

# RcM



49115

JUNE 1978

\$1.50



# radio control MODELER

THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



**Featured This Issue:**  
**THE DANISH HM-II**

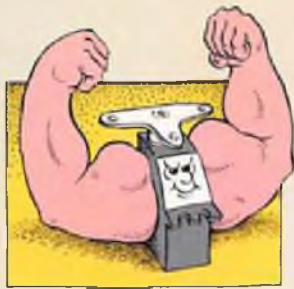
**CHUCK CUNNINGHAM'S**  
**MISS TEXAS**  
84" Span Low Wing

**THE GREAT ALL AMERICAN**  
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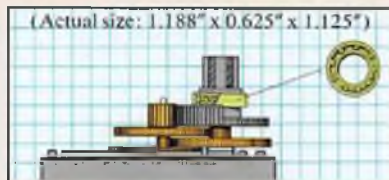


**Full size power.** Our new S20 is small in size, but packs a great big 22.2 oz/in. of torque.

And big power won't mean shorter flights, because our mighty mite's five-pole, micro motor and integrated circuitry draws a mere 5mA at idle.

### Precision cut, metal transport gears.

So all of that power doesn't go to waste, metal gears efficiently deliver every gram of torque. And an output shaft ball bearing keeps your servo action smooth, effortless and precise; matched with the quickest transit time of any servo in its class... a rapid .5 of a second.



### Completely compatible.

Like all of our fine servos, the S20's electronics and mini, three-pin connectors are compatible with every system we make, from the FP-2GA to the Contest 7.

**Value.** The S20 is very big in performance, but we've kept it small in price, \$39.95. Because with Futaba less is definitely more.

## Futaba

# The Futaba S20. We put a lot of servo into our little servo.

Actual size





# You'll see many good radios in this magazine. Here are the BEST ones.



*When we say these are the BEST radios you can buy  
we'd better have good reasons for saying it. We do:*

#### MOST RELIABLE

1. Hobby Lobby Radios are the radios best designed to prevent vibration-caused failures. Ours are the ONLY radios you can buy that have the servo amplifiers inside the more shock-protected receiver case rather than inside the servos.

2. You get more SAFE FLYING TIME from a Hobby Lobby Radio. Our servo amplifiers use very little current. With a HL radio you can fly confidently right through your last flight of the day while owners of other radios are worrying about discharged batteries.

3. You are never the test flyer for any Hobby Lobby Radio system. The electronic design of HL radios is a well-proven design. It has not ever required redesign. The tradition with less reliable radios is to redesign annually. And each annual change makes the RCer the guinea pig for field testing.

4. Owners of other radios have to worry about the security of their often-disconnected aileron servo connector (which can't be tightened like Hobby Lobby's). The owner of a HL radio can tighten the connectors on his set and then forget about them. Flying a high performance RC plane can be nerve-racking enough without having to worry about connectors coming apart.

5. We don't recommend this, but many owners of HL radios tell us that they can fly their HL

radio with the transmitter antenna partially collapsed. You can fly your RC plane much more confidently knowing that there is tremendous extra flying range built into your HL radio system.

6. Hobby Lobby Radios use electronic circuitry that gives you one-cell-out flight capability. In the rare event that one of the four cells in the airborne battery pack loses its charge or shorts out your HL Radio continues to fly safely.

#### MOST USABLE

1. One transmitter is capable of flying many RC planes. But, with most RC outfits it costs you almost the price of a complete new radio system just to buy four new servos to put into a second airplane. When you own a Hobby Lobby Radio you only pay for the expensive servo amplifiers once—they're inside the receiver case (except for the two auxiliary channels on the HL6). So, extra servos for our radios only cost you \$14 each. There's no other radio made that lets you equip a second 4 channel plane with 4 servos for only \$56.

2. "Usable" means your being able to change the direction of rotation of our servos in less than a minute. It's so simple to do this that you can do it right at the flying field. If you own any other radio than a HL radio you have to send the servo back to the factory for this

change. Or, worse yet, you have to buy another servo.

3. The HL6 and HL3 both have adjustable centering tension on the control sticks. You can adjust yours real tight if you're a beginner and need tight sticks to keep yourself oriented during nervous first flights. When you become an expert you can loosen our control sticks so there's nothing between you and the "feel" of your high performance aircraft.

4. You get an Owner's Manual with the HL6 that tells you how to do routine maintenance, how to install the radio in a plane, how to reverse servo rotation, how to adjust servo neutral—one more example of how we make our radios more USABLE.

5. A "usable" radio is one that'll fit into today's smaller RC planes. The four-servo version of the HL6 weighs only 11½ ounces. The two-servo version of the HL3 will only add 7 ounces to a small .049 plane (with our optional small battery). And these light airborne weights are for radios that give you enough servo power to fly planes as big as a 25 pound, 12 foot span Curtis Robin that we've flown.

*These are the reasons that we can say that Hobby Lobby Radios are BEST. Call us and order one today.*

#### HOBBY LOBBY 6 DIGITAL PROPORTIONAL ..... \$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.)

I enclose check for \$\_\_\_\_\_ plus \$1.40 handling.  Charge to my BankAmericard No. \_\_\_\_\_ Expires \_\_\_\_\_  
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with 2 servos ..... \$119.00  
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<b>BULK PACKAGE RC Steel Links with 10" Rods</b> 25 Links only <b>\$4.99</b> Compare at \$12.25 	<b>BULK PACKAGE Flex Cable Pushrod</b> 20 feet nylon tubing 20 feet 1/16" bronze cable only <b>\$3.99</b> 	<b>BULK PACKAGE Wing Fasteners</b> 20 threaded wood blocks 20 1/4-20 nylon bolts only <b>\$3.99</b> Compare at \$6.50 	<b>7 Fuel Filters</b> only <b>\$3.99</b> 	<b>BULK PACKAGE 10 FEET Surgical Fuel Line Tubing</b> only <b>\$1.99</b> 	<b>BULK PACKAGE Mini Nylon Pop Clevises with 70" Rods</b> 25 Clevises only <b>\$3.99</b> Compare at \$7.00 	<b>BULK PACKAGE Threaded Ball Links</b> 10 Sets only <b>\$3.99</b> NEW! Compare at \$8.50 	These are lightweight, high quality air-inflated wheels on strong molded nylon hubs. We think these are comparable to, or better than wheels that sell for twice the price. We absolutely guarantee that you'll like them. If you don't think they're comparable to wheels that sell for twice the price, return them and we'll give you your \$5.99 back.

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**HOBBY LOBBY/TRUeline**  
**KRIER CHIPMUNK** **\$79.00**  
 List price \$105



50" span near scale model of the Krier Conversion DeHavilland Chipmunk. For 35 to 40 engines and 4 RC channels. A very deluxe Trueline Kit: Pre-shaped balsa and plywood parts, pre-veneered foam wing and pre-veneered rear fuselage section. Formed wheel pants, wing root fairings and cowling. Superb molded clear canopy, good hardware and detailed drawings with instruction manual.  
 If you've always wanted to build a Chipmunk but were waiting for a kit that was good enough to be worth building—here it is!

**NEW!** Pre-veneered foam wing, pre-veneered foam fuselage sections and much more!  
**HOBBY LOBBY/TRUeline**  
**HAWKER TYPHOON** **\$88.00**  
 List price \$115



53 inch wing span near scale model of the famous WWII fighter and ground attack aircraft. For 40 size engines and 4 or 5 RC channels. The kit is a truly deluxe Trueline product: pre-shaped balsa parts, veneered foam wing panels, 3 large veneered foam fuselage sections, formed wing fairings, cowling and detail parts, authentic spun aluminum spinner, decals, accessory packs, detailed drawings and step-by-step building sketches. Typhoon is an excellent stand-off scale subject because model engines can be effectively hidden in the unusual deep scale cowling.

**I GUARANTEE you'll like SUPERKOTE. If you don't — I'll buy it back from you!**  
 Hobby Lobby's  
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Superkote is a new plastic heat shrink Model covering material. It irons on to an airplane structure at very low heat. Because of this low heat requirement it is also an excellent covering for foam aircraft. 1. Superkote shrinks and keeps on shrinking as you iron it. Very few wrinkles are so bad that Superkote's tremendous shrinkability can't eliminate them. 2. Superkote adheres to sheeted surfaces with a remarkable absence of air bubbles. 3. Superkote adheres to itself so well that joints are nearly invisible. 4. Superkote is strong, resists sagging, and is more easily repairable than other covering materials.

**SUPERKOTE 27" wide, 6 foot roll . . . \$3.99**  
 list price \$6.95

Cessna White	Midnight Black
Beechcraft Red	Campaign Brown
Piper Yellow	Terra Green
Waco (dark) Blue	Taylorcraft Cream
Ryan Orange	Metallic Gold
Aero (light) Blue	Aluminum

**NEW! NO ADAPTERS NEEDED!**  
 These will fit any engine!  
**KAVAN ALUMINUM SPINNERS**




1 1/2" (40mm) diameter	\$4.80
1 3/4" (45mm) diameter	\$5.10
2" (50mm) diameter	\$5.40
2 1/4" (55mm) diameter	\$5.70
2 1/2" (60mm) diameter	\$6.00

Kavan Four-way wrench . . . . . \$2.50


The deeply in-set flange is held directly against the prop by the prop nut eliminating adapter bolts. You can use a socket wrench or the Kavan 4-way wrench to tighten the prop nut. A soft rubber plug caps the spinner. Spinners are cast and polished aluminum that'll last when used with an electric starter.

**SUREFLITE FOAM FLOATS**



26" long Floats, \$11.95 pair for planes to 5 1/2 lbs.  
 32" long Floats, \$14.95 pair for planes to 10 1/2 lbs.

**SPECIAL OFFER! GEL-CELL BATTERY AND CHARGER**  
 list \$32.95 **\$24.94**



12 volt Gel Cell for electric starters, power panels.

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 list \$28.90 **\$19.99**




12 volt wet cell (shipped dry) for electric starters, power panels.

**If you EVER wanted a SUPERCYCLE buy one NOW!**  
**SUPERCYCLE \$49.00**  
 list price \$89.95



**Brand New Design! Lower Price!**  
**STARTS, CHARGES, LIGHTS, FILLS, DE-FUELS, TESTS!**

**Hobby Lobby POWER CENTER**  
**\$17.88**  
 List price \$29.95



This is the ideal field box accessory. With your 12 volt battery you can run your starter, your electric fuel pump and fill or de-fuel right from the Panel! It will also fast charge your airborne Nicad pack and your transmitter battery right at the flying field. It will power your 1 1/2 volt glow plug on the "HI" plug position and a 2 volt plug on the "LO" position . . . or you can use it to burn off too much fuel prime on your 1 1/2 volt glow plug on the "LO" position. The meter gives indication of glow plug condition and current flow during last charging. It won't fly the plane or clean it up when you go home, but it sure will just about do everything else you need in starting and getting your plane fueled, started and staying in the air. Size: 6" x 3 5/8"

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15-4	\$4.75	15-5	\$4.75	16-4	\$5.95	18-4	\$7.95
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The supply is somewhat limited, but until we run out you can buy all of these you want for this ridiculous \$49 price. Call now!



# NEW! Revolutionary! Variable Pitch Prop!

Hobby Lobby/S.L.E.C. 10" MULTI-PROP Introductory Price **\$9.99**  
List price \$14.50

This is the most revolutionary model airplane prop we've ever seen. It is 10 inch 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.

### HERE'S HOW IT WORKS:



## BRAND NEW! Now available in 12" diameter!

Hobby Lobby/S.L.E.C. 12" "MULTI-PROP" ..... Introductory Price **\$11.99**  
Spare 12" Blade for S.L.E.C. Prop . . . \$1.49 List price \$15.95

### Here's a plane for .09-.10 engines!

Hobby Lobby  
**09 CESSNA TRAINER**  
**\$22.57**

List price \$33.75

One of the EASIEST-TO-BUILD balsa & plywood kits you'll ever see! One piece fuselage sides, machine cut wing ribs, drop-out die-cut plywood fuselage formers for strength, dual landing gear, and plywood & balsa wheel pants. 42 1/2" span, 317 sq. inch wing area, for 2 or 3 RC channels. Words can't do this kit justice—you've got to see it!

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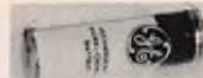
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Prices in effect until June 30, 1978

### SPECIAL! G.E. Nickel-Cadmium Batteries

1.2 volt 500 mah. Pencil size  
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This outfit starts you flying R/C with a full 4 channel plane!

### JUNIOR TELEMETER BEGINNERS OUTFIT \$277

**A** Hobby Lobby JUNIOR TELEMETER **C** Fox 15 R/C ENGINE



**B** Hobby Lobby 6 RADIO **D** 2 rolls/Hobby Lobby SUPERKOTE

Combo price in effect until June 30, 1978

# NEW! SPEEDS OVER 25 MPH! FACTORY ASSEMBLED!

PEERLESS/KYOSHO **\$88.00**  
ELECTRIC R/C RACE CARS Each



Porsche Turbo



(Chassis is fully assembled)



Lamborghini



Lancia Stratos

These 1/12 scale cars come fully assembled—all you do is install a 2 channel radio! 25 mph speeds, and the built-in rheostat speed control makes handling 100% realistic—power slides, fast acceleration out of turns. The included 1200 mah nicad pack can be quick-charged. Lightweight soft sponge tires, differential gears, pre-painted body with decals. Wheel base is 7 1/2".

Nicad Quick Charger ..... \$19.97  
Plugs into automobile cigarette lighter.

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# Hobby Shack

## 1978 MODELER'S CATALOG

For the past five years Hobby Shack has been striving to make the best catalog for the modeler in America, or the world for that matter. Each year we have refined it, enlarged it, added more color, and our new 1978 edition has to be the world's foremost catalog, whether used in your library as a reference or as a mail order tool to save big bucks.

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### 1978 Hobby Shack MODELERS CATALOG

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**B**ingo — it's spring. At least here in North Central Texas it is. Suddenly the cold weather picked up and left, and it's warm again. By the time that you read this, it will be warm in most parts of the U.S., and probably getting kind of hot here in Texas. But the ending of the cold weather always makes me think about the condition of our modeling equipment. This year with the horribly wet weather in California, the modelers have been subjected to the problem that other parts of the country have, and a few don't know it. That problem is condensation, or moisture, and it can sure play billy-blue heck with modeling equipment. Do you keep your "things" (prized possessions, etc.) in the garage or basement? Is the air warm and dry most of the time? Bet it isn't! Have you noticed landing gear wires rusting after sitting around in the garage all winter? If you don't, then you're lucky. I keep some older aircraft in the garage, and every spring I notice a fine coating of oxidation all over the wire parts, and any other music wire that was left laying around. How about your favorite engine? Did you store it in the nose of your aircraft for the past several months, and has it accumulated a nice coating of rust on all of the steel parts? And how about your radio? Was it, also, left to the changing climes in an unheated or damp basement or garage? This type of storage can be pretty tough on items that you want to work just like they did way last fall.

If you live where you can't get out flying all winter, then take the time to weather proof a few of your possessions. Take the radio out of your bird, and bring it into the house. There you can cycle the batteries once a month (charge 'em up, discharge them by working the transmitter sticks for two hours, charge 'em up again and then leave them until the next month and do it all over again).

Take the engine out of your plane; remove the muffler and wipe everything down; then squirt a few drops of 3-in-one oil into the intake and exhaust openings. Turn the prop over by hand a couple of times to distribute the oil around the engine. (actually about ten drops is a good amount). Then wrap the engine in a soft cloth and leave it until next flying season. Also, take the fuel tank out of

the aircraft and dry it out completely so that the horrible looking green goo that comes from something won't build up in the bottom of the tank, making it inoperable in the spring. If you have retracts installed, then do the same for them. Remove, clean, and oil, if you're going to store for any length of time. For those rusting landing gears, give them a light coat of oil, wipe them off, and wrap them in a soft cloth.

Or, there is one other method of storage, which bears some consideration. Toss your mother-in-law out of the spare bedroom and use this great location to store your goodies. Unless you have been successful in teaching your mother-in-law to build airplanes, then back to the garage with the airplanes and get Mom building on a new stable for next year. (Gee, Mom, I was only kidding.)

★

Before you get a chance to forget about it, let me remind you again of the "Happening" that I announced last month. That "Happening" is the Jumbo RC Fly-In to be held at Thunderbird Field on the shores of beautiful Lake Benbrook just southwest of Fort Worth, Texas July 22 and 23, 1978. All lovers of big model aircraft are invited to attend. This isn't a contest, it is a Fly-In. Bring your big airplanes, and any and all large aircraft are welcome from Quarter Scale to biggies to old timers to sailplanes. The only limiting factors are that for monoplanes the minimum wing span is 80" and for biplanes the minimum wing span is 66". The idea is to come and enjoy. Get an idea from another builder; get turned on by a design; decide to try the jump from old timers to biggies; or, just sit back, relax and take in the whole thing. Even if your bird is only half done, bring it along. You don't have to fly at this Fly-In unless you want to. Frequency will be strictly controlled and everything will be set up for safety of you and your aircraft. For a registration blank and map of the area and other information, write to me at 2440 Colonial Parkway, Fort Worth, Texas. See ya on the 22nd and 23rd of July.

★

Now, a bit more about big aircraft. Since my Biggies have turned out to be great flying aircraft, I have been working on an even larger biggie, though haven't worked it to the point of taking pictures of

it yet. This one is a 2/5th size biplane or, in other language, it is 40% of the size of the full size aircraft. Of course, the full size aircraft really isn't too big, so the model won't be absolutely gigantic, but it will have a wing area of about 2700 square inches. For power I have decided to try out the new MRC-Suevia 25cc engine. This engine really looks great, though as yet, I haven't run it. I decided to give it a try and ordered one from MRC. The shipment got stalled in all of the snow in the east and it didn't arrive until about four weeks after it was shipped. When it did get to my door I eagerly opened the box, and then almost canceled my plans. Just the top of the cylinder head was visible upon opening the box, and that was enough to almost scare me off. After taking it out of the box, I began to think that perhaps I would be smarter to stick with .10 size engines. This thing is **big**. It is a model engine constructed entirely by hand in West Germany, and really is a work of art. **Big** art. It makes a .60 engine look like nothing, parked beside it. Can hardly wait until I flip the prop for the first time. Luckily, I had not designed the fuselage structure before I got the engine and I have had to revise my thinking about materials and structural design. I will keep you posted on this as time goes by.

★

Did any of you happen to see the wire service photo that made most of the nation's newspapers Wednesday, March 8, 1978? I wish that the picture was good enough to reproduce but, since it isn't, let me tell you about it anyway.

The picture was of a new fighter aircraft for the Air Force. It is a research aircraft built by Rockwell International, and perhaps a number of readers have been working on that project. The interesting bit, though, was in the caption under the picture . . . "Rockwell International unveiled a research aircraft Tuesday in Los Angeles that will test its aerodynamics as a basis for designing 1990's fighters. **During tests the pilot will be on the ground**, controlling the plane through a cockpit-mounted television camera."

Just maybe someday in the future when one of your non-modeling friends asks you what your hobby is and when you tell him, he will look with awe, rather

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RADIO: 1-4 ch.

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A classic 1930's racer

SPAN: 36 in.  
AREA: 250 sq.in.  
ENGINE: .051 - .10  
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FEATURES  
Injection molded all foam fuselage, wings and stab • Vacuum formed cowling • Aluminum landing gear • Decals • Basic hardware • Pushrod material • Complete instruction book

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INJECTION MOLDED  
ALL FOAM GLIDER



- Factory joined, all foam fuselage
- All foam wing, stab & fin
- Vacuum formed canopy

SPAN: 76 in.  
AREA: 504 sq.in.  
WEIGHT: 32 oz. w/radio  
RADIO: 2 ch.

**\$27<sup>76</sup>**

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## SPITFIRE

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**\$28<sup>99</sup>**

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ENGINE: .29-.40  
RADIO: 4 ch.

— FEATURES —

- All foam fuselage, wing and stabilizer
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SPAN: 39.5 in.  
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ENGINE: .15-.20-.25  
RADIO: 2-3 ch.

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Old Keller

## PIPER J-3 CUB

SURE FLITE PRODUCTS  
the little aircraft company



SPAN: 52 in.  
AREA: 442 sq.in.  
ENGINE: .15-.19  
RADIO: 2-4 ch.

Ideal Trainer  
Lightweight  
Quick Final Assembly  
Easy For Anyone To Fly

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ENGINE: .15-.20  
RADIO: 2 ch.

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 1/2-A Motor Glider .049-.06 ENGINE

- Hand built & covered balsa wings
- ABS plastic fuselage
- Stab & rudder ready to hinge



SPAN: 48 in.  
 AREA: 294.5 sq.in.  
 ENGINE: .049 - .06  
 RADIO: 2 ch.

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**TRYSTAR-15**  
 1B ENGINE

Best Beginner's Trainer or Sport Model



SPAN: 49.2 in.  
 AREA: 403 sq.in.  
 RADIO: 3 ch.

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**Mermaid 20**  
 A.R.F. SEAPLANE

- Hand built & covered balsa wings
- ABS plastic fuselage
- Stab & rudder ready to hinge



SPAN: 52 in.  
 AREA: 427 sq.in.  
 ENGINE: .20 - .25  
 RADIO: 4 ch.

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**KITTY R-1500**  
 High Performance Glider

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- ABS plastic fuselage
- Stab & rudder ready to hinge



SPAN: 61 in.  
 AREA: 377 sq.in.  
 WEIGHT: 18 oz.  
 RADIO: 2 ch.

RETAIL \$62.95  
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**Hobby Shack** RADIO-CONTROL  
**ALMOST READY TO FLY**  
**Thermal Hopper**  
 High Performance Glider

RADIO: 2 ch.



SPAN: 98.5 in.  
 AREA: 589.5 sq.in.

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- Stab & rudder ready to hinge



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 ENGINE: .049 - .06  
 RADIO: 2 ch.

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 .049 or ELECTRIC R/C

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Interest in the larger scale type models seems to be definitely on the increase. Bud Nosen with his line of 1/3 and 1/4 size models probably has had more to do with this trend towards the larger size models than any other person. Power for these larger models has always been a problem. .60's are barely able to fly the models and even the O.S. 80, Fox .78, etc., are marginal. Several people started offering the converted utility engines intended for the small chain saws, generator units, etc. Du-Bro Products was the first to offer a propeller reduction drive unit allowing the use of larger diameter, more efficient propellers, followed by several other manufacturers — Stewart Aircraft's Maximizer, the Master Climb Products Power Conversion Unit, etc. The reduction drive units do work very well, but many fellows are not too wild about the non-scale sound. A Piper J-3 Cub sounds a little strange putt-putting along at scale speed with a screaming motor turning 13,000-14,000 rpm.

Several manufacturers have recognized the need for a power plant designed expressly for the larger models. One of the first engines to be offered was the Webra .90. Although not being in the same size category as the Roper, Rhino, MRC-Suevia, and monstrous Quadra, it is an engine designed by a model manufacturer for model aircraft use — not a conversion.

Late last fall, another manufacturer in Sweden sent an information package to the various model magazines announcing a new twin cylinder four cycle overhead valve engine that they were in the process of manufacturing with a displacement of 1.10 cu. in. The name of the engine is the DAMO 218 being distributed exclusively by Marketing Consulting Corporation AB in Sweden. The DAMO 218 is designed expressly for the 1/4-1/3 size models. Many of you have probably already seen pictures of the DAMO 218 in the various model magazines. Many of you may have wondered why no mention of the engine was made in RCM. Some pretty spectacular claims were made for the engine in the descriptive literature such as **no oil** necessary in the fuel. The lubricating qualities of Methanol alone



being sufficient lubrication. Needless to say, I found that a bit hard to believe so before giving the engine any mention in the magazine, I got a letter off to the importer suggesting they send an engine over for testing and evaluation. Much to my surprise, I received one of the first engines to enter the U.S., if not the first, this past week. So, in an upcoming Engine Clinic, I will be giving you a full report on the DAMO 218 as soon as we get the chance to run it in and perform some power checks. A letter from Mr. Anders Wahl who heads Marketing Consulting Corporation AB accompanied the engine. Mr. Wahl now recommends the use of 5% oil in the fuel. So we will be performing our tests with the 5% oil as recommended. I would like to say at this time, without even having run the engine, that it is one of the most beautiful pieces of workmanship in a model engine that I have seen. No effort was spared to put out a top quality product. The crankshaft is supported by 4 ball bearings. The connecting rod has needle bearings at both ends. The camshaft, as well, is supported by needle bearings.

The use of ball and needle bearings throughout is the reason for the manufacturer's recommendation of only 5% oil in the fuel. However, I do not think he has taken into consideration the abuse some of you hackers out there can subject an engine to. Lack of lubrication in an engine usually results in piston/cylinder scoring. The DAMO, like any other engine, uses aluminum pistons with one conventional ring on each, running in hardened steel cylinders. Mr. Wahl says that a prototype engine is being tested to destruction, running on **no oil** fuel. The engine now has 150 hours on it. The first batch of

engines were delivered to Swedish modelers last November and so far no problems have developed. The recommendation of 5% oil now is strictly for safety's sake. Our tests will either prove or disprove if this is possible or not.

Many of you are probably wondering about the advantages or disadvantages of a four stroke twin over a two stroke. One of the main problems with a two stroke twin has always been equal fuel distribution to both cylinders. If the design used off-set cylinders, one cylinder was closer to the carburetor than the other. Some manufacturers have used plenum chambers or even two carburetors to overcome this. Other manufacturers have designed their twins with both cylinders on the same center line but this, in turn, called for off-set connecting rods. Even though the cylinders were equal distance from the carburetor, you still had the rotational effect of the crankshaft supplying one cylinder with more fuel than the other. Modifications to the intake porting of the sleeve were necessary to compensate.

A four stroke twin does not have any fuel passing through the crankcase so crankshaft rotation plays no part. Intake is simply through two tubes leading direct to the intake valves. Although there will still be some variance in fuel mixture between cylinders it is not near as critical in a four stroke engine. Another advantage of a four stroke twin is that by camshaft timing, the engine can be made alternate firing. Although both pistons are at top center at the same time one is on the combustion stroke and the other on its exhaust stroke. So even though the engine is a four stroke, meaning one power impulse every other revolution with two cylinders firing alternately, there is one power impulse every revolution. This, in theory, making the twin far more efficient horsepower-wise than a single cylinder four stroke engine that only fires once every other revolution.

For you scale modelers out there, just imagine how great the J-3 Cub would look and sound with a DAMO twin in the nose. I think this is the engine that a lot of scale devotees have been looking for. However, the price may have an affect

to page 12



# New! First Ready-Built Sailboat for the R/C Modeler.

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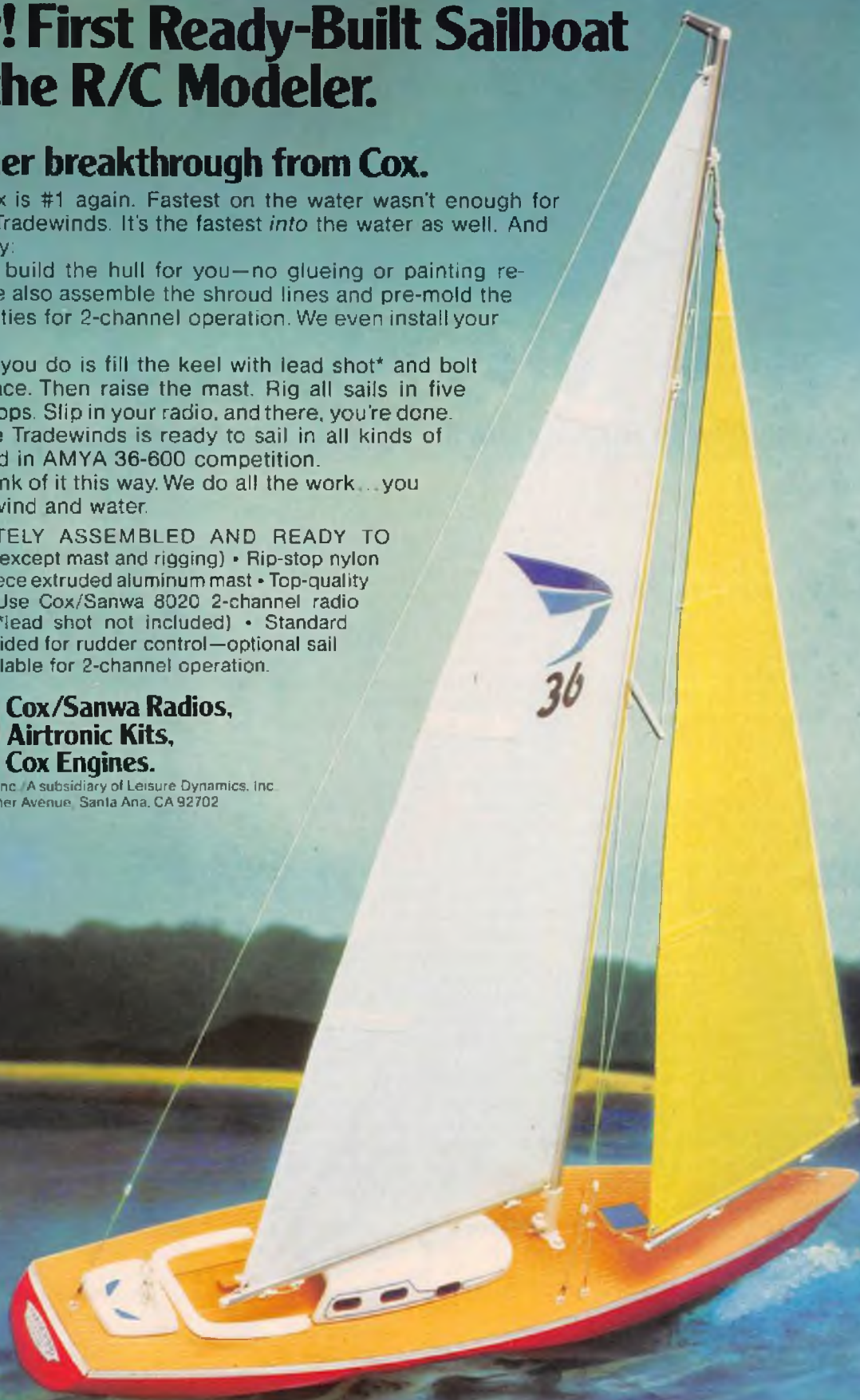
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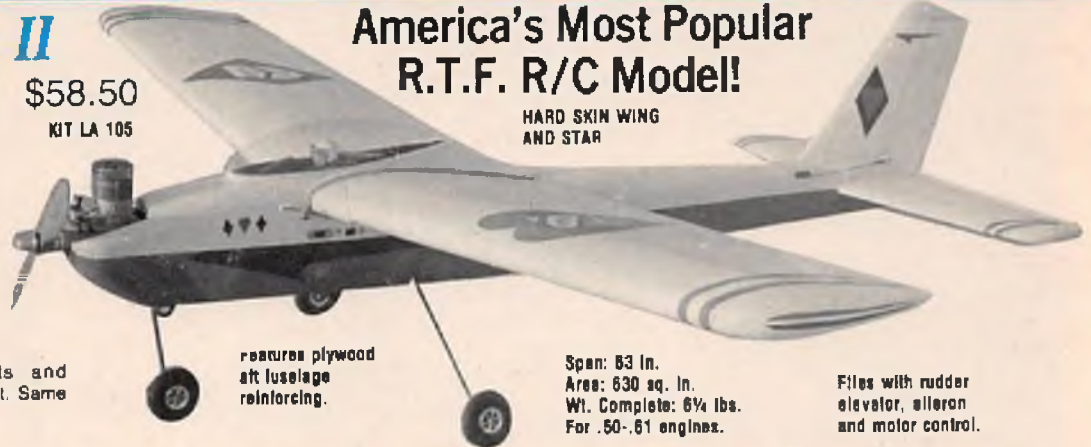
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### ENGINE CLINIC

from page 10

on your enthusiasm. Hang on to your socks — it is \$495.00 plus \$20.00 for air postage.

For any of you who may want to purchase an engine before we publish our tests and additional engine specifications, the mailing address is Marketing Consulting Corp. AB, P.O. Box 240 11, S-750 24, Uppsala, Sweden.

I am still getting a lot of response to the article on tuned pipes in the January Engine Clinic. Many fellows want to know how to determine proper length mathematically: where to get information regarding proper dimensions for building their own pipes, etc. I am sure most of you guys would be bored if I ran all of the formulas for designing tuned pipes — the majority preferring to purchase the finished article. For those of you who do want to go deeper into the theory of tuned pipes, there is an excellent book available on the subject. The book is "Two-stroke Tuners Handbook" by Gordon Jennings. Gordon Jennings is a motorcycle racer, but the book covers many things directly applicable to model engines. Combustion chamber shapes, intake and exhaust porting, etc., as well as the best chapter on tuned pipes I have ever read. Mr. Jennings speaks not only from theory but actual application, as well, and tells it in a language you can easily understand including the formulas for tuned pipes. The formulas for tuned pipes for motor bikes fall right into line with those used on models. The book is available in most any magazine/book store that handles motor and automotive oriented material. Many motorcycle shops sell the book. If you can't find it

locally in your area, Bob Murphy of Shamrock Competition Imports, P.O. Box 28247, New Orleans, Louisiana 70186, will mail you a copy for \$5.00 plus 50¢ postage. Bob is the importer of the OPS line of engines.

Incidentally, many of you have probably read the article on tuned pipes that has been making the rounds in many of the club newsletters. I do not know which newsletter first ran the article, but it is a direct quote from Gordon Jennings's book, pictures and all.

While on the tuned pipe topic, I made a goof in my description of how a pipe works. Normally when I make a goof, I get many letters telling me so. This time, however, only one fellow wrote to tell me so — John Swonger of Buena Vista, Pennsylvania. What's happened to the rest of you technical types out there — you aren't on your toes any more.

In my description I said that, "If the high pressure wave reaches the exhaust port while it is still open, but before the bypass port has opened, a super charging effect will take place." This should have read, "If the high pressure wave reaches the exhaust port while it is still open, but AFTER the bypass port has CLOSED, a super charging effect will take place." I knew what I was thinking, but did not get my thoughts down on paper in the proper sequence.

I received a letter from Bob Davis of Davis Diesel Development, this past month. Bob makes the diesel conversions for the Cox engines and markets diesel fuel. Bob wanted to comment on my answer in an earlier column to a fellow questioning the price of Davis Diesel fuel. Bob's letter...

Dear Clarence:

In an earlier column, a writer had put questions to you on the matter of diesel fuel. So as to satisfy these questions and some misunderstandings, I would

like to re-answer the gentleman's questions and your comments regarding the make-up of our diesel fuel and diesel fuel in general.

The fuel we are currently manufacturing in pints, quarts, and, more recently, gallon concentrates, are basically formulated from di-ethyl (medical) ether, kerosene and a combination of oils together with additional ingredients to raise the cetane rating of the fuel. The cetane additive performs just the opposite functions of an anti-knocking ingredient in gasoline --- namely it raises the pre-ignition point of kerosene to allow it to fire more readily. Since it is usually a nitrate compound, it furnishes additional oxygen to the chemical reaction to the fuel.

This particular ingredient in amounts of between 1% and 1 1/4% greatly aid the smooth running characteristics of the diesel engine. If amounts of 2% or higher are used, excessive heat is produced and destructive knocking may occur. In regard to the oil package, synthetic oils are not satisfactory since they flash at temperatures in excess of 450° and although an increase in economy and power may be noted with their use, the subsequent destruction of the metal bearing surfaces is not worth the gain. An even more important fact is that if the fuel is allowed to evaporate, it will vaporize and carry off the synthetic oil and thus concentrate the nitrate which will break down and form destructive nitric acid. Thus, castor oil or SAE 70 weight motor oil should be used in any oil package considered since heavy residues that remain on the metal serve to protect it. Castor is chosen due to its high temperature capability which provides a good running seal which is important in any engine.

to page 170



# SIMPLICITY

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*6x4	.79	10x6	1.29
*6x5	.79	*11x7	1.44
7x4 1/4	.89	11x7 1/3	1.44
7x6	.89	11x7 1/2	1.44
8x4 1/4	.94	*11x7 3/4	1.44
8x6	.94	*12x5	1.59
9x6	1.14	*12x6	1.59

\*Indicates new sizes

#### NEW SMALL

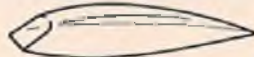
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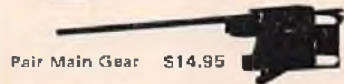
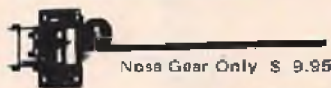


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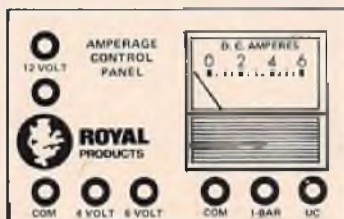
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**S**ome 22 years ago, Ed Pomponi and three of his modeling associates decided to form a club, even though it would only have 4 members to begin with. So they did. They didn't even have a name, at first; just four guys, banded together with a common interest in radio control flying of miniature aircraft, which most people call model airplanes.

Mary Jane (Ed's wife) was not only tolerant of Ed's sport, but took part. Every Sunday, with their four kids, they'd go out together to the flying field and spend a few hours while Ed fiddled, flew, crashed, repaired, fiddled some more and, gradually, got to the point where he did more flying than fiddling and repairing.

The enthusiasm of the four club members was contagious. As time went on, more and more fellows asked to join the club. A name was adopted — The Westchester Radio Aeromodelers Society. Quite a mouthful, so naturally, the acronym, WRAMS, became the standard way of referring to the club. (I didn't know exactly what WRAMS stood for until a year or so ago.)

The WRAMS continued to grow and prosper — and one of the reasons was that, like Mrs. Pomponi, many wives participated in the club activities. They still do.

Ten years ago, the WRAMS decided to educate the public about their sport by having a show. So they went to the management of the Westchester County Center, in White Plains, New York.

"We'd like to rent exhibit space for a day."

"Okay. How much room do you need, and what do you want to exhibit?"

"If we can have it, we'd like the entire basement exhibit hall, to display radio controlled aircraft."

"Sorry. There's no way you can get airplanes down there."

"Wait. You misunderstood us. When we said aircraft, we meant radio controlled model airplanes. They are only around 5 or 6 feet in span."

"You mean you want to have an exhibit of toy airplanes?"

"Yes."

"You've got to be out of your minds! Do you realize it costs \$400.00 to rent that space?"

There was just a moment of hesitation. After all, the club only had about \$30.00 in the kitty — and dues were all paid and there were some mailing expenses still outstanding. But they were determined.

"Do you want the money now?"

"Y' darn betcha! If you're crazy enough to waste that kind of dough to show toy planes, okay, but we ain't crazy enough to wait until you've lost your tail and can't pay the bill!"

Somehow, the WRAMS scraped up the money, and rented the basement exhibit hall for a day. The rest is history.

Each succeeding year the show got bigger and bigger. This year was no exception. The WRAMS rented the entire building, except for a couple of small classrooms, and shelled out five grand for the rent. And this time the management of the hall had totally different worries from just whether the WRAMS could pay the rent. The new worries were concerned with how the parking area could possibly handle the influx of cars bringing thousands of R/C enthusiasts into White Plains for the two day show, because, from that humble beginning 10 years ago, the WRAMS Eastern States R/C Jamboree is the largest event for the two day attendance that the Westchester County Center has on its schedule. And next year, unless the show is extended to three days, the Center will be totally inadequate to handle the crowds; it was marginally satisfactory this year. But isn't it great when the WRAMS, promoting the sport of R/C, have problems created by the success of their efforts? Beats the hell out of failing.

One of the reasons for that success is the total participation of the families involved. The members do booth set-ups, scheduling, security, publicity, etc., and the wives and kids handle raffles, door checks, lost and found, and other miscellaneous activities associated with staging a major show. Frank Devore, Show Manager, has had the job for every show. Joe Wimbrow, Club President, gives out the trophies. Tom Moore, Treasurer, handles the exhibitor arrangements and fees, with help from Larry DiRubbo, VP, and John Isbister, Secretary. (If I misspelled those last two names, blame my friend Ken Smalley.

But I'm close, anyway.)

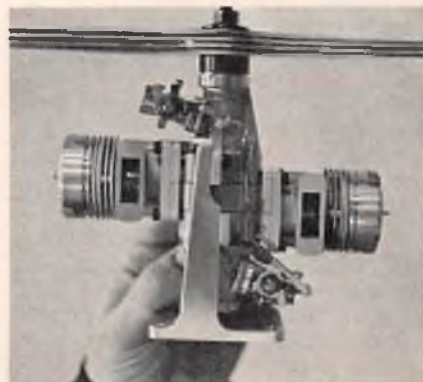
There were 92 exhibitors in the show this year, and several hundred modelers entered their models in the various categories for the aircraft, boats, and cars. As usual, the swap show had some fantastic bargains.

Some fifteen thousand enthusiasts came to see the show. I don't know exactly what the paid attendance was, but it was up from last year by about twenty percent.

The crowds were so great that at one time they almost became unruly; if we hadn't let them in during the final minutes of judging the models, they might have broken down the doors. But it all worked out.

Quite a few of the exhibitors ran into problems with the weather — their exhibits were delayed en route. So they improvised until the material arrived. Sid Axelrod, of Top Flite, never did get his exhibit to the show, but you'd never have known it. He scrounged around the hobby shops, begged and borrowed what he could find, and by the show time his exhibit looked as good and, in some cases, better than some of his competitors. Sid is living proof of the old saying, "Work 8 hours a day, and don't worry, and you'll wind up as President of your company. Then you'll work 24 hours a day, and have all the worry."

The exhibits were interesting, as always, but for new items, there weren't too many. Those that caught my attention most are shown in the following photos:



(1) Duke Fox's new twin .60. Swings a 15/6 prop at 11,000 rpm. Weighs 2½ pounds and puts out about 2½ horse-



power. Should sell for around \$250.00. Needs a muffler, which Duke is working on.



(2) Duke Fox and his new big wheels for big models. Says the interest in the wheels, if anything, was even greater than in his new big engine.

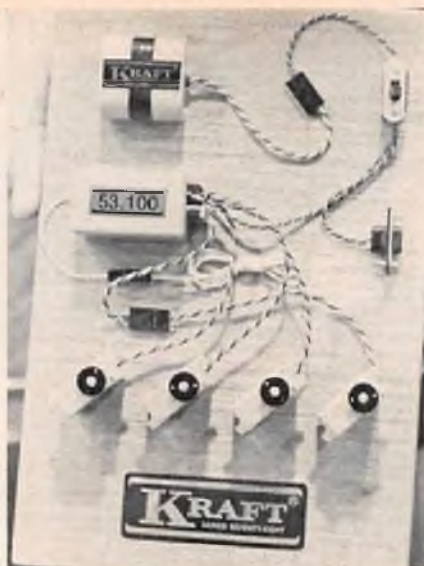


(3) The Damo FS218 four cycle engine, from Sweden, was shown by Jerry Nelson and Dave Sears of Midwest Model Supply. A beautiful engine: weighs around 20 ounces, puts out about 1/4 horsepower, has an rpm range from 11,000 maximum down to 1200 idle. Even without a muffler, is quieter than most .60s with one. Somewhat expensive — around \$600.00 according to Jerry — but you get what you pay for.



(4) Frank Garcher, of Midwest Products (not to be confused with Jerry Nelson's outfit) shows off his new 1/2A ducted fan and the kit. Should be available in April or May. The kit will retail for \$38.95. An all foam A4D kit specifically designed to use the ducted fan; will also be available for \$34.95. The fan puts out about 15 ounces of static thrust, and the 1 1/2 ounce tank runs the fan for about five minutes. Unfortunately, no provision is made for a throttle. That will have to come later.

(5) Kraft's super lightweight KPS-18 servos, which were first announced last



year — a bit prematurely — are now in reproduction and available. Even more interesting is that for the small models that can be flown, a new antenna wire, with a loading coil at the base, is only 18" long. Now you don't have to run the antenna back to the vertical fin, then out to the wing tip, and let it trail from there. Much neater.



(6) Gil Rifkin, of the Sailplane Accessory Company, showed his new mechanism for operating spoilers. The photo shows how it will continue to operate even if the wings happen to become slightly dislodged.



(7) This photo shows the simple bell-crank arrangement for positive spoiler action from the central mechanism of the Sailplane Accessory Company's spoiler system.

One other new item at the show was a new transmitter by Variant Radio, specifically set up for helicopter control. Unfortunately, my photo didn't turn out, but basically, according to Bob Hellman, it

has a throttle rate anticipator which applies a signal to the tail rotor when you open the throttle. It compensates for the big bite and eliminates the tail swish when you jam the throttle forward. It's adjustable, too. There was a lot more, which I didn't fully understand, but supposedly it will greatly simplify the challenge of helicopter flying. Of course, if you want to use the transmitter for conventional control, it has that ability as well. Certainly a new and different approach to helicopter flying.

Interestingly enough, a bit later on, I met and talked with Ron Barker, one of the outstanding helicopter pilots of these times. It was his opinion that what was needed even more than gimmicks to make helicopter flying easier, was the right servo for helicopters — powerful and very fast. He also said that the new rotor system, using direct drive into the rotor, will revolutionize helicopter flying, and all that a fixed wing flier will need to learn helicopter flying is the desire to fly one, and a competent instructor to teach him to hover and translate into forward speed. In forward flight, it will be just like flying a fixed wing pattern job, even including axial rolls. Ron says there's been too much emphasis on the difficulty of flying helicopters — like it was a black art. If you want to learn — not just "dabble" in it, and will listen to a good instructor, that's all you need, according to Ron. And, I might add, the necessary loot to buy a kit.

To me, the real highlight of the WRAMS show was the outstanding quality of the models entered in the various categories. I was asked to act as one of the judges, and I can truthfully say that I did my best, but if I were to judge the models all over again, without seeing how I judged them the first time the results might well have been different. The difference between First Place and even Third or Fourth Place, in many instances was about like tossing up the identifying cards and seeing which fluttered to the floor first. Here are some examples:



(8) A 1/4 Scale Gipsy Moth, built by C. Bussman from West Seneca, New York. It weighs 18 lbs., swings a 20/8 prop with a Quadra engine. It spans 90". Won in its class.

(9) An Avro 504K basic trainer, built by Len Stolk from Leonia, New Jersey. 6' span, .60 engine, weighs 7 1/2 lbs. Also a

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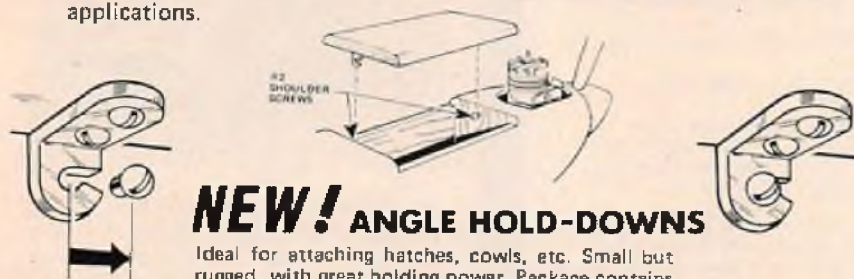


# NEW!

## HATCH HOLD-DOWNS and other needed items!



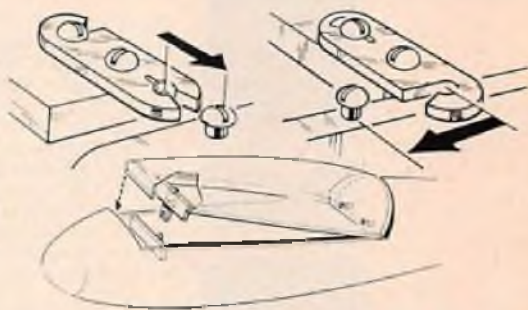
Here's the answer to an old problem — how to hold a hatch securely, yet remove it quickly. Our two new nylon hold-down designs snap on and off instantly. The side-action types have tremendous holding power, the end-action is for lighter duty. Adaptable to many applications.



### 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¢

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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



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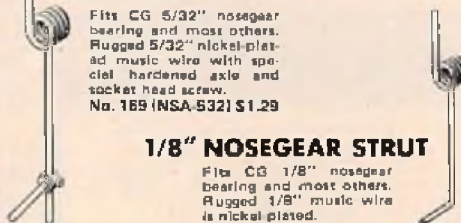
### NEW! SMALL HINGE SLOTING FORK

For Klein RK-2 small hinges and others. Fits CG Slotting Blade Handle or large Xecto handle. Small Pinned Hinges Slotting Fork No. 276 (SF2) 50¢; or Large Fork for reg. size hinges No. 271 (SF1) 50¢



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from page 16/15



winner in its class.



(10) Nick Zirola and his F4U-1 Corsair. Nick built it in about 4 months. It spans 93", weighs 18 lbs. Has a Max .60 with a Du-Bro reduction gear, swinging a 20" or 22" prop. Wings fold for transport. No retracts, but it'll still create a lot of attention just because of its size. Scale is 2 1/4" to the foot — just under 1/5 scale. Robert Conrad would love it.



(11) The winning model in Junior Class — a Nieuport 17 built by Gary Singer, 14 years old, from Armack, New York. 54" span, .60 Enya swinging a 14" prop. Weighs 5 1/2 pounds with scale of 2" to the foot. An absolutely fantastic job for a 14 year old boy.

(12) I'm not a boat buff, but I am always amazed at the intricate detail which boat builders incorporate in their work. This model won first place for John Steffen from Whitestone. He sails it in Flushing. It's a scale model of the schooner Eloise, and the detail is unbelievable; even the lifeboats are fully equipped. The flag on the mainmast is raised and lowered by R/C. Mr. Steffen is a maintenance man for a chemical firm, and a retired chief engineer on an oil tanker.

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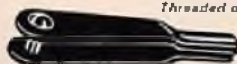
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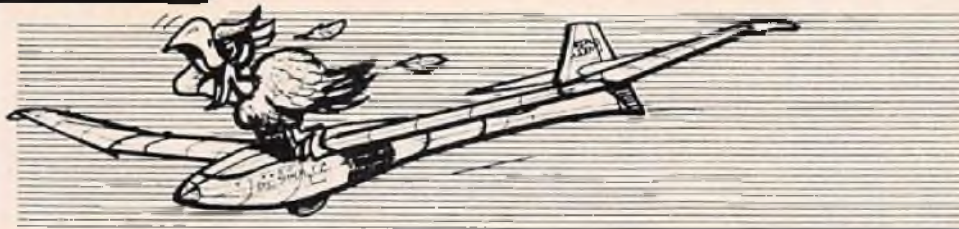
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**H**ow many times have all of us heard "the wind got me," at one time or another? Whether the aircraft is small or large, light or heavy, thick or thin, we all have our reasons and beliefs on what effect it has on our model aircraft. Much has been written, many hours of hangar and field talk has changed heads, but how much have we read about "what the wind doesn't do"?

Len Salter of the Cape Radio Flyers, has put together a "down to earth" explanation of what the wind doesn't do.

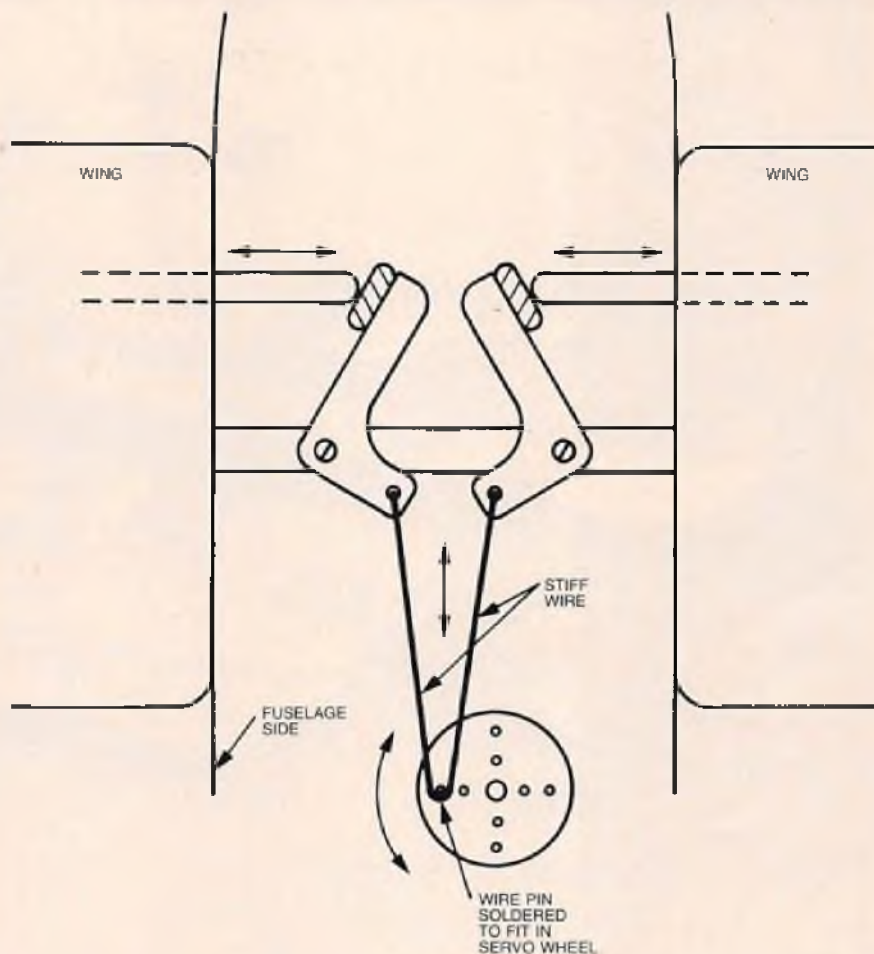
Recently told by a very experienced club member that the wind 'gets hold of' his aircraft when he turns cross wind and being aware that he is not the only one who still believes this fallacy, perhaps I should once again, explain the facts of the matter — ignoring turbulence and wind shear.

I normally avoid mathematics when dealing with this facet of flight, but perhaps a change of tactics may be more convincing for the skeptics.

It must first be appreciated that velocity is entirely dependent on the velocity of the reference being used, and is not necessarily related to a fixed point of the earth's surface. If a bullet is fired at a stationary man, by another stationary man at a hundred meters distance, the bullet will have a certain velocity when it hits. If it is fired from an aircraft approaching another head-on, at the same distance it will strike at a much higher velocity. Conversely, if fired from the ground at an aircraft flying away, it will strike with a lower velocity. For our purposes the velocity of an aircraft in normal flight can only be related to the air in which it travels through, and is measured as air speed, being in no way related to the ground (unless contact with it is made).

Inertia, momentum and kinetic energy are all products of mass and velocity; therefore as velocity is involved, they are all relative to the reference used. Pertaining to an aircraft in flight and its reactions to control surface movements, these forces must be referenced to the air.

Back to velocity and a calculated example. Imagine a small model aircraft flying in circles, having been tethered to a 10' long piece of string, the other end of which is being held above the flyer's head. Assume it makes one revolution



every four seconds. The radius of the turn will be 10' and the angular rate of the turn will be 360°. V (velocity) will equal WR where R is the 10' radius and W the angular rate of turn. To calculate a velocity in feet per second, degrees will have to be converted to radians. There are 2π radians in 360°. Therefore:

$$V = \frac{2\pi \times 10 \text{ ft.}}{4 \text{ sec.}} = 16 \text{ ft./sec.}$$

If the flyer is standing on the ground in still air, the tension of the string will remain constant, as will the model's velocity related to the flyer and the surrounding air. If an observer approaches in a car also traveling at 16 ft./sec., there will be a point on the circle, when the aircraft is flying directly away, where it will appear stationary as the observer and the

aircraft are both traveling in the same direction at the same speed. After turning 180°, the aircraft and the observer will be approaching each other at 32 ft./sec., creating the impression that the model is now flying at a much higher velocity when, in fact, it is not.

Now, let us put the flyer on top of a balloon, where he is flying the model exactly as he did from the ground. The balloon is drifting with a 20 mph wind. Here, relative to the surrounding air, the balloon, the pilot, and the aircraft, are once again flying in still air conditions, although they are drifting at 20 mph relative to the ground.

The tension on the string will remain constant because velocity remains constant, therefore kinetic energy remains constant, regardless of the aircraft's heading. Exactly the same principles apply to an untethered model or full size

to page 165



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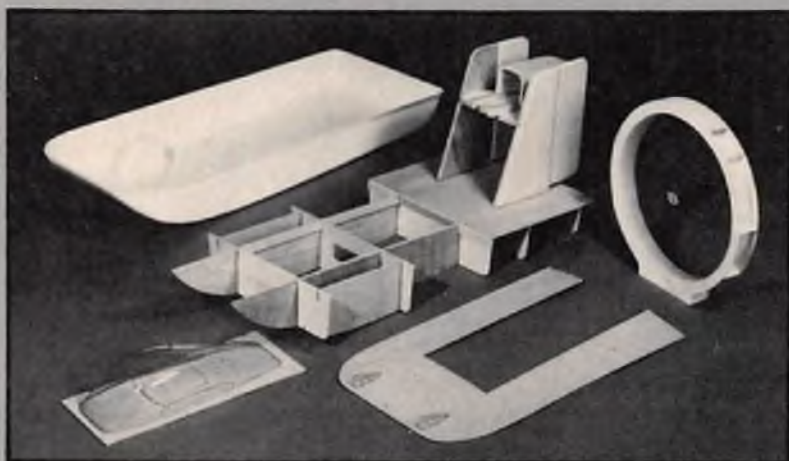
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Dry Kit. Rubber power material supplied. Other equipment not included.

The Beautiful Cherokee is manufactured by one of the greatest names in American Aviation, Piper Aircraft Corporation.

The Cherokee, a basic 2-seater with optional two family seats, is powered by a 150 hp. Lycoming engine and equipped with wheel speed fairings. Top speed is 142 mph.



## P-61 Black Widow



### Kit E-15

Wingspan: 37 1/2"

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# Hover



**B**y the time you read this you will already have seen the notice in the May issue of RCM that the NRCHA is on its own now without RCM doing all of the paper work and all the associated work that goes with the running of such an association. If it's going to continue this work will have to be done by all those who are interested in helicopters. The NRCHA will have to be supported by these interested people.

I think, with help, the NRCHA can grow and mature into a bigger and better association. But to do this we need your help. Any interested parties should get in contact with Walter Knaus, 82 Eldorado Avenue, London Ontario, Canada N5W 1S5.

The tentative plans now are to get together some sort of monthly newsletter to be sent to all NRCHA members. The news will be compiled on what's sent in from other NRCHA members. An up-to-date roster of all members with a move towards having more communication between helicopter people from all over the world.

As it stands now the Grade Level program, along with your NRCHA number, will stay intact with the emphasis being placed on making NRCHA grow and increase the exposure and communication between us all.

\*\*\*

Also some good news, depending on how you look at things, is that the Hover column will be back on a monthly basis. I'll continue trying to keep up but let's hear from you guys. If you have anything that you think would be of interest to other helicopter pilots, let me know and I'll see it gets in the Hover column.

Since the last Hover column I've had the pleasure of being in Germany to visit the Kavan factory and also the Nuremberg Toy Fair. Both experiences have been priceless. The Toy Fair is beyond description so I won't even try. Just suffice it to say that in size the Toy Fair, in comparison to Toledo, is like comparing a shopping mall to a yard sale --- out of site!

There wasn't much in the way of new helicopter products at the Toy Fair. I did see a four bladed head on the German BO 105 helicopter kit. But I must say after looking at it closely that, in my opinion, it was a non-flying model, built just for looks. At the Schluter booth on display was the Heli-Boy and the same with



**German made kit model of Bo 105 with for show only 4 bladed head.**



**Schluter's Bell 222 with plastic fuselage.**



**Heli-Boy with fiberglass 222 fuselage in background.**



**Clear plastic Hughes 500 body for Heli-Baby.**

the Bell 222 fuselage, in clear plastic and, soon to be available, the 222 in fiberglass and the clear plastic Hughes 500 body for the Heli-Baby.

Now I said I didn't see much new at the

Toy Fair but that doesn't mean that while I was in Germany I didn't see several exciting new developments that are coming for helicopters, namely from Kavan. These developments were not shown at the Toy Fair mainly because Mr. Kavan's policy is not to show anything that cannot be had at the moment. Rest assured that very soon new developments will be available from Kavan and when you hear about them or read about them in this column you will also be able to have them for yourself then, and not six months later. As you know, usually when you see or hear about something new and you get all hot to have it, you soon find out although it may be advertised etc., it's not available yet. Well, Kavan's policy is when he shows something new he can also fill your order at that moment. I'd just love to tell you what's coming but I'm sworn to secrecy for the time being --- but hang in there because there are several good things coming from Kavan.

Any of you who have ever built an Alouette 2 or Jet Ranger know the quality of these kits. Well I've often wondered just how you can have a production item and retain that type of quality. Well now I know. It's simple yet difficult --- let me explain.

Everyone in the Kavan operation is concerned with doing his or her particular job one way and that's the correct way. The emphasis is placed on quality not quantity. Everyone is busy but not hurried. And when I say everyone, that's what I mean. Even Mr. Kavan takes his job as a responsibility not just the attitude that he's the boss so he doesn't have to work. He puts in 60-80 hours a week working, not fishing or golfing.

One thing he is, though, is a hard head. I had no success at all in convincing him we should have a new body for the Jet Ranger. He told me he would leave that up to the modelers so it looks like we live with the Jet Ranger for a while longer. Are some of you guys out there good with fiberglass? It sure isn't my bag, I can tell you that.

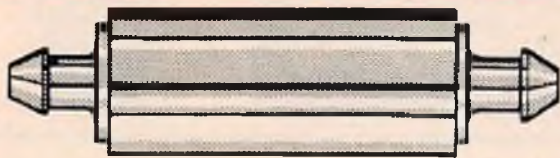
John Minasian makes a Hughes 500 body for the Jet Ranger mechanics like they used in the movie *Capricorn 1*, but I'm not sure how crazy he is about making them. What say you, John? I won't print your address unless you let me know.

\*\*\*

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# THE FINAL FILTER

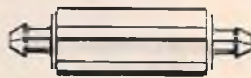


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**T**he 5th Annual Florida Winter-nationals was their biggest race ever, with 90 total entries arriving from all around the U.S.A. Southern California was represented, as well as the Midwest, East Coast, Texas and, would you believe, Venezuela? R/C cars are taking off in Venezuela, with the 6 month old club now up to 60 entries. The Winter-nationals are sponsored by the Central Florida R/C Auto Racers Club, with Bob Valyou very capably doing the race director's duties.

The out of state racers generally come to a race like this 2 or 3 days early, to learn the track and get their cars set up for this particular track. This was also our plan. The event was scheduled for February 10, 11, and 12, (Friday, Saturday, and Sunday). We planned on Wednesday and Thursday as practice days. Wednesday morning we were at Bob Valyou's Sunshine Hobbies in Orlando, to pick up our fuel. We then went to the track, which was right on the parking lot of Howard Johnson's Hotel in Orlando, where we were staying. Having the race track in your back yard sure tends to spoil you. We got our cars out and spent the next hour seeing how hard we could hit the boards. At least that's what it probably looked like to the spectators. In reality, the last thing we wanted to do, was to come into contact with the boards. The track had 3 long straightaways, with one straightaway right in front of the driver's stand, except this straightaway had an "S" curve right in the middle of it. Square cornered boards stuck out to form the "S". If you hit the boards something on your car broke. Earl Nestor, the winner of the East Coast Series, and I were talking and wondering why anyone would design a destruction track like this. Earl had come into contact with the boards a number of times, and was running out of replacement parts for his car. Earl is the East Coast Champion and a very smooth and competent driver. If the track makes him nervous, what must it do to Amateur or Novice class drivers. Beginners must go into a state of shock!!

We were only on the track an hour and it started to rain. I can't really say anything about the rain. It was also raining at home in Southern California. Okay, maybe it was a little more than raining — would you believe flooding? The rest of the day was spent bench racing. The



Scene of the 1978 Florida Winter-nationals was the parking lot of Howard Johnson's Hotel in Orlando, Florida. As you can see, there was a lot of action happening.



Only half of the 90 entries are shown. Entries came from Southern California, the Midwest, East Coast and even Venezuela.

guys from Southern California were saying how cold it was at 50 degrees, while Jack Jacobs and Rick Davis from Detroit and the guys from New York, who just came from 5 degree weather, thought it was great. It rained all Wednesday night and the weatherman forecast more rain for Thursday. Thursday morning it wasn't raining, but the track was all wet, so we went to Disneyworld. It was a great time to go to Disneyworld, because with the threatening rain that didn't come, there were no long lines and we were able to go right on all the



It seems that the pit area was always busier than any other race we've ever been to.

rides. It was a lot of fun. We went back to the track at 1:00. It was still wet. At 2:00 it was dry in spots, with a number of puddles on the track, so we went out to run, or should I say "to bang the boards?" My son, Curtis, who is one of the smoothest drivers you'll ever see, literally tore the front end off his car, twice!! And believe me, he was conservative compared to most of the other drivers. I somehow

to page 26



The Central Florida R/C Auto Racers Club have an efficient trailer that not only holds the track boards, but opens up into stands for placement cards and radio impound.



David Barnes won Concours with this beautiful Porsche 30KL over a large field of entries.



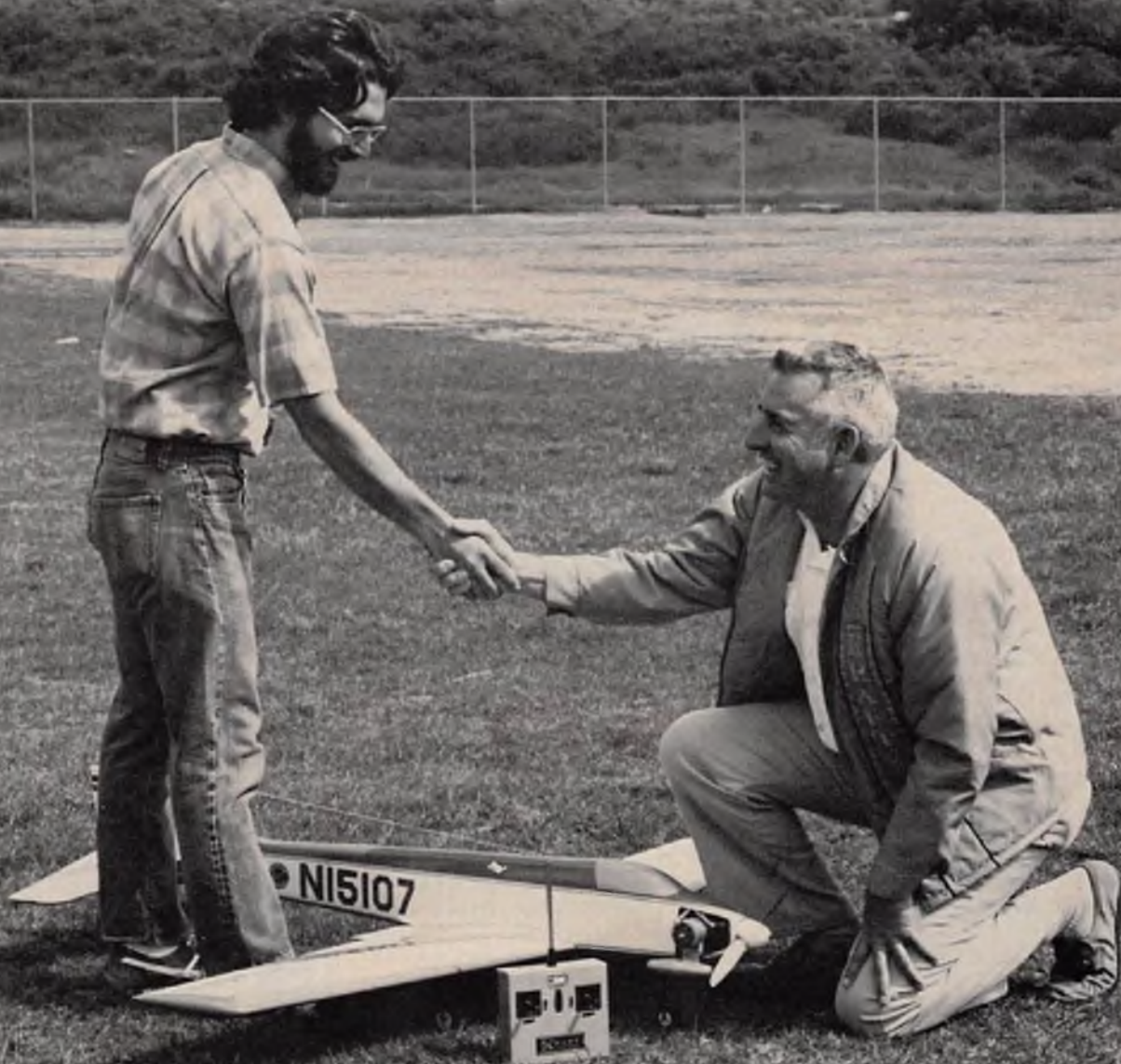
# Newcomer?

If you are new to Radio Control, visit a nearby hobby shop. They can direct you to local R/C clubs and flying fields where you will find friendly people who will be glad to help you in beginning the sport.

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## PIT STOP

from page 24

escaped the killer corner boards, but it was probably because I was blipping the throttle through the esses, instead of punching it.

Friday dawned bright and sunny and clear with perfect 70 degree weather which lasted throughout our visit. The schedule was for one round of controlled practice and one qualifying round. Friday was a revelation when we saw Arturo Carbonell on the track. For those of you who don't know who Art is, he's been the Midwest Series Champion —



*A little good natured humor is displayed by Mike Reedy, on the left, talking to Mr. Delta, Ken Campbell. That young man on the side with the Frisbee is Dick McCoy, along to spectate.*

forever, I think. He spends the winter in Miami, and I think the only time he's been beaten in Florida, is when he DNF's (did not finish), which is very seldom. I would rate Art and Bill Jianas as two out of the best three drivers in the U.S.A. I'll let you fight over the 3rd. I've seen Jianas run enough and I'm still amazed at what he can do. Arturo drives a Delta car, but he drives a Delta like no one else in the world. Compared to other Delta drivers, Art is in a class by himself. So, naturally, we were all anxiously awaiting Art's first time on the track. When you take a great driver, give him 5 years practice on a track, he'll fly around the track, and this Art did. Whereas,

some of the braver souls managed to punch through the esses by staying in the center of the course, Art was able to straighten out the esses, just missing the corner boards on every lap just the way it should be done.

