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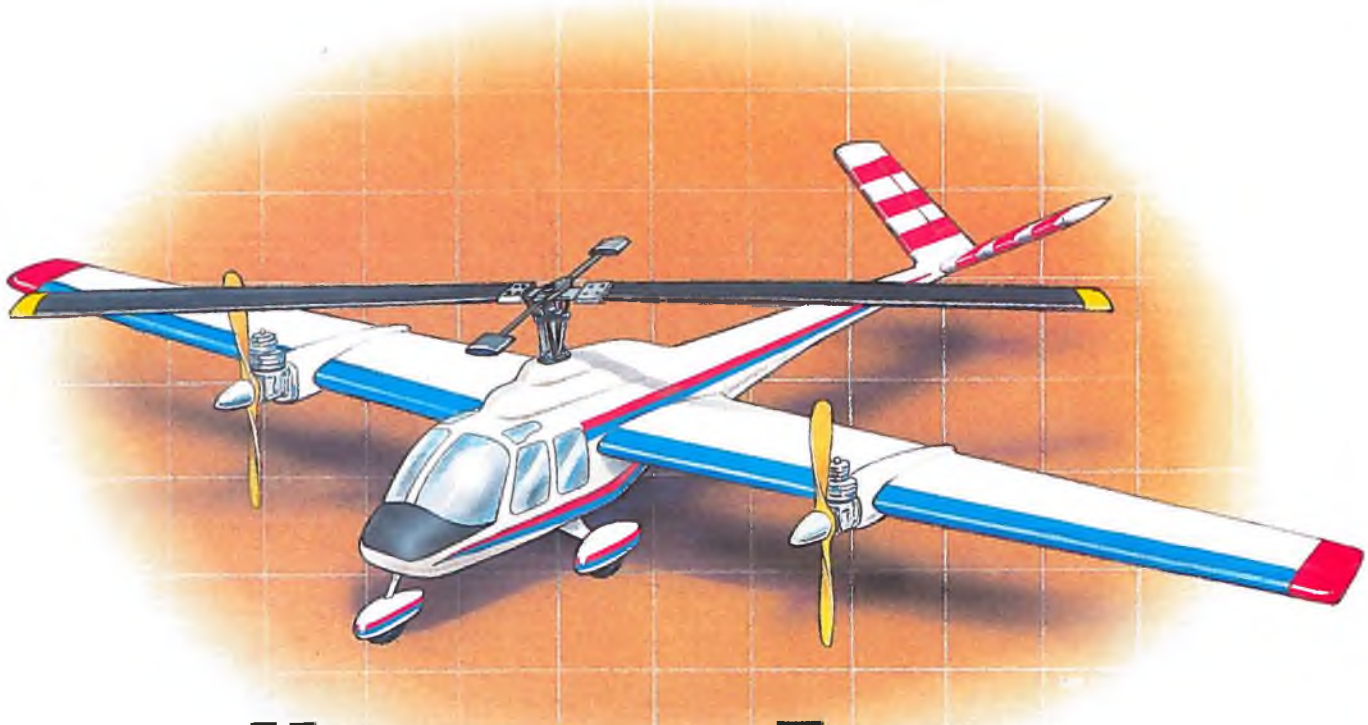
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RCM

VOLUME 28 NUMBER 5
MAY 1991

USPS 509-190 ISSN 0033-6866




**This Month's Cover** — features Dennis Tapsfield's 1/4 scale Kari-Keen Sioux Coupe shown with lovely Jeanette Adams. Powered by a K & B .65 Sportster, wing span of 90" and weighs 10½ lbs. Full construction article begins on page 96. Transparency by Simon Rodway, Editor, Radio Control Model World in England.





## FEATURES

**54 KEYSTONE '90 . . .**
Electric Fly
*(Ted Davey)*

**69 WHAT YOU CAN LEARN . . .**
From Your Model Airplane
*(Duke Iden)*

**93 THE FUN OF AN R/C VACATION**
Fun in Costa Rica
*(Stu Richmond)*

**140 AMPHIBIOUS DC-3**
Comes in two sizes
*(RCM Staff)*

**154 HOW TO BUILD . . .**
A Wing Tip Smoke System
*(John Lane)*

**187 DUKE FOX**
In Remembrance

**188 CURTISS V-12 ENGINE**
A scale masterpiece
*(Bob Banka)*

**200 A TIGER SHOWS ITS STRIPES**
A unique paint scheme
*(Art Harrison)*

**202 CEILING SHELVES FOR MODELS**
Inexpensive model hangers
*(George Kyer)*

**210 A LOOK INTO THE T.O.C.**
Interviews with participants
*(Pat Godfrey)*

**222 THE CONDORS 1ST ANNUAL JET RALLY**
*(Douglas Cerrito)*

**228 JET MODEL FUEL SYSTEM HOOK-UPS**
How-to
*(Wally Zober)*





## CONSTRUCTION

**96 KARI-KEEN SIOUX COUPE**
1/4 Scale 30's classic
*(Dennis Tapsfield)*

**192 SWINGER**
Wingeron thermal soarer
*(Mike Hollison)*

## COLUMNS

**3 FROM THE SHOP**
Dum-Dum Award
*(RCM Staff)*

**6 CUNNINGHAM ON R/C**
Cutting modeling costs
*(Chuck Cunningham)*

**12 RADIO SPECTRUM**
Ultimate Charger
*(Cal Orr)*

**22 SOARING**
Repairing foam wings
*(Don Edberg)*

**40 SILENT POWER**
Motor/prop selection
*(Ted Davey)*

**86 BIG IS BEAUTIFUL**
Wires, Wires, Wires . . .
*(Ken Runestrand)*

**108 HOVER**
Kalt Enforcer review
*(John Benario)*

**120 ENGINE CLINIC**
Questions and answers
*(Clarence Lee)*

**138 FOR WHAT IT'S WORTH**
Helpful hints for modelers
*(Jerry Smith)*

**156 PIT STOP**
Choosing your first equipment
*(Dean Hughey)*

**174 SCALE VIEWS**
Gyros in scales?
*(Col. Art Johnson)*

**197 RCM BOOK & VIDEO SHELF**
Book and Video reviews
*(RCM Staff)*



## REVIEWS

**16 SCHNEIDER SPORT 60**
Stream Inc.

**74 HAMMER 40**
Davey Systems Corp.

**164 BMS ONE BATTERY CYCLER & CHARGER**
R K Electronics
*(George Steiner)*

**181 STURDY BIRDY**
Great Planes Model Dist. Co.

**204 F4U CORSAIR SHORT KIT**
Wing Mfg.

## DEPARTMENTS

**235 SHOWCASE '91**
New product announcements

**246 RCM "FOR WHAT IT'S WORTH" CONTEST**
Win a Dremel Tool

**246 HOBBY SHOP BULLETIN**
Listing of hobby shops

**247 RCM PLAN CONTEST**
Win a super prize

**249 RCM ANTHOLOGY BOOK CONTEST**
Win a super prize

**252 READERS EXCHANGE**
Classified ads

**254 RCM SUBSCRIPTION CONTEST**
Win an Enya engine or sub.

**255 ADVERTISERS INDEX**
Advertiser page listing

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# FROM THE SHOP

This month, we are finally going to publish Ken Willard's Dum-Dum award. With Ken not being able to do his column, things just fell behind. Our apologies to both Ken and the winner, Bill Hebestreit of Wofford Heights, California. The following photo and letter explains just how Bill was picked by Ken for his Dum-Dum award. He will be receiving a one year subscription.



***From the left: Cessna — built in 1973; P-51 — built in 1987; Aeromaster — built in 1969; floats in 1986; Undone I — designed and built in 1970; Aeromaster — built in 1986; Pilot — built in 1927.***

*Dear Ken:*

*I was reading about the lack of input for the Dum-Dum award and I thought I would relate my experience. How about a whole committee of dum-dums! Enclosed is a picture of my Lou Andrews Aeromaster built in 1969. It still has the old Supertigre 60 engine. We were having an old fashioned cook-out at the local airport which is located on the shores of Lake Isabella, California. I keep my models in my hangar at the airport because it has lots more room than my garage. It was about an hour before sunset and well into the fifth or seventh scotch and water, when someone said, "Why don't you fly your seaplane and give us some entertainment."*

*Now I wouldn't even think of climbing in my Cessna in the condition I was in, but I could certainly still fly a model airplane, so out it came. I went through a full flight of loops, snap rolls, low inverted passes, and such, and for the finale I would do a ten turn spin ending in a landing and taxi back to shore. At about turn seven I realized that I was* ***much*** *too low, and the full throttle pull out resulted in a secondary stall, snap, and spin in the opposite direction. When it hit the water, the floats came off, and the bottom wing bent up and touched the top wing. And there it floated. Nose slightly low.*

*Enter the committee. The first one took off his shoes and shirt and dashed into the lake to save the remains. About half way to the airplane, he realized that the lake was made up mostly of recently melted snow, and grabbed onto a tree, unable to return, and unable to get to the airplane. The next member (who was a member of the local*

*Search and Rescue team) quickly drove home and picked up a rubber boat. In the excitement, he couldn't find the paddles so he brought a short handle shovel. He actually made it out to the airplane and picked it up but when he put the airplane in the boat, the metal struts (with no floats on the end) punched holes in the boat and it began to sink. By paddling furiously, he made it into wading distance from the shore before the boat sank. Due to a gentle breeze, the floats came ashore by themselves. Member number one decided that he didn't want to spend the night in the tree and made a heroic swim to shore.*

*The plane was repaired, and no one caught pneumonia, but the whole thing was real dum-dum.*

*Bill Hebestreit*
*Wofford Heights, California*

★

In the past several months, there has been letters published regarding the hazards of using CA glues. This information has appeared in club newsletters, model publications, along with various publications of special interest groups.

From information we received from the two major manufacturers of cyanoacrylate glue, most of these hazards have been partial facts without the proper research. Like any of the adhesives we deal with, breathing the fumes should be avoided. Try not to work in a closed room, use plenty of ventilation, and, if possible, use a fan to help dissipate the fumes. This type of precaution applies to many of the materials we use in our hobby. Read the label and be sure and adhere to the warning. That information is there for a good reason — your continued good health.

There are some people who are allergic to many things and they should be especially careful.

★

To finish off this month, here are a couple of great items we picked up in club newsletters.

First one came from the Crosswinds newsletter of the Sparks R/C Club of Spring, Texas. Walter Laich, Editor.




***Thrust Line Tip***
*By Brian Williams*

*Suppose you wish to change the thrust line of your engine by say 3 degrees. The use of washers or spacers between the engine mount and the firewall is not really good engineering because it induces localized loads, plus the washers tend to compress the firewall. Try this: Take a plastic cup or container that has a base that is slightly bigger than the back of the engine mount. Place it on your workbench with a piece of balsa under one side of the base so it is tipped 3 degrees (use a protractor). Mix up some slow epoxy plus glass microspheres (micro-balloons to us columnists --- Ed.) and pour it into the cup so the bottom is just completely covered after it has flowed level. Allow to set overnight, then tear off the cup. Hey presto — you will have a 3 degree wedge. With coarse sandpaper make sure both sides are flat and you can also shape the circumference if you wish. Don't forget to make the holes for the engine mount bolts oversize as the bolts will be slightly angled. It looks good and it's sound engineering.*

The second item we picked up from the San Gabriel Valley Radio Control League newsletter, Sue Pound, editor. It seems they spotted it in Flying People Paper newsletter of the Woodland Aero Modelers of Downers Grove, Illinois. We don't know the editor's name.

