | MRP |
| 7. Earl Campbell | Associated |
| 8. Chuck Hallum | HRE |
| 9. Rich Lee | Associated |
| 10. Jeff Rold | Associated |

NOVICE OVAL CLASS

Phil Goodwine, from So. Calif., was Top Qualifier in this class with 9.28, but it was Sandro Tomburri, from Texas, who won the Main Event, with Diane Moody 2nd, and Phil Goodwine 3rd.

- | | |
|--------------------|----------------|
| 1. Sandro Tomburri | 6. Reba Steele |
| 2. Diane Moody | 7. Ken Walsh |
| 3. Phil Goodwine | 8. Mike Reedy |
| 4. Mark Parus | 9. Bob Urban |
| 5. George Anderson | 10. Ken Hebert |

AMATEUR OVAL CLASS

When it was time to run the Main Event, the track was still wet from a rain the night before, so the Amateurs voted not to run on the damp track and use the qualifying times as official. I thought I was the only one who didn't like to run on a damp track.

- | | |
|------------------|--------------------|
| 1. B.J. Hunt | 6. Jim Welch |
| 2. Dana Smeltzer | 7. George Hague |
| 3. Mike Kimrey | 8. Tom McGarry |
| 4. Rick Perry | 9. Anita Bloom |
| 5. Dennis Thomas | 10. Jerry Thompson |

EXPERT OVAL CLASS

By the time the Expert Oval Class was ready to run, the track was mostly dry, but not entirely. There was still some damp spots. This, along with the bumps, caused a great deal of problems for everyone, except Bob Welch. Bob had put his Super Stock engine in his oval

car, and could punch around the track with no problems. Bob ended up winning the race, but the finish became very exciting. The track started to dry out and Top Qualifier, Arturo Carbonell, really started to close the gap. But time ran out and Arturo finished 2nd, with Rick Davis 3rd. I think it's very appropriate to mention that Rick Davis finished 2nd in G.T., 2nd in Can Am and then 3rd in the Oval. This is quite a display of driving, tuning and reliability over 3 different classes, that no one else even came close to. Enter Rick's name right along there with Arturo, Jianas, Rold, and your favorite driver.

- | | |
|---------------------|------------|
| 1. Bob Welch | MRP |
| 2. Art Carbonell | Delta |
| 3. Rick Davis | Associated |
| 4. Gary Kyes | MRP |
| 5. Georgia Campbell | Delta |
| 6. Don McKay | MRP |
| 7. Mike Quellar | Delta |
| 8. Chuck Hallum | HRE |
| 9. Charles Greene | |
| 10. Jay Costa | Associated |

1/12 SCALE NATIONALS

After a week and a half with the 1/8 Nationals I was totally exhausted along with everyone else, but now it was time to start the 1/12 Nationals. Arturo Carbonell dropped a bombshell right about here, when he expressed his desire to run a 1/12 electric car! Did you ever think you'd see the day Arturo would be running an Associated car? But Arturo is a true racer and with another week of racing coming up and nothing better to do, Arturo wanted to join the fun. Naturally, anyone would jump at the chance of having Arturo drive their car, so it wasn't long before a car was put together and Arturo was out practicing.

The 1/12 Nationals started with the gas classes and if it wasn't for the JoMac Team drivers, there wouldn't have been any entries at all, with only 9 entered in one class and 12 in another. It looks like these classes will be dropped at the next Nationals. Nevertheless, the competition was fierce among these friendly team drivers with the following results:

A Gas — Expert

- | | |
|-------------------|---------------------|
| 1. Gary Kyes | 5. Jerry Imboden |
| 2. Don McKay | 6. Jim Welch |
| 3. Tony Bellizzi | 7. Rick Del Rosario |
| 4. Dan Rutherford | |

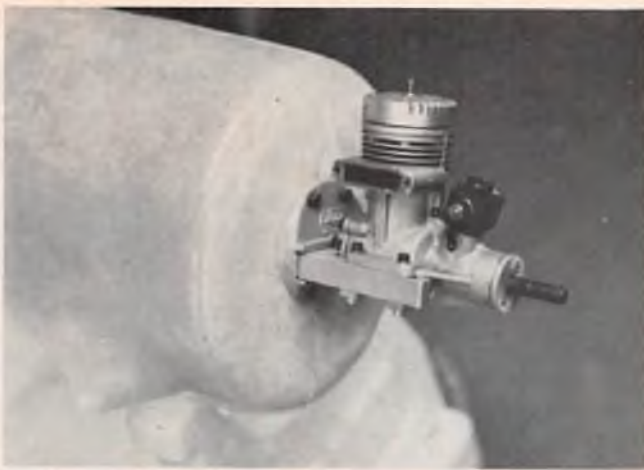
B Gas — Expert

- | | |
|---------------------|-------------------|
| 1. Bob Welch | 7. Eric Hahn |
| 2. Gary Kyes | 8. Dave Toth |
| 3. Don McKay | 9. Peter Fusco |
| 4. Dave Steinberg | 10. Jerry Imboden |
| 5. Rick Del Rosario | 11. Rapete Fusco |
| 6. Tony Bellizzi | |

B Gas — Amateur

- | | |
|------------------------|------------------------|
| 1. Michael del Rosario | 5. William Siry |
| 2. Dan Rutherford | 6. Charles Notabartolo |
| 3. Jim Welch | 7. Abe Shapiro |
| 4. John Hunt | |

EDSON MOTOR MOUNT ASSEMBLY



A K & B .61 engine installed. The fore-aft adjustment can be made when the cowl is ready for installation.

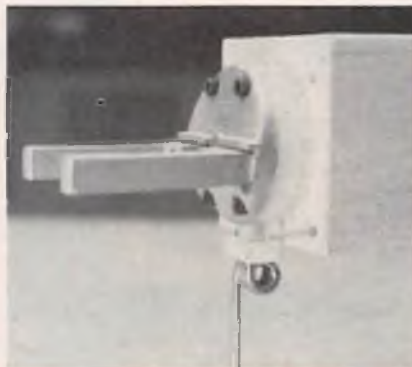
The Edson Adjustable Motor Mount System is a system in the true sense of the word. Just count the parts available; a cast aluminum motor mount assembly consisting of a back plate and a set of long and short engine mount arms, a nose gear mounting block (which can also be used as a spacer if desired) with nosegear strut and steering arm, a 2° thrust plate, spring locknut retainers, socket head hardened bolt and locknut to mount the engine and socket head hardened bolt and blind nut set to install the engine mount.

As shown in our photographs, we tried installing the engine mount on the nose of a fiberglass fuselage we're building and on a tricycle gear Ugly Stick type sport plane. Installation of the Edson Adjustable Motor Mount was surprisingly simple. The first step is to refer to your plans and mark the location of the engine prop shaft on the firewall. Or, if the engine is to be centered on the firewall, find the center. No other measurements or lines are required. The second step involves drilling a 1/4" hole through the firewall at the center. Remove the bit from the electric drill and stick it into the hole. Then, hang the engine mount backplate on the end of the drill bit, locate it on the nose of the fuselage in whatever position you plan to mount the engine, and mark and drill the holes through the firewall for the blind nuts.

Once the blind nuts are installed, temporarily mount the arms using the Allen head bolts and special hex head nuts provided. These nuts fit into a slotted area on the back side of the backplate so the bolts that hold the engine mounting arms in place cannot only be loosened and retightened again, but they can also be removed and replaced without getting to the nuts. Add the nylon nose gear block and thrust plate if needed and bolt the engine mount in place. Because of the bracket built into the bottom of the nose gear



The engine mount backplate in place on the 1/4" drill bit. We next added the arms and laid a straight edge across them to square up the engine mount with the stab. The mounting holes were then drilled and blind nuts installed.



Engine mount installed using nose gear block and thrust plate.

block only the set screw in the steering arm is needed to hold the nose gear strut in place. Neat.

With the drill bit removed from the hole in the firewall, get the proper spacing of the engine mount arms for your engine and snug down the bolts. Alignment marks are provided on the bottom of the slot into which the engine mount arms fit to make the job of centering the engine on the backplate an easy task. No drilling is needed to mount the engine onto the engine mount arms because

they are slotted to accept engine mount bolts of different spacing. Use the hex head bolts and nuts provided to bolt the engine loosely in place. Get the proper front to back location you want and tighten the bolts. That's it, all installed.

What about the 1/4" hole in the bulkhead? A perfectly located exit for your fuel feed line, after the sides are sealed to prevent fuel penetration. Want to change to a different engine? Remove the old engine, loosen the engine mount arm bolts to change the spacing as needed and retighten them again. Mount the new engine. Takes all of 5 minutes?

As we first unpacked the Edson Adjustable Motor Mount System to check it out we became concerned with all of the bolts that seemed necessary. When you start counting though, you find that this engine mount uses only two more bolts than other more familiar firewall mount engine mounts. The two extra bolts are used to lock the adjustable engine mount arms in place. As with all of our engine mount installations, we put some silicone seal onto the threads of all of the engine mount related bolts to minimize the possibility of their vibrating loose under flight conditions.

About the only part of the system with which we were a bit disappointed was the spring locknut retainers. These retainers hold the nuts for the engine mounting bolts in place under the bottom of the engine mount arms. While we were impressed with the idea, their design, and their need if you're using the engine mount in an enclosed engine compartment where it's difficult — or impossible — to get to the engine mounting bolt nuts with the engine in place, the problem we found with them was that when they are used the engine rests on the 4 spring retainers rather than flush on the engine mount arms. In our judgement this results in what we feel is a less rigid mount than without

to page 116

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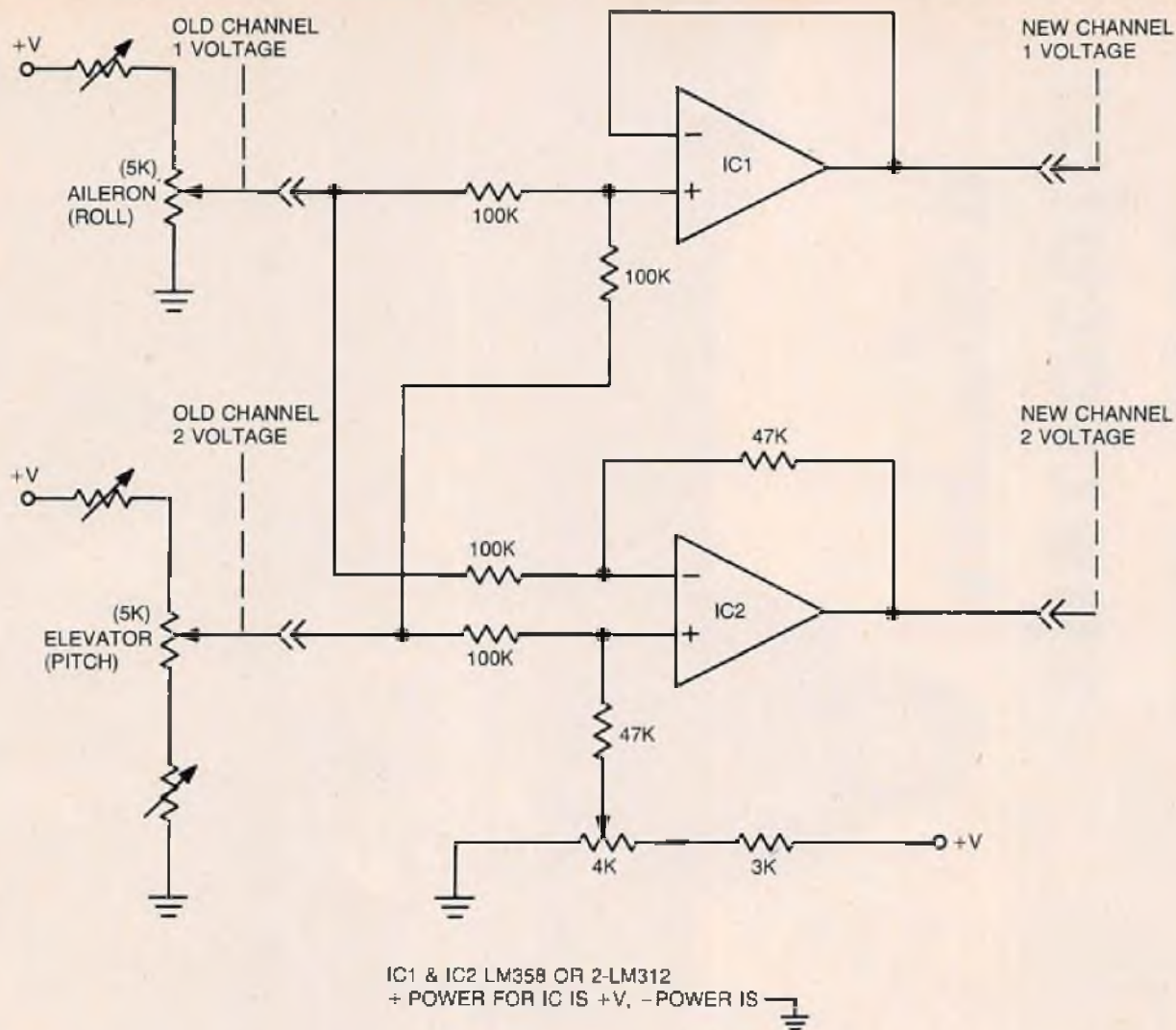


FIGURE 1
 SCHEMATIC DIAGRAM FOR THE "SIMPLE ELECTRONIC MIXER"

A SIMPLE ELECTRONIC CONTROL MIXER

By Steve Kukulich

Delta-type airplanes and V-tail gliders require a control mixer to operate the two control surfaces. The mixer causes the two control surfaces to move in the same direction for pitch (elevator) commands and in opposite directions for roll (aileron or rudder) commands. Here we give a circuit and description of an electronic mixer which is designed to be installed in the transmitter. This mixer will only work with newer type encoders such as in the Kraft KP4A and others described by Jim Oddino (RCM June 1978). These newer encoders develop voltages which depend on the stick positions rather than directly controlling time constants with the stick pots.

There are a number of good mechanical mixers available but these usually do not give as rigid and precise control as a direct rod from the servo. This problem is more serious on large deltas. Installation of the mechanical mixers is sometimes a problem in smaller planes. An electronic, receiver-type mixer was developed some time ago (see Christy Mixer, RCM July 1976 and Sept. 1976). This mixer, however, requires quite a bit of circuitry and since it is installed with the receiver, adds bulk and weight to the flight pack. The transmitter type mixer can be simpler and does not add to the weight of the flight pack.

In the newer type encoders we

mentioned that the transmitted pulse length which determines the control surface (or throttle) position is proportional to a voltage applied to an oscillator circuit which makes the pulses. This voltage controlled pulse oscillator is alternately connected to the different channel voltages by some type of switching circuit. It is much easier to make mixers with this type of encoder since it is much easier to make circuits which add and subtract voltages than to make circuits which add and subtract resistances or capacitances. The circuit for the simple electronic control mixer is shown in Figure 1. The voltages for roll (aileron) and pitch (elevator) control are obtained from the pots on the left side of



The 52" span Riggs delta used to test the electronic control mixer.

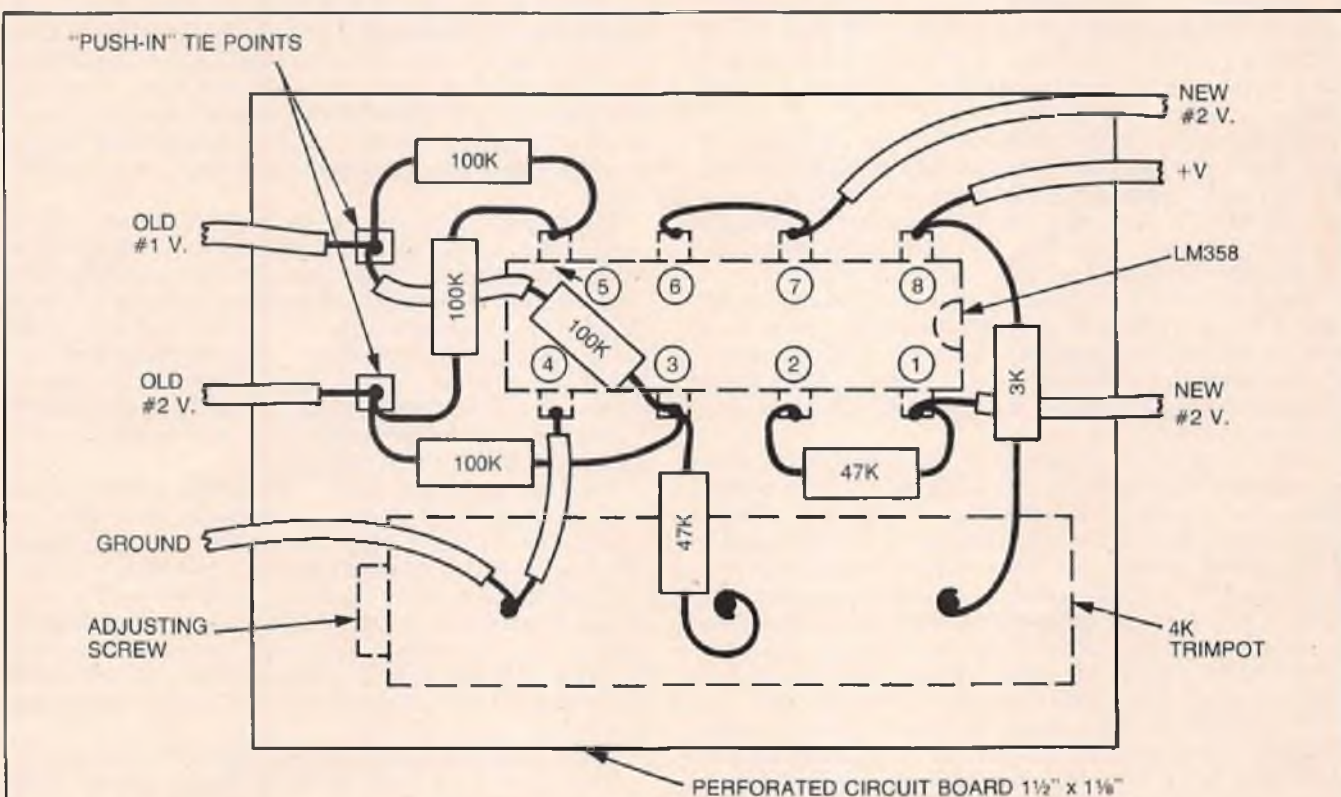


A flyby shot of the Riggs delta.

Figure 1. These pots are already in your transmitter and are the ones connected to the aileron elevator stick. The wires going to the wipers of these pots are to be disconnected so that the mixer can be inserted. The top integrated circuit

(IC1) is an operational amplifier connected up so that its output voltage will be one half of the **sum** of roll and pitch command voltages. This output is the new channel 1 voltage and goes to the wire which was connected to the

aileron pot. IC1 is connected as a summing voltage follower circuit for you engineering types. The lower integrated circuit (IC2) is another operational amplifier wired up as a differential to page 114



NOTES: (1) LM358 and 4K TRIMPOT MOUNTED ON BOTTOM OF CIRCUIT BOARD. (2) LEAVE THE SIX WIRES TO TRANSMITTER ABOUT 4" LONG AND LACE INTO A CABLE. (3) 1/4 W RESISTORS ARE MOUNTED ON TOP OF CIRCUIT BOARD. (4) THIS IS A BOTTOM VIEW OF LM358.

(3X ACTUAL SIZE)

FIGURE 2
PARTS LAYOUT FOR THE "SIMPLE ELECTRONIC CONTROL MIXER"
(LM358 VERSION)



Bruce Lund captured Best of Show Trophy with detailed Curtiss Junior, scratch-built, O & R 1.2 power, 15½ lbs., 10 ft. span.



Powder Puff Trophy winner, QSAA Secretary, Pat Bunker flew an Aeronca Champ, M & M power, 14 lbs. 10 oz., 9 ft. span.

ASSEMBLY OF THE EAGLES

The ten square mile Searchlight Dry Lake located between Las Vegas, Nevada, and Hoover Dam was the place. September 29 through October 1, 1978, were the days. The Second Annual Las Vegas Fly-In of the Quarter Scale Association of America was the event.

Well over 100 large aircraft arrived from across the United States and Canada to participate in the largest gathering to date of this fastest growing aspect of radio controlled aircraft modeling, Quarter Scale. These models are 1/4th the size of full size airplanes with wingspans ranging from about 5' to over 16'.

The driving force of the QSAA is its founder, Ed Morgan, of Las Vegas, who has been an enthusiastic devotee of the big birds for twenty years. Ed enlisted a group of dedicated people who assisted in conducting one of the two most significant modeling events of 1978. The other event is the prestigious Tournament of Champions, also held in Las Vegas.

The fly-in was not a contest; it was an opportunity for the large plane enthusiasts to exchange information and to fly at random for fun. Enjoyment was the theme of the gathering. Perpetual trophies were awarded and, where applicable, the recipients were selected by votes from the attendees who brought models.

The records show that a total of 282 official flights were made by the big models during the 2½ days at the dry lake. There was a good bit of flight activity by full scale aircraft. Beside some 30 or so private planes that flew in, there was a Ford Trimotor operated by Scenic Airlines that was hopping passengers. An aerobatic demonstration was presented by a Great Lakes Trainer. Howie Keefe brought his exciting Miss America P-51 in for a visit and donated a passenger ride to the QSAA which was sold at auction. There were two hot air balloons which also hauled numerous passengers aloft.

For model demonstrations outside the large model category, John Simone, Jr., showed his talents and the capabilities of the Rev-olution helicopter. Spectacular ducted fan powered flights were performed by Bob Violett with his A4

Skyhawk II and Larry Wolfe with his Mirage III. Incidentally, these high performance models are now available as kits and use "out of the box" equipment available at hobby shops; no longer is it necessary to be a mechanical genius to enjoy flying a model jet fighter.

The model industry companies involved in the larger aircraft were well represented. Bud Nosen was smiling a lot as his products were prominent all during the weekend. Ron Shetter, of Quadra fame, discussed his engines with almost everyone; E.W.H. Specialties, with Bob Hutton and crew, introduced their new 2.6 cu. in. Super Hustler engine; Byron Godbersen and his team from Midwest Industries demonstrated several new kits, a reduction drive unit, and a ducted fan powered MIG model.

Eastcraft Specialty Products' Lectra-Starters were installed in numerous models; Wescraft flew their P-51 and B-17; Andy Sherber watched his 1/3rd scale Pitts S2A perform; Hazel Sigafosse and Maxey Hester from Sig were flying a Quarter Scale model of Hazel's Clipped Wing Cub. Joe Bridi bored holes in the sky with the Bridi Baby Ace and several Bridi Little Toni's were also flying. Dick Wangler of Hobby Lobby showed their new 1.9 cu. in. ERVA engine. Jim Fox of Custom Retracts introduced a heavy duty retractable landing gear system suitable for Nosen's P-51 and P-47.

The Las Vegas Fly-In was an unqualified success. Credit must be given to Ed Morgan, Larry Vance, Rex Glenn, Irv Kvenzi, Tom and Pat Bunker, Doreen Blanchette, Lee Taylor, Billy Root, and all of the others whose names we failed to get. The preparations were beautifully handled. Just anyone cannot obtain the use of the Stardust Hotel Convention Center for a full day and evening — they did! Their work in handling the hotel room reservations, in arranging the watermelon bust and chicken dinner, and many other details was a labor of pure dedication.

Plans are already underway for a bigger and better fly-in in 1979. We don't know how they can top this one, but somehow they will. BIG IS BEAUTIFUL! □

EVENT	WINNER	MODEL	SPONSOR
BEST OF SHOW	Bruce Lund	Curtiss Junior	R/C Modeler Magazine
BEST OF SCALE	Bud Barkley	Tiger Moth	Kraft Systems
BEST FINISH	Eric Meyer	Decathalon	K & B Manufacturing
BEST WWI	Bobby Haight	Pfalz D-IIIa	Carl Goldberg Models
BEST MILITARY SCALE	Jim Folline	PT-19	Kraft Orange County
BEST STAND-OFF SCALE	Dave Lloyd	Pitts S2A	Model Airplane News
BEST BIPLANE	Stan Calmy	Fleet Model 7	Coverite
BEST MULTI-ENGINE	Ray Baker	Cessna 310	Bridi Hobby Enterprises
BEST SCRATCH BUILT	Bradford Allen	Heath Parasol	Billy Root
BEST JUNIOR ENTRY	Duke Smith (15 yrs.)	Gere Sport	Summa Corporation
BEST MECH. ACHIEVEMENT	Bob Baker	Heath Parasol	Larry Vance
POWDER PUFF AWARD			
OF EXCELLENCE	Pat Bunker	Aeronca Champ	Budweiser-Michelob
CRAP SHOOTER EVENT	Fred Eastman & Gary Rheault		Circus Circus
MARATHON	Los Angeles Team	P-51	Du-Bro
LONGEST DISTANCE	Ray Colelli	3150 Miles	J & J Hobbies



Ron Kobilka and Herb Lindsay assemble their P-51B, scratch-built, Quadra power, 21 lbs., 7½ ft. span.



Bobby Haight brought a Pfalz D-III A, Cox 1.2 power, 22 lbs.



Junior winner, Duke Smith, flew a Gere Bipe, Quadra power, 22 lbs., 8 ft. span.



Bob Baker with scratch-built Heath Parasol, K & B .61 with Brice gear drive, 15 lbs., 8 ft. span.



Fleet Model 7 by Stan Calmy, Cox 1.7 power, 19¾ lbs., 7 ft. span.



Jerry Steel's Miss America version of a Nosen P-51, Quadra power, 25 lbs.



Aeronca C-3 by Brad Allen, Quadra power, 32 lbs., 1/3rd scale.



George Killeen's Webra .91 powered Taylorcraft in foreground, Mike Killeen's Roper powered Piper J-3 second in line.



Hazel Sigafosse and Maxey Hester with Quadra powered model of Hazel's Clipped Wing Cub.



Dummy engine in Bob Baker's Heath Parasol served as a heat sink to cool K & B .61.



Joe Bridi (R) gets needed help from Ed Morgan (L) and Bill Bennett.



Bud Barkley's Tiger Moth 82C, Quadra, 28 lbs., 98 in. span, has over 75 flights.



A pair of Pitts S1A's from Byron's Originals. Soon to be available in kits.



Don Anderson's 1/3rd scale SuperFli, Quadra, Lectra Starter, 15 lbs., 89 in. span.



Bert Baker, Cherokee 235, Quadra, 24 lbs., 93 in. span.



Eric Meyers' Decathalon from Nosen Citabria kit, Suevia 1.5, 16½ lbs., 8 ft. span.



PT-19 by Jim Folline, Quadra, 31 lbs., 9 ft. span.



WW I Albatros Fighter by Nate Rambo, Quadra, 25½ lbs., 7½ ft. span.



L.A. to Las Vegas Marathon entry by L.A. team. Quadra, 36½ lbs. take-off weight.



Wescraft P-51. Bill Halpin, pilot.



Pneumatic retracts for QS P-51 by Jim Fox of Custom Retracts.



Lectra Start mounted on Quadra by Eastcraft Specialty Products.



Speed reduction unit from Byron's Originals.



Lou Stanley's Rearwin Speedster built from RCM plans.



Dave Lloyd's 1/3rd scale Pitts S2A, Quadra, 21 lbs., 6 ft. span.



Fairey Tipsey, nice, but we have no info.



Ron Shettler with his Frontier, Quadra, 21 lbs., 8 ft. span.



Taylorcraft by George Killeen, Webra .91, 18 lbs., 9 ft. span.



Ray Downs' Aeronca Champ, Fox 78, 10 lbs., 9 ft. span.



Concept Fleet by Pudge Wilson, Quadra, Lectra Starter, 25 lbs.



E.W.H. crew with Puma, Super Hustler 2.6, 30 lbs., 9 ft. span.



Former RPV carries Poloroid camera. Jim Cline, McCulloch 2.7 engine.



Frank Comyns' Eindecker with Fokker D-VIII's, O & R 1.2, 14 lbs., 7½ ft. span.



Byron's Originals crew with their P-51, Rossi .61, 18 lbs., 86 in. span.



Volksplanes by Bud Grover, Quadra, 35 lbs., 6 ft. 8 in. span, 1/3rd scale.



Stinson Voyager by Chris Evans, Quadra, 20 lbs., 9 ft. span.



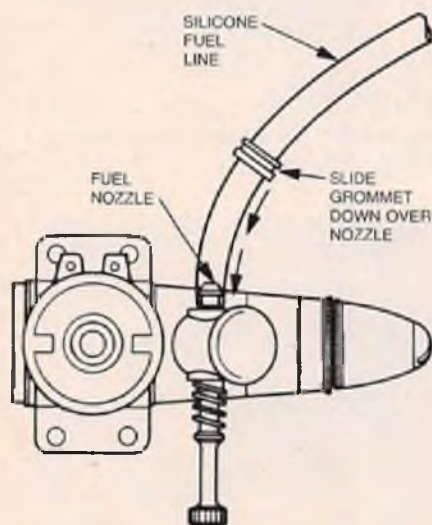
One of the four Nosen Cessna 310's entered.



Gere Sport by Neil Sweeney, Quadra, 26 lbs., 8 ft. span.