After Saturday's final round of qualifying, it came as no surprise to anyone, that Arturo was Top Qualifier with 36.2 laps for 10 minutes. What did come as a surprise, to me anyway, was that no else from Florida made a sit out for the Main. Second fastest qualifier was Rick Davis from Detroit. Rick hadn't driven for 4 months, due to that white fluffly stuff all over Detroit. Rick had to learn the track in his qualifying heats, but did a fantastic job picking it up and turned a 35.4 with his Associated car. Mike Rowland fol-

to page 160



*Is this the way the state of the art will be in a couple of years? Lowell Bayhi ran a tuned pipe on this K & B 21 engine and Jerry Weinberg ran a tuned pipe on an OPS 21 and they were as fast as any car there.*

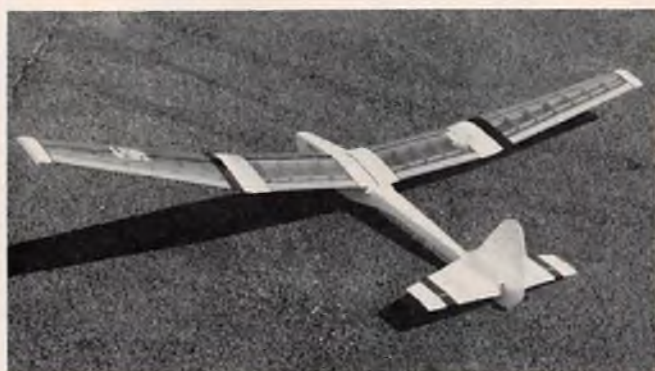


*Expert Main Event cars and drivers. From the left; Roger Curtis 8th, Doug McNeely 5th, Arturo Carbonell 1st, Bill Hawkins 9th, Rick Davis 2nd, Curtis Husting 3rd, Jack Jacobs 6th, Bill Jianas 4th, and Mike Rowland 7th.*



# RCM PRODUCT TEST

## Hobby Shack DAS SLUPEN THING



**D**as Slupen Thing is a sport sailplane designed by R.T. McVickar and sold by Hobby Shack. The notation on the plan sheet reads, "Manufactured in Occupied Southern California," and gives a hint as to what this fun plane is all about. When you come across notations like, "(rudder) der flappen thing fer turnen" or "(elevator) fer goen upp in un down," then you know that something is going on here. Well, what is going on is a nice, polyhedral 72" wingspan sailplane that can turn in some mighty satisfying flights off the slope, as well as off the hi-start. Packaging is well done, plans are clearly printed and easy to follow (wish they had been rolled instead of folded), die-cutting was done very nicely — especially the ply parts, and we found that parts did, indeed, match the plans. The plane is easy to build, with the instructions laid out in the step-by-step procedure that seems to be the way to go. And no, you don't even have to read German to figure out what they say. Anyhow, we followed the plans and instructions with no trouble, and quick as das wink, it was ready!

We finished it with Flite-Kote white and transparent blue, with metallic silver and red Solarfilm trim and D.J. Multistripe. Finished, there are several features worthy of special note. The first most noticeable thing is the fuselage shape. While it is all ply and balsa, it looks almost as though it were molded from one of the plastics. This is because of the pod and boom design that furnishes good room in the radio compartment, and keeps the weight down in the tail section. Another fine feature is the highly stable, polyhedral, 72" span wing, with turbulator spars.

Flight performance turned out to be even more fun than building (isn't it always?). The hi-start launches were a little tricky on the way up unless you were pointed pretty much into the wind. Corrections using rudder had immediate and good effect. Once off the line, it is as stable as a rock and will circle and circle without significant altitude loss. Into a thermal, it

to page 160

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts				NA	
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		●									

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

### SPECIFICATIONS

Name	Das Slupen Thing
Aircraft Type	Sailplane
Manufactured By	Hobby Shack 18480 Bandiller Circle Fountain Valley, California 92708
Mfg. Suggested Retail Price	\$14.99
Available From	Hobby Shack
Mfg. Recommended Usage	Sport Sailplane
Wing Span	72 Inches
Wing Chord	6½" (Avg.)
Total Wing Area	409 Square Inches
Fuselage Length	33 Inches
Radio Compartment Dimensions	(L) 7" x (W) 2.2" x (H) 3"
Wing Location	High Wing
Airfoil	Flat Bottom
Wing Planform	Constant Chord
Dihedral	3 Inches
Polyhedral	3 Inches
Stabilizer Span	18 Inches
Stabilizer Chord (incl. elev.)	6"
Total Stab Area	108 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	7½ Inches
Vertical Fin Width (incl. rud.)	6 Inches
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Landing Gear	Skid
Recommended No. Of Channels	2
Recommended Control Functions	Rudder & Elevator
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	35" x 33" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No
Kit Includes	Die-Cut Parts
Mfg. Rec. Flying Weight	22 Inches
Wing loading based on rec. flying wt.	7.8 oz./sq. ft.

### RCM PROTOTYPE

Weight, Ready To Fly	23 Ounces
Wing Loading	8.1 oz./sq. ft.
Covering & finishing materials used	Flite-Kote



# DIGITAL COMMANDER THREE CHANNEL SYSTEM KIT

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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.

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If you're tired of the fuss, mess, bother and hair-pulling you get from painting, now's the time to switch. The next time you want a really great looking bird but want it faster, easier, stronger, and lighter, remember these winning ideas from Top Flite.

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With MonoKote self-sticking TRIM SHEETS and MARKINGS you can finish off your planes with all of the beautiful detail you want without countless hours of painting and masking.

## ● Irons & Heat Guns

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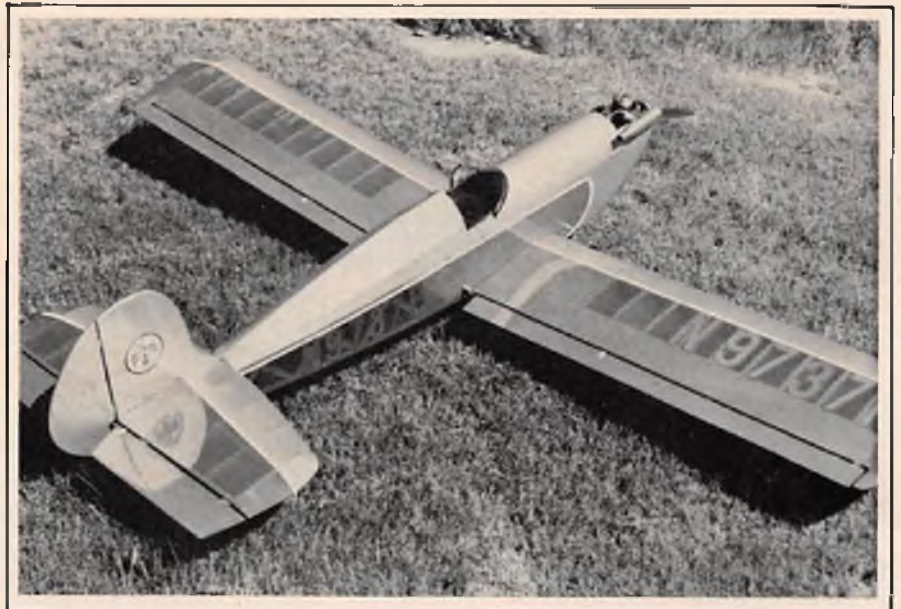




**M**iss Texas is a bigger than average model designed for bigger than average fun flying. She is a good looking throw-back to the light planes of the thirties in looks, and yet has modern lines. She is an open cockpit babe that simply cries out for you to jump in and fly her. Miss Texas is a .60 powered model that sports an 84" wing span and a 62" fuselage, carries almost 1100 square inches of wing area and yet flies with the greatest of ease. Like the Lazy Ace, she sports a slightly lifting tail section which makes her extremely docile on both landings and take-offs. Her wide spaced landing gear allows her to track straight down the run way on take-off, and lift into the air is accomplished in about sixty or seventy feet on a paved strip. I am flying my Miss Texas with a HP .61 for power. Any of the Schnuerle engines will fly her just great, and the less powerful standard sixties will yank her along very well. She

**If you have built Chuck's Lazy Ace, then this is the perfect mate to go with it. 84" span, open cockpit low wing that will make you want to climb in it and go.**

**By  
Chuck  
Cunningham**



was designed to fly on her wings rather than on engine power alone. She does this very well. I have been using both a 12/6, and a 13/5 prop on the engine and I feel that she does even better on the larger prop. A 13 ounce tank is fine, but due to all of the area up front, you could use just about any size fuel tank that you have pocketbook enough to fill. The radio compartment is large enough to allow a builder wearing boxing gloves to install the equipment, and yet with all of her size, and built-in strength, covered with MonoKote, my Miss Texas weighs in at 8 3/4 lbs. The construction techniques used on both the wing and the fuselage make for a reasonable light aircraft, but one that is very strong.

A word about the lifting tail section. With the slightly lifting horizontal stab and the semi-symmetrical wing section set at zero to the thrust line the balance point is just a bit further aft than is the normal practice, balance at about 33%



# MISS TEXAS



## MISS TEXAS

Designed By: Chuck Cunningham

### TYPE AIRCRAFT

Low Wing General Sport

### WINGSPAN

84 Inches

### WING CHORD

13 Inches

### TOTAL WING AREA

1092 Square Inches

### WING LOCATION

Low Wing

### AIRFOIL

Semi-Symmetrical

### WING PLANFORM

Constant Chord

### DIHEDRAL, EACH TIP

3 Inches

### O.A. FUSELAGE LENGTH

62 Inches

### RADIO COMPARTMENT AREA

(L) 11" X (W) 4 1/2" X (H) 3 1/2"

### STABILIZER SPAN

28 Inches

### STABILIZER CHORD (Incl. elev.)

12 Inches

### STABILIZER AREA

288 Square Inches

### STAB AIRFOIL SECTION

Flat Bottom

### STABILIZER LOCATION

Top of Fuselage

### VERTICAL FIN HEIGHT

9 Inches

### VERTICAL FIN WIDTH (Incl. rudder)

12 Inches

### REC. ENGINE SIZE

.60-.61 cu. in.

### FUEL TANK SIZE

13-16 Ounce

### LANDING GEAR

Conventional

### REC. NO. OF CHANNELS

4

### CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply & Spruce
Wing	Balsa, Ply & Spruce
Empennage	Balsa & Spruce
Weight Ready-To-Fly	136 oz.
Wing Loading	18 oz./sq. ft.

of the wing chord. The lift of the tail keeps Miss Texas flying at a much slower speed than you would expect for such a large aircraft. Landings can be made by buzzing in for a hot main gear only landing, or the tail can be dropped and slowed down for a "kiss the ground ever so lightly" three wheel landing. When taking off, I taxi out to the runway, turn into the wind, and shove the throttle to high. She picks up her tail into a flying attitude in about three or four feet, tracks straight down the runway and lifts cleanly into the air with just a gentle bit of back pressure on the stick. I have made zoom take-offs, and stall landings, with no loss of control. This is a big aircraft that will make you think that you're flying a small one. That is until you taxi up along side just about anything other than another Miss Texas or a Lazy Ace --- then you'll know that you're flying one of the big ones. Try it, you'll like it. What else could a big beautiful gal be named, but Miss Texas?

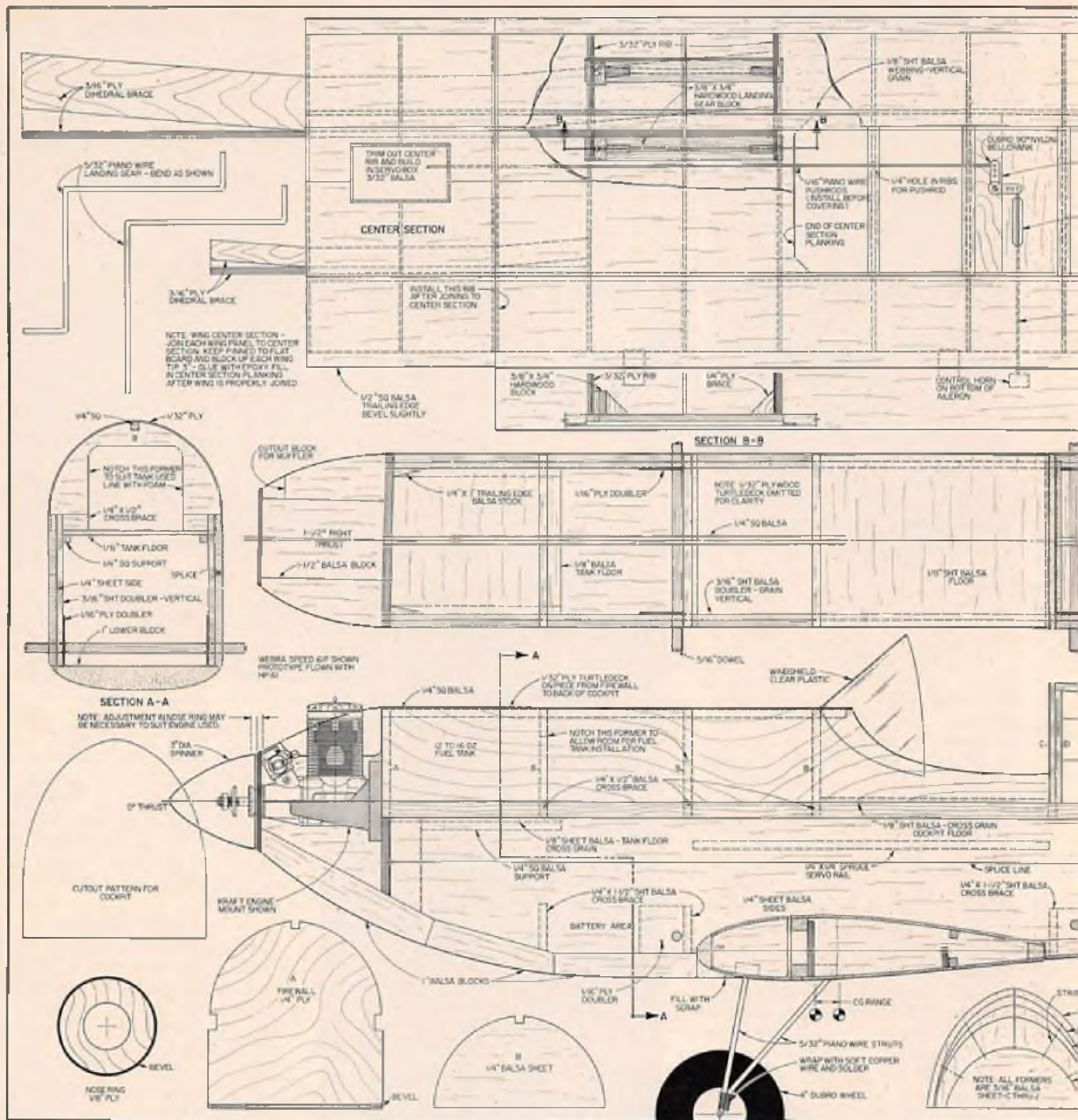
As in past construction articles about my larger than normal aircraft, I'd like to mention the code word "adhesives", I use three different --- nope, make that four different --- types of glues when working on these larger models. I use the cyanoacrylics to tack pieces in place, or to laminate two sheets together. I use Titebond to glue most of the pieces, and to reinforce joints tacked by the super glues. Then, I use epoxy at the firewall, the dihedral brace, and the landing gear

block. Finally, I use Borden's contact cement for holding the cap strips in place on the wing, and for gluing the fuselage doublers to the fuselage sides. Use any combination of glues that you wish, but remember, your aircraft will be only as strong as the glue joints that you construct. So, glue well, and glue carefully.

### CONSTRUCTION

Let's begin building Miss Texas by attacking her body first. (That doesn't sound quite right, but let's do it anyway.) The fuselage is a combination of slab sides and doublers, and an open truss construction that saves weight (and money for that matter) and is very strong. Make one fuselage side right over the plan, after first covering the plans with waxed paper or Saran Wrap. Cut the pieces carefully and make all of the glue joints well. Do not add the fuselage doublers now, that will come later. When the first side is dry, remove the pins, but do not remove the side from the building board. Spread another piece of wax paper over the constructed side, and then build the second side right over the first. This will insure that you will make both sides exactly the same. If you have screwed up and built in an error on the first side, then you will build in an error on the second side, but this is better than having two sides that are not even similar. After both sides are dry, remove from the plan and use a felt marker and mark the inside of each





fuselage half. Be sure that you have one right half, and one left half. Next, add the 3/16" doublers to the inside of each half. I use Borden's contact cement for this as it sets up quickly and does not cause the fuselage to warp in any way. When these doublers have been added, draw on the inside of each half with a felt or nylon marker, the location of all of the formers, the firewall, and the tank floor support, and the servo rail support. Use 1/4" square spruce for the servo rail support, and 1/4" balsa for the tank floor support, and glue both of these in place.

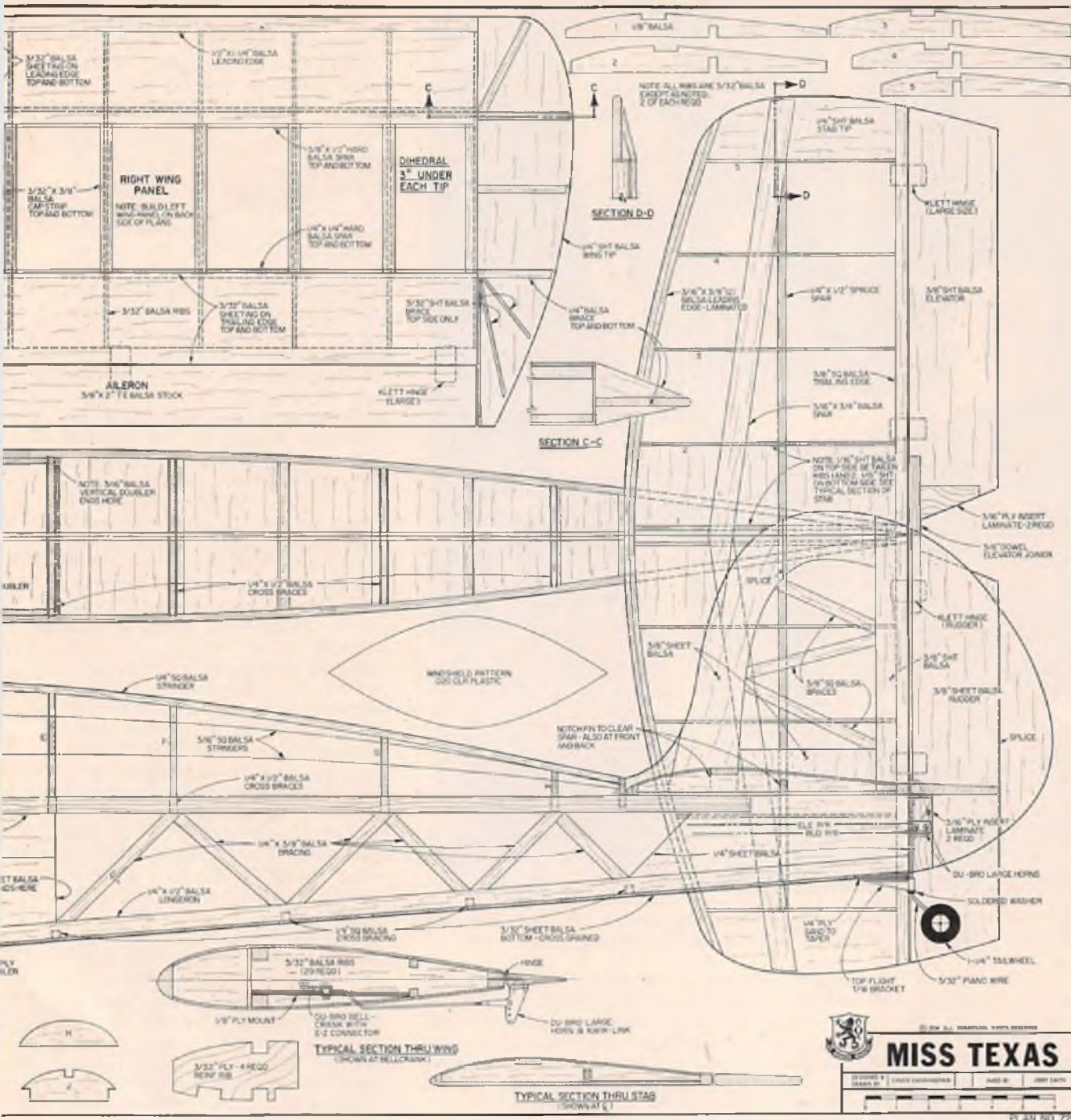
Now, spread yet another piece of wax paper over the top view of the fuselage

on the plan and then cut to length all of the cross pieces. Pin each one down to the correct location on the top view of the plan. Remember, when installing the fuselage double sheeting, let it run past the spruce longerons, then, when making the cross braces, cut them to fit inside of the doubled fuselage side. Pin the fuselage sides to the top view of the plan, and cement them to the cross pieces. This is a good place to use epoxy glue for quick drying. Glue the sides to the cross braces only back as far as the fuselage sides are straight. Do not pull in at the tail yet. Glue in the bottom sheet balsa formers. Check everything with a

drafting triangle, or a small square to be sure that the sides are square with the building board and each other.

When the forward section is dry, then bring the rear of each fuselage piece together right over the centerline on the plan and glue in place, and to the cross braces. Install the bottom cross braces and let everything dry completely. Remove from the plan, glue the plywood firewall in position with epoxy glue. Glue all of the fuselage formers in place, and add the stringers from the headrest to the tail. Install the gross grain bottom sheeting, and all of the nose blocks. Now, we are ready to install the top 1/32"





MISS TEXAS

PLAN NO. 726

ply covering. First, cut and trim this sheeting to fit, then make the cockpit cut-out. Then, wet the inside of the plywood with a damp sponge and watch the plywood begin to form the top curve. Mix up some epoxy glue and smear it all over the formers, stringer, and longerons where the plywood will fit. Place the plywood in position, and hold it in place with rubber bands, pins, or masking tape, or a combination of all three. When this is dry, you can add the cockpit floor --- come to think about it, add the floor before you put on the plywood top deck covering. Then, sand everything to shape and set aside to

cover later. Right now is a good time to paint the inside of the fuselage nose with some type of fuel proof paint to protect it if you're going to cover this aircraft with plastic film.

Okay, now that the fuselage is completed, let's take a look at the wing.

Make a tracing of the wing rib outline, all of the wing ribs are exactly alike except for the ones with the landing gear block cut-outs. Glue this tracing to a piece of 3/32" balsa wood and cut out this rib. Mark this as your master rib. Then draw around this master rib on sheets of 3/32" balsa 29 times to make twenty nine wings. Don't bother to

make the cut-out for the spars, we will do that later. Now, cut out all of the wing ribs and then pin them together to form one giant block of wing ribs. Be sure to line them up very carefully when pinning. Next sand them all to the same configuration with 120 grit sandpaper. Use care, and get them as near to the original outline as possible. Don't remove the pins. Mark out the location for the forward and rear spars on each end of the stack and then cut the spar slots with a razor saw. Cut to the correct depth with the saw, and then prick out the bits of balsa with a razor point or other sharp instrument. Test fit a spar





**Chuck trying to hide behind his Miss Texas. We knew he started designing these large airplanes for a good reason. His excuse is they're fun to fly.**

into the slot, and if it is a bit small, increase its size with a small metal file. You can make very neat, close fitting spar slots this way.

Now, take the rib stack apart and save all of the ribs from each end for the wing panels and use the center three ribs for the center section. Mark the correct ribs for the landing gear blocks, and cut these slots. Make the landing gear brace ribs from 3/32" plywood and cement

them to the correct ribs with epoxy cement. Next, build the center section of the wing in one piece, complete with the dihedral braces built in as you go along. Next, we come to each wing panel. Pin down the lower spar to the plan, then put several ribs in place and pin a 1/4" square (use one of the trailing edge spars) to the plan so that the aft ends of the wing ribs are resting on top of this piece of balsa, and they will all line up

just about horizontal. Starting at the rib next to the inside end rib, start gluing the ribs and webbing in place. Glue a rib to the spar, then put in a piece of webbing, then glue in another rib, then the next piece of webbing, and so on until you get to the end of the wing. Then go back and glue in the center rib to the correct dihedral angle, and the piece of webbing between this rib and the next rib. Now, glue the top spar to the ribs and to the webbing. Use lots of Titebond for all of these joints. Glue the leading edge in place and the top rear spar, and the trailing edge piece. Shape it, as shown, with sandpaper. Now, glue the leading and trailing edge top sheeting in place and let it all dry overnight. At the next building session, unpin this wing half from the plans, turn the plans over and build the other half on the back side. While this half is drying, take the time to make the cut-outs for the dihedral braces, and to glue the lower spar in place. When both wing halves are done, then work from the center of a reasonably long surface. Pin down the center section, propping it up so that it is exactly level from the center of the leading edge to the center of the trailing edge. Trial fit each wing panel to this center section and, when you are satisfied that everything is a good, perfect fit, glue the wing panels to the center section and to the dihedral brace with lots of epoxy glue. Be sure to block up each tip to the correct dihedral. When all of this is dry, remove from the building board and install the landing gear blocks with epoxy cement. One other point that I forgot to mention earlier, when you have all of the wing ribs in the sanding stack drill a 1/4" hole through all of them in the correct location for the aileron pushrod. Now, back to the construction sequence.

Install the bottom sheeting, the aileron bellcranks, etc., and then sheet the entire center section. Also at this time, install the aileron pushrods and the floor for the aileron servo well. Glue the cap strips in position (contact cement works great here) and the tip pieces, along with all of the tip braces. Sand everything smooth, and be sure to round the leading edge to the large radius as shown on the plan. A rounded leading edge makes for a much smoother and

**to page 157**





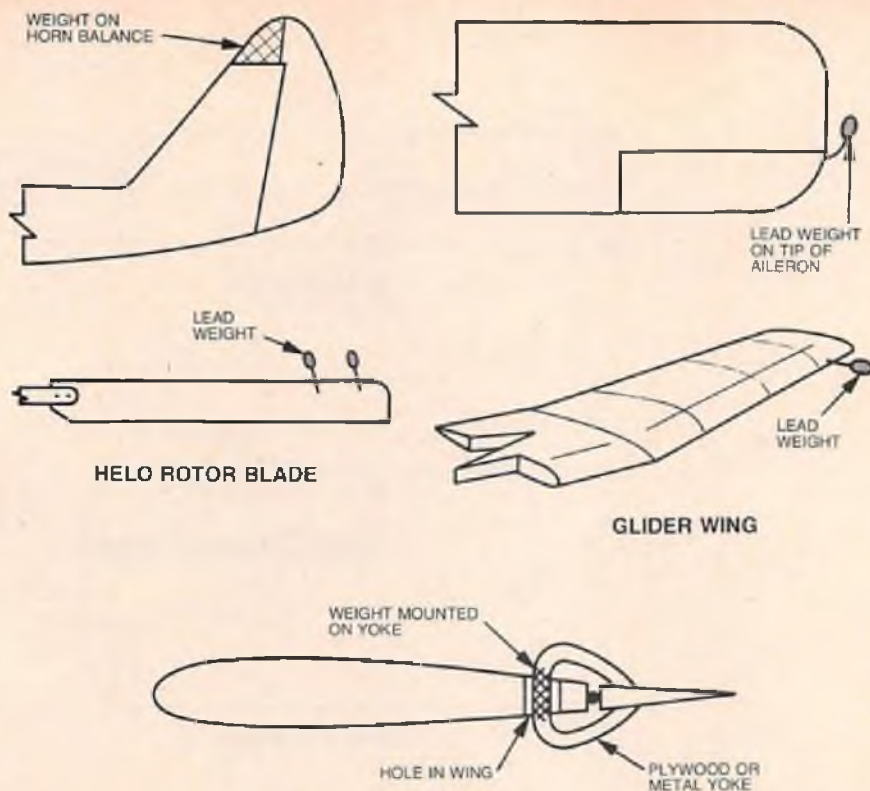


FIGURE 5

the aircraft from its initial design. Several ways of using the distributed mass system in model applications are shown in Figure 6.

The distributed system really works well. It is especially adaptable to rotor blades, glider wings, and flying stabilizers. The amount of weight needed should be enough to balance the control surface or flying tail about its hinge line. For glider wings and helicopter rotor blades of the usual design only enough to balance the outer third of the surface should be required. To find out how much that is, it would be safe to balance the whole blade or wing about a point 25% to 30% back from the leading edge. Then remove 2/3 of the weight and install the remaining 1/3 in the outer portion of the wing or blade leading edge. For gliders, simply inserting it down through the leading edge ribs should be sufficient. For helicopter rotor blades, however, the wire must be secure. If it were to come free in operation, it could cause a disaster. Make your groove for the wire stop at least an inch from the tip (Figure 7).

The solid wood outboard of the wire will help make sure that it doesn't escape. Rough the wire with coarse sandpaper, epoxy it in place, and fiberglass over the leading edge and wire all the way to the tip of the blade and back at least to the 1/3 chord line on top and bottom of the blade. Flying stabs can be balanced by installing wire as in glider wings, or by weighting the leading

edge with lead foil tape. This material is generally available through tape product distributors and is a very attractive addition to the plane's trim scheme. Its silvery sheen should be preserved by putting a clear paint over it after it is applied to the surface. This material is useful in several other balancing requirements such as helicopter rotor blades, glider wings, or control surfaces where there is an aerodynamic balance area that can be covered with the tape. An example of this material is 3M tape #420 which is an adhesive backed lead foil about .005" thick. It is available in different widths and works beautifully. Be sure to seal the edges of the tape to keep out fuel (clear epoxy, dope, varathane, etc.). The adhesive on this material is definitely not fuel-proof.

There is a serious problem with balancing some control surfaces. The main concern is with ailerons, and it will become especially critical on a glider type of wing where there is considerable flexibility to the wing structure. Visualize, if you will, a high aspect ratio scale glider wing with inset ailerons on the outer portion. In order to keep its weight light, the structure is open bay construction, covered with plastic film. During a flight, the model is pushed into a fairly high speed glide and the outer portion of the wing is seen to flutter. At this point, you have to make a crucial decision as to whether the condition is wing flutter or aileron flutter. If you assume that it is aileron flutter, and balance the ailerons to correct it, you have actually added

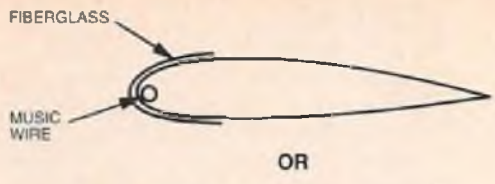
weight to the aft portion of the wing. If your guess is wrong, and the problem was really wing flutter, the aileron balance weights will make it worse. In the case of normal power model construction, with thick, stiff, low aspect ratio wings, you are sure to be correct in concluding that the problem is with the ailerons. The only exception to this might be a racing model with very thin wing tips where wing flutter can occur at extremely high speeds. In unusual cases, it might be necessary to balance the ailerons first, and then balance the outer portion of the wings too.

Be careful of repairs. The added weight of glue, wood, and paint on the rear portion of wings or control surfaces can cause flutter to occur on an aircraft that never had the problem before. Also, moving the pushrod in on the control horn, in order to get more control movement, can cause the installation to become more springy than it was previously. This can permit flutter to occur at lower speeds on unbalanced control surfaces.

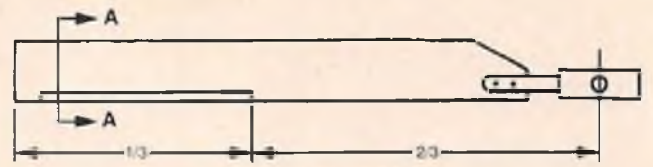
As a final note, I'd like to explain aileron reversal. I've never seen this happen on a model, but who knows what project is being conceived out there. The most likely candidate for this condition is the same glider that I talked about a few paragraphs back. Having solved his flutter problems by balancing both aileron and wing, he is now attempting long, vertical dives to find the maximum speed that he can get from his glider. As the speed builds in the dive, he notices that the aileron control becomes first, very weak, then disappears completely, and finally actually reverses so that right aileron control gives left roll and vice versa. This is caused by the relationship between the high aerodynamic forces on the wings and ailerons and the torsionally flexible construction of the wing. The scenario goes something like this: The large aerodynamic forces on the ailerons acting well behind the torsional axis of the wing actually twist the wing in a direction opposite to the aileron deflection (Figure 8).

At first this cancels part of the aileron force by twisting the outer part of the wing to a higher angle of attack actually increasing the lift of that part of the wing instead of reducing the lift as the aileron alone was trying to accomplish. At this point, the aileron begins to act like a trim tab on the wing as a whole, causing net aerodynamic forces to develop in a direction opposite to the applied control movement. The poor guy that we left in the dive, put out his spoilers and pulled out. At lower speeds, normal control returned and he landed safely. The only cure for this is a stiffer wing, such as you might get by fully sheeting it, or by avoiding ailerons for lateral control on a plane that you wanted to use in this way. Not much of a problem yet, but with the unbelievable speed records being

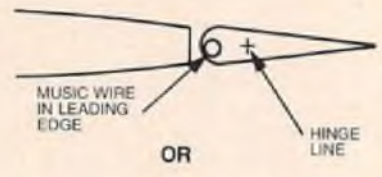




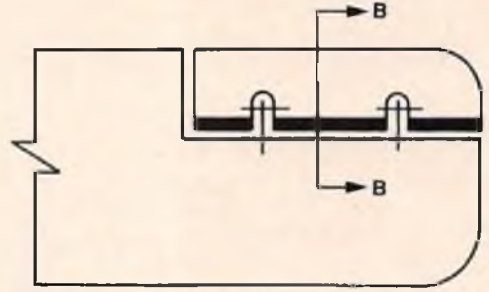
SECTION A-A



ROTOR BLADES (MAIN OR TAIL)



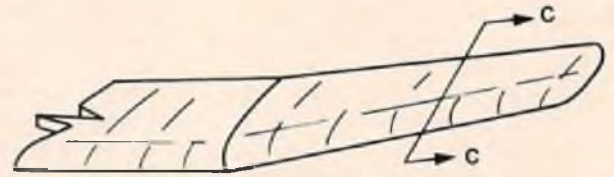
SECTION B-B



CONTROL SURFACE



SECTION C-C



GLIDER WING OR FLYING STAB

FIGURE 6

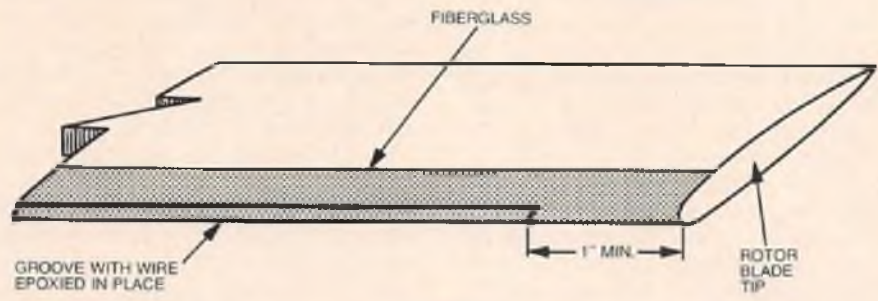


FIGURE 7

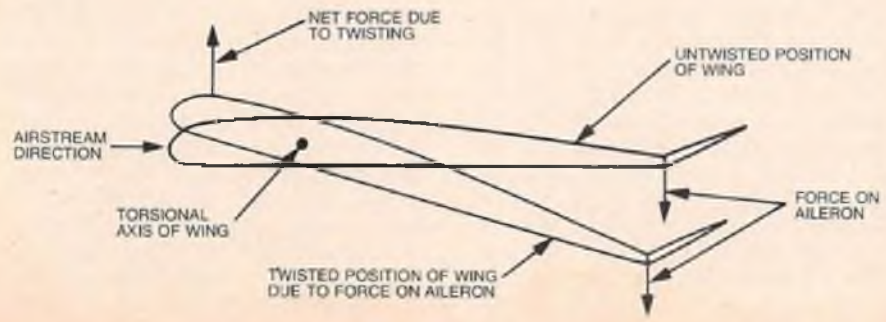


FIGURE 8

set these days, who knows . . .

Since I was writing an article on flutter, I've tended to over-emphasize flutter problems. If you've spent much time at the flying field, you know, however, that most models don't flutter. The point I'm trying to make here is that for the ordinary models that you can see one or two examples of on a good day at the flying field, you don't need all of these special instructions. Good building and control installation practice should be all that is necessary. Flutter usually becomes a problem when there is something unusual being done with the model. Installing a larger or more powerful engine than what it was designed for, or an unusual construction or control method, or maybe trying to drive the model to unusually high speeds (the FAI glider speed course would be an example) sets the conditions where you would do well to

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# HYDRA LOCKS

By Dick Russ

Last weekend while flying my new Revenger, one of the main landing gear wouldn't extend. Fortunately, after a few snaps and abrupt maneuvers, I was able to force it out and make a successful landing. I had checked everything out many times so why had this happened? One reason: the lack of lubrication. When I got home I injected some oil into each cylinder and sure enough the friction went away.

**Note:** With any pneumatic landing gear system, whether it's Sonic, Rhom, Violet, etc., the O-rings are going to become dry due to lack of lubrication. This condition will exist whether you use freon or air, although much more prevalent if freon is used, due to its ability to dissolve oils and greases. So the answer to an age old problem is keep the O-rings lubricated.

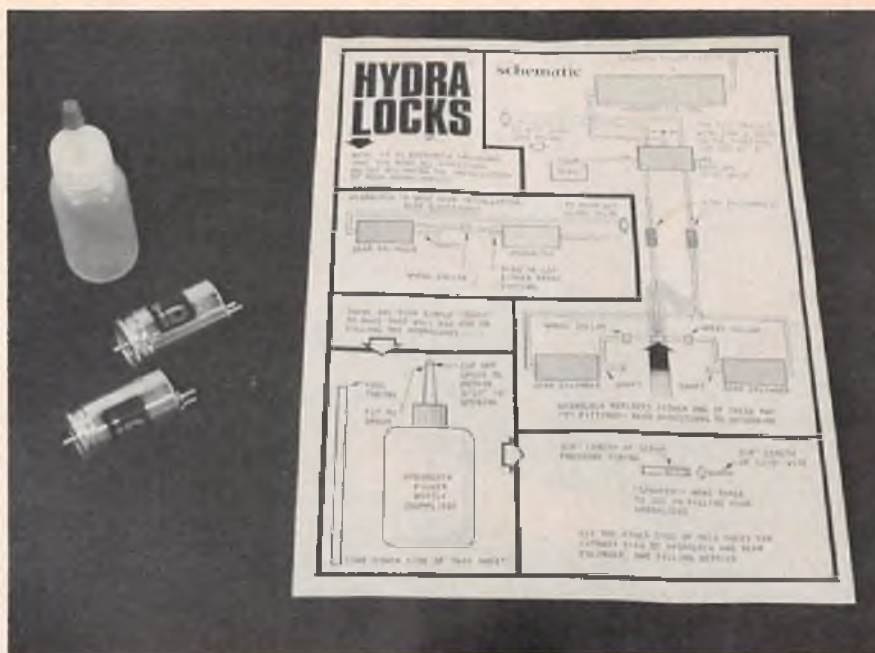
I was talking to Dick Kidd (RCM) about how I had almost banged up my new Revenger on the second flight due to landing gear problems, when he asked me if I had heard about "Hydralock"? I told him I hadn't and ask what it was. Dick said he had just received a set from Idea Development, Inc., and hadn't had a chance to study them, but it looked like it might be the answer to my problem, as well as many others, and he would send them to me to test and to let him know if I liked them.

When the package arrived, with no more than a couple of small cans, I must say I was a little surprised, but then I guess I was expecting something exotic.

After reading the instructions and reviewing the pictures I must say that "Idea Development" had done their homework. The instructions are detailed and very well written and, if followed without deviation, there will be no problems with the "Hydralock" system.

I'm sure by now you are wondering what the Hydralock system is? The Hydralock is a miniature accumulator similar to those used on real aircraft, except it does not store energy, like an actual accumulator.

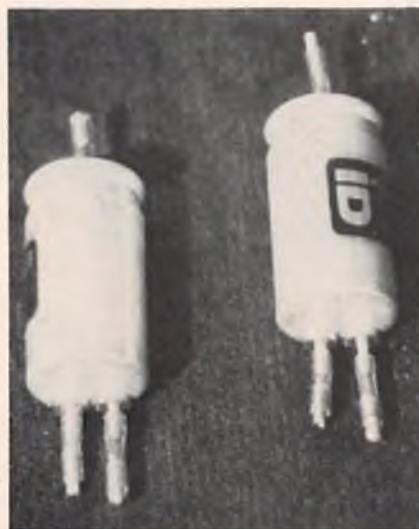
Someone might ask — what is an accumulator? An accumulator is a unit for storing hydraulic fluid (energy) under pressure to perform a function on the aircraft. It is usually either a sphere or cylinder with a diaphragm or bladder inside. Hydraulic fluid is on one side of the



Hydralocks come with filler bottle and complete instructions.



Filling Hydralock with hydraulic fluid.



Hydralocks fully serviced ready for hook up.

bladder and the opposite side is pressurized with air or nitrogen. Should the need arise for additional hydraulic pressure, the compressed air or nitrogen forces the hydraulic fluid out of the accumulator enabling it to perform its function.

The Hydralock is a small cylinder 5/8"x 1-5/8" with three fittings; two on one end and one at the opposite end. The end with two fittings is for hydraulic (oil) fluid and the opposite end (which is separated by a bladder or diaphragm) for compressed air or freon. Unlike the accumulator which has compressed air, the Hydralock requires the application of pressure to enable it to function.

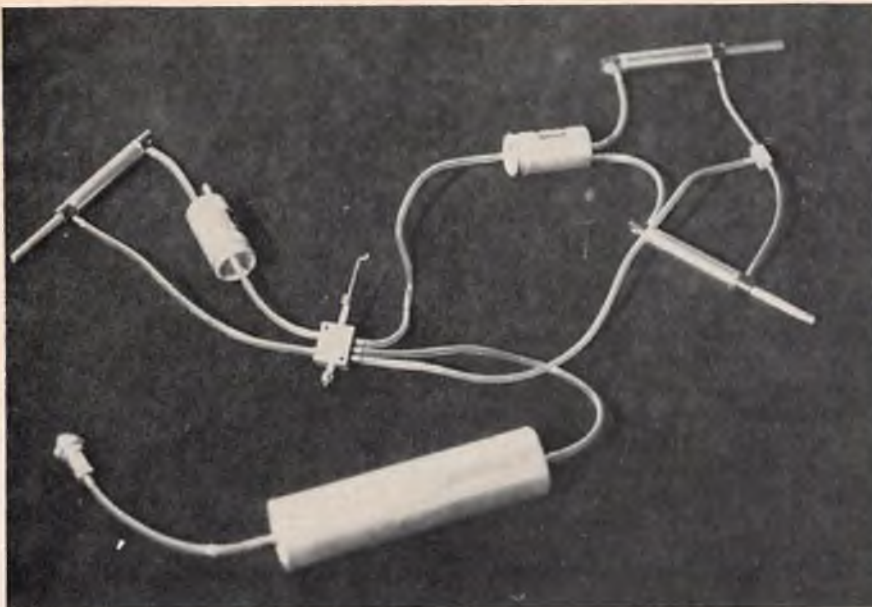
The Hydralock, when installed in the landing gear system, will provide a captive oil system on one side of each landing gear actuator which, in essence, gives you a true hydraulic landing gear (at least on one side of the actuators).

You might be asking why do I need hydraulics when I've got air or freon? There are many reasons, but to mention a few: (1) Air will leak where hydraulic fluid will not; (2) With hydraulic fluid the O-rings are constantly being lubricated, thereby reducing O-ring friction; (3) Smoother action with more positive locking action.

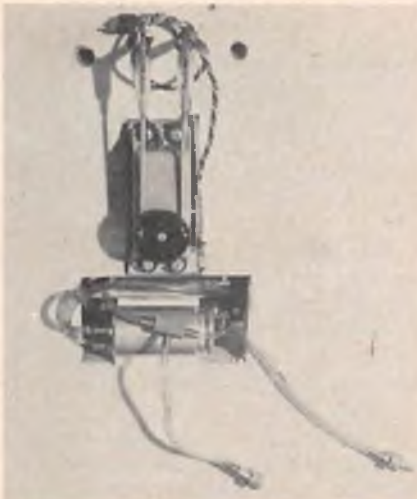
I don't plan on going into a lot of detail on how to charge the system initially as this is well covered in the manufacturers instructions. I must admit I was a little skeptical of putting the system in my plane so I hooked it up to a complete system on the bench for testing. Due to the results of these bench tests, I gained all the confidence I needed to put them in my contest plane.

One Hydralock would probably be adequate for three gear, but since most pattern planes have removable wings,

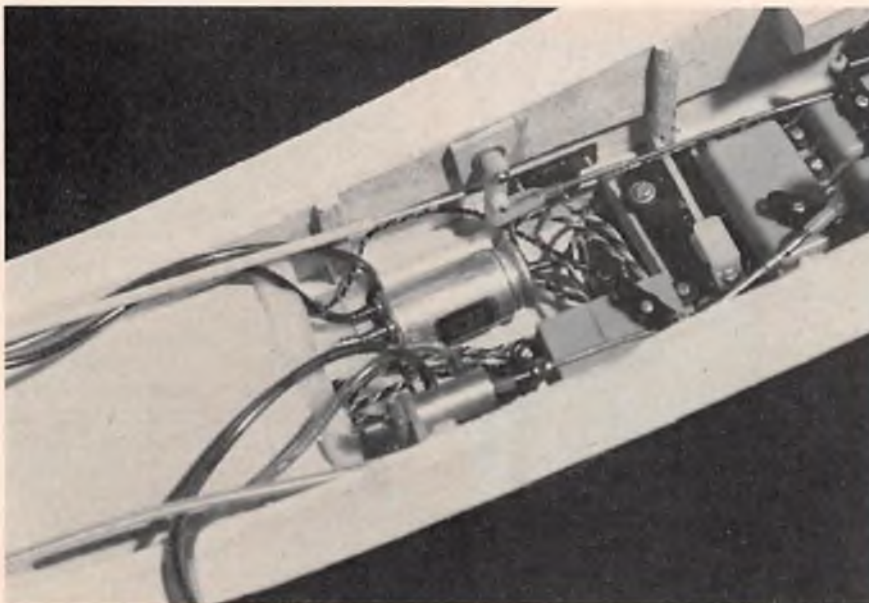




*Hydralocks and pneumatic system.*



*Main gear Hydralock installation.*



*Nose gear Hydralock installation.*

the system requires two.

I feel it is best to install the Hydralock on the piston end of the actuator to enable all the O-rings to be lubricated and, fortunately, most gear extend with the actuator pulling (which is the piston end).

Each Hydralock unit is completely serviced on the bench, which makes the installation much easier. One word of caution: don't get in a big hurry when servicing the units with oil (hydraulic fluid). It takes a little time and patience to get all the air out of the Hydralock which is very similar to bleeding the air out of the brakes of your car. Once the Hydralocks have been serviced, they can be set aside while you service the airplane. One Hydralock will replace the Tee fitting which connects one side of the main

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# THE NEW FAI GLIDER RULES

By  
Dave Thornburg

"You can be the best AMA glider pilot in America and all you'll ever win is a trophy," our author points out. "But you only have to be the third best FAI glider pilot to win a free trip to Europe . . ."

**F**or two mad and sleepless years (1975-76), I drove all over the western United States to fly in sailplane contests. I averaged two thousand miles a month. Chicago, L.A., Houston, Phoenix, Denver, Bakersfield, Tulsa; wherever two or more were gathered together in the name of Lift on a sunny Sunday morning, I tried to be there.

Two years, fifty thousand miles, and I only learned one thing of value about competition soaring: **don't argue about the rules.**

Example: You arrive in Pucker Hollow on the eve of the annual Pucker Hollow/Anthrax Junction Thermal Soar and Rattlesnake Fry. You look up the C.D. You get a copy of the rules. Then you ask lots of questions. **Dumb** questions. Does the time stop when the plane first touches the ground, or when it ceases forward motion? What happens to my landing points if a skid falls off? A wing? Do the contestants provide their own rattlesnakes, or will they be issued at transmitter impound?

You ask these questions because there are only two things you can take for granted about any contest outside your own club, only two things of which you may be absolutely certain in advance:

(1) Pucker Hollow is the Soaring Capital of the United States of America; it has more LSF members, more contests, and more rattlesnakes than Los Angeles and Warsaw, Indiana, combined.

(2) The Pucker Hollow rules are so logical and so obvious as to require no explanation, even to strangers.

So when you discover at the start of Round One that the standard Pucker Hollow launch is a downwind ROG on a



six volt winch, you don't argue; you watch how the local boys do it, and you follow suit. (First you take out all your ballast and some extra homeowners' insurance. Then you do it.)

If you don't do it - - if you stand there and argue the folly of a downwind "rise off ground" - - - you're going to work yourself into a state of high anxiety, waste a tremendous amount of psychic and physical energy, and develop a negative attitude toward the contest.

Competitors — those guys who are out there to have fun, fly hard, and win if possible — have a term for people who work themselves into a state of high anxiety, waste a tremendous amount of psychic and physical energy, and develop a negative attitude toward the contest.

The term is **loser**.

So the golden rule is, don't argue about the rules. In fact, don't make any judgements about the rules whatsoever. Just find out what they are, and exploit them to the fullest.

And that's exactly where I stand on the FAI rules.

They aren't simple; they aren't perfect; they aren't the rules I fly under at local contests. But they are the rules. And they do have a kind of Pucker Hollow logic about them.

They attempt, for example, to measure the three separate and distinct virtues of a sailplane. Those virtues are:

(1) Minimum Sink: The precision duration task. If everyone gets approximately the same 500 foot launch, who can stay up for six minutes and zero seconds exactly, then crash in (or reasonably near) a six foot diameter circle? In most parts of America, Australia, Canada and South Africa, this event is more a measure of the air on the field at the time of launch, than a true measure of minimum sink. In northern Europe's dense, soggy, semi-arctic air, however, six minute duration will often separate the good designs from the mediocre. And the 1979 World Championships, I'm told, may be held in Belgium . . . or Chicago.

(2) Maximum L/D: The distance task. From the same 500 foot launch, how many times can you traverse a course between two goalposts, 492 feet apart, in a four minute period? Again, partly a measure of the air on the field. But you needn't stay between the goalposts; the course extends to infinity on either side of the goalposts, so if the air is booming a half-mile off to the left — go for it. You have eight minutes from the firing of the gun to complete this four minute task, so you can stall three minutes to wait for better air (or to watch the success of others in your flight group) and still have sixty seconds to launch and get on course.

The 1976-77 rules left this task open ended, so that someone could blunder into a boomer and do twenty laps in the

same four minutes that the average competitor was doing his hard earned six or eight. The new rules have plugged this loophole: Twelve laps is now a "max". Every flier who completes twelve gets 1000 points, and lesser flights are pro-rated against this max score. (If the best flight of the round is only nine laps, however, then that pilot gets 1000 points and others are pro-rated against nine instead of twelve.)

(3) Minimum Drag: The speed task. How fast can you make one complete circuit (down and back) through that same 492 foot course? This is the one that separates out those chaps who rely too heavily on cyanoacrylate glues for building their wing spars. A highly competitive model will enter the turn at over seventy miles per hour, carrying one to three pounds of lead ballast. It wants sound spar construction, plus a smooth hand on the stick. If it doesn't get both, something very bad may happen.

This is the event that scares most people away from FAI. It shouldn't. Californian Jim Wiseman went to the Denver Finals with a relatively stock Windrifter, and missed making the team by a mere 25 points out of 9000. And not even Tom Williams, the Windrifter's designer, will claim it's a fast airplane; the Windrifter is designed for high tows and minimum sink.

And Jim did that under the old rules, when all three tasks (duration, distance and speed) carried the same scoring weight. They no longer do. The December 1977 rules committee meeting in Paris redefined a round: For 1978-79, a round will consist of "one duration flight plus one flight of either speed or distance." The speed and distance flights must alternate from round to round. Thus a contest will now look something like this:

Round One: Duration + Distance.

Round Two: Duration + Speed.

Round Three: Duration + Distance, etc.

The ideal contest would have an even number of rounds, so that speed and distance are evenly balanced. Contests with an odd number of rounds allow the C.D. to stack the deck slightly in favor of one or the other — and you no longer get to throw away your worst round score. The important change, however, should be obvious: **Duration is now worth exactly as much on the scoreboard as the other two combined.**

This seems to me to be a change in our favor. (Judgement! Judgement!) Because a good all-round sailplane is obviously going to be some sort of compromise between a high speed sloper (a kind of Curare sans prop) and a featherweight minimum sink thermal soarer (sort of a Kleenex with a wingspar). The question is, which end of the rope bridge do you start from? It's a nasty chasm to span, either way.

The most successful attempt to bridge

the chasm from the slope soarer side is unquestionably that of the Sitar brothers of Austria. These gentlemen terrorized the European FAI circuit last summer with a pair of identical, all fiberglass (repeat: ALL fiberglass) ships of about 80" span, 11 ounce minimum wing loading, and only two channels (ailerons and flying stab). They recorded a 10.8 second speed run at Oxford; they turned in fourteen laps, in soggy air. When the sun shone, they got their six minutes; when it didn't, they settled for four. They won.

Four months later, the international rules committee met in Paris. They looked at one another and said, "The Sitar hold the world speed record of 243 mph. They build their glass skins in precision ground, metal molds. They build to two thousandths of an inch. I don't want to build in metal molds. I don't want to build to two thousandths of an inch. What do you say we change the rules?"

So they did.

Note: I relate the above scene as a historian, not as a reporter. I did not attend the Paris meeting. Tolstoy wasn't with Napoleon on the march to Moscow, but that didn't keep him from writing *War and Peace*. Tolstoy, like me, was a historian and not a reporter. Reporters transcribe; historians simplify. Historians are, by definition, people who weren't there. Or, at least, not all there.

So where does this leave us with the rules? Potentially, in even better shape than we were in the last time around. And the last time around, the Americans looked pretty good.

Because we have always tended to approach the slope/thermal compromise from the thermal side of the chasm. Slope soaring has never been as popular in the States as it is in, say, West Germany. The vast majority of the American kits are designed for hi-start or winch launch, out over the flatlands; if you want to fly them on the slope, you have either to load them with lead or build them a new wing with a more versatile airfoil. (Bob Dodgson's Todi and Maestro are notable exceptions.)

So the current run of American kits look pretty competitive under the new rules. This means that, whatever you've been flying for the past season or two, you can probably compete successfully with it in FAI. You think your ship's too small? The current World Champ flew an 810 square inch wing to victory. You think you're up against too many seasoned competitors to stand a chance? Skip Miller never won a contest outside the state of Colorado before becoming World Champion. (If you don't find that inspirational, you'd better check your pulse — I think you may be dead.)

The months of April, May and June are designated quarter final months for  
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# WOODVALE SHOW

By Malcolm Kinnear

**S**ituated only a few miles along the coast from the busy city and seaport of Liverpool (who said Beatleland?), the Royal Air Force base of Woodvale provides superb runway surfaces and attendant amenities in a delightful rural setting.

The Woodvale Show has gone from strength to strength in just a few short years, and it has become one of the premier events of the contest calendar, attracting the top modelers from all over the country. Over 30,000 members of the public visit Woodvale every year, and well over 30,000 pounds have been raised for various charities. The show is organized by the Liverpool and District Model Club, with other local club members giving support. These people work like Trojans to give Woodvale the charisma it now has, despite the fact that there is no sponsorship whatsoever. It is a show run by modelers for modelers in a warm and friendly atmosphere. This

year, as usual, the show was held in early August, and enjoyed sunny, warm weather; in fact, excellent weather conditions have blessed every show since its conception (it ain't always raining around here, y'know). The show followed its normal format of competition flying in the morning of Saturday and Sunday, and displays by individuals and demonstration teams in the afternoons. The early morning competition flying has proved popular for the nervous first time flyers, as well as the more experienced pilots who enjoy the fresher, less turbulent air of the earlier hours. Woodvale has done its best to encourage the ordinary "Sunday flyer" to have a go at competition flying by emphasizing Class II scale (or eyeball scale, as you call it), and many first time competition pilots have put up really super flying performances. Almost 50 flyers turned up with their models this year, and two flight lines had to be set up to cope, but all

went very smoothly. The flying was of an extremely high order, and some very high flight scores were achieved. It is extremely hard, and perhaps unfair, to single out flyers, but Mick Reeves' Hurricane IIB was most realistic. Built to an unusually large scale of 1/6, giving a wing span of 80", and fitted with special homemade retractable u/c, this model was really majestic. It flew the schedule just like the real thing. Engine problems prevented Mick from being "in the money" on this occasion, however, he did win the Nationals (Class II scale) a few weeks later with this model. Class II winner at the Woodvale show this year was Dave Vaughn with a superb model of the Martin Baker M.B.2 experimental World War II fighter. The full size aircraft never went into production, and the company finally went into the development of the now world famous ejection seat. The large spatted fixed undercarriage and tiny tail plane of



Shows main access road from Liverpool (the city in the far background).



"Bucker Bestman" enlarged from Krick kit.



Jack Pomfrets' Hawker Tempest from B. Taylor plan.



Handley Page Halifax by Tyldsley display team. Note size.



1/4 Scale ME 109. (Look big don't they?)



Mick Reeves' 80" Hurricane. Flew beautifully.



Preparing to start J. Davies 1/4 Scale Spit.



Big "Barnstormer" model by Alpha display team, notice parasite models under wings. These are released in flight.



Magnificent BE2c by Roy Yates.



the M.B.2 were faithfully reproduced by Dave, and I was extremely curious as to how it would perform (just think of all that undercarriage drag!). Dave told me that on the first flight, he'd arranged the C.G. to be quite far forward to compensate for the small tail, and he'd anticipated a low elevator response as a result. Was he surprised! The climb-out was like a switch-back ride, and a hasty landing was made to reduce the elevator movement and also to calm shattered nerves. After the necessary adjustments, the model performed impeccably, and this was certainly in evidence at Woodvale. This model flew as if it were on rails and I have never seen a model perform so smoothly in flight. Quite rightly, it earned one of the highest flight scores of the competition and, together with the highest static marks, clinched First Place for him.

As I had the pleasure of being a static judge, I was able to examine all the models in great detail, and I must admit to drooling on more than one occasion. Terry Mellaney's now famous Moth Minor won Class I Scale yet again. Terry has now had five consecutive wins at Woodvale, and all with the same model!

Terry must certainly regard this venue as his "happy hunting ground" by now. The curious thing is that his model never seems to look any older; it's in as good a condition now as it was on its first appearance. There's got to be a trick to that somewhere! Lack of space prevents me from describing all the models that I would have liked to, but mention must be made of Brian Taylor's superb P-40 (or R.A.F. Warhawk) in desert colors which, although entered in Class II, would have put many a Class I model to shame. Brian is certainly a master of the "weathered finish" and his pilot figures are really outstanding. Roy Yates' large B.E.2c WW I biplane, flown so slowly with a realistic blue exhaust smoke puffing over the top wings, looked just like the real thing. Jack Pomfret's Hawker Tempest with retracts and flaps, flown for the first time on Saturday morning, and then entered in the competition . . . the list seems endless.

The temperature rose steadily during Sunday morning, and by mid-day, the crowds really started to flock in to enjoy the fun fair atmosphere, and the now famous demonstration displays. The beauty of Woodvale is that all tastes are

catered to. A display of really superb vintage and veteran motor vehicles (which is becoming almost as great an attraction as the models) was held on Sunday afternoon, and the fun fair for the kids was never empty! All this, together with well stocked trade tents, local TV and radio, might just convey what a terrific show Woodvale has become.

There seems to be a trend towards the large 1/4 scale, lightly loaded models evident at Woodvale, and the Liverpool club lads treated the large crowd to a "Magnificent Men" pylon race. Just imagine it, six huge models — Bleriot monoplanes, Fokker Eindeckers, etc., all about 7' or 8' span, "racing" around an oblong course at a "break neck" speed of about 8 mph (that's downwind, of course!), and no higher than 25 feet. The crowd had a wonderful time cheering on their favorite model, and great fun was had by all. Well, nearly all! Arthur Searle was unlucky enough to have a mid-air collision in this event, which destroyed his 1/4 scale Morane Parasol model. The thing is that Arthur likes to build his models with flying surfaces con-

to page 154



Really great M.B.2 by Dave Vaughn: Won Class 2. He even fueled the model through scale filler cap!



Dave Vaughn also brought his "Wirraway" model for Class 1. Placed Second.



1/2 Scale 'Cassutt' powered by 55cc chain saw motor.



1/4 Scale Spit. Rolling. Hope that 109's not on his tail!



35 lb. Falrey Swordfish by Tyldsley display team.



Tyldsley team displayed two Cessna Twins in formation flying. Models span 15' each.



1/4 Scale Lanc.



Lanc take-off.



... and Fly By.



# HERE'S HOW

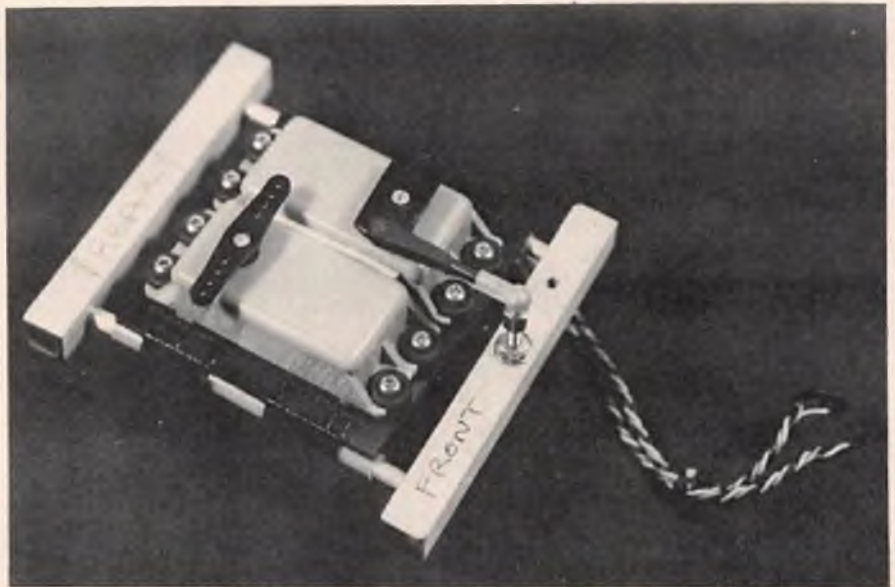
**H**ere is a great idea sent to me from Sydney Clement of Bridgeton, New Jersey. He calls it his "Hot Stuff Mixer." Many servo mixer ideas have appeared in various publications over the past years, however, Syd's mixer condenses the best of those ideas into an easy to build, small, light, strong, and tight unit. And, the best part of all is parts can be purchased at most any R/C hobby shop.

Syd's mixer is shown here using Kraft KPS-15 servos and matching tray. Other brands of servos may be used as long as a side-by-side tray is used to mount them.

The "Hot Stuff Mixer" was originally designed for split rudder dive brakes on a Phoenix 7. However, it can be used on other functions such as: elevons, flaperons and elevator/rudder operations. It is also capable of full double throw capabilities. By this we mean full throw from both servos can be added in the same direction. Or, let your imagination work out a configuration that will suit your particular application.

Are you still interested? Then let's start construction by modifying a 2 + 1 servo tray as shown in Sketch #1. This can be done simply with an X-Acto saw or, better yet, a jig saw if you own one. Next, cut two pieces of outer NyRod casing the same length as the modified servo tray. Hot Stuff these pieces to the existing underside lip and longitudinal brace as shown in Sketch #2. Next, wrap the tray and NyRod in four places as shown, with heavy thread and completely saturate each piece with Hot Stuff.

Cut two pieces of 5/32" O.D. K & S aluminum tubing about 3 1/2" long (longer if required). Smooth and clean the tubing and its ends with 600 grit paper. Insert the tubing into the NyRod. It should fit snug and slide smooth and easy.



*The Hot Stuff Mixer condenses the best of mixer ideas into an easy to build, small, light, strong and tight unit with many uses.*

Next, cut two 3/4" x 3/4" hardwood servo rails to fit your particular installation. Center the tray between the rail ends and mark the rail for drilling and insertion of the tubing. This fit is critical. Drill 5/32" holes in the rails approximately 1/4" deep. To make things align a little easier, try drilling the holes on one side slightly larger. Fill the holes with 5-minute epoxy and insert the tubing allowing the epoxy to cure. Hot Stuff the tubing into the holes on the opposite side.

Mount two servos together, side-by-side, with double stick tape. This is important as it imparts strength and stability to the mixer. Install the servos into the tray using normal servo tray hardware. Rotary output servos should be installed with the output arms at opposite ends.

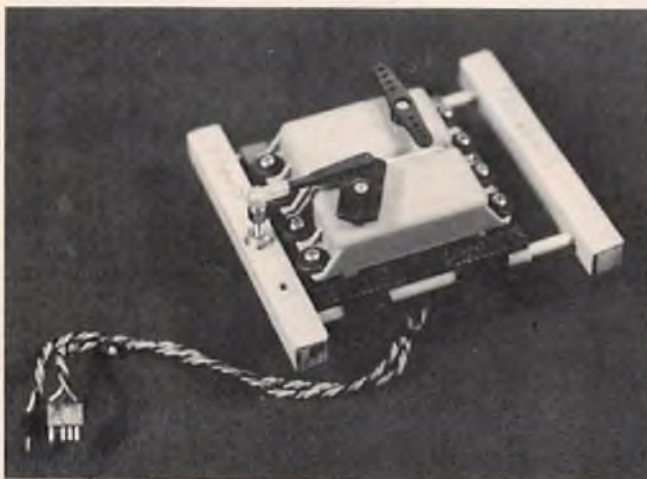
At this point, label one of the servo

rails "front" and the other "rear". It doesn't make any difference which are labeled "front" or "rear" but will help for better identification later on. Put together the ball joint cap and Du-Bro clevis using the #2-56 x 1/2" headless screw. Mount two sided output arms or wheels to each servo. Locate and mount the 4-40 x 1" screw to the "front" rail with threads up and in-line with outer hole of the inside wheel section of the tray drive servo. Mount the 4-40 bolt on the ball cap to the 1" screw. Adjust the ball joint cap for equal throw. Before operating, make sure the servo tray slides freely on the rails. It must not bind.

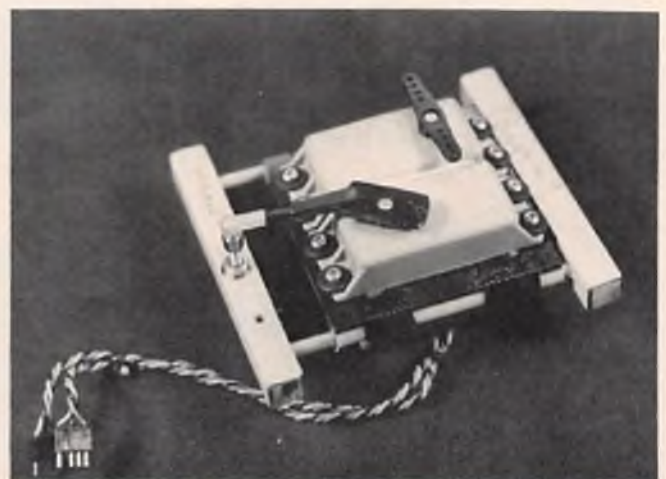
The following parts are required for construction of the "Hot Stuff Mixer:"

1 foot 3/8" x 3/8" hardwood servo mounting rail.

to page 154



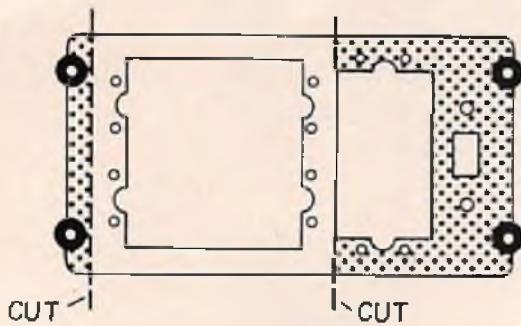
*Drive servo moves both servos along the rails shown here at the forward extreme position. Other servo moves chosen function.*



*Servos shown in extreme rear position. Complete freedom from binding is necessary for a smooth operating unit.*

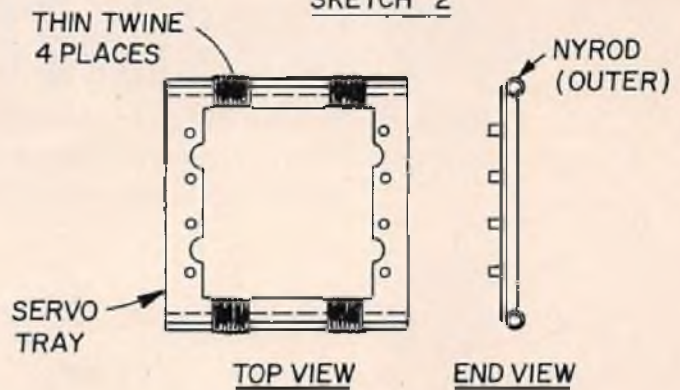


SKETCH 1

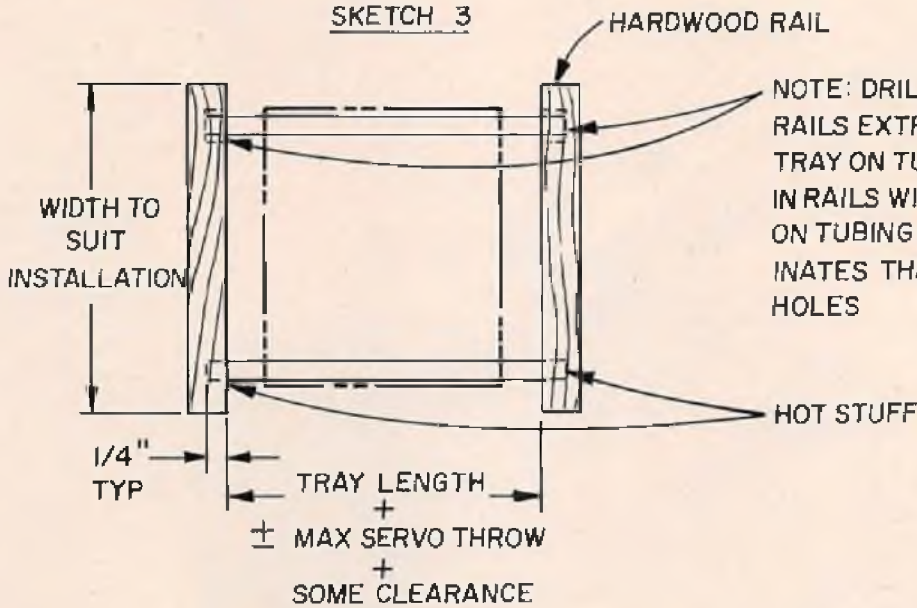


MODIFY KRAFT 2+1 SERVO TRAY AS SHOWN ABOVE

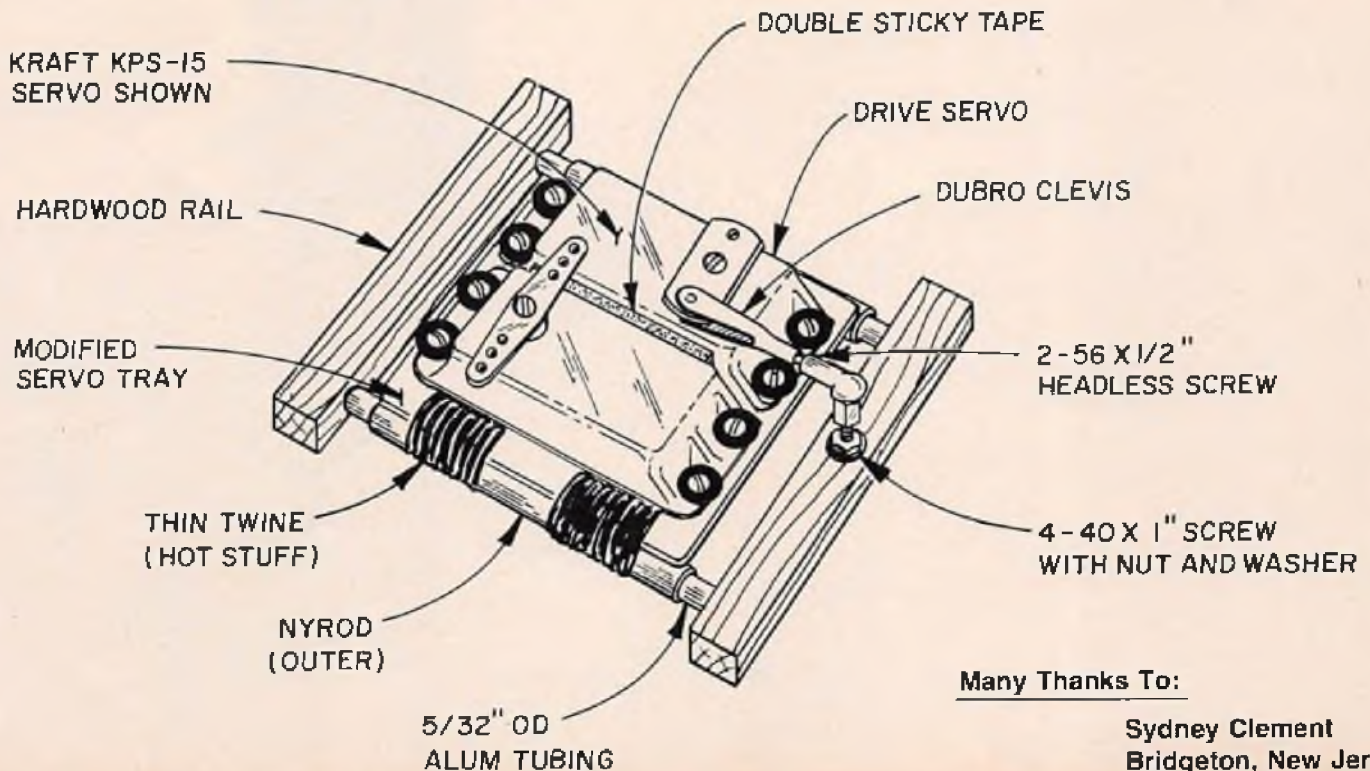
SKETCH 2



SKETCH 3



NOTE: DRILL HOLES FOR ALUM TUBING IN RAILS EXTRA LARGE ON THIS SIDE. INSTALL TRAY ON TUBES AND FILL OVERSIZED HOLES IN RAILS WITH 5 MIN EPOXY. INSTALL RAILS ON TUBING AND ALLOW TO CURE. THIS ELIMINATES THAT CRITICAL DISTANCE BETWEEN HOLES



Many Thanks To:

Sydney Clement  
Bridgeton, New Jersey



# DANISH HM-II

A Stand-Off Scale model of an early 1930 float plane that can be built as a three or four channel aircraft. Ideal for those who have access to water areas. By Edward C. Miller





**Pretty Miss Karen Riddell holds the RC model of the Danish HM-II in colorful arctic markings. Typical of the Greenland landscape is this rock-strewn hillside. Such mountainous terrain would give no quarter to a land plane forced down here, but with countless tens of thousands of lakes dotting the countryside, floatplanes always have an emergency landing area close at hand.**



In the early 1930's, much publicity was given to a continuing series of air shows, long-distance air races, and other such activities. While designed to capture the public's imagination with their pure sensationalism, these events, in themselves, contributed little of practical value.