***Sizing An Engine For Model Airplanes***
*By George A. Carney*

*This matter aroused my curiosity once and I did some research and found that to obtain a 2-stroke engine size, multiply .07 by the weight of your plane in pounds. This will give you a ballpark engine size. For a 4-stroke engine, multiply your 2-stroke engine size by 1.5.*

*Example:*

*.07 x 12 lbs. = .84 cubic inches*
*Round off to .90 cubic inches = 2-stroke.*
*.90 x 1.5 = 1.35 cubic inches = 4-stroke.*

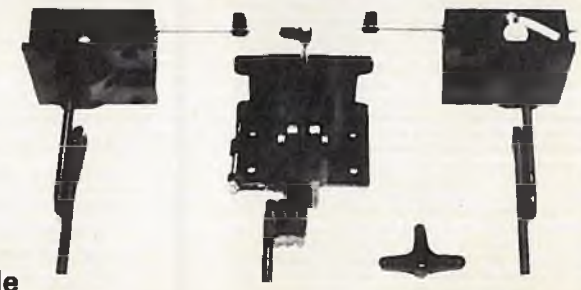
*This will aid in preventing too small or too large an engine. Use your judgment on the type of aircraft, such as basic trainer or a Pitts Special or whatever. Too much power is as bad as too little power.*

This is a super simple way of obtaining your engine size for your new design. Congratulations to George.

□


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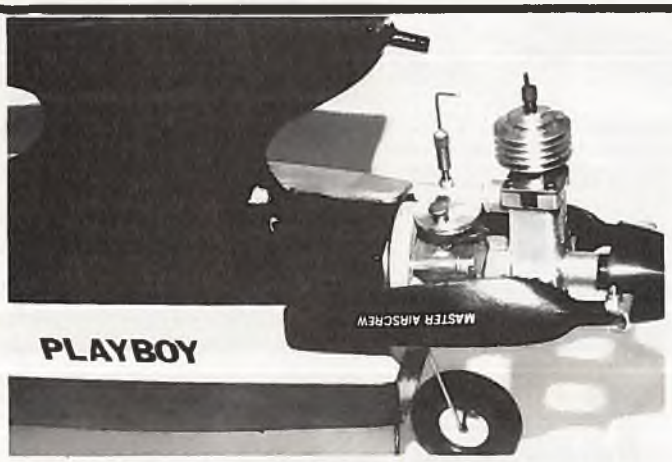
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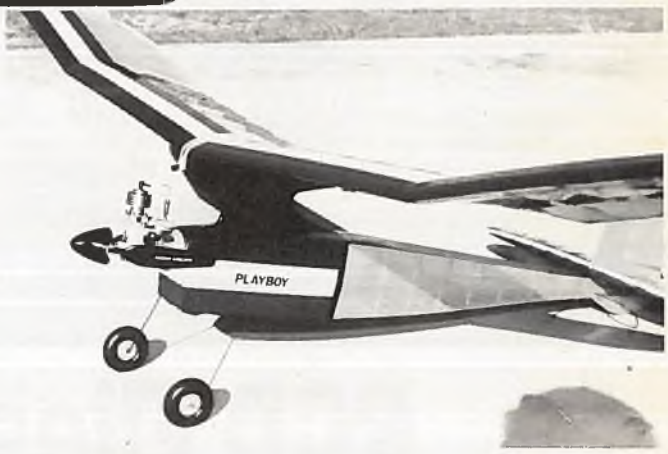


# CUNNINGHAM ON R/C

CHUCK CUNNINGHAM

There are a number of ways to cut costs and save money; first, let's take a look at your existing model. Are you flying an aircraft that is trike geared, and has the normal prop clearance of about an inch between the prop tips and the runway? Do you tend to break a lot of props landing this bird? Well, two simple changes can be made. First, change from a wood prop to a plastic one. The plastic one will be ground down a bit by contact with the runway, but probably will not be splintered. But, if you do grind a bit off of the diameter, balance it out with a bit of sandpaper both as to length and weight. Next, consider using larger wheels on this aircraft to give more ground clearance. But, better and cheaper, bend




***Photos are from Stu Richmond, Apopka, Florida, of his new "Playboy" old timer design built for the new experimental Class A Texaco R/C event. Kit is Leisure Electronics. All models must use a Perfect #5 fuel tank (1/2 ounce) (14cc's) of fuel. Stu chose Gordon Burford's made in Australia reproduction of the DEEZIL. Turns 12 x 8 folding Master Airscrew at 3900 rpms for about 4½ minutes. Won second place at SAM 46 contest on east coast of Florida. There were eight entries . . . more than the regulation 1/2A Texaco limited fuel event drew. Standard R/C on rudder and elevator, MonoKote, weighs 39 ounces. Much fun.***

**Cutting Modeling Costs**

The world of radio control is affected by the national and world economies just as is any other venture. This year, so far, reminds me of the world that we knew back in the early sixties. Then, money was hard to come by, and the amount of money available to spend for entertainment was not nearly as large as it became in the seventies and eighties. Back in the sixties I wrote about how to enjoy this great hobby/sport, and yet do it on a shoestring. Of course, the cost of everything was not nearly so high as it is today, but costs are relative. What we want to consider is how to continue to enjoy what we are doing without mortgaging the farm. Let's take a look at how to build a sixty size model on a budget price. This article won't put anyone out of business, it is just intended to show you how you can build a model and economize at the same time.

new wire main gears of an inch or so longer length, and buy a new nose gear that will give you a longer nose gear length. Give your aircraft at least two or more inches of clearance between the prop and the runway.

On a tail dragger make sure that the clearance is at least 2''-3'' inches, and make sure that the main gear is not too springy. Brace any gear that tends to toss the aircraft back into the air on a hard landing. We talked about this several months ago.

If the wing on your aircraft is held in place





***LEFT: Scratch designed/built models by Bob Hannah, Calgary, Canada. The bipe spans 42", the larger monoplane spans 60". All good flying models. RIGHT: Bob Mayfield's granddaughters show off his uncovered Big Lazy Ace built from Sky Master plans. Quadra 50 powered, and finished model has a smoke system.***

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**Weight:** 1.3 Oz
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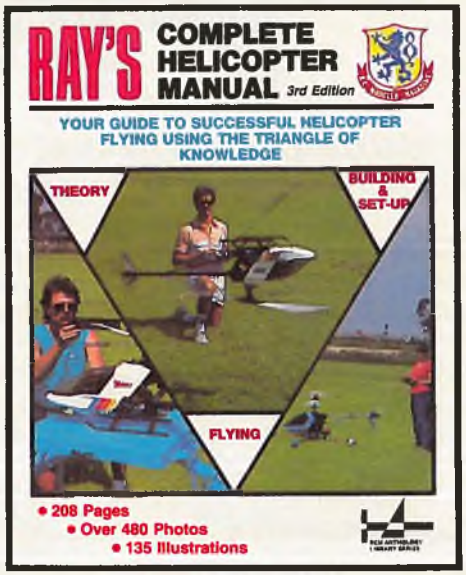
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***The information mentioned gives you some idea of what the book covers. The RCHM contains 33 Chapters, and an Appendix specifically for the newcomer to R/C Helicopters.***

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with rubber bands, don't try and economize by saving the bands after each use. If you simply have to save them, toss them into a sack of kitty litter; this material will absorb the oil from the rubber bands. Conservation of model fuel is a must when trying to save money. Hook a fuel line up to your tank overflow line; this will take normally wasted fuel back to your fuel supply container. It's amazing how much fuel can be spilled on the ground very quickly by an electric fuel pump. Always empty your fuel tank completely at the end of a day's flying, and empty it back into your supply container — don't dump it on the ground.

Another way to save money is to take care of the batteries, both transmitter and receiver. There is simply no need to buy a new set of batteries each spring. Simply cycle them each month or so during storage, or non use, and the battery packs will last for several years. Keep your model in good repair, inspect it after each flying session to determine if anything has become worn or broken. Always do this after flying so that you have time to make repairs prior to the next flying day. The easiest way to save money in this hobby is not to crash an aircraft, so anything that you can do to minimize this is worth doing.

If you do crash, don't just get mad and toss the remains into a trash can and stomp away. Gather up all of the parts, take them home and let them sit for a day or two. When you have calmed down you may find that your model is totally salvageable. A little work and money might restore it to flying condition once again. If it really is a total wipeout, then save the parts that are reuseable. Save the control horns and kwik links; save the landing gear and wheels; save the hinges if they are the plastic Klett type hinges, or the point type hinges; save the fuel tank and thoroughly check it for leaks; and save the aileron torque rods.

In other words, save everything that can be saved.

Another quick saving idea is to brew your own glo fuel, or fly engines that require gas and oil rather than the more expensive glo fuel. Actually, on the subject of glo fuel, I


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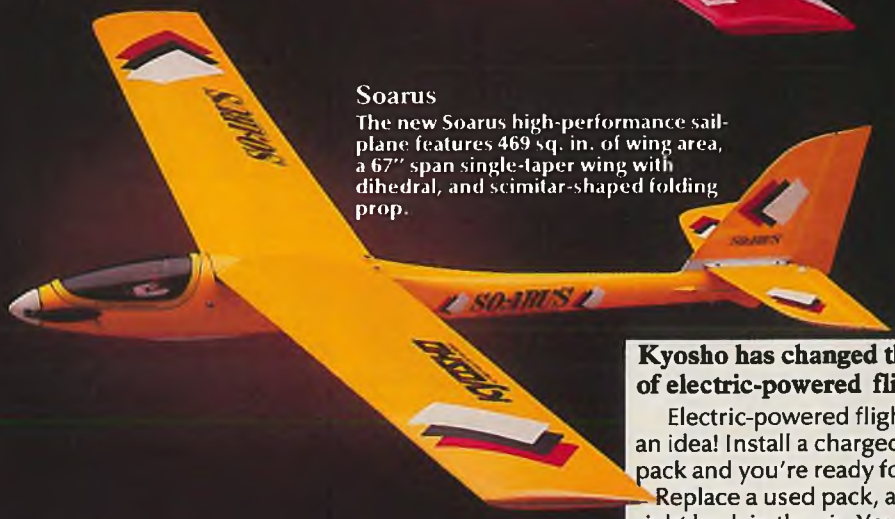
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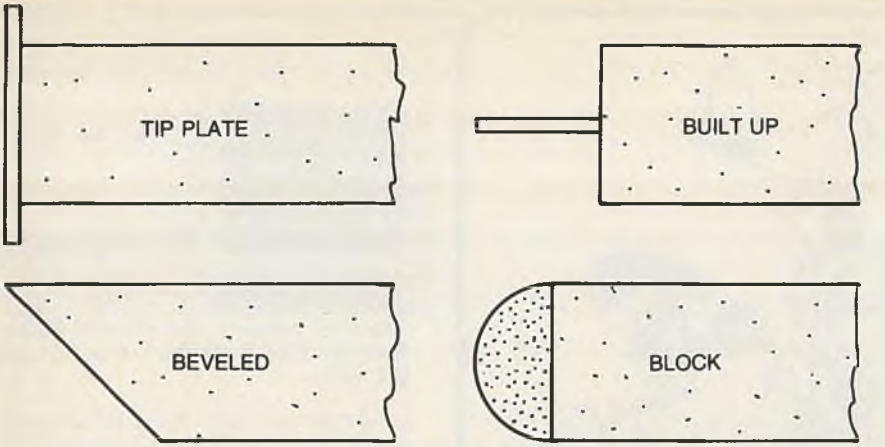
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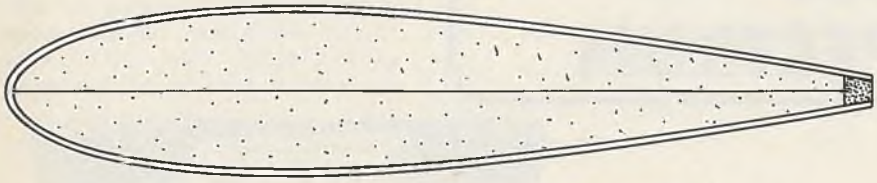
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**WING TIPS**