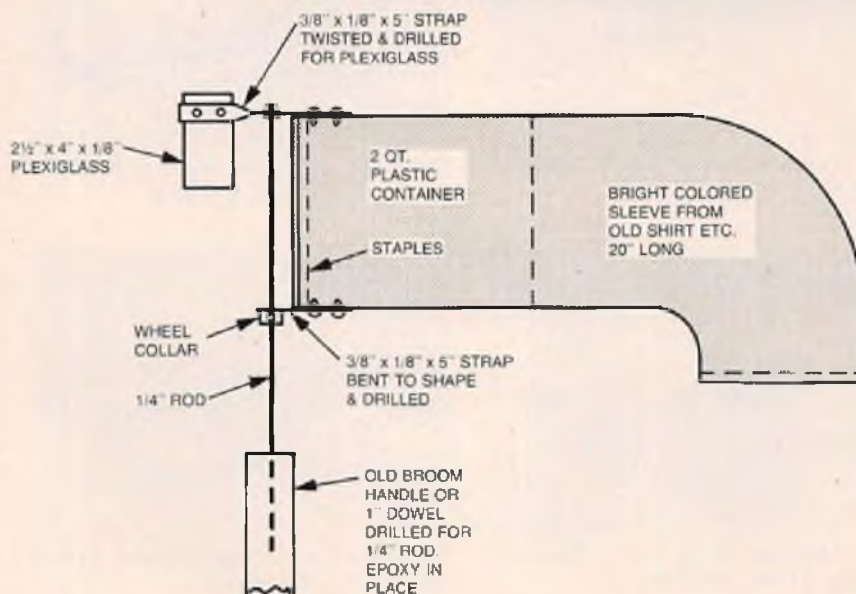
FOR WHAT IT'S WORTH

On Cox T.D. .049-.051 engines, there is a small nozzle for the fuel line to be connected for the fuel "feed-in". Bob Zimmerman of Neola, Iowa, in his past experiences with Half-A flying, found it difficult to keep the silicone fuel line from slipping off of the nozzle. Bob's idea is to slip a rubber servo grommet onto the silicone line and push it down an inch or so. Then put the fuel line on the nozzle and slip the grommet down over the nozzle. Now you have a tight "fuel line and fuel nozzle" connection. The accompanying sketch shows his method.

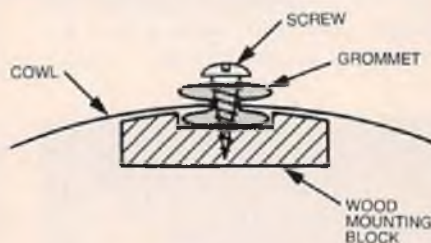


Jay Monce of the Peoria R/C Modelers Club in Illinois, has thought of another good application for Zap, Hot Stuff, etc. When making fillets or filling dents with D.A.P. vinyl spackling compound, apply a little cyanoacrylate glue to the D.A.P. immediately after sanding. The glue will not only seal the pores in the fillet, making it smoother, but will strengthen the D.A.P. making it more resistant to scratches and dents.

The wind sock shown in the sketch was received from Bernard Betten of Steamboat Rock, Iowa. The club he belongs to has been using this wind sock for several years and Bernard thought some other clubs might like to use the idea. The construction is simple and the cost is very small. Some explanations for the drawing are as follows: Drill the 1/4" rod to accept small cotter pins to support washers and straps (set screw collars could be used in place of cotter pins). The plastic container is fastened to the straps with small machine bolts with the old sleeve stapled to the container. The reason the sleeve is stapled is that when the material gets faded and weather worn, just remove the staples and re-staple a new sleeve in place of the old one.



Engine vibration can cause cracks which start in the mounting holes in plastic engine cowlings; it can also cause these holes to enlarge and loosen the mounting. Wm. D. Schierman, M.D. of Creve Coeur, Missouri, has a way to prevent this — mount the cowl with rubber grommets, the type and size used in mounting servos and servo trays, depending upon the size of wood screw or sheet metal screw used. To do this, enlarge the hole in the plastic cowl to accept the grommet. It may be helpful to cut or grind a groove in the wood mounting block which is attached to the firewall and to "countersink" the hole in the wood mounting block so the cowl will slip on easily and fit so that it doesn't quite touch the wood mounting block as shown in sketch. This method provides for a good, firm mount that insulates the cowl from vibration. It has been used successfully on a Platt T-28 and a Sig Liberty Sport.

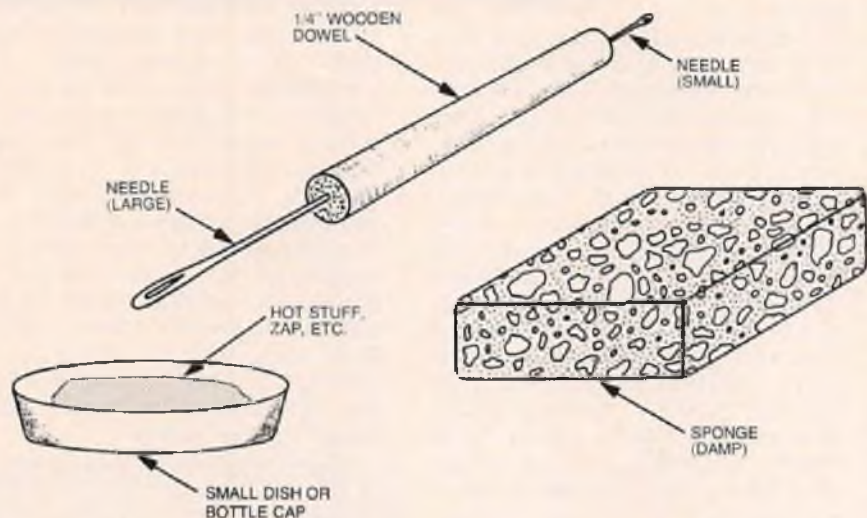


If you've ever tried to balance or ballast your model using lead strips or weights, you usually end up having to shave off some of the lead from the weight or trying to shape it to put it in those tight places where it takes the least amount of weight to accomplish the job. In most cases, you shave off too much lead or you end up gluing a bunch of lead shavings together, so that the

lead shapes to the tight area where it's needed. Ted Delahoussaye of New Iberia, La., has overcome these problems by using sand. It is a very accurate way of adding weight, since you can literally determine the amount needed to the grain. It can be easily shaped to any form or size since it will take on the shape of its container. You can spread glue on the area to be weighted and sprinkle the sand on it, or you can put the sand in plastic bags or pouches and glue them in place. Be sure to double wrap the sand bags, since one bag is likely to burst on an impact. Be sure the sand you use is **dry**. Wet sand will give you a false weight because the moisture will eventually evaporate, leaving you with less weight. If you're not sure that your sand is dry, bake it in your oven in an uncovered pan at 400° for 30 minutes. You can get sand at most plant stores, lumber companies, or your local shell yard or Highway Dept. You don't need much, so they usually will give it to you for free.

Don't throw away those plastic lids that come on Pringles, coffee, peanuts, etc. They are valuable to a modeler. These lids make excellent epoxy mixing trays, and are re-usable, yes, re-usable. Just mix your epoxy, use it, then set that lid aside. The epoxy on the lid can be periodically tested to find out when the glue on the model has set. Now when the epoxy has set, just twist the plastic lid around a little and the epoxy will break loose. Just peel it off and use the lid over again. Keep whatever amount of lids you need in the shop. This idea came from George Hughes of Warner Robins, Georgia, who has been using 5 or 6 lids in his shop for over a year now.

FOR WHAT IT'S WORTH



From Larry Renger of Costa Mesa, Calif., comes another useful idea on how to use cyanoacrylate adhesives. As shown in the sketches, you can pour a small amount of cyanoacrylate adhesive into the cap from a soft drink bottle and use the eye of a needle as an applicator. After a few uses, jab the end into a damp sponge to clean it. You can use various size needles to get whatever amount you desire. This will eliminate the tube which sometimes have a tendency to clog up. This is a nice and easy way of controlling the amount of adhesive you want to use.

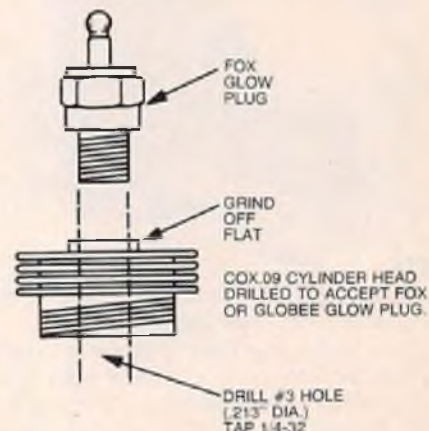
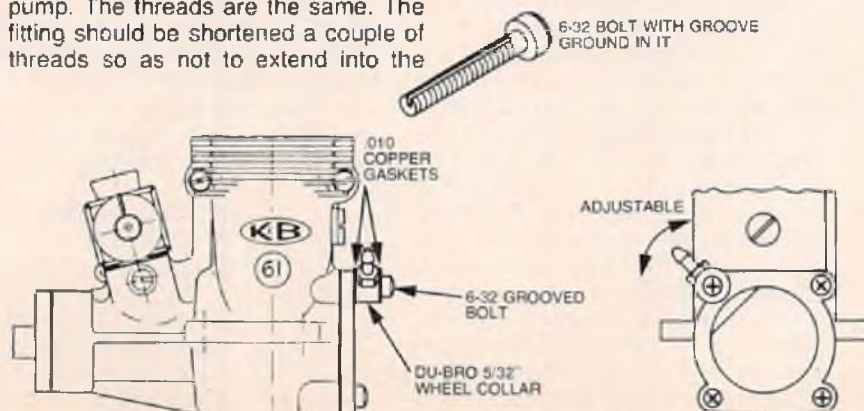
William P. Pangburn of Newark, Calif., sent in his solution for an adjustable 90° pressure fitting on his K & B .61 engine. The engine was mounted close to the firewall and he didn't want to drill and tap the backplate for the Robart Super Pumper. Bill first removed the upper left hand screw from the backplate. This hole is threaded clear through to the crankcase. Plug the hole with a small piece of cotton and file the lug surface flat. Use a fine tooth file which only takes a few strokes. Remove the cotton and then, with the set screw removed from a 5/32" Du-Bro wheel collar, screw in the pressure fitting that comes with the pump. The threads are the same. The fitting should be shortened a couple of threads so as not to extend into the

opening of the wheel collar. The next step is to select a 6-32 bolt that is long enough to go through the wheel collar and into the backplate. You'll need a bolt the length of the original, plus the thickness of the wheel collar and gaskets. With a Dremel tool and cutting wheel, groove the thread end of the bolt (see sketch) right to the head. Be careful not to deface the head as it has to be a good fit. This will now allow a passage for the pressure to the fitting. When installing this unit, Bill made two .010 soft copper gaskets, one for each side of the wheel collar to seal it properly. Most likely, a regular thin gasket material would work as well. Bill felt the copper would hold up better under the turning pressure of tightening the bolt. His reasoning on this system is the fact that there is no drilling or tapping to do - - - the work is done before you install the unit. The accompanying sketches show the end result.

Sometime in the past, RCM ran an article noting the danger involved in keeping metal fuel cans in the flight box next to the batteries we use to power our starters, fuel pumps, etc. Since then, Dr. Al Koller at the Kennedy Space Center,

Florida, tried a number of containers and finally found some, **free**, which do a great job. Depending on your consumption rate of fuel and how much room you have in your flight box, you can make a safe fuel storage container from the toner bottles found in liquid-based reproduction machines found in many offices. Both Apeco and Saxon, for example, come in different sizes and are plastic, so no hazards with electrical equipment are possible. Containers range from less than one to more than two liters in capacity. Some use ammonia, and need only to be washed out with alcohol. Others have a petro-based toner in them, but they clean out easily with plain old automobile gasoline. Use a Sullivan-type fuel tank rubber stopper for the feed and vent lines just as you would for a flight fuel tank, and you'll have an inexpensive, safe, and leakproof storage container which can be plumbed directly to your fuel pump for no-worry operation.

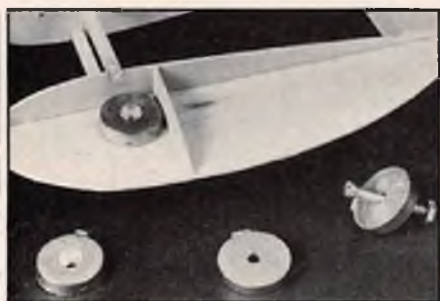
J. Dratch of Anaheim, Calif., has been flying a powered glider with a Cox .09 Tee Dee. Having trouble with glow heads burning out, he finally solved the problem. Taking the Cox glow head, he drilled it out with a #3 drill and tapped it to accept a standard 1/4-32 Fox or Globee plug. The first one that was converted was in use for 3 weeks and still going great. The saving is considerable with only a power loss of approximately 300-400 rpm with mild fuel - - - a little more with high nitro. The power loss was due to the larger cavity of the screw-in glow plug (lowers the compression). The Globee seems to be the best plug for this conversion.



Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free 1 year subscription to RCM.

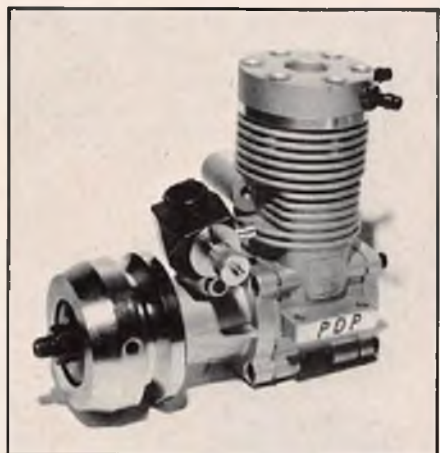
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THE GLUE-OR-SCREW WEIGHT

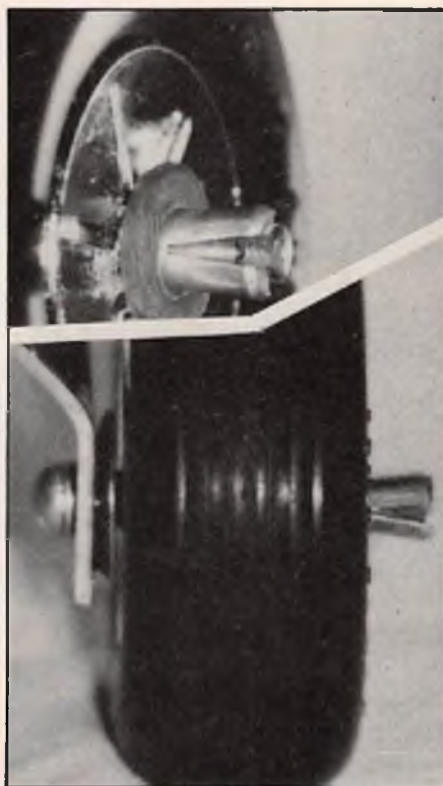
Harry B. Higley & Sons, Inc., 433 Arquilla Drive, Glenwood, Illinois 60425, presents the Glue-Or-Screw weight, a precision 1 ounce lead casting, especially designed as ballast for use on a model airplane. This weight can be attached with a wood screw, nut and bolt, or it can be glued in place with epoxy cement. The back is serrated for proper glue adhesion and the tapered shape acts as a wedge under the glue, making bond failure almost impossible. The Glue-Or-Screw weight can be used anywhere on the model with confidence because, once it's on, it stays. Price \$.89 for three.



HB ENGINES

HB Engines (Helmut Bernhardt) offers one of the most complete lines of top quality, high performance engines ever available to the U.S. market. All HB Engines have been contest proven all over the world. The workmanship is faultless and performance is legend. These quality engines are now available for all phases of the modeling hobby: U-Control Free Flight, R/C Planes, R/C

Boats, R/C Cars and R/C Helicopters. All HB Engines from HB.40 to HB.61 can now be equipped with the Perry Fuel Pump and special Pump Carburetor. The Perry Pump Back Plate plus a full line of accessories and spare parts are available from our large, complete stock. New engines now available in the U.S. include the new HB.61 PDP Marine, HB.40 PDP Marine (marine engines supplied with water cooled heads, steel flywheels and special Perry Carburetor) and the HB.21 racing car engines — with special automotive heat sink head and large air cleaner. Light weight (without muffler, less than 8.5 oz.) RPM range 3,000 to 28,000 — .83HP @ 25,000 RPM. Send for the complete list of engines, accessories and parts and free color catalog from Bavarian Precision Products Co. P.O. Box 6, New Canaan, Conn. 06840.



FLARED TIP AXEL

Flared Tip Axle now makes it possible for all models with aluminum blank struts to have professional wheel axles — no longer is it necessary to use a 2" bolt with nuts and lock nuts and perhaps a soldered washer gobbled on the end to hold the wheel on. Not only is the bolt and added hardware heavy, but it is unsightly, detracting from the sleek, careful attention you've put into your work. Flared Tip Axles are sharp, distinctive, static free, a new approach to a long neglected modeler's concern. Flared Tip Axles will fit any wheel capable of a 3/16" hole with hub widths up to and including 1". Each kit contains

a pair of aluminum axles, 2 self-tapping bolts, 2 lock washers, 2 flat fibre washers, instructions. Wheels and blank struts are not included. After tapping threads in the open end of the axle the wheel is run on the axle, the fibre washer goes on, and then the tip of the axle is flared to hold the wheel on. Simple, attractive, lightweight and static free, and adaptable to older installations, to new models, and to wheel pants of all designs. A complete kit is \$1.65 plus 35¢ postage and handling. Flared Tip Axle will need your name, address, zip and \$2.00 (Idaho residents please add 3% sales tax). Send to Flared Tip Axle, P.O. Box 761, Idaho Falls, Idaho 83401. Dealer inquiries invited.



"F4U Corsair in Action"

"F4U Corsair in Action" is one of forty titles from Squadron/Signal Publications of interest to the R/C scale enthusiast. This book covers the remarkable Chance Vought Bent Wing U-Bird from its origin through the Korean War and beyond. Its 13 full color illustrations, 14 detailed drawings and 125 black and white photos make this book a complete reference on the famous naval bird. The "In Action" series has been put together to provide the buff, historian and modeler with outstanding coverage of the subject. Special effort has been taken to show the aircraft in its operational environment. Many of the photos reveal details and interiors heretofore overlooked by other publishers. Some of the "In Action" series are the F-4 Phantom, F-100 Super Sabre, A-4 Skyhawk, P-47 Thunderbolt, P-38 Lightning, Messerschmitt BF 110, and other famous aircraft. Squadron/Signal Publications, 3461 East Ten Mile Road, Warren, Mich. 48091 asks that you purchase their books from your local hobby shop. Hobby dealers are offered the normal hobby discounts.

DUMAS NEW MODEL BOAT PROP

Dumas Products, Inc., 901 East 17th St., Tucson, Arizona 85719, has announced the release of a new bronze propeller for .60 size model boats. The new prop, #3107 is designated "P-102". It is 2 1/8" in diameter and drilled for 3/16"

showcase '78

shafts. The new prop makes a total of five bronze props made by Dumas and covers propeller requirements for model boats with engines from .049 through .60. The cast bronze props, as well as white metal, right and left hand rotation props for electric twin motor boats, and a series of plastic props for electric powered models, are available from hobby shops. Prices range from 55¢ to \$8.25.



float" boats. One the flat bottom, semi-V "Mariner" pleasure yacht; the other, the "Cobra Jet", a speed boat. Both are fiberglass complete with brightly colored gel coat finish. The yacht comes with MRC-Enya 35BIII TV Marine engine in place. The Cobra Jet has an MRC-Enya 40TV Marine installed. Both have waterproof boxes installed to house your radio equipment. Control rods, fuel tank, muffler, glow plug and starter belt are factory installed. These are really quite complete and need barely an hour to get them floating. In addition to being complete with engine, the boats come with MRC's new Turbo-Trol jet propulsion system. The system offers the average modeler uncommon maneuverability and control even in the most treacherous or stump-filled waters. With Turbo-Trol you can run the craft aground and still not damage the control mechanisms. There's no prop shaft or rudder assembly to break. With no external prop, the boats are great fun and excitement for the entire family. The Turbo-Trol system gives the boatsman an ability to run in reverse or brake in an instant. Sharp turns become an everyday reality. Complete with ball bearing bronze bushing for shaft support, the Turbo-Trol is a new generation of control. It features its own water outlet for supplying cooling water to the engine. The Mariner measures 36" in length with a 12 1/2" beam. Price is \$259.95. The Cobra Jet speed boat is 32" long, 17" beam. Price \$269.95. Both craft require a two channel radio (not included). A third channel can be used should the sailor want to utilize the brake or reverse control of the Turbo-Trol system. For further information, see your hobby dealer or contact Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N.J. 08817.

FLEX-MASK

Karoden Hobby Products, an innovative new company, has now introduced a long needed product called Flex-Mask. This is an ultra flexible masking tape which has the ability to lay flat around a 1/2" radius curve without wrinkling or bleeding under. It is extremely thin and has a low tack adhesive for minimum lifting of undercoats. With Flex-Mask you will no longer have to worry about how you will mask that fancy paint job. It is available



in two widths, 1/4" and 1/8", both come in economical 108 foot rolls. Available at your hobby dealer or direct. 1/4" \$2.95 per roll; 1/8" \$2.75 per roll. From Karoden Hobby Products, P.O. Box 434, Bergenfield, N.J. 07621.



DELTA RACE CAR CATALOG

The new 1978 illustrated catalog from Delta Manufacturing describes Delta 1/8 scale race cars and accessories. Chassis, bodies, disc brakes, clutches, engines, fuel systems, decals, wheels and tires, and high strength socket cap screws and self locking nuts are only part of the catalog. Exploded drawings of both the Super J (\$176) and the Panther Chassis (\$99.50) are included. Delta competition racing equipment was selected by the majority of USA circuit race champions in 1977 & continues to build an enviable track record in 1978. Send \$1.00 for catalog to: Delta Mfg., Dept., RCM, 27 Race Car Court, Lorimer, Iowa 50149.



KFIR C2

J & M Glascraft proudly announces a new model in their line of 1/2A (.049) model kits. Their latest is the KFIR C2 Israeli Aircraft Industries delta. The KFIR C2, designed by Kieth Shaw and



NEW DU-BRO

1/2A MODEL ACCESSORIES

From Du-Bro Products, 480 Bonner Rd., Wauconda, Illinois 60084, are three new 1/2 A model accessories. (1) Mini-Kwik Links, priced at 2 for 39¢ are small and strong and only 3/4" long. They snap and lock in place to prevent accidental opening under heavy stress loads. They are self-threading to fit 2-56 rods or couplers. (2) 1/2 A Control Horns priced at 2 sets for 49¢. They have 3/4" long - 4 adjustment positions and each set contains 1 right and 1 left control horn for safer installations. This enables you to mount a horn safely on either side of elevator while keeping the mounting holes furthest from the edge. (3) Mini-NY Steel pushrod assembly, priced at 2 complete sets for \$1.49. They are 20" long and feature no shrink, no-stretch, free running pushrod assembly. Perfect for 1/2 A airplanes; are lightweight, flexible and strong; trim settings are not affected by weather conditions; and have new spring thread couplers at both ends for micro trim adjustments. See your dealer or for further information contact Du-Bro Products.



MRC

READY TO FLOAT BOATS

MRC has introduced two "ready to

John Fotiu, has a wing span of 26", wing area 245 square inch, fuselage length 28" and flying weight is from 21-23 ounces. The kit includes a lightweight epoxy fiberglass fuselage (about 4 ounces), foam wing cores, rolled plans, canopy and trailing edge stock. Although the photo shows landing gear and wing tanks, the latest information is that flight performance is improved drastically when they are eliminated. The kit can also be built as a Dassault Mirage. J & M Glascraft also kits the Miss Paranoia P-51, champion Quarter Midget racer for hot .15's and the Fun-X 1/2A (.049) pattern and sport airplane. All have epoxy fiberglass fuselage and foam wings. J & M Glascraft kits are intended for the experienced modeler only. Construction and flight characteristics require advanced building and flying skills. The KFIR C2 is priced at \$40.00 plus shipping and are available from J & M Glascraft, 30820 Mayflower, Roseville, Mich. 48066.



NEW SIZE DRILL JIGS

Prather Products, 1660 Ravenna Ave., Wilmington, Ca. 90744, introduces three new size Drill Jigs. The first fits the Rossi .15 or Cox .15; the second fits the Kraft .61 or Webra Speed .61; and the third fits the O.S. .60 SR. Drilling and tapping motor mount holes which exactly fits your engine are easy, even without a drill press, when using our drill jigs.

STOCK DRIVE PRODUCTS CATALOG

A new 224 page catalog from Stock Drive Products contains over 8,800 inch and metric small belt and chain drive components and features a large off the shelf metric component selection. The standardized components in the catalog, are produced by SDP for both prototype and production requirements



so that engineers and specifiers can eliminate the added expense of custom designing small drives. Featured in SDP-651 is a new series of 1/4" high speed flat belts and pulleys. The belts, designed for a maximum speed of 20,000 FPM, are made of 1 ply polyester woven cord and having a working tension of .5 to 6 lbs. The metal reinforced Lexan 500 flat belt pulleys are offered in 3/16" and 1/4" (5 and 6mm) bore sizes. Other SDP drives in the catalog include roller chain drives, fractional HP Round and "V" belts, companion pulleys, variable speed pulleys, single and double groove sheaves, drive tighteners, idlers, plus a new series of miniature cable drives. All new products are conveniently identified in reverse type on the code number index page. The new Catalog SDP-651, is available at just \$1.95 postpaid from Stock Drive Products, Division of Designatronics, Inc., 55 South Denton Ave., New Hyde Park, New York 11040.



R/C CALENDAR

For 1979, Photography by Fred House presents the 1979 R/C Model Calendar! Finally a calendar designed especially with the modeler in mind is available. Each month of this calendar features an 8 x 10 size full color photograph of a radio control model aircraft. The entire spectrum of aircraft are represented with the scale aircraft

posed in scale-like surroundings, general interest aircraft posed with lovely ladies, racing aircraft, pattern aircraft, biplanes, every type is included! When the year is over, save that calendar as each photograph is suitable for framing! The calendar itself is 10" wide by 18" long and features a special vertical format for each month with plenty of space for noting contests, meetings and other events important to the R/C modeler. Quality has been stressed throughout with the use of enamel coated semi-luster paper of 100 pound density and full color printing. All photography of the model aircraft was done by Fred House whose combined career in photography and radio control modeling totals eleven years. In addition to photography as his business and R/C as his hobby, Fred has served six years with the U.S. Navy as a pilot of the A-6 attack aircraft. Fred's experience in both photography and aviation has provided the truly outstanding photographs featured in this calendar. The 1979 R/C Model Calendar is available from Photography by Fred House, 9032 90th Northwest, Oak Harbor, Wa. 98277. The cost for the 1979 Model Calendar is \$4.95 plus .75 cents shipping and handling. Washington state residents please add 5% state sales tax.



NEW DREMEL 4" SAW

Only 13" x 12" x 9", the new Dremel Model 580 motorized 4" table top saw is being introduced by Dremel, Division of Emerson Electric Company, Racine, Wisconsin. The saw can be used for perpendicular cuts up to 1", and is fully adjustable for mitered cuts up to 3/4". The new Dremel Model 580 is designed for the do it yourself, hobbyist and craftsman for home or shop repairs, picture framing, model hobby and crafts work and general purpose sawing of wood and plastics. And yet, it is small enough to easily store in the home workshop, apartment closet, mobile home, garage and trailer — weighs less than 10 pounds. A 10" x 12" work table is provided on a sturdy glass reinforced engineering plastic base with a 4" work

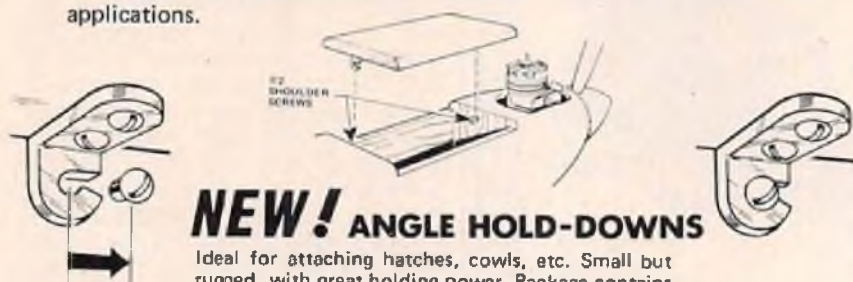
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NEW!



HATCH HOLD-DOWNS and other needed items!

Here's the answer to an old problem — how to hold a hatch securely, yet remove it quickly. Our two new nylon hold-down designs snap on and off instantly. The side-action types have tremendous holding power, the end-action is for lighter duty. Adaptable to many applications.

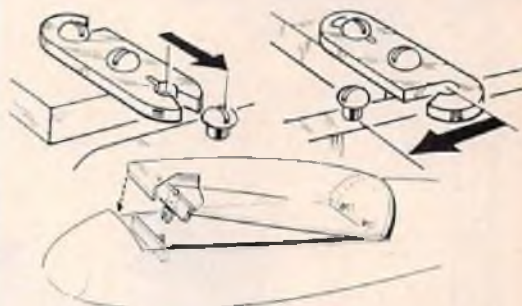


NEW! ANGLE HOLD-DOWNS

Ideal for attaching hatches, cowls, etc. Small but rugged, with great holding power. Package contains 2 pairs of left and right hold-downs with all screws and instructions.

No. 278 (AH1) 69¢

NEW! FLAT HOLD-DOWNS



Permit either side or end-action. Excellent for glider canopies, servo trays, hatches, wing struts, antenna fin clip, etc. Package contains 4 hold-downs with all screws and instructions.

No. 277 (FH1) 69¢

NEW! 3/32" 1/2A

STEERABLE NOSEGEAR

Now you 1/2A modelers can have the steerable nosegear you've long wanted. Plated rugged music wire strut furnished with axle unbent for your own height selection. Complete with steering arm, all mounting hardware, and instructions.

No. 167 (SN332) \$2.50



NEW! STRONG 1/16" THREADED COUPLER

Have you ever had a coupler break where the thread adjoins the body? CG Threaded Couplers use a different manufacturing method, making a stronger unit where the thread ends. Two per package, for joining 1/16" wire to clevis.

No. 217 (TC116) 35¢



NEW!

SMALL HINGE SLOTING FORK

For Klett RK-2 small hinges and others. Fits CG Slotting Blade Handle or large Xacto handle. Small Pinned Hinges Slotting Fork No. 276 (SF2) 50¢; or Large Fork for reg. size hinges

No. 271 (SF1) 50¢



NEW!

5/32" NOSEGEAR STRUT with ADJUSTABLE AXLE

Fits CG 5/32" nosegear bearing and most others. Rugged 5/32" nickel-plated music wire with special hardened axle and socket head screw.