But, if there were those in aviation who wished to bask in the glow of such strictly publicity oriented activities, there were others whose unheralded service was providing a basis for the future growth of all aviation industries. One such little known endeavor was the aerial photo mapping of arctic Greenland. The world's largest island, Greenland, lies astride the busy North Atlantic air routes. With its rugged, mountainous geography, and unpredictable, arctic weather extremes, this pioneering project was indeed an ambitious undertaking for this early era in aviation history. Begun in 1932, in association with the Geodetic Institute, this program required six years of strenuous flying over the desolate arctic landscape before being finally completed in 1938.

As Greenland is a part of the island nation of Denmark, the aerial photo-mapping assignment was given to the Danish Naval Flying Corp's 1st Luftflotille. Formed on 12 October, 1926 this unit is the oldest numbered Danish military flight unit, the direct descendant of which is now the Royal Danish Air Force's Escadrille 721 (RDAF No. 721 Squadron).

The aircraft which the 1st Luftflotille used to conduct this photo-mapping assignment was the obscure Heinkel Model HE-8 floatplane. As this was the second hydro-monoplane type aircraft operated by the Danes, it carried their designation HM-II. An unusually large single engine aircraft by 1930 standards, the HM-II had a wingspan of 55 feet, and accommodated a crew of three in open cockpits, itself a real challenge in arctic flying. It was powered by an Armstrong-Siddeley Jaguar VI air-cooled radial 9 cylinder engine that was rated at 450 horsepower. The first aircraft of this type was delivered to the

Luftmarinestation at Copenhagen on 17 August, 1928.

The original finish of the HM-II floatplanes, when first delivered, was an overall light gray color, with black buzz numbers on the aft fuselage sides. The vertical fin and rudder assembly were emblazoned with the Danish flag, while the Danish roundels of red with white centers were carried on the top and bottom of both wings. The aircraft's number was also displayed on the bottom of both wings in reverse order (i.e., beneath the left wing the numerals appeared with their bottoms facing the leading edge, and on the right wing, the trailing edge).

For arctic operations in Greenland, the HM-II's assigned to support the Geodetic Institute project were overpainted red/orange on all upper surfaces, a practice still common today with arctic-duty aircraft. Light gray rectangles were left around the fuselage numerals and fin markings in order to provide a contrasting background. The forward cowling and top-decking around the three cockpits were left in their natural, burnished-aluminum finish. The total effect of this arctic-finish paint scheme is a spectacular splash of color, made even more vivid when viewed in the bright rays of the midnight sun of summer north of the Arctic Circle.

Later in its career, the HM-II had camouflage markings applied shortly after the German invasion of Czechoslovakia. When the German blitzkrieg rolled over tiny Denmark in April 1940, the remaining HM-II's were captured. Placed in storage by the German occupation troops, the HM-II's were ultimately destroyed by the Danish underground in 1943, a tragic ending of an otherwise successful career for these historic aircraft. For the World War II Scale events, a photograph of an HM-II in camouflage finish appeared on page 70 of the August 1975 issue of "Air Classics" magazine (back copies available from the publisher, Challenge

### DANISH HM-II

Designed By: Ed Miller

#### TYPE AIRCRAFT

Stand-Off Scale Float Plane

#### WINGSPAN

63"

#### WING CHORD

11 3/4 Inches

#### TOTAL WING AREA

690 Square Inches

#### WING LOCATION

Low Wing

#### AIRFOIL

Semi-Symmetrical

#### WING PLANFORM

Constant Chord

#### DIHEDRAL, EACH TIP

2 1/2 Inches

#### OVERALL FUSELAGE LENGTH

43 3/4"

#### RADIO COMPARTMENT AREA

(L) 7" x (W) 2 3/4" x (H) 2 1/2"

#### STABILIZER SPAN

23 Inches

#### STABILIZER CHORD (incl. elev.)

6 1/2 Inch

#### STABILIZER AREA

134 Sq. In.

#### STAB AIRFOIL SECTION

Flat

#### STABILIZER LOCATION

Top of Fuselage

#### VERTICAL FIN HEIGHT

11 Inches

#### VERTICAL FIN WIDTH (incl. rudder)

8 Inches

#### REC. ENGINE SIZE

.40 - .50 cu in.

#### FUEL TANK SIZE

8 Ounce

#### LANDING GEAR

Floats

#### REC. NO. OF CHANNELS

4

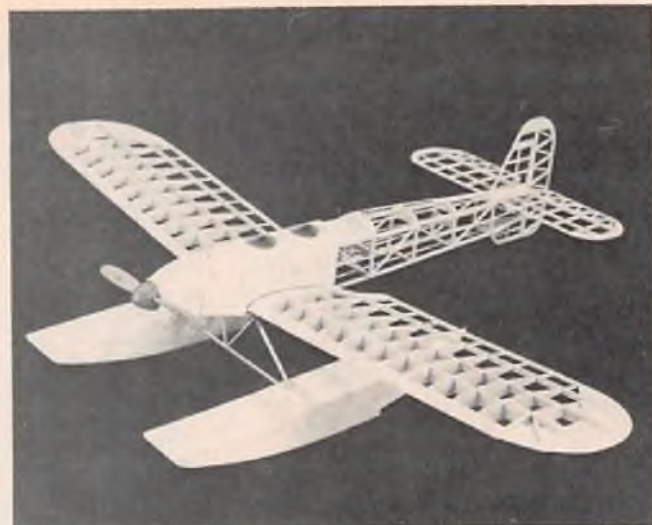
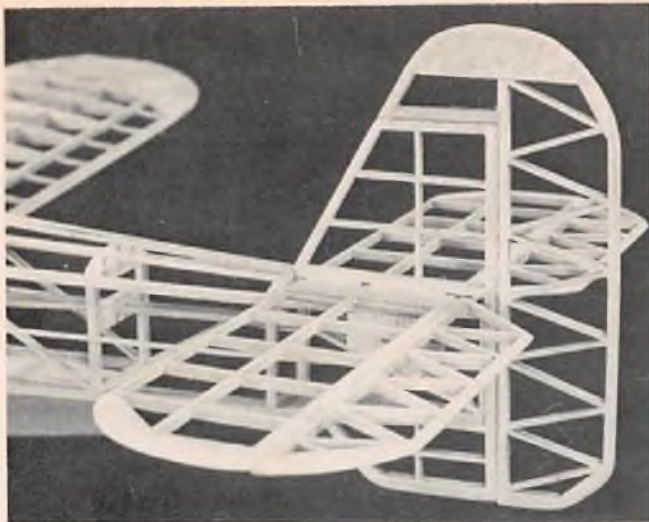
#### CONTROL FUNCTIONS

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

#### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa, Ply & Hardwood  
 Wing ..... Balsa, Ply & Hardwood  
 Empennage ..... Balsa  
 Wt. Ready-To-Fly ..... 76 Oz.  
 Wing Loading ..... 15.8 Oz/Sq. Ft.





**ABOVE LEFT:** Scale construction design on the empennage is evident here. Also note interlocking key notch in top of horizontal stabilizer that mates with vertical fin. **ABOVE RIGHT:** The skeletal airframe prior to covering. Note that only the wire float attach structure has been fitted at this time, with notched 1/8" x 1/4" balsa fairings. The float to wing struts are non-load carrying, dummy 1/8" x 1/4" balsa only, with no wire bracing.

Publications, 7950 Deering Avenue, Canoga Park, CA 91304).

With its historic and relatively obscure background, functional design, and brilliant arctic markings, the HM-II makes an ideal subject for a sport-scale R/C floatplane. Built to a scale of 1.14 inches per foot, the 64" wingspan model is adequately powered by either a .40 or .45 engine that gives a realistic, slow flight characteristic of the original aircraft's performance envelope (max. speed, 134 mph). With its extremely lightweight structure that closely follows that of the actual HM-II airframe construction, this docile model is an ideal introduction to the unique world of flying floats.

For anyone who has ever built a stick and tissue Guillow kit, the construction of the HM-II model is amazingly similar, although obviously quite larger. Since they present the only different aspect from the normal R/C land-based bird, the float construction is handled first. The basic 1/8" x 1/4" balsa framework is built directly over the plans (built in sets

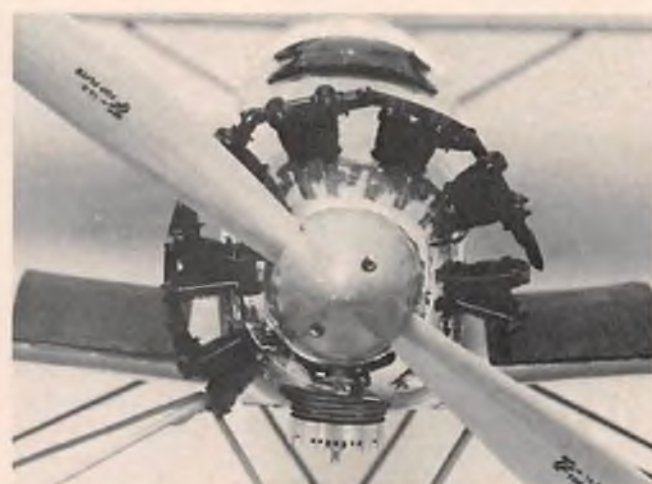
of two). Allow the top and bottom longerons to extend an extra four inches past the aft end to allow for the stern curvature when the sides are later assembled. After removing the framework from the plans, laminate each to a sheet of 3/32" balsa. Make sure to build two right and two left sides.

Assemble the completed side laminations into a basic box structure built around the two 1/4" sheet balsa anti-slosh bulkheads, Formers FF1 and FF3. In addition to providing separate, water-tight compartments, these bulkheads also provide the main compression, shock distribution point for water impact. (And if you don't think water impact can be hard on floatplanes, try jumping into a lake at about 50 mph.) Once the box structures have been allowed to dry, add the 1/4" square crossbraces and sheet the bottom of the floats.

The next item is the 1/8" piano wire bird cage that joins the floats to the wings. The fore and aft struts are wire wrapped and silver soldered to their

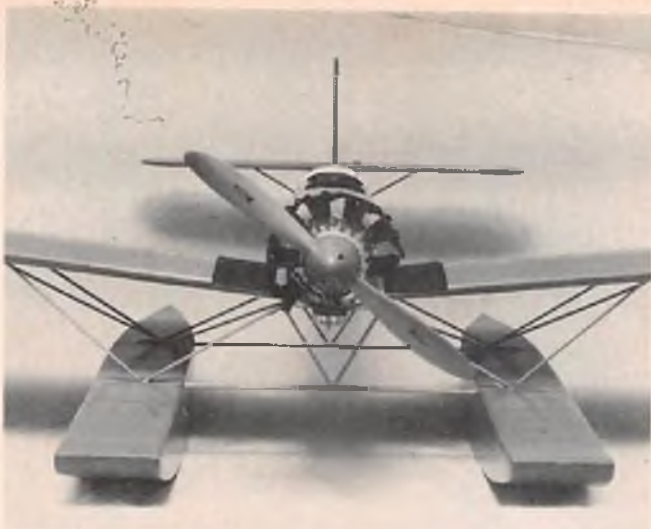
respective spreader wires that separate the two floats themselves. Then the four lower 1/4" x 3/4" hardwood beams are wire, or fishing line stitched around the 1/8" wire bird cage at the float attach points. Next, the four hardwood beams, with their attached wire bird cage structure, are epoxy mounted in place in the top of the open-top float assemblies. The hardwood beams are keyed in place with hard 1/4" balsa stress distribution gussets. It is **imperative** that this assembly be precisely aligned at this time to insure correct water-tracking. After the epoxy has cured, add the 1/8" wire N-struts that connect the fore and aft wire mounts. Thoroughly dope the inside of the still open-top floats with two coats of clear dope, then seal them up with the final pre-doped 3/32" top planking.

The fuselage is next on the agenda. Begin by assembling the 1/4" square, 1/8" x 1/4", and 1/4" sheet basic side directly over the plans. As with the floats, allow about an extra 4" of the 1/4" square longerons to extend past the



**ABOVE LEFT:** Aft view of skeletal airframe prior to covering. **ABOVE RIGHT:** The dummy Williams Brothers 1 1/2" scale J-5 engine that was modified to simulate the Jaguar VI. The oversize 14-6 prop is used for scale effect in static display.





**ABOVE LEFT:** This frontal view clearly details the intricate array of struts used on the HM-II. **ABOVE RIGHT:** Scale placement of the pushrod exits and control horns is evident here.

tailpost to allow for fuselage curvature during final assembly. Build two assemblies directly over each other on the plans (separate by a sheet of waxed paper to prevent sticking).

Remove the completed side frames from the plans and assemble the basic fuselage box structure built around Formers F2, F3, and two top Formers F4 and F5. After this has dried, add the aft 1/4" square crossbraces and turtle deck formers and hardwood wing mount blocks. Score the 1/4" square longerons along the aft section, add the tail post, and clamp together. The NyRod pushrods can now be installed, and then add all the 1/8" square stringers. Finally, plank the fuselage top decking and sides with 1/8" sheet balsa. The lower, removable engine cowl is built-up from balsa blocks, as is the top nose section between the nose ring and the firewall.

The wings and tail surfaces are self-explanatory, being built directly over the plans. With the generous dihedral, large area, and thick, semi-flat bottomed airfoil section, ailerons were not used on

the original model, but they are shown on the plans as optional.

Note that the vertical top and bottom fins are built as a single unit. The top fin is keyed to interlock into the stabilizer center section cut-out.

The entire airframe is clear-doped to preclude possible later water damage (dry-rot), then covered with Japanese silk. After covering and final dopping, the tail surfaces are hinged (pinned hinges) and control horns installed.

Next, the final airframe assembly is completed by installing the tail assembly as a single interlocked unit, epoxied in place. With the finish doped airframe now assembled, markings and insignia are cut from MonoKote and added as shown in the accompanying series of photographs.

Chrome MonoKote is used to simulate the burnished aluminum nose and top decking of the original HM-II's. The metallic gleam of the chrome flashing in bright sunlight adds a final touch of brilliance and, when viewed up-sun, the partially translucent airframe radiates

with a truly vivid coloring.

To simulate the Armstrong-Siddeley Jaguar VI engine used on the Danish HM-II's, a series of dummy Williams Brothers 1 1/2" scale Wright J-5 Whirlwind plastic engine cylinders were installed. As the Jaguar VI had much lower profile rocker boxes than the J-5, the dummy J-5 cylinders were modified accordingly.

The RCM Classic System was installed on this particular model, but the cavernous (3"W x 2 1/2"H x 8"L) fuselage compartment will accommodate any system. Whatever R/C system is selected, be sure to obtain a good, watertight seal at the wing saddle junction to eliminate any possible water seepage into the radio compartment.

An OS Max .40 R/C engine and a 10 ounce, round anti-foaming clunk tank were used on the prototype for reliable flights with good endurance. No water rudders were used, the large air rudder area being sufficient to overcome any weathervaning tendencies in winds up

**text to page 151**

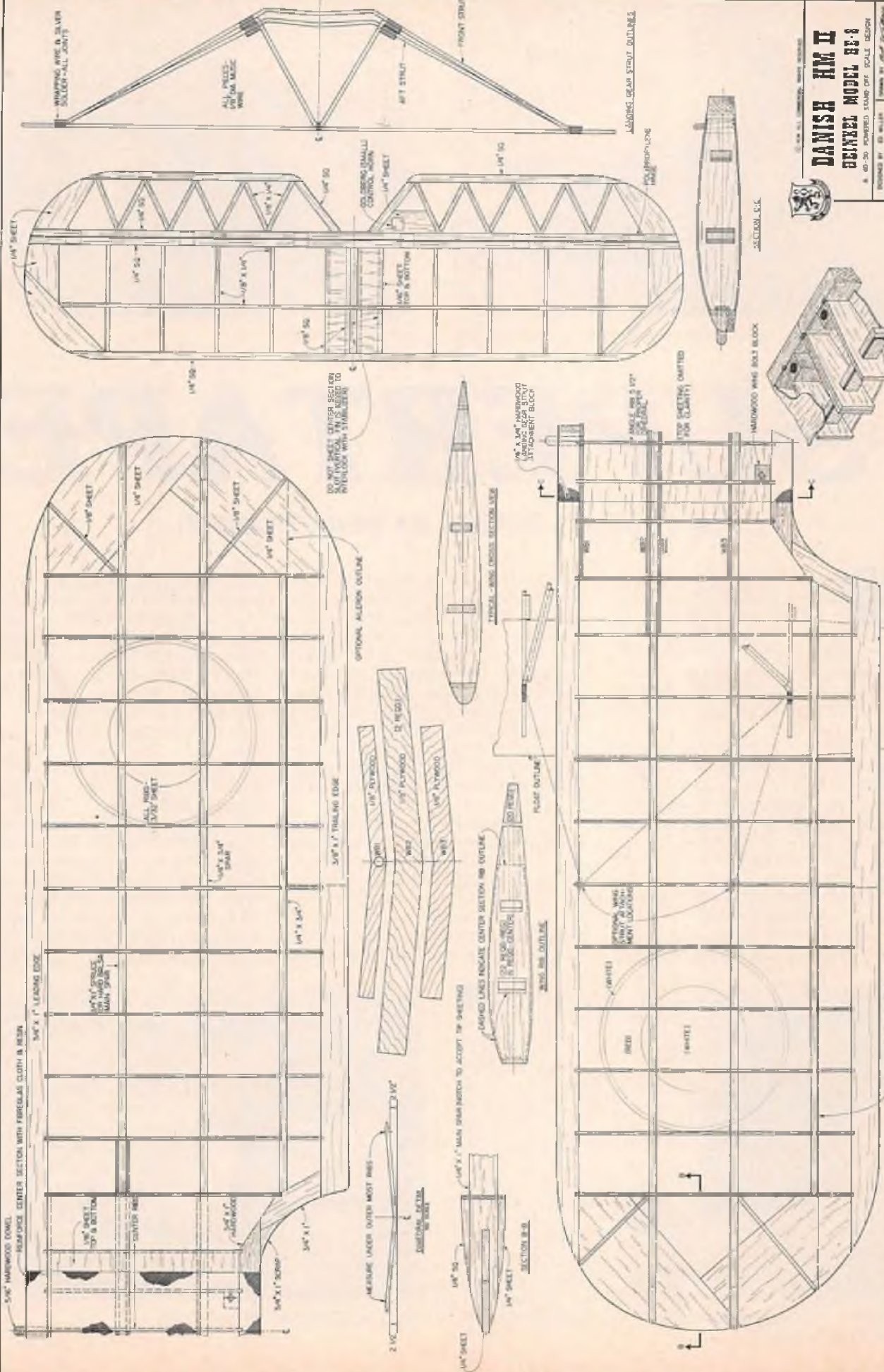


**ABOVE LEFT:** VFR on top, a formation of Danish HM-II's in flight. The aircraft are in their original light gray finish. **ABOVE RIGHT:** On the step, the same trio of HM-II's race for a formation take-off from Copenhagen harbor. Photos via J. Hultman.









**DANISH HM II**  
**GINNEL MODEL 83-8**

DESIGNED BY: G. H. HALL  
 DRAWN BY: G. H. HALL  
 SHEET 2 OF 2

PLAN NO. 7292

WHIPPING WIRE & SILVER  
 SLEEVE - ALL JOINTS

1/4\"/>

DO NOT SHEET CENTER SECTION  
 SLIT VERTICAL WAYS NEEDED TO  
 INCLUDE WITH SIMILAR

5/8\"/>

TOP SHEETING OVERT  
 FOR CLARITY

HARDWOOD WING BOLT BLOCK

OPTIONAL ALLEN OUTLINE - IF ALLENS ARE TO BE USED - DECREASE  
 THE AMOUNT OF OVERLAP TO 1/4\"/>

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Test wing panel section sheathed and leading edge applied with Supertape.



Roll of Supertape.

# SUPERTAPE

A PRODUCT REVIEW BY BEN STRASSER

**H**ow about an adhesive that goes on easily where you want it without sticky brushes to clean, or areas to mask; is stronger than any building material we use in R/C aircraft; weighs only one gram per square foot of area, and is ready the minute — no — the second you apply it? It's Supertape.

Different applications for this product (new to R/C modelers from Super Wings) will emerge as we in the hobby experiment with it. Its most promising use at this time is to apply balsa, cardboard, greenskin, or other skin, to foam wings. Here's how it's done. Prepare the foam wing core using 220 grit sandpaper on a sanding block with light pressure. Vacuum or blow the foam dust from the foam core and wipe it clean with a cloth (barely damp). If you have a heat gun,

give the core a quick once-over to remove any traces of moisture, holding the heat gun at least 12" from the foam so there is no chance of melting it. If the manufacturer recommends adding spars to the foam wing, they should be installed before the sheeting is applied. Supertape can be used by running a strip down the length of the groove in the foam and push the spar in place. Any internal aileron, flap, or spoiler linkage, should also be installed before the wing is sheathed.

To apply the sheeting, rest the wing core on the foam block from which it was cut. First, apply lengths of the 1" Supertape onto the part of the foam core to be sheathed, pressing it lightly in place throughout the width of each length of tape. If the wing is tapered, it isn't necessary to try to trim the adhesive. Overlap-

ping is perfectly okay. The 1" widths should be applied with a maximum gap of 1/4" between them. Then, get out your iron, set it to a temperature safe for foam, and heat the Supertape by running the iron over the Supertape and backing. The heat helps bond the adhesive to the foam, separate the backing from the tape, and speeds the curing time.

The second step is to peel off the brown paper backing leaving the layer of adhesive .0005" thick!

Step three is to apply the sheeting and press it firmly to the foam. It's very important that the foam wing core rest on the foam block so there is no chance of distorting the wing when the sheeting is applied. That's it - - - one, two, three. No weights are needed on the foam core or overnight set-up time is required. You



Piece of Supertape pulled from backing. Now how do I get it off of my fingers???



Applying Supertape to test block.





**Backing removed.**



**Pressing balsa in place.**

can go right on building.

While it isn't necessary to edge-glue widths of balsa sheeting together when using Supertape, we would do so to assure that we don't end up with some unexpected gaps between the lengths of sheeting because they don't mate squarely. Incidentally, after you apply the top sheeting and turn the wing over to apply Supertape to the bottom side, be sure to run some tape down the length of sheeting that extends beyond the trailing edge of the foam. This is needed to glue the top and bottom sheeting together at the trailing edge.

After the sheeting is applied to both sides of the foam wing core, it is trimmed flush with the leading edge, root, and tip. Supertape is then applied to the leading edge, root, and tip, and the leading edge, root rib and wing tip are applied.

As we marveled at our quickly and easily sheeted test wing panel, we wondered if polyurethane, dope, or resin applied to the balsa might affect the bonding strength of Supertape. To find out, we literally poured some urethane paint in one area, some dope in another area, and some resin in another area. It didn't look too good, but then this was for test purposes. When we checked the

sheeting, we could find no affect on the bonding strength of the tape. It held just as strong as it did before the paints and resin were applied.

To test the bond strength of Supertape further, we used it to apply some pieces of balsa to a couple of foam blocks. When we tried to break the balsa loose after 72 hours of set-up time, foam actually tore out of the foam block. The foam failed, not the Supertape. And the manufacturer reports that it will bond to any of the materials we use including fiberglass, plastics, and metals. For the technically minded, the specs indicate that at the moment of application, it holds with a tensile strength (resists pulling off) of 8 lbs./sq. in., or 50% of its potential. After 72 hours, the bonding strength is up to 80% of its potential, or 12.8 lbs./sq. in. After a year it bonds with 89% of its potential, or 14.24 lbs./sq. in. And those RC'ers among us whose aircraft are still around in 10 years will be pleased to know that the tensile strength has increased to 16 lbs./sq. in., unlike some contact cements that grow weaker with age. Supertape is just like us. It comes on stronger the older it gets! And the elastimeric values are guaranteed for 10 years. That means, I'm told, that it

doesn't get brittle — which is the cause of the failure of many adhesives.

If you accidentally apply Supertape in the wrong place, or if you want to take some off that extends beyond a sheeted area, it can be simply removed just like rubber cement by rubbing it off of the surface. It should be removed as soon as possible though. The longer you wait, the more difficult it will be. The only thing to watch out for is to keep your fingerprints off of the area to which it is to be applied and keep the area dust-free. Not much to ask.

Supertape comes in 1" and 3/8" wide rolls that are 2,160" long. The 3/8" width is ideal for applying cap strips for false ribs in partially sheeted wings and for installing spars. A roll of 1" tape is enough to sheet both sides of a 1,000 square inch wing with some to spare. As an introductory offer, the 1" width will sell for \$6.95 a roll and the 3/8" width roll will sell for \$3.95. After June 1, the prices will be \$7.95 and \$4.79, respectively. It should be available from your local hobby shop or directly from Super Wings, 11015 Glenoaks Blvd., Pacoima, California 91331. (213) 899-4312. Dealer inquiries invited.

Super adhesive - - - that Supertape. □



**Balsa block torn loose.**



**Sailplane wing panel partially sheeted, leading edge, ply wing tips, and false rib capstrips applied with Supertape.**



# RCM PRODUCT TEST

## Solution Aeromodels' SAKER



**T**he Saker is a sport or pattern trainer type aircraft that is designed for use with engines of .29 to .40 cubic inches of displacement. It is kitted by Solution Aeromodel Company, and is a Stan Johnson design.

The Saker utilizes conventional construction techniques and is an aircraft that is both easy and rapid to build. It is a rugged, well engineered design that should withstand the rigors of sport or novice pattern flying very well. The smaller component kit parts are all neatly packaged in vinyl bags. The fuselage features machine cut 1/8" poplar plywood sides and a plastic engine cowl that not only streamlines the aircraft, but adds much to its visual appeal. The wing is of conventional balsa rib and spruce spar construction. The spruce wing spars are glued to the plywood dihedral angle brace to initiate the wing assembly. This insures that the proper dihedral angle is built in. The tail surfaces are of all balsa sheet construction. A well thought-out and very complete eight page instruction booklet is included, which sequentially covers all assembly aspects and also such items as radio installation, control surface travel amounts and flying suggestions. An 11" x 17" sheet showing fifteen construction photos is included. The hardware package is excellent and very complete. It includes formed landing gear, threaded control rods, nylon clevises, nylon wing hold down bolts, control horns, aileron torque rods with all fittings, 90° cowl mounting brackets, and many other items. To illustrate how complete the instruction booklet is; it even informs the builder as to the meaning of the name Saker. For the benefit of those of you who do not know what a Saker is (this reviewer didn't either) it is a type of prairie falcon.

In constructing our Saker, the only change that we made was to the plastic cowl. The cowl comes in two halves which are glued together with plastic cement or lacquer thinner. We used Dupont lacquer thinner which worked just fine. The scrap plastic which is trimmed off each cowl half is used to reinforce

to page 150

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	●										

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

### SPECIFICATIONS

Name ..... Saker  
 Aircraft Type ..... Sport Pattern  
 Manufactured By ..... Solution Aeromodel Company  
 2258 Wyoming N.E.  
 Albuquerque, New Mexico 87112

Mfg. Suggested Retail Price ..... \$56.95  
 Available From ..... Both Mfg. and Retail Outlets  
 Mfg. Recommended Usage ..... General/Comp. Trainer  
 Wing Span ..... 51 Inches  
 Wing Chord ..... 10 1/8" (Avg.)  
 Total Wing Area ..... 523 Square Inches  
 Fuselage Length ..... 45"  
 Radio Compartment Dimensions ..... (L) 10" x (W) 2 3/4" x (H) 3"  
 Wing Location ..... Low Wing  
 Airfoil ..... Symmetrical  
 Wing Planform ..... Constant Chord  
 with tapering ailerons  
 Dihedral ..... 1 1/2 Inches  
 Stabilizer Span ..... 20 Inches  
 Stabilizer Chord (incl. elev.) ..... 5 3/4" (Avg.)  
 Total Stab Area ..... 115 Square Inches  
 Stab Airfoil Section ..... Flat  
 Stabilizer Location ..... Top Of Fuselage  
 Vertical Fin Height ..... 6 Inches  
 Vertical Fin Width ..... 8 1/2" (Max.)  
 Mfg. Rec. Engine Range ..... .29-.40  
 Mfg. Rec. Fuel Tank Size ..... 8 Ounce  
 Landing Gear ..... Tricycle  
 Recommended No. Of Channels ..... 4  
 Recommended Control Functions ..... Elev., Alt., Rud., Throt.

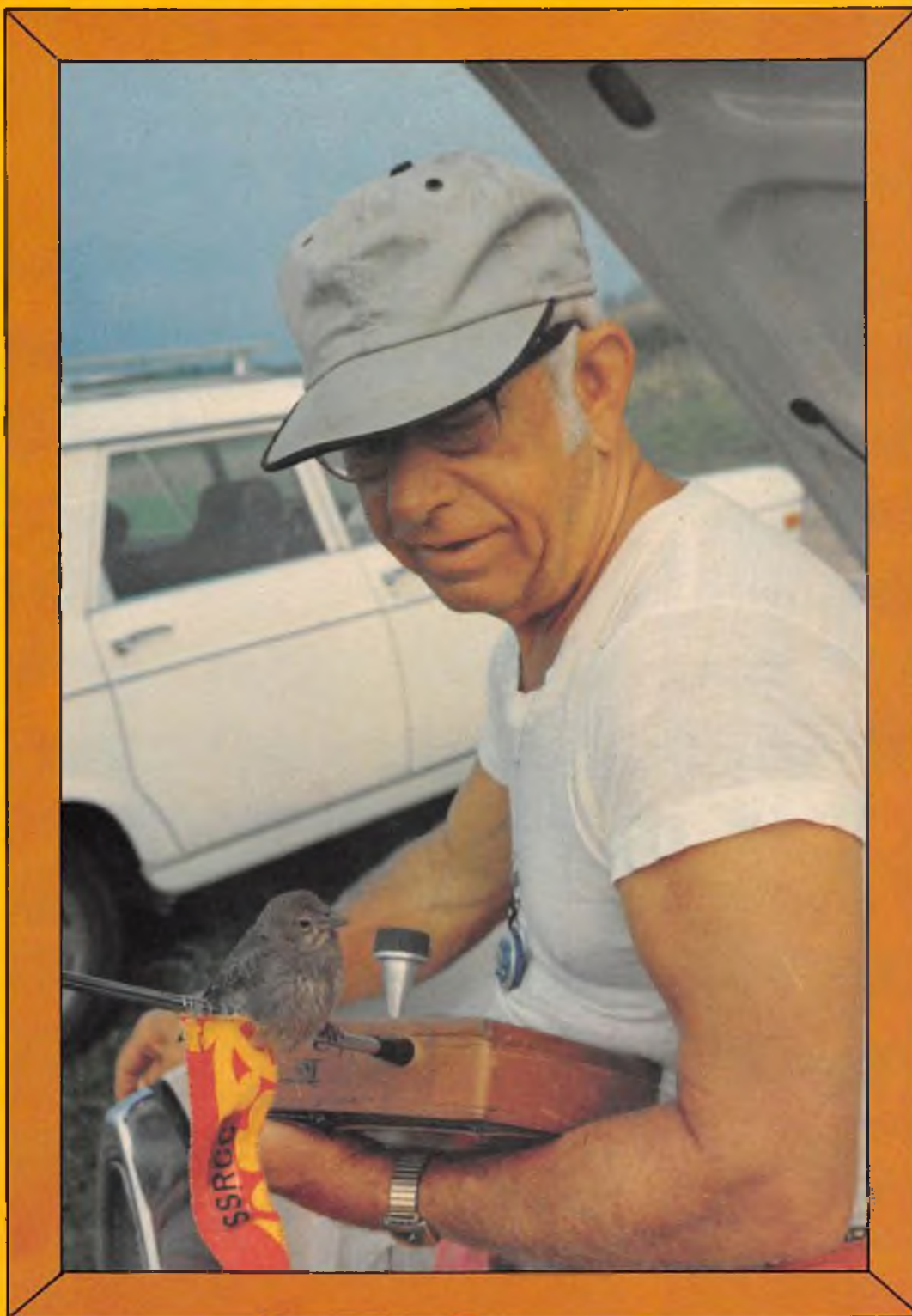
#### Basic Materials Used In Construction

Fuselage ..... Balsa & Ply  
 Wing ..... Balsa, Spruce & Ply  
 Tail Surfaces ..... Balsa  
 Hardware Included In Kit ..... See Text  
 Plan Size ..... 44" x 34" (1 sheet)  
 Building Instructions on Plan Sheets ..... Yes  
 Instruction Manual ..... Yes (8)  
 Construction Photos ..... Yes  
 Kit Includes ..... Shaped & Die-Cut Parts  
 Mfg. Rec. Flying Weight ..... 64-80 oz.  
 Wing loading based on rec. flying wt. .... 17.6-22 oz.

#### RCM PROTOTYPE

Weight, Ready To Fly ..... 69 ozs.  
 Wing Loading ..... 18.9 oz./sq. ft.  
 Covering & finishing materials used ..... See Text  
 Engine Make & Disp. .... K & B .40 RC  
 Muffler Used ..... Yes  
 Radio Used ..... Westport  
 Tank Size Used ..... 8 Ounces





## **BIRDS OF A FEATHER . . .**

**By Warren G. Shadrick**

**Photo By Dr. John Spillane**

One day while Harry Fake, an SSRCC (South Shore Radio Control Club) member of some 20 years, was sitting on the deck lid of the trunk of his car, holding his transmitter, a small bird landed on his antenna.

The next day, the bird came again and each day thereafter throughout the summer. The bird would always alight either on Harry's Tx antenna or on his shoulder.

Harry, being retired, flies almost every day. During the weekends, when the field was crowded (and Harry didn't fly) the bird never showed up. But come Monday morning when Harry would come to fly, the bird would come to perch.

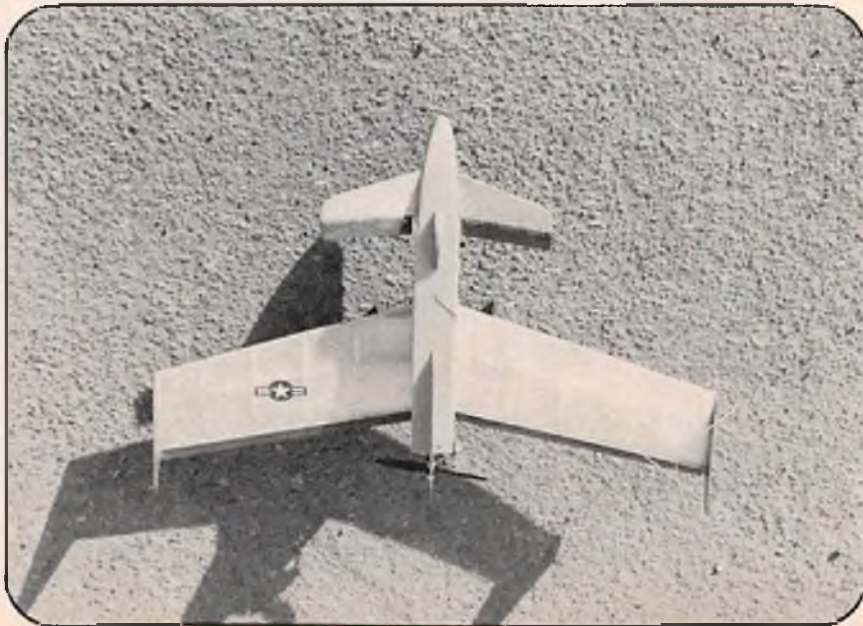
We have often wondered if the bird was trying to teach Harry how to fly. What do you think?



BY RANDY WRISLEY

# THE GREAT ALL AMERICAN BACKYARD CANARD

THIS SMALL FIELD .020 POWERED, 2 CHANNEL CANARD CAN BE A COMPLETE CHANGE OF PACE FOR THE RC'ER. TRY IT AND WE THINK YOU'LL LIKE IT.





**T**he Great All American Backyard Canard is just what its name implies, a good flying, small field canard. The planform has many advantages. First, it's almost impossible to stall. That means it won't spin either. Second, the Center of Gravity location makes balancing the model easier. The short, fat fuselage gives the builder leeway in radio installation. Third, the entire fuselage forward of the wing is expendable. The impact is absorbed by something other than the engine, firewall, and radio. Fourth, this means if you do crash, being a small model, the cost of repair is low. However, you must manufacture a few fittings you might buy ready-made for a larger model. As this article is intended for builders with some experience, it shouldn't be a problem. Fifth, though stable, the G.A.A.B.Y.C. is aerobatic enough to keep the flyer's interest up. Though it won't soar for hours dead stick, it glides better than some small models I've seen.

If you're looking for something to put your super-mini radio in, that's just a little off-beat, why not try going backwards? You might just like it!

#### PRE-CONSTRUCTION NOTES

In order to utilize the Cox T.D. .020 as a pusher, you must modify it slightly. Pull off the tank backplate and trim away the fuel pick-up tube inside. You must also use a left hand, or pusher, prop. Cox makes a 4.5d 2"p prop. If you can't find one locally, order from Cox direct.

When building, select the lightest lumber you can find. My lightest model weighed 6.75 oz. ready to fly.

The plans call for 1/20" sheet. If you can't find any, sand 1/16" down some before building. I used tissue for covering and recommend it --- it goes around small curves better for me. Use Sig Lite coat dope and 2 coats will fill the tissue. A built-in retarder prevents warps. Finally, take care to align the structure during assembly — the straighter it is, the better it flies.

#### Wing:

Building the wing is a simple affair. First, Hot Stuff a piece of 1/16" square balsa down the center of the leading and trailing edges. Lay the L.E., T.E., and spar, down on the plan. With a razor saw, cut all three to the proper sweep back angle, and epoxy. While these cure, cut out the 1/16" plywood sweep back braces. Attach them to the L.E. and the spar. When dry, block the L.E. and T.E. up 1/8" over the plan. The spar is pinned in position flat on the board. Cut the 1/16" x 3/16" top capstrips to approximate size. With the blade removed from an X-Acto knife, roll it over one side of each strip until a curve results. Trim the front of the capstrip to fit. Hot Stuff it into position. Now bend, don't break, the strip over the spar and Hot Stuff it to the trailing edge. Ideally, the strip should rest on the 1/16" center

## GREAT ALL AMERICAN BACKYARD CANARD

Designed By: Randy Wrisley

#### TYPE AIRCRAFT

Small Field Canard

#### WINGSPAN

21.75 inches

#### WING CHORD

4.8" (Avg.)

#### TOTAL WING AREA

105.4 Square Inches

#### WING LOCATION

Bottom Aft Fuselage

#### AIRFOIL

Symmetrical

#### WING PLANFORM

Swept Tapered

#### DIHEDRAL, EACH TIP

.75" (Nose Wing)

#### D.A. FUSELAGE LENGTH

14 Inches

#### RADIO COMPARTMENT AREA

(L) 7" X (W) 1.5" X (H) 2"

#### NOSE WING SPAN

8 inches

#### NOSE WING CHORD

1.96" (Avg.)

#### NOSE WING AREA

15.7 sq. in.

#### NOSE WING AIRFOIL SECTION

Flat

#### NOSE WING LOCATION

Front of Fuselage

#### VERTICAL FIN HEIGHT

2.5 Inches

#### VERTICAL FIN WIDTH (Avg.)

2.5"

#### REC. ENGINE SIZE

Cox T.D. .020

#### FUEL TANK SIZE

Std. Tank Mount

#### LANDING GEAR

Tricycle

#### REC. NO. OF CHANNELS

2

#### CONTROL FUNCTIONS

Elevator & Ailerons

#### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, & Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready-To-Fly	7 Oz.
Wing Loading	3.02 Oz./Sq. Ft.

#### G.A.A.B.Y.C.

#### BILL OF MATERIALS

#### Fuselage:

- (1) 1/20" x 3" x 36" - sides, top, bottom.
- (1) 1/16" x 1 1/2" x 12" ply - formers.
- (1) 1/8" x 5/16" x 2" spruce - hold-downs
- (1) 3/64" dia. x 36" wire - landing gear.
- (3) 3/4" dia. wheels.
- (1) 1/8" x 1/8" x 3" - landing gear retaining blocks.

#### Wing:

- (2) 3/16" sq. x 36" - L.E. & T.E.
- (2) 1/16" sq. x 36" - L.E. & T.E. center strips.
- (1) 1/8" x 1/2" x 36" - spar.
- (3) 3/16" x 1/16" x 36" - capstrips.
- (1) 1/2" x 36" trailing edge stock - ailerons.

#### Rudders, Nose Wing & Elevators:

- (1) 1/16" x 3" x 24"

#### Misc.:

- (1) 1/32" dia. x 36" music wire - pushrods, ele. linkages.
- (1) 1" 1/16" brass tubing - aileron linkages.
- (3) small wood screws.
- (1) 1/16" dia. x 1" dowel.

strip and be flush with the top of the L.E. and T.E. Install the rest of the top capstrips in the same manner. The 1/16" x 2" center section planking is installed last. Dampen the top of the planking with water and dry it with a heat gun or hair dryer. This sets the curve and helps maintain alignment.

When all is dry, flip the wing over. Block it up again, adding 1/16" to your blocks. Build the bottom of the wing exactly as you did the top. Once dry, remove from the board and sand the L.E. and T.E. to shape. Cut a slot in the top planking and epoxy the 1/16" hold-down dowel in place. It should rest on top of the front sweep back brace. Ailerons are cut from 1/2" tapered trailing edge stock. The horns are bent from 3/64" wire. Solder a flattened piece of 1/16" brass tubing to the top of each horn --- these should be pre-drilled to accept the pushrods. Install the completed horns on the ailerons.

#### Fuselage:

Cut the formers from 1/16" plywood. Make all cut-outs and drill all holes before installation. Cut the sides from 1/20" balsa. Make sure the nose wing slots line up. With the former locations drawn on the sides; install F-5 and F-3. Use a triangle to square things up. Install F-4 next. Pinch in the nose and cement F-1 in. Plank the fuselage top with 1/20" sheet applied crossgrain. Bend the main and nose gear from 3/64" music wire. Install the nose gear using F-2 as a back-up plate. Epoxy the main gear in place in front of F-4. Use 1/8" square balsa slotted down one corner to hold it in place. Make the hatch hold-down from 1/8" x 5/16" spruce; install in front of F-3. The wing hold-down is spruce likewise --- 1/8" x 5/16" epoxied to F-5. Plank the bottom and build the hatch. Cement the nose block on. When dry, shape and finish sand the fuselage. Fit the wing at this time and make any necessary adjustments.

#### Rudders, Nose Wing & Elevators:

Cut these from hard 1/16" sheet. Round the edges and sand smooth. Cut the nose wing down the centerline and add dihedral. Elevator linkages are bent from 1/32" music wire and installed.

#### Covering:

Use tissue if you know how (thanks, Dad). If you must use a plastic film, select one of the lighter brands. Take care not to warp the structure by applying too much heat to one side. Whatever the choice, cover all parts before assembly.

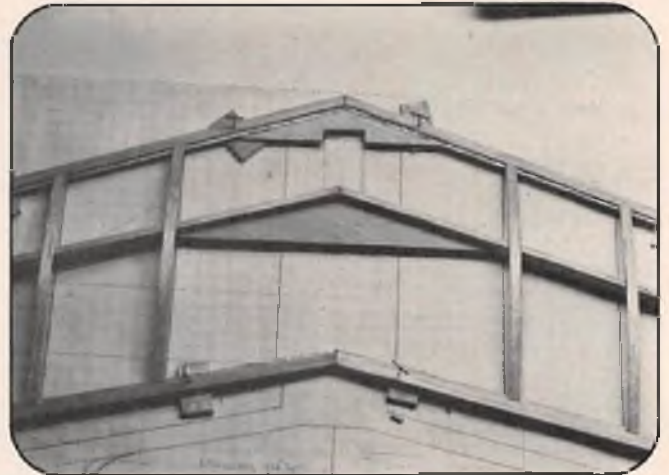
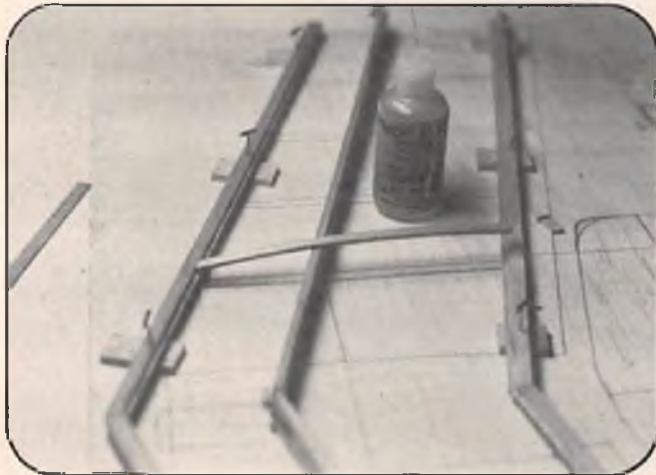
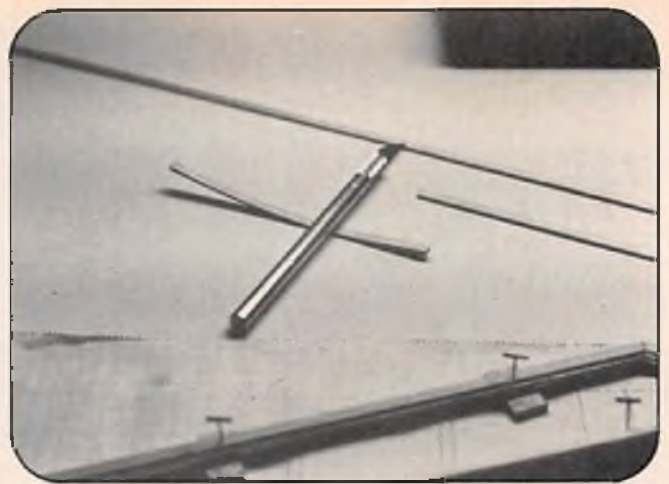
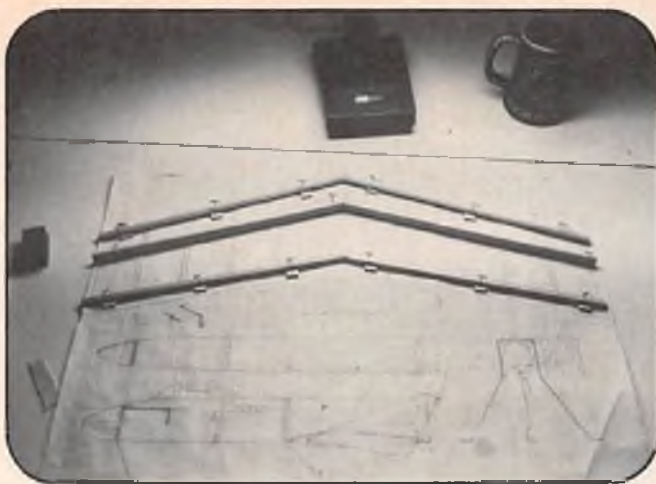
#### Assembly:

Cement the rudders in position. Slide the nose wing in place, and epoxy. Poke the elevator linkages through the fuselage. Secure the elevators to the nose wing with figure 8 thread stitching.

Cut a hole in the center section planking to receive the aileron servo. Ailerons are installed next with cut down

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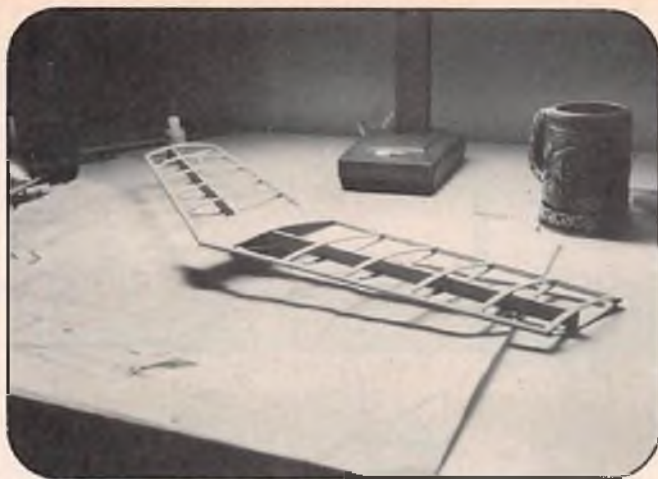




**1ST ROW LEFT:** Leading edge, trailing edge and spar cut to size. Note 1/8" blocks under leading edge and trailing edge. **RIGHT:** Rolling the capstrips to form curve. **2ND ROW LEFT:** Capstrip attached to leading edge first then pulled down to trailing edge. **RIGHT:** Top side of wing complete with ply braces and capstrips installed. **3RD ROW LEFT:** Center section sheeting installed. **RIGHT:** Wing turned over ready for bottom capstrips. **4TH ROW RIGHT:** Wing completed ready to remove from board.







small plastic hinges. Pushrods bent from 1/32" music wire are fitted between the servo and the horns. A "Z" bend in each will assist in making things line up. Fit the wing to the fuselage and install the 1/16" ply hold-down plate. Use small wood screws to hold the wing on. Bolt the engine in place. Check aileron control. No binding allowed. Solder the wheels in place.

Now is the time to dry fit the components in the fuselage. When the proper C.G. is reached, install parts permanently. Use 1/16" servo tape for servos and pad the rest with as much 1/8" foam as space allows. Connect the pushrod to the elevator servo. Remember, the elevators must move down to raise the nose. With the switch mounted and the hatch screwed on, you're ready to fly.

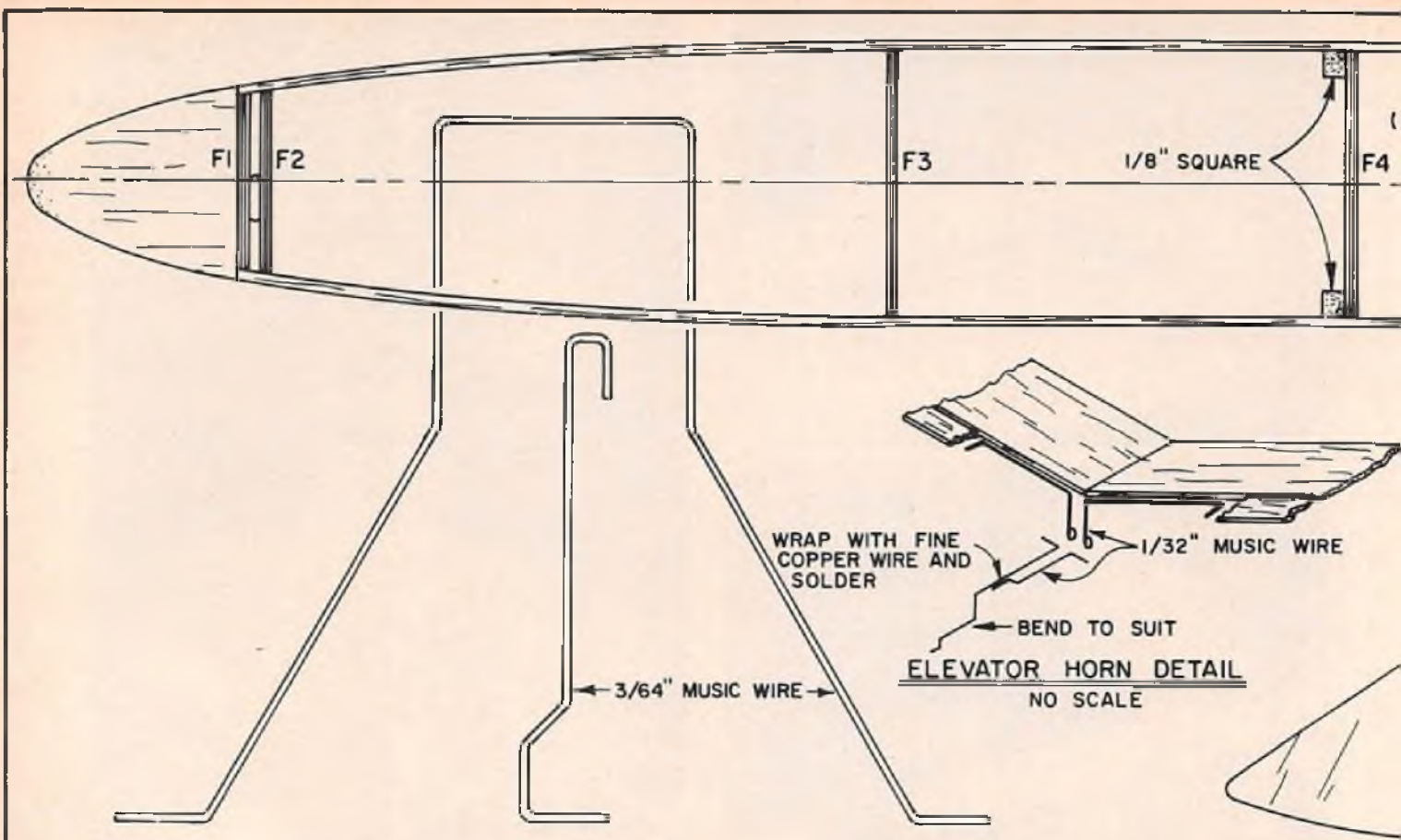
#### **Flying:**

My first flight with the prototype was interesting, to say the least. The fuel tank I was using refused to allow the engine to run. Picture one rather large modeler trying to start one tiny canard. Minutes ticked into hours. Interested bystanders offered the usual helpful suggestions, whiling away the time, awaiting the crash. Frustration mounted and in desperation, I installed the tank mount. The engine fired on the first flip. Not wasting any time, I stood up, switched on, and heaved this mini-monster into the ozone. Aggravation gave the launch the extra 10 feet of altitude needed. G.A.A.B.Y.C. recovered in time and proceeded to fly exactly as it has ever since --- better than I expected. Though this technique

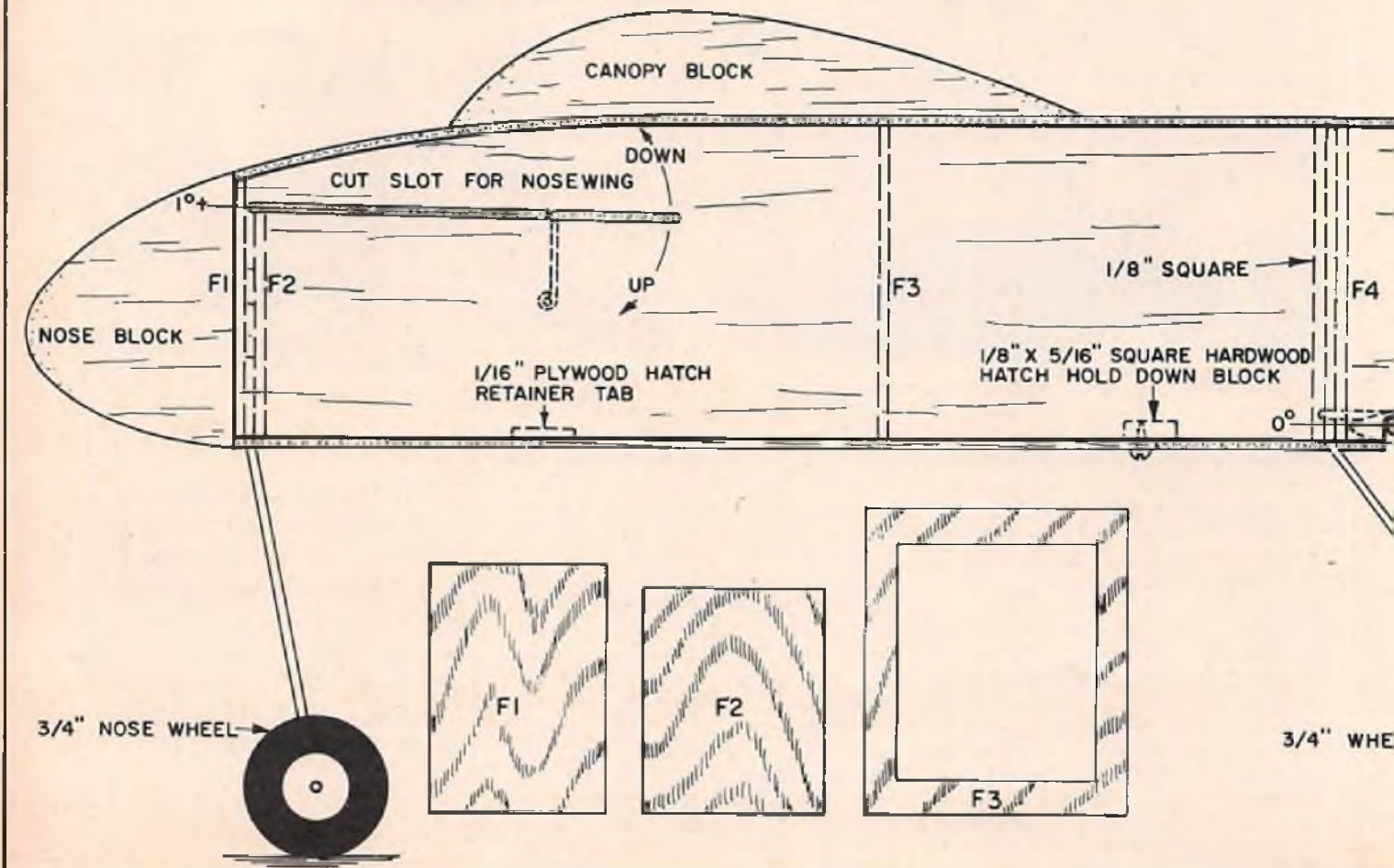
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*TOP LEFT: Final sanded wing. TOP RIGHT: Hatch removed showing servo linkage to elevators on nosewing. ABOVE LEFT: Aileron servo and linkage. ABOVE: Tail mounted Cox T.D. .020. This pusher configuration makes easy clean up after flying.*



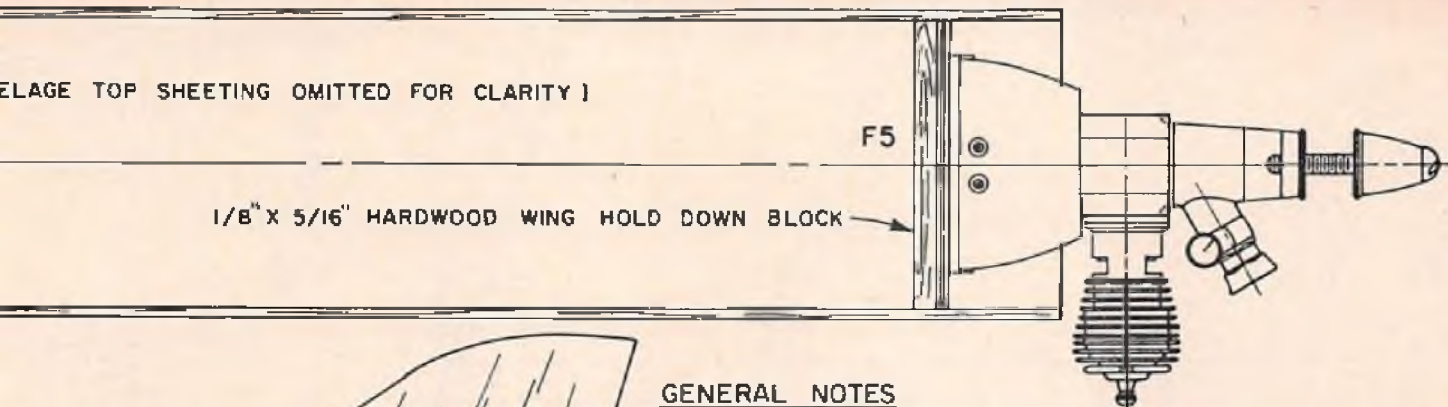


LANDING GEAR OUTLINES





(FUSELAGE TOP SHEETING OMITTED FOR CLARITY)

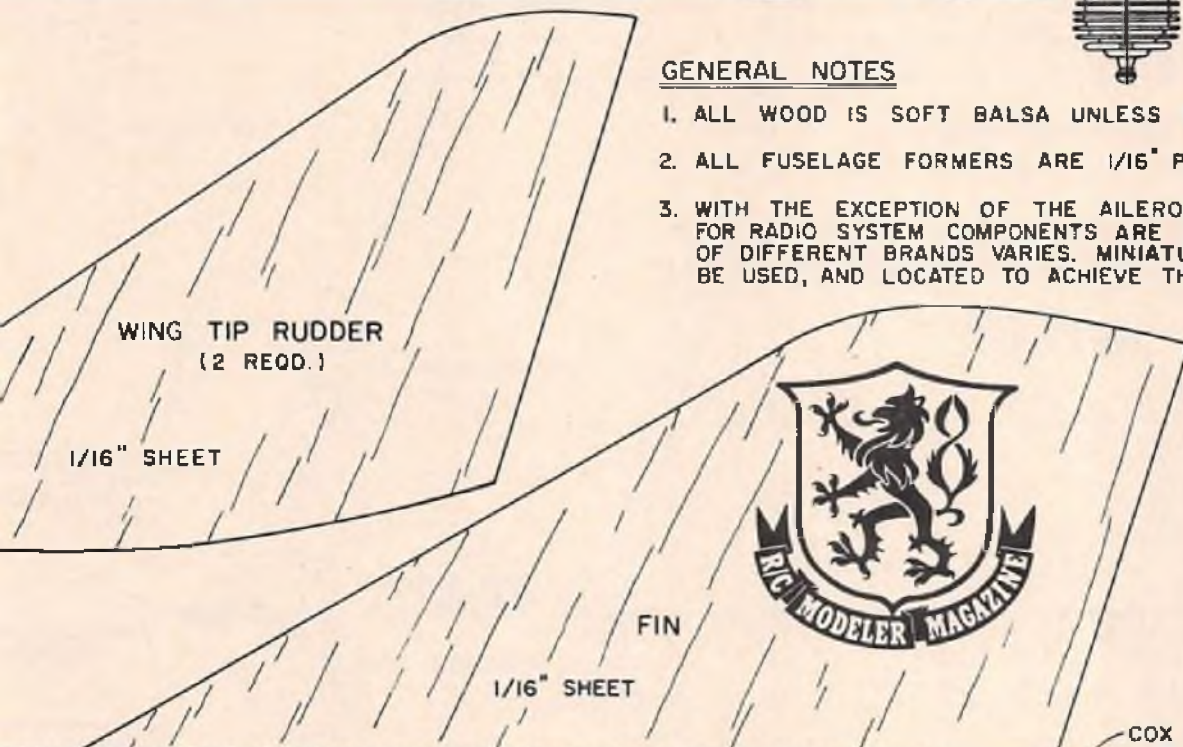


1/8" x 5/16" HARDWOOD WING HOLD DOWN BLOCK

F5

### GENERAL NOTES

1. ALL WOOD IS SOFT BALSA UNLESS OTHERWISE NOTED.
2. ALL FUSELAGE FORMERS ARE 1/16" PLYWOOD
3. WITH THE EXCEPTION OF THE AILERON SERVO, THE LOCATIONS FOR RADIO SYSTEM COMPONENTS ARE NOT SHOWN, AS THE SIZE OF DIFFERENT BRANDS VARIES. MINIATURE EQUIPMENT SHOULD BE USED, AND LOCATED TO ACHIEVE THE PROPER CG.

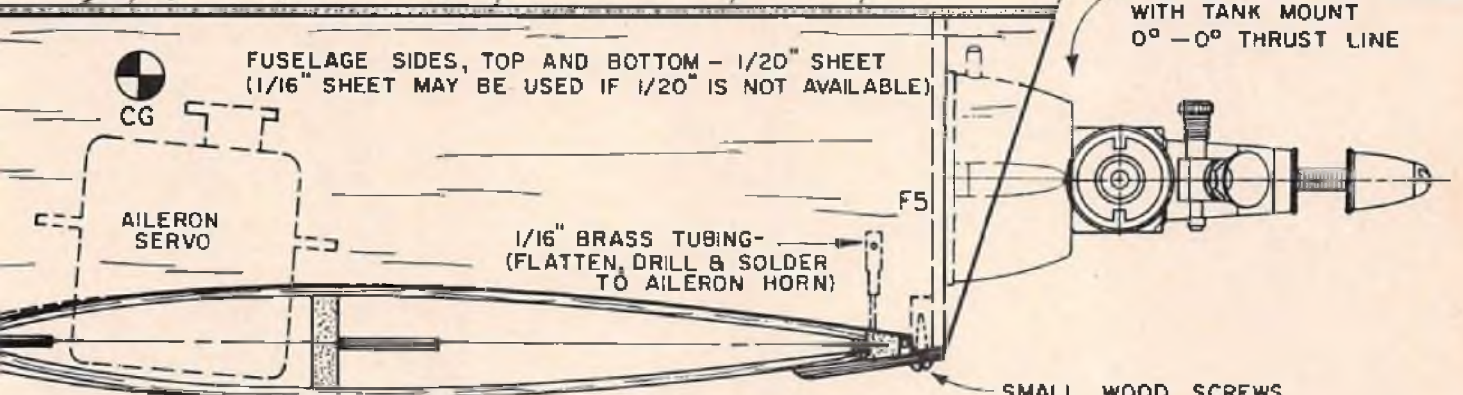


WING TIP RUDDER  
(2 REOD.)