**WRAPPING FOAM WING WITH CARDBOARD**

WRAP CARDBOARD COVERING MATERIAL COMPLETELY AROUND WING, STARTING AT TRAILING EDGE, ROLLING THE WING ONTO THE COVERING MATERIAL.

personally feel that it is cheaper in the long run to purchase a good grade of glo fuel than to subject your expensive engine to some home brew that might not contain the right kind of alcohol, or oil, or may not be mixed in the proper amounts. To protect your engines inject some after run oil into them and keep them well oiled between flying sessions.

Now, let's do some thinking about building a new aircraft, yet saving money when you are doing it. If you're building from scratch just about the least expensive way to go is to use a foam wing with cardboard covering. Yep, that's right, cardboard wing skins. When I first proposed this back about 1964 or so, some folks thought that I was nuts, and then a few tried it. Several kits are produced this way and they work very well. You don't have to go to the expense of setting up your own foam core cutting operation as almost every club has someone who will cut foam cores, or you can purchase them from several advertisers in RCM. The cardboard that I suggest using is the plain old poster board sold in almost every drugstore, dime store or office supply store, generally for about 39 cents per sheet. It comes in plain white or a multitude of colors. To use it, simply cut the cores with a rounded leading edge with the trailing edge finished with a balsa strip to anchor the ailerons. Use a good grade of contact cement such as 3m 77 to anchor the poster board to the wing core. Tips can be made of plywood tip plates, slanted method, built of sheet and covered, or use rounded balsa blocks (see sketches). Strip ailerons can be covered with leftover pieces of plastic covering, contact shelf paper (actually vinyl material) or simply painted.

If you elect to use shelf material for covering all control surfaces, it is easy to do. This material can be purchased at the local hardware store, and, again, comes in a wide variety of colors. Carefully cut the material and cover the surface. To shrink it and take out the wrinkles, set your kitchen oven to warm, open the door and hold the control surface inside, not letting it contact any rack. Very soon you will see it start to shrink and the wrinkles will disappear. You can probably do the same with a heat gun, but better not use an iron unless you keep the setting pretty low.

On our economy model the tail surfaces can be built of balsa sheet and covered with shelf paper or film, or you can use the tail feathers salvaged from your last crash. The tail almost always survives.

The fuselage can be built cheaply by using balsa sheets, or lite ply, or a combination of the two. Other inexpensive materials are 1/8'' plywood door skins which are not too heavy for a .60 size model. If you elect to cover the fuselage with plastic film or shelf paper then lightening holes can be cut into the door skin material to reduce weight. Even corrugated cardboard from 200 lb. boxes can be used to fabricate a fuselage. Make sure that the corrugations run the long way. Make the main fuselage load carrying member from plywood; 1/8'' door skins will do. Fasten the firewall and landing gear to this central system, then attach the rest of the cardboard fuselage to the load carrying system.

We've talked about cardboard covering, fuselage construction, tail feathers, how about paint? Well, once again the hardware store comes in handy. Buy a can of Rustoleum spray paint and use this to coat your model. Coat it lightly so that you won't add unnecessary weight. This material is fuelproof. If you use colored cardboard for the wing covering and you want to keep this color then use an overcoating of clear spray to protect it. Once I even used a filler on the balsa fuselage made of thinned white glue wiped over the balsa surface, then squeegeed off the excess with a piece of scrap balsa. After drying for a day or so it was sanded smooth, then painted with spray paint. It was a model that sure wouldn't win any best finish award. In fact, it looked kind of shabby, but it was cheap and quick, and I could build an entire model for less than ten bucks and it flew, and flew well.

Once I tried covering an open framework wing with vinyl shelf paper. Looked great . . . but don't do it. Once the wing got into the sun the shelf paper started to stretch and then the wing covering started to sag and the top surface sagged so much that it came into contact with the bottom surface and stuck together — one heck of a mess.

There are lots of ways to save money while enjoying this hobby, many ways that I have not yet touched upon. You're not going to build a Master's class scale model using the methods that I've talked about, nor are you going to build a best finish award model. What you are going to do is save some money. Back in the early days of R/C it was pretty standard to scrounge around looking for less expensive ways to enjoy this hobby/sport. For the past twenty years or so R/C has been fantastic. Great radios, great engines, great kits, and, above all, great people, have combined to make this the best of all possible hobbies. If you build an aircraft along some of the lines that I've suggested, send in some pictures and let us show others what you have created.

★

Next month we're going to take a look once again at float flying, how to do it, what you need to do it with, and how to equip your bird with an inexpensive set of floats. It's been a couple of years since I've done this so it's time to tell all of you new modelers about it.

□

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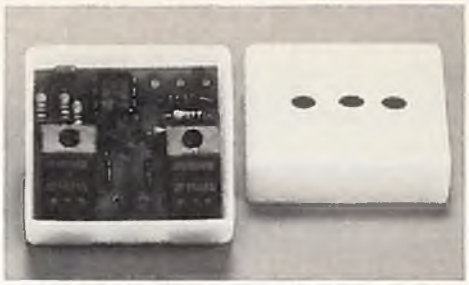


*Photo #3: Jomar's new Ultimate Battery Back Up circuit measures 1½" x 1½", and 3/4" deep.*

programmed, just plug in the wall transformer and watch the 16 segment LCD display step through each channel. The display will read "1, 9.6v 500 m xmtr" then in about 2 seconds the display will step to "2, 9.6v 500 m xmtr" another 2 seconds and it will display "3, 4.8v 270 m rcvr" etc. The display will step through all 8 channels

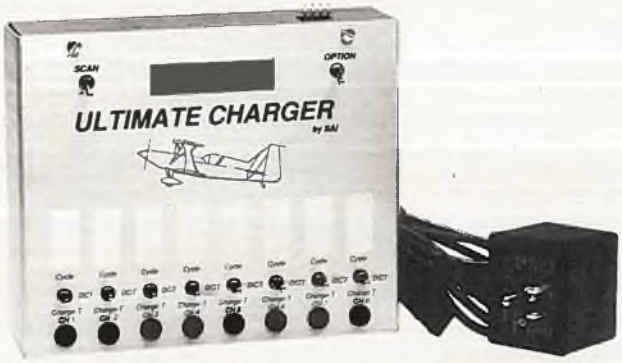



*Photo #1: Ultimate Charger by SAI will discharge, cycle, charge, and trickle eight different battery packs. The unit measures 7½" x 6½", and 2" deep, powered by a wall transformer.*

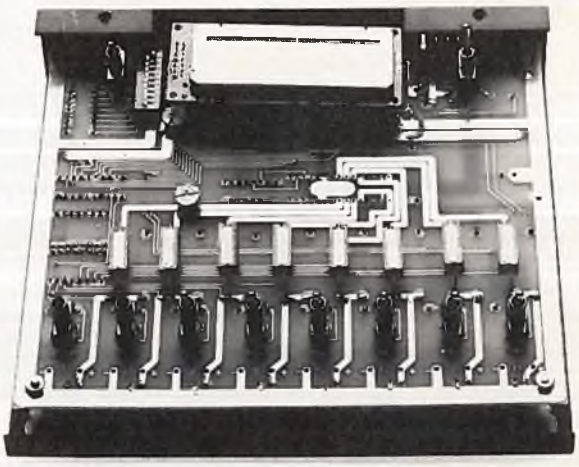


*Photo #2: Inside the Ultimate Charger, note programming dip switches (left of display) and eight set of holes marked (+) (−) to connect your battery connectors to (bottom).*

The life of our hobby is our batteries. We have the transmitter battery pack, usually made up of 8 cells and the airborn pack usually made up of 4 cells. Then as we progress through the hobby we usually acquire more transmitter and flight packs, not to mention extras such as NiCd battery engine starting systems. All these devices will come with their own battery charger, usually a wall transformer that charges the batteries at a C/10 or overnight rate. Then we hear things like "memory," "cycle," and "trickle" just to name a few terms used in maintaining our NiCd batteries and keeping them ready for use.

I have come across a battery charging/maintenance system called the "Ultimate Charger" by SAI (27107 Richmond Hill Rd., Conifer, Colorado 80433). The Ultimate Charger shown in Photo #1, is designed to completely maintain the electrical capacity of eight separate NiCd battery packs ranging from 100 mAh to 2200 mAh capacity, while the precise voltage and capacity of each battery pack is displayed on the sixteen character LCD display.

The Ultimate Charger is very versatile and requires some set-up. First you need to decide how you intend to use the Ultimate Charger, how many of the battery packs will be transmitter, how many battery packs are receiver packs and what is the capacity of each pack? The 8 channels could all be transmitter batteries or there may be 4 transmitter and 4 receiver battery packs or 2 transmitter and 6 receiver packs or all 8 channels could be receiver battery packs. Then you need to select either 500 mAh or 1000 mAh capacity for the transmitter batteries and select 125 mAh, 270 mAh, 500 mAh, 800 mAh, 1200 mAh, or 2200 mAh for the receiver batteries.

The 8 channels of this charging system are set up in pairs so you may decide to have 2 transmitters at 500 mAh, 2 receiver packs at 270 mAh, 2 more receiver packs at 500 mAh and the last 2 channels could be 2 receiver packs at 1200 mAh. This versatility is programmed by the 10 Dip switches inside the unit shown in Photo #2 just to the left of the 16 segment LCD display.

Once the Ultimate Charger is verifying your set-up.

Refer back to Photo #1, along the bottom you can see 8 grommets to run your radio connectors into the unit. Once inside the unit (Photo #2 bottom) we can see a row of holes, two for each channel labeled "+" and "−" where we solder our battery connector wires. A good source of wires/connectors may be from your old chargers — watch polarity when soldering the wires in place!