No. 169 (NSA-532) \$1.29



1/8" NOSEGEAR STRUT

Fits CG 1/8" nosegear bearing and most others. Rugged 1/8" music wire is nickel-plated.

No. 168 (NS-180) 60¢

NEW!

LONG 2-56 PAN HEAD MACHINE SCREWS

Hard-to-get long lengths are featured here. Packaged in 1", 3/4", 1/2" and 1/4" lengths. Each set of 8 is complete with nuts and washers.

2-56x1" No. 330 (MS208) 49¢

2-56x3/4" No. 329 (MS206) 49¢

2-56x1/2" No. 328 (MS204) 40¢

2-56x1/4" No. 327 (MS202) 40¢



For best service, see your dealer for items you want. If not available, write direct: add 50¢ per item (\$1.00 outside U.S.) Minimum order \$1.

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MANUFACTURERS — All our accessories are available at excellent O.E.M. bulk prices.

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Catalog with Basic Explanation of R/C
Equipment and Radio Control Definitions

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NEW
SILVER STAR
SERIES

HP ENGINES

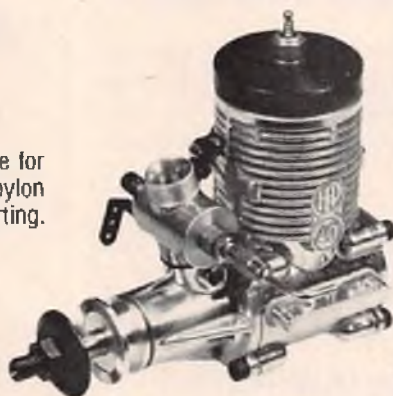
HIRTENBERGER — AUSTRIA

NEW PRODUCTION SERIES WITH FINEST QUALITY AND PERFORMANCE EVER OBTAINED BY HIRTENBERGER.



HP40F R/C. Light weight powerhouse for pattern flying, scale, and class pylon racing. Super idle and quick starting. Over one horsepower.

HP40F U/C. Placed 2nd at World U/C Championships. Compact crankcase and light weight (10 oz) is ideal for U/C and free flight.



HP61FS R/C. For R/C pattern and scale flying. Long life bearings and rugged internal parts makes for reliable contest flying. 1.6 + horsepower.

(silencer and glow plug not included)

All HP engines feature "schneurle" porting, forged piston/connecting rod/crankshaft, double ball bearings, excellent craftsmanship, light weight, smooth running, optional tuned silencer pipe for 40 and 61, parts available.

MW 777-3



Available at your favorite dealer

**MIDWEST MODEL
SUPPLY CO.**

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P.O. Box 518R

SHOWCASE '78

from page 92/90

area in front of the blade. The motor and blade tilt 45 degrees for bevel cuts. Locking depth and angle adjusting controls are all located up at the front of the table saw for easy accessibility. Safety-engineered throughout, a see-through amber colored blade guard covers the 4" combination blade at all depths and angle settings. Spreader and anti-kickback pawls keep the work from binding or kicking back at the operator. An "Alert Red" Pull-On/Push Off power switch has provisions for

locking the saw in the Off position. The compact, table top saw has an anti-glare black surface. The Dremel Model 580 saw is powered by a ruggedly built 2.2 amp, 115 volt, 60 Hz, AC, U.L. listed 9800 rpm motor with ball and sleeve bearings. A self-aligning adjustable rip fence and calibrated adjustable mitre gauge may be easily positioned on either side of the cutting blade. A convenient sawdust chute at the back of the motorized saw can be attached to a bag or vacuum cleaner. The saw itself is designed so that it can also be permanently attached to a table or workbench. The new Dremel Model 580 retails for only \$89.95. The saw comes with a 4" combination blade (1/2" arbor

hole), blade wrench and mounting screws. A fine finish saw blade is also available at \$4.95. It can be purchased at hardware, hobby and crafts dealers who handle Dremel's creative power tools, attachments and accessories. For further data, you can write to: Dremel, Division of Emerson Electric Company, Dept. P.R. 4915 — 21st St., Racine, Wisc. 43506.



4" SCALE WHEELS

New from Robart are 4" scale wheels with new exclusive features: The modeler can customize his wheels to suit his scale subject. A choice of straight grooved tread or crosshatch block (diamond) tread, allied or axis sidewall lettering, and spoke, smooth, and open hub cap styles, are available. Straight grooved tread \$8.49/pr., diamond tread \$8.99/pr. Available from Robart, 310 N. 5th St., St. Charles, Ill. 60174.



NOMAD SAILPLANE

Balsa U.S.A., Box 164, Marinette, Wisc. 54143, presents their Nomad sailplane. This complete kit features a 100" span, 10" chord, 914 sq. in., rolled plans, balsa and ply and is fast building. Direct only from Balsa U.S.A.

COREFILM

A new product, Corefilm, replaces using white glue, epoxy, or contact cement, for sheeting foam wing cores. Corefilm is a tough, thin, lightweight mylar tape which has been coated on both sides with a contact adhesive.

Corefilm is ready for instant use. After
to page 98

Six great reasons to give or get R/C gifts from Cox.

You've got five exciting, ready-to-run R/C models to choose from. And the best selling radio that controls them all. The classic Cox/Sanwa 8020.

No other two channel system gives more quality for the money. Or provides such precision control for all these *ready-built* models.

Ready-to-run R/C gifts are the best gifts of all. Because the fun starts on the spot. Unwrap them and run them—right on Christmas Day!

The breakthrough plane in ready-to-run R/C is our *Cessna Centurion*. Perfect for beginners, the easy flying Cessna sports a factory installed QRC .049 engine and 36-inch wingspan.

R/C's first ready-to-fly powered sailplane is the giant *Sportavia*, also with a factory installed QRC .049. That 70-inch wingspan makes for great soaring. And for great sport sailing or competition, launch the 36-600 class *Tradewinds*. It's ready-to-float with a pre-painted hull and optional sail winch.

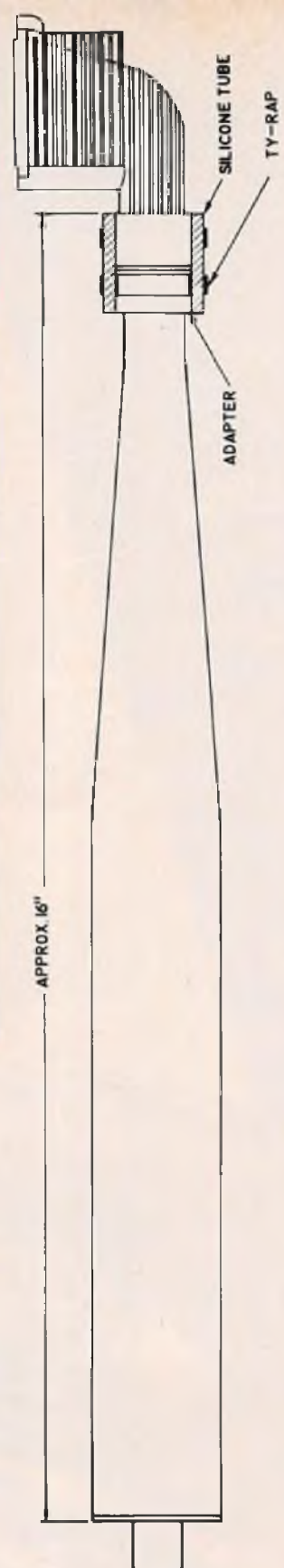
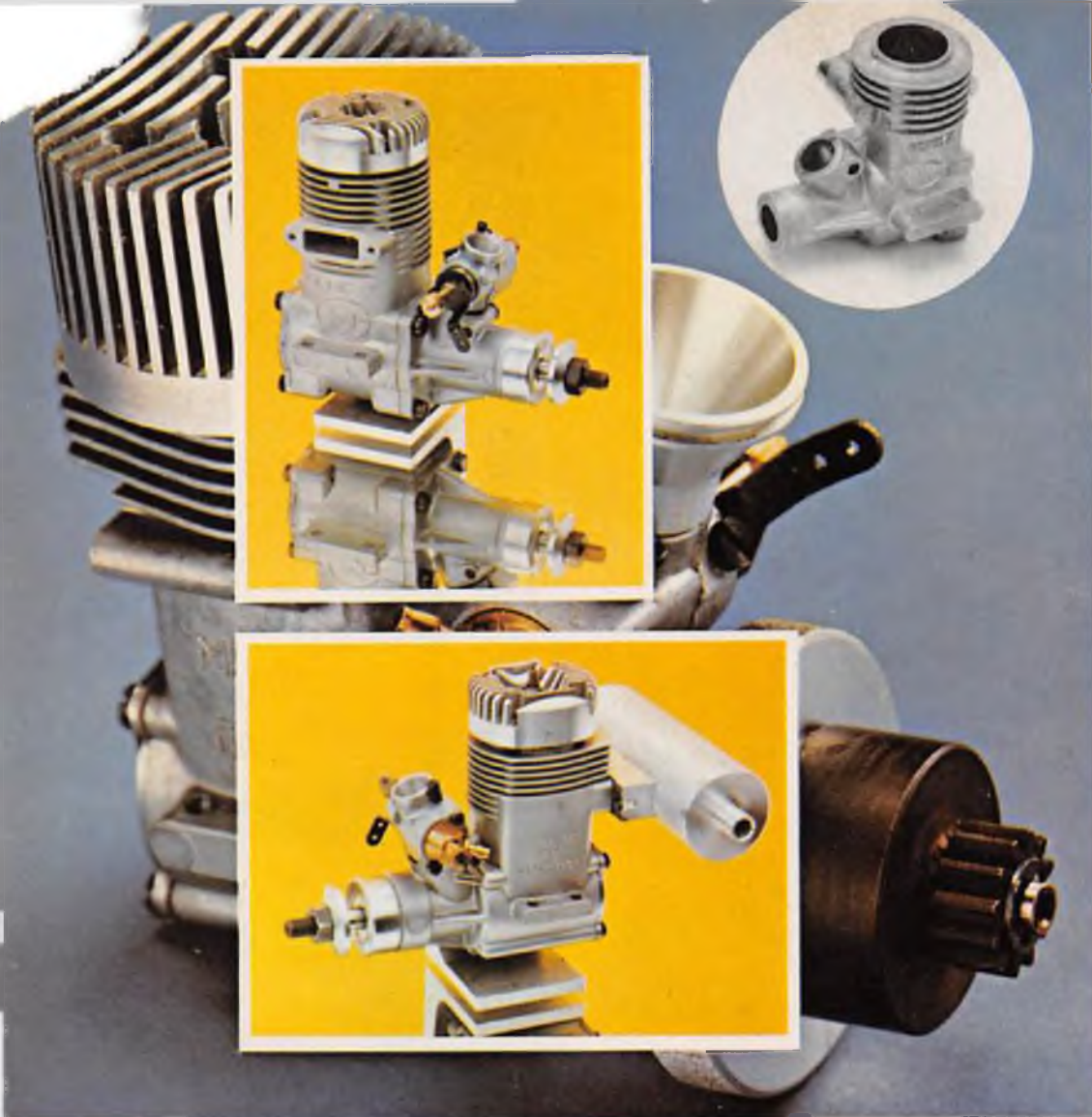
In R/C cars, both the *Ferrari 512 BB* and *BMW 3.5 CSL* give you speeds up to 30 mph, superb handling, and more: fully assembled chassis; proportional speed control forward and reverse; high-impact, pre-painted body; and a .05 motor, six-cell rechargeable battery pack and extra gear sets all included.

Whichever Cox ready-built you choose, be sure to include the 8020 radio. Then, expanding a collection of fine Cox models doesn't require the purchase of another R/C system. And that's like getting a present anytime of the year.



Cox/Sanwa Radios, Airtronic Kits, Cox Engines.

COX HOBBIES, INC. A subsidiary of Leisure Dynamics, Inc.
1505 East Warner Avenue, Santa Ana, CA 92702



SUPERTIGRE

SUPERTIGRE is on the move in 1978! New and coming, shown in the circle above, is the crankcase for the ST X-11 R/C Schuerle. In 1978 we have also had the Supertigre X-60 rear exhaust and side exhaust. Both of these engines have front induction. We have pipes and elbows for the 60's along with pipes for the X-45 rear exhaust. We have mufflers coming for the X-45.

In addition to this we are re-activating an older engine, the G21/40 R/C. It has a retail price

of \$66.95 (cat. no. 15125) and is an outstanding value for a twin ball bearing, ringed engine. Supertigre makes an excellent throttle for this engine that idles down to a tick. Production of this engine was a result of a long discussion between John Maloney of W.E. and John Kilsdonk of Detroit.

John Kilsdonk is spending a lot of time helping beginners in the Detroit area to fly R/C. He believes that a baffled pistoned 40, like the G21/40 Supertigre, is an excellent choice for trainers

like the Sig Cadet or our Miss World or the RCM Trainer 40.

Engines like the G21/40 are more tolerant when overpropped, which seems to be the natural tendency of people flying a low wing loading airplane like the Sig Cadet. These engines are in production in Italy and will be arriving in the U.S. about the last week in November.

In addition to working on the new 11, Mr. Garofali's next project is a rear exhaust 90. Watch coming ads for pictures.

World Engines

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SUPERTIGRE X-60 SIDE EXHAUST

W.E. CAT. NO. 15131

\$125.00 ABC Schnuerle ported R/C pattern engine.
Enjoy a high powered Schnuerle design from Mr.
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his Tigres. Pipe & adapter Cat. No. 15222, \$29.95.

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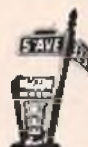
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Aster Marine Boilers are designed to be used with the Aster two and three cylinder marine engines. They are ideally suited for use in model boats with radio control. The boilers are supplied completely finished and include a pressure-ized alcohol burner. Standard fittings furnished with boilers include a Pressure Gauge, Sight Glass Water Level Indicator, Two Safety Valves, Regulator and Steam Pipes for connecting the boilers to the Aster marine engines.

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SHOWCASE '78

from page 94/90

covering the wing core with 1½" strips of Corefilm, remove the paper backing and set plywood or balsa sheeting material in place and press on to the foam core. The bond is instant. Corefilm is flight tested, on gliders and power ships. The tough

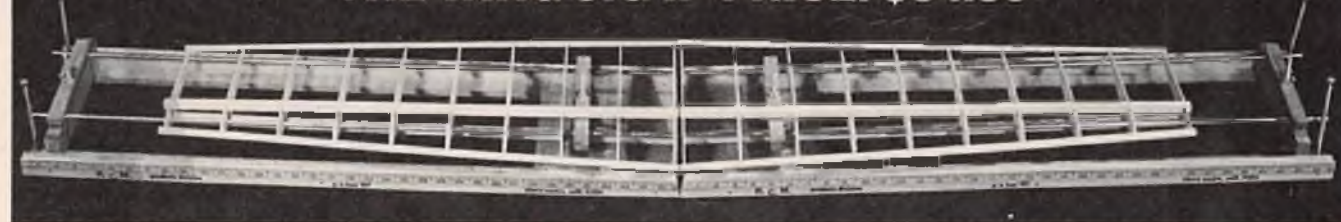
mylar film which provides a strapping tape effect, both top and bottom, has proven to be of desirable and superior quality. Corefilm comes in 1½" wide 36 yard rolls. One roll will cover over 1900 sq. in. or more than 13 sq. ft. List price for the 1½" roll is \$8.95, the introductory price is \$5.50 per roll plus 50¢ shipping. Calif. residents add 6% tax. Order from Bill Evans Aircraft, 19216 Calvert St., Reseda, Calif. 91335.

RIB PROFILER

A unique, new, adjustable rib profiler has been introduced by Jim Denaro Model Products, 543 Bedford St., Concord, Mass. 01742. Called the Taper Ace, this patented, template device enables model makers to design and draw rib profiles for built-up tapered wings quickly and precisely. Until now, as modelers know, the task has entailed

to page 100

THE WING JIG II—PRICE: \$34.50



The original RCM Wing Jig, first published in the August 1967 issue of this magazine made it possible for many modelers to build their airplane wings warp-free and in far less time than it had previously taken. The **WING JIG II** offers many design improvements on the original version that greatly extends both its versatility and the accuracy of the wings produced. It is now used exclusively in the RCM shop for all building projects.

The **WING JIG II** consists of two sections hinged in the middle. Each section consists of a front and back "L" shaped base piece. A jig rod support is located at either end of each wing jig section to mount the rods that support the wing ribs.

The switch to a double length jig that's hinged in the middle makes it possible to build an entire wing, complete with the dihedral called for in the plans, in one operation. Or, the **WING JIG II** can be set up flat to use both sections to build up a wing panel for one of those big powered or glider jobs. Or, with the dihedral set, a polyhedral wing can be accurately built. It can even be used to join foam wing halves to get the dihedral as it should be.

A uniquely designed rod end support makes it possible to true the wing jig rods to order. A simple protractor device makes it possible to set the dihedral even when it is given in degrees. The addition of adjustable end legs make it possible to set the dihedral accurately for each wing panel. New "L" shaped base pieces assure a warp free jig to start with. A yardstick attached to the front of the base pieces helps in spacing the ribs when the wing is set up on the jig. A bubble leveling arrangement assures both wing panels will be true to each other. A new design rod support makes it possible to move the two wing jig rods from as close as you'd want them to 6½" apart. And, a new technique makes it possible to build those small cord wings with ribs too narrow for two wing jig rod holes.

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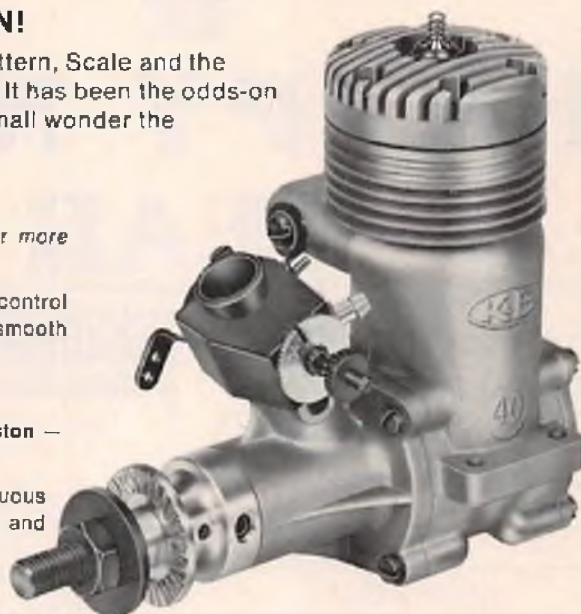
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It all adds up to many reasons . . . including K & B's continuous search for, and incorporation of, new and improved features and methods of production.



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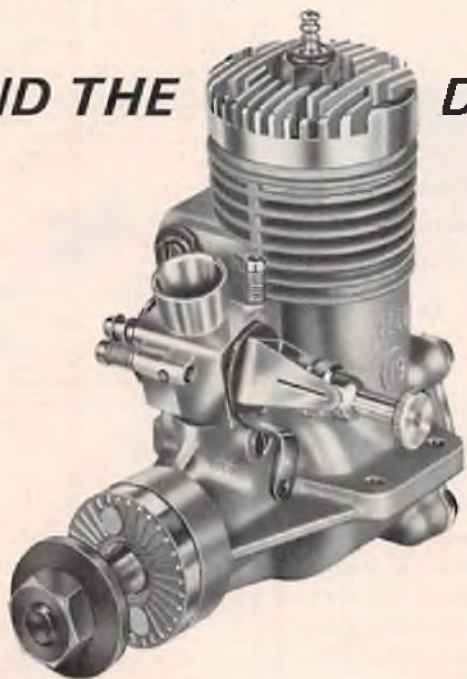
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SHOWCASE '78

from page 98/90



time-consuming plotting, calculations and French curve work. With the Taper Ace, modelers can draw rib profiles for all popular airfoils in a matter of seconds. The device includes two templates which are movable with respect to each other: one for defining the top portion or a rib profile, and the other for defining the bottom portion. A locking slide assembly permits the template to be moved in such a way that proportionally accurate profiles can be drawn for wing rib chords from 4" to 11" in length. The Taper Ace features easy to read chord and spar reference scales and a center (datum) line for jig hole location. Thickness percentage is adjustable to 4%. It's precision made of durable plastic, comes fully assembled, with complete operating instructions. The Taper Ace is priced at \$24.95, and can be ordered direct from the manufacturer.

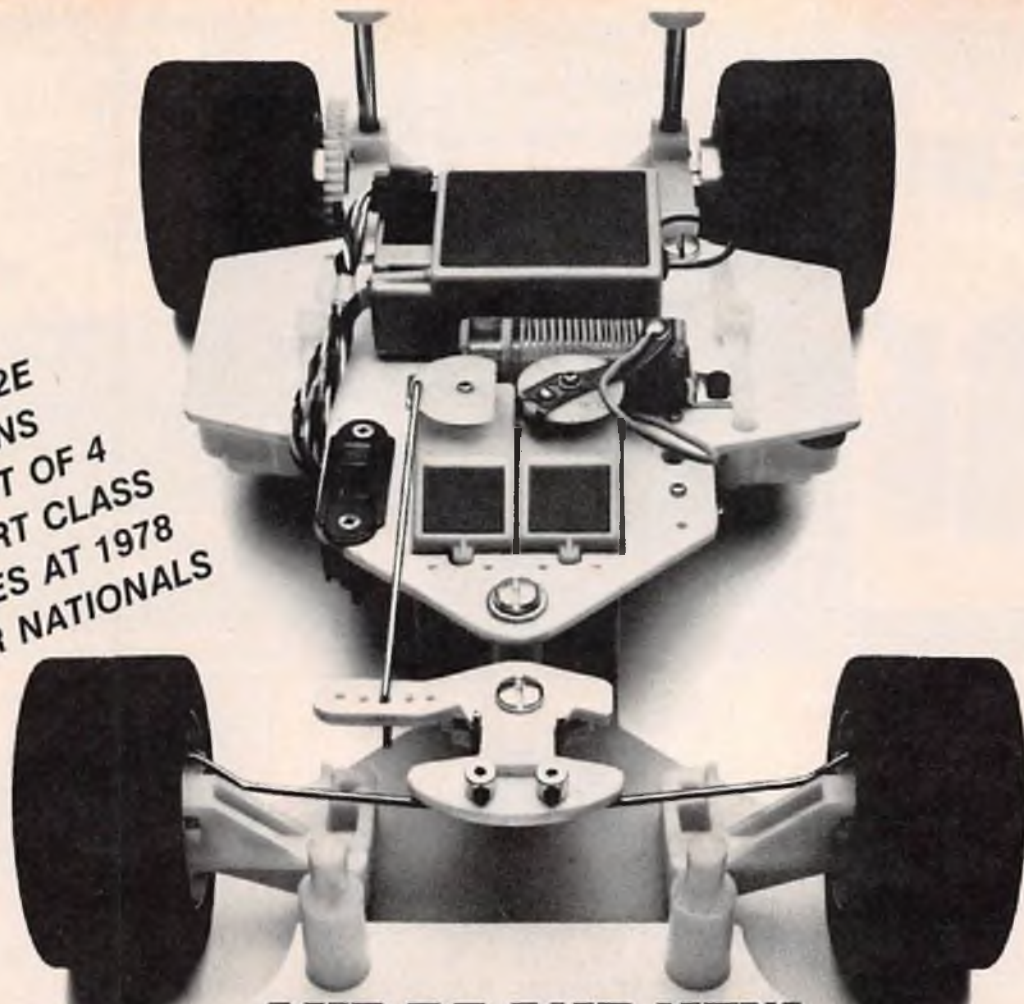


FLITE LINE KITS

Flite Line Products, 3207 - 34th, Lubbock, Texas 79410, introduces four of their kits now available. They are the "EZ Trainer", a super simple, touch little trainer. Ideal first plane using rudder, elevator and throttle control. Balsa and ply fuselage — foam wing. Wing span - 48"; weight - 3 1/4 lb.; wing area - 480"; engine - .19 to .35. Price is \$29.95.

to page 102

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SHOWCASE '78

from page 100/90



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to page 113

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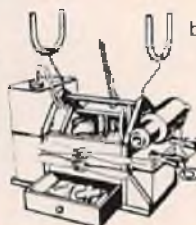
DUMAS 35%
HOT SHOT 21 OFF



This fiberglass tunnel hull with pickle fork bow is 27" long and is very competitive. Add the K&B .21 outboard engine and a 2 ch. radio and go!

RETAIL NOW ONLY \$44.18
\$67.95 R0002

GOLDBERG 38%
HANDI TOTE OFF

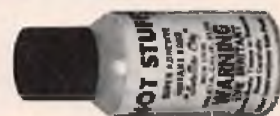


This flight box is compact yet has room for everything you need.

Most popular flight box ever made!

RETAIL NOW ONLY \$9.98
\$15.95 R0003

HOT STUFF 44% OFF
HOT STUFF



Hot Stuff is an instant bonding cyanoacrylate super adhesive that is a must for modelers. Stock up now at this super price. .5 oz.

RETAIL NOW ONLY \$1.98
\$3.50 R0004

K & B .40 40%
RC ENGINE OFF



The most popular .40 ever made! Features a Perry carb.

Quantities are limited. Limit of 1 engine per order until sold out.

RETAIL NOW ONLY \$39.98
\$67.50 R0005

DU-BRO
KWIK
FILL
FUEL
PUMP
36%
OFF



RETAIL \$10.95
NOW ONLY \$6.98
R0006

HOUSE OF BALSA 30%
P-51D (.29-.40) OFF



This all balsa sport, stand-off scale ship is beautiful. It has a 49" wing span and takes a .29 - .40 engine.

RETAIL NOW ONLY \$38.48
\$54.95 R0007

K & B .61 40%
R/C ENGINE OFF



The most popular .60 engine in the R/C hobby!

This outstanding engine features a Perry carb and muffler.

RETAIL NOW ONLY \$53.98
\$90.00 R0008

TOWER HOBBIES 50%
R/C LONG GLOW PLUGS OFF

These excellent glow plugs feature an idle bar. Made by the world's finest plug manufacturer especially for Tower. 6 plugs per package.



The best buy anywhere!
RETAIL NOW ONLY \$3.58
\$7.20 R0009

STERLING 40%
1/2 A CORSAIR OFF



This all balsa 36" span kit features special hardware and decal sheet. Requires a .049-.10 engine and a 2 channel radio.

RETAIL NOW ONLY \$17.98
\$29.95 R0010

TOP FLITE 36%
HEAT GUN OFF



This fine quality heat gun features a 3 position switch, nozzle attachment, 2 speed heat control, and long motor life. Great for Monokote, Solarfilm etc.

RETAIL NOW ONLY \$17.98
\$27.95 R0011

DUMAS 24" 40%
HOT SHOT TUNNEL HULL OFF



This die-cut mahogany and birch plywood kit is designed for a 3.5 cc outboard like K&B's.

RETAIL NOW ONLY \$19.48
\$30.00 R0012

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COX READY TO FLY SPORTAVIA THE PERFECT TRAINER

35%
OFF



This completely ready to fly molded foam trainer with a 70" wing span is unbelievably easy to fly. The first-flight beginner can take off and land by himself. Comes with .049 engine installed. Requires the Sanwa 2 channel or any other 2 channel radio.

RETAIL \$84.95

NOW ONLY \$54.98

R0013

COX READY TO FLY CESSNA CENTURION

35%
OFF



This all molded foam scale model comes complete with a Cox .049 engine, prop, push rods, horns, and all other fittings already installed. 36" span. Requires a 2 channel radio.

RETAIL \$69.95

NOW ONLY \$45.48

R0014

DREMEL MODEL 381 MOTO-TOOL WITH FULL ACCESSORIES

40% OFF



The Model 381 is the ultimate in hand grinders. It features variable speed control, ball bearings, and full accessories.

RETAIL \$69.95

NOW ONLY \$41.98

R0015

TOP FLITE SEALING IRON

30%
OFF



This sealing iron is great for covering with Monokote, Solarfilm, etc. It features adjustable temperature, teflon shoe, and a handy shape. Excellent quality.

RETAIL \$18.95

NOW ONLY \$13.28

R0016

MILLER No. 2017 SPRAY SET

40%
OFF



Complete set includes a 12 foot air hose, compressor, spray gun, air brush, and nozzles.

RETAIL \$77.95

NOW ONLY \$46.78

R0017

SULLIVAN ELECTRIC STARTER

35%
OFF



The Sullivan electric starter is a high torque, high R.P.M., 12 volt starter. Limit of 1 per order.

RETAIL \$36.95

NOW ONLY \$23.98

R0018

QUADRA 2 CUBIC INCH ENGINE

The perfect engine for the biggies. It comes complete with muffler, mount and Tillitson pump/carb. Longlasting.



RETAIL \$139.95

NOW ONLY \$99.98

R0019

DEVCON 5 MINUTE EPOXY IN ECONOMY 9 OZ. SIZE

40% OFF



Now in squeeze bottles for your convenience. Limit of 3 per order.

RETAIL \$5.80

NOW ONLY \$3.48

R0020

DREMEL 572 MOTO SHOP

35%
OFF



This deluxe saw features a complete accessory set of blades, discs, etc. and flexible shaft. Limit of 1.

RETAIL \$89.95

NOW ONLY \$58.88

R0021

GOLDBERG FALCON 56

40%
OFF



This all time best seller is now re-designed with ailerons. 56" span. Uses a .15 - .35 engine, all balsa construction. An excellent trainer.

RETAIL \$44.95

NOW ONLY \$26.98

R0022

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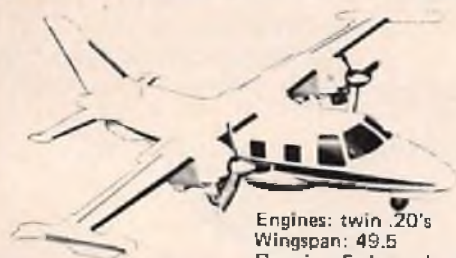
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EXHIB' AIR MITSUBISHI MU-2L -- NEW!!