1/16" SHEET

FIN

1/16" SHEET



FUSELAGE SIDES, TOP AND BOTTOM - 1/20" SHEET  
(1/16" SHEET MAY BE USED IF 1/20" IS NOT AVAILABLE)

CG

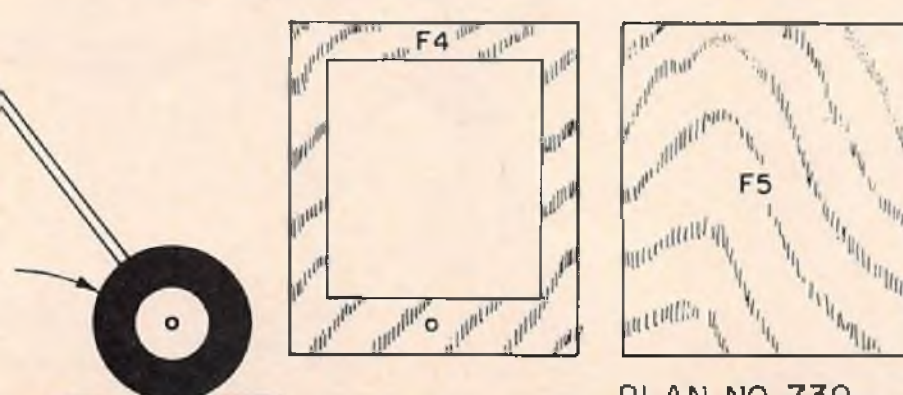
AILERON SERVO

1/16" BRASS TUBING-  
(FLATTEN, DRILL & SOLDER  
TO AILERON HORN)

F5

COX .020 TEE DEE ENGINE  
WITH TANK MOUNT  
0° - 0° THRUST LINE

SMALL WOOD SCREWS



F4

F5

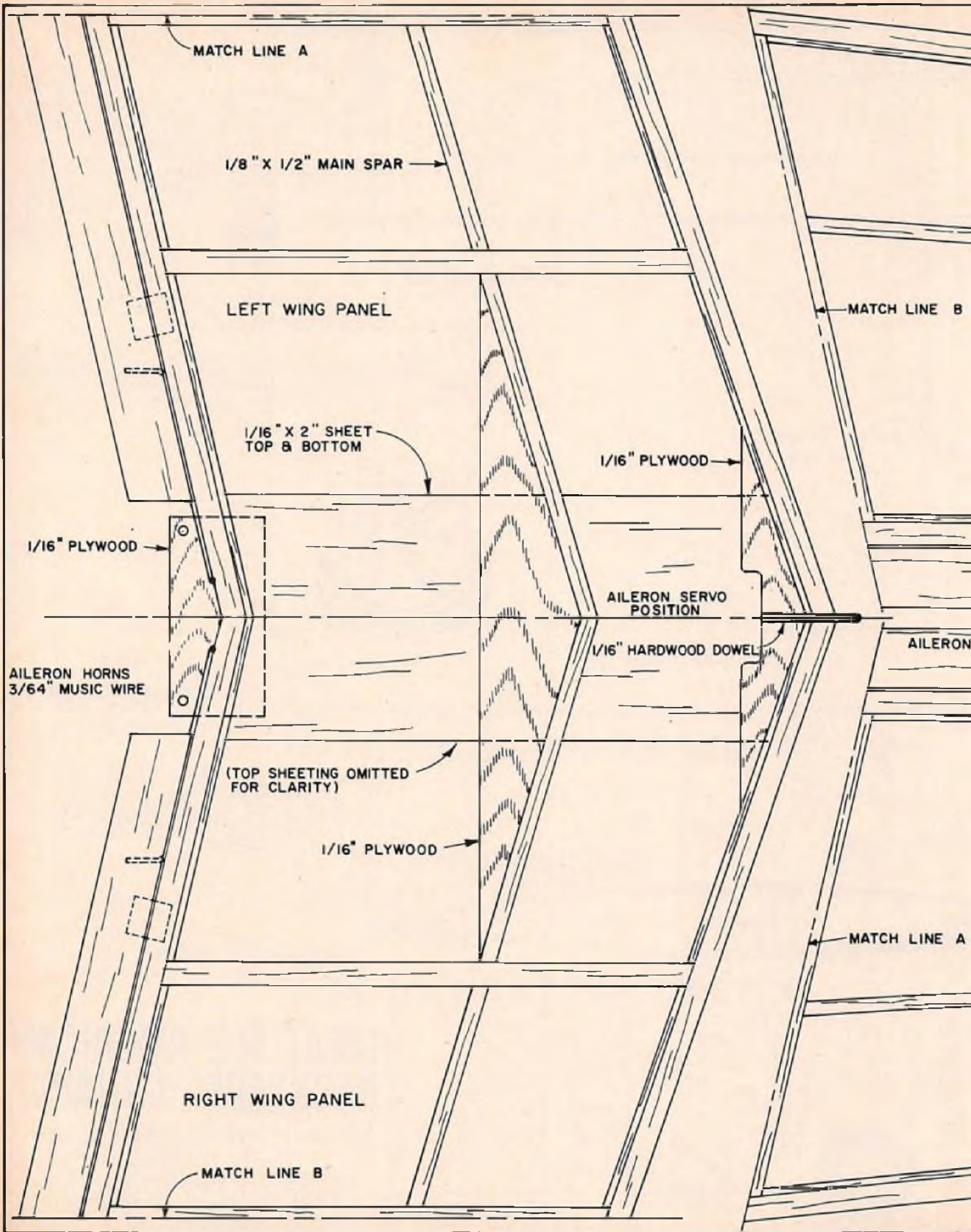
# GREAT ALL AMERICAN BACKYARD CANARD

AN .020 POWERED SPORT DESIGN  
FULL SCALE  
DESIGNED BY RANDY WRISLEY  
DRAWN BY *Bob Wallace*

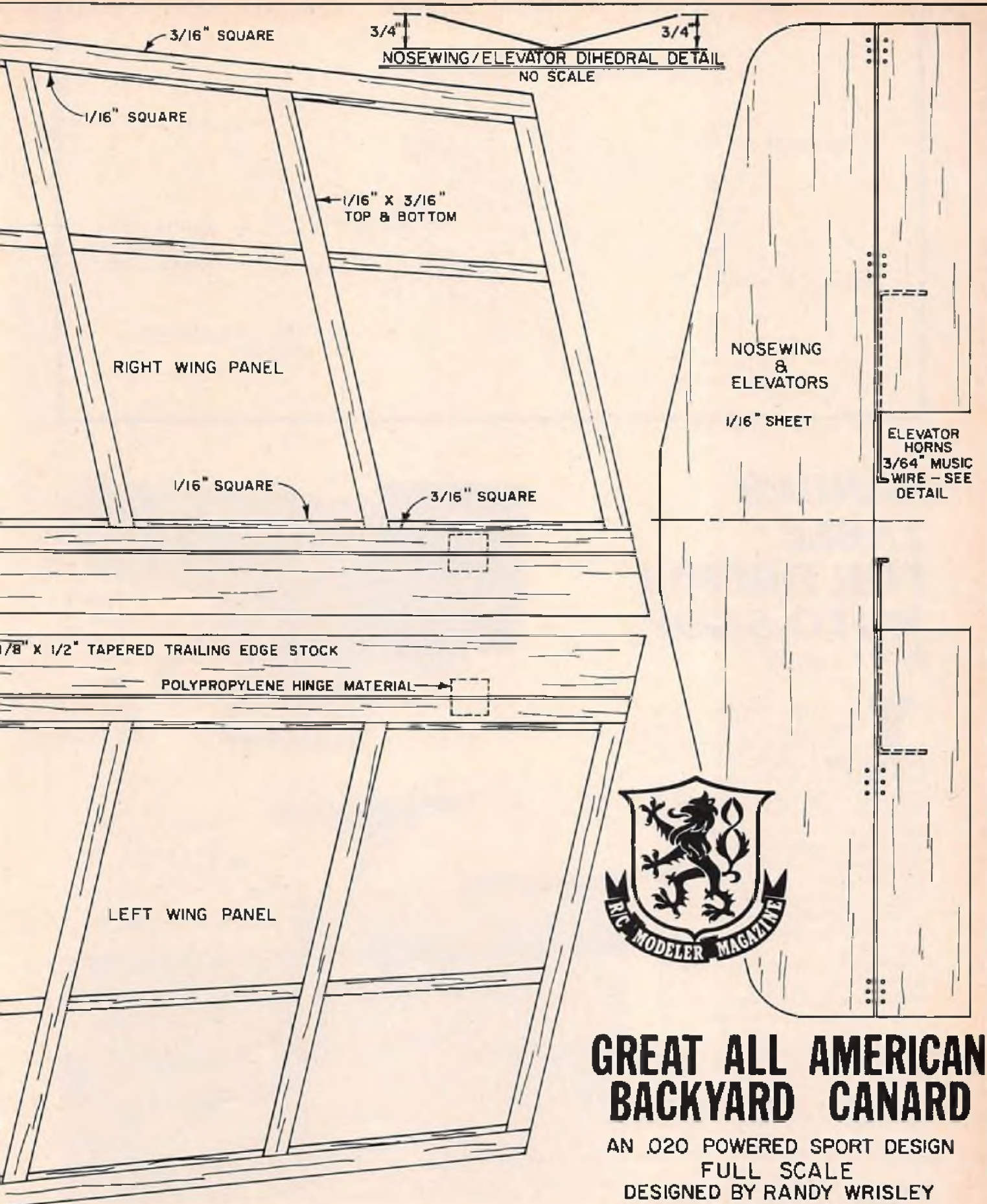
PLAN NO. 730

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# GREAT ALL AMERICAN BACKYARD CANARD

AN .020 POWERED SPORT DESIGN  
FULL SCALE

DESIGNED BY RANDY WRISLEY

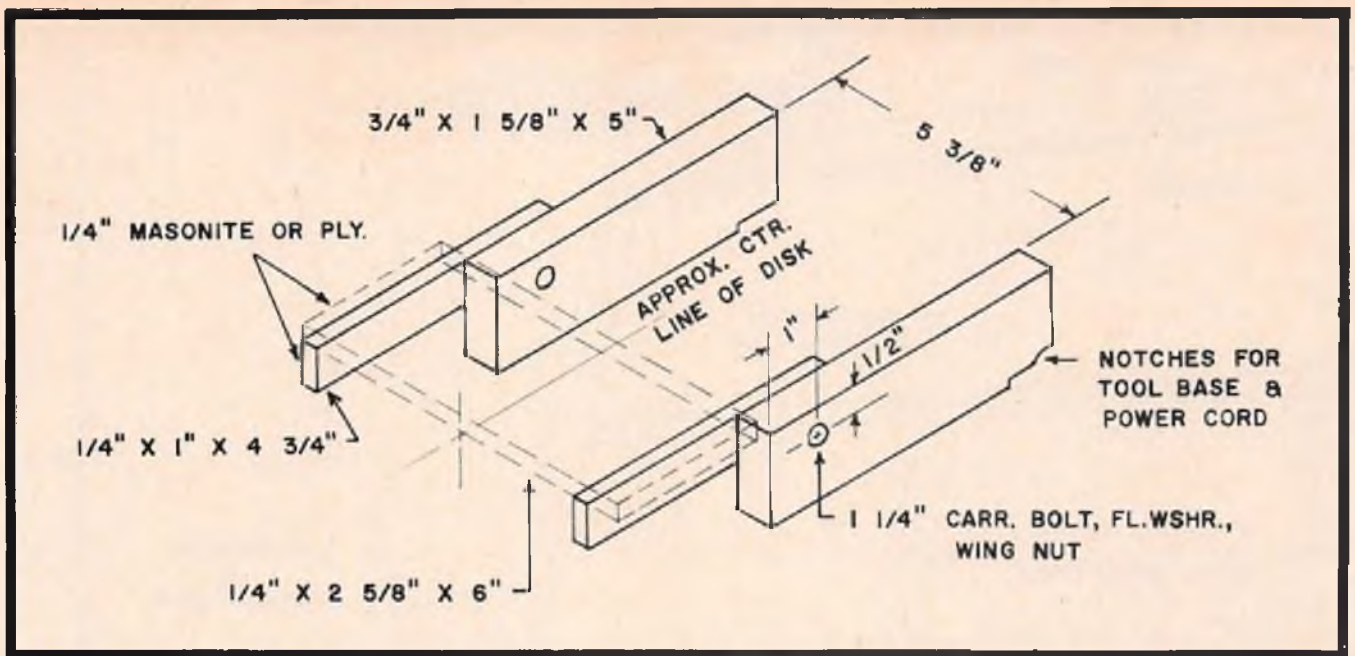
DRAWN BY *Bob Wallace*

0 DIHEDRAL IN WING)

PLAN NO. 730

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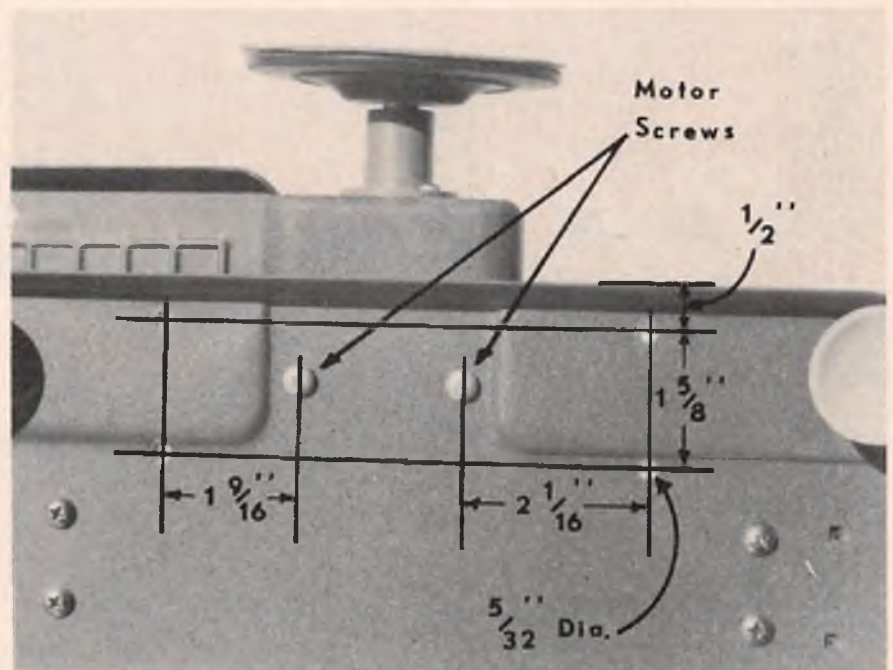
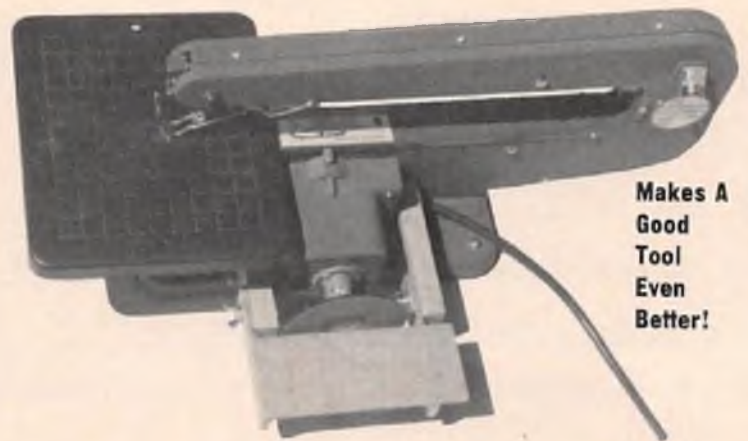


# SANDER TABLE FOR DREMEL MOTO-SHOP

By Al A. Lidberg

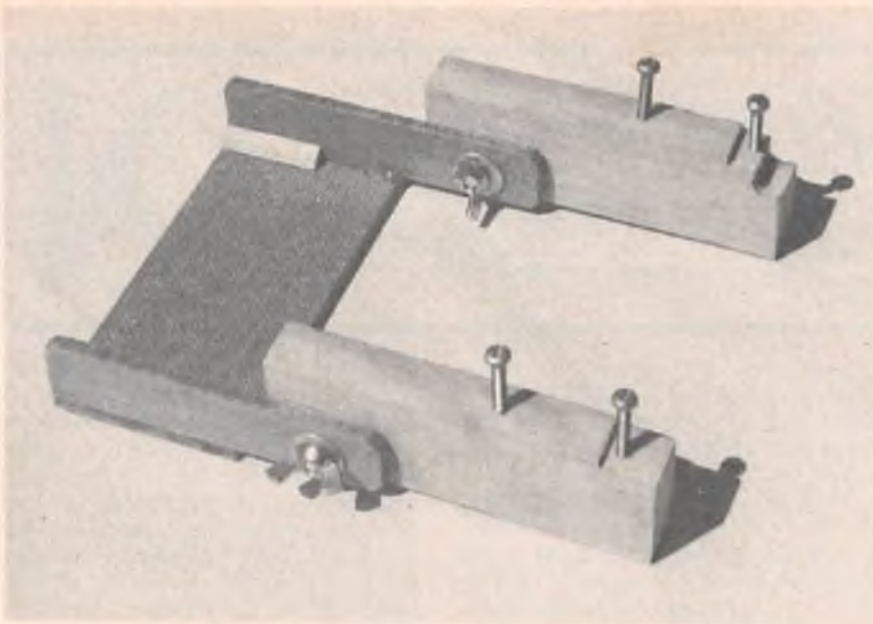
**T**he Dremel Moto-Shop is a convenient, versatile tool which can simplify and speed up many model building chores. The saw cut edges made by this machine are amazingly smooth without the usual roughness produced by conventional coping or jig saws. A power take-off allows fitting of a sanding disk or an optional flexible shaft accessory. Although the sanding disk is very handy for rough shaping of parts, precise shaping or squaring is virtually impossible without some type of support for the part and your hands.

The table shown can be easily assembled from scraps of wood plus a few screws and bolts from the hardware store. I used maple for the base blocks but almost any kind of wood except particle board or balsa would work fine. My table is made from 1/4" masonite but 1/4" plywood would work as well. Start construction by cutting out the table parts. Holes in the table bars (for the carriage bolts) should be 1/2" down from the top surface and about 1" from the end of the bars. Enlarge these holes into slots about 1/2" long to allow adjustment of the space between table and disk. If you have used masonite for the table bars, take advantage of the rough side of



*Hole layout for base block screws. Drill these holes first, then transfer their locations to the blocks for pilot holes.*

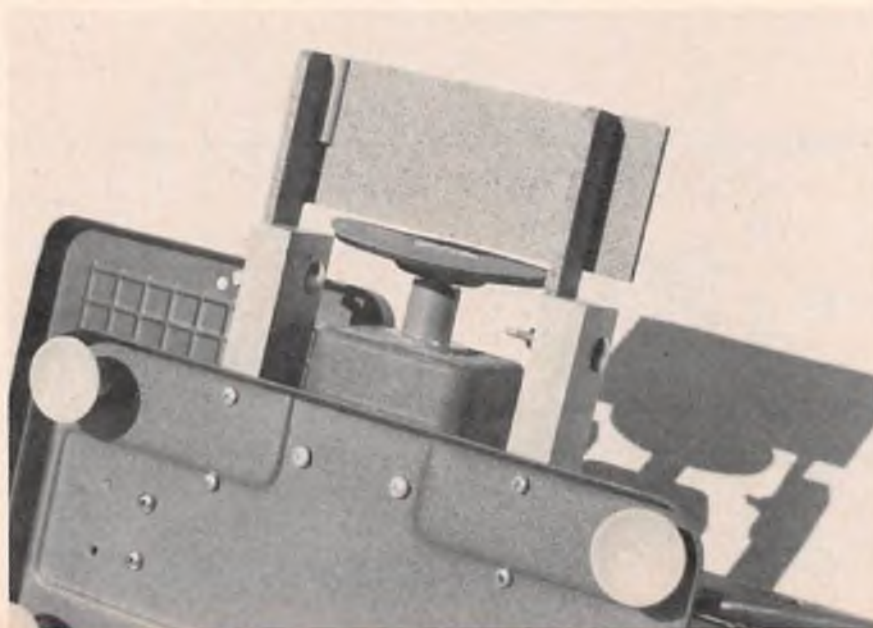
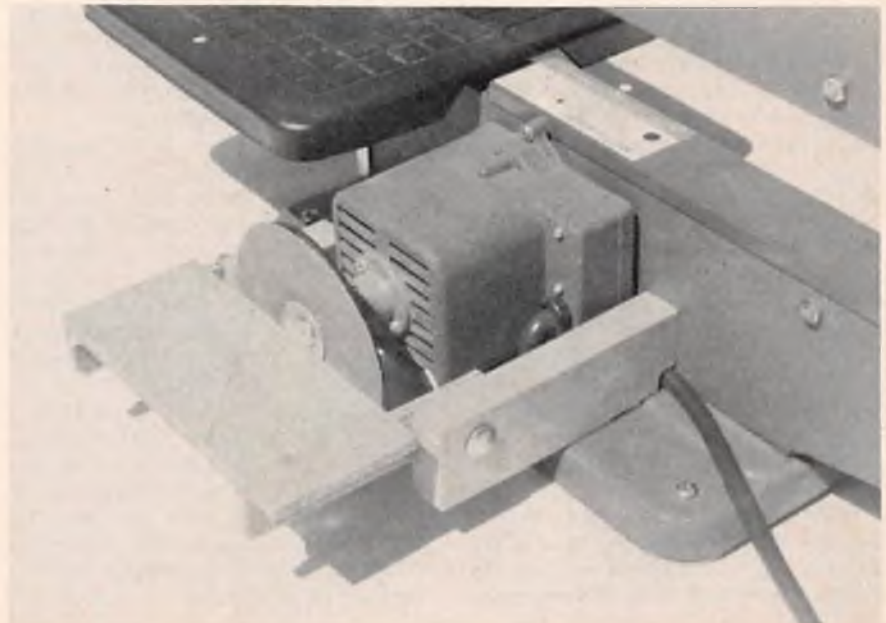




**The complete table/base assembly. Note that the carriage bolts face the same direction to allow removal of the table. Base block notches for tool base and power cord are also shown. 1/4" quarter-round can be used for glue blocks if desired. This easily built sander table adds versatility, convenience, and safety to the Moto-Shop tool. Note the power cord tucked safely down and back. Right angle and 45° lines drawn on the table aid accuracy.**

this material by placing it against the base blocks to provide friction against unwanted movement. If a smoother material such as plywood is used, a 1" diameter washer-shaped piece of sandpaper or rubberized gasket material should be sandwiched between the bars and base blocks to hold the table steady. Assembly of the table goes quickly with 5 minute epoxy, but make sure the bars are square with the table surface. To assist in sanding parts that require square or mitered edges, draw some 90 degree and 45 degree lines (relative to the disk face) on the table surface with a pencil or marker. Cut the base blocks to size and shape, noting the notches and hole locations.

After all the parts are completed, temporarily assemble the table to the base blocks so location and alignment can be checked. Note that the carriage bolts face the same direction to allow removing the table for disk replacement or use

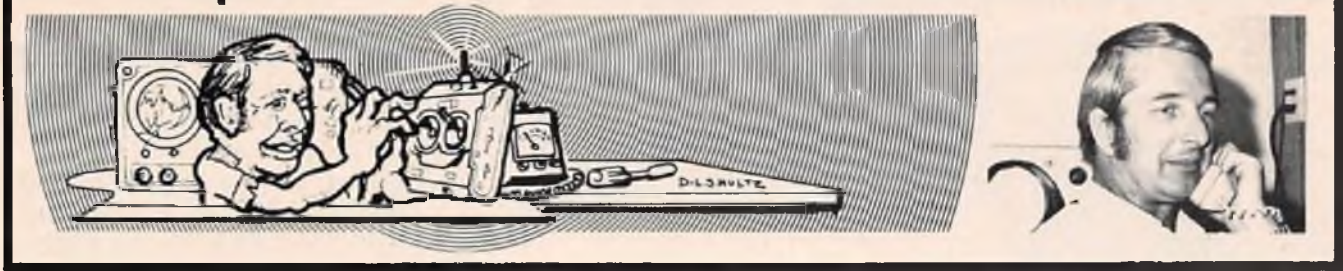


of the flexible shaft. Mark and drill the holes in the saw base for the mounting screws which should be #8 x 1" wood or sheet metal screws. The completed table may now be held in place on the saw base so that the pilot hole locations may be marked on the base blocks. Pilot holes should be 3/32" or 1/8" diameter, depending on the hardness of the wood. When satisfied with the alignment of table and disk, disassemble and finish the wood parts with dope or varnish. Wax or oil based stains could create later finishing problems if they rubbed off onto model parts so they should be avoided.

Proper use of the sanding table requires only that you remember to sand on the left side of the disk, so that the natural turning tendency will pull the sanded piece toward the table. Sanding anywhere else on the disk may cause the work piece to be pulled from your

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## Decoders (continued)

**J**ust got my April issue of RCM which reminded me that I was going to show you some decoder circuits that perform the functions of the block diagram we presented. There are many ways to do it, and if you got the engineers from each of the RC manufacturing companies together, they'd probably all have good reasons why their circuit is best. So if your system isn't like the ones I show you, don't feel too bad.

Figure 1 presents the circuit used in the early RS systems (maybe it is still used) and I also believe by Cannon. I kind of like it because it uses a minimum of parts and includes the reset function we talked about in April.

The transistor provides the threshold circuit. It is biased to the point that it is almost turned on, by means of the diode and two resistors in the base circuit. Current flows through the diode and the 10K resistor which causes a .6 volt drop across the diode. We know that we need .6 volts across the base-emitter junction of a transistor to turn it on, so if we connect the diode right across the transistor, we will turn it on. But we want it "almost" on so we put a resistor between the diode and the base of the transistor. The net result is, that the transistor will now turn on with very small

signals applied to its base from the receiver detector. You can control how small, by changing the 27K resistor. The larger it is, the larger the signal required to turn on the transistor.

The next part may look complicated but those six little triangles represent inverters which are all contained in one integrated circuit. The signal goes in on pin 1 and comes out on pin 12 slightly filtered by capacitor C1. It is basically the same shape but is squared up and very constant amplitude as a result of being amplified in the two inverters. These function as the pulse amplifier we showed in our block diagram.

The sync circuit is made up of a diode, capacitor and inverters 5 and 3. The input to this circuit must have the opposite polarity from the clock (be high with no pulses coming from the receiver) so inverter 2 is inserted. As long as pulses are coming from the receiver, capacitor C2 will be discharged below the threshold of inverter 5. Pins 10 and 5 will go high and pin 6 low. When our transmitter finishes a frame, it doesn't send pulses for seven milliseconds or so. This allows C2 to charge up (current flows from pin 11 into C2) and pins 10 and 5 go low and 6 high. We have now put the data (a one) into pins 1 and 2 of the shift register so the next pulse will put the data into stage one. This comes out

on pin 3 and is our channel 1. The next pulse shifts the data to stage 2 (pin 4) which is channel 2 and so on. Note that as long as the pulses are one to two milliseconds apart, pin 6 is low so no new data is entered. Remember that when I talk about data, I can have either a one or a zero represented by 5 volts or 0 volts respectively. So when I say the data is shifted, I mean pin 3 goes from zero to 5 volts and then from 5 to zero when the data is shifted to channel two. This is what is referred to as a positive going pulse, which requires servos that accept positive pulses. We could have all pins high (5v) and shift zeros around. This is what Pro-Line does and is the reason they require negative pulse servos. This has no advantage and, in fact, has a disadvantage which we'll talk about in a minute.

The reset circuit is similar to the sync circuit, only is designed to look for a longer absence of pulses.

If no pulses come in, C3 charges up, pin 9 goes high, pin 8 low, which causes all outputs to go to zero. This means your servos will not drive hard over if you turn your transmitter off or lose pulses for any other reason. Note that you can't use this feature if you have a negative pulse system. If you reset all outputs to zero, all servos would drive hard over. You can get around this of course by AC

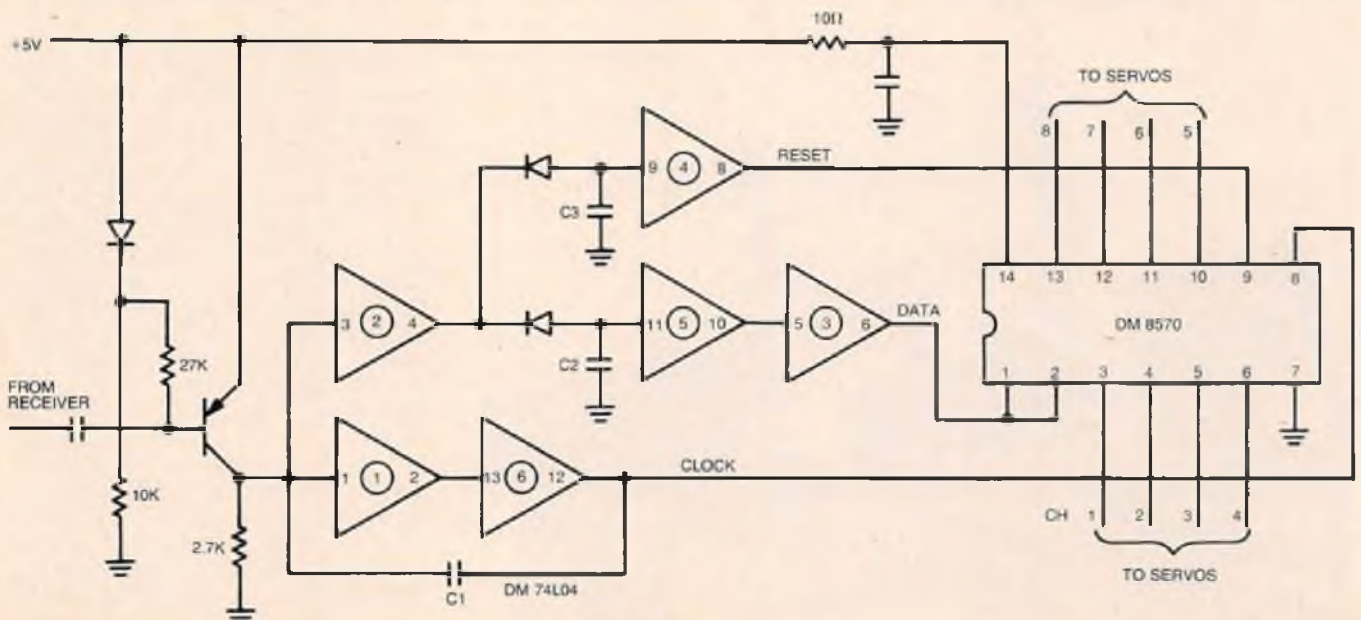


FIGURE 1



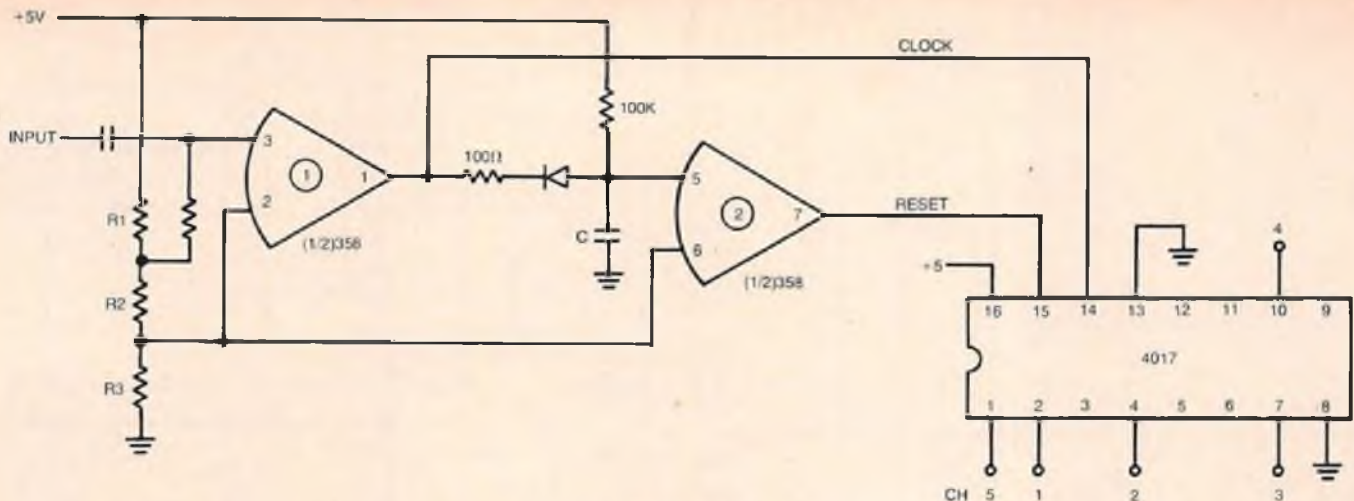


FIGURE 2

coupling, that is, placing a capacitor in the input of each servo.

The circuit just described and many like it have been around for seven or eight years. Kraft has a new approach in his FM systems (it may also be in the four channel) that I think really looks good. It uses a dual OP amp and a CMOS Johnson counter. The counter performs the same function as the shift register, only it kind of combines the sync and reset so a few more parts are saved. See Figure 2.

The two OP amps are in one eight pin dual inline integrated circuit so you can see the whole thing will take very little board space. The OP amps are operated as voltage comparators. R1, R2 and R3 establish the bias on the first OP amp. The larger the voltage drop across R2, the larger the input signal required to switch OP amp number one. Note that it takes a negative going pulse to drive this circuit. OP amp one with the three resistors then performs the function of both the threshold circuit and the pulse amplifier as its output provides the clock to the counter. The sync and reset circuit consists of the diode, 100K resistor, and capacitor C. It works just like those described in the previous circuit except the capacitor is charged through the 100K when no pulses are coming from the receiver. Pretty neat. If I were going to build a new decoder, I think this would be it. If there are any questions, just holler.

• •

#### Encoders (continued)

Before we got off on decoders, we had a series going on encoders. We described one of the new multiplexing schemes, but mentioned that World Engines had decided not to go that way. I hounded Dave Brown to send me some info on their new custom integrated circuit, so after he came through, I figure I better pass it on, or I'll be in big trouble. What they have done may seem like a step backwards at first if we looked at a block diagram because it would look like the encoder used on the very first digital

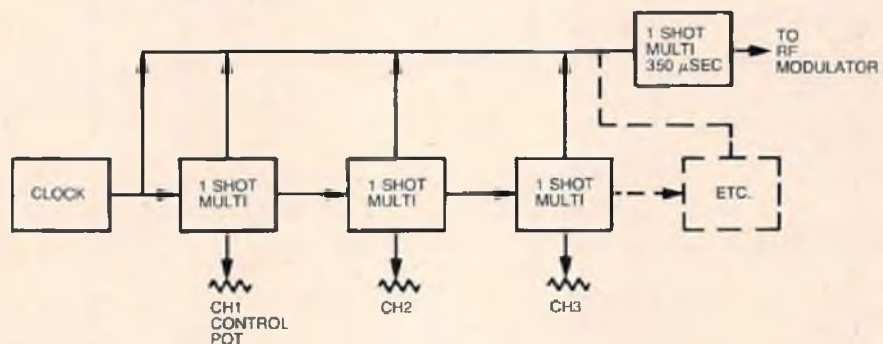


FIGURE 3

systems back in the mid '60's. See Figure 3.

What we have is a series of one shot multivibrators (or monostables) which are turned on in sequence. The clock starts the sequence by turning on multi number 1. When it goes on, it also pulses the 350μsec multi which turns the RF off for 350μsec. The number one multi will stay on for one to two milliseconds, depending on the setting of the control pot. When it finally goes off, it turns on multi number 2 and also pulses the 350μsec multi. This sequence continues for as many multi's as you have channels in your system. The period of the clock, a free running or astable multi, is set to start the sequence over after an appropriate pause to sync the decoder. The only problem with these early circuits was the fact that they took lots of parts. Modern integrated circuits have solved that problem as W.E. has put three multi's in one integrated circuit. It still takes separate timing capacitors and resistors for each channel, but the parts count is way down. Figure 4 shows a three channel encoder.

The circuit includes a voltage regulator that comes out on pin 14 and supplies all the timing circuits. Notice that the periods of the one shots are controlled by voltages that come off the control pots. See Figure 5.

This means you can put in an OP amp and sum together all the trick circuits you

want such as mixers, exponential control, push buttons, etc.

If you add another chip, you have six channels and with a third, you could have eight plus use one section for the 350μsec one shot. Not bad! It doesn't provide the linearity of some of the others, but I'm sure the linearity is good enough.

This might be a real good approach for guys who want to build their own stuff because it should be real easy to get going and trouble shoot if you have problems.

If you don't like that one, here is one to think about. Why not use an NE 544 servo amp as the heart of an encoder? See Figure 6.

I've built this one, but it has some problems. The time T is a function not only of the linear ramp, but also of the off time which is determined by the .01 capacitor on pin 4 and the 1.5K and 10K resistors on pin 7. I wasn't able to make this time stable with temperature. The circuit also draws more current than I like and you can't put more than 6 volts on it. Maybe some of you guys can solve those problems.

• •

#### Algebra Problem Answers

Let's hit some letters. We're still getting lots of answers to the airplane-balloon algebra problem and I must admit there are lot more coming in that recognized the aerodynamics, or physics or relativity or whatever the



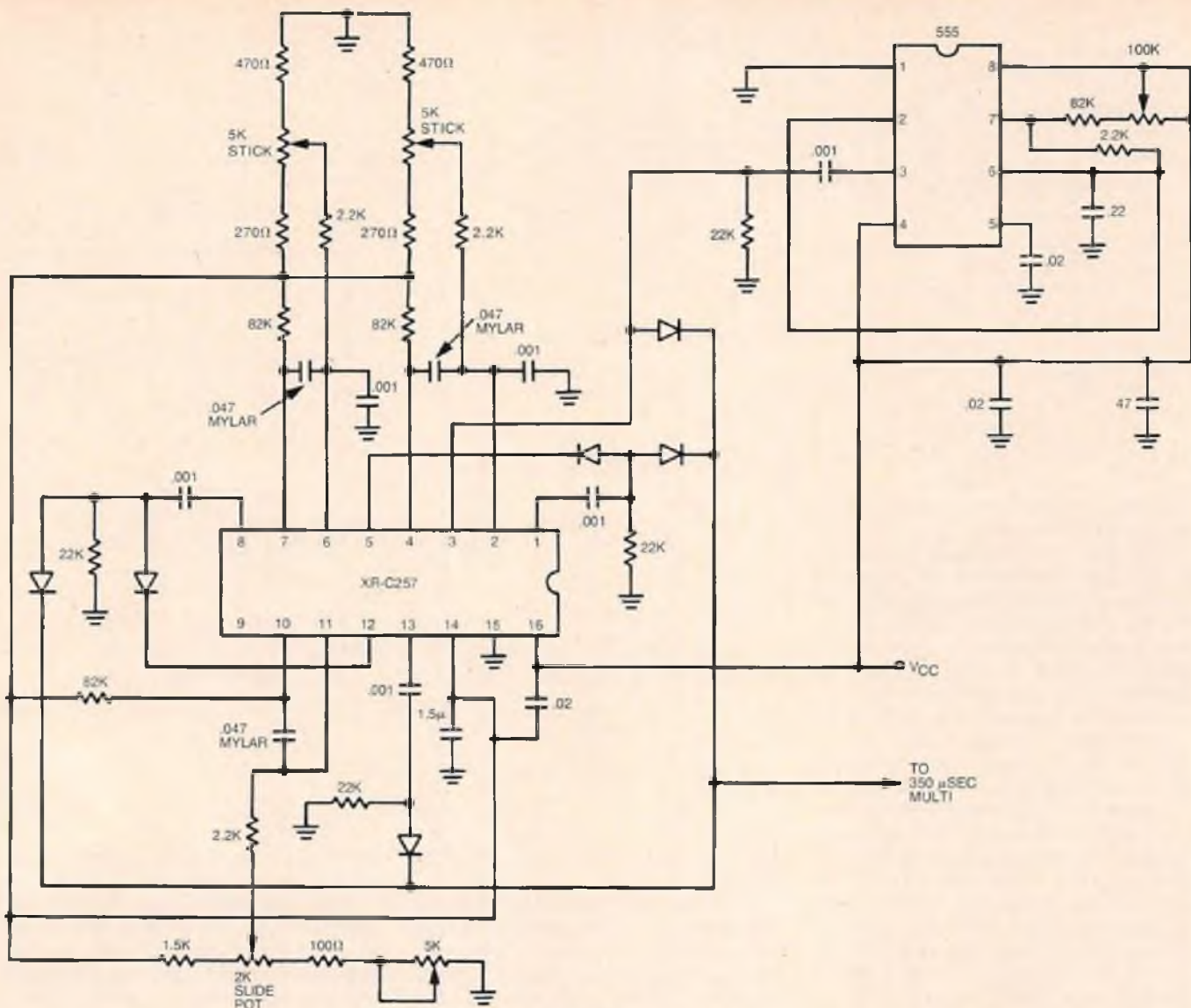


FIGURE 4

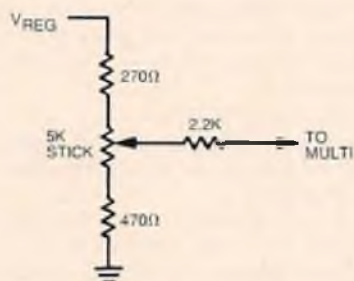


FIGURE 5

principle is. Here is a typical one:

Dear Jim;

Regarding your daughter's problem in Feb. RCM. First off, relative (Newtonian) to the balloon, there is no wind. Therefore, in this coordinate system, the pilot merely flies away from the balloon for an hour and back to the balloon for an hour. As the balloon covers ten miles along the ground in two hours, the balloon speed (or wind speed) relative to the earth is 5 mph. Any old aircraft speed will do for the

aircraft (right?).

Now, are you sure you didn't want a special relativistic calculation where time is different in the two coordinate systems?

Very truly yours,  
Ed German, Jr.  
Baltimore, Maryland

P. de Torcy from Martinique in the French West Indies came up with the same reasoning. He also came up with a very good suggestion and that is to put titles or headings on subjects in the column so they are easier to find when you go back to look for something at a later date. I should have known better because I almost never read "For What It's Worth" for the very same reason. I would like to scan headlines and see if there is anything that interests me. My first boss told me that about my first memo. We'll try to take care of that one.

I had to print the following letter because it came half way around the world.

Dear Jim,

After working out the algebraic solution, I figured out the following logic for solving the problem:

"From pilot's viewpoint the balloon is stationary in the air (no propulsion), and since aircraft's airspeed is the same in either up or downwind direction, then the pilot deduces that: if it took one hour flying away from the balloon, then it takes one hour to return to the balloon, since balloon travelled 10 miles in 2 hours, wind velocity was 5 miles per hour. Aircraft could be anything between a helicopter to a Concorde --- the result is the same."

By the way, thanks for your excellent column which demonstrates that our hobby is a serious one.

Very truly yours,  
Aziz A. Fozzi  
Tehran, Iran

Wish I had known there were some English speaking modelers in Tehran when I visited there in 1972. Maybe I'll get back some day and look you up,



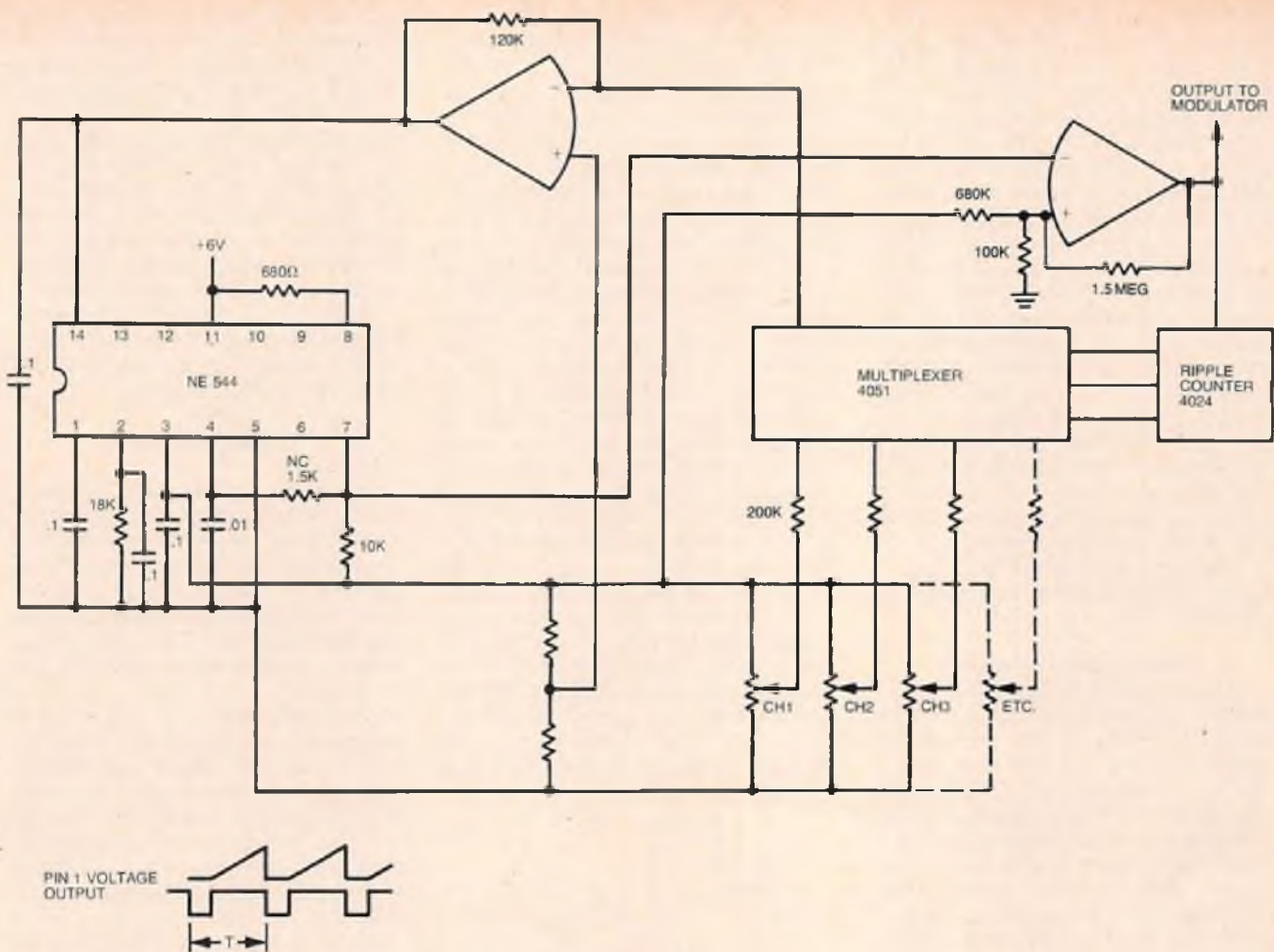


FIGURE 6

Aziz. By the way, these answers came in prior to my printing the solution.

### Transmitter Expanded Scale Voltmeter

The following letter comes from south of the border.

Dear Mr. Oddino:

I have an Expanded Scale Voltmeter from EK-Logictrol and with that tool, I can check adequately my power pack.

This device is for reading voltage from 4.4 to 5.4 DCV. I was thinking that if we can (all friends with this kind of ESV) check also the TX power pack, it would be great.

I also was thinking that this can be done with a special circuit, like a few resistances, and some other components, but, I do not know anything about electronics... so can you supply the diagram, and adequate text to build one?

Your friend in Mexico.

J. Sepulveda

There is a simple way to make a useful transmitter battery tester from the EK ESV, although it won't be perfectly accurate. What you need is a power resistor similar to the one that is already in the ESV. I think EK uses ten ohms

(10Ω). Connect the new one as shown in Figure 7 with a 500 ohm pot across it.

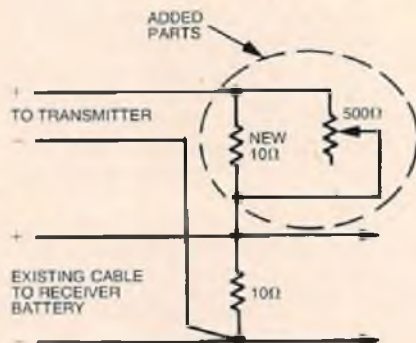


FIGURE 7

You will need a variable voltage supply to calibrate it, however. Set the input to 10 volts and set the 500Ω pot so the meter reads 5 volts. The ESV should then be good enough for what you want. Note that you can only test one or the other at one time. Never plug both in at the same time. When you check the transmitter, just multiply the reading by 2 or you could buy an S & O or Craft-Aire meter which has the capability to check both and be done with it.

### Adding Channels

The following letter is typical of many I get on this subject:

Dear Jim,

I have a Cox/Sanwa 8030 system which was given to me as a present last October. I really need a four channel system since I like to fly "Full House". I have contacted different Cox/Sanwa dealers, including Cox Hobbies, to see if I can have the system changed to a 4 or 6 channel one, but the answers have always been "no". Even Cox Hobbies wouldn't do it. I have tried to sell my system here, but everybody wants a 4 + channel radio and haven't been able to find a place to trade the system in for another one.

If you know of a place where I could send the radio to have it changed or any other way of doing it (even if I have to do the work myself), I would appreciate it very much.

Thank you very much for your help.

Jorge E. Casanova  
307 B Village Lane  
Greensboro, N.C. 27409

It is amazing how many people buy two or three channel radios and then want to expand. I guess if it's a present, you can't do much about it, but if you are



considering purchasing a new system, think about the future. One way to keep initial costs down and still have the capability to expand is the new Ace 10G30 system. You can convert the three channel transmitter to five for \$21.95, and add servos at less than \$25.00 each. Another thing to consider is the frequency. You'd be amazed at the number of guys who want to convert their 27 MHz equipment to 72 MHz and can't get anyone to talk to them. In this case, it is probably most important to choose a company that will stand behind their products and put modifications or conversions in for you, and maintain parts for all their older models. You may be buying a 72 MHz system now, but will the manufacturer be around and provide the parts to convert it to 40 MHz or whatever might become available in the future? Ask yourself that before you buy.

If anyone wants a two channel, I'm sure Jorge would make you a good deal. Drop him a line.

### Charging Small Batteries

Small airplanes are becoming more popular and this means many guys are using 100 mah and 250 mah battery packs. However, most of the chargers that are supplied with RC systems are designed for 500 mah packs and this can cause some problems for the small packs. The Super Cycles and Power Pacers have the same problem. If you connect your 50 ma or 150 ma charger to a 100 mah pack and charge it overnight a few times, you won't have a battery very long. The safe way is to have a charger that charges at C/10 or 10 ma for the 100 mah pack or 25 ma for the 250 mah pack. This can usually be done by adding a dropping resistor in series with the existing charger. See Figure 8.

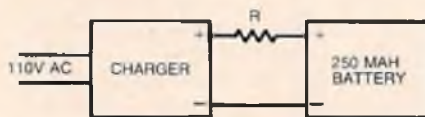


FIGURE 8

I can't tell you what value to use because there are a variety of chargers in use. The safe way is to put a milliammeter in the circuit and adjust R to give the current you want.

An alternate method is to use the Super Cycle or Power Pacer, discharge the batteries first, and then charge for a fixed amount of time. You could charge your 250 mah pack at 50 ma for about 7½ hours without overcharging (if you started with a discharged pack). However if you forget to take them off, you're in trouble.

The best way might be to use a fast charger which you can do right at the field. Plug it in for fifteen minutes and you're ready to go. Fly all day with the small pack.

### New "Trick" Circuit

One of the problems I've had with my Curare is the inability to find a combination that will trim the airplane to fly straight and level in neutral elevator and also fly straight up with neutral elevator. I gave up trying after talking to Bruno Giezendanner at California City last year. He was flying Phil Kraft's Curare and I asked him how he liked it. He said he didn't, because it wouldn't fly vertical without holding in a little down elevator. That made me feel a little better, I wasn't the only one with the problem, but it wasn't going to help me beat Dave Brown and those other guys who manage to get perfect vertical legs on their Figure M's, etc. I considered another switch on the transmitter to change trim when I pulled vertical, but I've got too many things to remember now so I resisted that one. I finally decided to make it automatic by installing a "G switch" in the airplane that sensed when I was right side up and added some up trim. If I'm vertical or upside down, I get a little down trim. I used the guts out of a General Electric household mercury switch. The switch is in series with a trim pot which establishes the change in trim. See Figure 9.

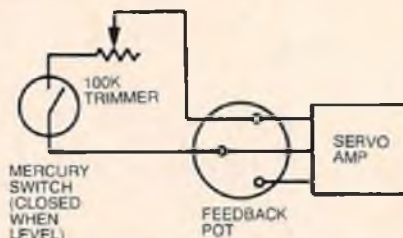


FIGURE 9

I took a guess at the original setting which was something less than 1/32" at the trailing edge of the elevator. It was too much. The airplane actually climbed when I flew inverted. After adjusting it, I felt it helped in the vertical stuff and also rolling maneuvers. However, I was not

completely happy with the loops. Part of the problem is the fact that this particular switch requires plus or minus 90° of rotation to open it, so it switches at bad times during loops. If anyone knows of a mercury switch that would only close over a small angle, let me know. I'm going to have to fly this a lot more before I decide whether it's worth it. The fact that it takes so little change makes me think there probably is a way to trim the airplane to do what I want without it.

I know a lot of guys will consider this cheating, but a lot of others might enjoy rolling over and having the airplane fly just like it was right side up.

### Strong Servos

Dear Jim,

You will no doubt be quite surprised to receive this letter, and the enclosed, but I am afraid you have only yourself to blame! In fact, what sparked me off was your article a couple of months ago in which you talked about the ideal radio, and mentioned in it the need for big, powerful and precise servos for big, fast flying planes.

Pierre Marrot, with whom I am associated closely, and who was one time World Silver Medalist in Pattern (Ajaccio), has developed the enclosed servo for just that reason, and also for R/C cars, where the stresses can be pretty high. We thought that you might be interested in taking a look at one, and maybe trying it out.

There are two pots enclosed and an 8 ohm motor, which is medium speed, for planes. In boats and cars, we use a 3 ohm for high speed, and power. There is no amplifier enclosed, so that you can try your own on it.

The servos are being handled in the States by Sid Gates of Royal Electronics, Colorado, and while sales are slow at the moment, we are hoping that things will pick up.

Anyway Jim, no arm-twisting or anything, just have a look at it, and then

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# RCM PRODUCT TEST

**Sig Mfg. Co.**  
**SMITH MINI-PLANE**



**S**ig Mfg. Co., Inc., has presented the Smith Miniplane as a "Craftsman Kit". The Miniplane is a high quality R/C kit of the full size airplane that is primarily responsible for generating the current interest in small homebuilt biplanes. Mike Gretz designed the kit which is modeled after the full size Miniplane owned by Sig.

My kit was received in good condition which seems to be the first big test of a kit now days. Upon opening the box I was impressed by the good quality material and the kit packing job. My first impression was that I would have a big job ahead of me. (Lots of pieces, lots of work.) Fortunately, the kit builds very quickly.

In my attempt to evaluate a kit I do read the instruction manual and follow the plans. Sig is to be commended for their excellent plans and instruction manual. I would not suggest this kit for a 1st model but I feel that **anyone** who can read and understand could build an acceptable model by following the instructions.

In my opinion, there are only a couple things that you should be aware of when building this kit. Be sure to follow the instructions — when it says to drill the fire wall and install the blind nuts. I didn't do that in the proper order and ended up with a hole to cut in the plywood cabane mount plate in order to get one blind nut installed. It took more time to correct than if I had paid attention to begin with.

As you progress with mounting the tubing used for the cabane mounts, be sure to not over-tighten the "J" bolts. I

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IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts			NA		
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		●									

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

## SPECIFICATIONS

Name	Smith Mini-Plane
Aircraft Type	Sport/Scale Biplane
Manufactured By	Sig Mfg. Co., Inc. Route 1, Box 1 Montezuma, Iowa 50171
Mfg. Suggested Retail Price	\$49.95
Available From	Both Mfg. and Retail Outlets
Mfg. Recommended Usage	General Sport or Stand-Off Scale
Wing Span	44 Inches
Wing Chord	7 3/4 Inches
Total Wing Area	650 Square Inches
Fuselage Length	40 3/4 Inches
Radio Compartment Dimensions	(L) 8" x (W) 3 1/2" x (H) 3"
Wing Location	Biplane
Airfoil	Semi-Symmetrical
Wing Planform	Constant Chord
Dihedral	5/8" (Lower wing — top wing flat)
Stabilizer Span	18 3/4 Inches
Stabilizer Chord (incl. elev.)	6 3/4 Inches
Total Stab Area	126 1/2 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top of Fuselage
Vertical Fin Height	9 Inches
Vertical Fin Width (incl. rud.)	8 Inches
Mfg. Rec. Engine Range	.40-.45
Recommended Fuel Tank Size	10 Ounces
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, Ply
Tail Surfaces	Balsa
Hardware Included In Kit	Very Complete
Plan Size	38" x 50" (2 sheets)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes
Construction Photos	Yes
Kit Includes	Printed Parts, Die Cut Parts
Mfg. Rec. Flying Weight	80 Oz.
Wing loading based on rec. flying wt.	17.74

## RCM PROTOTYPE

Weight, Ready To Fly	84 Ounces
Wing Loading	18.63 oz./sq. ft.
Covering & finishing materials used	.Sig silk, Supercat, & DJ trim
Engine Make and Disp.	.K & B 40 Pumper
Muffler Used	.Tatone
Radio Used	.Cox/Sarwa 4 Channel
Tank Size Used	.10 Ounce



# Power Boating DAVID THOMAS



**A**s usual I'll start with the new products, and the first is the Astro-Flight 05 electric motor and power-pak. Of course, it is by no means new on the market, but it is new in the sense that until this time I have not used it. Bob Boucher of Astro-Flight very kindly sent me one to try out. And I must say straight away that it is for a specific purpose.



**Astro-Flight Marine 05 electric motor - complete with plastic mounting - and power pack - four 1.2 ah nicad quick-charge cells.**

I have had quite a few letters expressing interest in the balloon bursting game I suggested some months back, and I am currently designing a hull suitable for it. I thought it would be a good idea to use the 05 as the standard motor, since it is readily available, reasonably priced, and American-made.

The marine 05 comes complete with a plastic mounting and a power-pak in a plastic container. It is equipped with a special adapter on the shaft, to take aero propellers, and I must confess that this caused a bit of difficulty concerning the coupling for the boat, but that is another story, and easily resolved. The very first thing I did was to run the motor without load for about an hour on 6 volts, to get the brushes well bedded-in. This is a point that many people don't appreciate - if you run a new electric motor straight away under load, the brushes will arc, and damage the collector. The result will be a motor which is down on power compared to one that has been run-in and, in addition, it will run hotter.

Having broken it in, I fitted a Cox 6/3 prop, and ran some tests on it, at a series of different voltages, to compare it with the Mabuchi 54. The tests, over a range of speeds from 5,000 to 11,000 rpm, were within 100 rpm on both motors which would seem to indicate that there is no difference between them. I would,



**05 compared with Mabuchi RS 54 electric motor. Trials show that these two motors are almost identical in power at all speeds.**

therefore, suggest that the Astro Flight be the standard motor for the balloon game, since it is the more readily available. We'll come back to this one when I finalize the plan for the boat.

Once you have the motor, some means of controlling it is necessary. Now I have to try out the Workrite Controller which the firm sent me, to see how it performs in a boat. This speed controller was designed for work in electric cars, running on either 4 or 6 volts, so it should suit our purposes just fine.

Basically, it is a circular printed circuit board, which is glued to the top of a servo. It is designed specifically for the Futaba, which is **not** supplied with the kit - over which runs a wiper arm. The segments on the board are linked to the motor through a series of 7W 0.25 ohm resistors. According to the position of the wiper, controlled by the transmitter stick, you can get a series of speeds ranging from off right through to maximum. One of the advantages of this kind of set-up is that there is no power loss on top speed - - - as there is on so many electronic controllers. Another advantage is that dynamic braking is available, and if you haven't seen a lightweight boat equipped with this facility, you will be surprised when you do - - - the model literally stops dead from full speed. This will obviously provide a useful tactic in the balloon bursting game, causing the other guy to overshoot, if you're clever. Finally, there is also a reverse, which is pretty useful too. And all this off of one servo.

There are, however, two disadvantages (at least for the category of boat we are talking about). One is the weight, which while not enormous, is

relatively high when we are considering a boat with an all-up weight of about 2½ lbs, which is what the prototype looks like it is working out at. This will, of course, be offset to a great extent by the fact that at high speed the total battery voltage will be available across the engine terminals. The other disadvantage is the size of the thing but, again, it is relative. In the small model in question, I shall manage to get it in okay, but there won't be a lot of room left over.

I should think that the Workrite Controller would be absolutely ideal on scale model ships, where size is no problem and where weight can be a distinct advantage. The accompanying literature suggests that a 12 volt 10 amp fuse be fitted, so the unit should be capable of handling in excess of 120 watts, and I can imagine few scale models using higher power than that. While on the subject of scale, it seems obvious that here is a device that, with very little adaptation, could be used to activate a whole series of things on a ship, such as lights, horn, guns, rockets, radar, and anything else you can think of, simply by not hooking up the resistors and using one each of the eight speed positions per function, the other side being linked to the ground line.

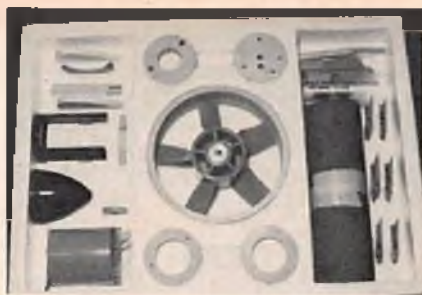


**Workrite electric controller, designed for 1/12 scale cars, but excellent for boats. Photo shows printed circuit board, wiper fixed to Futaba servo disc, on/off switch and charge jack, and resistor bank.**

As soon as I get the time to test this product, I'll tell you what I think of it. In the meantime, if anyone is interested in obtaining one, the address to write to is: Workrite R/C Hobby, 7009 Beaty Ave., Ft. Wayne, Indiana 46809.

The third item this month is the new Midwest Turb-Ax unit, which is a ducted fan for .40 size engines. And before anyone starts thinking that I have gone round the bend, forget it, I haven't. While this unit is designed primarily for planes,





**New Mid-West Axiflo-40 turbine unit. Designed for planes, this also will find use in the boating world, eliminating airscrews which have a nasty habit of trying to chop fingers off!**

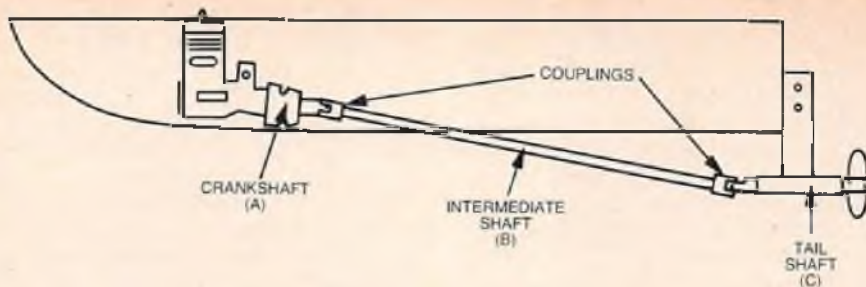
I see no reason at all why we shouldn't use it for a boat. The plan is to fix it on a catamaran and see what happens. With about 71 lbs of static thrust on a K & B .40 front rotor engine, it should be pretty fast, especially if I can work out some way of steering the thing that doesn't necessitate water rudders. Just think, folks, you could run the thing in puddles an inch deep, and make it take off over a ski-jump. There isn't even any torque problem! So far I have just started building the unit, so this is a project for the future.

Finally, I should like to just mention the M.A.C.K. Products gearbox I mentioned some months ago. Nope, I haven't forgotten it. The truth is that I am building it into an enormous torpedo boat, and the hull is an all wooden construction kit, definitely not A.R.T.F. With so many other projects on hand, this one is taking a little time. So my apologies to M.A.C.K. and anyone who might be waiting for the results - - - hang in there, fellows, we'll get there in the end!

\*\*\*

I have had several letters over the past few months asking about the source of strong vibrations in models — three-point and deep V — which use parallel drive systems. Okay, let's take a look at the possible reasons: First of all, you need to check that the engine is mounted securely, and that the area of hull floor around the engine mount has been reinforced. This is one thing that many people don't think about. All engines vibrate, to a greater or lesser degree, and if the hull floor is too thin, it will twist, provoking temporary and periodic misalignment of the crankshaft and prop shaft. So the first thing to do is to grab the engine firmly and try to wiggle it around. If it moves a couple of millimeters, in any direction, reinforce the hull floor, preferably with a couple of layers of fiberglass cloth and resin. Extend this reinforcement to the prop tube exit.

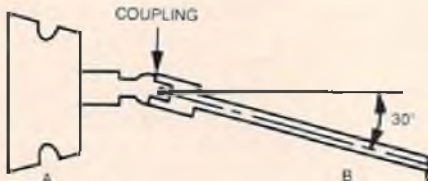
Having checked this point, we now have to move into the world of homocinetics. This is not as bad as it sounds, believe me, and no one is going to get blinded by science; all it means is



**FIGURE 1**  
TYPICAL PARALLEL DRIVE SET-UP

getting everything the same. (For those interested in etymology, the Greek prefix homos means quite literally, the same.) Okay, so what do we have to get the same?

To answer that question, let's take a look at a typical set-up using a parallel drive unit (Figure 1). Basically, we have three shafts; the crankshaft, intermediate, and tail shaft, and they are linked together by two ball and pin couplings. It is these couplings which can cause a lot of trouble.



**FIGURE 2**

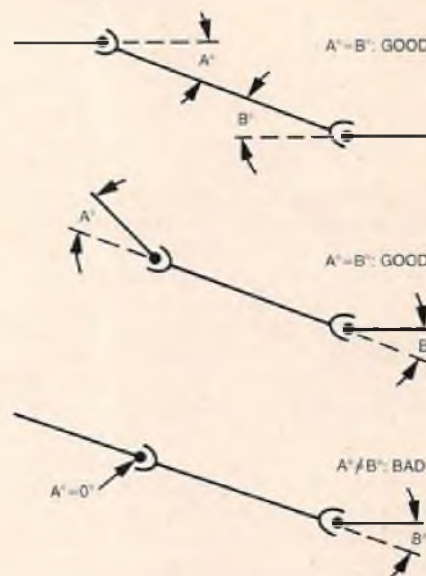
Now take a look at Figure 2. Here we have the coupling linking the engine to the intermediate shaft. The angle between them is about 30°, for the sake of argument. At this, or any other angle, a phenomenon of acceleration and deceleration takes place. In other words, while the crankshaft revs remain constant, the intermediate shaft will turn faster, then slower, than the crankshaft, during one revolution of the latter. A look at the graph will show this more clearly. It can be seen from this, that for a constant crankshaft speed of 1,000 rpm the intermediate will vary between 860 and 1,150 rpm. This fluctuation, in itself, would be enough to cause quite serious vibrations. However, there is an easy way to avoid it. At the other end of the intermediate shaft there is another coupling. Supposing that both ends of

DIAGRAM SHOWING BOTH FEMALE COUPLING PARTS ON INTERMEDIATE SHAFT IN LINE, AND NOT AT 90° TO EACH OTHER

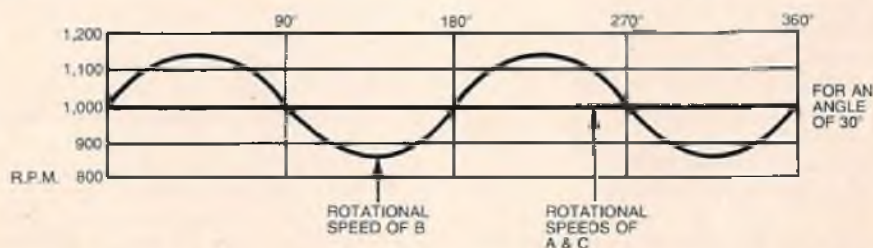


**FIGURE 4**

the intermediate have the female, or ball, half of the coupling; then by lining-up the slits in the two halves, we automatically have a situation where the differences in speed caused by the geometry cancel one another out. In other words, the acceleration to 1,150 rpm in the intermediate will cause the tail shaft, in the deceleration phase, to turn at 1,000 rpm. Thus the errors, if you like,



**FIGURE 5**



**FIGURE 3**



cancel themselves out.

Great, isn't it? But there is a snag, and this is the most common fault I have found. The two angles must be identical, otherwise the degrees of acceleration and deceleration will be different. And this is where a lot of people make mistakes. For instance, they line the crankshaft up with the intermediate, and then, naturally, have the tail shaft at something like 15° to the intermediate. Thus, there is no error induced in one coupling, and an error, not cancelled out, at the other.

To all this can be added several things. First, the smaller the angles involved the more efficient the system is; and at the speeds that modern two-cycle engines turn, it is obviously important to reduce these angles as far as possible. Second, the greater the angle, the greater the induced difference in rotational speed; for example, 5% at 10°, 10% at 20°, and so on.

So just remember, to get a homocinetically efficient system, get the couplings in line, and not at 90° to each other, and keep the two angles the same and as small as possible. This alone will reduce the vibration level of the model considerably.



FIGURE 6

Another source of vibration can come from the position of the bearings. It is very important to have these as close to the end of the shaft as possible. If not, the shaft will whip. Now, you can take this as a solid truth, despite what anyone cares to tell you. Two years ago I had a racing model with a Webra Speed 60 rear engine in it, running on a single 5mm silver-steel (not parallel drive). The level of vibration at speed was considerable. The shaft was then changed for an 8mm diameter rod, and the vibration level dropped considerably. Subsequent talks with a very highly qualified aerospace technician taught me that this is a very common phenomenon, and hard to overcome, because the whip occurs in the first third of the shaft. So it is very important to support the shaft as near to the bearing as possible.

And there it is; I hope that will be of some use to those of you who have been having this sort of problem.

\*\*\*

A short but interesting letter comes from John Buziak of Silver Springs, N.Y., on the subject of scale models. John is

building a 7' scale model (unfortunately he doesn't say of what), and wants to know, (a) if there are any batteries for radios with greater than average endurance for a moderate increase in weight, and (b) information on electric motors for a model of this size.

Well, in the first place, the last thing I would worry about if I were building a model of this size would be weight. John is going to find that, unless he builds the model from lead, he is going to need a lot of ballast to get down to the scale waterline. I have always been of the opinion that it is better to use ballast which is useful, rather than ballast which is just so much weight. Here is the ideal example. John, get yourself some sub-C nicads, (I use them in my multi racers, and they give me around 6 hours running time). This is going to be more than you will ever use, because you will have a job to get main drive motor batteries which will last one third of this time. Alternatively, you can tap 6 volts of the drive batteries with a resistor to drop the voltage to 4.8v, but I must confess that this is more Jim Oddino's department than mine.

As far as electric motors go, your best bet is a trip to the nearest automobile junk yard. Here you should look around for a couple of windshield wiper motors. I have had personal experience using one particular model — the one that comes from the Volkswagon "Beetle". This is rated 12 volts, but will take 18v with no trouble, and absorb 200 watts without overheating. A couple of these should be quite sufficient to push that big model along. An alternative could be a small automobile starter motor, but the snag here is weight, and the fact that it will run the drive batteries down very quickly. Or you could hunt around and find a Honda motorcycle starter motor. This is a geared unit, and the gears have to be stripped off, making it a lot lighter. But, quite honestly, I am sure that the windshield wiper motors will be more than sufficient.

As far as the main drive batteries are concerned, here is a good tip for you, John. Get friendly with you local automobile electrical repair man. Explain to him that you want four used car batteries, ones capable of delivering about 30 amps. A lot of car batteries get changed because one cell goes 'high'. This means that it will no longer deliver the very heavy currents required for starting the car engine, but may still be capable of giving you 25-30 amps. Get him to check out all his old batteries, waiting for scrap, with a heavy duty discharge tester. That way you will have two sets of batteries to run your ship, for next to nothing, and they will last a year. I personally use this sort of batteries for recharging nicads rapidly, so you can take it from me that the system works, and saves a lot of money.

One last thing, John, and I can't repeat

this often enough: Either you have direct drive and you use small props which will allow the motors to turn fast; or you use scale props, in which case you **have** to gear the motors. Be warned, if you use scale props on direct drive with a model this size I'll give your motors 10 minutes maximum before they melt, if not sooner.

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Harold Roach of Danville, Virginia, writes to ask if I can put him in touch with someone who can help him with steam power. Sure I can, Harold, just write to me! The truth is that I am getting ready to write about steam, and am in the process of building a pretty powerful twin-cylinder engine and boiler. (And the answer to those of you who are wondering is: I don't sleep, I model 24 hours a day 365 days a year, and in spare moments I get worried about what I am going to do on February 29th in Leap Years!) All joking apart, Harold, if you want to get some documentation on this subject, M.A.P., Bridge Street, Hemel Hempstead, Herts, England, have a terrific selection of modeling books, and among them, some on all aspects of steam models. I suggest you write them and ask for advice on what books to buy. I have several, they are full of technical information, are highly competent, and very low priced.

Harold mentions in his letter that he is particularly interested in endurance and speed control. Well, I happen to know that there is a club in France that is very actively promoting steam endurance racing, half an hour races in two categories, for boats up to 71 lbs. and boats over this weight. I don't have any more information at this time, but I'll try to get some. Steam is, in fact, becoming very popular again, especially with the availability of the new Japanese engines and boilers, which are sold all ready to go, and even with a reversing facility. I haven't actually had one in my hands, but have heard good reports about them. If there is an importer around who would like me to try one out and write it up, I should be more than interested.