Now we are ready for operation. Each channel operates in the same manner so I will describe channel #1. Again look at Photo #1, the bottom left corner is the grommet for the wires (in this case to the transmitter). Above the grommet is a 3 position switch labeled "Charge — T" (down position), "DCT" (mid position) and "Cycle" (up position). Above each 3 position switch is a white area that allows you to "write-in" the transmitter or model you have selected for that channel.

The "Charge-T" (down position) is charge then trickle, which is the normal mode. On this setting your battery pack is charged at a C/10 rate for 16 hours then

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automatically switches to the trickle charge rate of C/40 indefinitely. The 16 segment LCD display shows the batteries voltage, elapsed time and whether a shorted cell is found. When you unplug a battery pack and then plug it back in (probably because you went flying), the cycle starts over. If there were a power failure, the cycle also starts over.

The middle position of the switch is "DCT," which is discharge — charge then trickle. One feature is added to this mode, the battery pack is discharged to 1.1 volts a cell before being recharged, this is to avoid a memory in your batteries.

The final mode is with switch up or "Cycle." The battery pack is discharged at a 160 mA rate while the 16 segment LCD display shows the voltage and elapsed time in minutes. When the voltage reaches 1.1 volt/cell the microcontroller calculates the mAh rating which is then displayed on the LCD display — the battery is recharged at the 16 hour C/10 rate.

Any channel can be set to any mode independent of any other channel. Any channel can charge at any time. The Ultimate Charger will only discharge one battery pack at a time to prevent over heating of the unit. This system is controlled by a microcontroller IC which will automatically control the sequence of events. If you were to discharge several packs, the Ultimate Charger will automatically discharge them one at a time.

The Ultimate Charger is based on 4IC chips, an 8 channel A/D converter for reading voltages, an 8 channel voltage source IC for charging, an 8 channel current sink IC for discharge, and the programmed microcontroller chip. If any software changes are made, SAI could send you the updated program chip for a small additional cost.

To the left of the 16 segment LCD display is a scan switch. Normally the display scans all 8 channels, the scan switch will allow you to select one channel for a continuous readout if desired. The option switch is not yet programmed — any ideas contact SAI.

An interesting "All in one" charging system all for about $189.95. I believe if you get some of your friends together the price goes down in quantities of 5.

While I am on the subject of batteries I would like to point out that a large percentage of equipment failure is due to battery related problems.

A maintenance system as described above is a good idea. You may also want to consider redundant battery packs for your models.

In past articles I have mentioned battery back up systems for the do-it-yourselfers and some commercially available units.

I have recently run across a new battery back up system from Jomar Products, 2028 Knightsbridge Dr., Cincinnati, Ohio 45244 (513) 474-0985, who has a revision to their S2B2 battery backer shown in Photo #3. This circuit uses a new chip designed for battery back up and also uses two dionic photovoltaic mosfet driver chips that make for a small reliable package.

Jomars battery back up circuit is installed in your model with two of your 4 cell battery packs. The output of The Jomar circuit then goes to your receiver. The back up battery provides the reference for the switch over voltage. The unit switches over when the main battery falls more than 1.2 volts below the voltage of the back up battery. A 1.5 volt hysteresis is built into the unit so the unit will not switch back to the main battery unless the main battery becomes 1.5 volts above the back up battery. This means the Jomar battery backer will switch back to the main battery if the back up fails or "opens up."

Battery back up is an excellent idea, the Jomar battery back up system is small and will fit into most aircraft. The unit will operate with two of your 4 cell battery packs of same or different capacity.

For next month I have a review on Hitec's Focus 6 Radio System.

Till then have fun. □


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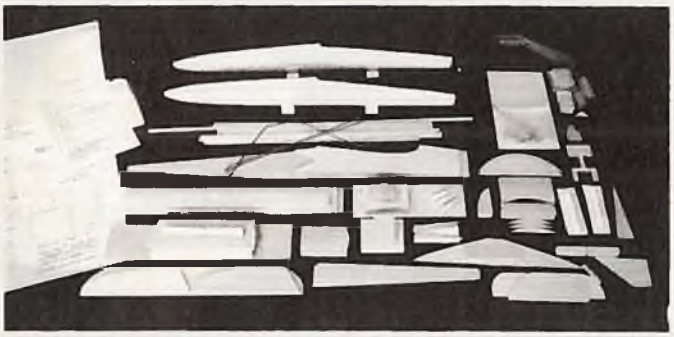
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# RCM PRODUCT REVIEW

## Stream Incorporated
## SCHNEIDER SPORT 60





The Schneider Sport 60, by Stream Incorporated, represents a sport sized float plane for accomplished pilots with the urge to fly from water or land. Designed primarily for flying from water, the Schneider Sport can also be equipped with an extra set of landing gear struts for land operations. It is a classic looking aircraft, with lines reminiscent of the famous Schneider Cup racing aircraft of the early century.

Inspection of the kit's contents reveals that most main assemblies are bundled with rubber bands to keep the parts for each together for easy identification. None of the parts are numbered or stamped, so final identification of the parts must be done by comparison to the plans. This was tricky in more than one instance, so it will be helpful to have building experience. The kit does have an extensive hardware package, which provides for most all of the required bits and pieces.

**Construction:**

Construction of the Schnieder Sport is accomplished by finding all the right parts for the right assemblies. Following the instruction manual takes some patience, as some of the steps are quite explicit, while other steps which should be there, are not. The plans are pretty fair, with the fuselage being easier to read than the wings. Again, experience will be quite helpful.

The fuselage assembly is a basic box type affair, having plenty of formers to keep the assembly strong. Formers are made from die-cut lite ply. The cutting is well done. All balsa parts are machine cut, and have a good fit. Once the basic box fuselage is completed, the upper deck is added, formed by sub-formers and sheet balsa.

With the basic fuselage completed, the wing is built next and is a modified "D" tube type wing. Be careful when identifying and selecting the wing ribs as they are not drawn out on the plans and identification can be a little

### SPECIFICATIONS

| | |
|---|---|
| Name | SCHNEIDER SPORT 60 |
| Aircraft Type | Sport Floatplane |
| Manufactured By | Stream Incorp. 11872-K Canon Blvd. Newport News, Virginia 23606 |
| Mfg. Suggested Retail Price | $199.95 incl. wheels & floats; $174.95 with floats only; $143.95 with wheels only |
| Available From | Stream direct |
| Wingspan | 57.0 Inches |
| Wing Chord | 11.0 Inches |
| Total Wing Area | 627 Sq. In. |
| Fuselage Length | 47 Inches |
| Stabilizer Span | 12.25 Inches |
| Total Stab Area | 67.3 Sq. Inches |
| Mfg. Rec. Engine Range | .45-.60 2-stroke (.60-.80 4-stroke) |
| Recommended Fuel Tank Size | 12 oz. |
| Recommended No. of Channels | 4 |
| Rec. Cont. Funct. | Rud., Elev., Throt., Ail. |
| Basic Materials Used In Construction: | |
| Fuselage | Balsa, ply |
| Wing | Balsa, ply, spruce |
| Tail | Balsa |
| Floats | ABS Plastic |
| Building Instructions on Plan Sheets | Yes |
| Instruction Manual | Yes |
| Construction Photos | No |

### RCM PROTOTYPE

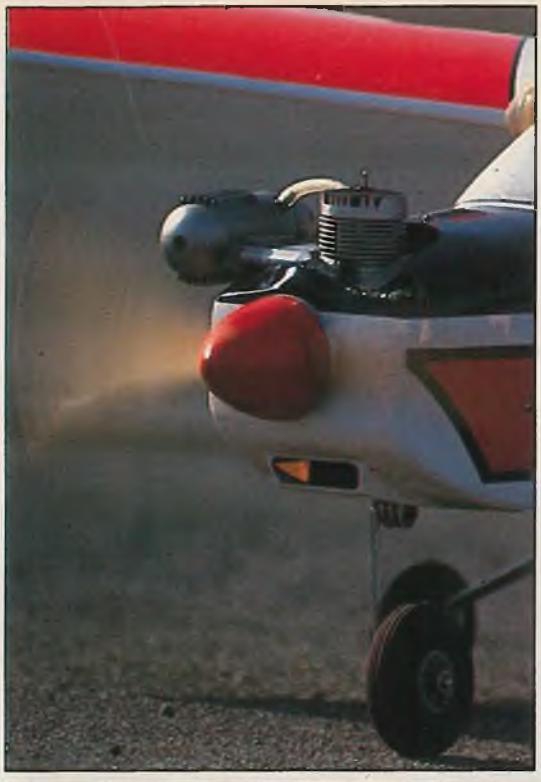
| | |
|---|---|
| Radio Used | Futaba 7UAP/PCM |
| Engine Make & Disp. | ASP .46 ABC |
| Tank Size Used | 6 Oz. |
| Wt. Ready to Fly | 96 Oz. (6 Lbs.) |
| Wing Loading | 22.06 Oz./Sq. Ft. |

### SUMMARY

**WE LIKED THE:**
Flight characteristics and ease of float finishing, large interior. Good die cutting.

**WE DIDN'T LIKE THE:**
Vague instructions, missing parts, lack of detail in plans, no part labeling.











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confusing. The dihedral angle is called out at 1 degree 15 minute. And a die-cut template is included to set the root rib angles so that the proper dihedral will be achieved. The finished wing is very strong, and will resist warping quite well.

Upon mating the wing to the fuselage, you are instructed to sand the wing saddle to fit the wing. This is a must, as our example required quite a bit of sanding to achieve the proper wing incidence angle. Once completed, the float struts are mounted and aligned to the fuselage. The struts are held in position by 1/4-20 nylon bolts, at the front and rear of the wing. This allows easy removal of the wing and floats as one unit.

Final assembly of the fuselage and the wing now takes place. Sheeting and cap strips are placed on the wings, while the fuselage is fitted with the tail planes and engine.

At the tail of the Schneider Sport, we find sheet balsa surfaces made from light aircraft grade balsa. The elevators are two separate parts joined by a standard steel rod joiner. Because the balsa is light grade, the joiner must be securely anchored by allowing a fast adhesive, such as Hot Stuff, to trickle into the balsa at the joiner. This will harden up the balsa and allow it to hold up under stress.

The vertical stab is a butt joint to the horizontal stab, however, this is later reinforced by filler blocks to fair in the upper fuselage lines. The filler blocks are best sanded to shape prior to actually gluing them in place; otherwise, you may accidentally dig into the stab while sanding. With the basic airframe completed, the final shaping and sanding can be performed.

**Engine:**

In the fuselage, you will find more than enough room to fit either a 2-stroke engine or a good sized 4-stroker. The kit recommends a .45 to .60 2-stroke engine, and a .60 through .80 4-stroke. Our choice of engine was the ASP .46 FSR ABC from World Engines. Fitting it up front was not a matter of having enough room, rather, it was a matter of how to get this compact engine forward enough to poke through the cowling. The kit provides a heavy plywood block for such reasons, this being epoxied directly to the firewall. In most cases, this is sufficient to make the engine reach. With this in mind, a 4-stroke engine is no sweat.