15%
OFF



Engines: twin .20's
Wingspan: 49.5
Requires 5 channel radio

EXCELLENT QUALITY!! For the modeler who demands absolutely the finest. Features a white glass gel-coated fuse and engine nacelles, a built up balsa wing with 1/16" balsa wing sheeting included, all necessary accessories and hardware, a scale nose gear, and a 1/4" solid balsa sheet stab and fin.

RETAIL NOW ONLY \$169.98
\$199.95 R0206

EXHIB' AIR FAIRCHILD F-27

35%
OFF



EXCELLENT QUALITY!! Flight characteristics are stable, predictable, and realistic. 96" span. Uses a 5 or 6 channel radio and two .60's. Features precut plywood frames; white gel-coated fiberglass nacelles, cone, cap. Scale aluminum landing gear.

RETAIL NOW ONLY \$259.98
\$399.95 R0205

*Radio
Sale!*

BE A SMART SHOPPER; COMPARE OUR PRICES. HERE IS JUST A SAMPLE
OF OUR LOW PRICES. WE HAVE THOUSANDS MORE JUST AS GOOD!

STOCK NUMBER	DESCRIPTION	SALE PRICE
R0048	Ace Alpha	\$12.38
R0211	Ace High Glider	12.38
R0212	Airtronics Q-Tee	15.38
R0213	Airtronics Aquila	48.98
R0049	Andrews S-Ray	22.68
R0050	Andrews H-Ray	25.98
R0051	Andrews Trainermaster	34.38
R0053	Associated RC100 Car	87.48
R0055	Badger 200-3 Deluxe Spray Kit	25.98
R0214	Bolink Car W/Futaba 2F	174.98
R0215	Bridi Dirty Birdy 60 - Wood	55.98
R0056	Bridi Sun Fli 4-20	17.98
R0057	Bridi Super Kaos 40	36.98
R0058	Bridi Kaos	44.18
R0059	Bridi Super Kaos 60	46.18
R0060	Bridi AT-6 Texan	89.98
R0061	Bridi Basic Trainer	26.38
R0062	Bridi Dirty Birdy 60(Glass)	79.98
R0063	Bridi Dirty Birdy 40	39.58
R0064	Bridi Soar Birdy Glider	13.98
R0216	Coverite Balsarite	1.98
R0217	Cox Electric Ferrari	83.98
R0065	Cox T.D. .051	13.68
R0066	Cox T.D. .09	15.18
R0067	Craft-Air Butterfly II	32.48
R0068	Craft-Air Bull Pup	15.78
R0218	Craft-Air Sailaire	83.98
R0219	Craft-Air Windrifter	28.78
R0220	Craft-Air VM-2 Voltmeter	13.98
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R0222	Dubro Flex-Cable 20"	.98
R0223	Dubro No. 190 Ball Link	.58
R0224	Dubro No. 203 Switch Mount	1.28
R0225	Dumas Atlas Van Lines U-1	31.18
R0226	Dumas Competition DV60-Glass	63.98
R0071	Fox .15 RC Schneurle	22.78
R0072	Fox .19 RC	20.98
R0073	Fox .25 RC	20.98
R0074	Fox .36 RC	22.78
R0075	Fox .40 RC Schneurle	27.58
R0076	Fox .45 RC Schneurle	31.18
R0077	Fox .60 RC Eagle	41.98

STOCK NUMBER	DESCRIPTION	SALE PRICE
R0078	Fox .60 RC Hawk	50.98
R0079	Globe Fire Plug	18.88
R0080	Futaba S-16 Servo	29.98
R0226	Futaba S7 Watertight Servo	29.98
R0081	Goldberg Sr. Falcon	35.98
R0082	Goldberg Skylane 62	35.98
R0083	HB .40 RC PDP	54.98
R0084	HB .61 RC PDP	73.28
	Helicopters	Call For Prices
R0085	Hobbypro Formula 2 Epoxy	2.58
R0086	Hot Stuff Blue Line .5 oz.	2.98
R0227	Jemco F6F Hellcat	51.38
R0087	Jemco P-51 Mustang	40.98
R0088	Jemco ME-109	38.18
R0089	Jemco FW-190	40.98
R0090	Jemco AT-6 Texan	43.88
R0228	K&B .40 RC Sport Marine	44.98
R0093	K&B .61 RC w/pump & muff	68.98
R0094	K&B .21 outboard	Call for price
R0095	K&B .21 RC inboard	41.68
	Kwikcote - All Colors	2.98
R0098	Latrax Alpha w/radio	45.98
R0099	Latrax Mustang w/radio	49.98
R0100	Marks Bushwacker w/access	31.78
R0101	Master Kit Peppermint Pattie	27.88
R0102	Men Trainer (.15 - .25)	21.38
R0230	Microflame Dix. Welding Kit	23.28
R0231	Midwest Axiflo RK - 40	34.28
R0232	Midwest Strikemaster	41.98
R0103	Midwest Little Stik	20.38
R0104	Midwest Sweet Stik	24.78
	Monokote Reg & Trans 6" rolls	4.98
	Monokote Reg & Trans 25" rolls	23.95
	Nosen	All Kits 28% Off Retail
R0233	OPS .40 RC Marine w/pipe	113.58
R0107	OPS .60 RC Marine w/pipe	139.98
R0108	Pacer X-30 Adhesive	1.78
R0109	Pacer Zap 1 oz. Econopak	3.28
R0234	Pearless Electric Porsche	79.98
R0235	Pica T-28 B	53.58
R0110	Pica Waco	53.58
R0236	Power-Mite H.D. Electric Sander	23.98

KRAFT

MODEL	NOW ONLY	STOCK NUMBER
KP-2AW (Wheel)	\$88.98	RO140
KP-2A (2 stick)	88.98	RO141
KP-2AS (1 stick)	88.98	RO142
KP-4A	189.98	RO143
KP-6A	214.98	RO144
KP-5C	269.98	RO145
KP-5CS	269.98	RO146
KP-7C	369.98	RO147
KP-7CS	369.98	RO148
KPS-1411	34.88	RO149
KPS-1511	34.88	RO150

FUTABA

MODEL	PRICE	STOCK NUMBER
FP-2GS	71.98	RO151
FP-2F	94.98	RO153
FP-2E	94.98	RO154
FP-3S S-20	104.98	RO155
FP-3FN	132.98	RO156
FP-4FN S-17	179.98	RO157
FP-4FN S-16	194.98	RO158
FP-5FN S-16	224.98	RO159
FP-6FN S-17	209.98	RO160
FP-6FN S-16	234.98	RO161
FP-7GN	389.98	RO162

MRC

MODEL	PRICE	STOCK NUMBER
No. 772	83.98	RO163
No. 774	208.98	RO164
No. 765	219.98	RO165
No. 775	249.98	RO166

WORLD

MODEL	PRICE	STOCK NUMBER
4 ch./2 st.	154.98	RO167
5 ch./2 st.	242.98	RO168
7 ch./2 st.	261.98	RO169

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WES CRAFT B-17 FLYING FORTRESS

THE ULTIMATE RC PROJECT!

21%
OFF



This stand off scale kit includes an all glass fuse, wing cells, and engine cowlings. Complete balsa sheeting for wing and stabs. Pre-formed plastic canopies and gun turrets. 120" span. Uses a 5 ch. radio and four .30 size engines. Flying site assembly is quick and simple.

RETAIL \$495.00

NOW ONLY \$389.98

R0204

ANDREWS AEROMASTER

30%
OFF



The most popular Biplane in R/C!! 52 1/2" span, 910 sq. in. area, .60-78 engine. All balsa construction.

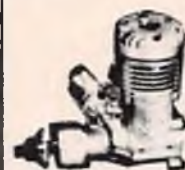
RETAIL \$74.95

NOW ONLY \$52.48

R0201

SUPERTIGRE .35 RC ENGINE

30%
OFF



For the value-conscious flier, this powerful .35 is moderately priced. Ideal for the medium-sized RC ships.

RETAIL \$47.95

NOW ONLY \$33.58

R0172

A-JUSTO-JIG

33%
OFF



This complete wing & fuse jig holds alignment within .1%. Allows you to make up to a 6 foot wing. Fuse jig fits on without tearing down your wing jig.

RETAIL \$59.95

NOW ONLY \$39.98

R0170

MIDWEST ATTACKER

35%
OFF



This all molded styrofoam kit builds fast and flies great. 48" span. Uses a .19-.35 engine. Very popular.

RETAIL \$39.95

NOW ONLY \$25.98

R0174

ANDREWS BIG H-RAY

40%
OFF



This 3 channel trainer has a 56" wing span and takes a .19-.45 engine. Super performance and strength.

RETAIL \$49.95

NOW ONLY \$29.98

R0175

PICA DUELIST 2/40

35%
OFF



This all balsa twin is easy to fly and safe handling. It has a 67" wing span and requires two .23-.40 engines.

RETAIL \$89.95

NOW ONLY \$58.48

R0176

JEMCO CORSAIR

30%
OFF



This beautiful stand-off scale favorite has a 54" span and takes a .40-.60 engine and a 4-6 ch. radio. This high quality kit has foam wings.

RETAIL \$68.50

NOW ONLY \$47.98

R0177

STERLING PUDDLE JUMPER MK II

35%
OFF



This airboat has a plastic hull and cabin with balsa and plywood parts. It uses a 2 channel and a .15 to .35.

RETAIL \$39.95

NOW ONLY \$25.98

R0178

MIDWEST CARDINAL A.R.F.

35%
OFF



This all foam trainer has a 46" span and takes a .049 - .15 size engine. Rugged and flies great.

RETAIL \$29.95

NOW ONLY \$19.48

R0179

DREMEL 580 TABLE SAW

30%
OFF



CUTS
UP TO
3/4" THICK-
NESS!

Multi-purpose table saw especially designed for hobbyists. Rips, cross cuts, miters, straight cuts, dados.

RETAIL \$89.95

NOW ONLY \$62.98

R0202

DUMAS BIG SWAMP BUGGY

36%
OFF



This rugged and stable airboat runs on water, dry grass, or snow. Really moves out with a .40 and speeds with a .60. Lots of fun!

RETAIL \$31.00

NOW ONLY \$19.88

R0181

STAFFORD TWIN COMMANCHE

30%
OFF



This museum scale twin engined favorite is always in high demand. It's all-balsa, has a 72" span, and needs two .40 engines.

RETAIL \$139.95

NOW ONLY \$97.98

R0182

BRIDI UFO

33%
OFF



The ultimate in pattern! This new release is .60 size with fiberglass fuselage and foam wings.

RETAIL \$124.95

NOW ONLY \$83.68

R0183

BUD NOSEN P-51 D

28%
OFF



FOR MODELLERS WHO THINK BIG!! 102" span! Uses a .60 engine with prop driver. Uses a 4 ch. radio. Very stable flyer.

RETAIL \$169.95

NOW ONLY \$122.38

R0203



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40% OFF FOX .45 RC BALL-BEARING SCHNEURLE  Tests show this to be one of the most powerful .45's on the market. Puts out over one horse. Starts easily- idles well- extremely durable. RETAIL NOW ONLY \$38.98 \$64.95 R0023	30% OFF VK CHEROKEE  This semi-scale model features a 65" span and uses a .40-.61 engine. Full length die cut sides. A good-looking high quality kit. RETAIL NOW ONLY \$48.98 \$69.95 R0024	40% OFF K&B .19 RC ENGINE  Features "squish band" head machined from solid aluminum bar stock; precision ball bearings. RETAIL NOW ONLY \$29.98 \$50.00 R0025	36% OFF LANIER COMET II  This popular almost-ready-to-fly features a 63" span and takes a .50-.61 engine. Great trainer. RETAIL NOW ONLY \$37.48 \$58.50 R0026
35% OFF K&B .35 RC ENGINE  A front rotor type engine featuring a light aluminum piston with the dykes ring. High quality! RETAIL NOW ONLY \$22.78 \$34.95 R0027	30% OFF SUPERTIGRE X-45 SCHNEURLE  Has front induction and rear exhaust. Features pinned ring running, exceptional balance, and very low vibrations. RETAIL NOW ONLY \$57.98 \$83.00 R0028	40% OFF RHOM 3 GEAR RETRACTS-FIREWALL MOUNT  Rom-Air retracts are exceptionally reliable and durable. Each system comes complete with all necessary parts. THE CHOICE OF PROSI RETAIL NOW ONLY \$74.68 \$125.00 R0029	34% OFF BRIDI RCM TRAINER 60  This popular all balsa trainer has a 58" span and takes a .40-.60 engine. High quality, flies great. RETAIL NOW ONLY \$41.58 \$62.95 R0030
28% OFF NOSEN GERE SPORT BIPE  This all wood stand off scale bipe has a 96" span. Uses a .60 engine and a 4 ch. radio. Necessary hardware is included. 18 hour assembly time. RETAIL NOW ONLY \$93.58 \$129.95 R0211	33% OFF MIDWEST PITTS SPECIAL  Wing span-48". Uses .40-.60 size engine. All balsa and ply parts; complete hardware; fuel-proof decals. RETAIL NOW ONLY \$63.58 \$94.95 R0032	50% OFF 12 VOLT MOTORCYCLE BATTERY  These are high quality, heavy duty motorcycle batteries that are perfect for all electric starters. Brand new. RETAIL NOW ONLY \$13.48 \$26.95 R0033	12 VOLT BATTERY CHARGER To go with your 12 volt motorcycle battery, or any other 12 volt battery, we now have this high quality charger that does a perfect job. Safe and easy to use. Works great with battery at left. UL approved. RETAIL NOW ONLY \$6.98 \$13.95 R0034

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SERIES IV OFF
POWER PANEL



The
all-in-one
power
panel!

Supply power to starter, plug,
pump, etc., as well as fast charge
your radio at the field!

RETAIL NOW ONLY \$22.48
\$34.95 R0035

BRIDI RCM 34%
TRAINER 40 OFF



This popular all balsa trainer has
a 52" span and takes a .35 - .49
engine. A high quality kit.

RETAIL NOW ONLY \$36.28
\$54.95 R0036



COX TD .049
STD. ENGINE
38%
OFF

A super hot 1/4A engine ideal for
free flight, control line, 1/4A R/C,
and more.

RETAIL NOW ONLY \$ 12.98
\$20.95 R0037

DUNE 25%
BUGGY OFF



This is the Sigma-Ace .19 size
dune buggy distributed by Leisure
Electronics, 17" length.

RETAIL NOW ONLY \$157.48
\$209.95 R0038

BOLINK 20%
ELECTRIC OFF
CAR



This 2 channel 1/12 scale electric
car comes already assembled with
05 motor, nicads, & charger &
goes over 25 mph.

RETAIL NOW ONLY \$79.98
\$99.95 R0039

CRAFT-AIR 33%
FIELD BOX OFF



It's ready to use, not a kit, made
of lightweight indestructible poly-
ethylene, 22" long & holds
everything. A SUPER BUY!

RETAIL NOW ONLY \$19.98
\$29.95 R0040

CRAFT-AIR 35%
HI - START OFF
HEAVY DUTY

Features reel,
tubing, towline,
parachute, stake,
tow ring, and
strong construction.
For sailplanes
of 100" wingspan
and larger.



RETAIL NOW ONLY \$27.98
\$42.95 R0041

AIRTRONICS 30%
OLYMPIC II OFF



This 99.9" span trainer is capable
of contest competition. All balsa
with pre-cut parts. An excellent
quality sailplane.

RETAIL NOW ONLY \$34.98
\$49.95 R0042

ZINGER 35%
WOOD OFF
PROPS

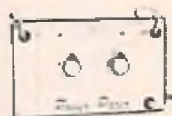


Two popular sizes--Stock up now
on these high quality props!

10X6 WOOD PROPS(6)
RETAIL NOW ONLY \$5.48
\$8.40 R0185

11X7 WOOD PROPS(6)
RETAIL NOW ONLY \$6.28
\$9.60 R0043

POWER PACER 20%
BATTERY OFF
TESTER



A new ni-cad battery tester,
cycler, and charger. Works great!
RETAIL NOW ONLY \$47.98
\$59.95

9.6 volt R0044
6 volt R0045

S&O BATTERY 35%
TESTER OFF



Test all aspects of your batteries
with this high quality tester.

RETAIL NOW ONLY \$16.18
\$24.95 R0046

GOLDBERG 40%
SKYLARK 56 OFF
MK II



Fun to fly sport airplane with pattern
capabilities. 56" span. .30 to
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New improved design!

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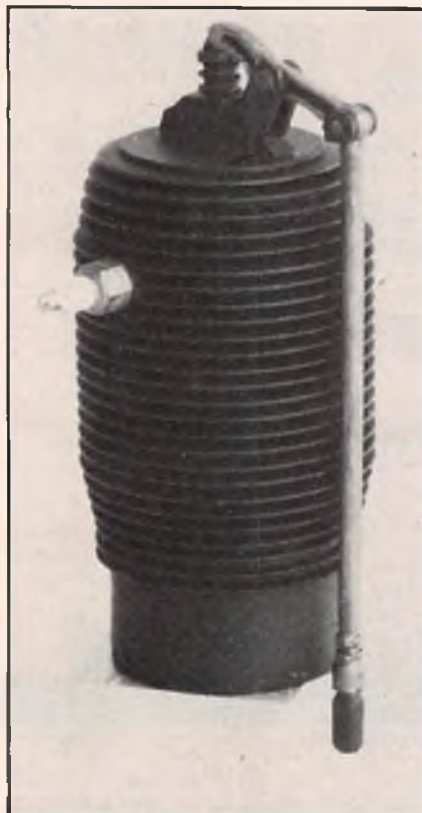


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from page 102/90

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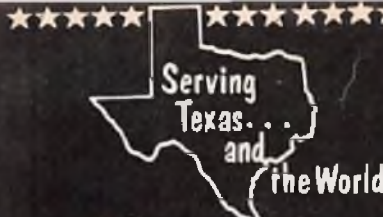
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ELECTRONIC CONTROL MIXER

from page 83/82

amplifier. The output of IC2 is one half of the difference of roll and pitch command voltages. The output at the new channel 2 is connected to the wire which used to be connected to the elevator pot. The 4K pot on the diagram is a small screwdriver adjusted trim pot and is used to center the channel 2 servo

when the control stick is "neutral."

The LM358 or LM312 integrated circuits are designed for low voltage operation and will work well with as little as 6 volts connected to the +V supply terminal. The -V supply terminal on the operational amplifiers is connected to the "ground" connection in the transmitter, and this is usually the case. These amplifiers can be used with an unbalanced supply so only the +V is needed. The LM358 has the advantage of having two operational amplifiers (IC1 and IC2) in the same package so that only one device is needed.

This circuit can easily be built on a

small (2" x 2" or less) piece of circuit board (the fiberglass board with all of the holes — Figure 2) and wrapped in foam and put in an unused corner of the transmitter case. A double pole-double throw switch could be used to switch the mixer in and out of the transmitter circuit. It is recommended that if a switch is used, it is put inside the transmitter case so that it cannot be flipped accidentally. It might be exciting trying to fly a delta with the mixer switched out. If you are really quick, you might rotate the transmitter box 45°, but I don't recommend this type of excitement.

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ELECTRONIC CONTROL MIXER

from page 114/82

If you wish to change the relative amount of elevator and aileron control, the resistors connected to IC1 and IC2 can be changed. For example: to decrease the roll sensitivity, the 100K resistors which go to the roll pot can be increased to 120K. This will decrease the roll sensitivity by approximately 20%. For larger changes, the feedback resistors on IC2 should be changed also and this will require some calculations. One disadvantage of electronic mixers is the reduced servo movement. Full movement of the elevator or aileron control alone only causes the servos to move one half of their full travel. This can be compensated for by using larger servo arms or larger control surfaces.

This control mixer circuit was tested using a Kraft KP4A radio and a large delta. The delta was designed and built mostly by Larry Riggs of Tucson, and is shown in the photos. It has a 52" wing span and 34" length. The airfoil is semi-symmetrical. It is powered by a K & B .35. Three channels are used, throttle and the other two for the two control surfaces or "elevons." It is reasonably aerobatic and lots of fun to fly. □

EDSON MOTOR MOUNT

from page 79

them. A compromise when the nuts aren't accessible.

We like the Edson Adjustable Engine Mount System because of the simple and accurate installation and the built-in flexibility. Ours set up easily, quickly, and "right on" with a minimum of measuring, aligning, and such. While the price for the system will turn out a bit more than other engine mounts presently on the market, remember that you won't have to dump it when you change engines. Just re-adjust the arms to fit the new engine. That's it. So, while it may cost more, it will be working for you for a long time to come.

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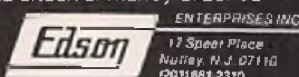
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The "Bird of Time"
 by Dave Thornburg
 1st Place FAI Winner at Florida

from page 78/76

4 CELL PRODUCTION ELECTRIC — AMATEURS

Bill Rattey's indoor 1/12 track is really
 a beautiful track. The surface is painted
 with sand mixed in, which gives
 excellent traction with some very good
 racing from the tight road course. With
 59 entries in Amateur and Expert
 classes shooting for a spot in the 6 place
 mains, the competition was always
 super close.

Bill Watson, from So. Calif., was Top
 Qualifier in the Amateur class and
 proceeded to lead the Main from start to
 finish, driving very smoothly and not
 making any mistakes. John Hunt, from
 Texas, followed in 2nd, with Manny
 Costa from Mass. in 3rd.

- | | |
|-----------------|------------------------|
| 1. Bill Watson | 4. Tony Vales |
| 2. John Hunt | 5. Charles Notabartolo |
| 3. Manuel Costa | 6. Jim Welch |

4 CELL PRODUCTION ELECTRIC — EXPERTS

Gary Kyes was Top Qualifier and got a
 good start and led the race until the last
 lap, when Bill Jianas had worked his way
 up through the traffic to challenge Gary
 for the lead. During the last few laps Bill
 kept closing the gap until he was ready
 to pass Gary on the inside of the slow
 sweeper on the last lap. As Bill passed
 Gary, the 2 cars came together and Bill
 got stuck in the boards with Gary
 winning it, Bill 2nd, and Pete Fusco 3rd.

- | | |
|------------------|---------------|
| 1. Gary Kyes | MRP |
| 2. Bill Jianas | Associated |
| 3. Peter Fusco | Associated |
| 4. Butch Kroells | Associated |
| 5. Don McKay | Jerobee |
| 6. Al Bean | Scratch-built |

6 CELL MODIFIED ELECTRIC — AMATEUR

Bill Watson got a good start in this
 race which was run on 2/3 of the outdoor
 1/8 track. Bill opened up his lead to
 almost a full lap when with 35 seconds
 left, his batteries went dead and Top
 Qualifier George Anderson went on for
 the win with Dennis Thomas 2nd, and
 Tony Vales 3rd.

- | | |
|--------------------|---------------------|
| 1. George Anderson | 6. Ken Walsh |
| 2. Dennis Thomas | 7. Roland Boucher |
| 3. Tony Vales | 8. Mike del Rosario |
| 4. Bill Watson | 9. Paul Gelman |
| 5. Bill Frame | 10. Jim Welch |

6 CELL MODIFIED ELECTRIC — EXPERT

Top Qualifier Gary Kyes got off to a
 good start and an early lead, until he
 spun a pinion gear. Paolo Patucchi then
 took over the lead until he came into
 contact with the wall and lost a wheel.
 Arturo Carbonell got caught in the first
 corner traffic, but had steadily worked
 his way through the traffic to take over
 1st place, with Bill Jianas right behind in
 2nd. Can you believe it!! Arturo and Bill
 held their positions for the remainder of
 the race with neither one able to change

to page 120



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-A-JUSTO JIG-

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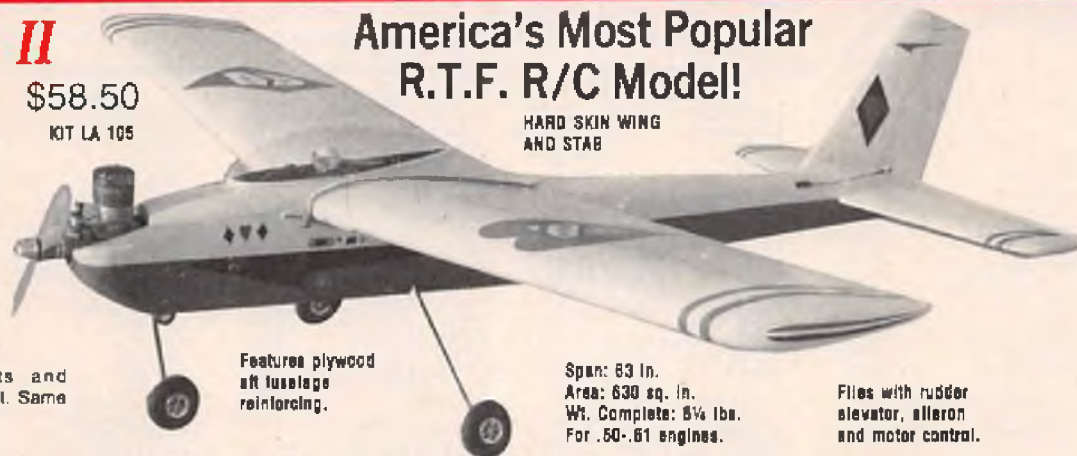
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PIT STOP

from page 118/76

the gap. Arturo went on for the win with Bill 2nd, and Eric Hahn 3rd. Are you ready for Arturo winning a 1/12 electric race?

- | | |
|---------------------|----------------|
| 1. Ari Carbonell | Associated |
| 2. Bill Jianas | Associated |
| 3. Eric Hahn | MRP |
| 4. Gene Husting | Associated |
| 5. Gary Kyes | MRP |
| 6. Mike Rowland | Associated |
| 7. Joe Alves | MRP |
| 8. Curtis Husting | Associated |
| 9. Mike del Rosario | MRP |
| 10. Paolo Patucchi | Leisure Elect. |

4 CELL INDOOR

MODIFIED — AMATEUR Top Qualifier Jim Welch, who must have been taking driving lessons from his dad, Bob, did a great driving job to win this race with George Anderson 2nd and

Manny Costa taking 3rd.

- | | |
|--------------------|------------------|
| 1. Jim Welch | 4. Tony Vales |
| 2. George Anderson | 5. John Huron |
| 3. Manny Costa | 6. Dennis Thomas |

4 CELL INDOOR MODIFIED — EXPERT

Mike Rowland took the lead, but by the 2nd lap Bill Jianas passed Mike for the lead. After a poor start, Curtis Husting started passing cars and by the 7th lap he had passed Mike, then Bill, to take the lead. Bill and Mike had a tough race going for 2nd, but a little too much crashing allowed Eric Hahn to slip by to take 2nd. Curtis lapped the field in winning, with Eric 2nd, and Top Qualifier Bill Jianas 3rd.

- | | |
|-------------------|----------------|
| 1. Curtis Husting | Associated |
| 2. Eric Hahn | MRP |
| 3. Bill Jianas | Associated |
| 4. Mike Rowland | Associated |
| 5. Jeff Rold | Associated |
| 6. Paolo Patucchi | Leisure Elect. |

6 CELL PRODUCTION ELECTRIC — AMATEUR

This class was scheduled to be run outdoors but, because of rain, it was moved indoors. Manny Costa took off in the lead, but after the 1st lap he was passed by Mike Reedy who, in turn, was passed by Top Qualifier John Hunt. John went on to win with George Anderson 2nd, and Manny Costa 3rd.

- | | |
|--------------------|------------------|
| 1. John Hunt | 4. Bob Emott |
| 2. George Anderson | 5. Dennis Thomas |
| 3. Manny Costa | 6. Mike Reedy |

6 CELL PRODUCTION ELECTRIC — EXPERT

I've got to tell you about this class. The 6 cell cars, running indoors, was really a ball. Just enough power so that it was easy to get out of shape if you weren't careful. During qualifying, my car was perfect and I was really driving good.

to page 122



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R/C EQUIP _____

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PIT STOP

from page 120/76

You know the feeling, when your car's really running great and you're passing everyone on the track. I figured I had finally found my class. I could do no wrong. I was passing cars continually. I had it made. But a funny thing happened. Out of the corner of my eye, I

thought I noticed a car gaining on me. But that was impossible! But sure enough, this car was getting a few feet closer every lap. Soon he was right behind me. Then he was in front of me and pulling away. It was impossible! But for 11 year old Repete Fusco, nothing is impossible. He easily went on to be Top Qualifier. Move over Arturo, Jianas and the rest of you. There's a new generation of drivers coming on. What are they going to be like when they're 19 years

old?

In the Main Event, Curtis Husting took off in the lead, but it only lasted a short while when he cut a corner too short and flipped over, letting everyone by, except me, who was experiencing radio problems. Mike Rowland then took the lead for a few laps, until a mistake gave the lead to Gary Kyes. It took Repete Fusco 10 laps before he could work his way up to the lead, then he was long

to page 128

Utopia

Enterprises

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(.60 SIZE)



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W.R. BROWN HOBBY SPRAYER

The Hobby Gun is the perfect little spray gun for those small delicate jobs that call for a smooth professional factory finish. It handles all paints, enamels, lacquers, including the urethane or epoxy spray finishes. Adjustable air and material nozzle make for easy spray control. Convertible to bleeder or non-bleeder for portable or tank compressors. Durable, easy to use and clean.

The compressor is lightweight, piston type, and operates on 115-Volt household current. Completely oil-less, it delivers clean oil free air up to 40 PSI pressure, ample for hobby gun. Palm sized, it can be carried anywhere. Never needs lubrication. Extra jars with screw caps enable you to store paints and spray directly from the jars.



211 ... Hobby Sprayer Complete.....	\$34.95
1520-3 Box of 3 - 1 oz. Jars & Caps.....	1.50
1521-3 Box of 3 - 2 oz. Jars & Caps.....	1.50
201 ... Compressor Only.....	27.95
812 ... Hobby Gun & Hose.....	7.95

Ideal for air brush use, plus many other uses around the home, garage or work shop. An economical, portable outfit that delivers a constant, steady supply of air. Five-gallon steel air storage tank holds ample air for home, farm and seal shop use. Nicely balanced with handle for carrying. Easily stows in car trunk. Oil-less diaphragm type compressor is built for rugged service. Permanently sealed ball bearings never need lubrication. Motor and compressor built as one unit. Complete with air shut-off cock, pressure switch set at 30-45 PSI, 15 ft. air hose and tire chuck; No. 331 multi-purpose spray gun uses 1 qt. cup or 2 1/2 gal. paint tank.