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Finally, a letter from Ft. Worth, Texas. While this letter is not of very general interest insomuch as the writer, Robert Borchardt, wants to know names and addresses of boat manufacturers, and not just dealers. Well, Robert, you have to understand straight away that these names and addresses would be of little use to you, since manufacturers only sell to accredited dealers, to whom you must go to buy their products. The few who do sell direct will do so at the regular retail price, so there is nothing to be gained by dealing direct with them. However, if you must do so, then I suggest you look through the ads and Showcase in a few back issues of RCM. In addition, I remember seeing an ad for a directory of

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# RCM PRODUCT TEST

**Ace RC Inc.  
GLH II**



**A**ce R/C Inc., noted as one of the pioneers in 1/2A, has kitted George Kurrick's 1/2A racer whose formal name of "Goes Like Heck" has been shortened to G.L.H. Ace is offering the model in two versions, one with a foam wing and the other using a built up structure. The foam wing version is priced at \$16.95 while the built up version costs \$18.95. Both versions have a 32 1/4" wing span with an area of 205 square inches. In order to attain maximum performance, the standard Ace foam supplied in that version is modified with a sanding block to provide a thinner airfoil. We tested the foam wing version and had no problems with any part of the construction.

The fuselage sides are die-cut from 3/32" stiffeners on the rear top and bottom, covered with 1/4" foam. The top front is of 1/8" precut Pop Ply, covered with 1/8" foam, while the bottom consists of 2 removable 1/8" Pop Ply hatches covered with 1/4" foam. These hatches give full access to both radio and fuel tank. In order to protect the bottom of the fuselage bottom from abrasion when landing, a two piece, faired in, tandem landing gear is provided with the fore and aft sections epoxied to their respective hatches. A 1/16" music wire plywood supported tail skid keeps the 3/32" sheet tail surfaces off the ground. The wing has a constant chord, swept back at 15 degrees and recontoured for speed. A triangular spruce leading edge not only adds strength but also protects the wing leading edge from dings. The foam cores have an accurately cut groove for the 1/8" spruce spar. A shaped trailing edge of 1/4 x 3/4" balsa is provided to finish the rear of the center section and to make the ailerons. The wing tips are of plywood and extend over the aileron ends. In addition, the tips are used as a pattern when recontouring the airfoil, prior to joining the wing panels. The kit includes an Ace 1" spinner, and Ace motor mount, the elevator horn, aileron linkage and appropriate screws and bolts.

The wing is permanently mounted, with the foam fuselage covering faired into the leading and trailing edges. The engine is mounted in an upright position and is fully accessible inside the lower half of the nose section which is faired into the fuselage.

Our test model was covered with Solarfilm and trimmed with DJ's tape. Since we were not planning on racing it right away and since our stock of TD .049's was in use elsewhere, we powered it with an .049 Medallion, fueled by a 2 ounce tank.

For control we used an Ace Digital Commander 1-8 with their new micro-servo equipped flite pack and a 225 ma battery pack. With this set-up the model weighed in at 22 ounces. Even though this was 2 ounces heavier than called for and even though our Medallion was not as powerful as a TD, she flew like a dream with very little trim adjustment required. It was fast and groovy with a flat glide and no marked bad flight

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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			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		●									

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

## SPECIFICATIONS

Name ..... GLH II  
 Aircraft Type ..... 1/2A Racer  
 Manufactured By ..... Ace R/C Inc.  
 Box 511, 116 W. 19 St.  
 Higginsville, Missouri 64037

### Mfg. Suggested Retail Price:

..... \$16.95 foam wing — \$18.95 built-up wing  
 Available From ..... Both Mfg. & Retail  
 Mfg. Recommended Usage ..... Comp/Sport  
 Wing Span ..... 32 1/4 Inches  
 Wing Chord ..... 6 3/8 Inches  
 Total Wing Area ..... 205 Square Inches  
 Fuselage Length ..... 26 1/2 Inches  
 Radio Compartment Dimensions ..... (L) 6 1/4" x (W) 1 3/4" x (H) 2 1/4"  
 Wing Location ..... Shoulder Wing  
 Airfoil ..... Semi-Symmetrical  
 Wing Planform ..... Swept back-Constant Chord  
 Stabilizer Span ..... 9 3/4 Inches  
 Stabilizer Chord (incl. elev.) ..... 3 1/2" (Avg.)  
 Total Stab Area ..... 34 1/4 sq. in.  
 Stab Airfoil Section ..... Flat  
 Stabilizer Location ..... Top Of Fuselage  
 Vertical Fin Height ..... 3 3/8 Inches  
 Vertical Fin Width (incl. rud.) ..... 4-1/16" (Avg.)  
 Mfg. Rec. Engine Range ..... .049-.051 Cu. In.  
 Recommended Fuel Tank Size ..... 2 Ounce  
 Landing Gear ..... Tandem  
 Recommended No. Of Channels ..... 2  
 Recommended Control Functions ..... Elevator & Ailerons  
 Basic Materials Used In Construction:  
 Fuselage ..... Balsa, Ply & Foam  
 Wing ..... Ply, Hardwood & Foam  
 Tail Surfaces ..... Balsa  
 Hardware Included In Kit ..... See Text  
 Plan Size ..... 20" x 28" (1 sheet)  
 Building Instructions on Plan Sheets ..... Yes  
 Instruction Manual ..... No  
 Construction Photos ..... Yes  
 Kit Includes ..... Die Cut Parts  
 Mfg. Rec. Flying Weight ..... 20 Ounces  
 Wing loading based on rec. flying wt. .... 14.4 oz./sq. ft.

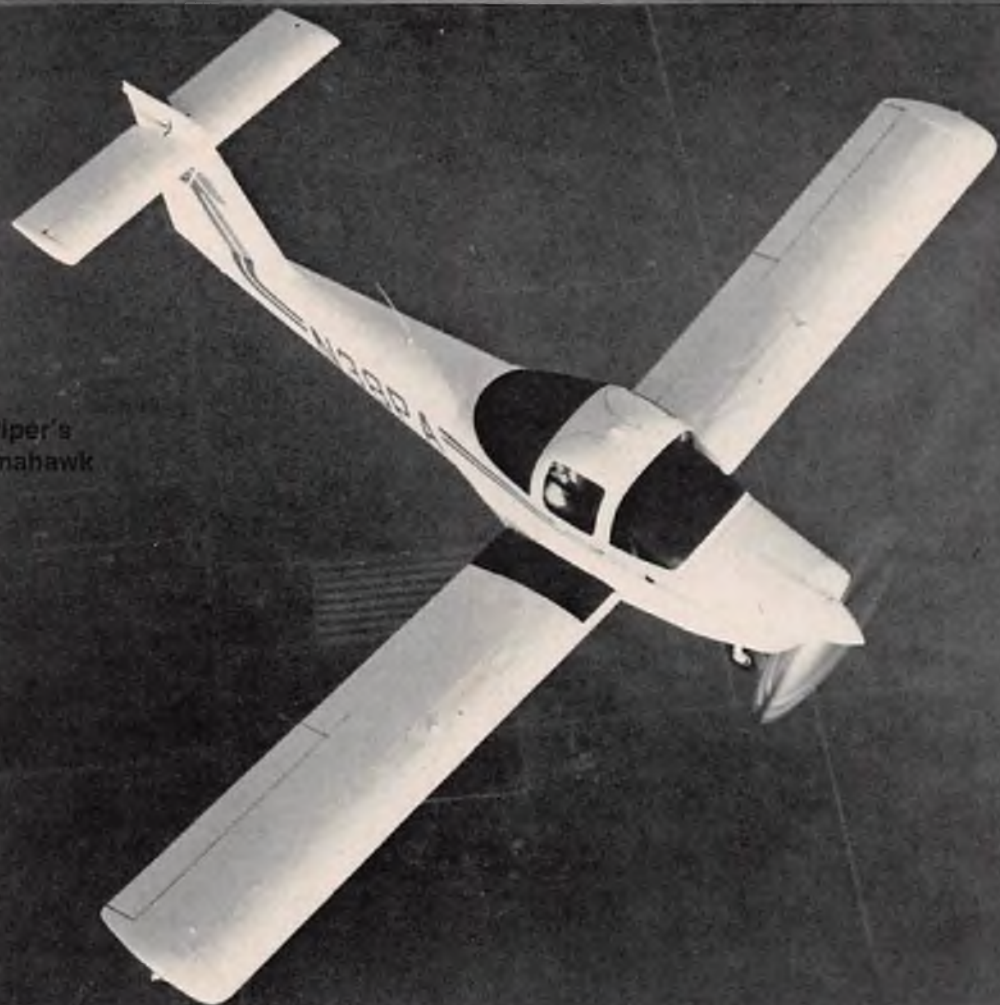
## RCM PROTOTYPE

Weight, Ready To Fly ..... 22 Ounces  
 Wing Loading ..... 15.7 oz./sq. ft.  
 Covering & finishing materials used ..... See Text  
 Engine Make & Disp. .... Cox .049 Medallion  
 Muffler Used ..... No  
 Radio Used ..... Ace  
 Tank Size Used ..... 2 Ounce





1978 Piper's  
New Tomahawk



# TRANSITIONING

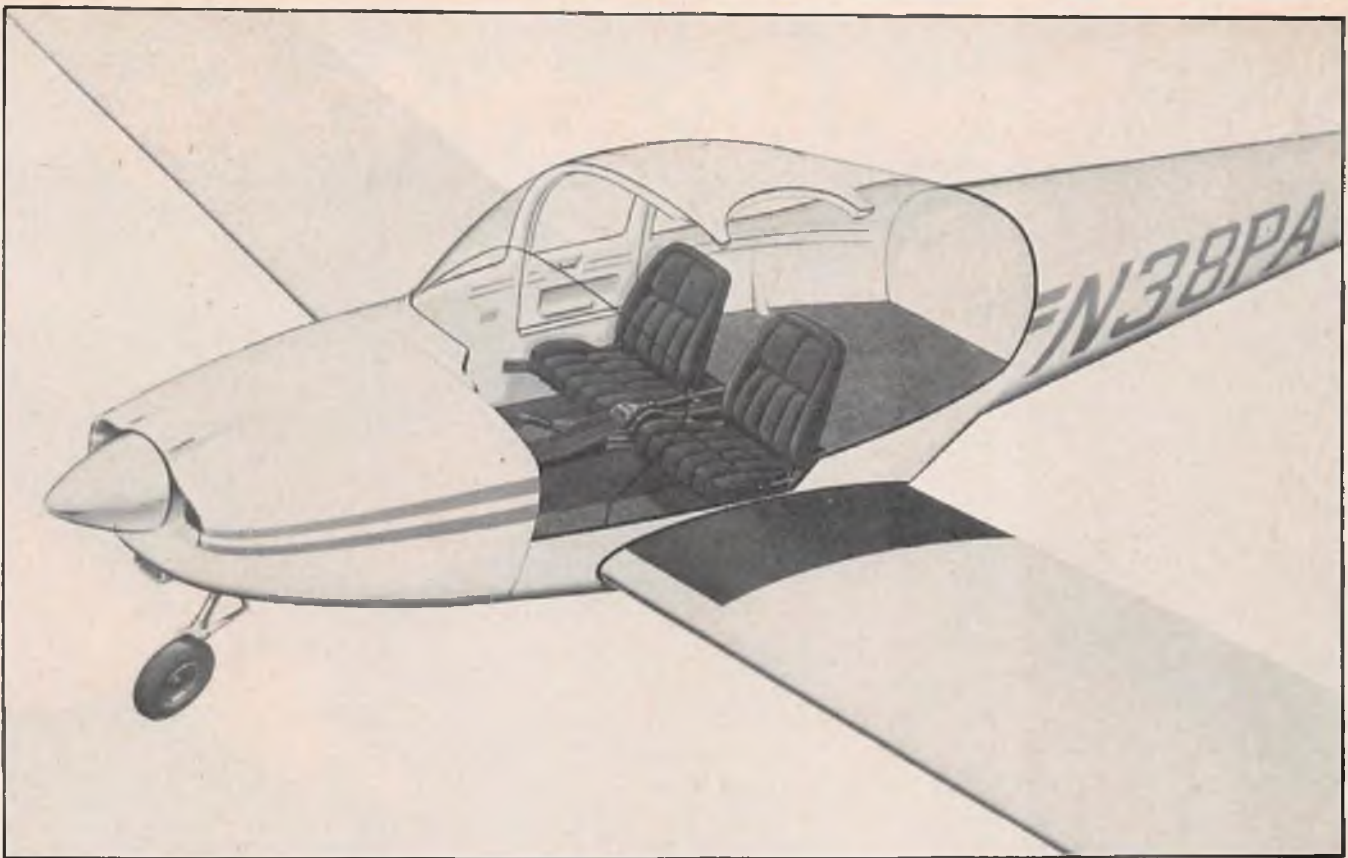
R/C Piloting To Full Scale Flying

PART III

PHOTOS COURTESY OF PIPER AIRCRAFT CORP.

By Arthur J. Sabin





**D**ensity altitude, "KIAS", Mean Sea Level, flight computer, "dead reckoning", "DME", Fractocumulus, "VORTAC", "FAR Part 91", "Zulu Time". If this all sounds like a different language, in fact it is — part of the language of flight. Indeed, there is a different world when you transition from R/C piloting to undertaking full scale flying. There was a new world of language and ideas that you had to absorb and understand in order to build, install R/C gear and fly R/C aircraft, but that which must be absorbed, understood and used as a student pilot working toward that private pilot license constitutes a challenge that honestly belittles that which must be understood and utilized for reasonable safe and competent R/C piloting.

I wonder whether you heard the statement made that I remember when "the going got rough" in learning how to fly an R/C model: that statement, given as an absolute verity, was to the effect that learning to fly a radio control model is **just as hard** as learning to fly a full scale aircraft. Given the difficulties that the average individual (including me!) experienced in that undertaking, it was readily believed. Believed, that is, until undertaking the transition to full scale flight. This is not to denigrate the efforts and even study that must be put into becoming a really proficient, perhaps expert R/C pilot. But then, most R/C pilots are satisfied when they have developed reasonably competent flying

skills, when, as it is often put, you can bring back in one piece that which you took out to the field. Undoubtedly, there are many private pilots of full scale craft that fly pretty much the same way, that lack the desire to really develop necessary proficiency and to take a professional approach to the piloting responsibility. The difference is, however, both obvious and crucial, the irresponsible R/C pilot will probably lose his model and may hurt himself or someone else in the process. The undertrained or irresponsible private pilots can cause a great deal more in the way of tragedy to himself and to others through less than adequate performance.

Assuming that you are realistically willing to diligently undertake the private pilot training, what are your options in terms of that training? An answer to that all important question will be the theme of this installment.

Some realistic appraisal is necessary on a very personal sort before you even begin to search out the kind of pilot training that makes the most sense and is the most appealing to you. That personal appraisal takes a number of dimensions, not the least of which is the necessity of making it a family decision where you are a family person. Assuming that family is there by virtue of a marriage, you really **do** have to have the support and encouragement of your wife or husband. After all, you are not giving up R/C modeling or flying; you are


adding another dimension to your flying experience. That means time and money. If you've had to battle for the hours you have spent in building, if you have experienced moans and groans about spending those hours at the flying field, should you realistically be ready to stretch the relationship to include many, many hours of study time at home combined with more hours devoted to those flying lessons? Is your spouse the type who will ultimately accept and even encourage your participation? Will your spouse ever get into that plane with you or risk the children as well? If the realistic appraisal that you must make is negative; if you've gone about as far as you can go in terms of time devoted to R/C modeling; if your spouse doesn't get "turned on" to the idea of flying cross-country with you; then realistically — forget it. In this undertaking you will need a tremendous amount of support and you should have it for your own sake as well as that of your family.

Another consideration is that of money. The cost of learning how to fly will ordinarily run you about \$1,500 to the point of getting your private pilot's license. Yes, many take plastic money and there are financing plans, but the outlay is considerable. Furthermore, once you have your license, the cost of renting a plane (not to mention the lure of owning your own) is not cheap. Another matter to be looked at is the weather in the area of the country in which you

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# New! Ready-to-Fly



PRE-ASSEMBLED AND READY TO FLY  
CRC muffled .049 engine installed • Beautifully  
finished scale model with 2 piece wing • Uses  
Cox/Sanwa 8020 radio (not included).

## THE ALMOST EASY WAY TO A SHOW TYPE FINISH

By Joe Zdankiewicz

**S**ome people can get a finish that looks like plastic and others get a finish that looks like it was put on with a number 10 broom. Actually that plastic finish only takes a little longer than the broom finish.

Before explaining the technique, let me explain a little about paints. First we have dope. Dope is similar to auto lacquer. It is fairly well fuel proof and comes in a wide variety of colors and is easy to spray. But as dope dries, it also shrinks. If you have any grain that is not completely filled, it will stand out when the paint dries. Next we have epoxies. Epoxies are of the enamel family,

are thicker than dope or lacquer, and fill imperfections a lot better. But even enamels shrink slightly as they dry. This shrinkage is caused by evaporation of the solvents. But epoxies dry by chemical reaction and do not shrink like dopes and lacquer. A good example of this is glue. Take your normal wood glues such as Ambroid, Tite Bond, Wilhold, etc. Glue two pieces of wood together to form a 90 degree angle. Part of the glue will penetrate the wood but a certain amount will shrink as it dries. After it is completely dry, you will only be able to see half of the original amount. Another example is using Ambroid to sheet a built-up wing. As the Ambroid dries and shrinks, it will actually pull part of the sheeting down next to the ribs. But mix up a batch of epoxy and glue a 90 degree angle. The amount left when dry will be about the same as when you started. This same holds true with epoxy paint.

Now this doesn't mean that you can spray a coat of epoxy paint on bare balsa and expect it to be a perfectly smooth finish. If the wood is not at least partially sealed, the paint will soak into the wood and once again you will have a number 10 broom finish. But with epoxy paints, you need only half the preparation as for dopes or lacquers.

### Preparation:

First, sand all the wood surfaces smooth. 320 gray sandpaper is good and doesn't load up as easy as the wet/dry type. The next step is not necessary, but helps make for a better finish.

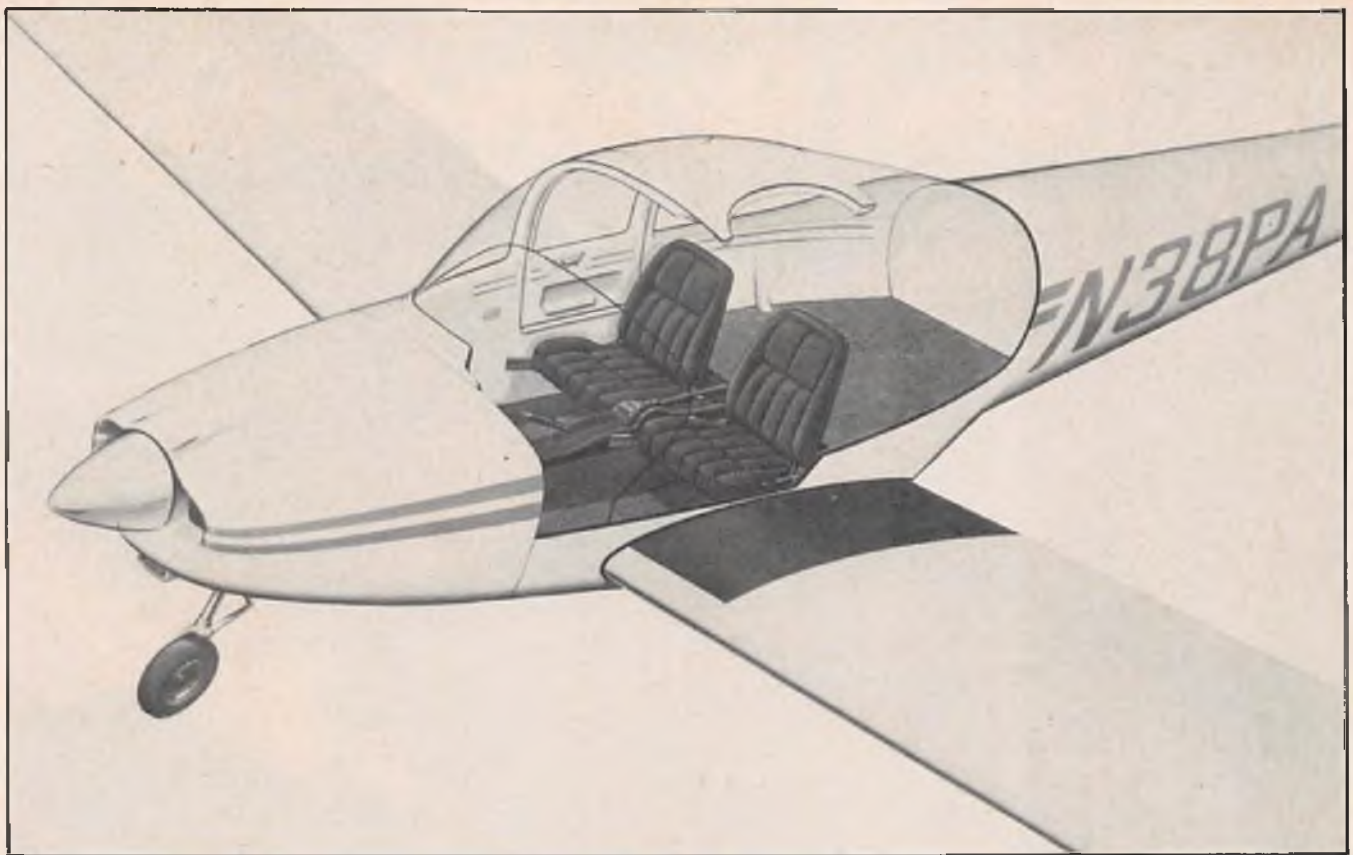
Mix up a batch of finishing resin, (K & B) and brush a light coat on the wood surfaces.

Before the resin dries, wipe the resin off with a paper towel. This wiping off process will force part of the resin into the pores and will remove all the excess. This process is not meant to fill the pores but to seal and strengthen the wood, so wipe up all the resin. After the resin is dry, lightly sand the wood with 360 gray sandpaper. Just sand enough to take off the fuzz that appears after the resin is dry. If you don't have a brush to wipe the resin on with, you can dip the end of a paper towel into the resin and wipe it on. Then use a dry paper towel to wipe off the excess.

Now for the actual filling of the woods. I use K & B epoxy primer for every one of my models. It fills the wood and is very easy to sand. Mix it according to the label (50-50) and spray it on un-thinned. I like spraying better than brushing because you get a more even coat. Start with one part of the plane such as the wing and spray on a light coat. This (light/fog coat) is the base for what the rest of the paint will adhere to. After you have fogged a light coat onto the fuse go back to the wing and spray on a heavier coat. This coat should start to fill the grain, but try not to get any runs. Now do the same on the fuse. Wait about 5 minutes and put another wet coat on the wing and fuse to full the grain. Wait about another ten minutes and check the finish. If you still see some grain, spray on another wet coat. That should be enough. Don't worry about the weight because the majority of the primer will be sanded off.

The next day, after the primer is dry, you will probably see some grain, which is normal. Sand the entire plane with 320 gray





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Assuming that you are realistically willing to diligently undertake the private pilot training, what are your options in terms of that training? An answer to that all important question will be the theme of this installment.

Some realistic appraisal is necessary on a very personal sort before you even begin to search out the kind of pilot training that makes the most sense and is the most appealing to you. That personal appraisal takes a number of dimensions, not the least of which is the necessity of making it a family decision where you are a family person. Assuming that family is there by virtue of a marriage, you really **do** have to have the support and encouragement of your wife or husband. After all, you are not giving up R/C modeling or flying; you are


adding another dimension to your flying experience. That means time and money. If you've had to battle for the hours you have spent in building, if you have experienced moans and groans about spending those hours at the flying field, should you realistically be ready to stretch the relationship to include many, many hours of study time at home combined with more hours devoted to those flying lessons? Is your spouse the type who will ultimately accept and even encourage your participation? Will your spouse ever get into that plane with you or risk the children as well? If the realistic appraisal that you must make is negative; if you've gone about as far as you can go in terms of time devoted to R/C modeling; if your spouse doesn't get "turned on" to the idea of flying cross-country with you; then realistically — forget it. In this undertaking you will need a tremendous amount of support and you should have it for your own sake as well as that of your family.

Another consideration is that of money. The cost of learning how to fly will ordinarily run you about \$1,500 to the point of getting your private pilot's license. Yes, many take plastic money and there are financing plans, but the outlay is considerable. Furthermore, once you have your license, the cost of renting a plane (not to mention the lure of owning your own) is not cheap. Another matter to be looked at is the weather in the area of the country in which you

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# New! Ready-to-Fly



PRE-ASSEMBLED AND READY TO FLY  
QRC muffled .049 engine installed • Beautifully  
finished scale model with 2 piece wing • Uses  
Cox/Sanwa 8020 radio (not included)

## THE ALMOST EASY WAY TO A SHOW TYPE FINISH

By Joe Zdankiewicz

**S**ome people can get a finish that looks like plastic and others get a finish that looks like it was put on with a number 10 broom. Actually that plastic finish only takes a little longer than the broom finish.

Before explaining the technique, let me explain a little about paints. First we have dope. Dope is similar to auto lacquer. It is fairly well fuel proof and comes in a wide variety of colors and is easy to spray. But as dope dries, it also shrinks. If you have any grain that is not completely filled, it will stand out when the paint dries. Next we have epoxies. Epoxies are of the enamel family,

are thicker than dope or lacquer, and fill imperfections a lot better. But even enamels shrink slightly as they dry. This shrinkage is caused by evaporation of the solvents. But epoxies dry by chemical reaction and do not shrink like dopes and lacquer. A good example of this is glue. Take your normal wood glues such as Ambroid, Tite Bond, Wilhold, etc. Glue two pieces of wood together to form a 90 degree angle. Part of the glue will penetrate the wood but a certain amount will shrink as it dries. After it is completely dry, you will only be able to see half of the original amount. Another example is using Ambroid to sheet a built-up wing. As the Ambroid dries and shrinks, it will actually pull part of the sheeting down next to the ribs. But mix up a batch of epoxy and glue a 90 degree angle. The amount left when dry will be about the same as when you started. This same holds true with epoxy paint.

Now this doesn't mean that you can spray a coat of epoxy paint on bare balsa and expect it to be a perfectly smooth finish. If the wood is not at least partially sealed, the paint will soak into the wood and once again you will have a number 10 broom finish. But with epoxy paints, you need only half the preparation as for dopes or lacquers.

### Preparation:

First, sand all the wood surfaces smooth. 320 gray sandpaper is good and doesn't load up as easy as the wet/dry type. The next step is not necessary, but helps make for a better finish.

Mix up a batch of finishing resin, (K & B) and brush a light coat on the wood surfaces.

Before the resin dries, wipe the resin off with a paper towel. This wiping off process will force part of the resin into the pores and will remove all the excess. This process is not meant to fill the pores but to seal and strengthen the wood, so wipe up all the resin. After the resin is dry, lightly sand the wood with 360 gray sandpaper. Just sand enough to take off the fuzz that appears after the resin is dry. If you don't have a brush to wipe the resin on with, you can dip the end of a paper towel into the resin and wipe it on. Then use a dry paper towel to wipe off the excess.

Now for the actual filling of the woods. I use K & B epoxy primer for every one of my models. It fills the wood and is very easy to sand. Mix it according to the label (50-50) and spray it on un-thinned. I like spraying better than brushing because you get a more even coat. Start with one part of the plane such as the wing and spray on a light coat. This (light fog coat) is the base for what the rest of the paint will adhere to. After you have fogged a light coat onto the fuselage go back to the wing and spray on a heavier coat. This coat should start to fill the grain, but try not to get any runs. Now do the same on the fuselage. Wait about 5 minutes and put another wet coat on the wing and fuselage to full the grain. Wait about another ten minutes and check the finish. If you still see some grain, spray on another wet coat. That should be enough. Don't worry about the weight because the majority of the primer will be sanded off.

The next day, after the primer is dry, you will probably see some grain, which is normal. Sand the entire plane with 320 gray



# Sportavia from Cox.

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And in the sleek new Sportavia, we've assembled just about everything in one package. Which means your fun starts right away.

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## Cox/Sanwa Radios, Airtronic Kits, Cox Engines.

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sandpaper. Keep sanding until you start to see the wood appear. Sand as much off without cutting through the primer.

Now you must decide how good of a finish you want. If you decide to apply your paint now you will wind up with a good looking finish with probably a little grain showing, but still a good looking finish. But if you want that super smooth finish, apply one more coat of primer. This coat should completely fill all the grain. After this coat is dry, sand it lightly with 360 gray sandpaper.

### Painting:

Again, I like using K & B Epoxy Paint. The biggest problem that most people have is in the thinning of the paint (whether it be K & B or any other brand). If the paint is too thick, it will dry with just a gloss finish and no real depth, and it will probably have a certain amount of orange peel in it. The thinner the paint is, the better the finish will be. The finish will be smoother and have more depth. But you can also go too thin. If the paint is too thin, it will need more coats to cover and it's easier to get a run.

Another item that determines the thickness of the paint is the type of spray gun you have. If you have a professional type auto spray gun or auto touch up gun you can mix the paint a little thicker. These professional guns atomize the paint a lot finer and it's easier to get a smooth finish. If you have a less expensive gun, such as the type sold in hobby shops with the small compressor, a thinner mixture should be used. The same type of finish can be obtained but a few more passes will have to be made with the thinner mixture.

The best all around mixture I found that works good in any type of gun is as follows:

1 part paint + 1 part catalyst. Mix this mixture and then add an equal amount of thinner.

Example:

1 oz. paint + 1 oz. catalyst = 2 oz.  
then

2 oz. paint mix + 2 oz. thin. = 4 oz.

As far as the actual painting goes, the first coat should be fogged on. If you are using a large compressor with a pressure regulator, use about 15 to 20 lbs. of pressure. If you have the small hobby type, the pressure is pre-set for the type of gun it comes with. Spray a light fog coat on the wing and then go to the fuselage and do the same. After the fuse is fogged go back to the wing and spray on a slightly heavier coat, but do not try to get complete coverage. You must build the paint up in layers. Keep going back and forth from wing to fuse giving each piece about 3 to 5 minutes to dry in-between coats. After about the third pass the coats should be wet enough for the paint to flow but not run. Keep applying the coats with the 3 to 5 minute intervals until the finish is completely covered.

Now the hardest part is to keep your fingers off until the paint is completely dry. (about 20 hours). If you have taken your time with the painting, the finish should look the same dry as it did wet. Also, if some dust particles should land on the wet finish, the paint will smooth out as it dries and you won't even notice them.

### Trim:

If you plan to paint your trim, use a vinyl

type of tape rather than masking tape. One of the best tapes I found for masking is Sig's Pin Striping Tape. It comes in many sizes and is inexpensive. Before applying any tape, wash your hands good and then wipe a little K & B Thinner on them with a paper towel. This will remove some of the body oil from your hands. Then wipe a little K & B Thinner with a paper towel onto the airplane. This will help the tape stick better. I usually use one-eighth inch tape for the initial pattern and then fill in the part I don't want painted with shelf/wrapping paper, found in super markets. This shelf paper is easier to work with than newspaper. You can secure the edge of the paper to the vinyl tape with any type of tape you want. Once the plane is covered, spray the trim in the same manner as the original color. (Thinning and spraying techniques the same.)

When you are through with the trim start to remove all the tape from the plane, if it is possible. Otherwise leave the tape on until the paint is completely dry. When you are through you will have a finish that is completely fuel proof and looks as good as a show model.

If you want to wax your model, use Rally Wax. It seems to work best. Also, if you wax within 24 hours you will smooth the finish out slightly. Do not use any rubbing compound on the finish. The epoxy paint is so hard that it will turn slightly dull and it will be almost impossible to bring the gloss back again.

This method with the main color and 1 trim color takes about 3 days. The actual sanding and painting takes only about 5 hours and the rest of the time is for drying. □





## Cap'n Dicks Cockpit BY DICK BRADFORD

### Guns or Airplanes



#### ABOUT THE AUTHOR

Capt. Richard C. Bradford is 41 years old and has been building since age 5. He has flown just about everything; control-line stunt and speed (1st in Class C Speed at 55 Nats, his only 'claim to fame'), free flight and, since 1971, sport R/C. He likes unusual and vintage stuff. He has been flying for Northwest Orient Airlines for 20 years and has flown DC-3, 4, 6, & 7; Boeing Stratocruiser, Lockheed Electra, B 720, 707, 727; and DC-10 for NWA (instructed in the last 5). Prior to NWA, Dick was USAF blow torch driver (F-86, F-94 & T-33). His wife of 21 years (Barbara) and four daughters (ages 19, 16, 11 and 9) and one son (Seth age 3) reside in Salt Lake City, Utah.

I was standing at my work bench when three-year-old Seth walked in. A freshly glass beaded Atwood Triumph lay in parts in front of me, and I was deep in thought as how to throttle it for an old timer. I was aware of Seth's presence, but did not pay any attention to him; and in fact I was annoyed when he pulled on my arm and said, "Dad, Dad."

"Go play on your Hot Cycle," I snapped as I glanced down ready to chastise



Ready to leave for first flight.



Wankel came from MECA swap sheet.

him for an ill-timed interruption.

He was clutching a cap pistol in his hand, had an inquisitive look on his face --- and when our eyes met I knew he had something important on his mind.

"Dad, what do you like best --- guns or airplanes?," he blurted out.

What a question!

I picked him up; sat him on the work bench; looked him in the eye; and replied, "airplanes."

He hesitated a moment and then said, "Well I think I like guns the best."

What a blow. After 4 older daughters, hundreds of ballet and music lessons; frilly dresses; and turned up noses to the

smell of glue, dope, and exhaust fumes; a caboose finally comes along in the form of a son --- who has all the potential for sharing my hobby --- and he tells me he "likes guns better than airplanes." I had to do something about that! It was definitely time for his first airplane. But what to build.

"How would you like your own model that we could build together?" I'll never forget his reaction. He threw his arms around my neck, layed a big kiss on me and excitedly said, "Let's go buy one now, Dad!"

That was good enough for me. We jumped into the Jeep; made a bee line



for the hobby shop; looked over the kits, and together settled on a Midwest Sweet Stick. He liked its looks and I liked its price and ease of construction for a dad and a boy.

Back home, we went to the engine drawer and selected an O. S. Wankel that I had just purchased through the Model Engine Collectors Association. It was new in the box and cost \$50.00 — a real bargain! All RC'ers might do well to investigate MECA. The quarterly swap sheet always has many R/C engines for sale or trade — at reasonable prices. Dues are only \$7.00 a year. For this you're sent quarterly newsletters and swap sheets with free ads. I can guarantee you'll make many new friends in MECA.

Well, Seth and I spent many happy hours together building that Sweet Stick. He kneeling on the work bench and applying glue, punching pins, and sanding as I directed. He had a real feeling of accomplishment, but most important of

good combo. We did the entire Stick in orange translucent and were pleased with the results. Here's our method for shrinking MonoKote. After sealing the edges with a hot iron, punch pin holes (one per square inch) over all sheeted areas, then shrink in front of a small portable electric space heater. The results are beautiful, with never a scratch or iron mark.

Seth said he wanted 'Star Wars' decoration on his airplane. That's understandable as he's seen the movie five times and wants to go again. We were browsing in the drug store and came across Dennison Stenso vinyl stick-on letters. Seth suggested that we "stick these on the wings" — not a bad idea — so we did, with the results seen in the photos. These letters are inexpensive, and they really stick. They can be sealed over MonoKote with Perfect clear spray, if desired. Naturally, Seth had to have his name on the fuselage and a 'face' on the nose.

The Cox Sanwa four channel installed quickly (there's a lot of room in a Sweet Stick to do it), and we were off to the Ute Model Airport just west of Salt Lake City. We range checked, then fired up the Wankel and were off - - - the stick flew right off the board, with no trim changes necessary. The rotary provided all the power needed, and is the smoothest running engine I've ever owned. We found that 15% nitro was necessary to give the best idle at the cold temperatures and high altitude in which we were operating. Seth was delighted, and soon learned to 'tweak' the sticks at altitude. Hopefully he'll be ready for solo by summer (he'll be four by then — wonder how he'll do by the time he's eight?)

While we were finishing up the Stick, we constructed a Goldberg Handitote flight box. It went together in a couple of hours with epoxy, and we finished it with polyurethane spray. It has proved to be the handiest piece of equipment we've owned for years. We needed a 12 volt wet cell, and I wanted more than 5 or 6 amps. The over-the-counter price was prohibitive, so I called the local motorcycle repair shop. They provided a 14 amp wet cell that was practically new for \$5.00. Saved \$25.00 — not bad!

We always wear ear protectors while running engines or flying. Even mild muffled engines can produce hearing loss — let alone the problems that will be caused by that hot TWA Schnuerle .60 pulling over 4 horse power. Take it from a guy who knows — my ear drums are like tin can lids after 35 years of screaming engines. Flying full scale jets hasn't helped either. I've lost normal hearing, and I'm required to take an audio test at the Mayo Clinic periodically in order to keep my airline transport rating. Fellows, wear ear protectors — I'm making sure Seth does right from day one. They can be purchased from any gun shop.

## IS IT REALLY NECESSARY?

By Lynn Faust

**N**ot totally new to 1/2A, this writer has been dabbling in some of the newer techniques that more experienced modelers have been sharing with us through the pages of RCM. Among these, the foam wing has been particularly intriguing. Having built the 1/2A SST as described in the August 1976 RCM, it was decided we would follow a January 1978 article and build a "Little Mediator", using the SST wing technique. While successful, the SST weighed in at 23 ounces and there was the definite feeling 2 or 3 ounces would need to be chopped off. Instead, construction of the Mediator was started and centering on the idea of cutting weight to the bone, the wing led to an idea which should be shared.

For what it's worth, the next time you are building a foam wing and are weight-watching, try this on for size.

Having just completed the Mediator wing in foam, some vital statistics are in order. 40" in span, with a 7" chord, both upper and lower leading edges of the wing were sheeted back 2" in 1/16" balsa. Similarly, the rear edges were then sheeted 1" forward of the aileron hinge line. Interconnecting these surfaces, 1/4" wide capstrips were added at 1 1/2" intervals to simulate ribs and give attachment points for the iron-on covering. It can only be said the wing followed conventional construction practices. Nothing unusual you may add, but hold on just a danged minute. There is more.

It has become standard practice here to use an OHAUS pan type scale, weighing each assembly as work is done to try getting an edge on our old enemy weight. Having the complete wing, it was weighed minus servo and covering at 172 grams. Incidentally, this is 6.06 ounces and really floored me. In panic, the necessary balsa which should have been used to construct the wing was gathered and weighed. Stunned, I judged the wing should have weighed in at 113 grams, or 4 ounces for those of you still fighting metrics. Considering these surplus ounces, I had visions of another flying bomb. Then the idea hit me.

Staring at this wing which suddenly felt like 50 pounds, I suddenly asked myself, is all that foam between ribs



Neat method for shrinking MonoKote — in front of space heater.



Vinyl letters are great for trim.

all was the love manifest one for another as we worked side by side.

Finally the framework was finished and we were ready to cover. I like MonoKote and Seth likes orange — a

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# GO FISHING IN THE SKY

By Bud Phillips

In the spirit of man, dwells the compelling urge to be free of the fetters of our humanity. Realities of the law of gravity, limitations of our 5 senses, physical structure of our bodies, circumscribes us & limits that urge to be free & unfettered.

Man has continually striven to break out of the limitations of his humanity. Religion is perhaps one of the earliest manifestations of this compelling drive that stirs men's souls. The concept of a soul, a spirit, that dwells in the body, imprisoned for the short span of man's life, freed by his death to transcend mortality and dwell in some Valhalla, some heaven in the sky, has possessed men's imagination even before the events of recorded history. Our persistent interest in religions; extra sensory perception; unidentified flying objects; the thrilling reality of our flights into space; all stimulate and give substance to that inner hunger and seeking for spiritual mobility and freedom.

The main thrusts of man's evolution have ever been toward increasing control of mobility, energy and communication. These are the basic drives that fuel the world's great economies today. And they are the drives that give life and substance to the sport, the industry and the job of flying model aircraft.

One segment of this absorbing hobby that above all others seems to stir the soul of the freedom seeking spirit, is the one that silently flings a model aircraft into the blue of the sky on a warm summer day. Silently as an eagle, it roams the sky to the extreme limits of vision, powered by the upward thrust of rising air currents. This is the sport, the hobby, the art of model airpane soaring.

At a summer cottage on one of the many lakes in Northern Canada, I have two special friends, a pair of Osprey. They have a nest in an enormously tall dead pine, one that somehow was left when the forests were denuded in the early eighteen hundreds and stripped bare of these majestic old giants. It stands 100 feet above the surrounding tree tops and provides a wondrous opportunity for watching the flights and nesting activities of these magnificent fliers. The soaring prowess of these birds is fascinating to watch and being an RC modeler I felt compelled to join my two friends in flight as well as in my inter-

est in their domestic affairs.

From my elder son, who had graduated from model flying to high flying models, I inherited a beautifully built Jetco Navigator. It is powered by a muffled TD 049 supplied by a one ounce tank and guided by a 2-channel Kraft brick of 1970 vintage. By stripping the model of its wing pontoons and careful trimming, this beautiful little flying boat does reasonably well as a power assisted glider. Lamentably, to get a glider up over water, motor assist seems to be the only way.

Motor boat activity on the lake prohibits the use of a high-start as propellers of the boats would soon make macaroni of surgical tubing. Also, monofilament nylon tow line plays hob with seals on propeller shafts. However, one ounce of 20% nitro fuel lifts the little

Jetco Navigator to about 500 feet, even without the help of a thermal, in about four minutes of engine running time. After that I am flying silently with the Ospreys.

Like flying over solid land masses, flying in a lake area has its good and bad days for thermal lift. It is delightful and amazing, however, to find that powerful thermal activity is often generated over small islands, sun drenched shores and promontories.

To avoid having vision restricted by trees on the shore, the Navigator is hand launched from a boat. Fitted with a TD 6/3 propeller, it flies away from a hand toss even in still air and climbs steadily. Once launched, the best technique seems to be a straight and steady climb to about 200'. From this altitude, and above, it is reasonably safe to venture over forest shores and islands in search of thermal activity. By searching the sky while the motor is running, it is often possible to find a thermal and reach 1000' before the motor quits.

If one of my Osprey friends is in the neighborhood sky, the glider joins in searching for thermals and soaring with this magnificent flier. Sometimes the glider finds a better thermal than the Osprey is riding and the eagle will then join the glider. Invariably the flight of the eagle will precisely define the thermal and the area of its greatest lift. In this mode, the three of us, the Osprey, the glider and I (in the boat) drift downward until the boat runs aground and limits my ability to stay with the drifting thermal. Being free to drift with the wind in the boat, adds a dimension to soaring over water that is not available to the land-based glider pilot. To a degree, it offsets the disadvantage of the motor and propeller drag that is essential to flying a glider over water. Flights of twenty minutes or more are not uncommon.

Because the glider must land on water, extra care must be taken to be sure all the seams in the fuselage, tail and wing, are water-tight. Wing tips must be hermetically sealed because, without wing pontoons, one or the other wing tip will dip into the water when the glider settles to rest. The wing tip can easily be tested for a good seal by putting it in your mouth and sucking. (Note — don't try putting the whole tip in your mouth at once, an inch or so at a time will do.) If



ABOUT THE AUTHOR:

Born on the prairies of Western Canada, Bud Phillips began his interest in building model aircraft at the time of Lindberg's epic flight in the Spirit of St. Louis. It was not, however, until his elder son who is also a model plane enthusiast, persuaded him to buy a radio control, that his interest in the hobby really came alive. Now eight years later, at age 62, he is enjoying, more than ever, the thrill of "Going fishing in the sky" and good fellowship that accompanies the absorbing sport of building and flying radio controlled model aircraft.





you can draw any air, find the leak and seal it or you will soon have an unbalanced and probably warped wing, due to water absorption.

Success with the Jetco Navigator led me to experiment with a Mark's Windward fitted with a Medallion .049 and a one ounce fuel tank. The Medallion, as compared to the TD .049 did not have those few extra RPM needed to achieve a rapid steady climb and, unless a good thermal was found at low altitude, its performance generally fell short of the average flight that could be expected of the Jetco Navigator. Also, it was more difficult to keep the radio compartment dry. My project for next summer is to build an Olympic II with the fuselage modified for water landings. The modifi-

cations will consist of widening the front portion sufficiently to give good flotation and contouring the nose to facilitate planing when landing.

Sometimes the Jetco Navigator has had interesting encounters with other birds. I have learned that it is not polite to fly over very small islands during the nesting season. Mother and Father Kingfisher and other species take a very dim view of large silent shapes invading their domain, especially at low altitude. There are a few dings in the wing that bear testimony to their willingness to fight off intruders. Loons, too, have a delightful social interest in the little flying boat. Especially at sunset on a quiet evening, as the glider is descending to land, small groups of Loons will send up

their welcoming call. When the model lands near them they swim all around it with much calling and occasional beating of wings. Their concern and distress is comical when I finally go to pick the airplane up and put it in the boat. They seem really disturbed because this bird is incapable of diving or swimming away from man.

Little has been written about soaring model aircraft over lakes. It is really a delightful variation to soaring that adds an element of mobility, the ability to drift downwind with your glider as it rides a thermal bubble. And of course, what could be more appealing to an RC modeler, on a weekend or vacation in the lake district, than to go fishing for thermals in the sky? □



# RCM PRODUCT TEST

House of Balsa's  
**1/2A PETE**



**T**he 1/2A Pete, manufactured by House of Balsa, was designed by Fred Reese and is a 42" stand-off scale version of the Pietenpol Air Scout. With a total wing area of 284 square inches, its all up flying weight of 14 ounces produces a wing loading of 14 ounces per square foot, including the dummy engine and radiator. Despite many similarities in appearance to the .30 size Pietenpol produced by House of Balsa, it is not just a scaled-down version of the larger plans, the Air Camper, but a specifically designed 1/2A version of the single seat Air Scout. Although both aircraft were popular during the same era and both were designed for the home builder of the '30's, the Scout was a smaller, single seat airplane whose flying characteristics are faithfully carried through into the model.

Fuselage construction is a basic sheet balsa box with plywood bulkheads, a sheeted former top section in the front and a former and stringer top rear section, both of which are built as sub-assemblies and added to the basic box. The wing is a flat bottom airfoil, constant chord structure of balsa and plywood. The tail surfaces are of sheet balsa and the cabane struts are cut to size hardwood. Construction is extremely simple and the step-by-step, photo illustrated instruction booklet together with the clear, uncluttered plans, makes this a kit that can be built by even the rank beginner. Assembly of the test model, including covering and radio installation took about 9 hours, most of which was spent waiting for the glue to dry. Access to the radio compartment is through a plywood hatch which covers the whole belly of the plane and which opens into an area which is spacious enough for any of today's radios.

As usual with House of Balsa, the die cutting is extremely sharp and clean on excellent wood. The parts match the plans well and overall parts fit is excellent. Hardware included in the kit consists of a pre-bent landing gear with mounting clamps and screws and the required wire for the tail skid. In addition, a complete list of parts needed to complete the model is

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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	●										

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

## SPECIFICATIONS

Name	1/2A "PETE"
Aircraft Type	Sport, S/O Scale, Trainer
Manufactured By	House of Balsa 2814 East 56th Way Long Beach, California 90805
Mfg. Suggested Retail Price	\$22.95
Available From	Both Mfg. & Retail
Mfg. Recommended Usage	General Sport
Wing Span	42 Inches
Wing Chord	6 3/4"
Total Wing Area	284 Square Inches
Fuselage Length	26 Inches
Radio Compartment Dimensions	(L) 4 1/2" x (W) 2 3/8" x (H) 3 3/4"
Wing Location	Parasol Wing
Airfoil	Flat Bottom
Wing Planform	Constant Chord
Dihedral	2 Inches
Stabilizer Span	14 Inches
Stabilizer Chord (incl. elev.)	5"
Total Stab Area	70 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	4 3/4 Inches
Vertical Fin Width (incl. rud.)	4 1/8" (Avg.)
Mfg. Rec. Engine Range	.049-.051 cu. in.
Recommended Fuel Tank Size	Cox Tank Mount
Landing Gear	Conventional
Recommended No. Of Channels	2
Recommended Control Functions	Rudder & Elevator
Basic Materials Used In Construction	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	25" x 38" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (25 pages)
Construction Photos	Yes
Kit Includes	Shaped & Die-Cut Parts
Mfg. Rec. Flying Weight	22-27 Ounces
Wing loading based on rec. flying wt.	11-14 oz./sq. ft.

## RCM PROTOTYPE

Weight, Ready To Fly	28 Ounces
Wing Loading	14 oz./sq. ft.
Covering & finishing materials used	See Text
Engine Make & Disp.	Cox .049 Medallion
Muffler Used	No
Radio Used	Ace
Tank Size Used	Tank Mount (Cox)



# TOWER IS TOPS!

**WHO IS TOWER HOBBIES?** Tower Hobbies is the largest, finest, fastest, friendliest, and the most progressive Radio Control Mail Order Company in the United States. Tower Hobbies is not a little hobby shop that sells mail order as a sideline, but rather we are a highly specialized and efficient volume merchandiser. Tower's quantity purchasing and efficient order processing add up to fantastic savings and excellent service for our more than 35,000 active customers. Very simply, Tower Hobbies is the only R/C supply company you'll ever need!

**REPUTATION** - Tower Hobbies has been courteously and honestly supplying modellers since 1971. Tower is a reliable company that you can depend upon for excellent quality, low prices, and outstanding service. Don't take a chance dealing with those little "here today - gone tomorrow" companies when you can deal with the best at no extra cost. Tower Hobbies is NUMBER ONE because we know that you are the most important part of our business. And that is something we never have nor ever will forget!

**DISCOUNT PRICES** - Tower Hobbies is the most competitive company in the hobby. Your hobby supplies cost you less from Tower because our volume purchasing and sales allow us to work closer than anyone else in the business. We would rather sell 10 radios at \$10.00 profit each than to sell one radio at \$100.00 profit - and that means super savings for you! Tower sells only brand new, brand name merchandise and we sell it at super discounts. Can you think of any reason why you should pay more for exactly the same product elsewhere?

**FAST SERVICE** - Tower Hobbies is the home of fast service! As soon as we receive your mail order or take your order over the phone we begin to process it immediately. We check your file (or make a new one for new customers), check over your order, computer process it, check it again, pick it, pack it, and then ship it within 24 hours. You receive exactly what you ordered in a carefully wrapped package that is courteously delivered by United Parcel Service (or Parcel Post if requested) within 1 to 5 days depending upon where you live. You never have to leave home - no heavy traffic, stuffy crowds, or discourteous salespeople when you deal with Tower Hobbies!

**TOLL FREE PHONES** - Tower Hobbies was the first to offer Toll Free "800" phone service to its customers. With the Toll Free lines you can call Tower at no charge to yourself to place orders, check on availabilities, check current prices, obtain professional advice, or whatever. Your telephone is a straight connection to the largest and finest R/C inventory in the United States - it's fast, easy, and free of charge.

**COMPUTER POWER** - Tower was the first and as far as we know still the only mail order company in the hobby to keep track of inventory, remember backorders, and process all orders with a computer. This enables us to keep errors to an absolute minimum which means that you don't have the headache of receiving wrong merchandise, being billed incorrectly, or having your backorders forgotten or misplaced. Tower processes your order quickly and correctly this time, next time, and everytime!

**EXTENSIVE INVENTORY** - Tower Hobbies has the largest and most complete inventory of radio controlled model airplane supplies and related accessories in the United States. Tower carries over 150 manufacturers lines including: Airborne, Ace, A.F.I., Airtronics, A.H.M., A-Justo-Jig, Allied Hobbies, Ambroid, Andrews, American Helicopters, Austin Craft, Badger, Banner, Bauer, Boelectra, Bridi, B.W.T., C.B. Associates, Custom Model Prod., Concept, Coverite, Cox, Craft Air, D&B, DAE, Devcon, Dodgson, Dremel, DuBro, Dumas, Economy Plus, Edson, Enya, Eveready, Exhib'air, Fliteglas, Fox, Fuseite, Futaba, Gas Model Prod., Goldberg, G.M.C., Graupner, Grish, Halco, Hobbyoxy, Hot Stuff, House of Balsa, Jemco, Jensen, K&B, Kavan, Kraft, Kwik-Cote, Lanier, Legionair, Leisure, Lenco, Long Island, Maco, Mark's Models, M.E.N., Microflame, Mich, Hobby, Mile High Models, Midwest, Milman, Miller, Model Dynamics, Monokote, M.R.C., Neal's, Bud Nosen, Octura, O.S. Max, Pactra Aerogloss, Panavise, Pacer, Perry, Platt, Powr-mite, Prather, Proctor, Power Pacer, R&S, R/C Guide, Rocket City, Rev-up, Robart, Rhom, Royal, 60 to Go, Sanwa, Scozzi, Scalecraft, Semco, Sherline, Sig, Simmons, Skyglas, Slimline, Bob Smith, Solarfilm, Soarcraft, Sonic Systems, Southwestern, Spickler, Su-Pr-Line, Southern R/C, Sta-Brite, Stafford, Sterling, Supertigre, SonicTronics, Sullivan, Superoxy, SureFlite, Tatone, Titebond, Tomco, Top Flite, Tower, Trexler, Universal, V.K., Williams Bros., Webra, Wing Mfg., Wilhold, World Engines, Westcraft, X-Acto, Zinger, Zap and more!



The front office file area is a busy place! Over 35,000 active customer files fill up 70 file cabinets. Can we make a file for you?



The warehouse final checking and packing area processes over 350 packages each day. You'll enjoy receiving packages from Tower!



Good afternoon - Tower Hobbies! Part of our phone staff answering our Toll Free lines. We want to take your orders, answer questions etc.



Our computer operators enter your order on the terminals. The computer quickly and accurately generates an errorless invoice just for you.



Now where did those rear valve ABC schnauflas with Perry pumpers go? Tower has the largest and finest R/C inventory selection available.



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# TOWER

P.O. BOX 778

CHAMPAIGN,

## TOWER HOBBIES SIX & THREE CHANNELS

Tower Hobbies digital proportional radio control systems are absolutely the finest value radios on the market today. Take a close comparative look at the Tower systems against *any* other brand and you will quickly see that you get unquestionably the most radio for your money with Tower!

**QUALITY :** Tower radios are made for us by Kraft Systems in California. They are manufactured to our exacting specifications which include the latest technology of design, the finest components, precision assembly, and outstanding quality control. Kraft is the World's finest R/C systems manufacturer and Tower Hobbies is the most reputable R/C distributor in the industry - the combination of the two guarantees you the finest possible product and service all at the lowest possible price.

**WARRANTY :** Tower radios are warrantied for 180 days from the date of first purchase. Five convenient warranty service centers are located across the Country for fast, dependable, and precise service.

**COMPATIBILITY :** The Tower 6 and Tower 3 components are fully compatible with the previous Tower 5 model as well as the entire line of Kraft Systems radios (except for the "A" series). This gives you the greatest accessory and feature availability in the industry - interchange flight packs, servos, chargers, trays, output arms, or anything from the Kraft lineup of outstanding products.

**COMPONENTS :** The Tower 3 channel comes standard with two KPS-14 servos and a lightweight 450 MAH ni-cad receiver battery pack, giving an airborne pack weight of only 7.9 ounces. The Tower 6 channel comes with your choice of four KPS-14 or KPS-15 servos and a powerful 550 MAH receiver battery pack, giving an airborne pack weight of only 11.9 ounces with 14's and 13.5 ounces with 15's. Both systems come with lightweight slimline receivers that make for very convenient installations. Both switch harnesses have external receptacles for charging convenience.

**FEATURES :** Both Tower systems feature a dual function meter that allows you to check RF and absolute battery voltage. This allows you to monitor your flying time in addition to being able to check for possible cell malfunction. This deluxe feature is usually only found on systems in the \$500.00 price range.

**POPULARITY :** Tower radios enjoy a high degree of popularity at flying fields all across the country. When you show up at the field with a Tower radio your flying buddies will know that you are a no-nonsense flyer that demands top quality equipment but at down to earth prices. Your choice of a Tower radio says a lot about your astute ability to recognize true value - it shows you're a smart shopper!

**APPEARANCE :** Tower Hobbies radios are attractive. There is just something very elegant about that rich ivory color accented with black trim pieces. But that's in keeping with the total quality feel of Tower radios - that first class feeling. We just don't think that a radio should look weird or strange - because we feel that the radio you fly is a reflection of your own personality. With Tower Hobbies radio control systems you go first class in quality, performance, and appearance.

**PRICE :** Tower Hobbies radios give you absolutely the maximum amount of radio for the least amount of money - and that's value! There is nothing cheap about a Tower radio. The design is the latest, the manufacturer is the finest, the quality is peerless, and the service is second to none. So how then can the price be the lowest in the industry? Simple. Tower's tremendous buying power allows us to create economies due to volume - and there are no middlemen between us and the manufacturer to artificially jack up the price. You're paying the bottom dollar price for the top of the line product. We can't think of any reasons why you should pay more to get less.

**ORDER NOW !!** Both systems are in stock for immediate delivery on the 72 mHz frequency of your choice. Call Toll Free right now for immediate COD delivery or send your order in the mail along with purchase amount plus \$1.50 for postage. If you are not 100% satisfied with your Tower radio after receiving it then simply send it back in original condition within 10 days for a full purchase price refund.

## TOWER SIX

The Tower 6 channel transmitter comes in the popular 2 stick closed gimbal configuration. Standard equipment includes a fully proportional fifth channel, toggle switch sixth channel, choice of four KPS14 or KPS-15 servos, slimline high range receiver, ni-cad batteries in both transmitter and receiver, charger, switch harness, servo trays, full servo accessories, and a dual function meter that indicates both RF and absolute battery voltage.

This is a top of the line complete radio system that is perfect for all radio control applications. From 1/8A to pattern ships, it offers all the performance you could ever ask for.

Six channels, top performance, high quality, and outstanding service after the sale - all at the lowest price in the hobby. Can you think of any reason why this shouldn't be your next radio? Retail \$350.00 Stock #TOW88462

**ONLY \$199.95**

## TOWER THREE

The Tower 3 channel transmitter comes in the popular single stick closed gimbal configuration. Standard equipment includes a fully proportional third channel, two KPS-14 servos, slimline high range receiver, ni-cad receiver battery, charger, switch harness, servo accessories, and a dual function meter that indicates both RF and absolute battery voltage. The dry cell transmitter (battery not included) can easily be converted to ni-cad operation by adding ni-cad pack.

This is a top of the line complete radio system that is perfect for small aircraft, gliders, boats, and cars. It's lightweight, yet very rugged.

Same outstanding performance, quality, and service as in our 6 channel and again all at the lowest price in the industry. This is the system that makes sense for the beginner that needs three or fewer channels.

Retail \$210.00 Stock #TOW88231

**ONLY \$119.95**



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P.O. BOX 778

CHAMPAIGN,

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SPECIAL STOCK NUMBERS MUST BE USED FOR PRICE TO BE HONORED. NO BACKORDERS TAKEN IF OUT OF STOCK.

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BE A SMART SHOPPER; COMPARE OUR PRICES. HERE IS JUST A SAMPLE OF OUR LOW PRICES. WE HAVE THOUSANDS MORE JUST AS GOOD!

**BUD NOSEN 28% OFF**  
**TRAINER**



This 8.5 ft. wingspan all wood, fast building trainer is designed for a .80 size engine & 3 or 4 channel radio.

**RETAIL NOW ONLY \$57.58**  
**\$79.95 Stock #NOS74008**

**BRIDI RCM 34% OFF**  
**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 Stock #BR174002**

**LANIER 36% OFF**  
**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 Stock #LAN74105**

*Radio Sale!*

	Retail Price	Tower Price
FUTABA		
2GA	99.95	69.98
2E	139.95	94.98
2F	139.95	94.98
3F	179.95	119.98
3FN	199.95	132.98
4FN4 S-17	269.95	174.98
4FN4 S-16	299.95	194.98
5FN	349.95	219.98
6FN S-17	319.95	204.98
6FN S-16	359.95	229.98
7GN	579.95	394.98
KRAFT		
KP-2AS	129.95	88.98
KP-2AW	129.95	88.98
KP-4A	299.95	194.98
KP-5C&5CS	375.43	279.98
KP-6A	329.95	224.98
KP-7C&7CS	515.43	369.98
SANWA		
2 CH	109.95	69.98

	Retail Price	Tower Price
S&O Battery Tester	24.95	16.18
Coverite Balsarite	2.95	1.98
Cox Tee Dee .051	20.95	13.68
Craft-Air Windrifter	47.95	28.78
Craft-Air Sailair	129.95	84.48
Craft-Air Butterfly-NEW!	49.95	32.48
Craft-Air VM-2 Voltmeter	24.95	14.98
Dubro Prop-Drive Unit	100.00	66.98
Dumas Big Swamp Buggy	28.95	18.58
Dumas Hot Shot 21-Glass-NEW	67.95	44.18
Fox-ALL RC ENGINES-40% OFF		
Futaba S-16 Mini Servo	39.95	29.98
Futaba S-17 Std. Servo	29.95	22.48
Futaba S-7 Waterproof Servo	39.95	29.98
Goldberg Senior Falcan	59.95	35.98
Goldberg Skylane 62	59.95	35.98
House of Balsa-ALL KITS-30% OFF		
Jemco Corsair	58.50	46.78
Jensen Ugly Stick	62.50	39.98
K&B .35 RC	34.95	22.78
K&B .40 RC Pressurized	95.00	56.98
K&B .19 RC	50.00	29.98
K&B .61 RC Pressurized	115.00	68.98
K&B .21 Outboard Marine	99.50	59.98
K&B .21 RC Inboard Marine	69.50	41.68
K&B .21 RC Schneurle w/muff	67.50	40.48
K&B .40 RC FR RE Schneurle	110.00	65.98
Kraft .61 RC w/muffler	99.95	71.98
Kraft KPS-14II & 15II Servos	44.95	34.98
Mark's Wanderer	19.95	12.98
Mark's Bushwacker w/access	52.95	31.78
MEN Trainer (.15-.25)	31.95	20.48
Midwest Klampon Kai Outboard	44.95	29.18
Midwest Cardinal-ARF	29.95	19.48
Midwest Sweet Stik	39.95	24.78
Midwest Attacker	39.95	25.98
Midwest RK-40 Ducted Fan	48.95	33.98
Monokote-Reg. & Trans. Colors	9.00	4.98
Dave Platt-ALL KITS-30% OFF		
Robart Super Pumper	17.95	10.78
Royal Corsair	94.95	73.98
Solarfilm-ALL REGULAR COLORS-3.98/roll		
Spickler Quikie 500	43.95	29.98
Sterling Puddle Jumper	16.95	11.18
Sterling Fledgling	41.95	26.48
Sullivan Deluxe Starter	39.95	25.98
Surelite Foam J-3 & Spitfire	34.95	22.78
Top Flite Freshman Trainer	49.95	29.18
Top Flite P-51	57.95	38.88
Tower 12 volt gel/cell battery	26.95	18.98
Tower No. 64 Rubberbands-1/4 lb	1.25	.68
Tower No. 11 Knife Blades (5)	.80	.38
Wescraft B-17	495.00	399.98
X-Acto No. 87 Knife & Tool Set	29.95	20.98

	Retail Price	Tower Price
AFI Analyzer-Rapid Charger	38.95	27.28
Airtronics Q-Tee	21.95	15.38
Airtronics Aquila	49.95	34.98
A-Justo-Jig wing & fuse jig	54.95	36.98
Badger 200-1 Air Brush Kit	29.95	19.48
Bridi-ALL WOOD KITS-34% OFF		
Bridi-ALL GLASS KITS-33% OFF		

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*CLOSED FRIDAY EVENING AND SUNDAY	



HOW TO ORDER BY MAIL

Write down all the items you want along with their stock numbers and prices. Add \$1.50 to the merchandise total to cover postage, handling, and full insurance. Send payment in Money Order or Check only (Personal Checks may be delayed to allow for clearance). Foreign orders add \$10.00 (excess will be refunded with order). Satisfaction always guaranteed.

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The all new 1978 Tower R/C catalog features over 3000 products from over 150 manufacturers. All at super discounts. Send for your copy now!

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DA ENTERPRISES 36%  
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 Stock #DAE90000

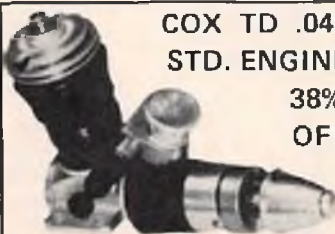
BRIDI RCM 34%  
TRAINER 40 OFF



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 Stock #BRI73007

COX TD .049 38%  
STD. ENGINE OFF



A super hot 1/4A engine ideal for free flight, control line, 1/4A R/C, and more. Limit of 2 per order.

RETAIL NOW ONLY \$ 12.98  
\$20.95 Stock #COXD01049

FUN 22%  
BUGGY OFF



This is the Sigma-Ace .19 size dune buggy distributed by Leisure Electronics. See the Dec, RCM article for more details.

RETAIL NOW ONLY \$139.98  
\$179.95 Stock #LEI90000

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 Stock #BOL90094

CRAFT-AIR 33%  
FIELD BOX NEW OFF



It's ready to use, not a kit, made of lightweight indestructible polyethylene. 22" long & holds everything. A SUPER BUY!

RETAIL NOW ONLY \$19.98  
\$29.95 Stock #CRA90100

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. Limit 1.



RETAIL NOW ONLY \$25.98  
\$39.95 Stock #CRA20020

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 Stock #AIR71208

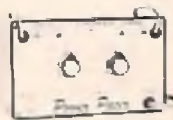
ZINGER 35%  
WOOD OFF  
PROPS

Two popular sizes—Stock up now on these high quality props!

10X6 WOOD PROPS(6)  
RETAIL NOW ONLY \$5.48  
\$8.40 Stock #ZIN17663

11X7 WOOD PROPS(6)  
RETAIL NOW ONLY \$6.28  
\$9.60 Stock #ZIN17675

POWER PACER 20%  
BATTERY OFF  
TESTER



A new ni-cad battery tester, cyclor, and charger. Works great!

RETAIL NOW ONLY \$47.98  
\$59.95  
9.6 volt Stock #PWR80096  
6 volt Stock #PWR80060

KRAFT KP-6A 34%  
6 CHANNEL NEW OFF



6 channels, open gimbals, 4 servos, nicads, trays, harness, charger & 1 yr. warranty make this all new Kraft radio a super value.

RETAIL NOW ONLY \$224.98  
\$339.95 Stock #KRA88262

SONICTRONICS 36%  
ELECTRIC OFF  
PUMP

MODEL No. 1250



This outstanding fuel pump operates on 12 volts. High quality.

RETAIL NOW ONLY \$8.98  
\$13.95 Stock #STR54249

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ZAP ZAP ZAP ZAP  
50% OFF



Zap is a Super Cyanoacrylate adhesive that is super fast setting. Large size comes with extra applicators. Limit of 6 per order.

RETAIL NOW ONLY \$1.78  
\$3.50 Stock #SOR32050

PACER X-30 50%  
ADHESIVE OFF



X-30 is super glue like Hot Stuff, Zap, etc except that it has a 30 second set time that allows for last minute fittings & adjustments. Also, its higher viscosity enables it to make fillets. Limit 6 per order.

RETAIL NOW ONLY \$1.78  
\$3.50 Stock #PCR32030

GOLDBERG 34%  
HANDI TOTE OFF



This flight box is compact yet has room for everything you need. Limit of 1 per order.

RETAIL NOW ONLY \$9.98  
\$14.95 Stock #GBG90000

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.

RETAIL NOW ONLY \$1.98  
\$3.50 Stock #HOT32001

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 Stock #K&B01040

DU-BRO 36%  
KWIK FILL FUEL PUMP OFF



RETAIL \$10.95  
NOW ONLY \$6.98  
Stock #DUB20191

HOUSE OF BALSA 30%  
P-51D (.29-.40) OFF



This all-balsa sport, stand-off scale ship is absolutely outstanding. The hottest new seller of the year.

RETAIL NOW ONLY \$38.48  
\$54.95 Stock #HOU73000

K & B .61 40%  
R/C ENGINE OFF



Limit of 1 engine per order.

This outstanding engine features a Perry carb and muffler.

RETAIL NOW ONLY \$53.98  
\$90.00 Stock #K&B01161

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. Limit of 2 packages per order.



RETAIL NOW ONLY \$3.58  
\$7.20 Stock #TOW15006

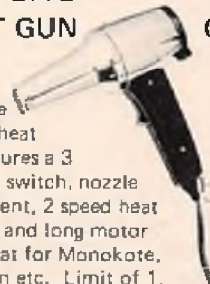
STERLING 40%  
1/2 A CORSAIR OFF



This all balsa 36" span kit features special hardware and decal sheet. .049-.10 engine and 2 Ch. radio.

RETAIL NOW ONLY \$17.98  
\$29.95 Stock #STE72036

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. Limit of 1.

RETAIL NOW ONLY \$17.98  
\$27.95 Stock #TOP45301

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 \$16.18  
\$26.95 Stock #DUM70400

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HOW TO ORDER BY MAIL

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### 12 VOLT MOTORCYCLE BATTERY

50%  
OFF



These are high quality, heavy duty motorcycle batteries that are perfect for all electric starters. Brand new. Limit 1/order.

RETAIL NOW ONLY \$13.48  
\$26.95 Stock #TOW19000

### 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. Limit 1 per order.

RETAIL NOW ONLY \$6.98  
\$13.95 Stock #TOW19100

### COX READY TO FLY CESSNA CENTURION

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, Cox 2 Ch, recommended.

RETAIL NOW ONLY \$38.48  
\$54.95 Stock #COX72401

The Cox/Sanwa 2 channel radio fits perfectly into this model. Buy both and be in the air within one hour!

RETAIL NOW ONLY \$69.98  
\$109.95 Stock #SAN88522



### DREMEL MODEL 381 MOTO-TOOL WITH FULL ACCESSORIES

37% OFF



The Model 381 is the ultimate in hand grinders. It features variable speed control, ball bearings, and full accessories. Limit 1 per order.