A rather small 6 ounce tank was used in this project, although there is no problem with fitting a tank twice that size into the nose. Finishing off the bird was a 10 x 6 Grish prop, and a standard 2 inch spinner.

**Floats:**

The floats for the Schneider Sport are of ABS type plastic, sealed and ready to mount. A small amount of trimming on the seams is necessary to tidy the floats up, and then the floats can be painted, or left as is in natural white. The float struts are of tempered aluminum predrilled and ready to accept the floats. Cross braces made from mild brass prevent inward or outward movement of the floats during take-off and landing.

**Cowling:**

The cowling is also of ABS, and will fit well to the contour of the nose at the firewall. It also lends the important look to the aircraft's nose that inspires the Schneider Cup look of the ship. Rounding out the trim is the preformed plastic exhaust stacks, which are glued to the sides of the nose. Once done, you can step back and observe a rather racy looking airframe.

**Covering:**

Covering of the Schneider Sport was done with Top Flite MonoKote. As a fan of the Supermarine aircraft from the

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|---|---|---|---|
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| 3/32 x 2 | 40 | | |
| 1/8 x 2 | 43 | | |
| 3/16 x 2 | 49 | | |
| 1/4 x 2 | 56 | | |
| 1/32 x 3 | 37 | | |
| 1/20 x 3 | 37 | | |
| 1/16 x 3 | 37 | 49 | 31 |
| 3/32 x 3 | 44 | 58 | 37 |
| 1/8 x 3 | .55 | .74 | 45 |
| 3/16 x 3 | .63 | .84 | 55 |
| 1/4 x 3 | .75 | .98 | 61 |
| 5/16 x 3 | .87 | 1.15 | |
| 3/8 x 3 | .90 | 1.28 | 71 |
| 1/2 x 3 | 1.14 | 1.60 | |
| 3/4 x 3 | 1.70 | 2.00 | |
| 1/16 x 4 | 58 | 76 | 48 |
| 3/32 x 4 | .72 | .97 | 56 |
| 1/8 x 4 | .82 | 1.09 | 66 |
| 3/16 x 4 | .96 | 1.26 | 75 |
| 1/4 x 4 | 1.15 | 1.39 | 84 |
| 3/8 x 4 | 1.70 | 2.35 | 1.44 |
| 1/2 x 4 | 2.35 | 2.73 | 2.00 |

**MATCHED SHEETS 42"**

| | |
|---|---|
| 3/32 x 4 | 1.00 |
| 1/8 x 4 | 1.08 |
| 3/16 x 4 | 1.20 |
| 1/4 x 4 | 1.31 |

**BALSA STICKS**

| | 36" | 48" |
|---|---|---|
| 1/16 x 1/4 | .10 | |
| 1/16 x 3/8 | .11 | |
| 1/16 x 1/2 | .15 | |
| 3/32 x 1/4 | .12 | |
| 3/32 x 3/8 | .13 | |
| 3/32 x 1/2 | .17 | |
| 1/8 x 1/8 | .09 | |
| 1/8 x 1/4 | .12 | .18 |
| 1/8 x 3/8 | .13 | .19 |
| 1/8 x 1/2 | .18 | .24 |
| 3/16 x 3/16 | .12 | .19 |
| 3/16 x 3/8 | .18 | .21 |
| 3/16 x 1/2 | .22 | .31 |
| 1/4 x 1/4 | .18 | .26 |
| 1/4 x 3/8 | .21 | .28 |
| 1/4 x 1/2 | .22 | .32 |
| 1/4 x 3/4 | .34 | .45 |
| 1/4 x 1 | .40 | .55 |
| 5/16 x 5/16 | .23 | .30 |
| 3/8 x 3/8 | .29 | .39 |
| 3/8 x 1/2 | .33 | .49 |
| 3/8 x 3/4 | .44 | .58 |
| 3/8 x 1 | .54 | .73 |
| 1/2 x 1/2 | .38 | .55 |
| 1/2 x 3/4 | .48 | .66 |
| 1/2 x 1 | .60 | .82 |
| 5/8 x 5/8 | .52 | .70 |
| 3/4 x 3/4 | .75 | .98 |
| O.L. 1/4 x 1 | .42 | .57 |

**BALSA TRIANGLES 36"**

| | |
|---|---|
| 1/4 x 1/4 | .25 |
| 3/8 x 3/8 | .30 |
| 1/2 x 1/2 | .35 |
| 3/4 x 3/4 | .45 |
| 1" x 1" | .55 |

**BALSA PLANKS 36"**

| | |
|---|---|
| 1 x 1 | .90 |
| 1 x 2 | 1.57 |
| 1 x 3 | 2.19 |
| 1 x 4 | 2.93 |
| 1½ x 3 | 3.02 |
| 1½ x 4 | 3.95 |
| 2 x 2 | 2.31 |
| 2 x 3 | 3.35 |
| 2 x 4 | 4.75 |
| 3 x 3 | 5.15 |
| 3 x 4 | 7.15 |

**TAPERED SHEETS 36"**

| | |
|---|---|
| 1/4 x 2 | 65 |
| 1/4 x 3 | 85 |
| 3/8 x 2 | 68 |
| 3/8 x 3 | 98 |
| 1/2 x 3 | 1.20 |

**LIGHT 4-6 LB. WOOD**

| | 36" |
|---|---|
| 1/32 x 3 | .62 |
| 1/20 x 3 | .62 |
| 1/16 x 3 | .62 |
| 3/32 x 3 | .74 |
| 1/8 x 3 | .91 |
| 3/16 x 3 | 1.05 |
| 1/4 x 3 | 1.25 |
| 3/8 x 3 | 1.50 |
| 1/2 x 3 | 1.90 |
| 3/4 x 3 | 3.00 |
| 1 x 3 | 4.25 |
| 1/32 x 4 | .98 |
| 1/20 x 4 | .98 |
| 1/16 x 4 | .98 |
| 3/32 x 4 | 1.19 |
| 1/8 x 4 | 1.35 |
| 3/16 x 4 | 1.57 |
| 1/4 x 4 | 1.89 |
| 3/8 x 4 | 2.85 |
| 1/2 x 4 | 3.85 |

**TRAILING EDGE 36"**

| | |
|---|---|
| 1/4 x 1" | .32 |
| 5/16 x 1 1/4 | .39 |
| 3/8 x 1 1/2 | .46 |
| 1/2 x 2" | .70 |

**BASSWOOD 48"**

| | |
|---|---|
| 3/16 x 3/16 | .26 |
| 3/16 x 1/4 | .30 |
| 3/16 x 3/8 | .38 |
| 3/16 x 1/2 | .46 |
| 3/16 x 3/4 | .60 |
| 1/4 x 1/4 | .42 |
| 1/4 x 3/8 | .49 |
| 1/4 x 3/4 | .80 |
| 3/8 x 3/8 | .60 |
| 3/8 x 1/2 | .70 |
| 3/8 x 3/4 | .90 |
| 1/2 x 1/2 | .90 |
| 1/2 x 3/4 | 1.00 |

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| 10-1/8 x 4 x 36 | 6.95 |
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| 10-3/16 x 4 x 36 | 8.35 |
| 10-1/4 x 3 x 36 | 6.55 |
| 10-1/4 x 4 x 36 | 10.50 |
| 10-3/8 x 3 x 36 | 8.90 |
| 5-3/8 x 4 x 36 | 6.55 |
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| | | |
|---|---|---|
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| 1/8 x 1/4 | .20 | .26 |
| 1/8 x 3/8 | .22 | .32 |
| 3/16 x 3/16 | .28 | .38 |
| 1/4 x 1/4 | .34 | .50 |
| 1/4 x 3/8 | .40 | .55 |
| 1/4 x 1/2 | .45 | .65 |
| 3/8 x 3/8 | .49 | .69 |
| 3/8 x 1/2 | .60 | .77 |
| 1/2 x 1/2 | .66 | .88 |
| 1/2 x 3/4 | .75 | .97 |

**SPRUCE TRIANGLES 36"**

| | |
|---|---|
| 3/8 x 3/8 | .47 |
| 1/2 x 1/2 | .64 |
| 3/4 x 3/4 | .81 |

**LITE PLY 48"**

| | |
|---|---|
| 1/8 x 6 | 1.75 |
| 1/8 x 12 | 3.50 |
| 1/4 x 6 | 2.75 |
| 1/4 x 12 | 5.50 |

**HARD MAPLE 18"**

| | |
|---|---|
| 1/4 x 3/8 | .40 |
| 3/8 x 3/8 | .45 |
| 3/8 x 1/2 | .50 |
| 3/8 x 3/4 | .58 |
| 1/2 x 3/4 | .68 |

**BIRCH DOWELS 36"**

| | |
|---|---|
| 1/8 | .09 |
| 3/16 | .11 |
| 1/4 | .14 |
| 5/16 | .25 |
| 3/8 | .32 |

**3 PLY BIRCH 48"**

| | |
|---|---|
| 1/64 x 12 | 8.35 |
| 1/32 x 12 | 4.75 |
| 1/16 x 12 | 4.75 |
| 1/8 x 12 | 4.95 |

**5 PLY BIRCH 48"**

| | |
|---|---|
| 3/32 x 12 | 7.00 |
| 1/8 x 12 | 7.75 |
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| 1/4 x 12 | 6.25 |
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racing era, the Insignia Blue MonoKote color was close enough to simulate the colors of the Supermarine S5 types. The cowling was shot with Black Baron epoxy paint in Insignia Blue, while the floats were shot with K&B Superpoxy paint, custom blended to simulate a greyed aluminum metal look. Country colors were added to the rudder, and to lend a glass cockpit look, white MonoKote was added just ahead of the open cockpit bay.

**Radio:**

Radio equipment used in this project was the Futaba 7UAP PCM radio, with FPS-148 and FPS-130 servos. The S-148 types were a perfect fit to the kit supplied servo tray, leaving lots of room inside the fuselage for the receiver, battery, and lots of foam. In all, a standard complement of four servos is used to guide the plane. Before leaving this area, you will have to provide your own pushrods, as these were not provided in the kit.

**Flying:**

Our test model was balanced at the location shown on the plans (approx. 28% back from the leading edge), and the control surface travels all set as called out. For our first flights, we decided to go with the floatplane version.

With everything now ready, we made one last check. The radio, engine, water, and weather were all flawless and we were ready to go. Upon having the engine set and the Schneider placed in the water, we found that the rudder was pretty good at providing water steering, until the wind perks up. Anything over 8 mph of wind will provide you with a full weather vane effect. This is all right for us, as we had the bird in position and ready to go. After opening the throttle on our first take-off run, our Schenider Sport used about 125 of water to get airborne, and at that, we had to use a fair amount of up elevator. Once you're up, the Schneider Sport handles quite well for a floatplane. The roll rate is mild and easy, and the rudder response is very positive.

Note: On later flights, we moved the C.G. back to about the 33% point, and that provided us with a more responsive aircraft that flew from the water well without excessive elevator input.