Air delivery 2.4 CFM at 30 PSI, 4.2 CFM air displacement, 50 PSI safety valve setting. 1/2 in. IPS thread. 1/3 H.P. 110V 60 cy. AC motor, 21x9x19 in. overall. 30 Ft. cord.

#370

W.R. BROWN



370 ... Porto Tank	\$116.95
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DREMEL TOOLS & ACCESSORIES

210 Drill Press.....	15.95
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219 Motor Speed Control.....	15.95
229 Router Attachment.....	7.95
232 Moto-Flex Tool.....	39.95
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370 Moto-Tool.....	33.95
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571 Moto-Shop.....	44.95
572 Deluxe Moto-Shop.....	59.95
701 Deluxe Moto-Lathe.....	39.95
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240 24 Pc. H.S. Cutter Set.....	45.00
9900 12 Pc. Tungsten Carbide Set.....	45.00



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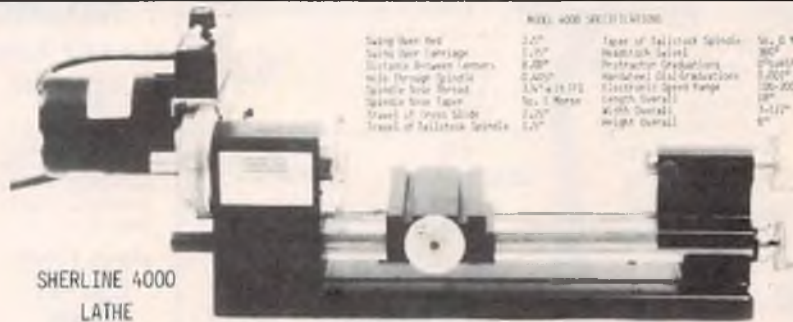
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EXPIRATION DATE

I would like to thank all of you for the excellent response to my advertising. It has been overwhelming. Especially your letters of congratulations on my new business venture. I acknowledge every order with an appropriate shipping date. But most times your order will probably arrive before my card. The new Dremel saw will be in stock the last week in August minus the slots for table extensions. For some reason they have decided to leave this feature off. But this item is still a terrific value for the price.



SHERLINE 4000
LATHE

Sherline Lathe with American threads. Standard equipment included with the Lathe consists of motor and speed control, pulleys, belt, faceplate and carrier, two dead centers, two hexagon keys, toolpost and tool bit, three-core cord, instruction booklet and guarantee card.

4000 Sherline Lathe.....	197.55
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1001 Handplane.....	3.75
1002 Jaw Chuck.....	44.95
1003 Tailstock Chuck & Key.....	13.25
1004 Straddle Rest.....	11.95
1160 Collet Set.....	44.95
1161 1/2" Collet Adapter & Draw Bar.....	21.95
1162 Vertical Milling Table.....	44.95
1163 Chuck to Top Slide Adapter.....	1.75
1164 Morse Arbor (for 1/2" 1077 chuck).....	3.45
1191 Live Center.....	13.05
1291 Leadin Block W/Cut.....	12.95
4000 Power Feed.....	25.95
1007 Lat-Off Tool & Holder.....	17.95
1003 Live Position Tool Post.....	6.75
8009 1/2" x 1/2" High Speed Tool Blank.....	1.45
8006 Carbide Tool Set.....	6.95
8007 High Speed Drill Set.....	12.95
1012 Wild Dog Set.....	12.95
8008 All-in-1 Driver (see cap viewed on label).....	1.35
8009 Center Drill Set.....	8.95
8010 Vertical Milling Column.....	53.95
8011 Milling Table.....	22.95
8012 File Cutter.....	13.95
8013 Boring Head.....	25.95
8014 Morse No. 1 Milling.....	4.95
1100 Screw Cutting Attachment.....	80.95
8016 1/2" Nut 10/31 (2).....	1.95
8017 Rucker Tool Post.....	11.65
8018 4-Inch Hold Open Set.....	2.95
4004 Drive Bolt (lathe SR-4004) & Nipple.....	1.95
4004 Drive Bolt.....	1.95

NEW DREMEL #580

Dremel's No. 580 4" Tilt Arbor Table Saw not only has all the features of larger table saws at a fraction of the cost, but will perform a wide range of precision cutting chores, without the waste of wood from the cut of a normal size blade, in one square foot of space! Don't forget the optional accessories which make this great saw even more versatile.



580 4" Circular Table Saw w/comb.blade.....	59.95
8003 Combination Blade 30 teeth.....	4.00
8004 Fine Tooth Blade 100 teeth.....	4.00
8014 Sawdust Bag Attachment.....	4.00

MODEL: WOOD SHED LATHE		
Spindle Rev. Per Min.	2,200	Range of Tailstock Spindle
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Spindle Rev. Per Min.	550	Headstock Spindle
Spindle Rev. Per Min.	275	Headstock Spindle
Spindle Rev. Per Min.	137 1/2	Headstock Spindle
Spindle Rev. Per Min.	68 3/4	Headstock Spindle
Spindle Rev. Per Min.	34 1/4	Headstock Spindle
Spindle Rev. Per Min.	17 1/4	Headstock Spindle
Spindle Rev. Per Min.	8 3/4	Headstock Spindle
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THE HOBBY

Jay

Dave

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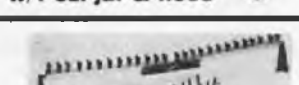
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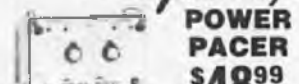
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Build accurate wings fast & easy. Adapters convert to fuse-jig. **\$39.99**

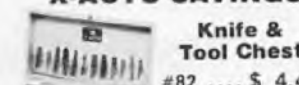
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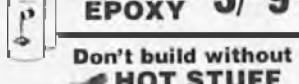


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SAVE

Sig KOUGAR



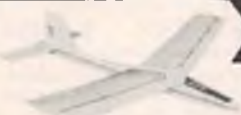
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Muffler extra

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plus Fox
.25 R/C

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FALCON 56
plus Fox .36 R/C
Muffler extra



Model
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Black Widow \$24⁹⁹



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UGLY STIK plus
K&B .61 R/C
with muffler



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plus Fox
.25 R/C \$38⁹⁹
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Transparent or opaque



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Immediate
power for your
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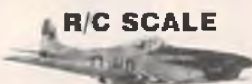
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Hand operated and re-
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Aligns and guides
the blade for per-
fect hinge slots.
Includes 3 steel
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New Lotus F-1

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1103 Lola-T33
1105 Porsche 935-77

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Color match to Solarfilm

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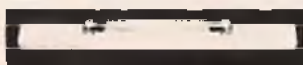
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35" span, a fun flyer designed for 2-channel radio with 1/2A motor.



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3 SIZES Aluminum tube with handle. E-Z
2-foot \$ 9.99 Flex Metalite Cloth
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Body, engine & radio extra

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Only **\$93⁹⁹**
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New kit **\$146**

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Withstands heat and pressure of "hot" engines.

6 for **\$3⁷²** 12 for **\$6⁹⁷** 24 for **\$12⁷⁵**

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Ranger 3-channel Dry
w/2 servos **\$119.99**
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- **MILD DETERGENT ACTION** THAT HELPS PREVENT VARNISH EVEN WITH A MUFFLER.

	(Gallon)	Give your engine a treat!!! Feed it Cool Power and you'll both be pleased. These are a few of the in-the-know people who do:
FAI	9.95	
5%	10.95	
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Rhett Miller Ron Chidge
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Cool Power is now available in metal cans as well as plastic bottles (\$1.00 more in cans).

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PIT STOP

from page 122/76

gone for the win with Mike Rowland following in 2nd and Gary Kyes 3rd.

1. Repete Fusco Associated
2. Mike Rowland Associated
3. Gary Kyes MRP
4. Curtis Husting Associated
5. Eric Hahn MRP
6. Gene Husting Associated

Some of the 1/12 races started at 8:30 in the morning and went on till 2 a.m. the next morning and, needless to say, we all looked like a bunch of racing zombies. But superman, Bill Ratley, race directed and announced every race the full 2 weeks! I don't know what kept him going. And some others worked almost as hard as Bill. Betty and Pop Hendrickson, Tony Vales, Ken Walsh, Ernie Mayberry, Manny Costa, plus all the lap counters. To all of you, the racers would like to say a big THANK YOU. □

CAP'N DICKS COCKPIT

from page 75

machined down to fit the Fox --- idles pretty good --- good enough for a bird on a string.

The airplane is almost built — the Ol' Cap'n will keep you posted on the latest of his fiascos in a future column. Incidentally, I can see great potential for R/C on a string for such events as Navy carrier — you know — 5 or 6 channels operating the throttle, flaps, gear, speed 'boards', arresting hook, etc., etc. And the bird would always split the center line of the deck since the tether would be affixed to a pylon. Anybody else think something like this has any potential? Please let me know.

★

I recently received a nice letter from Hank Hilscher, the coordinator of Model Engine Collectors Assoc. (MECA). He mentioned that as the result of the June '78 column, several new memberships had come in, but the new members had to obtain the Associations address using a magnifying glass on a picture of the MECA Bulletin in the article. Sorry 'bout that. For those of you without 10 power reading glasses, here's the MECA address: P.O. Box 725, Indianapolis, Ind. 46206.

★

At the recent SLAM (Salt Lake Antique Modelers) 16th Annual Meet, well-known Mark Fechner, who operates Marks Model Engines, had a batch of dandy airplanes, and a batch of 'dandier' engines on hand. Mark's custom Anderson .65 started first flip every time — very impressive.

to page 130

SOLAR POWER
YOUR RADIO CONTROL OR ELECTRIC MODEL
3 1/2" HALF HEX SILICON CELL
\$6.00 postpaid (restrictions included)
California residents add 9% tax
HIGH EFFICIENCY — up to 600ma at 0.5 v
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Diamond Tread
Wheels

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NEW! 4" DIA (OTHER SIZES AVAILABLE SOON)
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DEVICE READS FUEL DELIVERY AND FUEL REQUIREMENT AND ROUTS EXCESS FUEL BACK TO TANK VIA THE OVERFLOW LINE INTENDED FOR CRITICAL CARBIDPUMP APPLICATIONS TO SIMPLIFY ADJUSTMENT
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ARF High Performance Glider
Sport or Trainer

SPAN: 61 in.
AREA: 377 sq.in.
RADIO: 2 channel



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TRYSTAR-15

Best Beginners Trainer
or Sport Model

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ENGINE: .15 RADIO: 3 channel



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SPAN: 56½ in. AREA: 527 sq.in.
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ARF Powered Glider
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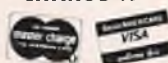
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CAP'N DICKS COCKPIT

from page 128/75

"Wouldn't be able to show my face if it didn't," quipped Mark.

Mark does beautiful work. Many of the engines used at the meet came out of his shop. His address is, 4456 W. 3145 South, Salt Lake City, Utah 84120.

Mark also serves as a MECA Regional Director (Region 4). He and Lin Haslam (SLAM Contest Director) hosted a fine collect together at Lin's home after flying ended Saturday evening (it was a 2 day meet). Everyone had a ball taking

in the engine displays and swapping old mills and stories from the past. If the opportunity ever arises to attend a MECA 'collecto' in your area, please take advantage of it — you'll probably get 'hooked' on the old time stuff just like I have.

Special recognition for the merchandise prizes for the contest must go to: Kraft Systems, Sig Mfg. Co., Sullivan Products, Sterling Models, Goldberg Models, John Pond Plans, Pactra Industries, FAI Model Supply, and Herb Wahl.

Just as we were wrapping up this month's column, Mark Fechner called and informed us that it's now official that

the 1979 SAM Nats will be held in Salt Lake City.

From Cap'n Dick's Cockpit . . . ☐

HOVER

from page 69

HeliBaby mechanics and I'm sure one could adapt Alouette mechanics as well. The quality of the fueslage is flawless and it comes complete with windows and plans. Also coming on the heels of the Baby Ranger is a Hughes 500 D which will probably be available by the

to page 133

\$64.95 w/built-up wing
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R/C MODELER MAGAZINE'S MODEL OF THE MONTH CONTEST

The Model of the Month Award Program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month Dremel will award a 371 Variable Speed Moto-Tool as illustrated in the photograph. The second and third place winners each month will receive a one year subscription to R/C Modeler Magazine, or, if they are a subscriber, an extension of their current subscription. If you would like further information concerning the winning models, write to us giving us the winner's name and what month he won, and we will forward your letter on to the winner. For rules of Model Of The Month Contest, see the October 1978 issue.

DECEMBER WINNERS

SECOND PLACE

Richard E. Davis
Vienna, Virginia



Built from a Royal F4U kit, this model has had many additions and mods made to it. Has sliding canopy, scale cockpit, scratch built cylinders hold L.G. doors open, spring loaded flaps and many more details. Powered by an OS Max 60 FSR with a flying weight of 9½ lbs. Uses EK Super Pro Radio and is finished with K & B cloth, resin and primer with Perfect Paint.



FIRST PLACE

Raymond H. McGowan
Napa, California

A Curtiss JN 4-D scratch built using Joy Products JN 4-D plan outlines plus detail obtained from Smithsonian Institute photos. It is true scale 1½" = 1' with a wing span of 65" and weight of 4½ lbs. Powered by McCoy .40, covered with Coverite and uses a Kraft 5 channel. Many Proctor accessories were used.



THIRD PLACE

Don Grassi
Bedford, Mass.

Scratch built by designer is this true scale Zlin 2-50L at 1½" = 1'. With a wing span of 54" and area of 506 sq. in., it weighs out at 5 lbs., 4 oz. The Enya .40 has a home made muffler and uses a Kraft 4 channel for guidance. The Zlin is covered with chrome Super MonoKote with K & B Super Poxyl Trim.



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Correction To

**AN EASIER AND MORE EXACT
WAY TO MAKE
TAPERED RIBS**
By Eddie Kolassa

from the Oct. '78 issue

The best way to look at the double taper is to split it into two separate panels (Figure 6) with rib, number 4 common to both panels. Make templates of rib numbers 1, 4, and 8, and sandwich 3 balsa blanks (4 ribs — one less blank) between 1 and 4, and sandwich 4 balsa blanks (5 ribs — one less blank) between 4 and 8. Duplicate template number 1 in balsa, and you have all the ribs. If there is any question as to the number of blanks needed, count all the ribs in the panel, including the ribs the templates are made of, and subtract one.

Keep America Beautiful

The woods, the fields and waters of America don't need a carpet of litter left by inconsiderate persons. Hunting, fishing, camping, or boating, keep America's outdoors clean and green.

time you read this. The fuselages are a very reasonable \$75.00 plus \$2.50 for postage from Charles H. Gilbert, 2101 Camino Rey, Fullerton, Calif. 92633. These new bodies for existing helicopter nuts need and I'm glad to see such high quality products becoming available. Thanks, Charlie, keep up the good work.

It was a real pleasure to attend Tom Burdin's Annual Cincinnati Fun Fly. Just about everything that flies and is radio controlled was there and it's really a change of pace to sit and enjoy watching someone else do their thing. Gliders, pylon, giant scale, pattern, 1/2A, scale, combat, spin contests, low inverted contests, just an all around R/C Fun Fly. I sure had a ball and will be looking forward to returning next year.

The response to the NRCHA questionnaire has been very good, to say the least, and as soon as possible, we will be letting you know what course we are going to take and let all of you who are interested know what is happening with the Grade Level programs, newsletters, etc. I say as soon as possible but I want you to understand the time lag is about three months between when this is being written and when you are actually reading it. So hang in there.

Well, I've got to run, remember --- keep the stick forward. ☐

SOARING

from page 68

Best Junior Performance
Tim Renaud

Best Technical Achievement
Chris Adams — Aileron flap spoiler hook-up with dihedral joints.

The FAI finals have yet to be flown in Florida, may the winners become World Champs in 1979.

Frank Leppla, of the Pasadena Soaring Society, sent in results of a contest that their club recently held and it stands out from the rest of the contests that have been reported to me and I want to pass it on to my readers:

Well, we tried it and it was a most exciting contest for the contestants and spectators. A team event type of contest. Here's how it works. We had 17 entrants. Break them up into three teams and use three winches. Team selection should basically separate frequencies i.e., an R/W on each team, an P/W, etc. If two R/W's end up on one

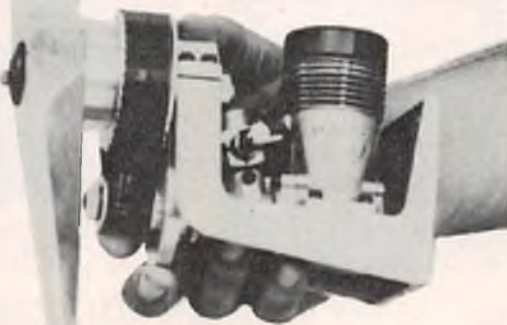
to page 136

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1978 ALL SIG KIT FUN FLY

COUNCIL BLUFFS COBRA'S FIELD - SEPT. 24TH



DIRECTED BY BUD KILNOSKI OF BUD'S HOBBY



Since Gary Hall's (Omaha, NE) Kiwi was painted green and yellow, a familiar farm equipment color combination, the name John Deere under the cockpit was a natural choice. He added cheek cowl to the kit design and mounted the motor upright instead of inverted.

83 FLY IN 5TH ANNUAL CONTEST

A steady increase in the number of contestants has marked the annual get-together started in 1974, but no one was quite ready for the enthusiastic gang of Sig kit fliers who arrived this year. Entries were about double last year and not enough goodies were on hand to give every one of the contestants their souvenir flight kit and Sig cup. So names were taken of late arrivals and prizes were mailed to them later. Luckily, Bud had ordered plenty of food for his big free feed and it managed to stretch enough to fill everyone up and a few had seconds. Main course on the menu was delicious barbecued beef.

With so many contestants, it turned out that there wasn't time for the usual four fun events so only three were held. The prizes intended for the fourth event were distributed to the other three so that more lower placed fliers received awards.

A good assortment of Sig kits were flown. Kougars predominated, with Komanders and Kadets running a close race for second place. Newest kits in the Sig line, the Cavalier and Kiwi, were well represented. Also seen were Skybolts, Liberty Sports, Clipped Wing Cubs, Komets and Klippers.

Plan to attend next year and get in on the fun!

Upper Left: Rusty Dose (Fremont, NE) modified his Kougars to include the latest pattern fads—air brakes and anhedralled stabilizer. Left: This O.S. 25 powered Kadet in a snappy red and white color scheme was flown by Bob Zimmerman (Neola, IA). A Christmas present, it's his first successful RC. Lower Left: Action in "Kill the Kite!" Bottom Left: Sharp Kougars by Bernie DeBaer (Le Mars, IA). Bottom Right: Judy Skiles (Deer Creek, IN) and her Cavalier. She has not been flying long but is doing fine.



Clark Wade installed the K & B 6.5 FR RC engine and a Top Flite 8-3/4" x 6-1/2" pylon racing prop on his Kougars and turned it into a real wild cat. This .40 powered streak of lightning appeared to be as fast or faster than some .60 powered Kougars. In the October, 1978 issue of Model Airplane News, engine expert Peter Chinn said "... the K & B 6.5 FR RC is far and away the most powerful pattern type .40 tested to date." Clark's Kougars demonstrated this spectacularly. Since Cobra Field is out in the boon-docks and does not require mufflers, he took off the muffler supplied with the engine and substituted the straight pipe that comes on K & B's pylon racing engine. As you can see, some nose modification was required, but it makes a fine performing model.





Left: A Clipped Wing Cub comes close in the "Kill The Kite" event. Above: Rick Altor's (Sioux City, IA) Komar zooms in on the kite. Powered by an O.P.S. .80 with a tuned pipe, there wouldn't have been much kite left if he had hit it! Above Right: You can almost hear the rat-tat-tat of machine guns as the Komar (it looks like Chuck Percy's) peels over at the kite. The kite did a pretty good job of defending itself this year, bringing down Gene Strauss' (Falls City, NE) Komander that hit it dead on, but not hurting the model much. Dave Litt's (Omaha, NE) Skybolt hit the string, cut the wing and went in hard. Another model ended up with a ball of string on the prop. Next year, back to smaller paper kites instead of big plastic ones and lighter weight string! Below Left: Joe Trouba (Omaha, NE) flew this silver and black Komander, .40 powered. Below: Dave Howlette (Red Oak, IA) won the plastic film covered Beauty Award with a tri-colored Kadet. Below Right: Chuck Percy (Sioux City, IA) digs for his Komar flight slip in the Loops-A-Lot event so C.D. Bud Kilnaski can judge the flight.



CONTEST RESULTS

SIG 500

- | | |
|------------------------------------|----------|
| 1st Chuck Jones, Spencer, IA | Kougar |
| 2nd Mike Lee, Omaha, NE | Kadet |
| 3rd Rich Kral, Omaha, NE | Kadet |
| 4th Rick Altee, Sioux City, IA | Kougar |
| 5th Hurlon Boatman, Falls City, NE | Komander |
| 6th Jerry Peters, Alexandria, MN | Kadet |
| 7th Gerald Wilson, Oakland, IA | Kadet |

LOOPS-A-LOT

- | | |
|------------------------------------|---------------|
| 1st Clark Wade, Council Bluffs, IA | Kougar |
| 2nd Bill Albin, Omaha, NE | Komet |
| 3rd Harlan Boatman, Falls City, NE | Komander |
| 4th Will Hicks, Omaha, NE | Liberty Sport |
| 5th Charlie Tordick, Omaha, NE | Kougar |
| 6th John Nollendorfs, Lincoln, NE | Kiwi |

KITE KILL

- | | |
|----------------------------------|---------------|
| 1st Gene Strauss, Falls City, NE | Komander |
| 2nd Will Hicks, Omaha, NE | Liberty Sport |

BEAUTY WINNERS

- Best Monokote: Dave Howlette, Red Oak, IA Kadet
Best Paint: Larry Skiles, Deer Creek, IN S. Chipmunk



Above: Dean Copeland (Omaha, NE) steers his Fox .60 powered Komar out of the Sig 500 course and takes aim at one of the score balloons. Above Right: Bill Sturatt (Glenwood, IA) did this airbrushed desert scene in many pastel colors on the wing of his Kadet. Right: Action on the Loops-A-Lot line with five pilots in the air at once. Below: Kim Pollard (Omaha, NE) holds his Kiwi before it starts down the Sig 500 course. Below right: Larry Skiles (Deer Creek, IN) with the Super Chipmunk that won him the Beauty Award in the class for painted airplanes.



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Futaba FP-2GA	109.95	75.	2	no
Futaba FP-2E	139.95	93.	2	no
MRC 772	119.95	84.	2	no
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Cox 8021	139.95	93.	2	no
Futaba FP-2F	139.95	93.	2	no
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Cox 8031	159.95	104.	2	no
Logictrol LRB-3	159.00	100.	2	no
Logictrol Ranger	179.00	113.	2	no
3 Channel Dual stick				
Cox 8033	229.95	148.	3	yes
Futaba FP-3F	179.95	118.	2	no
Futaba FP-3FN	199.95	131.	2	yes
4 Channel				
Cox 8040	299.95	189.	4	yes
Cox 8044	279.95	178.	4	yes
Cox 8048	449.95	285.	4	yes
Futaba FP-4N	299.95	190.	4	yes
Futaba FP-4FN S17	269.95	175.	4	yes
Logictrol Nimbus	309.00	187.	4	yes
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SOARING

from page 133/68

team, that's the way it goes. Have the team elect its own captain. Assign each team a winch. Fly for one hour with two simple rules: (1) a team may only have one frequency clip at a time and (2) a team may not use the same color for two successive flights. At the end of one hour, stop all scoring, set all planes on the ground, and take a ten minute break (you are going to need it). Rotate team assignments on the winches and go for another hour. Take another ten minute break and do it again for a total of 3 one hour sessions. One other rule which forces a little more strategy is that each pilot must fly a minimum of four flights during the three hours or take a 500 point penalty. Also, flight points are limited to 500 per flight. Scoring is set at one point/second for Duration and 25 points for landing in a 25' diameter circle.

Each team has to retrieve its own launch lines and maintain its assigned winch equipment. If it breaks, get it tied together; if it tangles, get it untangled. If you pop off, start the clock and fly it as best as you can. Hurry up --- he's almost down, who is going to be next?

A brief example of what happens is as follows. Team One is starting with O/W. Team Two with P/W, and Team Three with B/W. They launch and it's early morning with light lift. Team Two lands first, about two minutes later. A helper grabs the transmitter, runs to frequency control, turns in the transmitter and P/W clip, grabs the B/W clip and transmitter, runs to winch #2 helps his team member hook up, and away he goes. Hopefully, another team member has remembered to retrieve the winch line. Team One lands at 2:15 and wanted B/W but it's gone so they grab P/W and fly. And so it goes for the next hour. With short tow lines and two minute lift, you have to scramble. The neat thing about all this is you never know for sure when you are going to fly and you are always busy timing, retrieving a tow, running a transmitter, or relaxing by flying. It is a good way to get the new pilot involved in contest flying.

As for our contest, using 3 one hour periods for a total time of 180 minutes, the winning teams duration was 152 minutes, 45 seconds, for 29 flights with 20 landings. The Second Place team had 150 minutes, 44 seconds, for 33 flights with 21 landings. The Third Place team had 137 minutes, 42 seconds, for 32 flights with 19 landings.

The maximum duration scored by one individual was 44:51. Maximum number of flights by one individual was nine. Most landings were seven. Seventeen

to page 138



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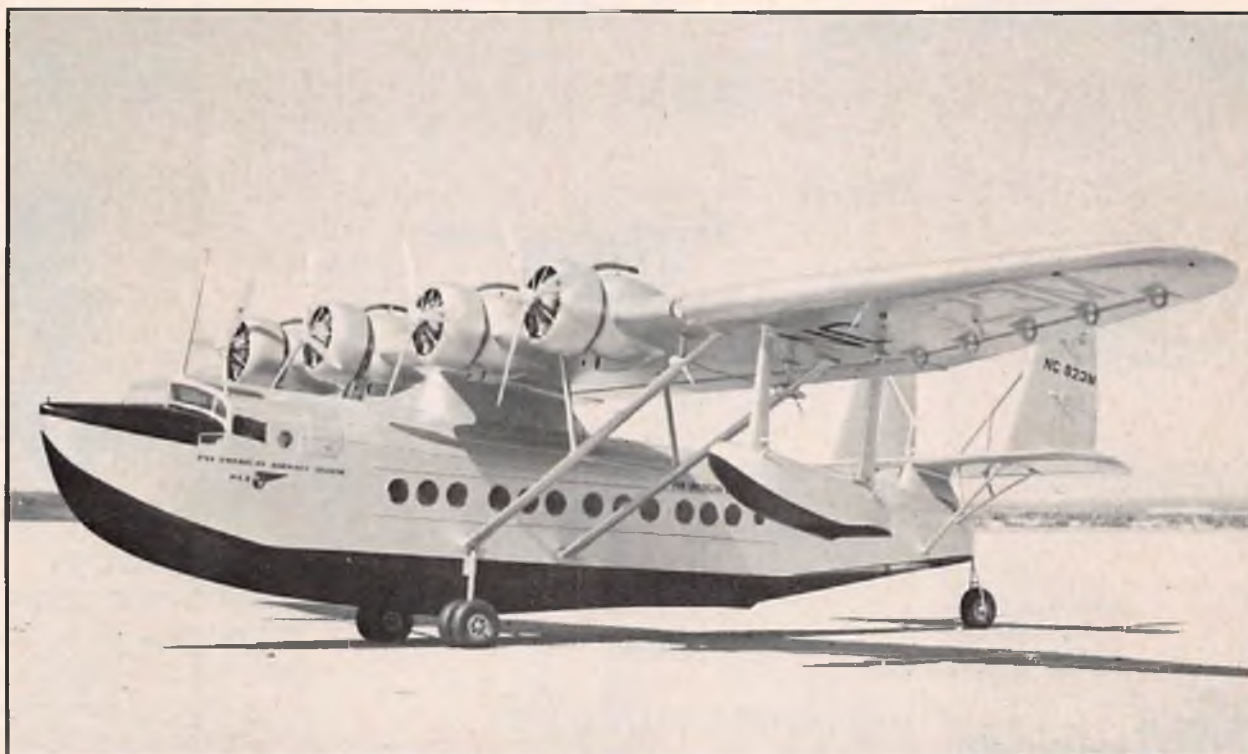
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Satellite City

Dear Bill & Bob:

142 Tabard Drive
San Antonio, Texas
June 30, 1978

Do hope all is well for you both and "HOT STUFF". Here's some thoughts of mine that perhaps you'd like to know. As a professional scale model builder, I use many techniques and products to help me duplicate full size aircraft in model form. I've used your product "HOT STUFF" since it was introduced by R/C Modeler, and I must say it's strength and instant setting time have become increasingly valuable in my work.

I've enclosed several photos you might like, such as the Douglas World Cruiser, Sikorsky S-42 Clipper, P-26 Pea Shooter, Winnie Mae, Ford Tri-Motor and my latest project, the Curtiss Condor, which was the last of the luxury airliners to feature sleeping accommodations. All models, of course, have full interior detail.

The Curtiss Condor is now on display permanently at the Nut Tree Restaurant near Vacaville, Calif., so if you ever happen to be on U.S. 80, between San Francisco and Sacramento, stop in at the Nut Tree airport. Don Birrell, the design director, commissioned me years ago to build scale aircraft for their extensive display, and I'm sure you would enjoy browsing thru aircraft of years gone by. The dining is great, so the visit would appeal to your wives also.

We had eighty-nine visitors to view the Condor at my shop in San Antonio prior to delivery. Most were model builders all interested in model building of some sort. Many were already "HOT STUFF" users and the rest were amazed to learn that the entire Condor was built with your wonderful product.