RETAIL NOW ONLY \$43.98  
\$69.95 Stock #DRE34381

### SEALECTOR CUSTOM MODEL SEALING IRON

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# QUICK RELEASE SERVO MOUNT — SLIDING TRAY

By  
Dave  
Greenfield

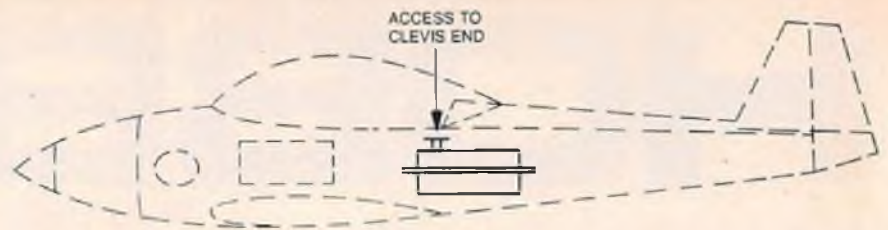


FIGURE 1

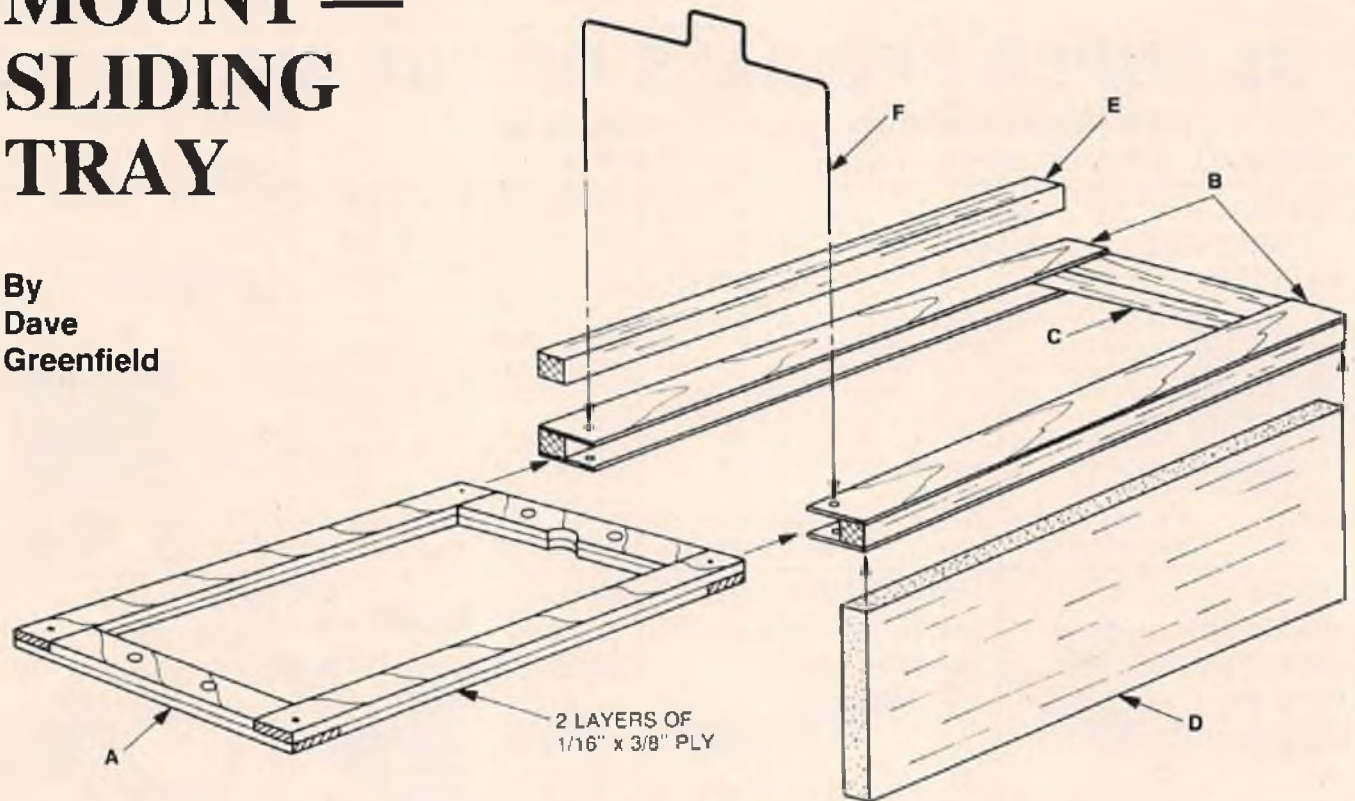


FIGURE 2

**L**ike most of you, I really enjoy working on my various model projects, and especially like "how-to" articles . . . something I find is missing from most British magazines. (Dave hails from Leeds, England, hence the reference to British magazines — Ed.). In fact, I'm a real "make it, and make it better" type. So much so that a local dealer I fly with says that I'm no good for the trade. I tell him that I like to think that I might be good for the hobby. I like building small, and that often means that servos have to be slid into inaccessible areas. The following method is good, provided the clevis end is exposed when the canopy and/or cover is removed (see Figure 1).

## CONSTRUCTION

(see Figure 2)

(1) The tray (A) for the servo is made from 1/16" ply, with lap joints glued and pinned at the corners. Cut ply strips about 3/8" wide, and make up frames to fit your servo(s). Be sure to overlap material at corners as per drawing. Note: Tray is made up of eight pieces of 1/16" ply, two per each end and two per each

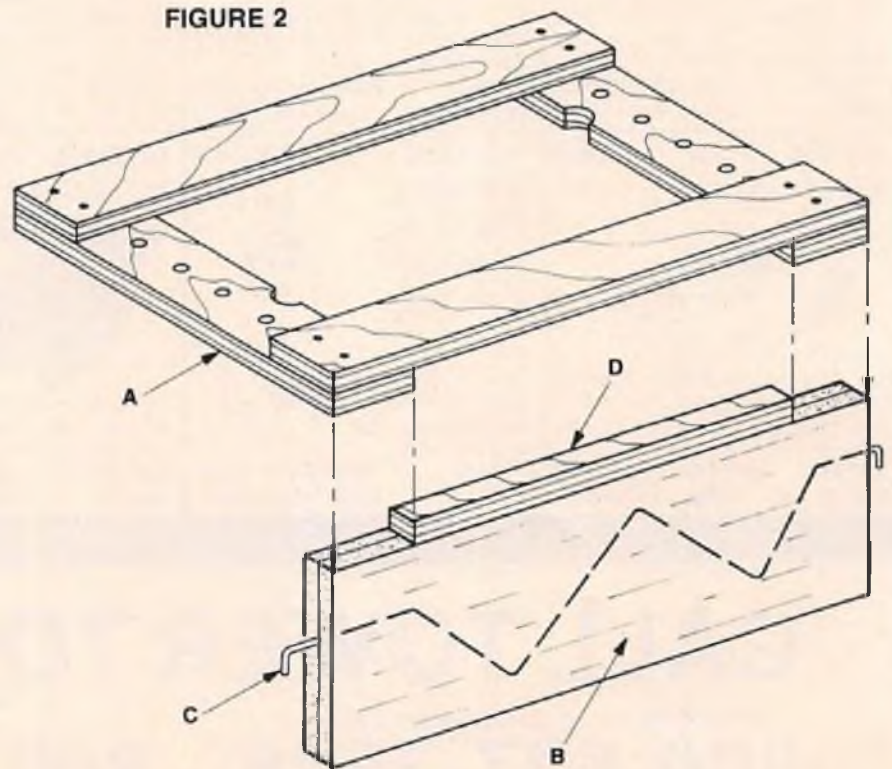


FIGURE 3



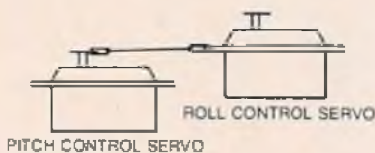
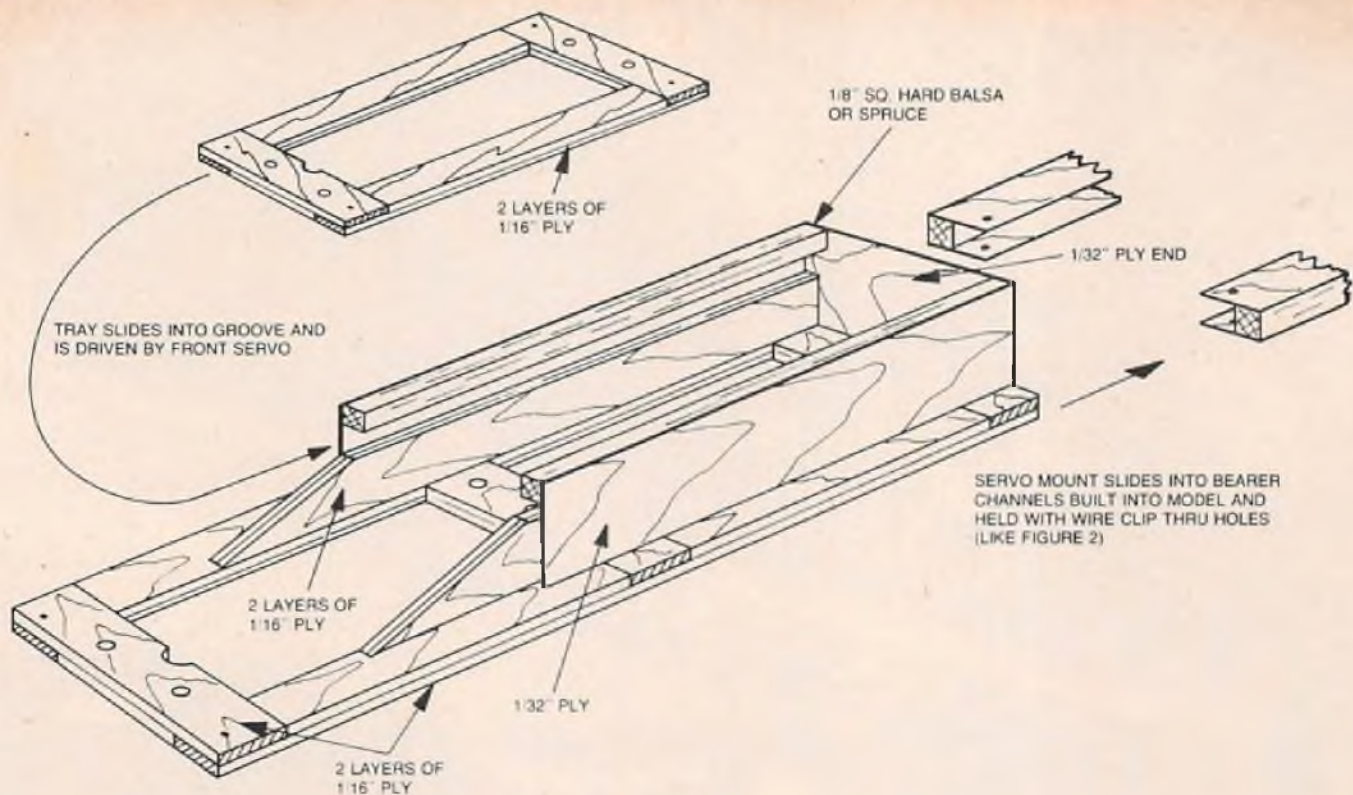
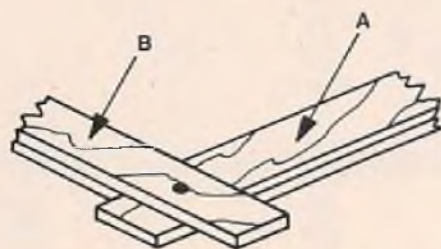


FIGURE 4



**CONSTRUCTION NOTES:**

1. CUT ONLY CRITICAL LENGTHS TO SIZE INITIALLY ('A' IN FIGURE 5).
2. LEAVE MEMBERS LIKE 'B' OVERSIZE AND TRIM OFF WHEN GLUE IS DRY.
3. PIN BEFORE GLUING AND CHECK FOR ALIGNMENT. PRY APART, INSERT GLUE AND THEN HAMMER HOME.

FIGURE 5

side, so that the finished thickness of the tray is 1/8".

(2) After the end and side pieces have been completed, the tray should be assembled using small brass flat head nails. Check for proper fit of servo in tray, disassemble and apply glue to corner joints. Assemble, and clamp until dry. Insert brass nails, hammer home with a touch of glue on the shank of the nail. When the glue is dry, clip off the nails and file flat. These pinned corner areas

must be smooth and clean enough to allow the tray to be slid into snug fitting channels (next step).

(3) The channels (B) are made up of 1/16" or 1/32" ply and 1/8" balsa spacers. Construct "U" shaped channel so that tray will slide snugly, but without binding. Slide tray into channels, and install 1/8" balsa cross brace (C).

(4) Cut 1/8" balsa side pieces (D) and glue to bottom of channel assembly. Side pieces must, of course, be tall enough to support the tray with servo installed and still allow clearance between bottom of servo and floor of fuselage.

(5) Balsa strips (E) of proper dimension should be cut for later installation between servo mount and fuselage side.

(6) Small diameter piano wire (approximately 22 gauge) should be bent to form servo keeper (F). Servo tray should be slid into place, and holes drilled through channel lips and servo tray.

(7) Servo mount assembly should be installed in place, and balsa strips (E) glued to the mount and fuselage side.

(8) For quick release, the wire keeper (F) is removed and tray, with servo, slid out.

**QUICK RELEASE SERVO MOUNT CONSTRUCTION** (see Figure 3)

- (1) Construct servo tray (A) as per

Figure 3, lapped, pinned, and glued at corners. 1/8" ply should be used, and fit of servo to tray should be checked prior to gluing and pinning.

(2) Four pieces of 3/32" balsa (B) cut to length of tray and high enough to support servo with clearance to fuselage bottom. Do not laminate these pieces yet (see Step 3).

(3) 1/16" wire (C) bent and glued between side pieces (B).

(4) Two pieces of 1/8" x 3/16" ply (D) cut and glued to top of side pieces (B). They should be of a length to afford a snug fit between cross braces of the servo tray.

(5) The lower body of the mount is now installed and glued to bottom of fuselage. The tray (with servos) is simply held in place with rubber bands that are hooked over projecting ends of wire (C). Needless to say, the rubber bands should hold the servos firmly in place to insure smooth control operation.

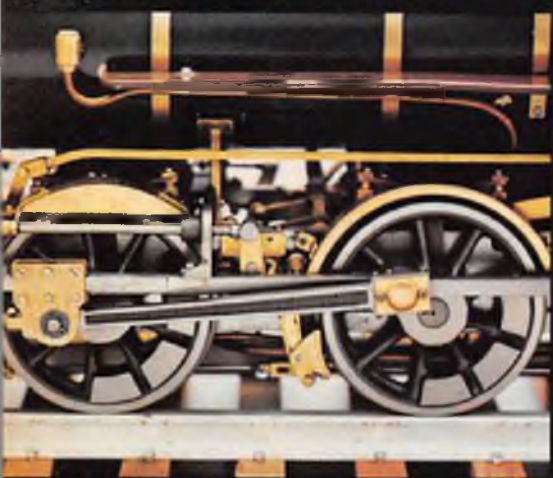
**SERVO MOUNT FOR ELEVON CONTROL**

**CONSTRUCTION** (see Figure 4)

(1) Construct servo tray as per Figure 4, lapped, pinned, and glued at corners. 1/16" ply should be laminated to provide net thickness of 1/8" (see instructions for tray (A) in Figure 2). Check fit of servo

to page 132





**OS 2-6-0 PORTER MOGUL LIVE STEAM LOCOMOTIVE**

Model builders know that OS has come to stand for very high precision model airplanes that are virtually finished like jewelry. Please show your train buddies this advertisement. The train in bolt together kit form is a Live Steam Porter Mogul of 1880 vintage. Everyone agrees that the machine work and finish of the parts is something never yet marketed in a live steam train kit. A machine shop is not required to complete this locomotive.

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Bob Maynard—long time member of Cincinnati Cinder Sniffers and a boiler manufacturer was instrumental in the instruction manuals. For \$20.00 we will send you complete assembly and operating instructions and drawing plus a full size assembly drawing—refundable should you decide to purchase the locomotive. The Porter kit price is \$2995.00, available through hobby dealers.

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# HANDY HINTS

By Larry Hoffman

**NUMBER 1:** An easily mounted, yet mobile, clothespin holder is a length of spar hardwood. I used a 5mm x 5mm piece, with a hole at one end for a loop of string. A thumb tack, pin or nail can be located in your workshop building area from which to hang this handy building aid. See Figure 1.

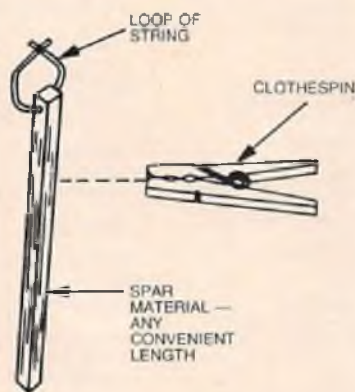


FIGURE 1

**NUMBER 2:** For more years than I can remember, I have used a convenient pin retainer in the form of a small cardboard box, 122mm long x 82mm wide x 45mm high, with a piece of synthetic foam about 20mm thick inserted therein. Even if a pin becomes unstuck, as it often will, the box keeps it from scattering. See Figure 2.

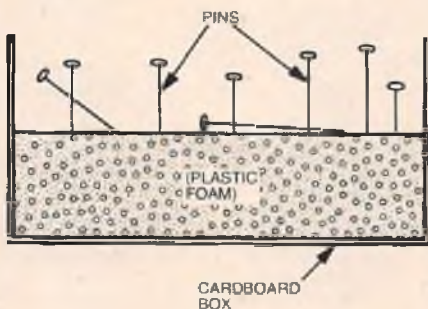


FIGURE 2

**NUMBER 3:** This suggestion is one of those that "everyone knows about," however, maybe there are a few modelers who haven't tried it yet. I retain the plastic backing sheet from heat shrink film covering materials and use it

to page 126

# FREE NICADS

By Bob Thompson

Tools and equipment required:

**Tools:** Hacksaw; 1/4" drill plus bits as required; Carpet knife; Soldering iron plus quantity of solder.

**Electronics:** Power Pacer, Flite Life, Super Cycle, D & D Battery Management System or E.S.V. and some talent.

**Cases, Etc.:** Kraft and Ace are good sources and both indicate they will supply on an as-required basis. I'm sure all of the reputable concerns will fit their customers out with the required plugs, etc.

Daily, thousands of perfectly good nicads are thrown in the trash heap.

Every fire department, rescue unit, police department, security service, telephone or communications company, using two-way portable units, makes use of 15 volt nicad packs.

These packs are normally made up of twelve 450 MAH fast charge cells in series. Herein lies the reason for this article. When one goes, they are all gone until that particular cell is replaced.

In the land of RC, when a cell goes, we replace it and carry on. In the land of communicators, repair does not pay. They replace the entire pack.

One cell out and away to the trash heap go eleven other perfectly good cells. I will grant that, in some cases, the packs are pretty well worn out when the one cell lets go or the entire pack gives up; however, the odds are such that I don't plan on buying nicads for some time.

Where to get them? Your friendly yellow pages under Radio Communications, although I don't recommend using the phone to try to get the packs. The personal approach to scrounging has always proven best. As the numbers of cells available should be high, it might be best to do your scrounging on the club level.

Initial attempts to examine the interior of these pesky little packs proved frustrating, to say the least. After much sparking, pinched fingers and general cussing, I managed to literally wrench one into pieces. My original thought regarding good cells was at least being proven out if you consider the sparks that flew.

The second unit was taken apart in a little more orderly fashion. Measure 1 3/8" from either end and draw a line across the center of the pack. Measure in 3/4"

from each side and drill a 1/4" hole just through the outer cover. This will release the two support pillars and allow the pack to separate once the outside saw cuts are made. Now cut carefully around the perimeter with a hacksaw using care to ensure you do not score the individual cells. A little care in prying and the cover comes off exposing pay dirt.

Remove the paper insulators and one has twelve cells to choose from.

Some packs have very obvious flaws, i.e., swollen cells, discolored, etc., however, the majority look good as gold. I just clip off units of four (4.8v) and head for my Super Cycle. Punch the "Discharge Start" and sit back. If the unit goes into the discharge mode, we are on easy street, though one doesn't know for sure until the first cycle is through.

If the unit won't hold the discharge mode, we can check each cell voltage-wise; remove the dead cell(s); replace cells as required. It may be the particular ones we are trying to discharge are below the 1.1v per cell level, in which case we will have to go through a charge cycle to get things started.

Following are some practical points on recovering these cells.

Clip the cells apart where possible in units of four by cutting through the middle of the connecting strap. This ensures a maximum of strap length available on which to solder your leads.

The practice of units of four allows one to make use of a maximum number of factory connections.

Scrape the strap where soldering is desired until it is a bright shiny surface and immediately tin with solder. Soldering your leads on will now be a snap.

We have come to the part which causes me severe chest pains, nausea, etc. Cases and leads are not free. Sources are noted and indicate they will supply single units for those requiring them.

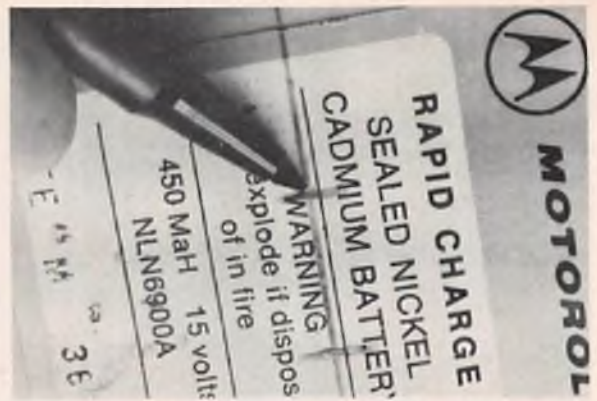
Use of the cases and leads is self-explanatory, however, I will mention the need for a bit of silicone sealant to bond each wire soldered to the pack. This ensures that vibration will not break the wires loose. Use a small amount as the sealant is heavy and can interfere with venting. Evidence of this will be found when your sealant turns a dirty brown after a period of time in use.

Every effort has been made to fail these cells, i.e., strapping to a vibration sander, etc., and they have come back for more. □





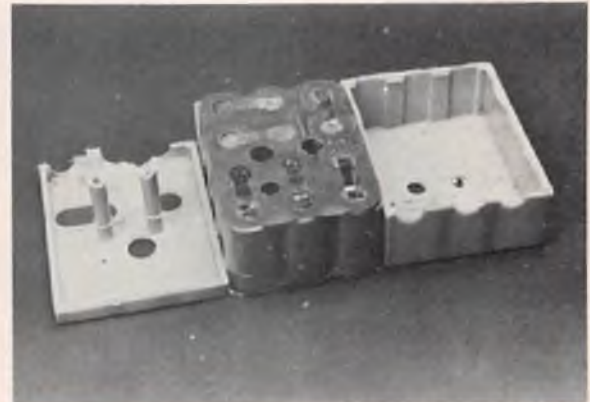
*This is how they start. Note the swelling.*



*Mark and drill carefully to disconnect posts.*



*Cut carefully - not too hard.*



*Paydirt.*



*Clip leads at center. Scrape before tinning.*



*A bright surface ensures proper tinning.*

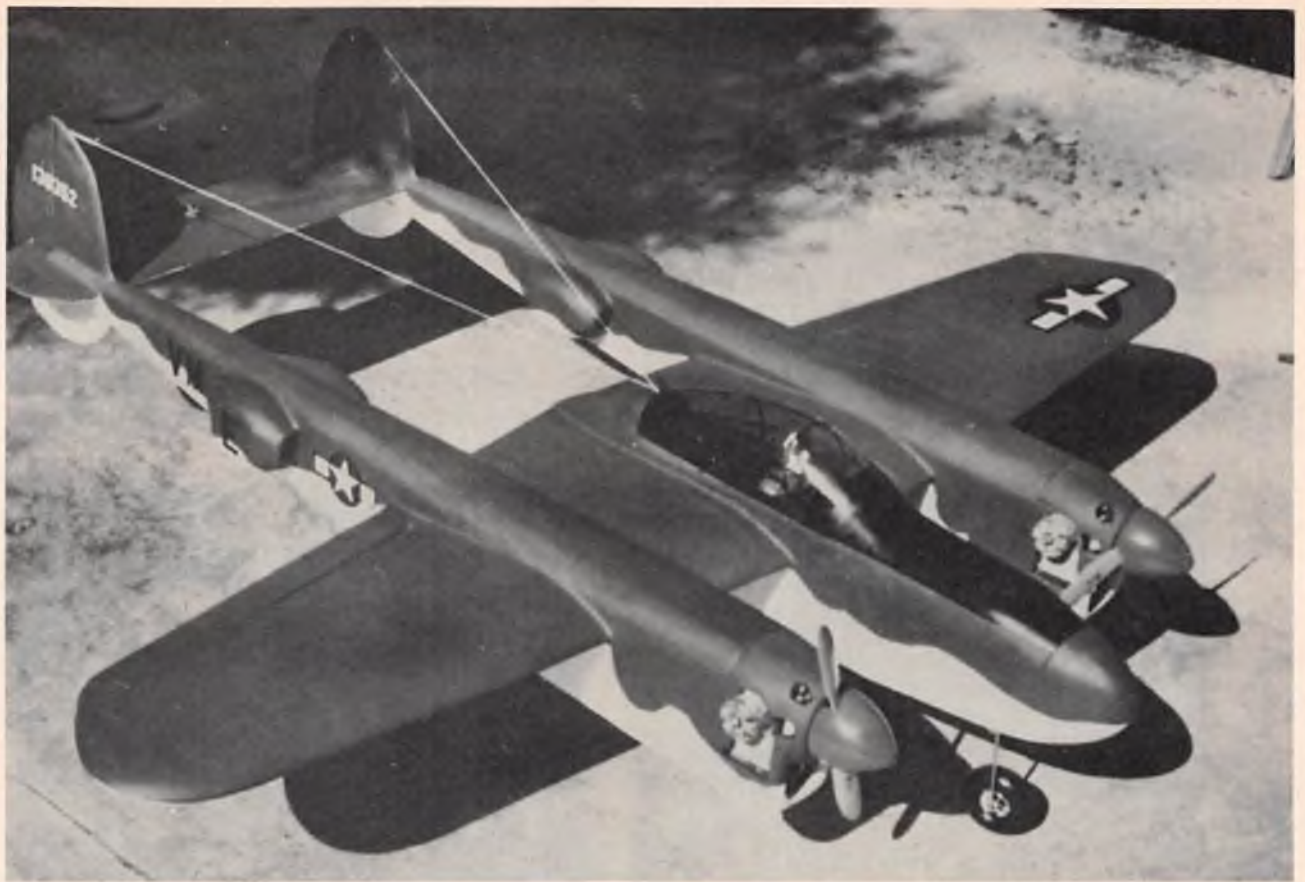


*The steps.*



*The results.*





# CLIPPED WING P-38 By Richard D. Metlen

● I suppose that my start in R/C has been repeated by others many times. I started in U-Control when I was a kid in high school. I would buy a kit, and spend my evenings and other pieces of free time during the week, turning it into an airplane, and the weekends turning it back into a kit. Then there was the usual hiatus of college, marriage, kids, work, and then as middle age approached (come to think of it, the only way you can call this middle age, is if I live to be ninety) and with it some free time, the search for a hobby.

One day, while I was cleaning the garage, I came across a box of goodies that my folks got tired of keeping for me. Since this was clean-up time, I decided to see if there was anything I wanted to keep and just dump the rest. Among the goodies was a Fox .15 and a McCoy .19 Red Head.

Well, I started to think about the times we had had as youngsters, and I decided to go to a hobby shop to see what they had that would fit the engines I had. I began to realize just how long I had been away from the hobby when I was subjected to the plethora (thanks Howard) of things that had come along

while I was engaged elsewhere. I guess that my first realization came when I asked for a tube of glue and just kept building up from there.

The proprietor had probably been through this a hundred times, and sat me down in the work shop in the back room, and showed me what made up the state of the art. At any rate, I returned home with a kit for the Fox and had it together in a short time, although I almost passed out from the fumes from the dope when painting it. I remember stumbling into the den and my startled wife asking me why my skin looked yellow. I don't remember the dope fumes being that potent when I was a kid.

Near our home there is a model aircraft field. It consists of several U-Control fields, and an R/C field and plenty of vacant land. We got over to the field with my plane, and I tried to show the confidence I didn't really feel. After about twenty minutes, my young son and I had the lines all deployed, and had checked to make sure that I had the handle right side up so that the elevator operated properly, and we fired up the old Fox.

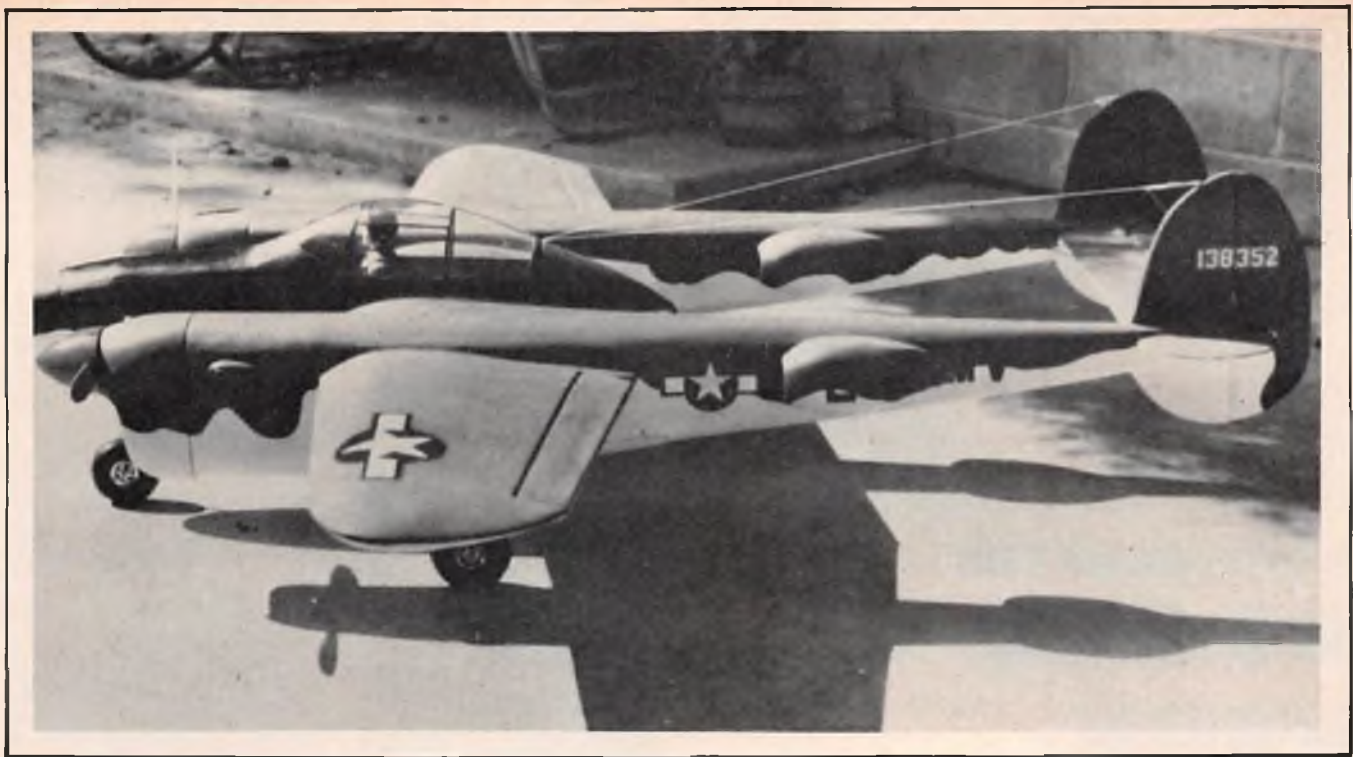
Well, there I was at the end of those 50

foot lines shaking like a leaf, my son holding the plane watching the hot exhaust drip down his hand, and my wife looking at me like I had lost my mind. After a time I figured that I had better tell him to let go or I would run out of fuel, so I gave him the pre-set signal (a stifled scream as I remember) and he let go of the plane and headed toward the safety of the car with his 24" legs pumping at about 5,000 strokes per minute.

To my surprise the plane took right off, and I started going around in a circle just trying to keep it level. It was doing pretty well ticking off lap, after lap, after lap, after . . . I cannot remember getting that dizzy in my entire life. After I fell down, the plane turned toward me and I couldn't even crawl away. Everytime I got to my knees, I pitched over on my back. I remember the control lines covering me like a spider web and the roar of the engine as the plane attacked me.

My wife and son figured that I had had a heart attack and were jumping up and down like monkeys on a string, screaming. It took a while to recuperate and get everyone quieted down, but we got the pieces of the plane back in the





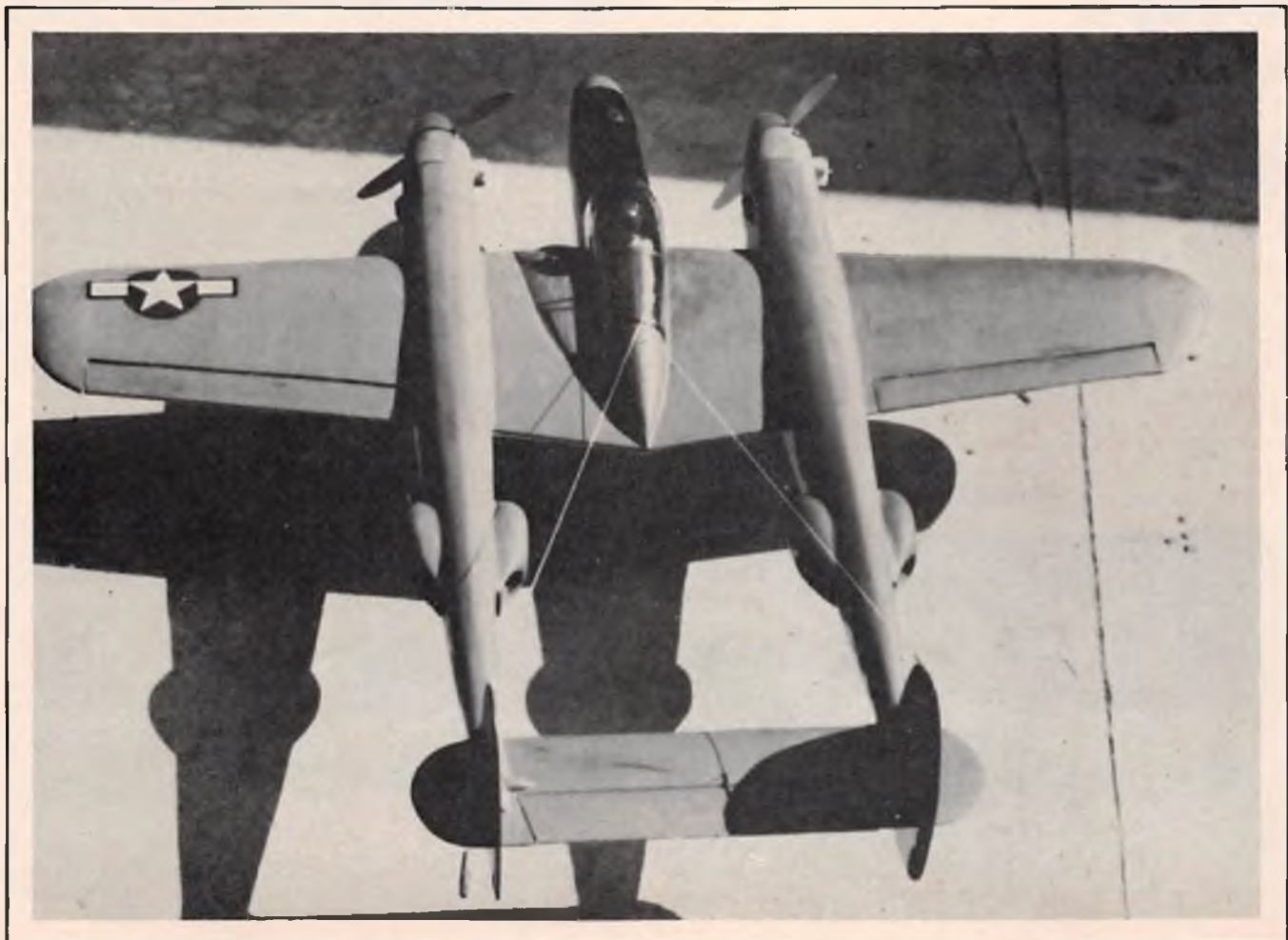
car and got ready to head home. Everyone in the car was very quiet. I tend to get a little snappy when things like that happen.

It was about that time that we noticed

the R/C field. There wasn't anyone there doing a bad imitation of a ballet dancer. They were just standing quietly in one place, pushing levers, and the planes were doing loops and rolls and

what-nots with seemingly little effort on the part of the pilot.

Well, needless to say, I was enthralled. I fell in love. For the rest of the  
to page 116







# RCM BUILDS THE DU-BRO PROP DRIVE UNIT

By Grady Howard

**W**hen faced with the Du-Bro Prop Drive unit, I almost panicked at the thought of building anything large enough to use it on. This fear of building anything that large was soon dispelled when a fellow flyer agreed to do the building of the airplane. I was to do the construction of the prop drive unit, the photo work, and the writing while supplying the engine for the unit. James Poe was to do the aircraft building. After deciding on a suitable type of airplane, a list of materials was made. The airplane that was decided on was a double sized Miss Vintage. This is a .30 size airplane

put out by Michigan Hobby Hangar, and was also a construction article in June 1976 issue RCM (Plan #644). The dimensions were doubled and the results were fantastic. The airplane now had an 11'-6" wing span, with a chord of 19". The length from prop nut to tail was now 7'-10" with a height of 32" from floor to tripod that held the flying wires. A stab that is larger than many wings was 37" long with a chord of 10". Flying weight was 25 lbs. even and the new name was "The Ad-Vintage."

Construction materials were 1/2" square spruce, 5/32" paneling from a

construction job, 1/4" aircraft plywood, and balsa for the wing ribs, tail surfaces, and top block. Aluminum was used for the front top deck. The fuselage was stained walnut and R & S Perfect clear paint was used for fuel proofing. The wing and stab were covered with Hobby Lobby's Super Kote. This covering film works beautifully on these large airplanes because of the light weight and very easy application.

Now that the airplane is ready, we will go into the instructions on installing the Du-Bro Prop Drive unit. This unit comes assembled with partial disassembly



*James Poe is 6' 2" and is having difficulty holding the Ad-Vintage in a stiff wind.*



*Here is the Ad-Vintage waiting for its first flight. Note size of home-made wheels with transmitter next to them.*



*A beautiful sight as the Ad-Vintage gets airborne. Only the lack of a pilot gives it away as not being a real Vintage aircraft.*





*Temporarily mount the engine to the pulley and bearing plate and mark for drilling holes. Here I use 5/32 wire sharpened as a bit to mark hole locations.*



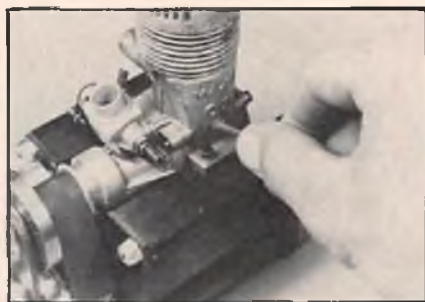
*Remove plates from unit and drill holes for threading or for using bolts and nuts. Hold plates firmly so they will not grab on bit and cause injury.*



*Here, tapping for 6/32 bolts is made easier by using bacon grease as a lubricant.*



*With motor re-installed into bearing plate, you can now put in the engine bolts. Ball wrench works well for installing bolts.*



*After installing bolts, tighten them with regular Allen wrench.*



*As a safety, I install aircraft lock nuts to bottom of bolts.*



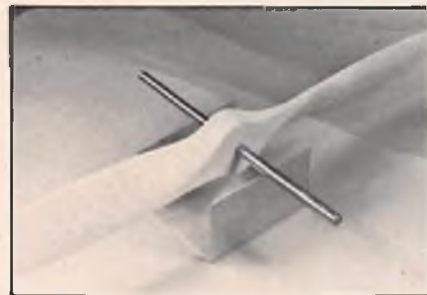
*Motor and muffler installed and ready for tightening the idler pulley against the belt.*



*I used a screwdriver to put pressure against the idler to get the right tension on the belt. Use just enough but not enough to have a lumpy feel when you turn the prop over.*



*Grish prop as it comes from the box. Sanding and rounding of edges is necessary.*



*Balance the prop by using a 3/8" shaft thru the prop and two straight edges. Sand more on the heavy side.*



*Finished prop was stained with walnut and rubbed for an antique look. Clear R & S Perfect Paint was used to fuel proof.*



*Completed unit ready for installing on your favorite giant.*

needed to install the engine. This was a simple process of removing the mounting plates for drilling for the engine mounting bolts. I will not go into these steps here as the photos will tell the story very clearly. However, I will tell how to install the unit to the airplane. This is about the same as any "T" type motor

mounts. Place the unit next to the firewall so that the prop shaft of the unit is on the thrust line. Mark the location of the mounting holes and drill for your bolts or, if you prefer, you can use #8 sheet metal screws if you have at least 1/2" plywood for a firewall. Make sure your tank location is about on centerline with your

needle valve. This is necessary for good fuel draw.

At this time we will go into the flying characteristics of the Du-Bro Prop Drive unit as used with an old OS Max .60 Goldhead. I purposely used an old engine to see if the unit would handle a

to page 115



**If You Want A Safe Return  
On Your Investment ....**



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You Can Depend On It!**



# CIRRUS Hobby Shack 700 Series

Everyone makes investment decisions as they go through life: some are major ones, and a few are less important. Just the fact that you are looking at and reading about Cirrus says that you're ready to make a decision on a new radio control system. We feel that, for your overall enjoyment in the years to come, the investment in a radio system is an important one.



The Cirrus Radio Systems' new features are: new triple tuned front end receiver; the RF amp is controlled by AGC (Automatic Gain Control), and the three and four systems have a new BA-633 decoder chip. The six channel alone features a double sided, copper clad, fiberglass PC board with the same decoder as our previously successful Cirrus radios, which in fact does have a special Custom Made chip. It's the only system we know of having a single conversion receiver with triple tuning, which causes high image rejection plus high rejection of intermodulation distortion.

## You Deserve A Safe Return On Your Investment.

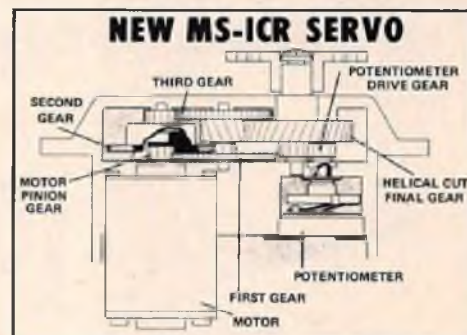
When you select a radio system you want quality, dependability, up to date engineering design, back up service and warranty, and that's why we know that Cirrus is your best investment. You get innovative design features. You get a triple tuned front end receiver for high image rejection. You get a handsome appearing system that you'll be proud to own and

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show off to your friends. In owning a Cirrus System you'll have one of the finest radio systems offered in America that will insure you safe flights for more fun over many years.

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If you're not the gambling type, we can assure you that buying a Cirrus is one of your safest and smartest moves. Cirrus Systems have been one of the biggest sellers in America this last year. We have climbed to the top because we have taken the gamble away from the new radio investor in offering these outstanding Cirrus Systems at economical prices. We can sell them to you at sensible prices because they come directly to you from our warehouse, and thus we have eliminated the so-called 'middle men' who force prices up. Notice that we said economical, not cheap, for Cirrus are as good as and in some cases better than our competition. It's just a smart investment to want a Cirrus, as modelers all over America have found out.



Featuring the new innovative design utilizing "Helical Cut" final gear in a servo allowing more bearing surface for smoother mesh, less noise, better wear for ultimate reliability. This is a compact three wire servo that is still rugged and lightweight providing high power output with high resolution and low power consumption. It has two monolithic IC's, 74 transistors, 13 diodes, and 79 resistors for a total of 165 parts. Size - L: 41.5 mm, H: 35.5 mm, W: 19.5 mm.

## Invest Some Time.

It's natural that you may want to shop around, and we think you should. We suggest that you invest some time in comparing Cirrus with other radio systems. Ask a modeler who owns a Cirrus and find out if he feels he made the right investment. After investing your time we know you'll make the best choice for the most return.

**CIRRUS SPORT THREE RADIO SYSTEMS INCLUDE:** 3 channel receiver, 3 channel transmitter (dry), 2 servos, airborne battery pack (dry), switch harness, servo trays, frequency flag, instruction booklet, and FULL 180 day warranty. 27 or 72 MHz.

CIRRUS THREE CHANNEL SYSTEM (DRY) WITH 2 SERVOS

**\$109<sup>99</sup>**

CIRRUS THREE CHANNEL SYSTEM (DRY) WITH 3 SERVOS

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CIRRUS THREE CHANNEL SYSTEM (DRY TRANS., AIRBORNE NI-CAD & CHGR.) W/ 2 SERVOS.

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**CIRRUS SUPER SPORT FOUR RADIO SYSTEMS INCLUDE:** 4 channel transmitter with Ni-Cads, 4 channel receiver, 2 mini servos, Ni-Cad airborne battery pack with charger for both transmitter and receiver, servo trays, switch harness, frequency flag, instruction booklet, and FULL 180 day warranty. 27 or 72 MHz.

CIRRUS FOUR CHANNEL ALL NI-CAD SYSTEM WITH 2 SERVOS.

**\$159<sup>99</sup>**

CIRRUS FOUR CHANNEL ALL NI-CAD SYSTEM WITH 4 SERVOS.

**\$189<sup>99</sup>**

**CIRRUS SUPER SPORT SIX RADIO SYSTEMS INCLUDE:** 6 channel receiver, 6 channel transmitter, all Ni-Cads in the transmitter, and a Ni-Cad airborne battery pack, separate charger for the batteries, 4 Cirrus Mini-Servos, servo trays, instruction booklet, frequency flag, and a FULL 180 day warranty. 27 or 72 MHz.

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circumstances. See sketch.

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## showcase '78

Non-Scale Models, Articles, Reviews) and hundreds of sub-topics directs the user to the specific category of information sought. Citations identify journal, date, volume, number and page on which the cited item appears. A listing of the magazines indexed provides ordering information and details of coverage. Also included in the work are listings of abbreviations and notes on terminology and arrangement. The volume is a must for model clubs, active modelers everywhere and for the libraries serving their needs. Order from Scarecrow Press, Inc., P.O. Box 656, Metuchen, New Jersey 08840. Price \$27.50.



### VARIABLE PITCH PROP

Hobby Lobby International, Rt. 3, Franklin Pike Circle, Brentwood, Tennessee 37017, has available a revolutionary Variable Pitch Prop. It comes in either 10" or 12" diameter with 3 blades. Extra or replacement blades are available from open stock. You can set it up as a 2, 3 or 6 blade prop. These props can be set up on various engine sizes because they can be adjusted to any pitch you want. 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. 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. The 10" multi-prop list price is \$14.50 with introductory price at \$9.99. Replacement blades priced at 99c. The 12" multi-prop list price is \$15.95 with introductory price at \$11.99. Replacement blades priced at \$1.49.

### DOCKEN PAINT SPRAY GUN

This gun operates on the syphon principle and may be used to spray oil-based paints and lacquers, solvents, varnishes, aircraft dopes, etc. The gun is



not recommended for thick paints such as latex. It gives very fine atomization and an exceptionally smooth finish. The gun may be used with supply air pressures between 40 and 120 pounds per square inch. Supply air should be clean and free from water. A unique feature of the Docken Spray Gun is the trigger stop which may be adjusted to control air flow and hence the size of the spray pattern. This gun outshines all others in painting small or narrow objects with minimum overspray. This spray gun excels in painting different colors with a minimum of mess. Just fill different cups with different color paints and switch from one to another as required. An extra cup may be filled with thinner to clean the gun between colors. Cleanup is a "breeze". Throw away used paint cup. Pour a little thinner in a new cup and snap it into place on the gun. Shake the gun briskly to clean inside parts and pull the trigger a few times to clean the syphon hose and nozzle. Remove cup with thinner from the gun. That is all there is to it. There is very little maintenance required with this gun. If paint is allowed to dry in the nozzle, it may be poked out using a stiff wire. For further information, contact Chippewa Springs Corp, Box 154, Chippewa Falls, Wisconsin 54729.



### A.J. RETRACTS

A-justo-jig Company's retracts, R.R. 1, Box 673, Noblesville, In. 46060, are \$11.95 and have the following features: Lightweight (approx. 3/4 ounce total); fully adjustable retract height and angle; tough and durable (will handle a .19 size plane); designed to operate with miniature 90° servos; struts have double shock coil; no strain on servo in either retracted or down position; positive lock

down feature; and easy installation and servo hook-up. Available from your hobby shop or direct from A-justo-jig.



### THE HANG GLIDERS BIBLE

Here's a "hot off the press" book "The Hang Gliders Bible", which is interesting, informative and authoritative. The book is available directly from the author, Michael A. Markowski, P.O. Box 4371, Harrisburg, Pennsylvania 17111. The price is \$9.95 postpaid for the softbound and \$13.95 postpaid for the hardback. The "Hang Glider's Bible" is actually a 2-in-1 volume with easily understood "flyers theory" and down to earth, practical information you can really use to improve your flying skills. The author has cleverly unraveled the "mysteries" of flight and revealed the "secrets" of the soaring birds. This book is written in plain English without any engineering double talk. Yet, it is extremely accurate, well detailed and lavishly illustrated. Whether you're a beginner, expert, builder, buyer, flyer, instructor, designer, manufacturer or retailer, this book is for you. Dealer inquiries invited.



### ANDERSON KINGFISHER RC STAND-OFF SCALE

Champion Model Aeroplane Company, Inc., P.O. Box 45, Keyport, New Jersey 07735, is a new company



with a brand new product --- the Anderson Kingfisher R/C Stand-Off Scale. It is flight proven for use with 4 or more radio control channels and features hardware package; die-cut ribs; pre-cut formers; maple gear blocks; pre-drilled parts; aircraft plywood; engine .60-.80; weight 6½-7½ lbs.; full size plans; isometric views; quality balsa; machined parts; wing area 750 sq. in.; 72" Stand-Off Scale; all balsa construction; ABS tip floats; ABS cowl and nacelle; and pre-formed wire parts. For more information, write to Champion Model Aeroplane Company, Inc.



### NEW GLOBEE 1/2A PLUGS

"Simply replace the original plug in your popular 1/2A engine with a new GloBee plug, and you'll increase engine output by 1,000 rpm or more!" That's the powerful claim being made by Fusite Division of Emerson Electric Co. for their brand new 1/2A replacement plugs, based on lab and field tests of prototype models. In fact, they say, some of the first prototypes have already been flown in competition and immediately helped set new class records. Greater power and longer life is provided by the high strength alloy coil, patented spiral tip, and blow-proof glass seal, according to Fusite sources. Initial pricing is said to be competitive with other 1/2A replacement plugs now on the market. The new plugs come in two models — Racing, with a hemi-head glow button and "Superloy" coil, and Sport, with a conical button and standard coil. Both are packaged with individual, interchangeable clamps and gaskets. Glow button changing is done easily and quickly with a standard 1/2A wrench. The addition of these new plugs to the GloBee line makes Fusite the world's only manufacturer of a complete line of glow plugs. For additional information, write GloBee Sales, Fusite Division, 6000 Fernview Ave., Cincinnati, Ohio 45212.

### MODEL "E" AIRBRUSH

Thayer & Chandler introduces their Model "E" Airbrush to the hobby market. The Model "E" Airbrush has been largely used in industry for many years.

This single action airbrush will spray all types of lacquer, enamel, dopes, ceramic glazes, etc., from approximately 1/16" to 2/4" without the need to change paint tips or spray heads. The Model "E" is all brass (no plastics) nickel plated and comes complete with 1, 2 & 4 oz. jars, brush hanger & 8' cloth covered hose with connections, packaged in crush proof styrofoam box 7 x 11 x 3½. For free catalog write: Thayer & Chandler, Inc., 422 N. Wells St., Dept. PR, Chicago, Illinois 60610.



### BOB HOLMAN KITS & PLAN PACS

Gloster Gladiator is a complete kit with a 56" span and .60 power. It has an all built-up construction with a glass cowl. The kit price with plans is \$91.95 plus \$3.00 shipping costs. Also available is Brian Taylor's new P-40E and his Spitfire MK1. The P-40 is 1¾ scale with plan, cowl, canopy and even the scale size and shape spinner. Brian won first at the British Nats with the Spitfire a few years ago and of all the Spits on the market, it is the closest to scale. Plan Pacs available for both. "Best in Scale Catalog" is \$1.00 plus .50 for first class mailing. Available from Bob Holman Plans, P.O. Box 741, San Bernardino, California 92402.

### SUPER-LOCK A

Devcon's Super-Lock A, is an anaerobic compound used in small quantities to lock screws, nuts, bolts, shafts, and bearings in place.

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### ANTIQUE DECALS

The antique decals pictured took some investigation because, not only are there different styles by the same manufacture, but also color variations. The color, size and type lettering are as exact as possible with the research conducted. These decals are of best quality. They will lay flat, will not crack, and can be nitro proof (to a degree) with proper application. A set of decals are available for \$7.50 p.p. This includes 23 varieties on 6 sheets, 2 sheets each style. Available from Larry Vance, 5066 Cindy Way, Las Vegas, Nevada 89104.

to page 114



# BUD NOSEN MODELS

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Thunder Bay, Ontario



# Bud Nosen's spectacular

## 102" P-51 D

KIT \$169<sup>95</sup>

- Stand-off Scale
- 2.75" equals 1'
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- 16.5# flying wt.
- 1800 sq. in. wing
- 26<sup>1</sup>/<sub>4</sub>" chord at root

- 4 channel radios required
- Designed for .60 engines with prop driver
- Very stable flyer
- Proof of scale 3 views
- Kit includes 21" canopy

- No foam or plastic
- 6" spinner is not included available direct only \$16.95
- Huge rolled Plans
- Machine and die-cut parts
- Decals not included



# BUD NOSEN MODELS, INC.

Box 105

Two Harbors, MN 55616

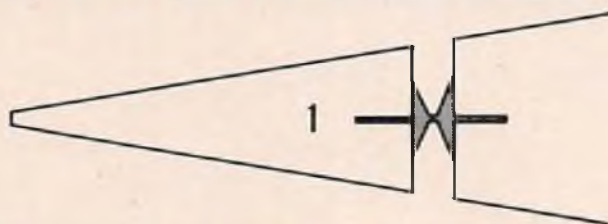
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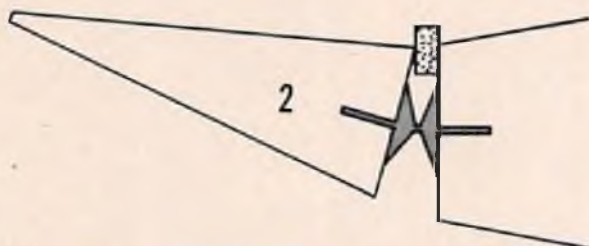
## A BETTER WAY

By Jerry Holcomb

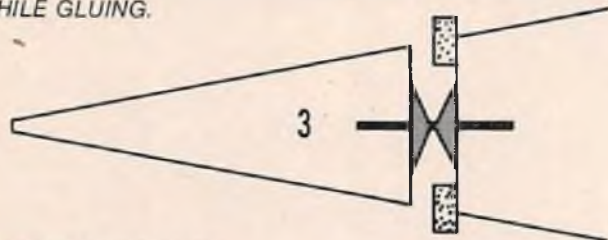
THIS SYSTEM WORKS WELL TO CLOSE THE CLEARANCE IN SMALL DEFLECTION CONTROL SURFACES SUCH AS STRIP AILERONS WHEN USING COONEY GAPLESS HINGE.



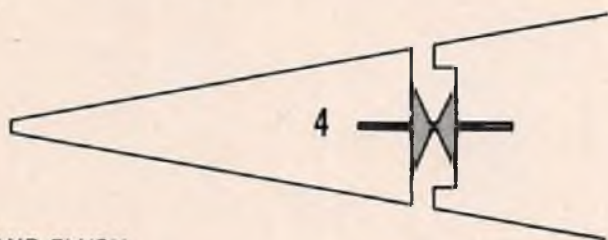
(1) USING CYANOACRYLATE ADHESIVE, INSTALL HINGE AS USUAL. (USE SMALL HINGE.)



(2) SELECT A STRIP OF Balsa THAT WILL GIVE THE DEFLECTION THAT YOU DESIRE. USE THE CONTROL SURFACE AS A CLAMP WHILE GLUING.



(3) REPEAT OTHER SIDE.



(4) SAND FLUSH.

## STAND-OFF SCALE WARBIRDS CONTEST

June 24 & 25, 1978 — Oshawa, Ontario, Canada  
Sponsored By The Oshawa Radio Control Club

The Warbirds Meet will feature 4 Classes:  
1900 to 1925 Warbird — 1926 to 1945 Warbird  
1946 to 1978 Warbird — Mammoth Warbird 1/4 Scale

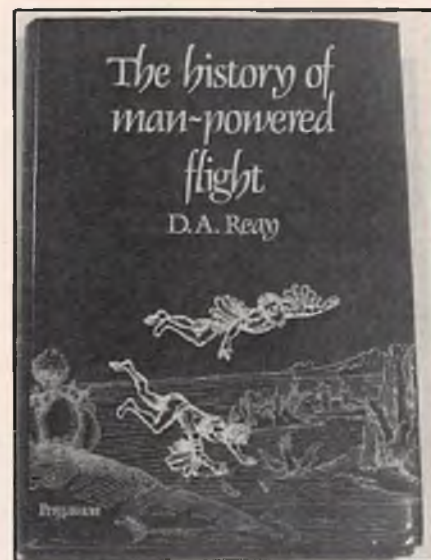
A Warbird is an operational model of any powered aircraft used for military purposes and painted accordingly with accompanying documentation. M.A.A.C. Stand-Off Scale rules will apply except bonus points will be awarded for flying the model (proxy pilots are allowed).

Every competitor will receive a prize with super prizes for the top 4 winners in each class. The Oshawa Radio Control Club demonstration team will put on a show for the public and this will be one of the highlights of the National Television coverage planned for the meet.

For further information, contact:  
Ted Curl, 7 Avon Court, Whitby, Ontario Canada L1N 5R5

SHOWCASE '78

from page 111/108



### THE HISTORY OF MAN-POWERED FLIGHT

This book covers the history of man-powered flight, from early mythology to current-day sophisticated aircraft. As well as presenting data on the machines, the author has supplied background information on the philosophy behind the designs, the controversy surrounding some areas of development, and the role played by serious contemporary aeronautical institutions. Special features include: a unique detailed account of the personalities involved, as well as the aircraft themselves; the background to many of the man-powered flight competitions; the success and failures worldwide. It has 362 pages, with 175 illustrations. Available from Pergamon Press, Fairview Park, Elmsford, New York 10523. Price \$15.00.

### PORTABLE IGNITION SYSTEM

L & L Electronics, P.O. Box 13434, Albuquerque, New Mexico 87112, presents their new Portable Ignition System. This unit is designed to provide optimum starting conditions and plug life under even the most adverse conditions. The unit is compatible with all 1.5 and 2 volt glow plugs. It automatically adjusts the current to the glow plug, thus compensating for flooded conditions. The unit is solid state, and is capable of supplying up to 12 amps for 1.5 volt operation, and up to 40 amps for 2 volt operation. It has been designed to be recharged from any current limited 4.8 or 9.6 volt supply, but



can be recharged from any current limited supply between 2.3 and 11 volts. Size: 4" x 2 7/8" x 1-9/16"; Weight: less than 16 ounces; Color: black; Material: plastic; Accessories: mating jacks, instructions; Warranty: 90 day limited on parts and labor; Price: \$19.95; Available through: retail outlets or order direct from L & L Electronics.



#### MECHANICAL SPEED REDUCER

Astro Flight, Inc., 13377 Beach Ave., Venice, California 90291, introduces their Mechanical Speed Reducer. This precision made ball bearing speed reducer lets you swing a big prop for more thrust and aerodynamic efficiency. Now you can turn a scale size prop. The high quality timing belt and precision timing pulleys insure long life and almost silent operation. Replacement belts available separately. Order direct from Astro Flight or see your dealer. Price is \$29.95. □

#### DU-BRO PROP DRIVE UNIT

from page 103/102



large heavy airplane without using a new high powered engine.

The unit performed excellently with this engine and a Grish 22/10 pitched prop. Idle was tacked at 900 rpm and top end was a smooth 4200 rpm. This was excellent for this aircraft with lift-off after about 75 to 100 ft. of take-off run. The beauty of this gigantic airplane as it went into the clear blue sky is beyond words for this writer. It would take a poet to describe the sense of awe as this flying machine, reminiscent of the days of those "magnificent men" lifted into the

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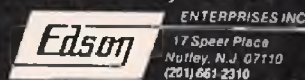


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A stand-off scale T-38 Talon as flown by the famous Air Force Thunderbirds. A beautiful jet, a beautiful model. This model will do all the Thunderbird aerobatic routines. Rolls and point maneuvers are crisp and precise just like the real aircraft.

The Thunderbirds manual included in the kit shows complete paint scheme and three views. Everything needed for scale presentation. Construction is foam wing and stab, balsa fuselage.

#### Specifications: Kit Features:

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Span - 55 in.  
Area - 575 sq. in.  
Eng - 60

1. Complete rolled plans and instructions.
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3. Complete Cockpit detail shown.
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5. Foam wing and stab.
6. Thunderbird manual, full color photos and 3 views.

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**CLIPPED WING P-38**

from page 101/100

day I dreamed, ate, and slept R/C, and when the hobby shop opened the next day, they found me with my nose pressed to the window waiting for them, with my checkbook in one hand and a pen in the other.

The sequence of events that followed in the next two years went something like this. There was a three channel high wing trainer, followed by a four channel high wing trainer, followed by a low wing full house trainer, followed by some Stand-Off Scale planes and etc., etc., etc. By the time I had a dozen planes all with their own engines, two receivers, nine servos, and a ticked-off wife, I was looking for a new challenge in building. I felt that if I did some scratch-building, I could answer the inevitable question my wife would ask of why I needed another plane.

I know very little about the science of aeronautics, but I had picked up what I thought was a fair working knowledge of model aeronautical principles. At about the same time, while I was looking through a copy of R/C Modeler Magazine, I came across a picture of a Snoopy's Dog House plane that seemed to consist of very little but a dog house and an engine, and it flew! I figured that if someone could build and fly a dog house, I could copy a scale airplane and be successful. After all, what's so hard about designing a kit? All I had to do was figure out how to start and the rest would just fall into place, right?

I figured that I would start out with a rather straightforward design so that I could avoid any unnecessary complications on my first scratch-built plane, so I chose to make a P-38. Here is where I ran into my first problem. I couldn't figure out how to take the plane apart so I could safely transport it. If the wing, with its center pod, came off as a unit, I was bound to fracture the horizontal stabilizer which would be all that was holding the two side pods together. The more I thought about it, the more it looked as if I would just have to build the plane in one piece, and transport it as a single unit. Now that this knotty problem had been solved, the



next step was to measure the inside of my car. By positioning the plane side ways, I could accommodate a wing span of 60", and a fuselage all-over length of 50".

With these complicated engineering measurements completed, I was ready to start building. I got a piece of shelf paper from my long suffering wife (it's hard to describe the look on her face when I told her I was building another plane), and drew out a sketch of the wing.

Now I just didn't guess at the wing shape. I used the dimensions from a picture I had in one of my books. It wasn't real accurate but it gave me a general idea of what it should look like, and I had seen a lot of P-38's in war movies. Well, after sketching it out, I realized that it wasn't going to have enough wing area for the anticipated 8 pounds of weight I was planning on. Told you I knew what I was doing. So I just lengthened the root of the wing until it was okay in the wing loading department.

While building the wing, one small mistake was made. I forgot to taper the width of the wing, and ended up with a wing that was just about as thick at the tip as it was at the root. This turned out to be a fortunate error, however, because I ended up with a 10 pound plane and in later reading I discovered that when we figure wing loading in the traditional manner, we are treating the wing as if it had no thickness at all, when in reality the thickness of the wing plays an important part in actual wing life. Lucky eh?

Well, you can guess what happened next. By widening out the wing that far out of scale, I soon found that I was working with one scale length in the wing area and another scale from the end of the trailing edge to the vertical stabilizer. This unfortunate turn of events necessitated ignoring any real measurements, and just kind of eye balling everything. This was especially true, when I found that the 11" props wouldn't clear the cockpit pod where I had originally planned to place the side pods. I didn't discover this until after the wing was completed, and now if I moved the pods far enough down the wing so that the props would clear, the ailerons would end up partially buried inside the side pods. The solution was, of course, to narrow the pods. While this solved the problem, I now found myself with another scale discrepancy. I had one scale determined by the wing root, another by the wing thickness, and the third by the prop clearance problem solved by thinning the cockpit and side pod measurements.

Well, let me tell you I almost went screwy trying to put everything together so that it still looked like a P-38. I must have made fifty trips to the hobby store for advice, pieces and parts. I

to page 120



## Our flying file helps us help you.

It contains records of your vital statistics (address, phone, type of Sunday flying or competition, etc.) which lessen confusion and mistakes in filling orders... But more important, it aids in understanding between the business end of R.C. Modeling and the consumer end (the flyers). Though we are flyers ourselves, we still want to stay in touch with flyers (and their problems) from around the World. We want an open line of communication working both ways so that no "Altitude Gap" will ever exist between us and the folks who make R.C. Modeling the greatest sport hobby in the world.

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**CLIPPED WING P-38**

from page 117/100

haven't got the vaguest idea how many hours Colby (the proprietor) spent with me, but I started to notice that after awhile he knew when to expect me, and started picking up an extra donut for me. Looking back on it, I can remember him spending hours helping me with something, and I ended up buying a 75¢ part. That's what I call devotion.

I think that my next mistake was

mounting the engines sideways. Not having had any experience with multi-engine craft, I wasn't aware of the vibration problem this would create. Each time I ran the engines up, I had to re-cement one of the bottom rudder hinges. By this time that was a minor problem.

Well, after this fiasco had gone on for four months, the plane was finished. If you squinted your eyes and stood in just the right spot at a moderate distance, the P-38 looked pretty good.

I took my finished creation to the hobby shop for the admiration of the crowd. Everyone was very appreciative,

and I felt wonderful. Mary, Colby's wife, even took my picture with the plane. I explained to Colby, how, after putting so much work into the plane, that I wanted him to fly it on its maiden flight. Have you ever seen anyone turn dead white with a smile plastered all over his face? I haven't seen a sight like that since the last time I watched the Joker on Batman. I have to admit that he regained his composure nicely, and agreed to do it, and I agreed to not hold him responsible for anything that happened, and after signing some papers to that effect, we arranged the time of the big event.

to page 122

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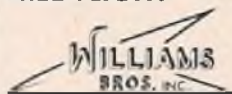






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I decided to take my wife along for the event since she had watched the growth of the plane from a pile of wood to the finished product, and she might as well watch the procedure in reverse. Besides, she is a registered nurse, and at my age it's best not to take any chances.

The excitement started as soon as we neared the field. People who were leaving and passed us as we came in, turned their cars around and started back. I guess that the P-38 showed up pretty well draped across the back seat and front seat looking out at everyone, or maybe it was my wife hunched over the glove compartment trying to avoid the wing tip as we drove along the pot holed unpaved access road.

After parking and rolling down all the windows on the right side of the car, Jean (my wife) crawled out of the car, and I crawled in to lower her bucket seat. Then with the door opened as wide as it would go (and then some), the P-38 was maneuvered out of the car. Quite a crowd had gathered by this time. I couldn't tell if the plane or our antics had attracted them.

We got to the yellow and white pit area and started to get set up for the flight. It took quite a while because of all the questions I was getting from the other fliers. I was amazed at the interest shown, but the expert opinion was that it wouldn't fly with the weight I was carrying, the high wing loading, the thick wing, the short wing, etc., etc., and etc. I was discouraged to get discouraged and wondered if it wouldn't be a good idea just to take it home and hang it up as a mobile for my work room.

Fortunately, Harry came along. I don't know his real name, but he looked over the plane, hefted it a couple of times, and told me that while it would be a hairy take-off, hairy if it slowed down too much, hairy if I lost an engine, and hairy on landing, he thought it would fly. What other name could I give him but Harry?

By this time my reluctant test pilot had arrived, pushed his way through the crowd of doubters, and asked when I was up. I looked around, and everyone on my frequency was standing next to me. Actually almost everyone at the field was in our pit area. Everyone agreed that it was my turn.

Colby decided to just see how it tracked the first time. He would start the take-off, and then cut the engines before take-off and bring it back, and we could evaluate how it performed. I started the engines and the sound of two .40's going full-bore in sync. has got to be one of the most beautiful man-made sounds. I got



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7 ft. tall; 60 sq. ft. room for modelers & airplane stuff!	
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## RADIOS

Cannon Radios	
Tini Twin-3 chan, 2 servos	\$149.95
Tini Twin-3 chan, 3 servos	\$174.95
Kraft 7C - CALL FOR BEST \$	
Kraft 5C - PRICE ON \$ ?	
Kraft-KP4 KRAFT RADIOS \$	
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10% NITRO CONTENT \$5.98  
per gal. in cases (4 per case).  
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Best Power/Best Quality	
All 9" Props	
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10" x 6"	
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11" x 7"/11" x 7 1/2"	
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K & B 61-with pump and muffler	\$79.95
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RC	\$ 36.95 \$29.95
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**NEW QUADRA ENGINE-2 cycle, 2 cubic inches, 2 HP, comes complete with Prop. Adp., engine mount, muffr, Pump type carb. .... \$121.50**

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**Power Panel**  
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**Pylon Brand Starter**  
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.15	..... \$31.95
.20	..... \$36.95
.25	..... \$39.95
.40 PDP	..... \$59.95
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(All engines have ball bearings,  
with muffler)

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**\$ 19.95**

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**CLIPPED WING P-38**

from page 122/100

the assignment to taxi the plane to the runway, after all, how much trouble could I get into at three miles an hour?

Before Colby took over, I revved up the engines a couple of times to clear them out, and then turned the transmitter over to him. By this time, I started to notice that I had silver specks darting across my vision. My blood pressure must have been over two hundred. I started to wish I had taken the precaution of bringing some oxygen and amyl nitrate from the office with me.

Colby moved the P-38 out, hit the throttle, and the plane headed down the center line of the runway like a slot car.

With a yell of "I'm going," Colby hit the elevator, the P-38 leaped into the air, dropped first the right wing tip, then the left, as Colby adjusted the trim, and then moved straight out, and banked into the normal left bank the pattern of our flight field dictated.

I started to feel kind of light-headed and couldn't understand why until I realized I hadn't been breathing for quite awhile. At any rate, after a couple of passes over the field, Colby put the plane into a steep climb and cut back on the throttle to see what would happen at low speed. As far as I could tell, it just hung there. Apparently satisfied, Colby hit the throttles, and the plane moved out into the original circular pattern.

"Let's show the doubting Thomases," Colby said with the first unforced smile I has seen on him for a week, and he did. Rolls, loops inverted flight, the works, and the plane handled great.

That is just about the end of the story of the Clipped Wing P-38. The landing was a little fast & we broke a prop (big deal), but as I taxied it back to the pits on one engine, everyone there gave us a round of applause. Truthfully, I never expected to get it back in one piece considering all the mistakes I had made. I even had a cardboard box in the trunk of the car, just in case.

I figured that I made about a dozen mistakes on the plane, but for some reason, they cancelled each other out. If you think that a lot more luck than brains was involved, you are probably right. The good Lord was just trying to make up for the fact that He let me go bald at twenty, I guess.

I have had some exciting moments in my life, including being elected to public office, but nothing equalled that first flight of my first scratch-built plane.

to page 126



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57 years of combined building and flying experience have gone into the design of each airplane in the Mark's Models line. Our active participation in both sport and competition flying assures the modeler he is purchasing a proven practical airplane. See these fine kits today at your local hobby shop.