Landing the Schneider Sport on water is as easy as any land based aircraft. It slows up well when throttled back, and floats downward at a bit steeper angle than a land based bird. This is probably attributed to the higher drag of the floats as well as the weight. However, the Schneider will flair in nicely, producing a well controlled slide into the water on touch down. At worst, the Schneider Sport simply plopped down, never even coming close to being in danger of dunking the airframe.

**Land Flying:**

To convert the Schneider Sport to a land based version, simply remove the floats and mounts, and install the landing gear, about 10 minute time.

Since the land based version is lighter and cleaner (less drag), its performance was also improved. This improvement in performance is only to be expected when the heavier floats are removed. In this configuration, the ship handles well with no bad habits. Landings are slower than water landings, and again, this is due to the aircraft's overall lighter weight.

Overall, the Schneider Sport 60 will make a fine floatplane for the sport minded pilot with building experience in hand. Although not as cleanly executed in the plans or instructions as we have seen in other kits, most modelers will be able to construct the Schneider Sport without any major problems. Its flight capabilities are up to par with most mild sport aircraft in this size class, and will provide the pilot with hours of easy waterborne flying. Although a true water craft pilot will opt for a water rudder, it is not entirely necessary. □

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| KR-1200AE | 1200 | 17.0 x 48.0 | 4.00 |
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| N-600SCR | 600 | 23.0 x 26.0 | 3.80 |
| N-900SC | 900 | 23.0 x 32.0 | 3.50 |
| N-900SCR | 900 | 23.0 x 32.0 | 3.80 |
| N-1200SC | 1200 | 23.0 x 43.0 | 3.50 |
| N-1200SCR | 1200 | 23.0 x 43.0 | 3.80 |
| N-1200SCK | 1200 | 23.0 x 43.0 | 4.40 |
| KR-1300SC | 1300 | 23.0 x 43.0 | 3.50 |
| N-1400SCR | 1400 | 23.0 x 43.0 | 4.00 |
| N-1500SCR | 1500 | 23.0 x 50.0 | 4.60 |
| KR-1700SCE | 1700 | 23.0 x 43.0 | 5.00 |
| N-1100CR | 1100 | 26.0 x 30.0 | 4.60 |
| KR-2000C | 2000 | 26.0 x 50.0 | 5.00 |
| KR-2800D | 2800 | 34.0 x 44.0 | 8.50 |
| KR-4400D | 4400 | 34.0 x 61.0 | 9.50 |
| KR-7000F | 7000 | 34.0 x 91.0 | 15.00 |

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| | | LxWxT (mm) | SALE |
|---|---|---|---|
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| 4N-270AA | 4.8V/270 | 58 x 30 x 15 | 12.00 |
| 4N-600AA | 4.8V/600 | 58 x 50 x 15 | 10.00 |
| 4N-500A | 4.8V/500 | 68 x 28 x 18 | 12.00 |
| 4N-600AE | 4.8V/600 | 68 x 28 x 18 | 14.00 |
| 4N-700AAE | 4.8V/700 | 58 x 50 x 15 | 12.50 |
| 4N-800AR | 4.8V/800 | 68 x 48 x 18 | 16.00 |
| 4KR-1000AE | 4.8V/1000 | 68 x 43 x 18 | 17.00 |
| 4KR-1200AE | 4.8V/1200 | 68 x 48 x 18 | 18.00 |
| 4N-650SC | 4.8V/650 | 46 x 46 x 24 | 16.00 |
| 4N-900SC | 4.8V/900 | 90 x 32 x 24 | 16.00 |
| 4N-1200SC | 4.8V/1200 | 90 x 43 x 24 | 16.00 |
| 4KR-1300SC | 4.8V/1300 | 90 x 43 x 24 | 16.00 |
| 4KR-1700SCE | 4.8V/1700 | 90 x 43 x 24 | 22.00 |
| 4KR-2000C | 4.8V/2000 | 106 x 50 x 27 | 22.00 |
| 4KR-4400D | 4.8V/4400 | 138 x 61 x 35 | 38.00 |
| 5N-50AAA | 6.0V/50 | 54 x 16 x 11 | 12.00 |
| 5N-110AA | 6.0V/110 | 73 x 18 x 15 | 12.00 |
| 5N-250AA(GE) | 6.0V/250 | 73 x 30 x 15 | 9.00 |
| 5N-270AA | 6.0V/270 | 73 x 30 x 15 | 14.00 |
| 5N-600AA | 6.0V/600 | 73 x 50 x 15 | 12.00 |
| 5N-500A | 6.0V/500 | 84 x 28 x 18 | 15.00 |
| 5N-600AE | 6.0V/600 | 84 x 28 x 18 | 17.50 |
| KR-1200AE | 6.0V/1200 | 84 x 48 x 18 | 22.00 |
| 5N-1200SC | 6.0V/1200 | 116 x 43 x 24 | 20.00 |
| 5N-1800C | 6.0V/1800C | 130 x 50 x 26 | 24.00 |
| 8N-500AA | 9.6V/500 | 100 x 29 x 29 | 16.00 |
| 8N-600AA-1 | 9.6V/600 | 100 x 29 x 29 | 19.00 |
| 8N-600AA-2 | 9.6V/600 | 150 x 44 x 15 | 20.00 |
| 8N-600AA-3 | 9.6V-600 | 116 x 50 x 15 | 20.00 |

*All Sizes For Flat Packs
*Add $4.00 to Connect Specific Radio Connector

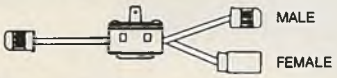
### Packs For Car/Plane (Flat or Hump)

| | | | |
|---|---|---|---|
| 4N-110AA-S | 4.8V/110 | 29 x 29 x 18 | 12.50 |
| 6N-500A-F | 7.2V/500 | 102 x 28 x 18 | 20.00 |
| 6N-600A-F | 7.2V/600 | 102 x 28 x 18 | 22.00 |
| 6N-800AR-F | 7.2V/800 | 102 x 48 x 18 | 24.00 |
| 7N-800AR-F/H | 8.4V/800 | 68 x 48 x 32 | 27.00 |
| 6KR-1200AE-F | 7.2V/1200 | 102 x 48 x 18 | 27.00 |
| 7KR-1200AE-F/H | 8.4V/1200 | 68 x 48 x 32 | 31.00 |
| 6KR-1300SC-F | 7.2V/1300 | 135 x 45 x 23 | 21.00 |
| 7KR-1300SC-F/H | 8.4V-1300 | 150 x 45 x 23 | 24.00 |
| 7N-1300SC-F/H | 8.4V-1300 | 150 x 45 x 23 | 24.00 |
| 6N-1200SCR-F | 7.2V/1200 | 135 x 45 x 23 | 23.00 |
| 7N-1200SCR-F/H | 8.4V/1200 | 150 x 45 x 23 | 27.00 |
| 8N-1200SCR-F | 9.6V/120 | 180 x 45 x 23 | 31.00 |
| 6N-1400SCR-F | 7.2V/1400 | 135 x 45 x 23 | 31.00 |
| 7N-1400SCR-F/H | 8.4V/1400 | 150 x 45 x 23 | 36.00 |
| 8N-1400SCR-F | 9.6V/1400 | 180 x 45 x 23 | 41.00 |
| 6N-900SCR-F | 7.2V/900 | 102 x 45 x 23 | 23.00 |
| 7N-900SCR-F | 8.4V/900 | 125 x 45 x 23 | 27.00 |
| 8N-900SCR-F | 9.6V/900 | 136 x 45 x 23 | 31.00 |
| 6N-600SCR-F | 7.2V/600 | 84 x 45 x 23 | 23.00 |
| 7N-600SCR-F | 8.4V/600 | 107 x 45 x 23 | 27.00 |
| 6KR-1700SCE-F | 7.2V/1700 | 135 x 45 x 23 | 33.00 |
| 7KR-1700SCE-F/H | 8.4V/1700 | 150 x 45 x 23 | 38.00 |
| 8KR-1700SCE-F | 9.6V/1700 | 180 x 45 x 23 | 43.00 |
| 8N-1100CR-F | 9.6V/1100 | 120 x 53 x 26 | 36.00 |
| 6KR-2000C-F | 7.2V/2000 | 157 x 50 x 26 | 38.00 |
| 6KR-4000D-F | 7.2V/4400 | 205 x 61 x 34 | 58.00 |

### Chargers For Battery Packs

| | | |
|---|---|---|
| CH-70 | 4.8V/125MA | 7.00 |
| CH-71 | 4.8V/400MA | 7.00 |
| CH-72 | 4.8V/50 & 125MA | 8.00 |
| CH-73 | 4.8 & 9.6V/50MA | 8.00 |
| CH-73A | 4.8 & 9.6V/50MA for FUTABA FM | 12.00 |
| CH-74 | 6.0V/800MA | 7.00 |
| CH-75 | 7.2V/125MA LED. Tamiya plug | 7.00 |
| CH-76 | 7.2V/400MA or 8.4V/250MA LED, Tamiya plug | 8.00 |
| CH-77 | 12V/125MA | 7.00 |
| CH-78 | 12V/500MA | 8.00 |
| CH-90 | 7.2 or 8.4V quick charger 30 Minutes Timer. DC | 15.00 |
| CH-91 | 7.2 or 8.4V quick charger 20 Minutes Automatic, AC/DC | 38.00 |

### Radio Connectors Futaba AM/FM, JR, Airtronic, Kraft, Old/New World Engine




| | |
|---|---|
| Male or Female w/8" Wire | 3.00 |
| Extension Cord 12" Male/Female each side | 5.00 |
| Extension Cord 24" Male/Female each side | 5.50 |
| Y-Adaptor, Male w/2 Female 10" Wire | 6.50 |
| Switch Harness w/Charging Jack | 8.00 |
| Exchange Adaptor, 2" Wire | 4.50 |

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| Fly Weight | 64-71 oz. |
| Engine | 35-45 (2 Cyl) 40-50 (4 Cyl) |
| Radio | 4 Channel |

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*"Split elevators, something one usually finds only on larger pattern type models."*

*"Extraordinary detailings for an ARF."*

*"Follows the great standards of craftsmanship of the Red Arrow series."*

*"Everything was beautifully built."*

*"The kit is deluxe in every way."*

*"It is quick and requires an experienced sport pilot at the helm."*

*"Real great sport flyer."*

*"Goes together easy."*

*"This little bipe will be loads of fun."*

*"The Ultima is a really innovative ARF."*

*"There's nothing else available in its class."*

**Above are just some of the comments provided by a fine panel of R/C experts.**

Please refer to Feb. 1991 issue of "Model Builder" page 88-92 for more information and detail.