The Curtiss R3c-2—will be next and the Nut Tree is interested in an 8 ft. DC-3, lots of "HOT STUFF" will go into that.

Sincerely yours,

Edward Chavez

Edward Chavez

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SOARING

from page 136/68

maxes were scored. Shortest flight was 27 seconds near the end of round two. Average flight time was about 4 minutes, 42 seconds. But these statistics are only indicative, the real challenge is team performance.

The advantage of this type of contest is that it is easy to run, has a definite ending time, and is a lot of fun. Try it by varying the number of winches, time periods, and/or minimum number of flights, but set it up to get everyone

involved and kept busy. Five or six people on a team is about right. Try it out and see if it sparks some interest in your club's contest. Bring a movie camera and record some of this madness for your next meeting.

Frank, it sounds like you people had a real ball, the spectators can really let it out on this type of competition.

The contest season is coming to a close, building picks up to a rapid pace, the holiday season is on us. Where does this circle stop? Never! Everybody have a joyous Christmas and may your new year be the best ever.

Good lift.

1978 INDY UNLIMITED

from page 62

in points accumulation. The 1978 winner was also the first to receive the award way back in 1973. With radio problems that really messed up a beautiful red and black Crapshooter, Bob Finley totaled zero points after five rounds and thus becomes the first two-time winner.

We all thank the Indy Model Boat Club and their wives for their hard work and "hoosier hospitality" for a truly fun modeling event.

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6 FOOT WING

Wing Span..... 71½"
Wing Area..... 573 sq. in.
Weight Without Radio..... 9 oz.
Typical Flying Weight..... 18 oz.
Wing Loading..... 4.5 oz/ft²
Airfoil..... Windrifter 11½ % Flat Bottom

2 METER WING *

Wing Span..... 78¾"
Wing Area..... 635 sq. in.
Weight Without Radio..... 10 oz.
Typical Flying Weight..... 19 oz.
Wing Loading..... 4.3 oz/ft²
Airfoil..... Windrifter 11½ % Flat Bottom

*material for 2 meter modification listed but not included.

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Wing Span 149 in.
Wing Area 1643 in.²
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L/D (measured) 21.3:1
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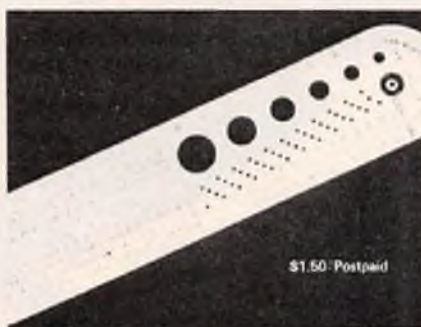
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RADIO SPECTRUM

from page 66/64

NEW FREQUENCIES

The AMA has been working for some time, preparing a petition which they hope to submit to the FCC before the end of 1978. A position paper has been circulated for comments throughout the R/C industry. Briefly summarized, the objectives are as follows:

- (1) Use of FM on current and future frequencies.
- (2) More 72 MHz R/C frequencies.
- (3) A new band of R/C frequencies, 30-42 MHz (with relatively simple conversion of 27 MHz equipment).
- (4) Exclusive R/C frequencies or at least sharing only with low power users.

I understand Kraft Systems has been delivering FM sets on six meters in the U.S. and on 35, 40, and 27 to 30 MHz in Europe. I'm also told they are working with only 10 KHz separation. If all the 27 MHz CB rigs were operating legally, FM might even make 27 MHz R/C frequencies usable again. Anyway, sounds like the AMA is doing everyone a favor. We'll keep you posted on future developments. □

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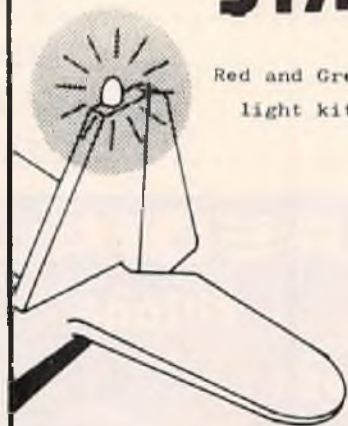
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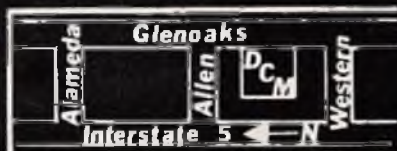
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ELECTRA-FLI

from page 61

We believe that electric models will open many new flying sights to modelers who otherwise would be grounded.

This turned out to be one of the most complete kits that we have built. The use of the motor batteries to serve for the receiver battery pack is truly unique. As the batteries drain from motor use, the CVR unit cuts off the motor, saving enough battery life to operate your receiver and get your plane safely to the ground. This completely eliminates the use of your airborne receiver battery. □

RCM 1/2A BASIC TRAINER

from page 57/56

sandpaper.

We covered our models with Kwik Cote from Hobby Shack. Any of the light weight, heat shrinkable plastic films will work very well. The covering was used to hinge the rudder and elevators. Our technique is to lay the upper side of the elevators on top of the upper side of the stabilizer with the hinge edges lined up evenly. The film is draped over these hinge edges and ironed to them. Then the elevators and stab are unfolded out flat and the film is adhered to all the outer edges. When the bottom covering has been trimmed, the upper covering is applied in the same manner. The same method is used to hinge the rudder to the fin.

The covering on the center portion of the stab must be adhered securely to the balsa on both the upper and lower surfaces. Carefully cut and remove the stab covering in the areas where the stab is epoxied to the fuselage and where the fin is epoxied to the stab. This is necessary as epoxy does not stick very well to plastic film. The trim was striping tape and trim film.

Our models used the Cannon Tiny Twin-Block radio which has to be the easiest of any to install. For other types of servos, install servo rails to suit. Keep the servos toward the rear of the cabin as you will need space in the front for the receiver.

Sullivan semi-flexible plastic pushrods were used for control hook-up. Holes must be drilled in bulkhead F3, in line with the servo arms, to accommodate the pushrods. A dab of epoxy will secure them in place.

The landing struts are merely inserted in their respective holes at each side and pushed into the slot across the bottom. A bit of epoxy will hold them.

After everything is assembled, there are three important checks to be made.

to page 149

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All our kits are designed for fast building, are all Balsa with layout specs or machine cut parts and printed parts-no foam! All kits come complete with joined balsa plans, necessary hardware, formed wire, canopy, ABS covers and wheel pants.

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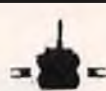
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CHRISTMAS gift ideas
on next page...

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See Previous Page For Ordering Information.

RCM 1/2A BASIC TRAINER

from page 144/56

First, take a good look at the engine position to verify that you have the down and right thrust adjustment. If not, shim with washers to correct. Second, place a straight-edge along the fuselage side and beneath the bottom surface of the wing and stab; they should be flat on the straight-edge. Third, and most important, check the C.G. by placing a forefinger at the aft edge of the front spar on each side of the fuselage. Gently lift the model and it should balance with the nose slightly low. If any adjustments are needed, try shifting the battery pack and/or receiver to get the proper balance. Use additional weight only as a last resort.

We are confident that the RCM 1/2A Basic Trainer will provide you with many hours of flying pleasure as it has for us. Enjoy! ☐

PITTS S2A

from page 42/40

Southern R.C. Products Flex-all. Normal sport fuel, up to 25% nitro, will not affect this type of finish. Whatever method you use, try to keep it light.

Final Assembly:

Make up and install the tail wheel. Hinge and mount the control surfaces. Add the control horns. Using epoxy, glue in the cabane struts making sure they are bottomed in slots. Glue the strut mounting plates over the struts inside of the fuselage sides.

Before mounting the fuel tank, remove that portion of the building crutch between the firewall and former #2. This allows you to mount the tank at the proper height. Install equipment, engine, etc.

Position the servos to balance the model as shown on the plans.

To install the top wing, a certain procedure must be followed: mount the inter-plane struts to the bottom of the top wing. Notches in struts fit around the dowel in the wing. They will fit only one way. Holding one strut in each hand, and with the leading edge of the wing facing you, place the bottom end of the struts in the slots of the bottom wing at a slight angle. Engage dowels with struts and rotate the whole assembly forward until the holes in the tabs are aligned with the holes in the struts. Use 6-32 nylon bolts to mount the top wing.

Flying:

Caution! The recommended control surface throws are as follows: Aileron 3/16" each direction; Rudder 1/2" each direction; Elevator 1/2" each direction. Do not attempt to fly until these are adjusted. We know from experience.

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WING - The Megan wing is supplied with a basic (a) 128" span plus parts & materials to construct plug-in wing tip extensions that yield a total span of (b) 140".

Wing Area - (a) 1,216 sq. in., (b) 1,300 sq. in.

Aspect Ratio - (a) 11.5 to 1, (b) 15 to 1

Wing Loading - (a) 8 oz per sq ft, (b) 7.5 oz per sq ft.

Airfoil - Advanced 10% Eppler with Philips Entry.

FLYING WEIGHT - 68 oz.

ONE OF THE BIGGEST SURPRISES about the Megan is that it is ONE OF THE EASIEST HIGH-PERFORMANCE OPEN-CLASS COMPETITION SAILPLANES TO FLY while at the same time being the MOST SOPHISTICATED. The Megan has the ability to HANG IN ON DEAD AIR OR LIGHT LIFT with the slowest floaters, CRUISE AND PENETRATE with the lead sleds and OUT MANEUVER AND OUT PERFORM them all.

THIS IS A HOT ONE: Anticipated release date of the Maestro Megan is about the middle of September 1978. Orders will be filled on a first-come, first-serve basis.

Full Megan Kit - \$129.95, Megan Wing kit - \$70.00. (The Megan Wing can be used on all other Maestro fuselages.)

NEW KIT PRICES Effective Sept. 1, 1978: MK III \$119.95, Caliente \$119.95, Talisman \$124.95, Todl \$104.95, Gull II \$89.95, Hljacker II \$89.95.

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Make sure that the C.G. is still correct. If you have wheel pants, make sure the wheels cannot rub the pant when the wheel flattens, causing it to bind. I feel that this is one of the greatest causes of ground loops. You might want to make the first flight with the pants removed.

One last check --- everything tight, engine running correctly, range check okay? Increase power slowly. Add a small amount of right rudder and release after the tail lifts. Once the tail has lifted, the Pitts will track straight for as long as you want her to. Break ground by feeding in a little up. Once airborne, gain altitude for trim changes --- it's safer up there.

Good flying and I hope you enjoy your Pitts S2A as much as we do. □

E.A.A. ACRO-SPORT

from page 39

had to go back and correct mine. Well now, after 32 steps we now have two wings.

The tail is next and very straightforward --- just some sanding to shape and you are about set for final assembly and finishing. Only 10 steps this time.

Now on to the wire works. This is usually a most difficult part of a biplane, but not in this case. It's easy --- just follow the instructions, measure and solder carefully and you will be done in 9 steps.

The wing and strut installation instructions are complete and accurate and require 13 steps to complete. Now you have all of the construction completed and it's time to start the finishing process.

Jack suggests a finishing method that works good. I elected to do something a little different, however. I covered my model with Coverite Permagloss. In the three rolls that I used, I noticed some flaws in coloring and weave which are not as obvious after it is ironed on. I did have a time trying to match the Permagloss blue color with paint for the struts, cowl, and wheel pants. I used R-S Perfect Paint which still was not a match. For trim I used Bridi Quick-Stripe Trim Tape.

Well, it's time now to install your equipment. I used Prather motor mount that came drilled and tapped for my K & B .61 Pumper. My choice for radio gear is a Kraft 7 channel, which I am very pleased with --- quality shows! Set it up for the surface movements that are called out in the instructions. After you get everything all set make one more check of **everything**. I saved an airplane recently by checking the receiver battery condition with my D & D Electronics Battery Management System and found that my charger had gone over the hill and had failed to tell me. So be careful!

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After everything is double checked it's time to fly and fly it does. The K & B .61 Pumper is most adequate power and very easy to set up in the cowl. This engine is very dependable at all speed settings and really makes the Acro-Sport perform.

The Acro-Sport is a super flyer! It will do anything you ask including very pleasant slow speed landings. Any of you planning to fly the IMAC routine will be very pleased with its performance. You should see John Lockwood do his inverted flat spin trick --- it's spectacular. I have flown 3 different Acro-Sports that each have different weights --- all of them fly beautifully.

If you are looking for a biplane that can do it all --- I think this is a good choice. The kit builds quickly and displays the same good quality and personal touch that is evident in all of Jack Stafford Model Kits. You enjoy the end results!

For my next maneuver . . .

HAWKER TYPHOON

from page 38

... Hawker test pilots were sent to visit with these squadrons, in an attempt to reassure them that the Typhoon was not a rogue aircraft. Although it was a Hawker design, almost all of the 3,330 Typhoons built were produced by the Gloster Aircraft Co. Ltd. The Typhoon was to be replaced by the Hawker Tempest in 1945 and virtually every Typhoon was reduced to scrap.

While the full size Typhoon was a flop as an interceptor; the Trueline Stand-Off Scale model of this notorious aircraft is very good. The kit features a foam wing, that is pre-sheated with hardwood veneer which goes together very rapidly. The wing trailing edge, ailerons, and tips, are all balsa. The tail surfaces are of pre-cut balsa sheet. The fuselage is constructed by first gluing the bulkheads to 1/4" x 1" balsa side strips, using the plan sheet fuselage top view as a guide. This produces the basic fuselage structure. All of the round or oval portions of the fuselage are foam, which is pre-sheated with the same hardwood veneer that is used on the wing. This method of construction greatly simplifies and hastens the fuselage assembly. If you have ever planked an oval, tapering, shaped fuselage you can well appreciate the work and time that is saved, via this construction technique. The remainder of the fuselage is of conventional balsa sheet and block construction. The cowl, fuselage top access hatch cover, wing root fairings, and engine exhaust stacks are molded ABS plastic. A formed clear butyrate canopy, filled fiberglass engine mount, and an aluminum spinner are also included in the kit. The kit quality is very

to page 155

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GIANT Scale!



VINTAGE WHEELS

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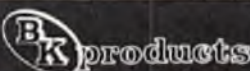
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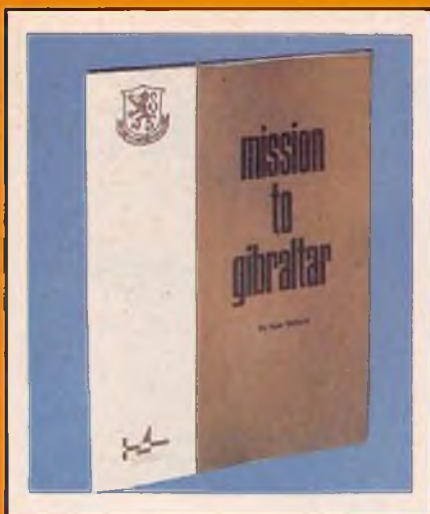
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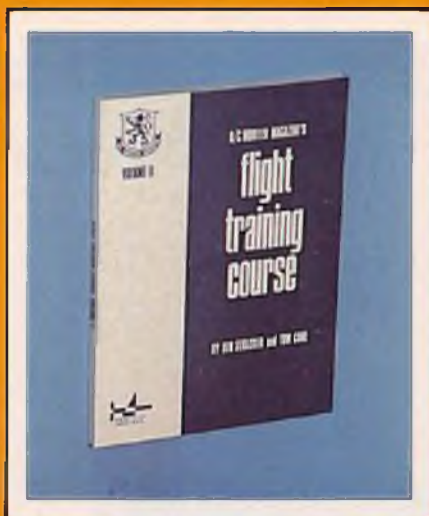
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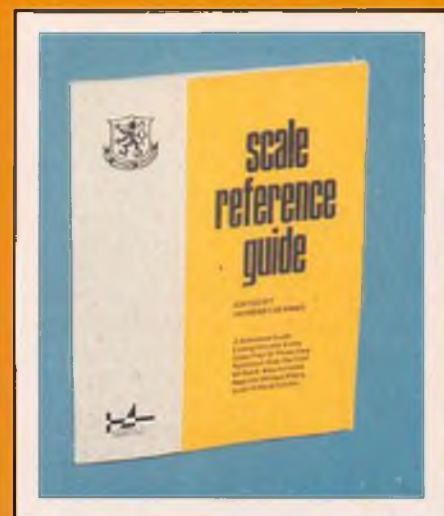
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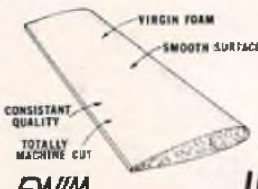
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HAWKER TYPHOON

from page 151/38

good with one exception — the plan
sheet is below average, due to its
information deficiencies. For example,
the landing gear is not shown in any
view. Plywood landing gear well covers
are included in the kit and, since they are
not symmetrical in shape, there is no
way for the builder to determine which
way they should be mounted to the
landing gear legs. An excellent source of
highly detailed information and scale
color data is the Profile Publications

Booklet #81, entitled "The Hawker
Typhoon". We used this valuable aid in
constructing and finishing our test
model. We installed the fixed landing
gear which is included in the kit,
although the wing is sufficiently thick to
allow the use of retractors. If retractors
were to be installed, the builder would be wise
to strengthen the wing with a plywood
spar and additional fiberglass cloth and
resin, due to the large wheel well
cut-outs that would be required.

Our Typhoon was powered with an
OS Schnuerle .40 R/C engine, which
was mounted in an inverted position with
a Semco helicopter type muffler. In an
effort to minimize the possibility of

engine failure on low throttle settings,
due to its inverted mounting, we installed
a "C" size 1.25 volt nicad battery on the
firewall, with a micro switch which was
activated by the throttle control cable.
This system works just fine and even
allows the engine to be started without
an external battery. Since the Typhoon
nose moment is relatively short, all radio
equipment (except the aileron servo) is
installed directly behind the firewall with
the fuel tank. This area is larger than it
seems at first, and any relatively modern
radio system will fit into it easily.
Although there is cavernous space
within the fuselage, over the wing saddle

to page 157

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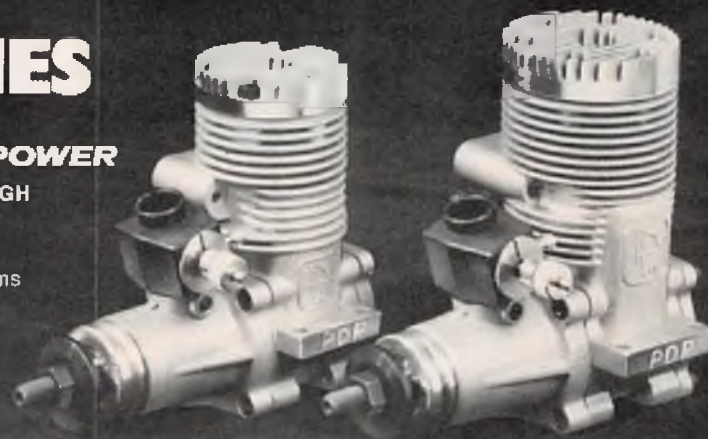
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HAWKER TYPHOON

from page 155/38

area, placing the radio components in this area will undoubtedly produce a tail heavy aircraft. We used Westport International's Variant radio system in our Typhoon, which was finished with K & B Super Poxy primer and R & S camouflage enamels. The bottom surfaces were sprayed blue-gray and the top was finished with a dark green and sand brown camouflage effect. The RAF roundel decals, which are included in the kit, were applied and the entire aircraft was given a final coat of R & S satin clear enamel.

Our finished Typhoon ready to fly weighed 91 ounces.

Before evaluating the Typhoon's in-flight qualities, we would like to

strongly emphasize that most World War II fighters do not make good R/C beginner type aircraft. The Typhoon is no exception, both from a building and flying viewpoint. The Typhoon requires the hands (or thumbs) of an R/C pilot, who is experienced in four control function as well as low wing experience. We mention this not as a criticism of the Typhoon, but rather in the hope that any beginner will resist that common urge to build, as his first aircraft, a plane that looks great, but is simply not suited for learning to fly.

In rating the Typhoon's flying characteristics we attempted to keep our comparison based on other scale type aircraft. The reader should bear this in mind — that to make any comparison with sport or pattern type aircraft, for example, would be grossly unfair. As a scale R/C aircraft, the Typhoon does, however, fly quite well. Take-off is

smooth with only a slight amount of right rudder being required. Take-offs should be made by first picking up sufficient ground speed and then applying a small amount of up elevator, to become airborne.

In-flight characteristics are good and the Typhoon will perform all the usual aerobatic maneuvers fairly well. Landings are not a problem providing the pilot maintains a rather brisk landing approach speed until the ship is on final, when it can be flared in the conventional fashion.

To summarize: the True Line Hawker Typhoon, in spite of its below average plan sheet and written information deficiencies, is still a good kit. Rapid assembly and the fact that it is a refreshing alternative to the current flock of Mustangs, Corsairs, Focke-Wulf 190's, etc. make the Hawker Typhoon a most appealing R/C scale project. □



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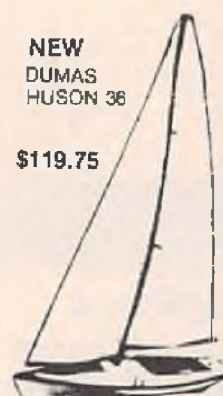
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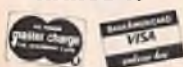
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the fuselage into the breeze.

Stab and Fin:

(1) The stab and fin are assembled from 1/8" balsa and 1/8" square spruce strips in the simplest fashion. Trim the edges of appropriate length sheets and glue them together. Use drafting or masking tape to hold the pieces together and then put the pieces down on a piece of Saran Wrap weighted with an old book on top to make sure they dry flat.

(2) When the pieces are dry, slip them under the plan and use a pin to mark the corners. Leave the elevator attached until after sanding, and cut out to the outline.

(3) You might do a bit of shaping if you like that sort of thing, but be careful to keep the underside of the stab flat where it connects with the fuselage. In any case, at least sand the stab and fin smooth, with a rounded leading edge.

(4) Cut the elevator off, and bevel its leading edge like you did the ailerons.

(5) Attach the stab and fin to the fuselage, with the appropriate 1/4" triangle stock.

(6) The tail group may be primed and painted or covered with light iron-on plastic.

Flying The Ridge Rat

This discussion assumes that the reader has no experience with an aileron ship, but is fairly capable with a rudder and elevator glider.

Setting Up The Airplane: First, put the Center of Gravity in the place shown on the plans. This is important, in fact it is much more important to have the C.G. in the right place than to save a few ounces. For starters, set the aileron deflection to 3/8" down and 1/2" up, and the elevator throw 3/8" each way.

The differential throw in the ailerons can be achieved by using a servo output arm with holes that are swept aft or perpendicular from the pivot point about 30°. The idea of the differential is to cause the inside and outside wings to have equal, or close to equal, drag when starting a turn. Since the dropping aileron causes more drag for the same deflection, it is deflected less. The way to test for a proper relationship is to fly directly away from yourself at eye level, into the wind, and bang the ailerons full one way, and then the other. Note when you do this if the plane yaws one way or the other from unequal drag. It is best to have the plane remain pointed straight or yaw just a bit to the inside of the following turn. If you use too much

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aileron differential, then when you roll up for a turn, the nose will be dropped too much. When you get it right, the plane will roll up via ailerons and just wait there for awhile until you pull on the elevator.

For the first flights, select a hill that is not disastrous to crash into, on a day that has a moderate breeze, when other aileron ships can stay up easily, but aren't going really fast.

If you can fly a rudder and elevator glider, then you will have no trouble with a Ridge Rat. There are a few differences between flying aileron ships and rudder and elevator gliders. However, while most rudder and elevator planes can be flown almost without the use of the elevator, you will find with the Ridge Rat that you will use the elevator much more. On an aileron ship, the ailerons don't make the plane turn, rather, they control the roll of the plane. In order to make a turn, the plane is rolled up via aileron to an appropriate bank angle, and then the ailerons are neutralized as you feed in up elevator to bring the plane around. Too much elevator, and the plane will float up; too little, and it will slide off the inside of the turn. To terminate the turn, neutralize the elevator as you feed in opposite aileron. When the plane is straight and level, all controls are neutralized, or perhaps a bit of down is held in for a moment to counteract the zooming tendency caused by a possible speed increase in the turn.

Start out making big gentle turns, which require very little elevator, so as to stay out of trouble. As you gain confidence and skill you will find that you can roll the plane up to vertical and pull very hard on the elevator to make a sharp beautiful pylon turn. After a little while you will find that your Ridge Rat can be maneuvered at will, like a go-kart of the skies, and you may wonder how you ever even flew that clumsy rudder and elevator airplane.

I like to adjust the aileron throw so that I can use full aileron to roll up for a turn without having such a rapid roll rate that it is difficult to end the rolling in a precise position. I have heard stories about aileron flyers rolling up for a turn the first time doing one or two complete rolls, so start out cautiously!

I like to adjust elevator throw so that the plane can be flown inverted with half to three quarters down stick. I also like to have the elevator response rapid but not jumpy. If you find that inverted flight requires so much elevator that response is jumpy, you might try moving the C.G. back a bit, but watch out because the plane will be less pitch stable, a condition some people favor anyway.

As far as flying the Ridge Rat, there really isn't much to it. It doesn't stall severely, you don't have to worry about breaking it in the air, and it is always responsive. One quirk of low-dihedral aileron ships you should be aware of: In

"RIGID ROTOR"
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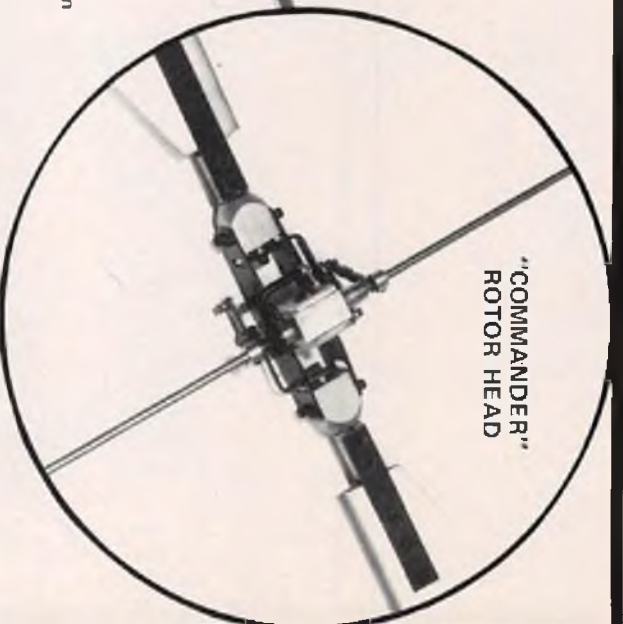
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RIDGE RAT

from page 162/32

silhouette from near side view, it is very difficult to tell which direction the plane is rolling. This is very disorienting and scary if you are close to the ground at the time. Usually this happens when flying in front of a bright sky, when you take your eyes off the plane and then come back to it. There are two ways to alleviate this problem. One way is to always follow the airplane carefully so that you can tell what it is doing from what it was doing before. The other way is to make the top and bottom of the wings different colors

and lightnesses. I recommend a dark color for the bottom, since it is usually dark anyway.

BIG IS BEAUTIFUL

from page 30/28

Polaris Products, 2514 Highway 97 North, Kelowna B.C. Canada V1X 4J4.

Dave Platt has come out with a much needed item for the Super Scaler. It's a Quarter Scale pilot figure (see photo). This item will be available only direct from Dave Platt Models, 6940 N.W. 15th St., Plantation, Fla. 33313. Price is



Dave Platt's new Quarter Scale Pilot figure, available only from Dave Platt Models direct.

to page 166



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- Case Material: Hi-Impact ABS plastic.
- Type Gimbals: Dunham open-gimbals.
- Type Pots: CTS 5K ceramic.
- Power Supply: 9.6v nicad.
- Type Meter: RF and battery condition indicator.
- Modes Available: Two stick, Mode 1, Mode 2, and single stick — also special order stick arrangements.
- Frequencies Available: 27, 53, 72 MHz
- Weight: 19 oz. with antenna & nicads.
- Size: 1-23/32" x 4-27/32" x 5-11/32" (43.5 x 123 x 136mm).
- Unique Features: RF section provides nominal 750 mw output. One of the smallest transmitters on the market.

RECEIVER Model 520R (5) (4)

- Case Material: Nylon.
- Size: 23/32" x 1-19/32" x 1-27/32" (18 x 40.5 x 47 mm).
- Weight: 1.24 oz. (35.1 gr.) for 5-channel.
- Type Decoder: C-MOS 8-bit shift register.
- Type Front End: Double tuned, dual FETS.
- FET RF AMP. Feeding a FET Mixer.

SERVO Model CE-4

- Case Material: Nylon.
- Size: 3/4" x 1 1/2" x 1 1/2" (19 x 38 x 38 mm).
- Weight: 1.25 oz. (35.4 grams).
- Output: Rotary type.
- Output Controls: Arms.