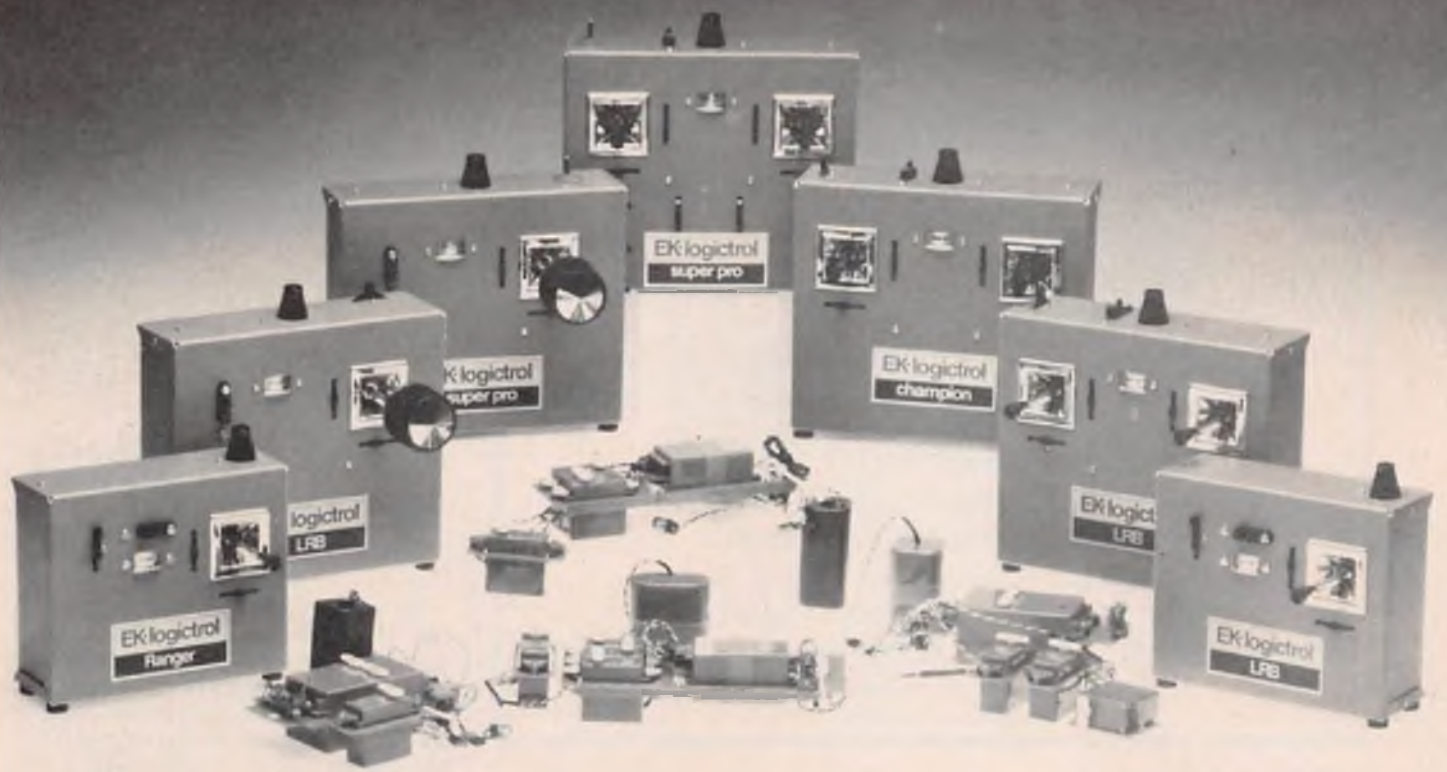
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Wing Span . . . . . 99.25 in.  
Wing Area . . . . . 555 sq. in.  
Weight . . . 29 oz. (Ready to fly)

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**RANGER** provides 2 or 3 channel operation with separate components and is designed to operate with dry cell power or optional NICAD batteries.

**LRB-5** is the most expandable system available at any cost, anywhere. It can be used as 2, 3, 4, or 5 channel system for sail planes, trainers, sport, scale or pattern airplanes. This is possible because the 2 servo brick features a "magic" red plug which allows rudder/aileron functions to be switched or coupled.

**CHAMPION** is the sport flyers 5 channel favorite. It will allow operation up to 5 channels with separate components and is offered with 4 servos as standard equipment.

**SUPER-PRO** allows up to 7 channel operation with separate components and has become the favorite choice of both scale and pattern flyers. It is the first line best quality radio and features one or two stick transmitter operation and an optional dual conversion crystal filter receiver.

*Warranty:* To prove we have the best radio systems available today, we offer our exclusive one year warranty which even covers crash damage for the first ninety days and is renewable the second year.

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AVAILABLE IN GALLONS,

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Goodyear	\$10.50	20%
Combat	\$12.50	30%
Rat Race	\$14.00	40%

Boaters: For the second year in a row, Doug Floyd won the Atlanta Enduro Race Grand Championship & 60 Class using 40% Custom Blend Fuel.

Don's wheel, Fast Fills & gas tanks now available.

from page 124/100

Now all the hard work and doubts are forgotten, and I have found a new scratch-built project to start on, but of course you already know that don't you? Sure you do. You must have heard the scream Jean let out when I told her. □

**HANDY HINTS**

from page 98

to cover plans on my building board when laying out a wing or body. This keeps the glue from sticking parts to the plans or board.

**NUMBER 4:** My collection of piano wire is retained in a container easily made with thin, one to two millimeter, cardboard and contact cement. Four or five vertical sections and one horizontal section, for small pieces and leftovers, is an adequate size. The top section is reinforced with a double piece of cardboard, with holes cut for wall mounting. Figure 3 explains how it's done.

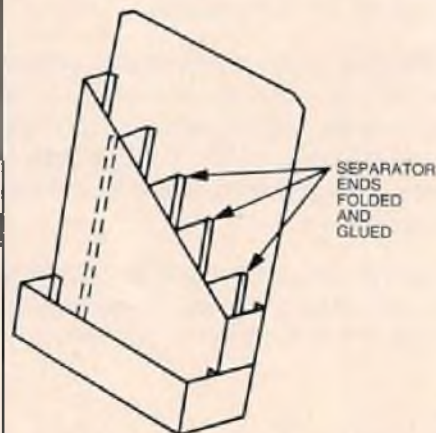
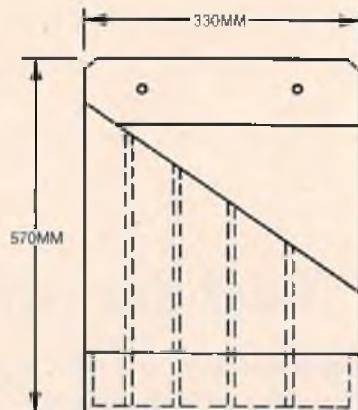


FIGURE 3



# SERVOs, RECEIVERs, COMPLETE FLITE PAKs REGULAR OR MICRO, ASSEMBLED OR KITS

Litco flite paks or components can be purchased assembled or in kit form. Assembled units are pretuned and ready to use with transmitter specified below. All units use Deans connectors. Servos are supplied with extra female Deans connector to simplify installation.

Litco Systems has pioneered the concept of fully assembled flite paks custom matched to various transmitters. Our servos are electrically adapted to match the transmitter specified. There is no universal servo that operates properly with all transmitters since throws and pulse spacing vary with each make. Please order from table below.

PLEASE CIRCLE THE MAKE OF YOUR TRANSMITTER:

KRAFT EK ROYAL FUTABA WORLD MRC RS ORBIT REATH ACE UNICOM CANNON  
(PRO LINE COMPLETE FLITE PAK ONLY) SANWA CIRRUS MICROAVIONICS KRAFT KP4A

## REGULAR COMPONENTS



## MICRO COMPONENTS



### SERVO

- Double sided PC boards
- Solid tantalum capacitors
- Long life potentiometers
- High quality servo motors
- 4.0 lb. power, 0.5 sec transit
- 8 mA drain
- Fast, precise, high resolution
- Gold plated Deans connectors

REGULAR Size: 1.5x1.45x.73

Wt. 1.2 oz.

MICRO Size: 1.28x1.3x.6

Wt. 0.7 oz.

### RECEIVER

- Double sided PC boards
- Double tuned front end
- 1.5  $\mu$ V. AGC on 4 stages
- Gold plated Deans connectors
- High selectivity and rejection
- 5 channels, 8 available

FREQUENCY: 72.08, 72.16, 72.24, 72.32,  
72.40, 72.96, 75.640

REGULAR Size: 1.9x1.7x.8 Wt. 1.5 oz.

MICRO Size: 1.75x1.14x1.0 Wt. 1.5 oz.

### BATTERY

- REGULAR
- 500 mA.H, vibration resistant
  - Nylon D&R case
  - Gold plated Deans connectors
- Size: 2.2x1.25x1.25 Wt. 4 oz.
- MICRO
- 225 mA.H, vibration resistant
  - Nylon D&R case
  - Gold plated Deans connectors
- Size: .85x1.45x1.45 Wt. 2 oz.

### SWITCH HARNESS

- Noble high quality switch
- Deans gold plated connectors
- Nylon protective cover
- Wt. 0.4 oz. (charging connector to be supplied by user)

WRITE: We answer inquiries immediately. We ship rapidly when paid by money order or cash.

GIFT CERTIFICATES \$25.00 EACH

## NEW 544 SERVOS!

## NEW LOW PRICES!

After one year of research we are introducing the best servos ever produced regardless of price — the 544 Servo Line. Also in addition to our regular kits a new microservo kit (S5443K) is now available.

These new servos and kits use a new highly advanced 544 AA IC offering internally regulated power supply, dynamic braking, linear ramp timing and the need for very few external components. This revolutionary new IC is complemented by the most sophisticated PC board in the industry — double sided, plated inside holes, reflowed in hot oil and manufactured of epoxy glass. This inherent reliability and vibration resistance is further enhanced by CTS metered deposition pots and the

best motors available. D&R mechanix production is now electronically controlled for increased precision. Finally a burn-in procedure further assures the highest reliability.

We have purchased a large volume of parts at low prices and we are passing the savings on to you. The prices will hold as long as this supply of parts lasts.

Our flite pak approach has been immensely popular and many modelers have purchased their 4th or 5th flite pak. If you have not yet tried our approach now is the best time to do it and save. Flite pak prices are the sum of component prices and all parts can be mixed.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

ZIP CODE \_\_\_\_\_

QUANTITY	CAT. NO.	DESCRIPTION	PRICE	TOTAL
	S5441	Rotary D&R servo, assembled	544 IC 20.00	
	S5442	Rotary Dunham servo, assembled	544 IC 22.00	
	S5443	Rotary Dunham micro servo, assembled	544 IC 29.00	
	R2000	Receiver regular, assembled	Frequency _____ 36.00	
	R2001	Receiver micro, assembled	Frequency _____ 39.00	
	B1000	Battery regular, assembled	13.00	
	B1002	Battery micro, assembled	13.00	
	H1001	Switch harness, assembled	5.00	
	S5441K	Kit of S5441 servo	544 IC 17.00	
	S5442K	Kit of S5442 servo	544 IC 19.00	
	S5443K	Kit of S5443 servo	544 IC 25.00	
	R2000K	Kit of R2000 receiver	Frequency _____ 30.00	
	H2010	5 male & 5 female Deans 3 pin connectors & assortment of wire	8.00	
	S2000	Trays for all regular servos 5 pcs.	4.00	
	S2000A	Single snap on tray for all micro servos	1.25	

COD, Shipping, handling & insurance

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2.50

1.50

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COOL POWER FUELS ARE COOL CLEAN BURNING FUELS THAT LET YOUR ENGINE PERFORM ITS BEST AND LAST LONGER. THEY CONTAIN ALL THE TIME HONORED INGREDIENTS PLUS A FEW DIFFERENT FEATURES THAT GIVE THEM A DIFFERENT EDGE...

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	(Gallon)
FAI	7.95
5%	8.95
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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:

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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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SALE!

	LIST	OUR PRICE	LIST	OUR PRICE
FP-2GA	99.95	69.	FP-3FN	199.95 131.
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FP-2E	139.95	93.	FP-5FN	349.95 217.
FP-3F	179.95	118.	FP-6FN	359.95 227.
			FP-7G	579.95 392.

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- Fold & Glue construction
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the **ZOX-35**  
fun-pattern sportsler

Wing span-55" Wing Area-500" sq.  
Engine-.29-.36 (.35)  
Approx. weight-4 lb  
4 Channels

Top Materials, Instructions

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Enclosed is my check or money order for \$ \_\_\_\_\_

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send now

only **\$29.95**

made in USA

Precision die-cut  
Foam-core, ply, balsa

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## HANDY HINTS

from page 126

**NUMBER 5:** Recently, I have been using the IM engine mounts which employ Allen head screws to clamp the engine in place. Reaching these screws can be a problem using a standard Allen wrench, therefore, with the use of an 8mm square section of aluminum stock, approximately 50mm to 60mm long, a useful tool can be easily fashioned. See Figure 4.

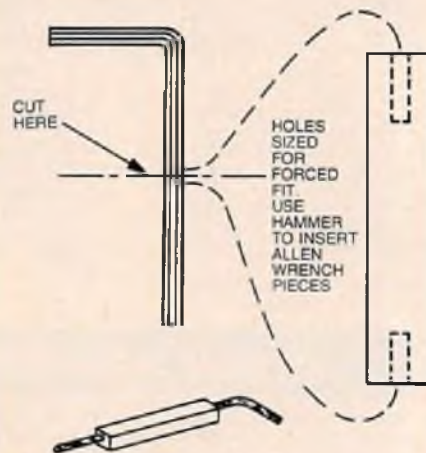


FIGURE 4

**NUMBER 6:** Another piece of 8mm square aluminum stock, approximately 140mm long, was fashioned to make a positive, safe, and simple way of holding one-half of a double edged razor blade. I used my Dremel saw, cutting very slowly, to cut a 35mm long slot and tapped the retaining screw hole for a 3mm screw. See Figure 5.

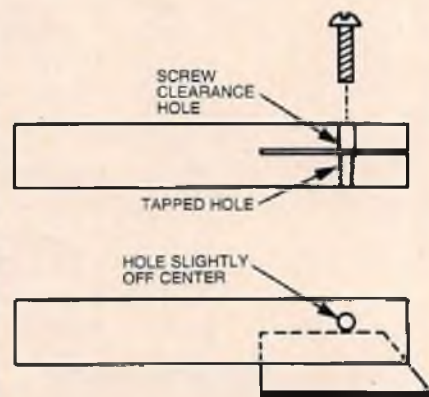


FIGURE 5



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## A breakthrough in Radio Control...

### THE 18-WHEELER

You can hitch and unhitch tractor and trailer by radio control. Steering wheel on transmitter provides proportional steering. Drives forward and reverse. Pro-Cision brake-stop action. Trailer body can be removed to reveal flat-bed with loading ramp.



### 1/12 SCALE PORSCHE 935 TURBO

Pro-Cision engineered for realistic simultaneous racing. Three different cars on separate frequencies. Variable speed, reverse and proportional steering with dual-stick transmitter. Ni-Cad batteries can be used for extra power. Charger for Ni-Cads optional.



### 1/16 SCALE BMW 3.5 CSL AND MASERATI BORA

Two different BMWs and two Maseratis in this exciting Pro-Cision series...four different cars on separate frequencies for simultaneous racing. Variable speed control and proportional steering with steering-wheel transmitters. Ni-Cad batteries can be used. Pro-Cision Charger for Ni-Cad batteries optional.



### 1/20 SCALE FIREBIRD

Two Pro-Cision Firebirds each with beautifully detailed Firebird markings. Separate radio frequencies for simultaneous racing. Two speeds forward. Radio-controlled left and right turns.



### 1/16 SCALE

#### M23 McLAREN FORMULA 1

This replica of the famous McLaren race car features radio-controlled left and right turns. Speeds can be pre-set at slow for beginners and fast for more experienced drivers.



### POWERSTREAKER RACING SET

This racing set includes a 1/24 Super Corvette and a 1/24 Lancia Stratos...along with two push-button transmitters and six racing pylons. Cars have two forward speeds. Cars are also available separately.

EXCELLENCE IN RADIO CONTROL





# SIG DOUBLER II SCORES WITH MINNESOTA RC CLUB



Bill Cowette, Director of the Grassfield RC Club Racing Program in Minneapolis sent us the accompanying photo of just some of the flock of Doubler II's being built and flown in that area. Even more are under construction---a total of 48 in all!

The rules for their racing program envision a standardized type of model with a plain bearing .15 engine using 15% fuel. At the present time the Doubler II and one other competing kit are specified as acceptable. The Doubler II won the last contest of the season (it was introduced on the market last summer) and Bill comments: "Although they ( Doublers ) do not appear to be any faster than the -----°, it is quite apparent that they handle much better and fly smoother."

A brief summary of the rules used by the Grassfield Club follows, for the information of other clubs who might like to try a similar program.

## ° Competing Kit Name Deleted

### RACE RULES

1. Each entrant will furnish own fuel. 15% nitro maximum.
2. Course will be N.C.P.L. 1/4 Midget short course. Ten laps equal 1.7 miles.
3. Six heats per race will normally be flown.
4. One and one half minutes "starting time" will be allowed.
5. When equipment and manpower are available, scoring will be based on time as follows:

Lowest time .....	4 points
2nd. time .....	3 points
3rd. time .....	2 points
4th. time .....	1 points
Ten Laps not completed .....	0 points

A penalty of ten seconds will be added to actual time for one cut.

Two cuts disqualify flyer from that heat. 0 points.

6. When timing equipment is not available, scoring will be as follows:

1st. place .....	4 points
2nd. place .....	3 points
3rd. place .....	2 points
4th. place .....	1 points
Ten laps not completed .....	0 points

Penalty for one cut is "last place" - 1 point.

Two cuts disqualify flyer from that heat. 0 points.



SPORT VERSION

KIT RC-40  
For: .15 Engines  
Wing Span: 36 In.  
Wing Area: 315 Sq. In.  
4 Channel Radio

**\$24.95**

## DOUBLER II

Designed By BRAD SHEPHERD

DUAL PURPOSE KIT - FOR RACING OR SPORT

## PLAN TO ATTEND SIG'S INTERNATIONAL MINIATURE AEROBATIC CHAMPIONSHIPS FOR AEROBATIC BIPLANES AND MONOPLANES - JUNE 17 & 18, 1978



SMITH MINIPLANE  
KIT RC-38 - \$49.95

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PRIZES FOR ALL CONTESTANTS

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Full-Size Aerobatic Demonstration  
by the SIG MINI AIR FORCE -  
SUNDAY NOON!



For More Information, Contact:

Masey Hester, Contest Director  
Box 368, Mantzuma, Iowa 50171  
PH.515-623-9154, 623-5157 or 623-2194

### 1977 AMA/IMAC RULES WILL BE USED

#### SPORTSMAN CLASS SEQUENCE

1. INSIDE LOOP
2. ONE ROLL
3. ONE SPIN
4. HALF CUBAN EIGHT
5. IMMELMAN TURN
6. HALF REVERSE CUBAN EIGHT
7. ONE INSIDE SNAP ROLL
8. SQUARE INSIDE LOOP
9. ONE FREE STYLE MANEUVER
10. PRESENTATION

#### ADVANCED CLASS SEQUENCE

1. 45 DEGREE CLIMBING SNAP ROLL
2. HAMMERHEAD
3. REVERSE SPIN - ONE TURN EACH WAY
4. OUTSIDE LOOP
5. SLOW ROLL
6. INSIDE LOOP - SNAP AT TOP
7. KNIFE EDGE FLIGHT
8. 4 POINT ROLL
9. TWO FREE STYLE MANEUVERS
10. PRESENTATION

#### 120 DEGREE AEROBATIC ZONE.

#### 10% SCALE BONUS APPLIES FOR BIPLANE EVENTS.

Monoplanes must be a stand-off or full-scale copy of an aerobatic aircraft that was designed for and flown in full size competition aerobatic "box". Contestants must furnish proof of the aircraft's identity and connection with full-size aerobatic competition.

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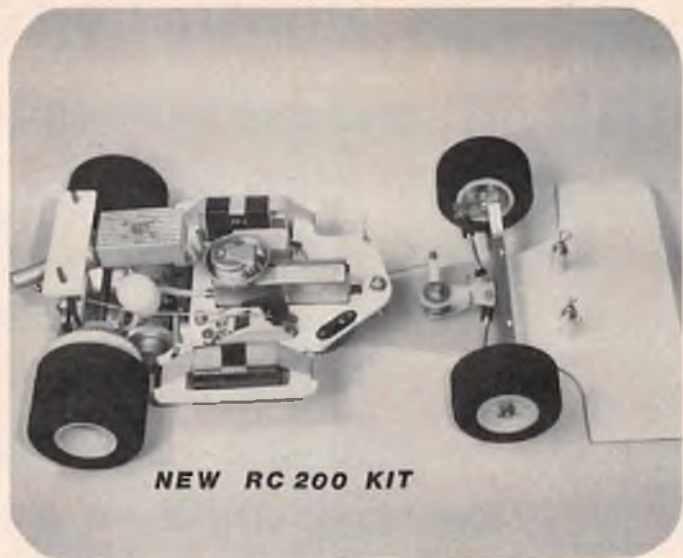


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**QUICK RELEASE SERVO MOUNT**

from page 95/94

prior to gluing and pinning. This tray will slide in bearer channels, and should be lubricated with a silicone spray or rubbed with candle wax.

(2) Study Figure 4 closely before proceeding. Note that the base of the lower assembly (this is the unit that the upper or roll control servo tray slides into) consists of two devices joined as one. The upper portion of it consists of grooves, or channels, that accept the roll control servo, and the lower, or base, of the assembly forms not only the support for the upper portion, but also the tray for the pitch control servo. With this in mind, proceed to construct the base of the assembly (the pitch control servo tray) as per instructions in Step 1, making the tray slightly over double the length of the servo (see Figure 4). Check the fit of servo before gluing and pinning.

(3) Next, build the side pieces as per Figure 4. Note that the 1/32" ply sides are braced by two 1/16" ply rails. **Important:** Install roll control servo in its tray (already constructed) and hold it above the pitch control servo installed in the base/lower tray. Study Figure 4, and refer to your two servos you are now holding in approximate position to the finished product. You can now get an idea of how high the side pieces that support the groove or channel will have to be in order that the upper servo can slide to and fro without binding or interfering with the lower, fixed servo. Whew!

to page 134

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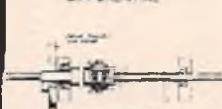


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**QUICK RELEASE SERVO MOUNT**

from page 132/94

(4) After entire assembly has been completed, construct servo mount slide channels (see Figure 4). Construction is essentially the same as that of the channels built for our Quick Release Servo Mount Sliding Tray model (whew, again!). Refer to Figure 2 to refresh your memory.

(5) After channels are finished, slide entire assembly into channels, and check for general fit, clearance of sliding servo, etc. At this point, holes can be drilled through the open end of the channels, through the base/lower tray portion, and a wire keeper bent and installed.

(6) For installation in model, assemble with servos in place, slide into channels, and "lock" with wire keeper. Locate entire assembly where desired in fuselage, and glue channels to sides. If channels do not touch sides of fuselage, spacers or strips may be glued between channel assembly and sides (see Figure 2, part E).

(7) Prior to final assembly, make sure you have clearance between the lower servo and the bottom of the fuselage.

**Concluding Remarks**

As I mentioned at the start of this article, I really enjoy building, and it is with that thought in mind that I've presented these projects. I claim no "break-through" in servo mounts, but, rather, would like to believe that the hobby still has those who find great satisfaction figuring out solutions to some of the little problems we all seem to encounter along the way. And, as you build, modify to suit your needs, if you so desire. Perhaps you can come up with yet a better way to do the job. And that, it seems to me, is a big part of the fun of building. □

**1/2A "PETE"**

from page 86

..... provided in the instruction booklet, including the odds and ends needed to fabricate the dummy engine and radiator. The optional wing struts are held in place by a couple of small rubber bands inside the bottom hatch and are easily removable for flight if desired, without leaving any unsightly evidence of their removal. A further indication of the thought and attention to detail that went into the kit is the internal switch mounting and the wing keys that assure accurate location of the wing on the cabanes.

to page 137



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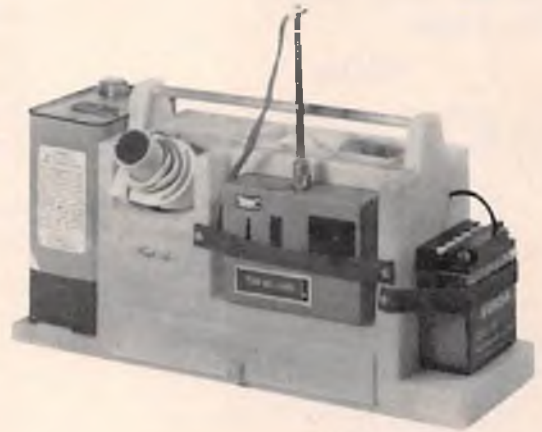
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The Model of the Month Award Program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month R/C Modeler Magazine 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.

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### SECOND PLACE

**Bob Bara**  
Basking Ridge, New Jersey

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### THIRD PLACE

**Donald C. Hewlings**  
Cresco, Pennsylvania

Original design scratch-built Delta named "Arrowhead". Constructed entirely of balsa, spruce and plywood with a span of 34" and weight of 50 ounces. Wing loading is 16.28 oz./sq. ft. It is now powered by a Cox .15 Conquest. Using a World Engines Blue Max 6 radio, which operates elevator, ailerons, rudder and throttle. Finish is three colors of Hobbyoxy.



### FIRST PLACE

**Don Lodge**  
Simi Valley, California

Scratch-built Lockheed AH-56A "Cheyenne" compound helicopter. 4 blade rigid rotor 52" diameter; 4 blade tail rotor 10" diameter; 3 blade controllable pusher prop 10" diameter; fuselage length 50"; weight is 11 1/2 pounds. Uses a Kraft radio and a Webra Speed engine. Has molded fiberglass fuselage with retractable landing gear. First flight was on June 14, 1977.



## RULES

### A. Model Aircraft Origin

1. Any kit — wood, fiberglass, foam, or ARF kit is eligible. Any scratch-built aircraft built from magazine or original plans is also eligible.

### B. Category

1. All types of radio controlled airplanes models.
  - a. Scale
  - b. Pattern
  - c. Racing
  - d. Fun-To-Fly
  - e. Original Design

### C. Entrants to submit:

1. Color photo or slide, size 35 millimeter or larger.
2. Black and white glossy photos (any size) of both sides, top, rear, front, and bottom views.
3. Close-up photos may be submitted on detail work if desired.
4. A short write-up giving dimensions, weight, power, radio, etc.
5. A statement that:
  - a. The submitter was the sole builder of the model.
  - b. Parts and/or accessories used were part of the kit or available to all modelers at retail outlets.
  - c. All non-available or special parts were built by the hands of the submitter.

### D. Judging will be on:

1. Workmanship
2. Quality of finish
3. Attention to detail
4. Subject of model or difficulty of the project will count in judging.

### E. Judging will be done by RCM Editors Don Dewey and Pat Crews.

### F. Persons not eligible

1. Members and employees of RCM or any other model airplane publication.

### 2. Members and direct or indirect employees of Dremel Manufacturing Co.

3. Members and employees of any manufacturer of hobby kits, hardware or supplies.
4. Anyone engaged in the wholesale or retail distribution of hobby kits, hardware or supplies as a major source of income.

### G. Models not eligible for submittal are:

1. Models that have been submitted for judging of workmanship at any major AMA sanctioned contest and have placed 1st, 2nd, or 3rd in that judging. Flying points as a final standing do not apply.
2. Models that have been built for display purposes only.
3. Models that have been built for manufacturers demonstration purposes.
4. Models that have won a similar award in another publication.

### H. Entrants who have models that qualify under these conditions are eligible to enter. Inclusion with the entry should be the entrant's AMA and FCC numbers, and also, the name of his club, if any.

### I. Prize Information:

1. A Dremel 371 Variable Speed Moto-Tool will be awarded to the monthly winner. An illustration and description of the kit will be included each month along with the winner's name, address, club, etc. The second and third place runners-up will be awarded a one year subscription to R/C Modeler Magazine.
2. Dremel Manufacturing Co. of Racine, Wisconsin will be notified of the monthly winner immediately after a decision is reached by the judges so that the kit award can be received by the winner prior to the issue of that month's RCM.

### J. General:

1. All contest entries must be addressed to RCM Model of the Month Award Program, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024.
2. All photographs and materials submitted by the contestant will become the property of R/C Modeler Magazine and none will be acknowledged or returned.

This contest will be null and void in any state or locality where specifically prohibited by law.





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## 1/2A "PETE"

from page 134/86

Our test model was powered by a Medallion .049 on a Cox tank mount, used an Ace Digital Commander 1-8 with Bantam servos and a



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may seem insignificant. On the other hand, ask anyone who builds these diminutive birds what 1¼ ounces could mean and the answer may surprise you. Especially when one considers design parameters averaging between 18 and 23 ounces flying weight. Obviously the elimination of garbage, even lightweight foam, can be the difference between success and failure in 1/2A.

This writer is not suggesting the described idea will cause any waves or revolutionize the modeling industry. It is only hoped some small contribution might be made in the never ending battle against overweight models, and to an art where a universal truism exists... in 1/2A the light ones fly, the heavyweights don't. □

### **CAP'N DICK'S COCKPIT**

from page 83/82

Our kids are wonderful — let's bring them into our hobby, and teach them any level of expertise we can. Our reward will be the increased love they show, and real companionship. And who knows, this modeling might even lead to a career — it did for me. □

### **TRANSITIONING**

from page 79/78



reside; for most of the country, in R/C flying, you are limited to certain months of the year and to good weather conditions. The same is true for full scale piloting, only more so. If weather and wind make a difference in R/C flying, which they do, they are even more crucial in both learning how to fly and in ultimately enjoying the flying experience. Believe me, brochures that are used to induce you to undertake becoming a licensed private pilot are always illustrated with ideal weather conditions.

Finally, there should be a personal appraisal of how you feel about the risks involved in full scale piloting. Those risks are very real in terms of life and limb. Again by analogy, get that beautiful



Sunday afternoon and every R/C pilot seems to come out of the woodwork to fly; the sky is full of planes covering every frequency available. The same is true of full scale piloting and the chances of mishap are evident. Most accidents happen within just a few miles of an airport and occur without adverse weather conditions. On one level, it might be glamorous and exciting to challenge your wits and skill against the unforgiving realm of flight. But on the other hand, there are a good many R/C pilots who prefer modeling and piloting for just this reason; they want the excitement and pleasure of flight without the risk of death and serious injury.

Along this line, one very pragmatic recommendation is that you review your life and accident insurance program **before undertaking that first lesson**. If you are carrying a minimum amount of life insurance, if you have insured your life for less than five or six times your yearly income, the time to apply for increased insurance coverage is **before** you undertake your first lesson. In fact, you should obtain that insurance before your first lesson so that you can honestly answer the **Inevitable** insurance questions about whether you are engaged in private piloting as a student or licensed pilot. If you do it the other way around, you may find yourself paying between 100 to 250 percent additional premium for an accident policy issued when you are engaged in private piloting and an additional premium for that life insurance policy as well. I'm not in the insurance business, and you should get insurance guidance, but I do make these suggestions including the recommendation that you go for a decreasing term rider over the next 10 or 15 more years to insure adequate monies for your family in the event of your death.

Turning now to the matter of selecting pilot training, you will want to know what the alternatives are. Unlike R/C piloting, the training that you must undertake to obtain your private pilot's license is both regulated by the Federal Aviation Administration and formal in the sense that the instruction must be with a Certified Flight Instructor. The training of private pilots for general aviation has come a long way since the "barn storming" days of "come and try it." In fact, compared to where training was a mere 10 or 15 years ago, it's a whole new ball game. And with good reason; flying is an adventure, but it's a very serious adventure where, with your life and the lives and property of others at stake, you want professional training, training that is both regulated and supervised by an agency of the federal government that wants you to become a proficient, competent and safe pilot. In terms of your alternatives, in order to avail yourself of flight and ground school

to page 142

McCoy 35, 40, K & B 40; O.S. Max 40; Enya 45; H.P. 40; Webra 40; S.T. 40-46; / MICRO:

LARGE: S.T. 60, 51-56, G60-71; Talpan 61; Webra 61; K & B 61; H.P. 61; O.S. Max 58, 60; Enya 60; Merco 61Mk4; / SMALL: Veco 45, 50,

O.S. Max 15, 19, 20, 25, 30; S.T. 15, 23-30; Veco 19; Wankel Rotary; Enya 19BB, 19SB, McCoy 19; K & B 25; Talpan 15; Rossi 15.

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an FAA approved course through their dealer network, built around flying their particular aircraft. Leading manufacturers that have organized such pilot training courses include Cessna, Piper, Beech and Gruman.

By writing to the U.S. Department of Transportation, Publications Section, TAD-443.1, Washington, D.C. 20590, you can obtain FAA advisory circular 140-2J, "List of Certified Pilot Flight and Ground Schools," available to you without charge. Additionally, the FAA General Aviation District Office can be contacted for a list of all active pilot training facilities in your area. They maintain a current file on all certified schools and instructors within their district.

(2) You can work individually with a flight instructor who is certified by the FAA. Here, instead of signing up for a course of instruction as you would normally do under the option listed above, you are paying by the hour for your dual time instruction and getting the guidance that can be given by that flight instructor with respect to your ground school study.

(3) More popular perhaps a few years ago than now, are flying clubs. These flying clubs will sell you a membership or share and in return you will get flight instruction from a CFI (Certified Flight Instructor) and share time on the club's airplane or airplanes.

Of the three, undoubtedly the most popular and well organized is stated under option number one in terms of the non-approved, but certified courses offered by (usually) aircraft dealers who offer a particular manufacturer's flight course. Back about 10 years ago, the aircraft manufacturers began to realize that the slackening off of interest in flying was in large measure because of the poor quality of instruction. What was needed was training on an organized, integrated basis where flight training and ground school were reasonably integrated to make sense in terms of a meaningful course of instruction. All major manufacturers of light, single engine, fixed wing aircraft now offer a course in private piloting training.

The entrance of the major manufacturers like Cessna, Piper, Beechcraft and the others has vastly improved the quality of private pilot training. All of these courses offer text and workbooks that organize your ground school as well as prepare you for flight training. All of them use audio-visual materials, usually in the form of cassettes tied into pictures which you listen to and study as part of your ground school as well as flight preparation. Generally, you are not committed to pay for the entire course though you do have to lay out a chunk of money (usually about a \$100.00) to obtain the basic books and materials

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### TRANSITIONING

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training, you have these basic options:

(1) You can sign up with an FAA-approved school or a non-approved (but regulated) school. The approved type school is one that will carry a flying school rating, a ground school rating or both. In addition, they may be authorized to give their graduates flight test, written tests or both for the private pilot certificate. Those schools which do not have the approved status may offer flight courses, but they

cannot do all of the things that an approved school can do. The "approved" schools are generally ones which require residence for training; you have to go to the school and live there while undertaking the particular course of instruction. It is obvious that this is the most efficient and thorough way to undertake pilot training; it is obviously out of the question for most individuals holding down full time jobs.

The non-approved, but regulated flight schools, are the ones you will find advertising in your local newspapers and telephone "Yellow Pages." They are most frequently tied to an aircraft manufacturer; the tie-in is that they offer



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## TRANSITIONING

from page 142/78

and become enrolled in that course of instruction.

At this point, you should consider what kind of aircraft you want to learn to fly in; do you want to learn to fly in a high wing? Then you'll go with Cessna which, by the way, has about 70% or so of the market in terms of private pilot instruction courses. You have three or four choices if you want to go the low wing way. In either case, the plane that you will learn on is the plane that, chances are, you will continue to fly. The manufacturers know that and that's why they put so much effort behind trying to induce you into their particular school.

Perhaps your best bet is to get that list of approved schools and instructors and go out and talk to two or three. Find out if there are any flight clubs around and what they offer. By all means, don't be afraid to ask any questions that come into your mind. Look at the facilities and ask about their staff of instructors, the costs, availability of time to mesh with your availability and anything else that is important to you. Take the time to find the right place for your training because its time well spent.

Next month, the sequence of moving through the training program will be discussed. □

## GLH II

from page 77

characteristics. With a TD in the nose, we have no doubt that this airplane would be fully competitive. With the recommended control throws we found it quite responsive without being overly touchy.

The materials provided are of good quality and the die cutting required only a minimum of help. The kit builds fast and easy and, at the going price of \$16.95 is an exceptional buy. Although we don't recommend this airplane for the rank beginner, the average Sunday flier should have no trouble with it. Just remember, it's small and fast, so stay on your toes and don't get too far out. □

## POWER BOATING

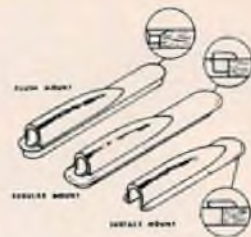
from page 76/74

model manufacturers in the U.S.A. in a back issue.

★ ★ ★

Incidentally, Harold Roach sent me a newspaper clipping from the

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R/C MODELER MAGAZINE

P.O. Box 487, Sierra Madre, Calif. 91024

Weekender, showing a collection of steam powered models operated in the Busch Bird Sanctuary. A couple of them, the Titanic and a paddle wheeler, look pretty big. What did annoy me was the fact that the newspaper caption states: "All the toy boats are remote controlled..." When, oh when, are people going to realize that a model taking hundreds of hours to build, powered by machinery demanding a high level of technical competence, and costing a small fortune is **not** a toy? Boy, that gets me mad! Let that be a warning to all of us: if the press comes around to club activities and so on, do try to make sure that what they write is correct, and that it presents the hobby in a serious light, and not as an activity for prematurely senile dotards!

\*\*\*

See you all next time. □

### SMITH MINI-PLANE

from page 73

inserted the cabane wire into the tubing while tightening and managed to still crimp the the tubing which makes it very difficult to remove the wire. By the way, you do want to make sure to end up with the wire being a "slip fit" into the tubing. If you don't, you will find that your beautiful cabanes that you just soldered together won't come out of the fuselage and you now have to finish them on the plane. Believe me, it's a lot more difficult to finish with the cabane struts in place.

While we are speaking of struts, the wing struts, cabane struts and landing gear are all made the same way. The method is very easy and straight forward. I found that Goldberg "Jet" super glue was the way to attach the balsa to the wires followed up by epoxy and the new Prather micro-balloons to fill. I have tried several micro-balloon products and I find Prathers to be the best, most convenient product for me to use.

The wings and tail are very straight forward. I can't think of anything that would cause any confusion. Carl Goldbergs "Jet" glue sure helped speed this job up. There is a feeling of relief and satisfaction upon completion. That second wing seems more work than it actually is.

When it comes time to cover the fuselage, I did vary just a bit from the instruction manual. I started with just the fuselage and covered the bottom and sides up to the turtle deck. At that point I mounted the stab and fin according to directions, and then completed the covering job. It has been a long time since I have done a dope and silk finish,

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## Now-- House of Balsa presents the rib jig UP-RIGHT



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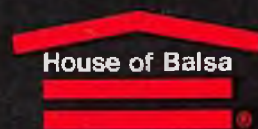
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### SMITH MINI-PLANE

from page 145/73

it is apparent by a close look at the model. However, I did get a nice job that is presentable. Dope and Silk takes longer than the "iron-ons" but well worth the extra effort.

The kit includes decals to duplicate the Sig Miniplane. I chose to finish mine as N4GH which is my I.M.A.C. registration. I plan to fly my model in I.M.A.C. competition primarily. If you plan to fly in Sport Scale, Sig has available a package of color pictures for

your documentation which when presented with the 3-views, included in the instruction manual, will surely satisfy any judge.

After the final coats of clear "over coat" I installed the radio and other needed items like engine, tank, etc. This model is very easy to work in and even "Ham Handed" folks should not have any trouble. The kit is very complete and included the push rod links and horns for control surfaces. There are a couple of hardware items that are not included but are readily available from your local hobby shop. Motor mounts are included in the kit, but I chose to use a new Prather Products mount that came

pre-drilled for my K & B 40 pumper. I might add that a K & B 40 pumper is adequate power.

When the model was ready for its first flight there happened to be 2 feet of snow on my flying field so off came the wheels and wheel parts and on went a pair of skis I had on another model. Someone once said that "the proof is in the eating". In our case its "the flying" and the Miniplane proves to be very stable yet nimble even on skis. A red and white biplane is a beautiful sight cavorting around in a bright blue sky. It makes one wonder why everyone does not have a Sig Smith Miniplane — you should, you know. □

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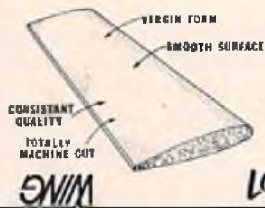
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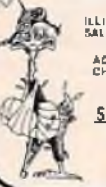
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**RADIO SPECTRUM**

from page 72/68

do what you like, including slinging it in the dustbin — it's all over to you.

Very best wishes,  
David Thomas  
Falaise, France

The "enclosed" as you probably guessed was a servo kit (see photo). It is the so-called "Chevron" servo that was mentioned in the press a few times about a year ago. The Chevron tag comes from the shape of the teeth in the output gears. I put the servo together with a little difficulty. It has ball bearings



that come in a little bag that you must install in the case, but after I thought about it awhile, it wasn't all that difficult. The servo is very rugged and strong and with the 8 ohm motor, has a nice response. I was able to cut the minimum pulse down to 2msec which increased the smoothness and it still did not have a problem being soft around neutral. The servo is a little bigger but looks to me like it would be a winner in a big airplane. I'm sure Sid Gates at Royal would like to have you try them.

If you've got an RC product, you'd like to make our readers aware of, let us know, but it better be good because I'm awfully finicky.

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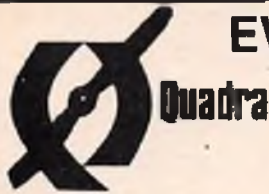
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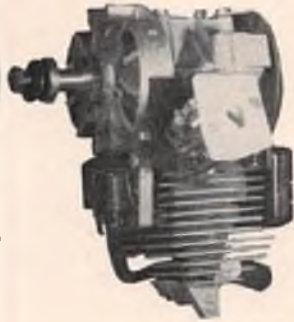
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## SANDER TABLE

from page 67/66

hand and possibly thrown loose.

Before I built the sander table, I was reluctant to leave the sanding disk attached to the Moto-Shop because the disk was completely unguarded — a potentially dangerous situation for the tool's power cord and for fingers. Now, with the cord safely held out of the way and the table offering at least partial guarding, I leave the disk attached all the time. With the addition of this sanding table, I think you'll find many more uses for the Moto-Shop. With this added capability it becomes even more versatile and useful, but don't blame me when the family artist or print collector discovers how well you can miter picture frames! □

## BACKYARD CANARD

from page 61/58

worked for me, I'd suggest a more sane approach. Adjust the engine to max. rpm while holding the model's nose up about 40 degrees. Set it down, pointed into the wind and release without pushing. Add a touch of up if she's not airborne in about 25 feet. Grab some altitude and check things out. Ideally, the model should climb slightly under power and glide without adding up trim. Use downthrust in small amounts to achieve this pattern. Once trimmed out, you'll find the performance exciting, to say the least! Now you, too, can fly a full tank out, do wild aerobatics, amaze your friends, and still not use much more space than your living room. Not bad for a \$5.00 airplane that flies backwards! Have fun, that's what it's all about. □

from page 56

..... the points where the cowl attachment screws would be placed in the same manner. We simply cut 3/8" squares of scrap plastic and glued them inside the cowl at the screw hole locations. This added reinforcement helps to minimize the possibility of fatigue cracks developing at the mounting point — particularly in colder weather when the plastic tends to become brittle. While this reinforcing addition is certainly not essential we feel it is well worth the extra few minutes spent to achieve a longer lasting cowl.

The wing of our Saker was covered with Hobby Lobby's new heat shrinkable film covering material called SuperKote. This budget priced covering media is applied with much less heat than other film coverings. It possesses a very high shrink ratio, yet will not warp the structure. SuperKote goes around a



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compound curve better than most other brands. If you haven't tried SuperKote or if you have been disappointed by the results of other brands, we urge you to give SuperKote a try. As the saying goes; "try it - you'll like it". SuperKote comes in a full range of colors. The fuselage and tail surfaces of our test aircraft were finished with K & B Superpoxy Primer and Enamel.

We used a K & B .40 R/C engine for power and the radio equipment utilized was Westport International's sensational new Variant system.

Our ready to fly Saker weighed in at 69 ounces. Test flying produced take-offs that were smooth with virtually no rudder correction being required. In-flight performance was equally good and no bad air borne traits were in evidence. Due to its clean lines, the Saker is faster than most sport designs. Slow speed handling is also good. While the Saker

would certainly fly with a .29 or .35 size engine, we feel that a .40 engine is the ideal size for best performance.

To sum up this review; the Saker is a fine kit that flies as well as it looks. It will perform all the usual pattern maneuvers in a commendable fashion. If you are contemplating building a new sport or novice pattern aircraft, the Saker is well worth your serious consideration. □

### DANISH HM-II

from page 51/48

to 8-10 knots. In winds higher than 12-15 knots, the surface chop becomes the limiting factor, forcing curtailment of operation except in extremely sheltered waters.

When water taxiing, always hold full up elevator to minimize propeller spray

ingestion. Turning downwind can most expeditiously be accomplished by a brief application of power coupled with full rudder. As with real floatplanes, sailing one is an art in itself, that is perfected only with continued practice. But it is an art that once mastered, provides its own special sense of accomplishment that is limited to but a relative few when one considers the ratio between land and seaplanes. But no sight can match that of a floatplane flaring gracefully, then gently touching down on a mirror-smooth lake amidst a splash of spray.

This particular Danish HM-II modeled, Number 87, was embarked aboard the Royal Greenland Trade Department ship Gustav Holm. A barkentine with auxiliary steam propulsion, the Gustav Holm sailed for Greenland on 15 June, 1932, with the colorful red-orange  
 to page 154

As featured in November 1977 RCM

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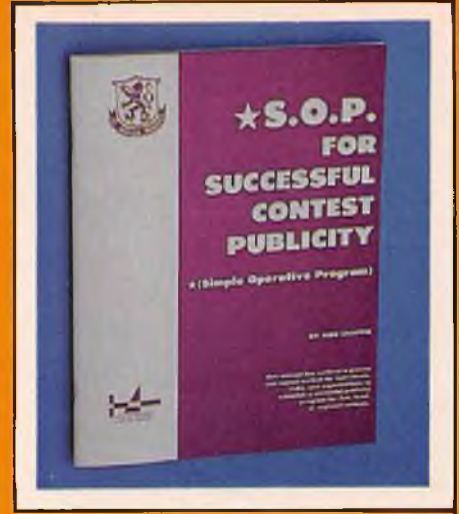




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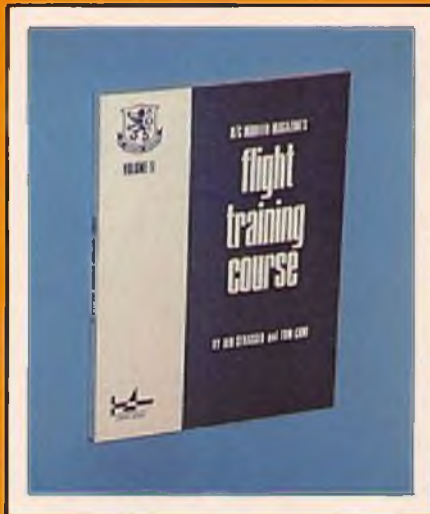
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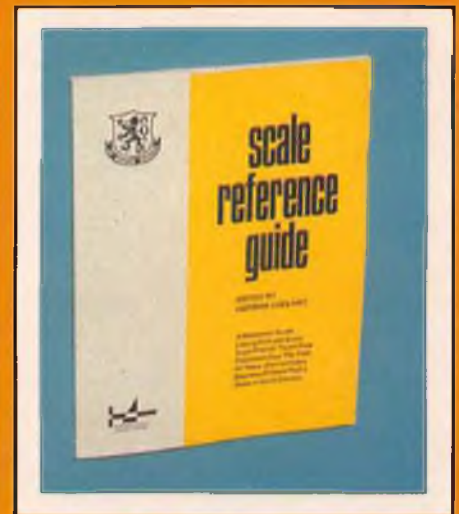
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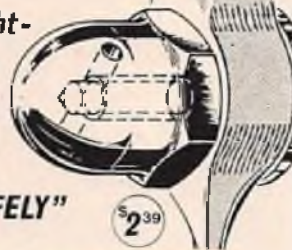
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## DANISH HM-II

from page 151/48

Number 87 securely fastened to its aft platform. Thus began the first summer of an epic, six year odyssey that saw the HM-II's accumulate a total of 1114 hours of arctic flying over the desolate Greenland terrain, reaching as far north as 81° North Latitude, or to within 540 nautical miles of the Geographic North Pole. And 43 years later, another, although perhaps somewhat less historic HM-II would make an appearance in Greenland. For it was in the Spring and Summer of 1975 at Sondrestrom, above the Arctic Circle on Greenland's mountainous west coast, that this unique model was designed and built. □

## HERE'S HOW

from page 46

- 1 foot 5/32" OD K & S Aluminum tubing.
- 1 foot Sullivan NyRod (outer shell).
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## WOODVALE SHOW

from page 45/44

trolled like the full size, with wire control runs, and proper wing warping systems instead of ailerons. This, unfortunately, was his undoing because another model sliced neatly through these wing warping wires, and the Morane simply raised its wings in total surrender and slowly spiraled to earth just like a one-winged butterfly!

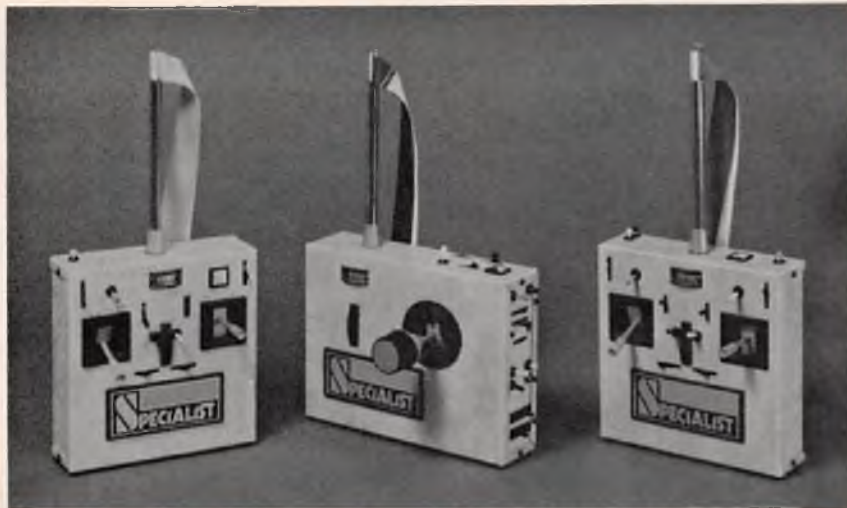
The display everybody (including me) had been looking forward to was the 1/4 scale Spitfire and M.E. 109 dog-fight, flown by the Jim Davies display team. Their visit to Woodvale last year had everybody enthralled, but this year's display was even better. It is very difficult to put into words the sight, sound, and excitement of these huge models; you've really got to experience it personally. They are built from conventional







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of almost every flier in the 48 contiguous states, and the finals will probably be in the Great Lakes area, over Labor Day.

Sound like a lot driving? It's only three contests, spread across the whole summer. Best of all, the program is small; the Finals at Denver was the biggest contest of the 1976 team selection program, and it was only a 36-man contest. Think you can take third place in a 36-man contest? If you do, you're on the team!

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**HYDRA LOCKS**

from page 42/41

gear actuators together and the Hydralock for the nose gear will go in the line between the valve and the actuator.

The successful operation of the Hydralock is the removal of all the air between the actuator and Hydralock and, for me, this was a problem. I didn't think I would ever get all the air out of the line from the cylinder to the Hydralock, but finally I did. Once the air was removed from the actuator and supply line and air replaced with hydraulic fluid (oil) the rest was easy; just a matter of hooking up the line on one end of the Hydralock, and hooking up the air line to the opposite end.

I can say without reservation that I am impressed with the Hydralocks. The gear on the plane is so much smoother (although slower) and more positive that I now feel that my gear problems associated with sticking or dry O-rings has gone away. Believe me, there is nothing more frustrating to a contest flyer than to be knocked out of contention due to a gear stuck in the wing or nose of the airplane.

**FLUTTER**

from page 40/37

consider some special flutter control installations. I'd also advise you to be very careful if a construction article on the building instructions mention flutter



in any way. If it's mentioned, you better assume that the builder had a problem with it and it would be well to install balanced controls right at the beginning. Build carefully, fly safely and most of all, keep having fun. □

## MISS TEXAS

from page 36/32

saner flying aircraft than does a sharp leading edge.

The horizontal stab is a cinch to build as is the vertical fin. Just take care to build them strong and straight. Glue the elevator halves together with the hardwood dowel, and pin to the building board, while drying, so that the elevators will not be misaligned. Be sure that when you make the slot for the vertical fin in the elevator that you build it straight so that the fin will not be installed in a crooked manner.

Sand everything lightly and get ready to cover. If you're going to cover with MonoKote or other plastic films be sure to go over all of the structure with a vacuum cleaner to remove all of the sawdust. This sawdust, if left on the aircraft, will keep the covering from fitting tightly and adhering correctly. I even use a slightly damp towel to go over all of the aircraft just one more time after vacuuming it. Cover Miss Texas in any color scheme that you want, since you will probably have better ideas on how to dupe her up than I have. Install the radio equipment, using 1/4" spruce spars as pushrods. These are strong, straight, flexible, and pretty lightweight. I always use spruce spars for pushrods on any aircraft of the large size. Slip the fuel tank floor in place, pad the tank area with foam rubber, determine the correct location of the CG from the plans and install the radio and the battery so that the CG falls in the correct location. Make the tail wheel installation, and the landing gears and install them. Be sure to make good solder joints on the wire. Install engine, muffler, etc., and check everything out to see that all controls and pushrods work freely and that everything is square and ship shape.

### FLYING

Not much needs to be said about flying Miss Texas. She is a very easy girl to fly, and responds well to all commands. She can do just about anything that you, as a pilot, can ask her to do. If you have constructed her according to the plans, and have balanced where shown, you are going to have a bird that will give you many many hours of flying pleasure. And all of the guys flying Ugly Sticks will wish that they had taken the time to build a big Miss Texas. □



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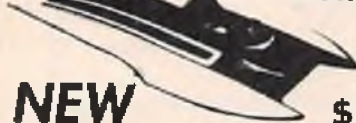
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MOTOR \_\_\_\_\_

R/C EQUIP \_\_\_\_\_

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## DAS SLUPEN THING

from page 27


...climbs very fast, and is quite reluctant to come back down. We added approximately 2 ounces of ballast and were rewarded with long, gentle, flat glides. Landings were easy and extremely graceful. Flying off the slope, we had to add 3 ounces of ballast to make it penetrate during a 15 to 18 mph wind. The flight characteristics were superb, exhibiting the same flat glide on the slope as it had on the thermal. Gentle turns, and slow loops were the order of the day. Our first slope flight lasted 31 minutes, and was all fun. Like der man says, "Nothing Slupes like Das Slupen Thing!"

from page 26/24

lowed in 3rd Place and Roger Curtis took the last sit out spot. Jianas blew two engines in qualifying and ended up using a 40 carb engine to take 5th qualifying spot. What happened to me? I thought you'd never ask. I lost the fight to Murphies Law, me and 80 other guys. The first round, Jack Jacobs and I had a fantastic race until my pit stop when the engine flamed out. The second round I lasted exactly 2 laps until a connection broke on a new battery pack. The third round I was leading on the 12th lap when somebody spun out in front of me in the esses, I swerved to miss him and hit the boards — you only get one chance to hit the boards. Sometimes it's your day and sometimes it's not your day.

The Expert Semi-Main had some interesting sidelights. Jianas ran his small 40 carb engine and easily ran off with the Semi. But what really surprised me was

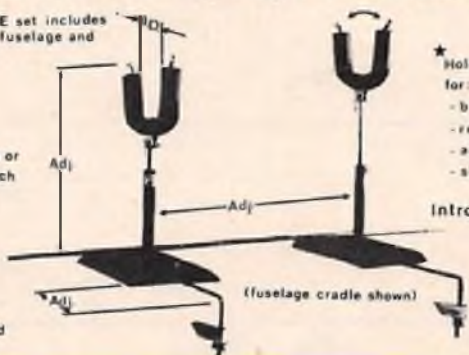
how well Georgia Campbell was running. I last saw her running at the World Championships, where she was running very well, but she looked much better here. I may get shot for this, but she looked like she was running as well as her husband, Ken Campbell. And I want to say that at the Nationals in Southern California a few years ago, I thought no one would ever be able to drive better than Ken Campbell — he was just unreal there. But at this race, in the Semi-Main, at the 25 lap mark, Georgia was just in front of Ken and they were having a very close race. Georgia started through the esses, tried to avoid another car, got crossed up and Ken nailed her solid enough to break her engine case. Now the winters in Iowa are long and cold enough, but the prospect of a really long and cold winter must have entered Ken's mind — but there was nothing Ken could do. I'm sure Georgia forgave him and Mr. and Mrs. Delta lived happily ever



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after. I think? At least I know another Mr. and Mrs. who were happy after the Semi. Judy and Jack Jacobs were really excited when Jack moved up to the Main Event. Jack has been building super exotic independent suspension scratch-built cars for the last few years. But, because of a million problems with such an endeavor, his racing fortunes had not been too good. Today he was running an Associated car and found out that he still had the driving talent to make the Main Events. Judy said the best part about running a kit car was that Jack didn't have to spend as much time in the basement building all those elaborate parts anymore. This, of course, means the winters in Detroit will be a lot warmer.

In the Novice Class, 17 year old Diane Moody obviously got her driving lessons from her dad, Roy Moody. Roy is a very smooth driver and Diane also looked very smooth as she was Top Qualifier in the Novice Class. The Main Event be-

longed to Steve DeVito who drove a very smart race, staying out of trouble, and going fast to take the checkered flag. 2nd Place went to Mike Reedy. Mike was trying as hard as he could and went as fast as he's ever gone to earn a well deserved 2nd, just one lap behind Steve. Another lap back was Diane Moody in 3rd Place.

Rod Galloway was Top Qualifier in the Amateur Class with a time of 33.1, which was better than most Experts did. But the Main Event belonged to Tom McGarry from Detroit. Tom drove an exceptionally clean race considering the foreign track, and right behind Tom was another Detroit, Louis Przybyla to take 2nd Place with Jeff Hawkins following in 3rd Place.

The Experts were up next to see if anyone could stop that flying Cuban, Arturo Carbonell. At the green flag, Art was away first. There was a mad scramble as all the cars tried to get through the first

turn together. A few of them spun out and Jianas went over the cement curb, which outlined the straightaway, tore the body off in front and killed the engine. Meanwhile, Art had the lead with Rick Davis in hot pursuit. About the 12th lap Mike Rowland had worked his way up to 2nd within a straightaway of Art, but then he lost a throttle servo. Rick took 2nd spot back over with a hard charging Roger Curtis starting to make ground. Roger's charge didn't last too long as he nailed someone in the esses destroying both cars. About halfway in the race there were only 5 cars on the track. The rest were in the pits for repairs. I was pitting for my son Curtis, and I told him to just cruise around and keep out of everybody's way, because at this rate there wouldn't be any cars left running at 120 laps. It's hard to tell a racer to slow down, and it's hard for a racer to slow down, but he could hear all the crashing going on, so he slowed down. Mean-

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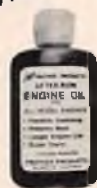
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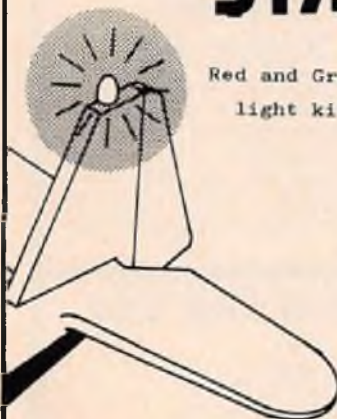
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while, Jianas was running with Arturo. Jianas was about 10 laps down due to 12 pit stops for a body that was cracked in the front and refused to stay on. But at this moment he was racing with Art. These were two Master Craftsmen at their work. For 5 full laps they raced together with less than a car's length separating them. They changed the lead back and forth in those 5 laps without one car touching the other and yet they were racing as close together as Petty drafting Pearson!! Then they came up on traffic, Jianas lost his body again and the fun was over. Art had managed to avoid all the crashing going on around him and built up a huge lead. With 8 laps to go, his muffler came loose, but he just slowed down to keep the DB's down and finished the race to take the checkered flag. Rick Davis held 2nd spot for most of the race, even with some time spent in the pits, and finished with a well deserved 2nd Place. Curtis Husting kept his car in one piece and finished 3rd. Even with all the time off the track, Jianas was going fast enough when he was on the track to finish 4th.

We stayed an extra day in Florida and got to watch "Good Ol' Boys" qualifying for the Daytona 500 and took a tour of the impressive Kennedy Space Center. All in all, the Florida trip was a lot of fun. But I really think Florida is going to submerge in the ocean before California sinks in the ocean.

## RESULTS 1978 WINTERNATIONALS

### EXPERTS

1. Arturo Carbonell ..... Delta
2. Rick Davis ..... Associated
3. Curtis Husting ..... Associated
4. Bill Jianas ..... Associated
5. Doug McNeely ..... Delta
6. Jack Jacobs ..... Associated
7. Mike Rowland ..... Associated
8. Roger Curtis ..... Associated
9. Bill Hawkins ..... Delta

### AMATEURS

1. Tom McGarry
2. Louis Przybyla
3. Jeff Hawkins
4. Steve Sanders
5. Roy Eick
6. Richard Keller
7. John Hunt
8. Rod Galloway
9. Dale Jones

### NOVICES

1. Steve DeVito
2. Mike Reedy
3. Diane Moody
4. Lynn Loomis
5. Thomas Dobbins
6. Vince Arias
7. Matt Davenport
8. Michel Olasz
9. Pat Laurie

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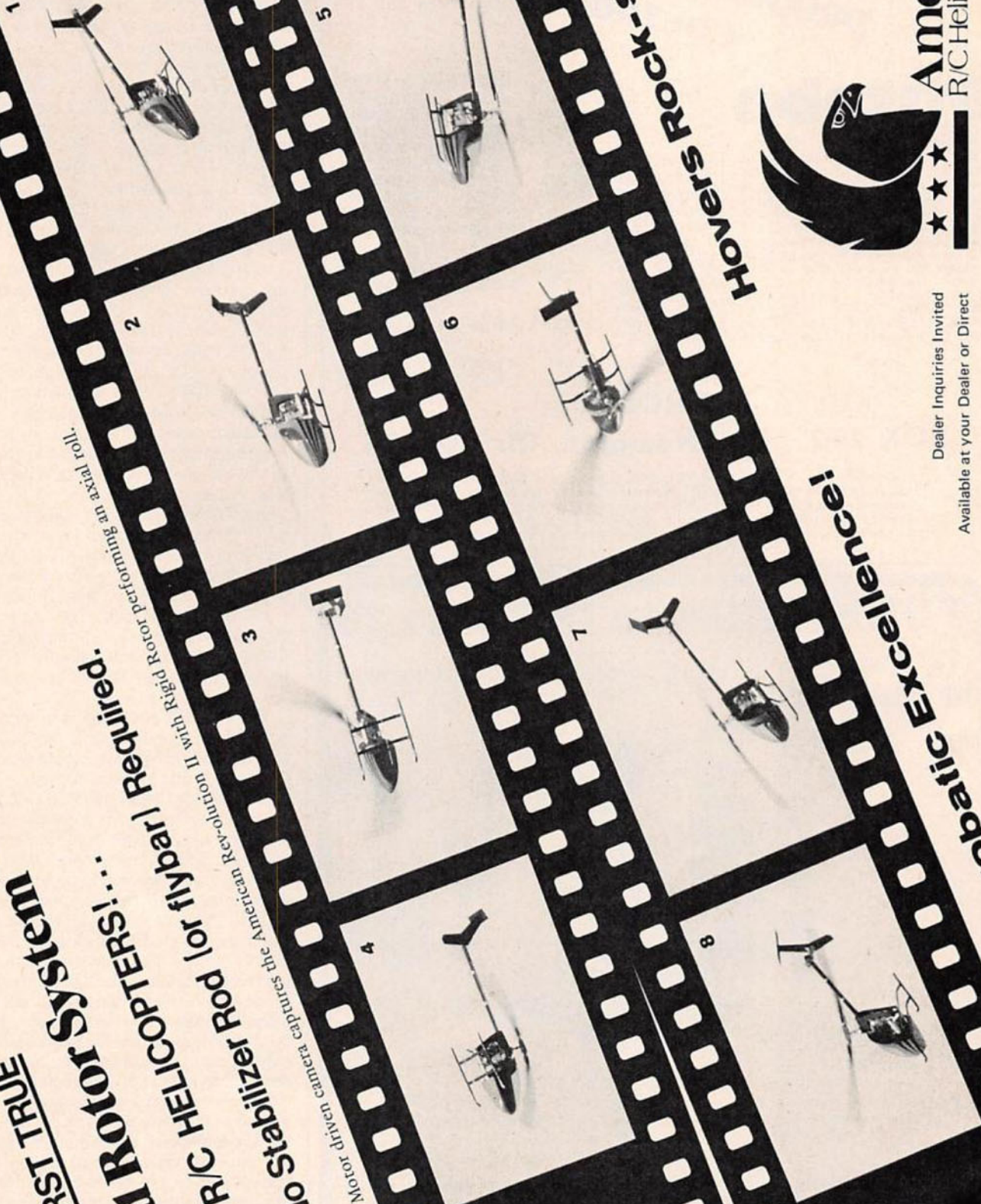
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## HOVER

from page 22

I've got a new engine that I'm testing that, so far, looks good for helicopters. It's the new HP 60 Gold Cup. It has a unique coating (inside and out) that is called thermax coating that is supposed to give 80% cooling compared to 18% for non-treated aluminum.

And, as we all know, the environment in the average helicopter is not the best conditions for cooling. Initial bench tests show excellent power and rpm and it definitely runs cooler. It is a Schneurle ported engine with a chrome cylinder and a Dykes ring which is an interesting combination. I've got it in my new Ranger that I'm finishing now so I'll give you a more detailed report later.

Speaking of engines, in the .40 size engine there is not nearly the choice in Schneurle ported .40's as there are in the .60 size. The Webra Speed .40 and the OS FSR .40 seem to be the most popular, but OS has just brought out the OS .45 FSR-H and guess what the H stands for. You're right, helicopter. I've got one to test and it looks good. There have been significant changes to the .40 to make it into the .45 for use in helicopters. It uses the same case as the .40 with a slightly larger bore; different porting for more mid-range torque, and more fuel flow for cooler running; plus some minor changes in the carb department. It also comes equipped with a Dykes ring.

HP also has a Gold Cup .40 which looks interesting --- well maybe later. Either way I'll keep you posted on what's happening the best way I can.

\*\*\*

The NRCHA Nationals this year will be held in Columbus, Ohio, on July 22 and 23. The contest will include Novice, Sportsman, and Masters, with an option to the Masters Class called the Hot Dog. This class will be for the pilots who wish to demonstrate their skills as far as aerobatic flying is concerned. This class will only have two rounds and will be flown in-between rounds of the other classes so everyone will get a chance to watch the Hot Dogs do their thing. Pilots for this class will be able to choose five high risk maneuvers and have 3 minutes to do them. The maneuvers should be judged on quality and the pilots shouldn't be pressed, as far as time is concerned, trying to cram as many as they can into 3 minutes, trying to get extra points. Also, the machine being used won't have to be the same machine that is being used in the Masters Class. It's something different that is going to be tried to keep the competition up but not to the point that any one pilot has to put his machine in a high risk position to be competitive, yet still allow the Hot Dog pilot to do his thing.

If you have any questions to the location, etc., see the ad on page 116 of



this issue or call or write the Contest Director Dwayne Stephens, 5911 Olentangy River Rd., Worthington, Ohio, 43085. Phone: (home) 614-846-7495 and (work) 614-297-2204.

Maybe this year Bill Curtis will fly at the contest. He has been the Contest Director at the past four NRCHA Nats held in Greenville, PA.

\*\*\*

On June 17 and 18, the Mid-Arkansas Radio Control Society, Inc., will present the Second Annual South Central Helicopter Championships. This AMA Sanctioned Contest included Expert, Intermediate, Novice, and Scale Classes with a special category for beginners.

Last year's contest brought 15 contestants and approximately 2,500 spectators for the two-day contest. This year, at least twice as many spectators and contestants are expected. Last year's television and radio coverage was excellent.

Well that about does it for this month. Until next time, keep the stick forward. □

## SOARING

from page 19

aircraft turning or circling in a wind.

The conclusion is that the kinetic energy (momentum or inertia) of an aircraft in flight can only be related to the surrounding air and not to the ground. Therefore, an aircraft will react exactly the same in whichever direction it is turned, and in any plane, regardless of wind speed and direction.


The wind will never 'get hold of it'.

★

On a sailplane where the wing halves plug in over wires, the hassle of dial cord or mechanical linkage for spoiler actuation can be eliminated with this idea from Dr. Paul Levin of Santa Cruz, California. He states that recently he became dissatisfied with the conventional controls for the spoilers on his Airtronics Aquila. It is always a bit of a nuisance to remove and replace the canopy on the sailplane to connect and disconnect the spoiler cables, and occasionally the cables would stretch or the hooks would break.


The present installation which utilizes pushrods give very crisp and accurate control of the spoilers and does not require removing the canopy to make any connections inside the aircraft. The spoiler system is automatically activated, simply by slipping on the wings over the wing rods in the usual manner.

The pushrods, which operate bell cranks in the wings, protrude about 1" from each wing and touch against paddles which are made from stiff control horn nylon. The paddles are fastened to the nylon bellcranks with Zap. The paddles are activated by stiff brass or steel wire which is bent in the shape of a V




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with a small second piece of wire soldered at the apex of the V which fits into the servo wheel. Return of the spoilers to the down position is accomplished with small weights on the underside of the spoiler blades. Minor adjustment can be made by rotating the pushrod on a threaded clevis.

★



*On a cold damp day, electric socks — the only answer. "If the feet are warm, so goes the body."*

It was a cold blustery day in February; the ground was still wet from our more than average rain fall. The club contest was well underway, everybody present was doing something non-constructive to keep warm, everybody except one person. Garland Fastag, wife of a local flyer, had on her electric socks. Her motto: if the feet are warm, so goes the body. If interested the electric socks and gloves are available. Write to Timely Products Corporation, 210 Eliot St., Fairfield, CT 06430.

★

Many congrats to the new LSF officers for 1978. President, Gordon Pearson; V.P. John Nielsen; Secretary, Warren Tiahart; and Treasurer, Keith Finkenbinder.

You fellows have a great bunch of sailplaners behind you.

Good Lift. □

**SUNDAY FLIER**

from page 18/15



(13) George Rose and his P6E. Best In Show, when all the judges scores were added up. Another beautiful model. I love the P6E — maybe that's why I backed off from giving George my to page 168

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## SUNDAY FLIER

from page 166/15



first place vote. But I voted for the next one.