# ARF-RED ARROW

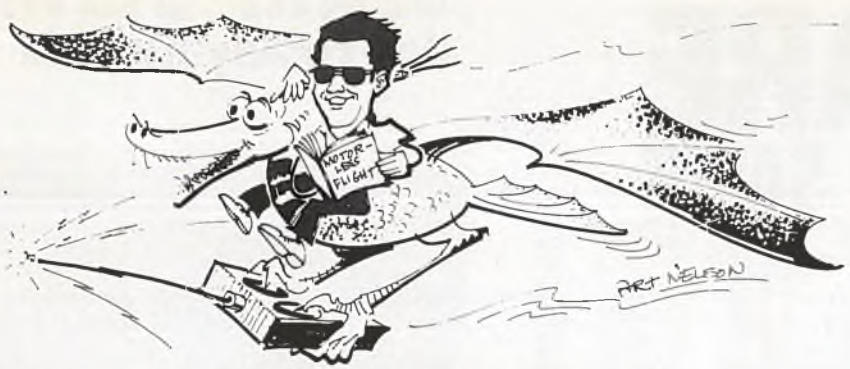
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| Hi-Wing 45 | | Lo-Wing 45 |
|---|---|---|
| 41¾" | Length | 40¾" |
| 55" | Wing Span | 53" |
| 564 sq. in. | Wing Area | 533 sq. in. |
| 57-64 oz. | Fly Weight | 57-64 oz. |
| 40-50 (2 Cyl) | Engine | 40-50 (2 Cyl) |
| 4 Channel | Radio | 4 Channel |
| $169.95 | Price | $169.95 |

| Hi-Wing 25 | | Lo-Wing 25 |
|---|---|---|
| 36" | Length | 35¼" |
| 51" | Wing Span | 49" |
| 460 sq. in. | Wing Area | 390 sq. in. |
| 49-55 oz. | Fly Weight | 49-55 oz. |
| 19-30 (2 Cyl) | Engine | 19-30 (2 Cyl) |
| 4 Channel | Radio | 4 Channel |
| $129.95 | Price | $129.95 |

Please refer to Oct. 1990 issue of Model Builder for more information

DON EDBERG




# SOARING



***Photo #3: For aerodynamics, fashion a piece of soda can to cover up the offending area. Be careful of the sharp edges.***

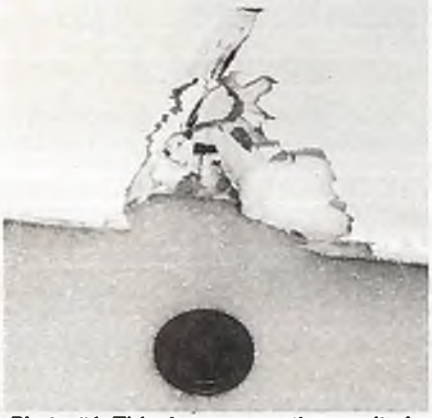


***Photo #1: This damage was the result of a mid-air collision. A 25 cent piece shows the scale.***



***Photo #2: For temporary repairs, a piece of fiberglass reinforced strapping tape provides strength in the spanwise direction. The tape is available at any store selling packing materials.***

### Repairing Foam Wings

Since foam-winged sailplanes are becoming quite common now (for example, Falcons, Sabers, Ultimas, etc.), there are going to be more "incidents" with them. Therefore, it seems appropriate to talk about repairing foam wings. This piece will be on relatively minor repairs, like flying into a post or making some gash in the leading edge. If the damage is more severe, you might want to look at the soaring column in RCM of January 1987, where my predecessor Al Doig showed how to repair a totally broken (that's two pieces) wing. But do me one favor. Before you toss the damaged model in the trash, take all the pieces home and let them sit for a while. In many cases, such as the ones I am about to describe, repairs are relatively easy, and take much less time than building a new model from scratch. It even is kind of fun to fix them!

First let's talk about a temporary fix. You might be out flying and hit a rock or a post, resulting in damage that might resemble what's shown in Photo #1. You want to continue flying because you're in a contest, or you drove a long way to get to the flying field, or . . . (the damage in the photo was caused by a mid-air collision between my Muller King and a Gemini flown by Pete Olsen. Pete's model suffered a severed wing and a high velocity impact, while mine was somewhat flyable down to the ground).

If you want to continue flying, you'll have to make a temporary repair that accomplishes two things: First, the structure must continue to carry the flight loads. Second, you will want to restore the aerodynamics as much as possible.

To replace the wing's strength, I use the filament reinforced packing or strapping



***Photo #4: Attach the metal patch with more strapping tape. This provides torsional (twisting) rigidity.***

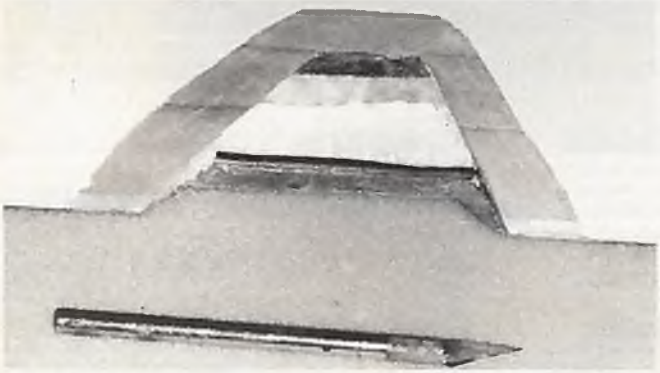


***Photo #5: Remove all damaged wood and foam. Note aileron servo wires at front of foam.***



***Photo #6: Cut a piece of foam to fill up all the damaged foam areas. Glue on securely.***

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***Photo #7: A piece of hardwood leading edge replacement is carefully fitted to the front of the wound.***

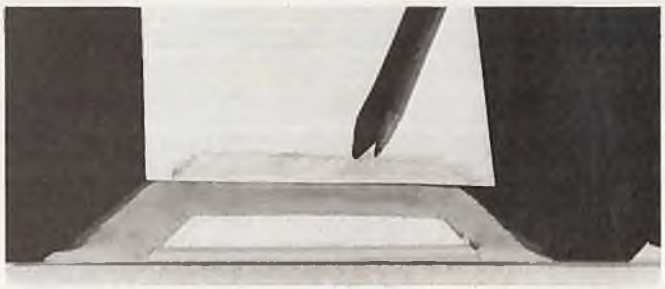


***Photo #8: After the leading edge and foam are properly sanded, use a pencil to trace the correct shape of the sheeting replacement.***

tape which is reinforced with fiberglass. This tape is available at most stationery stores, as well as office supply places. (The stuff is great for temporary repairs, and I keep a roll in my flying box all the time. I also use it to hold on landing skids and other "semi-permanent" things.) As shown in Photo #2, a piece is placed across the leading edge gap. This will sustain the drag loads until a complete repair is made.

Next, I scrounge an aluminum can and cut it to cover the offending area, as shown in Photo #3. You might want to rinse out the can with water first, or else it gets a bit sticky. Regular scissors may be used to cut pieces after a starter hole is poked into the can. **Use extreme caution in cutting up the can — edges are very sharp.** Add more of the strapping tape to bind the "shield" onto the leading edge (Photo #4). Twist and bend the wing to make sure that it is okay, before attempting to launch it. Be sure, to also check all the controls, linkages, and servos for damage, which can appear as broken servo gears, snapped or loose control horns, or buckled pushrods.

Later, when you are at home, you can do the real — or permanent — repairs. Cut out the crushed and damaged foam areas with diagonal cuts, until you have something like Photo #5. A sharp X-Acto is good for this purpose, but try not to remove any more than necessary, and try not to cut underlying servo wires or reinforcement (such as the carbon fibre that may be seen towards the end of the cutout). Try to make your cuts as straight as possible; later on you will be trying to make pieces to match the openings.

Next, cut a piece of foam to fill the foam areas that were removed. Use 5-minute epoxy or UFO to bond to the existing foam. Tape it very well to ensure contact over all damaged areas (Photo #6).

After this glue sets, shape the foam to approximate the wing's airfoil. Cut back enough foam to allow a new wooden leading edge piece to be spliced in. Carefully shape the two ends to make full contact with the edges of the damaged area. Now glue this piece into position (Photo #7). When dry, shape the leading edge piece and the foam to the final shape of the wing before sheeting is applied. This means sanding the foam to a point one sheeting thickness below the adjoining (undamaged) wing. Be sure to take your time here and do it right. The time spent here will minimize sanding and make the repair go a lot smoother.

Now you will have to cut sheeting to fill the damaged area. To get the shape of the piece, which is somewhat irregular, I just tape down a piece of paper over the area I am trying to cover and gently rub a pencil over the edges (Photo #8). The dark part of the pencil marking shows the edge of the wood cutout, which is where the sheeting patch should be cut. When trimming, work carefully and check the fit frequently. You should end up with a piece of wood that fits

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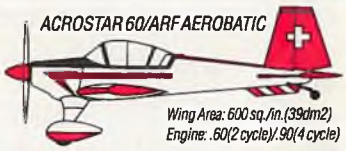
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*Photo #9: After the patch is on the wing, and the epoxy still wet, use a heavy weight to hold everything in alignment. Don uses a 60 lb. winch battery.*

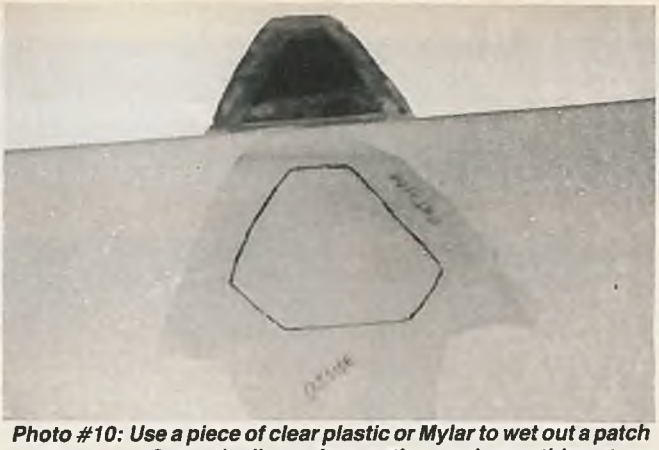


*Photo #10: Use a piece of clear plastic or Mylar to wet out a patch of fiberglass. Cut to the lines after wetting, and everything stays neat and clean!*

perfectly, with minimal gaps.

Once you are satisfied with the fit, mix up a batch of slow-curing epoxy, and if there are significant dings or holes in the foam underneath, add some micro-balloons for filler. Spread glue over the area that the wood patch will occupy, and use lots of tape to hold it in position. If the foam wing "beds" are available (the beds are the pieces of foam the wing was cut out of), put the wing back into its bed and weight it down over the damaged area, or if you have a vacuum system you can bag it together (be sure not to apply too much vacuum if it is a white foam core). Photo #9 shows my winch battery being used for this purpose. Be sure to allow an exit place for the excess epoxy and micro-balloons to flow, and be sure that the excess will not flow onto another area of the wing or core — and glue the whole affair into one piece! After the glue sets, do your contour sanding. The patch should match the wing's contour at all locations. You can hold it in the bright sun and check for shadows. Holes and depressions may be filled with putty, and high spots need more sanding.

I recommend that the repair be covered with a light layer of fiberglass, at least 2 oz./yd.$^2$ (68 g/m$^2$). If the damaged area is in a high stress location, such as near the wing root, you should consider using unidirectional fiberglass or graphite for the external patch. Kevlar should be avoided for the tops of wings, simply because it is not terribly good in compression. I try to overlap about 1" (25mm) past the damaged area. This serves to make the wing structure continuous again, as well as waterproofing it and giving a base for painting. Be sure to remove any paint or covering material from underneath the patch location.