- Type Amplifier I.C. amplifier, utilizing T.I. 28604 I.C. chip.
- Motor Size: 8 ohm, 16 mm.
- Servos: CE-4 (Dunham Mechanics)

SYSTEM

- Airborne Power: 500 mah (Nicads).
- Type Connector: Deans 3-pin.
- Type Charger: Dual nicad charger, 2 charge indicators.
- Servo Trays: Full set.
- Shipping Container: Plastic outer, foam plastic inner.
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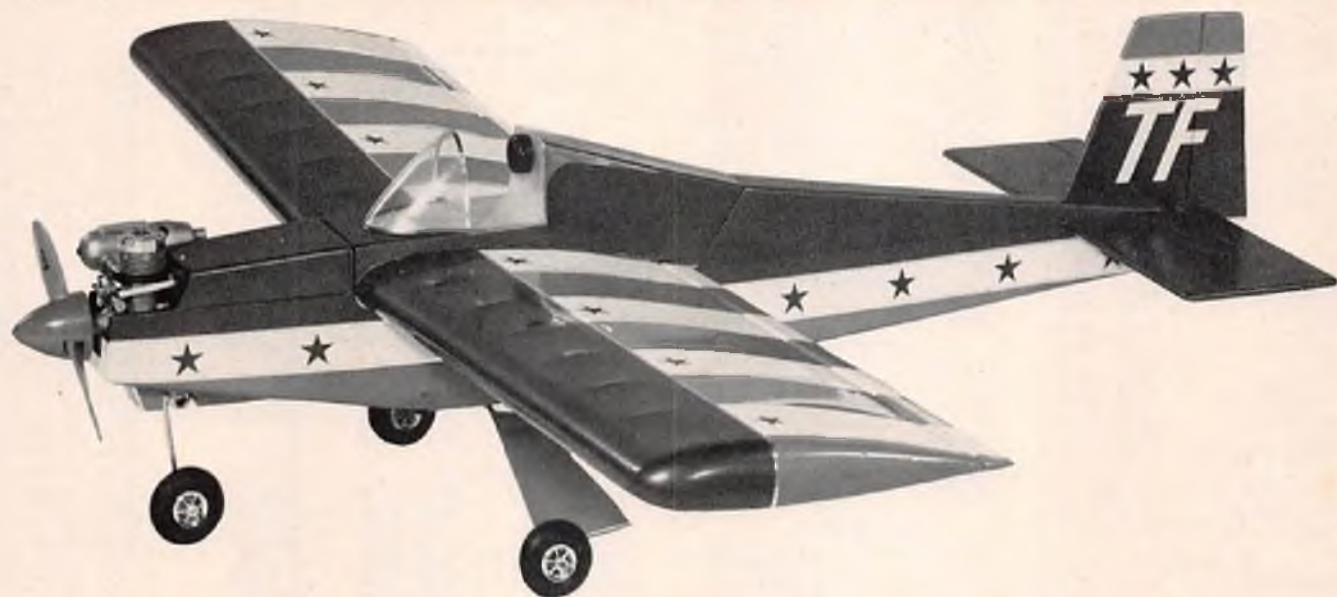
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WORLD ENGINE KITS

Mr. Mulligan	47.95	34.99
J-3 Cub	39.95	27.99
Champion	39.95	27.99
Box Fly (.19.25)	34.95	25.99
Boxfly Jr.	24.95	17.99
Boxfly Bipe	39.95	27.99
Boxfly S	29.95	20.99
Boxfly L	34.95	25.99

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Fox

Fox .15 Sch. RC	55.95	39.99
Fox .19 RC	31.95	23.99
Fox .25 RC	31.95	23.99
Fox .29 RC	34.95	26.99
Fox .36 RC	34.95	26.99
Fox .40 RC BB	61.95	45.99
Fox .45 RC BB	64.95	48.99
Fox .61 RC Hawk	84.95	63.99
Fox .78 RC	96.95	69.99

K & B

K&B .19 RC	50.00	34.99
K&B .21 RC	67.50	47.99
K&B .35 RC	39.95	25.99
K&B .40 RC w/ Perry Pump	95.00	63.99
K&B .40 RC	67.50	44.95
K&B .61 RC	90.00	54.99
K&B .61 RC w/ Perry Pump	115.00	69.99
K&B .40 SR III	92.50	59.99
K&B .40 (6.5) w/Perry Carb	110.00	64.99

Kraft

Kraft .61 RC	99.95	74.99
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O.S. with Mufflers

OS .10 RC FSR	35.95	27.99
OS .15 RC	39.95	31.99
OS .20 RC	42.95	33.99
OS .25 RC	44.95	35.99
OS .25 RC FSR	59.95	47.99
OS .30 RC	50.95	39.99
OS .35 RC	53.95	42.99
OS .36	117.50	89.99
OS .40 RC	74.95	53.99
OS .40 RC FSR	89.95	64.99
OS .45 RC FSR	104.95	75.99
OS .45 FSR H	104.95	75.99
OS .60 4-cycle	225.00	155.99
OS .60 BH RC	99.95	72.99
OS .60 RC FSR	129.95	93.99
OS .60 RC FSR	159.95	119.99
w/Perry pump		
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OS .90 RC	---	---
OS .120 RC	---	---

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COMBINATION SPECIAL

The Perry Pump and Perry Pump Carburetor are available to fit the following engines:

SUPER TIGRE G 60

OPS 60

WEBRA 61 BLACKHEAD

KRAFT

VECO 61

O.S. MAX SCHNURERLE 60F-SR

WEBRA SPEED .61

HOBBY BARN SPECIAL

Perry Pump & Carb)

\$129.99

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THE STREAKER

FIBERGLASS COMPETITION DEEP VEE.

IMPBA and NAMBA legal.



Designed for 6.5CC Engines.

Length 39 1/2"

Transom Width . . . 10 1/4"

Hobby Barn SPECIAL

\$63.99

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3 CH system	119.95	104.99
3 CH micro kit	124.95	109.99
5 CH Tx. conv.	21.95	18.99
7 CH Tx. conv.	26.95	23.99

Micro Servo/Battery Combos

Two micro servo kits with battery	58.95	52.99
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Four micro servo kits with battery

Micro Filite Pak Kits w/2 servos	94.95	84.99
w/4 servos	146.95	129.99

Flite Pak Kits

w/2 Bantam Servos	79.95	72.99
w/4 bantam servos	124.95	113.99

Dual Rack Servos

Add	1.00 each	
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w/2 midgit Bantam Servos

Servos	74.95	67.99
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w/4 Midgit Bantam Servos

Servos	114.95	99.99
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Servo Kits

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Bantam Servo	23.95	20.99

Dual Rack Servo

Retract Servo	24.95	21.99
Midgit Servo	23.95	20.99
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Digipack Assembled	94.95	82.99

Kraft

KP-2A	129.95	89.99
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KP-6A	339.95	217.99
KP-3C	219.99	169.99
KP-5C	375.43	268.99
KP-5CS	375.43	268.99
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Signature Series	749.95	680.99
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Signature Single Stick	849.95	780.99
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WORLD EXPERT SERIES

5 ch. Expert	399.95	234.99
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7 ch. Expert (with 5 servos)	454.95	274.99
For single stick add	15.00	

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MRC E/K

Prices too low to print!

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Lil' Shelly Foss	41.00	30.99
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40' Utility	44.00	33.99
Dauntless	59.00	44.99

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Atlas Van Line	11.00	8.99
Miss Thriftway	11.00	8.99
Atlas Van Line "40"	53.00	39.99
Miss Unlimited	28.00	21.99
Thriftway Too	16.00	12.99
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Drag'N Fly 40	55.00	41.99
Drag'N Fly 20	39.95	29.99
Hot Shot wood	30.00	22.99
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Atlas U-1	47.95	34.99
Hot Shot glass	67.95	50.99

Deep Vee

DV .10 Mah	11.00	8.99
DV .20 Ply	30.00	22.99
DV .40 Ply	47.00	35.99
DV .60 Ply	65.00	48.99
DV .20 CF glass	78.00	58.99
DV .40 CF glass	82.00	68.99
DV .60 CF glass	100.00	74.99
DV .21 CF wood	42.95	32.99
Little Jon	6.50	4.99
Lil' Swamp Buggy	13.00	9.99
Swamp Buggy	30.00	22.99
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Dumas Sailboats and other hardware — call for prices

Octura

Wing Ding .40	70.00	59.99
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Northwind .20	58.95	41.99
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Bushwhacker	109.95	79.99
Lil' Dolphin	32.95	23.99
Mini Dolphin	26.95	18.99

Call (602) 747-3633 for immediate COD shipments.

Looking for that perfect Christmas present?
HERE IT IS!!!
"FLYIN' BOX"

Many are in use by beginners and experts alike. This molded fiberglass unit is extremely attractive and professional looking, and stays that way year after year. Noted for outstanding utility and durability. Features: 4PVC plastic folding legs, folding and locking PVC plastic plane supports, filed work surface, light weight, large capacity (21L x 12H x 10W), and much more.

Assembled..... \$89.95
 Optional Alum. Legs..... 7.95
 Alum. Plane Supps..... 9.95

"LECTRIC FLITE CADDY"

The "Caddy" has all of the above PLUS it comes complete with mounted standard power panel, built-in battery charger and 12V H.D. (Wet Cell) battery, fuse protected. Features: Aluminum legs and plane supports, rear-mounted removable power cord to plug into your 110V line, bright indicating light shows charging cycle in operation. The power unit also offers fast charging at the field for your receiver and transmitter batteries. Can be purchased direct for **\$149.95**. Options: - a gel cell battery and matching charger - \$19.95 add'l. Choice of power panel: Sonics-Tronics Solid State or D.A.E. Dual Range - \$5.00 add'l. or D.A.E. Series IV - \$10.00 add'l. Any model in The Flyin' Box line can be obtained in Red, Orange, Blue and now in White.

Equipment not included.

Shown →



HOW TO ORDER:

Call now or send check or m.o. Cod's (\$2.00 extra). **PLEASE SPECIFY 1st and 2nd color choice**, and special "Ship To" address if any. Full payment with order guarantees **Aerotrend** pays the shipping charges!

AEROTREND
 PRODUCTS

44 W. PROSPECT STREET
 NEW HAVEN, CONN. 06515
 (203) 397-3755

Flyin' Box

RC FLYING AND THE LAW

from page 166/19

franchise taxes, and other fees, are generally kept to minimal amounts in order to favor such organizations.

On the other hand, you do have to keep in mind that there is the formality of corporate existence; you can't just do things because a few people feel like it or it suits their needs of the moment. Everyone has to function in line with the adopted bylaws and the authority vested in the board of directors and the officers of the corporation. You have to follow the

procedures set out in the bylaws of the corporation, have minutes of meetings, take formal votes and generally operate as a democratic organization. You also have to file an annual report with the state and have a designated registered agent, which I recommend should be your attorney. There are also costs involved in establishing the corporation and there may be fees for the attorney in terms of organizing and helping you maintain the corporate existence.

In general, the leaders of the group or club that want to consider incorporating will sit down with an attorney who will explain that state's rules concerning not for profit corporations. You will then

need a set of incorporators (in Illinois 3 are required), and you will be asked to designate initial directors of the corporation who, in turn, at the first meeting of the corporation (once the state has granted it a charter or issued its Articles of Incorporation) will elect officers. Unlike business corporations, there are **no shareholders**; instead there are **members** and the corporation issues membership certificates. Usually your incorporators, who will most likely also be directors, will elect officers (a director can also be an officer) and the qualifications for membership will be established. The corporation may or may not issue membership certificates.

Model Master Caddy

- ★ Special plastic laminate exterior
- ★ Weather Mar Burn & Fuel resistant surface
- ★ Paper towel holder
- ★ Four colors: Orange Red, Yellow, Blue
- ★ Wide stance. All Aluminum legs
- ★ Light weight



- ★ Optional Aluminum detachable POWER MODULE CASE
- ★ Carries starter 12v battery, power panel, transmitter & has hooks for coiling gas plug & starter cords.



(starter 12v battery, per panel trans not included)



- ★ recessed top keeps parts & tools from rolling off
- ★ Optional clear plastic 10 drawer organizer
- ★ Additional storage for 2nd trans, tools, props, etc.



- ★ Model cradles telescope & suit for field repairs
- ★ Fuselage cradles pre-light in four standard sizes (see below)
- ★ Cradles are interchangeable with wing, tail and helicopter cradles
- ★ All cradles are interchangeable with our Bench Top MODEL MASTER CRADLE set.

How to Order:

Mail money order-certified check personal check (please allow delay for clearance) C.O.D. with certified check. Add \$3.50 for shipping and handling.

Name _____ MODEL MASTER CADDY \$79.95
 Address _____ POWER MODULE CASE optional \$19.95
 City & State _____ Zip _____ 10 DRAWER CABINET INST. (D optional) \$50
 * Select any two fuselage cradle sizes with MODEL MASTER CADDY
 (Circle: A-12V; B-12V; C-15; D-15)

Patent Pending

D&C MODEL PRODUCTS
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UP, UP 'N AWAY!

Chuck Cunningham's Original Line-up!
The big, beautiful birds that do it all. Buy & fly the best!



**Sleek & sporty
Miss Texas**

- 84" span, 1000 squares
- 8 1/2 pounds, great maneuverability

Perfect flyer on a .61, really turns on with a .91. Buy it — build it and really have fun.

All kits are complete: rolled plans, balsa, spruce, plywood. All parts machine cut and packaged. SKY MASTER kits are designed for easy building and easy flying. You'll be proud of your finished ship.



NEW & TERRIFIC EINDECKER

- 104" span
- 1950 squares

The easiest entry to really big flying! Lots of room in a big fuse to make building easy, stable design to make flying fun. Power it with .91 to Quadra. 16 pounds

For flyin' fun, this is the way to go! Take a big one home to build

You convinced us that you wanted a quality kit at a low price, so we are now direct only!



Magnificent LAZY ACE

- 76" span, 1800 squares
- The 'biplane lovers' biplane

The name of the game is fun! And the Lazy Ace is lots of it. Start with a .61 and add excitement with a .91. Be original — customize it

Outstanding Trainer



LUCKY LADY

72" span, 850 squares
.40 to .60 engine

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Use MasterCard or Visa, personal check or money order, no C.O.D.'s. Texas residents add 5% sales tax. UPS shipment included in price.

CUSTOMIZED DESIGNS for scientific & research applications. Write if you are interested in this service.

One thing the club may want to consider is this matter of whether to issue a formal membership certificate; it looks like a certificate of stock in a business corporation and can be a very nice gift to an incoming member.

The attorney will also guide you through establishing your not for profit corporation bylaws which lay out such things as the election of directors by the members, the election of officers by the directors, the duties of officers, the replacement of officers and the qualifications for membership in the club. Decisions will have to be made as to how often the board will meet, how often the membership meets, when elections

take place, and the like. There can also be different kinds of membership including voting and non-voting.

Under current postal regulations, a not for profit corporation which puts out an official publication may qualify for lower postage rates. There are all kinds of areas and functions about which your attorney can give you advice and guidance.

Once again, the R/C club organized as a not for profit corporation should make certain that each of its members has the AMA insurance (obtained by AMA membership) and that the club follows through with the necessary forms to obtain an AMA charter and,

thereby, the club will be covered by the one million dollar AMA policy; of course, the same admonition is applicable to non-incorporated groups.

A sense of organization is a sense of solidity and soundness. The corporate route is a sound one for any group seriously engaged in R/C modeling. If you haven't as yet, you and your friends ought to look into this matter.

For illustrative purposes, R/C Modeler has reproduced a sample of the application for corporate existence to the state of Illinois for a fictitiousness R/C club. Your friendly attorney at law will help you with your state's forms and requirements. □

INTRODUCING FLITE LINE'S ECONOMICAL E Z BUILD SERIES SPORT PLANES



E Z TRAINER \$29.95

A super simple, tough little trainer. Ideal first plane using rudder, elevator and throttle controls. Balsa and ply fuselage. Foam wing. Build as a tail dragger or trike gear.
wing span - 48"
weight - 3 1/4 lb.
wing area - 460"
engine - .19 to .35



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A simple, good looking cabin model. Great aerobion trainer or sport model that can be flown with 3 or 4 channel radio. E Z to build with foam wing, balsa and ply fuselage.
wing span - 51"
weight - 3 1/4 lbs.
wing area - 510"
engine - .19 to .40



E Z SPORT \$29.95

A versatile fun fly plane - perfect for one design club events, or knock around sport flying. An ideal, E Z second plane. Build as a tail dragger or trike gear.
wing span - 51"
weight - 3 1/4 lb.
wing area - 505"
engine - .19 to .40



SKOOTER II \$29.95

A great one design racing plane, novice pattern bird or fun fly hot rod. New available with standard 15% wing, or the new 12%, 500" racing wing.
wing span - 48"
weight - 3 1/4 lb.
wing area - 480"
engine - .19 to .40



FLITE LINE PRODUCTS

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Lubbock, Texas 79410

Model 100 1/12 scale Series

100 E Electronic Speed Control
100 R Rheostat Speed Control
100 W Resistor Car without radio

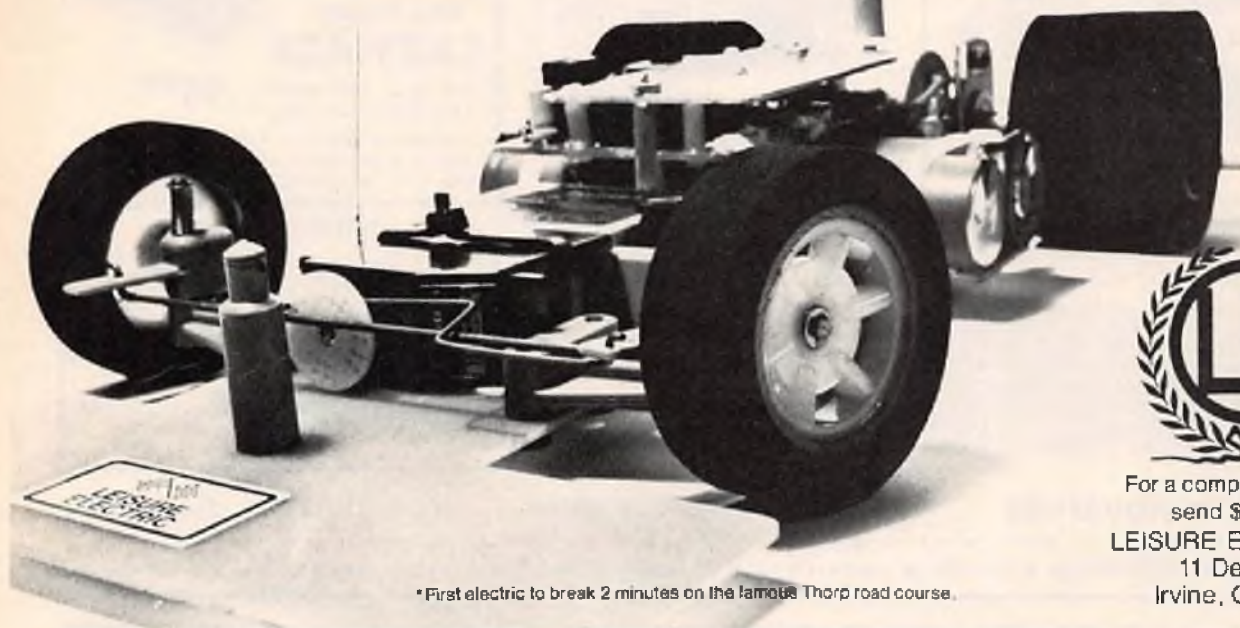
Chassis Routed & Computer Drilled
Fiberglass.
Wheels Slicks, Trued & Bonded to
Virgin Nylon Rims.
Motor Mid-Engined Leisure .05
ROAR Legal.
Axles Rear: Round Solid Steel
Front: Steel pin.
Weight 34.5 ounces.

NAKED TRUTH

LEISURE ELECTRONICS'
NEW MID-ENGINED
MODEL 100

Our new Model 100 series is truly a study in advanced 1/12 scale race car design. Its ultra-low center of gravity and mid-engined placement of the fast, ROAR Legal, .05 Leisure motor produced an amazing 10-2 win/loss record in regional and national 1/12 scale racing for 1978.*

The naked truth is we built the Model 100 from the fiberglass chassis up, to have the anatomy of a champion.



*First electric to break 2 minutes on the famous Thorp road course.



For a complete catalogue
send \$1.00 to:
LEISURE ELECTRONICS
11 Deerspring
Irvine, Ca. 92714

SUNDAY FLIER

from page 15

events? All fun. First, put twenty beans in a cup on top of your model, and fly once around the field. 100 points if you didn't lose any, five points off for each one lost. Talk about your gentle take-offs, banks and turns! But the beans kept coming out anyway.

Second, the egg drop. Egg in the cup, with a streamer. The streamer, unless carefully folded, would get caught in the

airstream and pull the egg out. No matter; so long as the plane was airborne, the drop counted. No complicated rules. Just fun.

Third, remove your watch and, with no help, take your plane off and keep it airborne for exactly 100 seconds. Try it, it's fun.

Last event — take-off and climb under power for 35 seconds, then shut off the engine and glide as long as you can. To be sure the engine is dead, push full throttle after ten seconds in the glide. If the engine picks up - - - you're disqualified. In this event, Gary Korpi, flying an old Taurus with a .60 and tuned pipe, went straight up almost out of sight,

floated around in "green air" (as thermal pilots call it) and landed 5½ minutes later. Great fun.

In this great sport of R/C flying, there are perhaps 500 "serious" contest fliers. And, in contrast, there are probably a quarter of a million sport fliers — or, as I long ago dubbed them, "Sunday fliers." Louis Lopez expressed their feelings — your feelings, if you prefer. The exhilaration, the satisfaction, the sheer fun of flying.

Don't ever lose it. And write me about your latest adventure, so we can share it with all the other thousands of Sunday fliers in the world.

to page 174

NEW! SINGLE STICK KNOB IMPROVED! 2 AXIS GIMBAL

The already famous Dunham's E-Z-TRIM Gimbals, chosen by R/C Manufacturers throughout the entire world for superior mechanical and electrical centering, now improved to give even more positive "center feel" and smoother overall operation.

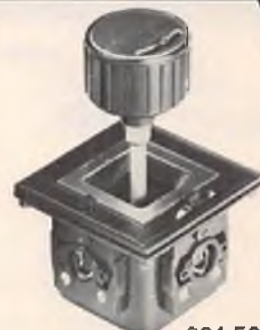
Now available in single stick mode with ALL NEW Light Weight Knob and E-Z Trim.



\$14.50
Less Pots

Dunham's
R&R

1100 N. LAKE HAVASU AVENUE, SUITE I
LAKE HAVASU CITY, ARIZONA 86403



\$24.50
Less Pots
Knob \$8.95 less pot

EKlogictrol

7-CHANNEL SUPER-PRO
1978 Model
254⁹⁵

SET CONTAINS:
4 Servos, Rechargeable Batteries, Frequency Flag, Battery Charger, Servo Trays, Servo Accessories, PLUS ONE YEAR FACTORY WARRANTY!

5-CHANNEL CHAMPION
1978 Model
229⁹⁵

M.R.C. 2 CHANNEL SYSTEM #172
With 2 Servos
84⁹⁵

M.R.C. 5 CHANNEL SYSTEM #175
With 4 Servos
239⁹⁵

AMERICAN'S hobby center, inc.
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'superstock' BRAND NAMES SAVINGS

CESNA 170
1st Jersey Models
54" Wingspan

RADIO CONTROL COMBO
37⁹⁵

PLUS
SINGLE CHANNEL PULSE SYSTEM
Transmitter, Receiver, Servo, Battery, and Batteries.

PLUS
.041 Engine
With Propeller and Tank

SAHWA 3 CHANNEL SYSTEM
Transmitter, Receiver, 3 Servos, 1200mAh Battery, and Charger
SALE 144⁹⁵

FAMOUS BRAND 4 CHANNEL R/C SYSTEM
4 Servos, Rechargeable Batteries, and Charger, Servo Trays, Frequency Flag and Servo Accessories.
SALE 215⁹⁵

Common 4 CHANNEL Deluxe SYSTEM
Vinyl and Transmitter, 4 Servos, 1200mAh Battery, and Charger, 4 Full power auto mixtures, Servo, 300mAh NiCad battery pack, with Transmitter Needs and Charger
194⁹⁵

Common SUPER-MINI 4 CHANNEL SYSTEM
With 4 Servos
SALE 259⁹⁵

PIPER CHEROKEE
READY TO FLY
With 5 CHANNEL RADIO & 4 Servos, All Head Batteries and Charger, Ready to Fly (FIRE-GLASS Model) (Only needs Fuel and Starter Battery)
309⁹⁵

CESNA 172 CARDINAL
With 5 CHANNEL R/C Engine, 55" Wingspan
284⁹⁵

XR311 COMBAT SUPPORT VEHICLE 1/12 SCALE
15 1/2" LONG
62⁹⁵

LESS R/C

R/C HELICOPTERS

alouette 2
41" Body, 40" Engine
159⁹⁵

RELI-BABY
40" Body, 40" Engine
199⁹⁵

SUPER HELI-BABY
40" Body, 40" Engine
222⁹⁵

TRI-STAR
40" Body, 40" Engine
188⁹⁵

SHARK 60
40" Body, 40" Engine
259⁹⁵

SUPER BOY 1
40" Body, 40" Engine
309⁹⁵

JET RANGER
40" Body, 40" Engine
309⁹⁵

R/C GLIDERS

Midwest HAWK KH
58" Wingspan
105⁹⁵

LEGIONAIR 100
100" Wingspan
73⁹⁵

LEGIONAIR 140
140" Wingspan
87⁹⁵

MAESTRO KHII
132" Wingspan
87⁹⁵

GLASS Filled NYLON Propellers
Each 3 3/4"
1 1/2" 1.24
2 1/2" 1.48
3 1/2" 1.74
4 1/2" 2.00
5 1/2" 2.26
6 1/2" 2.52

P-41D THUNDERBOLT
50" Wingspan
58⁹⁵

CLIPPED WING CUR
For 19" to 20" Engines
31⁸⁸

PIPER CUB J-3
For 19" to 20" Engines
31⁸⁸

YAI-JET 350 R/C
135" Wingspan
19⁹⁵

F4U-3 CORSAIR
50" Wingspan, For 40" Engines
20⁹⁵

O.S. ENGINES
Motors
SALE

Flash 15 R/C
(Less Muffler)
Muffler... \$4.95
12⁹⁵

Flash 35 R/C
(With Muffler)
20⁹⁵

VERBA ENGINES
SALE

K&B .21 OUTBOARD
Year 19 R/C
69⁹⁵

ENMA C. BERRY
Length: 40"
Height: 10"
Beam: 10"
1/2" B.M.
SALE 43⁹⁵

DARWIN 999
Length: 40"
Height: 10"
Beam: 10"
1/2" B.M.
SALE 27⁹⁵

CAPRI R/C
For 40" Engines
37⁸⁸

MISSOURI
Length: 30"
Height: 10"
Beam: 10"
1/2" B.M.
14⁹⁵

MARTINI PORSCHE
Electric Race Car
Forward, Reverse, Right and Left Steering (Less Batteries)
57⁹⁵

TYRELL P34 FORD
1/18 Scale
57⁹⁵

PORSCHE 934 TURBO RSR
Less Radio
55⁹⁵

CORVETTE Style
12" Long
Electric R/C Race Car. Less With Multi Control System. Batteries
49⁹⁵

PEANUT DUNE BUGGY KIT
74⁹⁵

Associated 1/8 Scale R/C Car Kit only
69⁹⁵

R/C 1 Car Kit Plus Year 19 R/C & Futaba 2 Channel
See with 2 Servos
175⁹⁵

HEAT GUN SEALING IRON
1985
14⁹⁵

WATKINS ENGINE STARTER
Standard
24⁹⁵

Deluxe & Boat
27⁹⁵

POWER PACER
Tape and Cables
Instruments included
47⁹⁵

DAE POWER PANEL
With Meter, Max Voltmeter for Starter, Pump & Plug
14⁹⁵

HEAVY DUTY 12 Volt Wet Cell
6.5 Amp
14⁹⁵

6 Volt 4 Amp Wet Cell
7⁹⁵

WET CELL CHARGER
12 Volt
2⁹⁵

ZAP Adhesive
Cyanacrylate, Bonds in seconds. 1/2 oz.
2⁹⁵

SINGLE CHANNEL PULSE SYSTEM
Transmitter, Receiver with Trim, Antenna and Battery Light Indicator (Less Switch, Battery and Battery Box)
19⁹⁵

RHOW RETRACTS
Two Gear System
62⁹⁵

SALE
Three Gear System
83⁹⁵

LEOPARD A-4 TANK KIT
1/18 Scale
Includes Electric Motor
137⁹⁵

M4 SHERMAN TANK KIT
1/18 Scale
Includes Electric Motor
185⁹⁵

WATKINS ENGINE STARTER
Standard
24⁹⁵

Deluxe & Boat
27⁹⁵

SPEED BOAT COMBO
with H21 Hardware
28⁹⁵

DEEP VEE 10
10" Long, 1/2" B.M.
Value: \$38.00
With COX .041 R/C Engine
Reg. \$17.00

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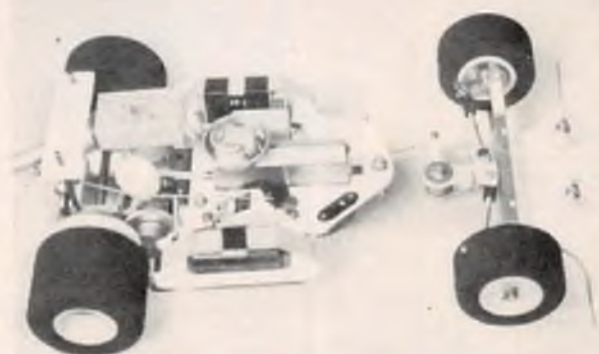
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NEW RC 200 KIT

SUNDAY FLIER

from page 172/15

It's a great fraternity — ask my friend Elmer Haynes. Or maybe "fraternity" isn't the best word; comradeship might be better. Ask Dedra Jo and Karen, they're enthusiastic members of the group also.

I'm glad — and proud — to belong to the Sunday fliers' international comradeship.

So tell me what's going on at your field. I'll pass it on. □

ENGINE CLINIC

from page 12/10

brass shim stock between the back of the flywheel and what would normally be

the prop drive washer to eliminate any wobble. You want the flywheel to run true within one or two thousandths in all planes. If not, you are going to have bad vibration as you are experiencing.

Dear Mr. Lee,

Just recently, I purchased an OS Max .45 Marine engine for a Deep V boat that I am building. Being new, however, to R/C boating, I have the following questions:

(1) Why are water cooled throttles used?

(2) Should I use one in conjunction with my jacketed head?

(3) Should the water flow first to the head and then to throttle or vice versa?

(4) Is it a good idea to restrict the water discharge to keep the engine at a more constant temperature?

(5) What percent nitro can I safely use with my .45 RSR engine?

I hope you can clear up some of these questions. Thank you.