(14) Jim Funduk's fabulous Corsair F4U-5NL was entered in the AMA scale class. Wingspan is 62½", weighs 12 lbs., powered by a twin Dooling engine swinging a 14/6 prop. The reduction gear to the prop appears to be about four to one. Jim spent three years building it. Modified Rhom retracts. The wings fold — not manually, but by R/C.



(15) Close-up of the wing folding mechanism on Jim Funduk's Corsair. It was perhaps for this feature, which outweighed the lack of scale engine detail in my opinion, that I personally gave it my vote for Best In Show. It gives me chills just to think of the first test flight.

Two very nice things happened during the presentation of awards. Picture Number 16 shows Phil Kraft accepting



to page 170



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## SUNDAY FLIER

from page 168/15

the Howard McEntee award, for technical contributions to R/C, from Howard's widow, Eleanor.

And picture Number 17 shows John Worth giving Maynard Hill the plaque which proclaims Maynard a member of the AMA Hall of Fame — an honor which Maynard richly deserves for his many contributions to aeromodelling.

This year was the first time I've been able to get back to White Plains for the WRAMS show — but it won't be the last.



The show is truly one of the outstanding events in R/C modeling. I recommend that you make every effort to attend the 1979 WRAMS show.

You'll be glad you did. □

from page 12/10

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and distributed in the United States. Let us not cause the same havoc and chaos to the new immigrating diesel fuel market that we have caused to the glow fuel market.

I am sure, Clarence, you can attest to the poor qualities of home grown glow fuel and their deleterious effect on beautifully engineered motors. I think the hazards of mixing fuels in one's home whether be glow or diesel cannot be overstressed.

Sincerely yours,  
Bob Davis

Our second letter this month is one in which the sender solved his own

problem. Although I have mentioned problems associated with a plugged fuel vent many times in the past, we are always picking up new readers and also those who do not associate the problem with their own situation. As Mr. Schaefer points out, the use of pumps on engines has made the problem a little more difficult to diagnose.

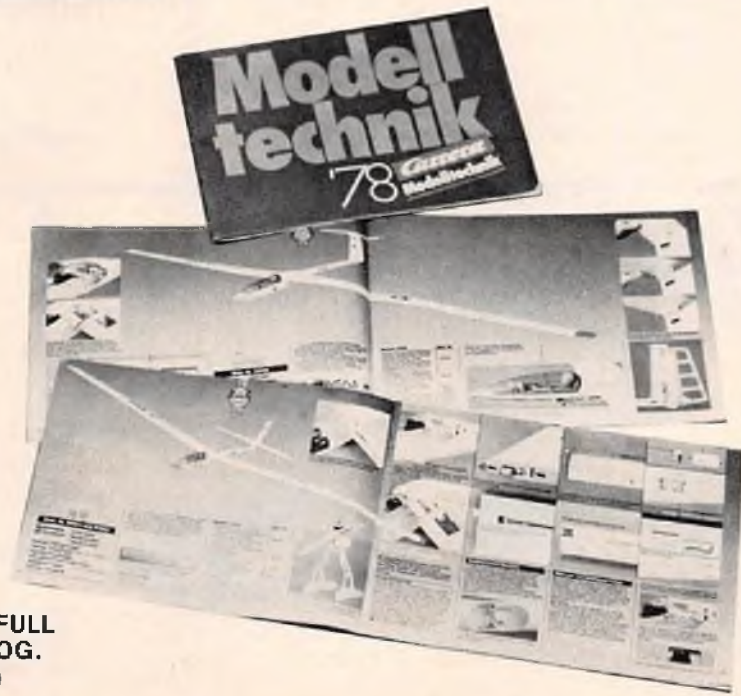
Dear Clarence;

Noting your plea in the March issue for some letters containing solutions instead of problems, here is one for your readers that was so damn subtle, I and several of my flying buddies, nearly

to page 174

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KP-7C	515.43	360.00
KP-7CS	515.43	380.00
KPS 14, 15 SERVOS	38.95	

Brand New Fully Guaranteed By Kraft Systems Inc. KRAFT TRAYS, MOUNTS, TANKS WHEELS, NICAD PAKS, ENGINES



**WORLD ENGINES NEW LOW, LOW PRICE**  
5 CHAN EXPERT ONLY \$236.95

NEW MARK II	LIST	BHC
EXPERT 7 CHAN 2 STICK 4 SERVOS	433.00	283.95
EXPERT 7 CHAN 2 STICK 5 SERVOS	465.00	271.95
EXPERT 5 CHAN 2 STICK 4 SERVOS	400.00	235.95
S-10 OR S-11 SERVOS	45.00	36.95
550 MAH BATTERY PAK	19.00	15.95
MULLIGAN	47.95	38.40
SKYWAGON, SKYKNIGHT	59.95	48.00
SHELL FLY B	59.95	48.00
DAS BOX FLY BIPLANE	39.95	29.95
DAS BOX FLY SHOULDER WING	29.95	23.95
DAS BOX FLY LOW WING	34.95	27.95
PIPER CHEROKEE	42.95	34.40
NEW CUB	39.95	31.99
CARDINAL, OLYMPIA	42.95	34.40
WORLD ENGINES 5 CHAN, 1 STICK-ALL NICADS 3 SERVOS-ONLY \$169.99		

OS ENGINES	LIST	BHC	OS 10 FSR	LIST	BHC
OS 10 FSR std	22.95	18.40	OS 10 FSR R/C	28.95	23.20
OS 15 std	29.95	24.00	MARINE	47.95	38.40
OS 15 R/C	35.95	28.80	OS 40 SR R/C	94.95	76.00
OS 20 std	30.95	24.80	MARINE	104.95	84.00
OS 20 R/C	37.95	30.40	OS 45 RSR		
OS 25 std	33.95	27.20	MARINE	104.95	84.00
OS 25 R/C	39.95	32.00	SUPER TIGRE ENGINES		
OS 25 FSR R/C	56.95	45.60	LIST BHC		
OS 25 FSR std	49.95	40.00	X-15 FI sch. std	59.95	47.95
OS 30 std	40.95	32.80	X-15 ABC R/C	82.00	48.00
OS 30 R/C	45.95	36.80	G-15 R/C	38.00	31.00
OS 35 std	41.95	33.60	ST 23 std	35.00	28.00
OS 35 R/C	47.95	38.40	ST 23 R/C	49.95	35.50
OS 40 std	57.95	46.40	X-29 RV ABC	74.00	58.00
OS 40 R/C	69.95	56.00	ST 35 std	50.00	39.00
OS 40 FSR R/C	84.95	68.00	ST 35 R/C	56.00	44.80
OS 60 R/C			ST-X 40	78.95	61.60
BLK HD.	94.95	76.00	ST 46 R/C	56.00	44.00
OS 60 FSR R/C	114.95	92.00	ST G 2, 1/35 std	50.00	39.00
OS 60 FSR std			G60 FI PYP R/C	85.00	67.00
w/pump carb. & muff	116.00		G60 ABC		
OS WANKEL	104.95	87.00	PYP R/C	93.00	74.00
OS 60 RSR	129.00	103.20	G60 BH w/pump & carb	104.00	83.00
OS 65 RSR	133.95	107.20	G71 FI R/C	99.00	78.00
OS 60 four cycle R/C	199.95	139.95	ST 60 FI		
O.S. 80 RC	137.00	109.60	BB R/C	70.00	56.00

## SUPER SPECIAL!

## KRAFT SYSTEMS, INC.

BRAND NEW 1978 KRAFT 5 CHANNEL, 2 STICK (KP5C) SYSTEMS ON ANY 72 THROUGH 75 MHZ. CHOICE OF SERVOS-14'S OR 15'S. LIMITED OFFER!

LIST \$375.43 BHC \$274.95

SEND MONEY ORDER FOR IMMEDIATE DELIVERY. ADD \$3.00 FOR SHIPPING. EXCESS REFUNDED.

**MRC SYSTEMS**

	LIST	BHC
772-2 CHAN	109.95	87.50
774-4 CHAN	269.95	189.95
765-5 CHAN	339.95	219.95
775-5 CHAN	369.95	229.95

**LEOPARD TANK**

LIST 159.95 BHC 121.95

**PORSCHE CAR**

LIST 59.95 BHC 47.95

**MRC VEHICLES**

	LIST	BHC
PORSCHE	59.95	47.95
SHERMAN TANK	119.95	93.95
LEOPARD TANK	159.95	121.95

**40% OFF! "HOT" SPECIALS!**

	LIST	BHC
S.T. X40	77.00	46.20
S.T. X28	74.00	44.40
S.T. X15	80.00	36.00
S.T. 35 RC	58.00	33.60
S.T. 35 COMBAT	37.00	22.20
COX 15 CONQUEST RC	80.00	36.00
COX 15 CONQUEST STD	58.00	33.60
ENYA 60 RC XF CHROME SCHUERLE	180.00	108.00

**E.K. LOGICTROL**

"NIMBUS" 4 CHAN 2 ST. \$189.00  
 CHAMPION 5 CHAN 2 ST. 245.00  
 SUPER-PRO 7 CHAN 2 ST. 265.00  
 RECHARGEABLE BATTERIES, CHARGER, TRAYS, ACCESSORIES, WARRANTY, ETC. ALL ABOVE COMPLETE—4 SERVOS.

**MRC READY-TO-FLY PLANES**

MRC Cherokee

MRC Cessna

MRC AIRPLANES	LIST	BHC
CHEROKEE	309.95	259.00
CESSNA	339.95	225.00

MRC HELICOPTERS LIST BHC

HELI-BABY	295.00	193.95
SUPER HELI-BABY	299.95	218.95

**MRC TURBO TROL**

LIST 59.95 BHC 47.95

The water jet propulsion system that offers modelers maneuverability and control even in the most treacherous or stump filled waters.

**REMOCALL**

LIST 24.95 BHC 19.95 ONLY 1 1/2" LONG UNDER 10 OZ. WT.

**WATERPROOF INSTALLATION BOX**

Includes a pre-formed fiberglass box complete with clear acrylic top, a set of water-proof seals and brass chemical tubing. Holds servos and receiver, protects against water damage, submersion, dampness. Dimensions: Exterior: 1 1/2" long x 5 1/2" wide x 2 1/2" deep. Interior area: 5 1/2" long x 4 1/2" wide x 2 1/2" deep.

LIST 19.95 BHC 15.99

**SHERMAN R/C TANK KIT**

\$93.95

INCLUDE \$4.00 FOR SHIPPING—EXCESS REFUNDED IN CASH. SEND MONEY ORDERS FOR PROMPT SHIPMENTS—EXTRA FOR AIR & OVERSEAS, PRICE LIST 35C—FREE WITH EACH ORDER

SAVE \$ ALL MAJOR R/C SYSTEMS, KITS, ARFS, AND READY TO OPERATE EQUIPMENT.

# BROWN'S HOBBY CENTER

6031 BROADWAY, BRONX, NEW YORK 10471 ONE BLOCK NORTH OF 242nd STREET "EL" STATION  
 OPPOSITE VAN CORTLANDT MANSION TELEPHONE 212-786-5422 CLOSED ON WEDNESDAY AND SUNDAY



# SAVE BROWN'S SAVE \$ HOBBY CENTER

## EMEL \*SPECIAL!

PRICES SUBJECT TO CHANGE. RESIDENTS OF NEW YORK STATE ADD 7% FOR SALES TAX. SALE PRICES FOR LIMITED TIME ONLY. NO G.O.D. POSTAGE-INSURANCE EXTRA—ADD \$4.00 WE REFUND ALL EXCESS IN CASH WITH ORDER.

**EMEL** LIST BHC

0 PRESS..... 21.95 16.40

7 CONTROL..... 23.95 16.77

9 CONTROL..... 21.95 15.40

13 STAND..... 14.95 10.50

19 ROUTER..... 10.95 7.70

12 FLXTOOL..... 69.95 49.00

5 TOOL..... 39.95 28.00

10 TOOL..... 39.95 27.97

11 TOOL..... 49.95 34.97

10 TOOL..... 44.95 31.47

11 TOOL..... 59.95 42.00

10 TOOL..... 49.95 34.97

**Variable Speed MOTO-TOOL KIT 381**  
Includes Model 380 Moto-Tool with ball bearing construction and 9 amp motor, 115V 60 Hz AC. Contains over 30 accessories in carry/storage case. LIST 69.95 BHC 43.95 \*special

**MOTO-SHOP Model 572 Deluxe**  
Includes a rubber backing pad, adapter, 8 sanding discs, 9 saw blades, 1 cloth wheel, 1 wire brush, 1 adapter, 1 polishing compound stick, 1 flexible shaft attachment and complete accessory kit.

LIST 89.95 BHC \$63.00

### DREMEL EXTRAS

BHC 57.70 229

219 BHC \$15.40

217 BHC \$15.40

210 \$15.40

223 BHC 10.50 BHC \$15.80

WE HAVE A COMPLETE LINE OF DREMEL TOOLS AND ACCESSORIES

ASTRO FLITE STARTER LIST \$36.95 BHC \$11.95 ALSO NEW POWER PANEL AT ONLY BHC \$16.95

DAE POWER PANEL STANDARD \$14.95 DELUXE \$24.95

### BANTAM PLUG RC WITH IDLE BAR LIST—\$2.00 BHC—\$1.40

STANDARD BHC—\$1.20 PRIME THRU PLUG

#6525 61 RC W/MUFF LST \$90.00 BHC \$63.00

#6535 61 RC W/PIMP/MUFF LST \$115.00 BHC \$80.50

#6712 19RC CAR/BOAT/PLN LST \$50.00 BHC \$34.99

#7060 35 UKIE LST \$29.95 BHC \$21.00

#7061 35RC LST \$34.95 BHC \$24.45

#8011 40RC 75° LST \$57.50 BHC \$47.25

#8060 40RC MARINE LST \$76.00 BHC \$52.50

#8360 40RC FR/WPP LST \$95.00 BHC \$66.50

#8380 3.5ccS1 FR W P LST \$67.50 BHC \$47.25

#8382 3.5ccS1 OUTBOARD LST \$98.50 BHC \$69.95

#8384 3.5ccS1 MARINE LST \$69.50 BHC \$48.65

#8450 3.5ccFF or UC LST \$57.00 BHC \$39.90

#8500 4.9cc RACING FF or UC \$95.00 BHC \$66.50

#8550 3.25cc FF or UC \$57.00 BHC \$39.50

#8600 5.8ccFF or UC \$95.00 BHC \$66.50

#9000 6.5cc FR/MUFF LST \$110.00 BHC \$77.00

#9001 6.5 RACING LST \$89.50 BHC \$62.70

#9020 6.5ccFF or UC LST \$95.00 BHC \$66.50

#9030 6.5ccRS3 III RR LST \$92.00 BHC \$64.40

#9040 6.5ccRS3 MARINE LST \$98.50 BHC \$69.95

### PANAVISE

#315 LIST \$16.95 BHC \$13.80

#356 LIST \$10.00 BHC \$8.00

#304 LIST \$10.00 BHC \$8.00

#303 LIST \$10.00 BHC \$8.00

#305 LIST \$11.95 BHC \$9.90

#380 LIST \$16.95 BHC \$13.80

MODEL #300 LIST \$11.95 BHC \$9.90

BHC ONLY \$7.95

CHARGER A GREAT TEAMMATE

SUPERSTAR OF STARTERS

DELUXE \$28.00 STANDARD \$25.90

### 12 VOLT 4 AMP SUPERGEL EXPRESSLY FOR MODEL USE

BHC—ONLY \$19.99

CHARGER A GREAT TEAMMATE

SUPERSTAR OF STARTERS

DELUXE \$28.00 STANDARD \$25.90

### FULL LINE OF CONTROL LINE KITS, ENGINES, & ACCESSORIES, AT BIG DISCOUNTS

**DUBRO FUEL PUMP**  
ONLY ONE MOVING PART NOTHING TO BREAK FOR WIP-A-DUST!  
LIST \$10.95 BHC \$7.98

**SELECTOR HEAT IRON**  
LIST \$22.40—BHC \$18.99

**GEE BEE** IN STOCK  
MALLARD..... \$32.99  
ISLANDER..... \$34.95  
SEA HAWK..... \$34.95  
FLOATS 33" \$16.49  
FLOATS 28" \$14.95

### SPECIAL! NICADS - GOULD PAK OF 4 - 475 MA 4.8 VOLTS EASILY SEPARATED \$4.98 AS ABOVE - 500 MA ONLY \$5.98

**SELECTOR HEAT IRON**  
LIST \$22.40—BHC \$18.99

### #8382 K&B MARINE OUTBOARD

LIST \$99.50 BHC \$69.95

### DUBRO PROP DRIVE UNIT

FOR BIG AIRPLANES  
LIST 100.00 BHC 69.95

ARROW .60 RC IN LINE SINGLE CYLINDER BHC SPECIAL ONLY \$289.95

### COMPLETE CONTROL LINE KITS

Includes appropriate tank, handle, control lines, wheels, fuel line, line connectors, ball crank, elevator horn, spare glow plug, wrench, fuel filter, wheel collars, spinner nut, motor mount bolts, and landing gear clips.

**FOX ENGINES**

FOX 15 BAFFLE	39.33	27.00
FOX 15 SCHNEURLE	46.33	32.00
FOX 19	43.43	30.00
FOX 35 (PROFILE)	46.33	33.00
FOX 35 (FUSELAGE)	46.03	31.80

### STEVE MUCK'S LIL LIGHTNING

LIST \$48.95 BHC \$34.99

ALSO AVAILABLE IN 1/4 SCALE: 20.20" LONG LIST \$15.95 BHC \$11.95 40.32" LONG LIST \$29.00 BHC \$21.00 64.34" DOLPHIN \$23.99 NET ADD \$2.00 SHIPPING—EASE OF FUNDED

### D&B KITS

ZERO LIST 109.99 BHC 109.99

STUKA LIST 129.99 BHC 129.99

STUKA LIST 129.99 BHC 129.99

7.2 BUCKEYE LIST 74.95 BHC 74.95

SABRE JET LIST 139.99 BHC 139.99

P-51 LIST 119.99 BHC 119.99

Add \$5.00 for shipping

### DUMA'S BOATS

AND PLANES

DUMAS HIGHEST QUALITY BOATS AND PLANES IN WOOD AND FIBERGLAS AT 30% OFF-FITTINGS AT 20% OFF. SEE OUR LIST, SAVE \$!

### POWER PACER

LIST \$59.95 BHC \$44.95

### TELECO CO. MOTOR & CHARGING GUN

LIST \$19.95 BHC \$15.99

**DUBRO COPTERS**  
LIST \$25.00 BHC \$20.95

### LOWEST PRICES ANYWHERE ON KITS, BOATS, ENGINES, BATTERIES, ACCESSORIES ETC.

**RC** LIST BHC

19.95 14.00

3.10

**NEWS MASTER** BHC 55.00

39.95

27.95

34.00

**ASTRO FLIGHT** LIST BHC

7 76.97 56.00

5 54.95 42.00

44.95 31.50

44.95 31.50

24.95 17.50

44.95 31.50

29.95 21.00

**TRIC FLIGHT SYSTEMS**

0.5 44.95 31.50

0.10 79.95 56.00

0.15 99.95 70.00

0.25 109.95 77.00

0.02 F 19.95 14.00

0.02 RC 22.95 16.10

0.02 N 29.95 21.00

0.02 S 54.95 38.50

0.02 T 34.95 24.50

0.02 START 45.00 31.50

0.02 CHARGER 39.95 28.00

0.02 CHARGER 7.95 5.80

**ASTRO FLIGHT** LIST BHC

STAR CLASS 30 47.00 32.90

STAR CLASS 45 110.00 77.00

BINGO 250.00 175.00

EQUATION 165.00 115.50

ETCHELLS 22 235.00 164.50

EAST COAST 12 METER 250.00 175.00

45" GLASS STAR 180.00 126.00

HUSON 36 155.00 105.50

PROBAR 52.00 36.40

DAUNTLESS 44.00 30.80

DV-10 MAH 11.00 8.00

DV-20 PLY 30.00 21.00

DV-40 PLY 47.00 32.90

DV-60 PLY 65.00 45.50

DV-20 GLASS CF 78.00 54.60

DV-40 GLASS CF 92.00 64.40

DV-60 GLASS CF 100.00 70.00

PT-109 38.00 26.60

LIFEBOAT 44 65.00 38.50

TUNA CLIPPER 45.00 31.50

FOSS TUG 75.00 52.50

U-76 50.00 35.00

SWAMP BUGGY, LARGE 31.00 21.70

HOT SHOT 30.00 21.00

PAY-N-PAK 38.00 26.60

ALL DUMAS IN STOCK. HARDWARE AT 20% OFF-KITS OVER \$20.00 LIST AT 30% OFF & 20% OFF IF LESS THAN \$20.00.

**GOLDBERG** LIST BHC

RANGER 42 24.95 19.99

FALCON 58 39.95 31.99

JR. FALCON 13.95 11.19

SKYLARK 56 44.95 35.99

JR. SKYLARK 14.95 11.99

**SOLAR ENERGY** BHC

SOLAR POWER MOTOR 14.45

SOLAR CELL ONLY 7.95

**GOLDBERG** LIST BHC

SKYLARK 62 59.95 47.99

SKYLARK 42 15.95 12.79

SR. FALCON 59.95 47.99

ALL OTHER GOLDBERG KITS AND ACCESSORIES IN STOCK

**MIDWEST KITS** LIST BHC

ATTACKER 39.95 28.00

SILENT SQUIRE 39.95 28.00

CARDINAL SQUIRE 85.00 59.50

CESSNA CARDINAL 29.95 21.00

ROYAL CHIMPONK 29.95 21.00

DAS LIL STIK 32.95 23.10

SWEET STIK 39.95 28.00

MACH 1 94.96 66.50

PITTS SPECIAL 94.95 66.50

STRIKEMASTER 69.95 49.00

MINI STAR 90.00 69.95

**PROCTOR KITS** LIST BHC

NIUEPORT 164.50 132.00

ANTIC 89.95 72.50

ANTIC BIPE 106.95 85.99

**SIG KITS** LIST BHC

KADET 34.95 27.96

KOUGAR 44.95 35.96

KOMANDER 39.95 31.96

KOMET 47.25 37.80

CITABRIA 57.95 46.36

KLIPPER 20.95 16.76

SUPER SPORT 19.95 15.96

P-51 57.95 46.36

CHIPMONK 59.95 47.96

J-3 CUB 39.95 31.96

CLYBOLT WING CUB 39.95 31.96

SKYPOLT BIPE 62.50 50.00

LIBERTY SPORT BIPE 64.75 51.80

CESSNA 150 66.50 55.96

RYAN STA 73.50 58.80

LIN AKROBAT 54.85 43.96

SMITH MINIPLANE 49.95 39.96

OTHER SIG KITS ALSO IN STOCK

**TOP FLITE** LIST BHC

AIRCORBRA 59.95 47.95

P-40 59.95 47.95

SESA 59.95 47.95

P-61 57.95 45.95

CONTENDER 45.95 35.95

HEADMASTER 25.50 19.95

P-47 T-BOLT 79.95 63.95

FRESHMAN TRAINER 44.95 36.00

TAURUS 53.95 43.20

**VK MODELS** LIST BHC

CHEROKEE 67.95 54.40

CHEROKEE BABE 36.95 29.95

NAVAJO 62.95 50.40

NIUEPORT 62.95 50.40

CORBEN 41.95 33.95

FOKKER TRI-PLANE 62.95 50.40

SOPWITH GEMEL 62.95 50.40

**FOX ENGINES** LIST BHC

FOX RC 19 31.95 22.40

FOX 25 RC 31.95 22.40

FOX 29 RC 34.95 24.50

FOX 36 RC 34.95 24.50

FOX 40 RC 45.95 32.20

FOX 45 RC 41.95 36.40

FOX 60 RC 84.95 59.50

FOX 78 RC 96.95 67.90

ALL FOX U-CONTROL ENGINES IN STOCK 30% OFF LIST PRICE

**GEL CELLS** BHC

6 VOLT, 4 AMP 10.39

6 VOLT, 7 AMP 12.95

6VOLT CHARGER 6.95

12 VOLT, 4.5 AMP 19.99

12 VOLT CHARGER 7.95

**ZAP** BHC

X-30 38 FL OZ 2.75

ZAP 18 FL OZ 1.60

**SAVE \$! SAVE \$! SAVE \$! SAVE \$!**  
RHOM RETRACTS, SET OF 3 LIST \$115.95 BHC \$79.95 SET OF 2 \$84.95

**WEBBA-MRC** LIST BHC

#1022 40 RC 69.99

#1020 61 RC 89.99

#1034 40 RC FL 79.99

#1024 61 RI SR 104.95

#1026 61 RI SR 109.95

#1023 40 RC MARINE 79.99

#1035 40 RC SR MARINE 89.99

#1020 61 RC MARINE 99.99

#1025 61 RC FI MARINE SR 114.99

#1026 61 RC RI MARINE SR 124.99

#1037 90 RC 119.99

#1039 90 RC MARINE 139.99

SUEVIA 2.5 H.P. ENGINE 199.99

**ENYA ENGINES** LIST BHC

ENYA .09 RC 32.98 23.10

ENYA 1.8 RC 36.99 28.90

ENYA .35 RC 40.98 28.70

ENYA .40 RC 41.88 33.60

ENYA .45 RC 81.88 67.40

ENYA .45 RC 81.98 57.40

ENYA .60 RC Schaubert 179.99 126.00

ENYA .60 RC EBIII 106.98 74.90

### ASTRO FLIGHT

LIST BHC

RAPID CHARGER 29.95 21.00

ANALYZER-CHARGER 37.95 27.00

ELECTRA TWIN 99.95 70.00

1/2 A ASTRO STARTER 16.95 11.95

ASTRO POWER PANEL 22.95 16.10

ELECTRONIC SPEED CONTROL 59.95 42.00

MECHANICAL SPEED REDUCER 23.00

MONOCOUPPE 34.95 24.50

**AIRBORNE** LIST BHC

NUTCRACKER 73.50 49.00

TIGER TAIL 73.50 49.00

**BRIDI KITS** LIST BHC

DIRTY BIRD 40 (wood) 59.95 45.50

DIRTY BIRD 60 (wood) 84.95 59.95

SHRIKE 185.00 135.00

RCM 15-500 40.00 30.00

T-20 45.00 32.00

KAOS 40 55.00 42.00

SUPER KAOS 70.00 51.50

TRAINER 40 56.00 42.00

TRAINER 60 63.00 53.00

BASIC TRAINER 40.00 30.00

TRAINER 10 27.95 21.00

SPORTSTER 40.00 30.00

P-51 135.00 102.00

QUICK CHARGER 19.00

TWEEDY BIRD 43.95 35.00

QUICKSET 500 43.00 32.00

SUN FLI 4-20 29.95 23.00

**COVERRITE** LIST BHC

1/2 PINT CAN BALSARITE 2.95 2.39

PERMAGLOSS 9.10 6.40

COVERRITE 7.75 5.60

**DAE** LIST BHC

POWER PANEL 19.95 14.95

DELUXE 34.85 24.85

### DUMA'S BOATS

AND PLANES

DUMAS HIGHEST QUALITY BOATS AND PLANES IN WOOD AND FIBERGLAS AT 30% OFF-FITTINGS AT 20% OFF. SEE OUR LIST, SAVE \$!

### TELECO CO. MOTOR & CHARGING GUN

LIST \$19.95 BHC \$15.99

**DUBRO COPTERS**  
LIST \$25.00 BHC \$20.95

### POWER PACER

LIST \$59.95 BHC \$44.95

### WEBBA-MRC

LIST BHC

#1022 40 RC 69.99

#1020 61 RC 89.99

#1034 40 RC FL 79.99

#1024 61 RI SR 104.95

#1026 61 RI SR 109.95

#1023 40 RC MARINE 79.99

#1035 40 RC SR MARINE 89.99

#1020 61 RC MARINE 99.99

#1025 61 RC FI MARINE SR 114.99

#1026 61 RC RI MARINE SR 124.99

#1037 90 RC 119.99

#1039 90 RC MARINE 139.99

SUEVIA 2.5 H.P. ENGINE 199.99

**ENYA ENGINES** LIST BHC

ENYA .09 RC 32.98 23.10

ENYA 1.8 RC 36.99 28.90

ENYA .35 RC 40.98 28.70

ENYA .40 RC 41.88 33.60

ENYA .45 RC 81.88 67.40

ENYA .45 RC 81.98 57.40

ENYA .60 RC Schaubert 179.99 126.00

ENYA .60 RC EBIII 106.98 74.90

## BROWN'S HOBBY CENTER

6031 BROADWAY, BRONX, NEW YORK 10471 ONE BLOCK NORTH OF 242ND STREET "EL" STATION  
OPPOSITE VAN CORTLANDT MANSION TELEPHONE (212) 796-5422 CLOSED ON WEDNESDAY AND SUNDAY



# Just fuel it, flip it 'n go! Truly amazing!



Diesel Converters

Models for .020 and .049/.051  
Converts in seconds. No special  
tools . . . . . \$9.95  
Direct, add \$1.00 p&h.

"The first breakthrough in diesel design in 30 years," says Peter Chinn (M.A.N. April '77). Up to 50% more power and 50% more economy than glow with new fuel formula. Diesel Power fuel available in pints & quarts.

**Other Davis Diesel Products:**

- D-Varnishing Brushes for .020-.60
- Fuel Bulbs 1 and 2 oz.
- 1/2A Fuel Line Asst.
- 1/4 and 1/2A Twin Exhaust Stax

Pint . . . . . \$3.50  
Quart . . . . . \$5.00  
Ask your dealer, or add \$1.00 p&h to order direct. (Conn. res. add sales tax)  
Send SASE for literature.  
Dealer inquiries invited.



**Davis Diesel Development Inc.**

BOX 141, MILFORD, CT 06460  
PHONE: (203) 877-1670

## GIANT SCALE BUFFS



72 DESIGNS YOU NEVER BELIEVED YOU'D SEE MODELED BUT THRU CO-OPERATIVE DESIGNING WE'VE DONE IT FOR YOU!

Item #	Name	Price
74	Coastlines One Bee	\$45
63	Doug DC-3 Airline	29
64	Beck C17-B Stag	\$39
54	Lock Electra 11	\$29
61	Sison Reliant	\$12
82	Sison Reliant	\$15
64	Boeing Stearman	\$14
77	Lucasbe Section	\$20
65	Standard J-1 Tr	\$20
61	Curtis Robin OX3	\$14
71	Doug DC-3 (C-47)	30
95	Doug DC-3 (C-47)	\$49
86	Hawks Tex 13 T/A	\$32
98	Star Kaydet PT17	\$39
73	Travel Air 6000	\$18
69	Lindberg NX211	\$18
91	Lindberg NX211	\$35
54	Fairch P1-26 (Comp)	18
54	Sikorsky Amph 5-38	25
108	Sikorsky Amph 5-38	42
83	Lindberg Lock SR	\$18
65	B-W Birdcage	\$29
70	Beav Navion	\$29
99	Lock Hudson Bomb	\$49
77	Flying Fort B-17G	\$30
102	Flying Fort B-17G	\$49
66	M Merrouder B-26	\$39
99	Black Widow P-61	\$69
68	Junkers JU86	\$88
62	Howard "Bea" Race	\$25
78	BT's Waddell-Wms	\$39
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### ENGINE CLINIC

from page 171/10

went nuts until we figured it out! What was worse, this goof blew me out of a First Place win in a Scale contest due to persistent engine failure after 2-3 minutes into my flight.

I had installed a Robart pump on my old, Veco .61 (one of your customs, by the way) in my Fokker Triplane. The tank was a standard, 10 oz. square-sided Sullivan polyethylene type - very garden variety. Everything was mounted observing all the basic rules - i.e., up close, shock mounted

and level with the needle.

In any case, the engine would start just fine, run-up and idle okay with no hint of trouble. Then, 2-3 minutes into the flight, she'd lean out, lose power and die. Ground running proved to exhibit the same symptoms. Changing the needle setting and fuel level was no help - same thing. There was an awful lot of head scratching going on about now and I learned a lot of new names for model aircraft engines!

In any case, getting to the point, I finally found the answer. The vent tube to the tank had become pinched off! Something you would find immediately if not using a pump because, normally,

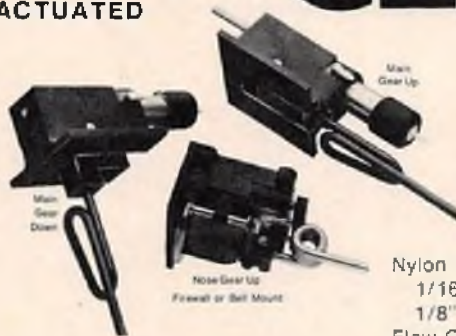
the engine wouldn't run 10 seconds with no tank vent. But - the Robart pump (and probably any pump) had enough power to draw fuel from the non-vented tank by slowly collapsing the plastic tank walls. When the tank finally resisted collapse enough to over-power the pump's suction, the engine would starve and quit.

With the proliferation of pumper engines and the almost universal use of the poly bottles for tanks, I can't imagine I am the only RC'er who this will ever happen to - so I hope my experience will help head this one off at the pass for somebody else.

Sincerely,

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Dan Schaefer  
Manhattan Beach, Calif.

Dear Clarence,

I have a friend who has a Fox Schneurie .60 engine. He knows a lot about model engines but can't work this one out. The engine is fitted to a pattern type aeroplane. Tank, tank position, fuel lines, etc., have all been set correctly and then rechecked. The problem is with mixture set correctly at start of flight (slightly rich) the engine won't run more than 3-4 minutes. Set the mixture very rich (so rich the aircraft only just takes-off and won't do a thing once in the air), however, it does run out a tank

of fuel. The fuel used is 20% castor, 70% methanol, 10% nitro. Plugs - several types, idle bar and standard. The fuel tank is pressurized by the muffler. With mixture set correctly, the engine appears to have plenty of power (about 2 hours running). When the engine quits, it can be any time - flat out or part throttle - mostly flat out. The tank has been raised; no difference.

My friend is half inclined to dismantle the engine and check it out himself. Pressure of business and a certain amount of doubt of finding anything have stopped him so far. The engine condition just seems so good from the outside - compression,

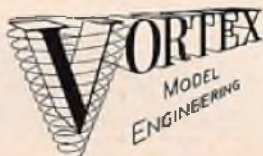
crankcase compression, etc., and piston skirt sealing, he doesn't really wish to dismantle it. Won't ask us to check it either.

Have you had any similar inquiries on the Fox Hawk .60? Apart from quitting, the engine performs well - idle, mid-range, high speed. I have no problems - I use Webras with Perry pumps - what a way to go! I hope you can throw some light on this one.

Yours faithfully,  
A Reader  
Australia

These model engines are pretty basic in operation as I have said many times in  
to page 176

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### ENGINE CLINIC

from page 175/10

the past. If the cylinder compression and base compression are good and nothing is binding in the engine, then it is going to run as long as the glow plug is good and you supply it with fuel. Your friend's problem is in his fuel system somewhere. He has a hole in his fuel line, a split in the brass tubing in the tank, a plugged filter, or foreign matter in his fuel, etc. There are so many variables involved that it is hard to cover everything. Are you sure the muffler

pressure is working? Many times the pressure fitting will become plugged. Vacuum is formed as the tank empties, leaning the engine out—the same as a plugged tank vent in the previous letter. Try running the engine without the muffler pressure to see if this does make a difference.

I have seen a few Fox Hawk's with the piston a hair on the tight side. This is something that should loosen up with running, especially after two hours of running time. However, check the piston to see if there are any bright, shiny marks, especially just below the ring. If there is a bright, shiny band around the piston just below the ring, the piston is

expanding and sticking up. Carefully sand it down with #400 grit wet or dry and machine oil (3-in-1, etc.).

Dear Mr. Lee;

I have used tuned pipes on my K & B 6.5 and OPS .60 in two of my boats with great success. However, recently I installed a tuned pipe in a Dee Vee that has my OS .60 Schneurlud engine. This engine is a front valve, side exhaust type and I've had to put an elbow in the line to accommodate rear exit. Rather than super charging this Perry pump and Perry carburetor engine, it is keeping it from breathing properly. I feel I will have to shorten the pipe but how

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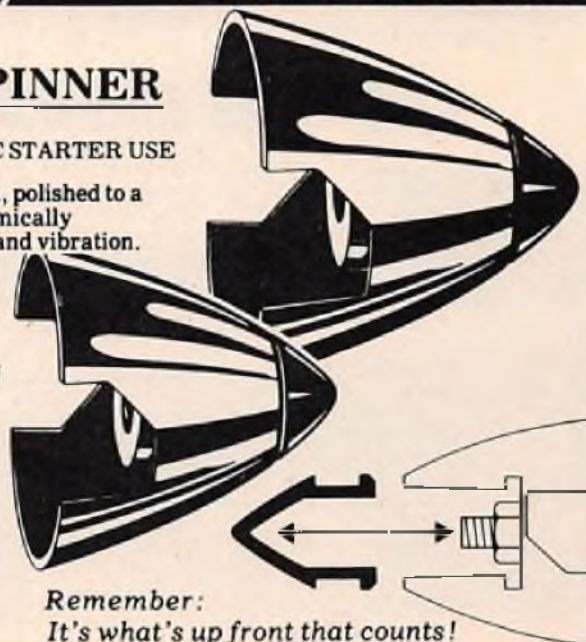
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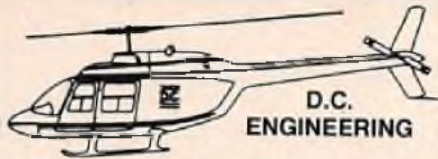


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*much is a large problem. Once cut off, you have a hard time adding. I am using 15% nitro in this engine and a Marine Specialties pipe. Is there a measurement from the center of the piston to the maximum diameter of the pipe that would accommodate a 90° bend in its dimension to give me a starting point?*

*Very truly yours,  
Donald M. Lippoth  
Cape Elizabeth, Maine*

If your engine does not show a gain with the pipe, it is just too long. I haven't had any experience with the Marine Specialties pipe on a .60. I have run

OPS, Rossi, and Webra pipes and imagine the Marine Specialties will fall in the same range. A good starting point for these on a side exhaust .60 is 11" from the center line of the engine to the welded seam at maximum diameter. Try shortening the pipe in 1/4" increments until maximum gain is achieved. As you shorten the pipe, you should begin to notice a gain with each cut. When you make a cut with no further gain, you are at the right length. Even if you make a cut and lose a few hundred rpm, there is no problem as you have only to slip the pipe back out of the silicone rubber connector slightly. Depending on the length of the connector, you should have at least a

1/2" leeway in length here.

Our final letter this month is another in which the sender has a cure for a problem. Although this is an old time trick dating back to the beginning of model engines, it will be new to many newcomers in the hobby of R/C.

*Dear Clarence,*

*I'd like you to make your readers aware of a simple old solution to a problem that's been confronting modelers (particularly newer ones) on the flying field.*

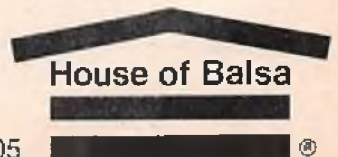
*The problem I'm referring to is the engine that won't fire and the fellow is*

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cranking away and wondering if his engine is flooded or starving for fuel, sometimes no fuel is getting through the carb. Usually his plug battery is getting weak or the glow plug has failed and he is not yet aware of it; so he continues to crank and occasionally choke or prime the engine, and soon it becomes very flooded.

The solution that more fliers should know about is to merely pick up the plane, position the prop, so that the exhaust is open and rotate the entire airplane 360 degrees in the direction that will allow the accumulated fuel in the crankcase to pass through the by-pass and then out of the exhaust stack and into the muffler. Then tip the plane back and the fuel will pour out of the muffler (be sure to have a rag handy).

This is also a quick way to get water out of an engine if it accidentally gets dunked into a lake or puddle, etc. And this is really a handy trick at pylon races. I've done it when my caller has tipped my racer forward when walking on the way out to the starting line and I suspect that fuel, for this or any other reason, may have entered the crankcase through the pressure line and I will do this rather than risk having the prop and spinner, etc., come loose when I attempt to start. But this shouldn't be done on the line about the time planes are being identified or you will surely cause confusion at the #1 pylon (a definite no-no).

Incidentally, another way to dump the fuel in a front intake engine is to tip the plane forward and let the fuel run out of the carb., but this could wet down the spinner and prop.

You've got a great column, keep up the good work.

Sincerely,  
Saul Green  
Niagara Falls, New York

□

### CUNNINGHAM ON R/C

from page 7

than the scorn usually received from the unenlightened masses. And, on this subject, it always amazes me when I finally convince a non-modeling friend to take a trip to the flying field with me to see the wonderment on his face when he sees a remote guided miniature aircraft zipping through the air. "Gee, I had no idea they could fly like that, all I've ever seen are the kind that you fly on a string, and that always crash, over at the school yard."

★  
Here is a letter that I received the other day. I want to pass it along to you for several reasons, and for several reasons, I will not identify the source:

to page 180



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### CUNNINGHAM ON R/C

from page 178/7

Dear Chuck,

The --- RC club needs raffle items for club meetings. I imagine you are loaded with items sent you by the trade to evaluate. If you have unwanted items of interest to RC flyers, we would pay the freight. Thank you very much for helping to surface our strip.

There seems to be a very mistaken idea that all writers covering the RC scene are simply loaded down with free items. Well, this isn't correct. I can't speak for all of us, but I can certainly speak for myself. The radios that I fly, I purchased. The engines that I run, I purchased. The planes that I fly, well, mostly, I designed them, but the balsa wood I used, I purchased. The purchases were made in the same hobby shops that you trade in and at the same prices. Now, for the

second item. Most manufacturers of RC equipment are all small companies. They simply don't have the money to distribute free goods to all of the model press and for that matter all of the clubs in the country. If a kit is sent to the magazine for evaluation, it represents a large investment on the part of the kit maker to give this kit away. And, he expects to have it evaluated, not shipped off to someone else for a give-away at a contest. Frankly, I applaud Walt Schroeder's stand in his MAN at Work Column a couple of months ago, where he said that the bite business had been overdone by clubs wishing to put on contests. I think that a club should stand on its own legs, raise its own money for whatever purpose rather than put the arm on struggling businesses to supply them with free items that might get just a bit of recognition when they are given away.

I've always wondered just how many kits were given as contest awards that were never built because the winner just wasn't interested in that type of aircraft.

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bank and several of us made a bank loan for the balance. The field was built, the bank loan paid off, and we did it ourselves without resorting to trying to raise money from others. Give it a try, it will work. You've got to work at it, but it can be done. The same can be said for any money that you need to raise. A little bit put in by a lot, over a period of time, can amount to a bunch. But, don't get in a hurry. Raise the money first, then make the purchase. It will surprise you how many pledges won't be paid if the field is built on promises.

★

One last letter, from Bill Carpenter, Riverton, Wyoming.

Dear Mr. Cunningham:

I really enjoy your column in R/C Modeler Magazine, it seems we like the same type of airplanes.

I have built and flown models for over 30 years, all types from Scale to

Formula 1.

My main interests now are just sport flying, fun flies, and old timers. I am sending you some shots of my Lazy Ace, built from your RCM plans. I built it in two weeks mostly from pine, cardboard and foam, for a cost of about \$20.00. I haven't weighed it, but it weighs about 14 lbs. It flies very nice on a K & B .61 pumper with a Royal Tech radio. I stuck with your plans and used a lifting stab, but I used a semi-symmetrical wing section. I have bolted on the wings and landing gear. It will fly off in about 100', with no help. I'm sure I could get it off much shorter. I have been building from cardboard and foam for about ten years now; all types of planes. I have a Senior Telemaster built from these materials that flies much better than the kit-built one. But I took out the incidence. I would love to come to Texas and fly with you sometime.

Sincerely,  
Bill Carpenter

Thanks for the words about the Lazy Ace, Bill, and for your mention of the use of pine, cardboard and foam. There are lots of ways to save money in the sport, and the use of the above mentioned materials is one great way for the scratch-builder to save bucks. I have wondered how that Ace would fly with semi-symmetrical wings, and now Bill tells me. Currently I am building a .40 size version of the Lazy Ace called the Sporty Ace, and this bird has semi-symmetrical airfoiled wings. Somewhere down the line will be a smaller .60 size with about 1200 square inches of wing area. Whenever I can work in the time, that is.

★

One other last thought. If you send me, or any other columnist, pictures that you would like to see used in the

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### FROM THE SHOP

from page 2

Whenever possible, a head and shoulder picture of the author, along with a short biographical sketch, including the author's age, background in the hobby, occupation, and general interest should accompany the article. Payment for a construction article is determined upon receipt of the manuscript, photos and drawings, and the author will be notified of receipt of the article and, if accepted for publication, will be notified of said acceptance. If, after the editorial board has had an opportunity to review the article, and it is found unacceptable for publication, the article will be returned promptly. For the safety of your manuscript, a carbon copy should be retained by the author, and manuscripts containing valuable photographs and/or transparencies should be sent by registered mail, or insured. If acceptable for publication, payment will be made thirty days following date of publication. Rate of payment for Construction Articles are made at existing current rates which vary from \$150.00 to \$350.00.

### Secondary Articles:

Secondary articles are all those manuscripts which do not fall into a monthly column or a construction article category. Subject material for these articles are wide and varied and may range all the way from humorous short pieces to technical treatises. Again, these articles should emphasize the "how-to-do-it" theme of the publication. Secondary articles should also be typewritten and double-spaced, should include any sketches necessary, done as completely and neatly as possible in pencil ready for ink tracing by our draftsman. All photographs accompanying the article should be 4" x 5", or larger, black and white glossy photographs, and 35mm or larger Ektachrome or Kodachrome transparencies or high grade color prints. In no case can Polaroid prints be accepted for either construction articles or secondary feature articles. Again, rate of payment is within thirty days following date of publication. Payment for secondary articles vary from \$20.00 to \$200.00, depending upon subject material, general interest, length of article, and quality of accompanying material.

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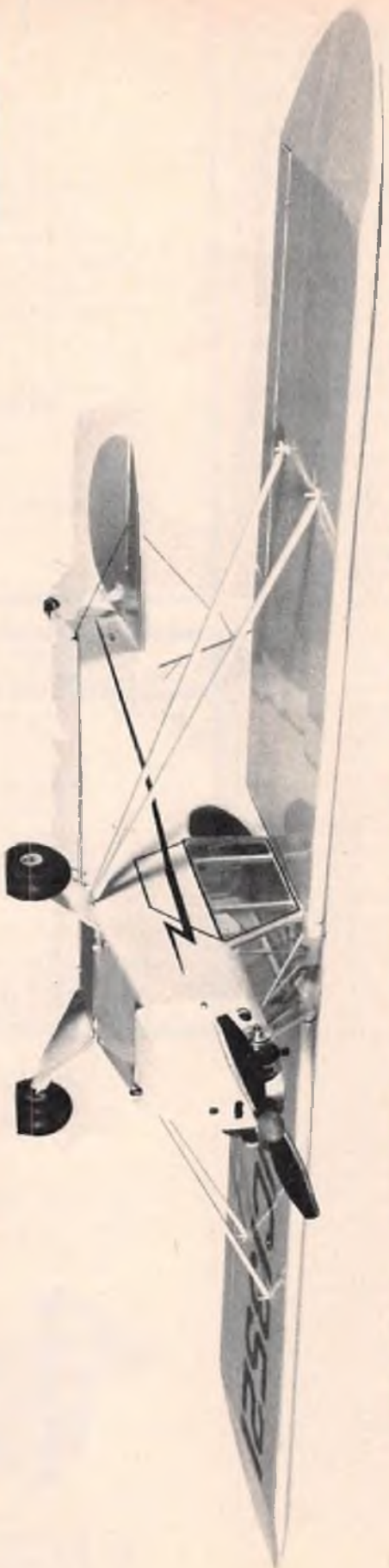
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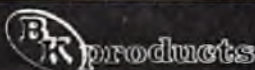
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## FROM THE SHOP

from page 182/2

### Monthly Columns:

The number of monthly columns that can be utilized in *R/C Modeler Magazine* is necessarily prescribed by space limitations, ideas for additional monthly columns are welcome. In addition to the technical parameters concerning the manuscript and accompanying art and photographs described above apply to monthly columns, the author should outline what his proposed column would cover, and should include no less than three completed columns ready for publication. The closing date for editorial copy for any issue is the 12th of the 3rd preceding month of the date of issue. If accepted for publication on a monthly basis, the rate of payment is \$100.00 per monthly column payable within thirty days after the date of each monthly issue. The continued publication of any monthly column is predicated upon reader interest in that column. After twelve months of continuous publication, the rate of payment for a monthly column will be increased at the discretion of the publisher.

### Filler Articles:

Filler articles may vary from a single item for the "For What It's Worth" section or up to a one-page article. All of the physical parameters described above for Construction and Secondary articles apply to this category. Rate of payment varies from \$5.00 to \$50.00 payable within thirty days from date of publication.

### Cover Art:

The requirements for cover art is the submission of 35mm, or larger, Ektachrome or Kodachrome transparencies with good color density and a nice background, if applicable. 35mm transparencies are acceptable only if they are of exceptional quality and resolution. 8" x 10" or 11" x 14" Type C professional quality color prints are also acceptable. Remember that a magazine cover has a vertical format and that first consideration will be given to transparencies shot with a vertical format or, alternately, in a square format with room allowed for cropping at the left and right hand sides. Horizontal format cover art will be used only in rare exceptions. Payment for cover art varies between \$75.00 and \$100.00 and is paid thirty days following date of publication.

### General:

All manuscripts must be accompanied by return postage and any material accepted for publication is subject to such editorial revision as is



necessary, in our discretion, to meet the requirements of this magazine. Editorial material is selected on the basis of general interest to the radio control enthusiast and the publisher assumes no responsibility for accuracy of content. The opinions stated in published material are those of the individual author and do not necessarily reflect those of the publisher. RCM Publications assumes no responsibility for loss or damage of editorial contributions, although all care will be taken in the handling of such material and in the return of unacceptable material to the contributor. Upon acceptance, payment will be made within thirty days of publication at our existing current rate, which covers all author's rights, title to, and interest in the material mailed including, but not limited to, photos, drawings, and art work, which shall be considered as text. Submission of the manuscript to *R/C Modeler Magazine* expresses a warranty, by the author, that the material is in no way an infringement upon the rights of others, nor has been previously published in any other publication. *R/C Modeler Magazine* purchases first international publication rights, as well as the rights to reprint portions of, or the complete article, as a part, or parts, of any book which RCM Publications may print in the future. In addition, in the case of construction articles, RCM Publications retains all rights to plan sales. Secondary printing rights, or any commercial interests that might possibly evolve from said published article, remain the property of the author and any commercial compensation for any product as a result of said article shall be made between the author and the company interested in producing the author's design and/or idea. All physical material such as typewritten copy, photographs, transparencies, and art work purchased become the property of *R/C Modeler Magazine*. However, every attempt will be made to return all unused photographs and art work to the owner following publication.

#### Submission of Editorial Material:

All manuscripts and other editorial material, and/or correspondence pertaining to said editorial material, and/or queries concerning possible editorial submissions should be addressed to Don Dewey, Editor, *R/C Modeler Magazine*, P.O. Box 487, Sierra Madre, California 91024. The editorial offices of RCM Publications are located at 120 West Sierra Madre Blvd., Sierra Madre, California 91024.

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Devcon 5 min. 9oz.	5.80	3.99
Devcon slo cure	5.80	3.89
Hot stuff	3.50	2.75
Blue Line H.S.	4.95	3.50
Giant Zap	3.50	2.75
X-30 Adhesive	1.15	1.00
Ambruid 8 oz.	1.15	1.00
Ambruid 1/2 oz.	.60	.50
Super Cement	.55	.45
Blue Geo.	2.95	2.59

## BOATS & CARS

**JEROBEE CARS**




**CARS WITH RADIOS**

	List	Indy
MK-88	177.50	142.00
Challenger	187.50	150.00
Alfa	226.95	181.00
Vette	215.95	172.00

**CARS LESS RADIO**

	List	Indy
MK-88	55.00	44.00
Challenger	65.00	52.00
Alfa	87.50	78.00
Vette	87.50	67.00

## PUMPS STARTERS



**STARTERS**

	List	Indy
Std. Sullivan	36.95	26.99
Del. Sullivan	39.95	28.99
Sonic Tronic	38.50	27.00
Kavan	45.00	32.00
Astro-1/4A	16.95	13.50

**FUEL PUMPS**

	List	Indy
Sonic Tronics MK II electric fuel pump	13.95	10.95

**HAND PUMPS**

	List	Indy
Du-Bro	10.95	8.50
Six Shooter	10.95	8.50

PRICES  
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**Indy**  
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SOUTHERN R/C  
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L. \$52.95  
 I. \$32.83

**Indy**  
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 SUNNY BIPE

L. \$32.95  
 I. \$23.07

**Indy**  
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 WANKEL

L. \$104.95  
 I. \$75.57

**Indy**  
 40% OFF

40% OFF  
 ON  
 ALL  
 FOX ENGINES  
 IN STOCK

**Indy**  
 40% OFF

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 3/32" & 1/8"  
 Wide

L. \$2.69  
 I. \$1.62

**Indy**  
 40% OFF

CAL STRIPE  
 TAPE  
 1/4" Wide

L. \$3.89  
 I. \$2.22



TRAINMASTER

**ANDREWS**

	List	Indy
S-Ray	34.95	27.95
A-Ray	44.95	35.95
H-Ray	39.95	31.95
Sportmaster	69.95	55.95
Mini Master	44.95	35.95
Trainmaster	52.95	42.95
Aeromaster Too	74.95	59.95

**ASTRO FLIGHT**

	List	Indy
Electra Fly	24.95	17.96
Bushmaster	44.95	33.75
Fourier RF/4	44.95	33.75
Malibu	29.95	22.50
Monterey	39.95	29.95



DIRTY BIRDY

**BRIDI**

	List	Indy
Strike	184.95	129.99
Brown Racer	134.95	102.00
Chipmunk	124.95	93.00
Dirty Birdy (balsa)	84.95	63.95
Dirty Birdy 40	59.95	45.99
Twinedy Birdy	43.95	34.50
Sportster	39.95	31.00
Trainer 10	27.95	21.50
Trainer 20	34.95	27.00
Trainer 40	54.95	42.00
Trainer 60	62.95	49.00
Basic Trainer	39.95	31.00
15-500	39.95	31.00
Sun Fli 4-20	29.95	23.00
Quickest 200	24.95	19.00
Quickest 500	42.95	33.00
Super Kaos 40	55.95	43.00
Super Kaos 60	68.96	54.00
Kaos	66.95	52.00
Sirus Lockheed	134.95	102.00



SR FALCON

**GOLDBERG MODELS**

	List	Indy
Ranger 42 (ARF)	23.95	19.00
Sr. Falcon	55.95	44.00
Falcon 56 MK II	39.95	28.50
Skylane 62	55.95	44.00
Jr. Falcon R/C	11.95	9.95
1/4 Skylane	15.95	12.50
Skylark 56	34.95	26.00
Jr. Skylark	12.95	10.00



PETE  
 AIR CAMPER

**HOUSE OF BALSA**

	List	Indy
Mis. Ora	39.95	27.99
Pietenpol	49.95	39.95
1/4 Pietenpol	29.95	23.99
P-51	27.95	21.95
ME-109	27.95	21.95
P-39	27.95	21.95
Chipmunk	27.95	21.95
P-47	28.95	23.99
FW-190A	28.95	23.99

**LANIER MODELS**

	List	Indy
Jester II	73.50	51.50
Rebel II	99.95	69.95
Invader	84.50	59.00
Scamp	52.50	36.75
Comet II	58.50	40.95
Cessna	46.50	32.75
Pinto	46.50	32.75

**MARKS MODELS**

	List	Indy
Sunny (Bipe)	32.95	24.75
Windward	32.95	24.75
Windfree	44.95	35.00
Wanderer	19.95	15.85
Buschwacker	44.95	35.00

**MILE HIGH MODELS**

	List	Indy
Joy Stick	18.95	14.99
Supr Joy Stick	36.95	25.95

**COVERING MATERIAL**

**INDY SILK**

	List	Indy
1 yd. pkg.	3.25	2.75
2 yd. pkg.	6.50	5.00

**COVERITE**

	List	Indy
Super 38 x 47	7.75	6.20
Silkspon	7.75	6.20
Permagloss	9.10	7.25
Day-glo permagloss		
orange, yellow, olive drab & aluminum	9.95	7.95
Camouflage 1/4 and 2" scale		
orange	9.95	7.25
Balsarite 1/4 pt.	2.95	2.75

**MONOKOTE**

	List	Indy
Opaque	9.00	5.50
Transparents	9.00	5.50
Metallic	10.50	7.00
plain trim sheets	1.19	1.10
Checkerboard trim	1.59	1.50

**SOLARFILM**

	List	Indy
Opaque	7.80	5.00
Transparent	9.00	6.50
Metallic	10.00	7.00

**MIDWEST**

	List	Indy
MicroLon	1.95	1.75

**BUTY - FLEX DOPE**

	List	Indy
22 colors		
quartz, colors	4.95	
quartz clear	3.95	
Gallons clear	9.95	
gallons Thinner	5.95	

**GLIDER ACCESSORIES**

**AIRTRONICS**

	List	Indy
Std. launch pail	34.95	27.99
HD launch pail	36.95	28.00

**CRAFT AIR**

	List	Indy
Del. Hi-Start	37.95	31.00
Std. Hi-Start	34.95	25.00
Para Pod	9.95	7.00

**ASTRO-FLITE**

	List	Indy
HD Hi-Start	41.95	31.95
(real heavy duty)		
Astro-start	39.95	31.00

**CARS LESS RADIO AND ENGINE**

	List	Indy
MK-88	27.00	21.50
Challenger	32.00	25.50
Vette	50.00	40.00

**JEROBEE - BODIES**

	List	Indy
MK-88 Body	7.95	6.50
Porsche	4.95	4.00
VW Bug Body	12.95	10.50
Vette Body	12.95	10.50

**ACCESSORIES**

	List	Indy
Tank heat sink	2.50	
wing with decal	2.95	
brake kit	1.95	
remote tank kit	2.95	
Aluminum flywheel	2.95	
mount for Tee Dee	1.95	
Bumper	2.49	
Chassis Frame	3.95	
Lexan Chassis frame	7.95	
Starter Rebuild kit	1.60	
Eng. rebuild kit	7.55	
Rear Axle kit	1.49	
Clutch shoes	.98	
drive shaft w/ret.	.89	

**HUGHEY**

	List	Indy
20 Rigger	100.00	85.00
40 Rigger	110.00	93.50
19 Hydra	77.00	67.00



**SAIL BOATS**

	List	Indy
Blue Sonic 900	129.95	
Indy special	\$99.95	

**RETRACTS**

**ROM - AIR**

	List	Indy
2 gear mains	85.00	57.75
3 gr. firewall	114.00	79.95
3 gr. belly	114.00	79.95
pressure gauge		13.50
Front		2.75
1/4 oz. Oil		1.85
line coupler		1.90
quick disconnect		2.00

**GOLDBERG**

	List	Indy
2 Gear	14.95	10.50
3 gear	24.95	17.50

**POWER PANELS**

**DAE**

	List	Indy
Dual range	24.95	18.00
Mini panel	15.95	11.00
Series V	34.95	24.95
Std. panel	18.95	14.95

**STEVE MUCKS**

	List	Indy
Lil Lighting	48.95	38.95
Buschwacker	109.95	74.95

prices subject to change  
 without notice





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New Indy catalog hot off the press. 52 pages of condensed good buys.

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# INDY

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Family Hobby & Toy Center  
Route 5, Box 84 B  
Conway, Ar. 72032

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300 N. Wright Street  
Sloans Springs, Ar. 72761

### Cash Auto Supply, Inc.

P.O. Box 165  
Cash, Ar. 72421

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Bay Hobby  
1448 Cary Avenue  
San Mateo, Ca. 94401

### Dave's Custom Models

1844 W. Glenoaks Blvd.  
Glendale, Ca. 91207  
ph. 213-240-8810

### Root's Hobby

6036 Telegraph Avenue  
Oakland, Ca. 94609

### D & D Hobbies

8781 Cuyamaca Street  
San Jose, Ca. 92071  
ph. 714-449-6656

### Active Hobby

717 E. Main Street  
Santa Maria, Ca. 93454

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Manford, Ca. 93220  
ph. 582-5571

### COLORADO

G. Al. Inc.  
Musick Drug & Hobby  
309 E. Fontanera Street  
Colorado Springs, Co. 80907

### Jensen Cycle & Auto Parts

Box 182  
Granada, Co. 81041  
ph. 303-734-5337

### FLORIDA

A & J Models, Inc.  
Coralwood Mall  
Cape Coral, Fl. 33904  
ph. 813-542-8858

### Action Hobbies

4301 A. North Dixie Hwy.  
Ft. Lauderdale, Fl. 33334  
ph. 305-561-5611

### The Hobby House, Inc.

360 U.S. Hwy. 17 B2  
Maitland, Fl. 32751  
ph. 305-547-3442

### GEORGIA

Atlanta Hobby Center  
6125 Roswell Road, N.E.  
Atlanta, Ga. 30328  
ph. 404-255-9033

### Country Cloth Shop

Rt 4, Teamon Road  
Duffin, Ga. 30223  
ph. 404-227-8015

### ILLINOIS

80's Hobby Hut  
68 Main Street  
Oswego, Il. 60543  
ph. 554-8243

### Lake County Hobbies

3192 N. Sheridan Road  
Waukegan, Il. 60085  
ph. 312-462-4544

### Wings & Things, Inc.

1122 Broadway  
Rockford, Il. 61104

### INDIANA

ABC Hobby Craft  
2155 E. Morgan Avenue  
Evansville, In. 47711  
ph. 812-477-8661

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Craft & Hobby House  
324 Main Street  
Vincennes, In. 47591

### Frank's Hobby Shack

4954 E. Robin Court  
Holling Prairie, In. 46371  
ph. 219-778-4670

### Hobby Hanger

509 S. Montee Street  
Harford City, In. 47348  
ph. 217-348-1931

### Hobby World

154 13A W. Hively Avenue  
Elkhart, In. 46514  
ph. 219-293-3715

### Hobbyland

343 Luicelindway West  
South Bend, In. 46501  
ph. 219-287-0180

### Kirk's Hobby Shop

117 E. Main  
Muncie, In. 47305  
ph. 317-282-4121

### Wings N' Rails, Inc.

1824 E. Main Street  
Plainfield, In. 46158  
ph. 317-839-6363

### IOWA

Family Craft & Hobby  
2034 S. Saint Aubin  
Soux City, Ia. 51106  
ph. 712-276-7086

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313 W. 5th Street  
Waterloo, Ia. 50701  
ph. 319-236-0695

### A Z Hobby, Ltd.

1314 Army Post Road  
Des Moines, Ia. 50315

### KANSAS

Bill's Budy Shop  
607 N. Fern  
Olathe, Mo. 63749  
ph. 813-475-2624

### The Modeler Hobby Shop

1726 South Hillside  
Wichita, Ka. 67211  
ph. 316-881-2941

### LOUISIANA

Ron's Hobbies  
713 E. McNease  
Lake Charles, La. 70605  
ph. 318-478-8651

### MAINE

Hobby Corner  
70 Main Street  
Houlton, Me. 04730  
ph. 207-532-6289

### Pats & Pastimes

6 Central Street  
Bangor, Me. 04401  
ph. 207-942-9346

### MASSACHUSETTS

Bill's Hobby Supplies  
600 N. Main Street  
E. Longmeadow, Ma.  
ph. 413-738-7711

### MICHIGAN

Aco Model Supplies  
1885 Dyson Street  
Muskegon, Mi. 49842  
ph. 616-726-3400

### Bary's Hobby House

3535 10th Avenue  
Port Huron, Mi. 48060  
ph. 313-982-1237

### MINNESOTA

Mac's Models, Inc.  
1322 N. Rice Street  
St. Paul, Min. 55117  
ph. 612-489-6060

### Wickland's Hobby House

Route 1  
Lake Lillian, Mo. 58253

### MISSISSIPPI

Creative Sources  
1802 Jackson Avenue  
Oxford, Ms. 38655  
ph. 601-234-2475

### H & B Models

319 W. Main  
Tupelo, Ms. 38801  
ph. 601-844-7946

### Sacky's Model & Hobby Shop

3019 Cordoba Drive  
Gautier, Ms. 39553

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Sho Me Hobby Center  
1239 E. Republic Road  
Springfield, Mo. 65807  
ph. 417-887-2327

### Smith's Hobby Supply

830 Chestnut  
Joplin, Mo. 64801

### MONTANA

Viking Hobbies, Inc.  
1745 E. Main  
Billings, Mt. 59101

### NEW HAMPSHIRE

Hobby Hut  
1 Cannon Drive  
Nashua, Nh. 03060  
ph. 888-3576

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Fairfield, N.J. 07009  
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Custom Hobbies  
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Kingston, NY 12461

### Hobbies Galore

99 Central Avenue  
Lancaster, NY 14086  
ph. 716-681-8567

### Jim's R/C Hanger

Rt 4, Box 4 Canton Road  
Ogdensburg, NY 13699  
ph. 315-393-2580

### King Arthur Comics & Hobbies, Co.

Box 8, Bridge Rd.  
Hudson Falls, NY 12839  
ph. 518-747-5818

### Thompson Outboard S & S

Upper East Street  
Oneonta, NY 13820  
ph. 607-432-5368

### Ray's Hobby Supplies

488 Jerusalem Avenue  
Uniondale, NY 11553  
ph. 52 516-485-4047

### NORTH CAROLINA

B & J Hobby Enterprise  
4909 Western Blvd.  
Raleigh, N.C. 27606  
ph. 919-851-4492

### Thomson's Hobbies

100 N. Main Street  
Four Oaks, N.C. 27524

### Edros Hobbies

1318 Lakeside Drive  
Wilson, N.C.

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Cialis Etc.  
Northport Shopping Ctr.  
Fargo, ND 58102  
ph. 701-293-7121

### McGillins, Inc.

1228 9th Ave. South  
Grand Forks, ND 58201  
ph. 701-772-5311

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Dickinson, ND 58601  
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### OHIO

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### Dad's Toy Shop

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Wapakoneta, Oh. 45895

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### Lafayette Escadrille Hobby

1414 S. Avenue  
Toledo, Oh. 43609  
ph. 419-385-8739

### Lighthouse Hobby Supply

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ph. 614-484-2110

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2495 Commercial NE  
Salem, Or. 97303  
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ph. 503-244-3356

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ph. 412-221-2600

### H & S Sales & Service

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ph. 412-463-0191

### Laurel Shop

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Bookville, Pa. 15825

### The Silver Mine

301 Oak Spring Road  
Washington, Pa. 15301  
ph. 412-228-3470

### Sharon R.C. & Hobby

95 Taylor Blvd.  
Sharon, Pa. 16146  
ph. 347-4581

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ph. 614-484-5168

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ph. 806-889-3541

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ph. 434-0228

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ph. 713-358-2224

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Dumas, Tx. 79829  
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Borger, Tx. 79007  
ph. 273-7037

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ph. 802-464-8059

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Waterleaf Plaza  
Lynchburg, Va. 24502

### WASHINGTON

Bill's Hobby Town  
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Tacoma, Wa. 98444  
ph. 206-531-8111

### Kitsap Hobby Supply

Poulsbo Jet & Hwy. 3  
Poulsbo, Wa. 98370  
ph. 206-779-7676

### Stewart Enterprises

at McCarey's TV & Radio  
429 S. Chelan Street  
Wenatchee, Wa. 98801  
ph. 509-663-3232

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Sanksville, WV 26178

### Mountaineer Shop

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Ripley, WV 25271  
ph. 304-332-8544

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Happy House Gift Shop  
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New Richmond, Wi.  
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### Lake Geneva Model Center

726 1/2 Ann  
Lake Geneva, Wi. 53147

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St. Catharines, Ontario,  
Canada

### B & H Hobby Supply

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Barrie, Ontario,  
Canada

### Calgary Hobby Supply Ltd.

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### Royal Oak Hobbies





## BEST FROM INDY

1. Mount the Indy Power Panel in your tool box. Operates from 12v. and services your engine starter, fast field charger, and glow plug. List: \$34.95. Indy: \$23.50.

2. Indy 6 amp hour gel cell. This is a 12 volt battery for engine starter. Charger - 24 hour type only \$15.95. Battery - \$21.95

3. Como 40 engine. Twin ball bearing, cast aluminum piston, chrome ring, special porting. Complete with Supertigre carburetor and muffler. List: \$69.95. Indy: \$43.00. U/Control version less muffler - List: \$55.95. Indy: \$33.95.

4. Indy US-2 Servo. DS mechanics, Signetics IC 544. For use with systems like Futaba, Kraft, Standard, World - positive pulse systems. Mitsumi connector. List: \$23.95. Indy: \$16.95.

5. Snap-in servo tray for US-2 servo. Center section is spacer which cuts out. List: \$0.99. Indy: \$0.69.

6. Round output arms for US-2. List: \$0.50. Indy: \$0.35.

7. US-1 servo similar to above described US-2 servo except in Dunham mechanics with dual racks. List: \$28.95. Indy: \$20.95.

8. Capillo .09 Italian glow engine. List: \$14.95. Indy: \$11.95. Throttle. List: \$3.50. Indy: \$2.98.

9. Mills .075 diesel engine. Sentimental favorite. Excellent for small R/C. List: \$19.95. Indy: \$15.95.

10. Panasonic pencil nicads with tabs. New. (4) ea. \$1.80 - \$7.20. (8) ea. \$1.65 - \$13.20. (12) ea. \$1.55 - \$18.66.

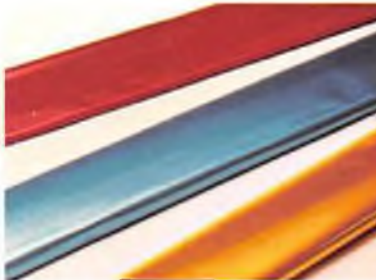
11. 2 volt Gell Cell starting battery. List: \$9.95. Indy: \$6.95 and charger for battery. List: \$9.95. Indy: \$6.95.

Notes - the bore in the Como 40 U/Control venturi will be about .275. We also offer a 12v. Gell Cell with 6v. and 2v. taps. Gives you power for your electric starter and your glow plug. List: \$25.95. Indy: \$18.50.



### SG RACE CAR

SG RACE CAR - Complete with Supertigre X-21 Schnuelle ported engine. One eighth scale, Deluxe version with ball bearings wheels. This is a competition car-latest version-just arrived. List: \$199.95 Indy: \$159.95



### INDY FILM MK II

MK II - new colors like K & B epoxy. Solids - white, cub yellow, orange, black, royal blue, flag red. \$7.50/roll. Introductory price \$3.99/roll or 3 rolls/\$9.99.



### MK (KATO) CURARE

MK's all balsa kit of Hanno Prattner's famous Curare. MK's quality really shows on this kit that Mr. Kato is building under an agreement with Hanno, 60 size - List: \$98.50. Indy: \$79.00. 40 size - List \$79.50. Indy: \$63.00.



### MK'S HAPPY - 20

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