Sincerely yours,
Michael O. Szemety
Elyria, Ohio

Taking your questions in order, Mike:

(1) You did not say whether you are talking about a carburetor or exhaust throttle. If an exhaust throttle, then water cooling is just another means of cooling the engine and taking away heat. The exhaust area being the hottest part of an engine. If you are referring to a carburetor throttle — getting a cooler mixture into an engine means a denser charge and more power.

(2) As far as using one it is not going to hurt anything and can only help.

(3) If an exhaust throttle, the water flow should be to the head first. If a carburetor throttle, then to the carburetor first.

to page 178



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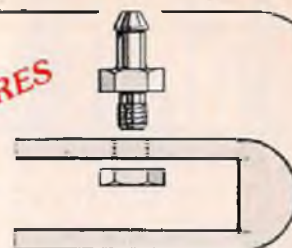
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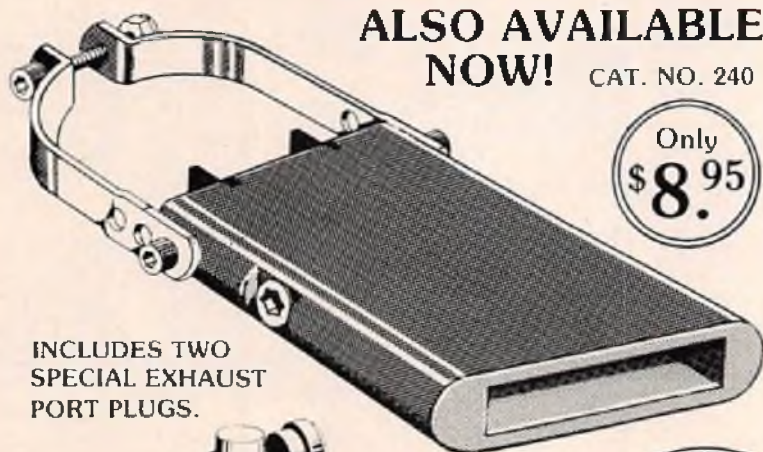
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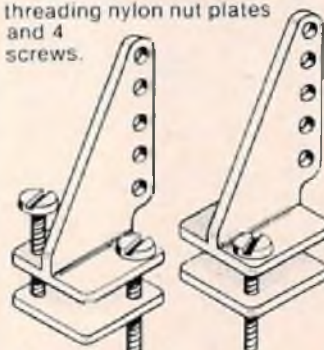
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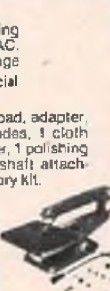


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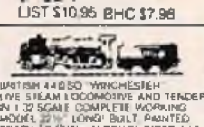


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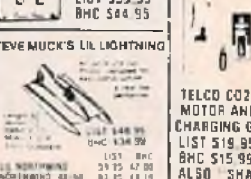
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OS 15 R/C	39.95	32.00			
OS 20 std	35.95	28.80			
OS 20 R/C	42.95	34.40			
OS 25 std	37.95	30.40			
OS 25 R/C	44.95	36.00			
OS 25 FSR R/C	59.95	48.00			
OS 25 FSR std	52.95	42.40			
OS 30 std	45.95	36.80			
OS 30 R/C	50.95	40.80			
OS 35 R/C	53.95	43.20			
OS 35 std	47.95	38.40			
OS 40 R/C	74.95	60.00			
OS 40 FSR R/C	89.95	72.00			
OS 60 FSR R/C	129.95	104.00			
OS 60 FGR B.H.	99.95	80.00			
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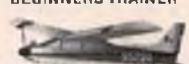
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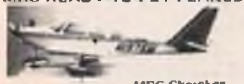
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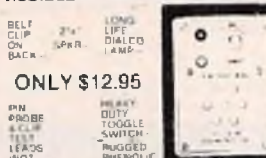


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ENGINE CLINIC

from page 174/10

(4) Unless you are using extremely large pick-up tubing, etc., it is usually not necessary.

(5) 25% nitro would be about maximum and even with this you will have to be careful about lean runs.

Dear Sir,

I have a question that concerns mounting of tuned pipes to the aircraft. Specifically the aft or exhaust end of the pipe. I do not know if I should make the mounting point a rigid, no-give type

mount or if it should be a sort of shock mount - - - that is, to say, isolated through a vibration absorbing plate or device of some kind. The anchor point for the pipe mount will be in the foam wing. In short, what is the most reliable method of mounting to keep the pipe from vibrating loose while the plane is in the air. This is my first pipe mounting and I would like to get off on the right foot in this area for a change.

I would also like to make a suggestion about an article on tuned pipes. Since pipes add so much to the performance of an engine, why not an article that tells the do's and don't's of pipes? It would also be quite helpful to us novices to

have something like a table that tells us which manufacturers make pipes and for which engines.

Also, if there are adaptors on the market to adapt a pipe to ones present engines. Whether pipes are available for smaller size engines and if they will, in fact, work as well on the smaller displacement engines.

I subscribe to your fine magazine and really enjoy each issue. If the information I have asked for is hidden in any of the back issues, please indicate which back issues the info is in and press ahead with the good work. If not, please advise as it is nearly that point in

to page 180



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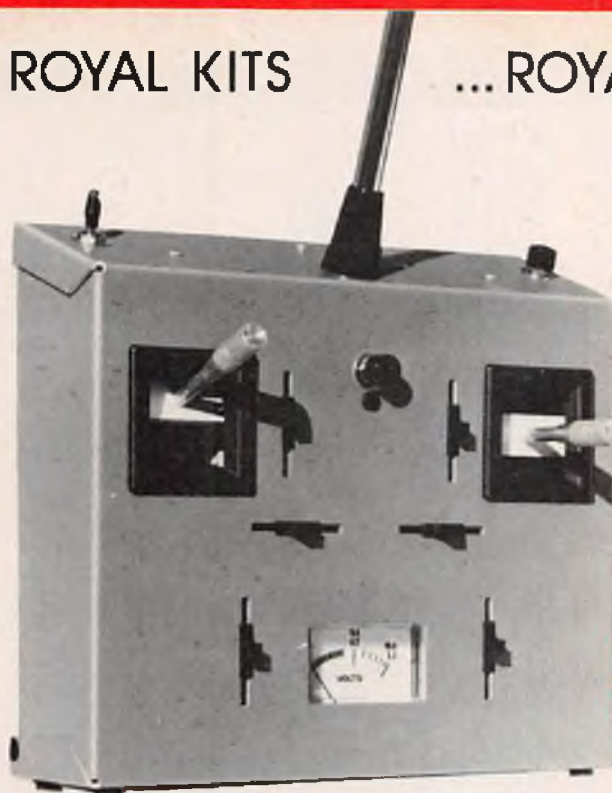
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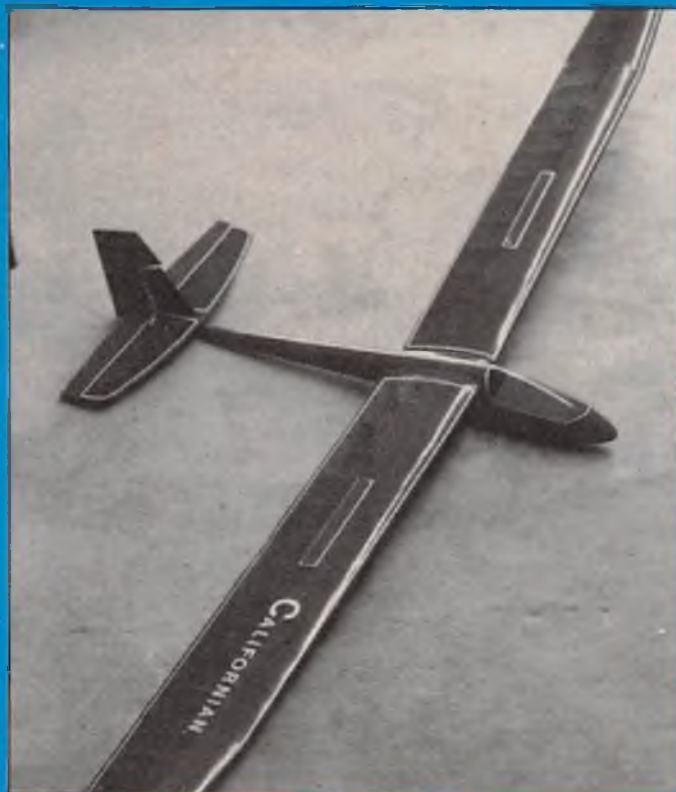
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Wing Span	111 Inches
Length	44 1/2 Inches
Flying Weight	44 Ounces
Radio	2 or 3 Channels



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ENGINE CLINIC

from page 178/10

construction where I should install the pipe mount. Thanks.

Sincerely,
Douglas E. Powell
Bolling AFB, Wash. D.C.

Pipe mounting isn't really all that critical. Most fellows just use some sort of a metal strap around the tail pipe. However, this does sometimes result in the tail pipe breaking off. A strap around the main pipe body would be more desirable. If you wanted to go to the

trouble of making some sort of anti-vibration mounting, it isn't going to hurt anything but really isn't that necessary.

Regarding articles on tuned pipes — I have done several over the years. The first appeared some years back as a review of the then new E.D. Power Pipe. This was the first tuned pipe offered for pattern use and was a little ahead of its time. Modelers weren't ready to accept pipes yet (other than U-control speed fliers). This article is reprinted in the Anthology series booklet "The R/C Engine" Vol. I (page 38). There have been several subsequent articles another of which is in the "The R/C

Engine" Vol. II. I have more recently written another article on tuned pipes in the January 1978 "Engine Clinic."

There are any number of pipe manufacturers. Both Rossi and OPS have a line of pipes that, although intended for the Rossi and OPS engines, can be used as well on other makes. The OPS .60SS pipe is an extremely popular pipe among the top pattern fliers. Rudy Thomas, of International Products, offers a complete line of tuned pipes and adapters. Although Rudy's line was initially intended for the boaters, his pipes and adapters can be used for
to page 182

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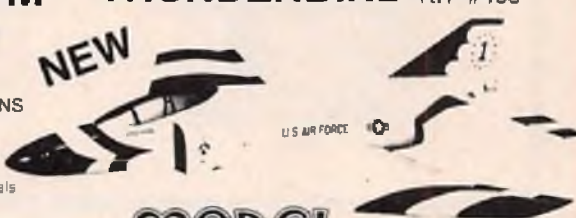
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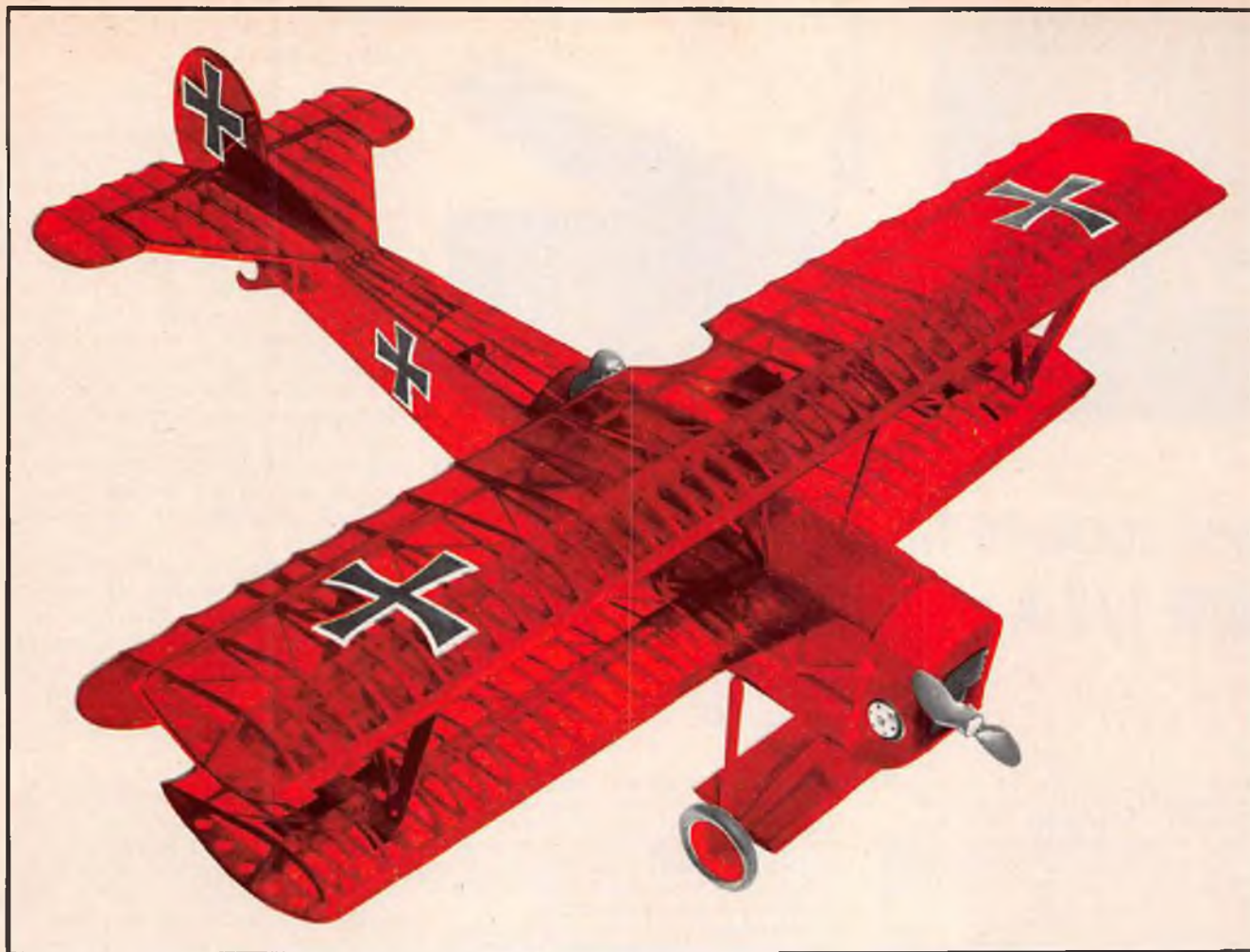
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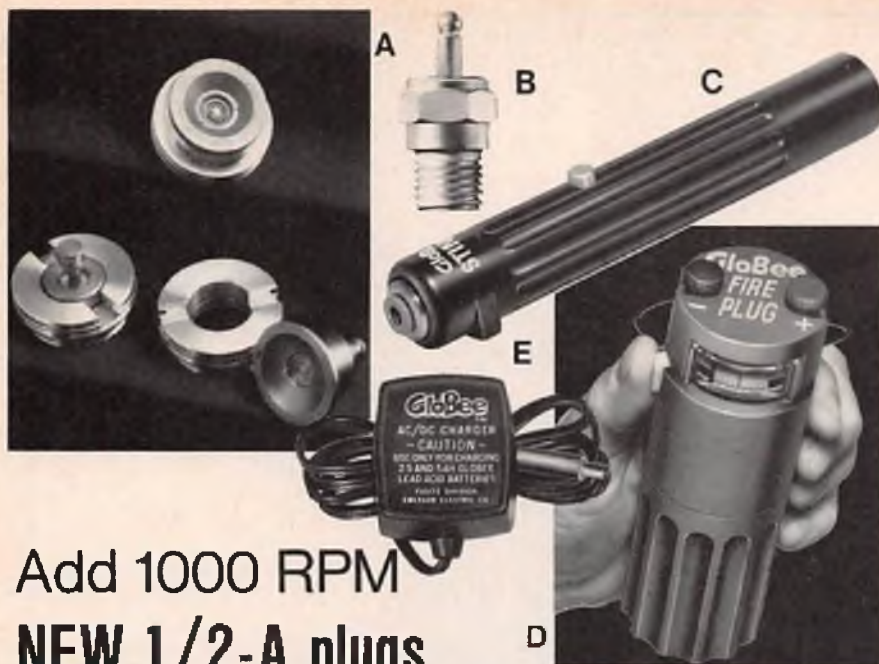
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ENGINE CLINIC

from page 180/10

aircraft use as well. Wally McAllister, who manufactures the "Mac's" line of mufflers, is now also getting into the pipe field, I understand. I haven't seen one of Wally's tuned pipes as yet, but from past experience with his muffler I know it is bound to be a top quality product. Addresses for the above mentioned tuned pipes are as follows: Bill's Miniature Engines (Rossi), 1325 Carol Dr., Memphis, Tenn. 38116; Shamrock Competition Imports (OPS), P.O. Box 26247, New Orleans, La. 70186; International Products, 1010 Morse #4, Sunnyvale, Calif. 94086; Mac's Products, 8020 18th Ave., Sacramento, Calif. 95826.

Our final letter this month is the kind I like to receive since it requires no brain work on my part. If any of you other guys have an idea or have come across something that you think might be of interest to the other readers, don't be shy about sending it in.

Dear Clarence Lee;

I have had the same problems as several of your readers. How do you plug the holes in the exhaust stack of K & B and Fox engines when you install a muffler? A simpler solution than searching all over town for aluminum plugs which never seem to fit is to use clear silicone rubber cement. First clean the exhaust stack inside and out with alcohol and a toothbrush (an old one I hope). Lay a thin layer of the cement inside the stack so that it bridges the hole. After it starts to skin (about 10-15 minutes), fill the hole from the outside. That is all there is to it. The cement will act as a flexible rivet. After several years of weekly operation, the silicone has never burned nor blown out.

Keep up the good work.

Best regards,
David E. Pastor
Pleasanton, Calif.

CUNNINGHAM ON RC

from page 8

take-off. We all know (I hope) that the aircraft should be headed directly into the wind at take-off. Many heavy pattern bombs with trike gear can make a good crosswind take-off, but lighter trainers, and two wheel geared aircraft need to be headed into the wind to minimize take-off problems. Lots of tail draggers are going to take-off right into the wind anyhow --- they know what they are doing, even if old fumble thumbs on the sticks doesn't. I have watched many

pilots screw up a take-off of a tail dragger by fighting the aircraft's natural tendency to turn into the wind. 'Nuff of the wind.

Next in line for a problem is plucking the aircraft off of the ground before it has reached flying speed. The result is after plucking it off of the ground, pointing the nose straight up to the sky . . . you watch your pride and joy toss in the towel and die. Sure, some aircraft can get off of the ground quicker than others, and some pilots can aim the nose of the bird up into the wild blue and get away with it, but those pilots have a "feel" for their aircraft. The best take-off is one in which the aircraft moves down the runway, picking up speed to flying speed, then is gently lifted off to climb into the sky. You can feel when the aircraft is ready, just like in a light plane. I know that a 727 airliner blasts into the sky with a climb angle that makes a homesick angel look like a piker, but you're not flying in a 727, you don't have to climb out over city skyscrapers, or get along to the next airport in time. You're trying to learn how to fly your bird the best way that you can. Grass fields are harder to take-off from than are paved fields because the drag of the grass keeps the aircraft below flying speed longer. It's really surprising how many of today's kit and magazine aircraft plans are designed by people who do all of their flying from paved fields. Quite often smaller wheels are used, the aircraft has a high wing loading, thus needing a longer take-off run, etc. If you're flying from grass, and the grass is not closely mowed, then be a bit careful in your selection of aircraft to build.

Once your aircraft is in the air, and flying, you need to give some thought to the idea of defensive flying. It's much like defensive driving --- you need to give some thought to what to do in an emergency. In training pilots to fly full size aircraft, a lot of time is spent thinking about what to do in an emergency. While driving, if you don't know what to do, or when to do it, well --- it's your neck. Flying R/C is similar. There is more to flying than just getting up and down and jack batting around the sky in the middle. You need to know what to do when things go wrong. For example, after take-off, and while your bird is climbing away from you, the engine quits. You can make a turn and try to get back to the field . . . but chances are about 100 to 1 that your airplane won't make it; it will stall out and crash. The best thing to do is to give it a bit of down elevator to build up speed from the climb and then let it glide to a landing straight ahead. Sure, you may have to walk over to pick it up, but probably a broken prop is all that you will have in the way of damage. Anyone who knows anything about flying will applaud your decision; only the dummy will criticize you for having to walk back. Of course, if your aircraft is pretty high when the engine quits, say 100' or so,

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you can make the turn and come in for a landing but, generally, the engine quits at about 15' to 20' above the ground. Kind of an unwritten law in engine land I think.

Try another problem. You're flying along, dumb and happy, enjoying yourself, when suddenly your aircraft develops a mind of its own and flies between you and the sun. Naturally you didn't put her there, she just did it by herself! But, you're blinded, you can't see the ship at all. First, if you don't fly the airplane in that spot you won't get yourself in this trouble. But, if you do, and you can see that your aircraft is approaching the sun, use your transmitter as a sun shade by extending it at arms length and use it to block out the sun on your face. The aircraft will pace across the face of the sun, and you will see it coming out the other side. But, if you're too late, and you're blinded, shut your eyes, and chop throttle. Don't make any other correction. Stick your transmitter up for a sun shade and open your eyes, they should have time to adjust in just a second or two. (Editor's Note: From the McDonald Douglas RC Club newsletter - "Extensive tests performed by members of our club indicate that when you fly your plane into the sun, you are blinded for only five seconds. However, it has also been found the airplanes crash within three seconds.") Look below where you were flying for your aircraft, determine what position it is in, right it if it is diving or banked away from you, and gradually feed power back to it. Chopping throttle is the best plane saving device there is. If you get disoriented in the sky, or are in too much of a power dive, or anything out of the usual, then by chopping the throttle you will gain precious time to make a decision on what to do, or to shout for help. If you think that you are experiencing a radio problem, interference, or failure, then chop throttle. If you've cut back the power and, if the aircraft crashes, it will not be heading all-out for the ground. Get this idea firmly in the back of your mind - - - chop the throttle when in danger. This same safety idea is also the best one when you have started to make a take-off that goes screwy. Chop the throttle if your aircraft goes nuts and starts its take-off run into the pit area; chop the throttle and, in the case of a tail dragger, give it full down elevator. This will dump the aircraft over on its nose, but it will stop it. Up elevator just might take you into the pits, or into a car or a person. Full throttle will always get you into trouble if the take-off has turned bad. It is much better to dork an airplane than it is to unleash a runaway, prop swinging monster into the pits or the spectators - - - engines make nasty contact with people. It's your responsibility to abort your flight rather than to crash into people.

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Next month we will take a further look at defensive flying. Remember, keep building during the winter, someday it's going to be flying time again. □

FROM THE SHOP

from page 2

.... this information on to you now since, if you so desire, you can take advantage of the old subscription rates until January 1, 1979. After that time, the individual copy price will be \$2.25 and an annual subscription will be \$24.00. We're sorry that this increase in price is necessary, but it is something over which we have absolutely no control. There are only two sources of income for a magazine --- advertising and sales of the magazine. We have raised both proportionately and, hopefully, this will meet the inflationary production costs that we have been experiencing in the past few years and which we have attempted to absorb, ourselves, for as long as possible.

On the subject of money, here's a piece that appeared in the newsletter of the Torrey Pines Gulls:

"The \$25.00 I paid to enter the 1978 LSF shindig started me thinking about the amount of money I spend on soaring contests in one year, and these costs are going up. In 1978 I will attend about 25 contests. I will pay \$142.00 in entry fees. I will drive 7,250 miles at 17¢ per mile. I will stay fifteen nights in motels and spend about \$200.00 for food. This comes to a grand total of \$1794.00. During these contests I will fly 103 flights. Each flight will cost me \$17.42. At an average of five minutes per flight this comes to \$3.48 per minute.

When you come to think of it --- this is a hell of a lot cheaper than sitting in a doctor's office!"

Within the next issue or two R/C Modeler Magazine is going to present its 1979 Design Contest which has been so popular in years past. We hope you will start thinking now about a design to enter in the contest where you will get a shot at some top RC prizes as well as get a chance to see your design published in RCM as well as getting paid for it! Another contest, dreamed up by the RCM staff is the Ubiquitous Pop Top Pull-Ring Contest. If you're wondering what that is, the demented mind of our staff has decided on a one time only contest for the person who can submit the most number of modeling uses for the Pull-Ring Pop Top that adorns the top of our favorite beverage cans. If you think we're kidding ... we're not! Look for details in this issue of RCM.

And don't forget to watch for the rules for the 1979 RCM Design Contest.

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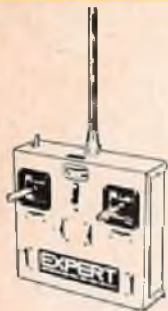
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Trainer 20	34.95 27.00
Trainer 40	54.95 42.00
Trainer 60	62.95 49.00
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Quickest 500	42.95 33.00
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Super Koas 60	69.95 54.00
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ADHESIVES

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Devcon 5 minutes	
1 oz	1.50 1.15
2% oz	2.65 2.05
GMP Zip	1.29 1.10
GMP Styro	2.98 2.75
Hot Stuff	3.50 2.40
Blue Line HS	4.95 3.50
H.P. II	4.00 2.99
H.P. IV	2.00 1.75
Giant Zap	3.50 2.40
X-30 Adh.	3.25 2.40
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Glaskote Thinner	2.55 2.25

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2 yd. pkg.	7.50 5.75

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Silkspun 38 x 54	7.75 6.20
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	9.75 7.50
Olive drab, aluminum, day	
glo orange and yellow	
	10.70 8.25
Camouflage 27 x 60 - 1 1/2"	
& 2" scale	9.95 7.25
Balsarite 1/2 pt.	2.95 2.75

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Std. Hi Start	34.95 25.00
S. HD Hi Start	53.95 39.95
Del. Hi Start	39.95 31.00
Para Pod	9.95 7.00

ASTRO FLIGHT	
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Astro-start	44.95 34.50



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Del. Sullivan	39.95 28.99
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L.	119.95 89.95

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L.	129.95 99.95

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Du-Bro	10.95 8.50
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Pressure Gauge	13.50
Freon	2.75
1% oz. Oil	1.65
Line Coupler	1.90
Quick Disconnect	2.00

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Series IV	34.95 24.95
Std. Panel	18.95 14.95



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\$1.00 handling on all orders. Prepaid domestic orders postpaid; foreign orders allow \$10.00 (excess refunded). Orders - check, M.O. or C.O.D. Also, BankAmericard, Visa or Master Charge (bank number) Indiana Residents add 4% Tax.

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High capacity Indy 12V/6 amp hour gel cell.
L: \$29.95 I: \$21.95
24 hour charger L: \$19.95 I: \$16.95

New G.E. pen cell nicads with tabs. Lots of (4) ea.
\$1.85 - \$7.40; (8) ea. \$1.70 - \$13.60; (12) ea.
\$1.60 - \$19.20.



Mills Diesels

MILLS 075

Sentimental diesel favorite. Great for small R/C.
L: \$19.95 I: \$15.95

MILLS 1.3

The classic Mills 1.3 cu. in. diesel, now manufactured in India. Reach back into 1954 and power your old timer with a real old timer.
L: \$29.95 I: \$19.95



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Complete with Supertigre X-21 Schnuerle engine and clutch. Includes engine, muffler, and heat sink head. This is the competition series race car with ball bearing wheels. Ferrari body included.
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Santa Maria, Ca. 93454

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N. Webster, In. 46555
ph. 219-834-2238

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Elkhart, In. 46514
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Gautier, Ms. 38553

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Oxford, Ms. 38655

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H & S Models

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ph. 601-844-7945

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Lancaster, NY 14086

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Ogdenburg, NY 13698

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Uniondale, NY 11553

ph. 516-486-0407

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Dickinson, ND 58601

ph. 701-225-3703

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Midwest City, Ok. 73110

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Amsterdam, Oh. 43903

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F. L. Vacuum Hbs.
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Celina, Oh. 45822

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Xenia Hby. & Crt. Ctr.
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Xenia, Oh. 45385

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Crabtree, Or. 97335

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R/C Model Coral
1209 Kelly Ave.
The Dalles, Or. 97058

ph. 503-244-3366

Strickley R/C
7888 SW Capital Hwy.
Portland, Or. 97219

ph. 503-244-3366

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Conway, SC 29526

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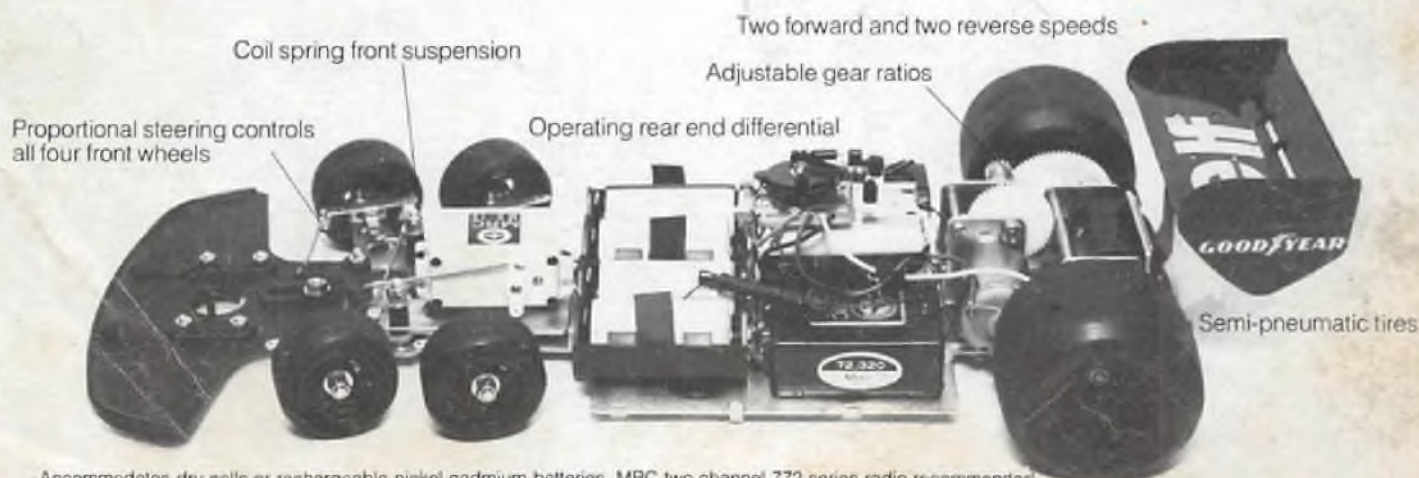
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