To get a fiberglass patch that is the right size, I use a piece of thin Mylar (four to six mils thick) marked with a felt pen to show the exact area to be glassed (Photo #10). You can also use polyethylene sheeting, or anything else that doesn't stick to epoxy. I always mark the outside so that I stick the correct side down! The fiberglass should be cut oversize and placed onto the Mylar sheeting. Then, use some kind of thin epoxy (such as Aerospace Composite Product's EZ Lam Epoxy) and wet out the cloth. The nice part is that you don't have to worry about the exact shape, because you will cut to the marked line after the cloth is totally wetted out. Cut to the line that you marked on the Mylar, then simply lower the wet cloth patch into the correct position. Use plenty of tape to hold it in place until the epoxy cures.

Sometimes there are more severe injuries. The modeling knife in Photo #11 points to a creased location in a wing, where the sheeting "puckers" inward under load. In this case, you have to keep the skins from puckering as well as make them nice again. This wing came from a model flown by Larry Jolly that suffered a mishap while practicing for the 1989 World Championships.

Once again, you must remove all the wood in the creased or buckled area. A Dremel tool with a router attachment is handy for removing the wood that is not too smashed up. Just set the cut depth to be less than the wood skin thickness. After the wood is removed and you have access to the area underneath the skins, a vertical grained balsa web is made for placement between the top and bottom skins to ensure that the buckling doesn't reoccur after the outer skins are patched. This web is shown partially sticking out of the wing in Photo #12, along with a fitted wood patch piece and a precured carbon reinforcement piece. The wing is slotted vertically for the shear web, using a Dremel tool with a carbide cutter or router. Try to make a good snug fit. When you are happy with the fit, mix up a batch of slow-cure and micro-balloons, and apply a generous portion to the web and/or its slot. Put the web into position. Finally, mix up another batch of slow cure only for the carbon reinforcement (the micro-balloons will weaken the joint between the patch, reinforcement, and existing reinforcement) and place it on top of the balsa web. Use slow cure or slow cure with micro-balloons to cover the remainder of foam, depending on whether the foam is smooth or has holes in it.



*Photo #11: This wing is suffering from a crease in its top surface.*

After this is cured, you sand to match the wing's contour as before, and then add the fiberglass reinforcement patch on the outside.

Guess what! The repair is complete, except for sanding and refinishing. Sand whatever rough edges there are, and then you can paint or cover the previously damaged area. Photo #13 shows a creased wing damage totally repaired. It is as strong as the original, and not too much heavier.

I primed the wound that was on the painted wing shown in Photos #1-8, but two years later I still haven't painted the finish coat! Welcome to the procrastinator's club.

A future piece will discuss repairs to fiberglass fuselages. I'll just have to wait until I break one, so I can take pictures during the repair process!

★

**The Easiest Winch To Bring To The Field**

Photo #14 shows one of five identical winches belonging to the Desert Union of Soaring Thermalists (D.U.S.T.), a group located near Palm Springs, California. As you can see, the assemblies provide both a winch and a retriever in a single package, as well as a nice cushion for the winch operator

**continued on page 30**

# Micro-Mark™ SPRING

**PRICES GOOD FROM THIS AD ONLY**

**HURRY! - ORDER NOW!**

## SAVE 29%

***ROYAL SEALING IRON***



170 watts with temperature selection knob for all shrinkable fabrics and films. Teflon coated shoe minimizes scratching. Heats to 450°. Has metal stand.

**#60534** . . . . . List $20.95 . . . . . **Sale $14.95**

## SAVE 26%

***TRUE SANDER***



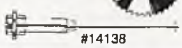
The True Sander is designed to give you a quick, precision finish on wood, plastic and metal sheet and strip stock. Also works beautifully to square-up cut ends of brass tubing. Works on material up to 4" wide x 1" thick x any length. Four sided sanding block lets you have 4 diff. grits mounted at the same time. Includes pre-set angle guides for 30, 45, 60 and 90 degrees plus protractor type guide for any angle in between.

**#14475** . . . . . List $26.95 . . . . . **Sale $19.95**

## SAVE 25%

***MINIATURE SAW BLADES CUT WOOD, PLASTIC, FIBERGLASS AND SOFT METAL***





#14138

Hard-to-find blades are precision ground tools of drop forged, tempered high carbon steel. All are .015" thick with 1/8" hole.

**#14133** 3/4 dia., 36 teeth List $9.95 **Sale $7.50**
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**#14135** 1" dia., 68 teeth List $10.95 **Sale $8.25**
**#14136** 1" dia., 34 teeth List $10.95 **Sale $8.25**
**#14137** 2" dia., 140 teeth List $14.95 **Sale $11.25**
**#14138** 1/8" shank mandrel for above blades . . . . . **$2.75**
**Save Even More!** Set of all the above
**#14139** . . . . . List $59.50 . . . . . **Sale $44.50**

## SAVE 25%

***3-JAW CHUCK FOR DREMEL MOTO-TOOLS***



Tired of changing collets on your Moto-Tool? Then you'll love our 3-jaw keyless chuck! Works with ALL Dremel and Sears models. Holds drill bits & accessories from 1/64" to 1/8". Use up to 10,000 rpm.

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***DREMEL MOTO-SHOP TABLE ATTACHMENT***



Now you can make straight and true rip cuts and precise angle cuts with the rip fence and miter gage we include... plus the larger table size gives your work more support. 10"x 12" table attaches to your Moto-Shop without modification. Adjustable guides slide in machined grooves and can be removed in seconds for scroll cutting.

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## SAVE 34%

***HANDS-FREE LIGHTED MAGNIFIER***

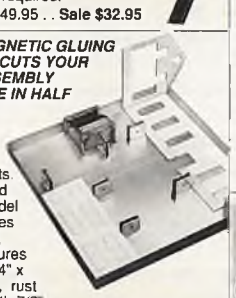


Excellent for close precision inspection, jewelry work, model building, stamp and coin collecting, needlework, reading. The 3" dia. optical quality glass lens enlarges to 175% of actual size. Swivel mounting bracket clamps to benches up to 1 1/2". Spring balanced arms extend magnifier to exact position required.

**#24101** . . List $49.95 . . **Sale $32.95**

## SAVE 40%

***MAGNETIC GLUING JIG CUTS YOUR ASSEMBLY TIME IN HALF***



A "why-didn't-I-think-of-that" tool for quick assembly of small components. Use for plane and ship models, model rail-road structures and rolling stock, dollhouse miniatures and more. 10 1/4" x 10 1/4", 21 gage, rust resistant steel with 7/8" flanges bent up at 90 degrees. Includes 8 magnetic holding plates that keep components squarely together while glue dries.

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**#60305** Eight extra magnetic plates . . **Sale $7.95**

## SOLID CARBIDE MICRO DRILLS — SAVE 59%



Originally made for the electronics industry, these bits will last 30 times longer than other drill bits . . . and because they all have 1/8" shanks they're a lot easier to handle and will fit in one size Moto-Tool collet. Set of 9 asst. sizes from #54 to #80. Industrial users pay up to $3.50 each for these bits, but we bought a manufacturer's overstock at a great price and we're passing the savings on to you.

**#60310** . . . . . List $31.50 . . . . . **Sale $12.95**

## SAVE 15%

***PERMA-GRIT SANDING TOOLS LAST ALMOST FOREVER***




These perfect sanding tools made of tungsten carbide permanently brazed to steel, will last a lifetime in normal use and won't load up like sand paper. Sands plywood, fiberglass, epoxy, styrofoam, hardwood, softwood, plastic - just about anything! The money saved on sandpaper pays for them in no time. 9" long.

**A** 1/8" radius, wood handle. Two sides, fine and coarse grit. **#14524**. . . List $4.95. . . **Sale $4.20**
**B** 1/4" radius, wood handle. Two sides, fine and coarse grit. **#14525**. . . List $4.95. . . **Sale $4.20**
**C** 3/8" radius, wood handle. Two-sides, fine and coarse grit. **#14526** . . . List $6.25. . . **Sale $5.30**
**D** 1/8" tangent radius (V-shaped). Fine grit one end, coarse grit opposite end.
**#14527** . . . . . List $6.95 . . . . . **Sale $5.90**
**E** 3/4" radius (flat U shape). Fine grit one end, coarse grit opposite end.
**#14528** . . . . . List $6.95 . . . . . Sale **$5.90**
**F** 1 1/2" flat. Fine grit one end, coarse grit opposite end. **#14529**. . . List $6.95. . . . . **Sale $5.90**

## WORLD'S SMALLEST, MOST ACCURATE TABLE SAW — SAVE 33%



For miniature woodworking. Cuts both softwood and hardwood up to 1/4" thick. Ideal for ripping narrow strips or miter cutting. Features 6" x 6" aluminum table, rip fence, miter gage, blade guard, dust catcher compartment, 80 tooth blade. 1/10 HP 120v motor.

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**#15220** Extra fine 107 tooth blade. Cuts burr free. . . . . **$10.95**

## SAVE 25%

***PROPORTIONAL DIVIDER SCALES DRAWINGS UP OR DOWN IN SECONDS***



No need to measure, calculate and remeasure when working from scale drawings. Our proportional divider does it for you. Calibrated in 13 ratios from 3/4:1 to 10:1. A precision instrument made of plated brass with steel points. Includes vinyl wallet and instructions. Made in W. Germany.

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List $42.95. . . . **Sale $32.25**

## SAVE 25% — *RIGHT ANGLE DRIVE FOR DREMEL MOTO-TOOLS*



This precision tool is one of the most versatile attachments you can own for the Dremel Moto-Tool. It will drill, sand, cut and grind in places you never could before. Has hardened metal gears and lifetime lubricated ball bearings. Attaches in seconds to Moto-Tool models 275, 285, 395 and 595.

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Operates starter, fuel pump and glow plug clip. Has glow plug current adjustment knob, glow plug voltage and condition meter, 6 banana plugs, battery connection clamps, fuel pump switch (fill,drain, off) and protective back cover. Fits most field boxes. **#60532** . . . . . List $29.95 . . . **Sale $22.50**

## CAM ACTION BAR CLAMPS — SAVE 30%



The fastest, easiest sure-grip modeler's clamps ever made and exclusive with MICRO•MARK. Just slide the moveable jaw along the bar & flip the cam-action lever. Cork lined jaws won't mar or slip. 7" capacity. Set of two. **#15125**. . . . List $7.95. . . . . **Sale$5.50**

## DREMEL DISC/BELT SANDER with FREE Belts & Discs - A $16.50 Value — SAVE 40%

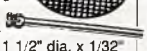
**SUPER SPECIAL!**



A rugged, solidly built tool that can save you hours of tedious hand sanding. Trims model parts precisely to your marked line. Use on all metals, woods and plastics. Has cast aluminum tables and frame, removeable platten for sanding curves, miter gage, 1/5 hp, 3450 rpm quiet induction motor. Also includes 2-80 & 2-120 grit belts & 5-80 grit discs. (**FREE!** from this ad only). Belts-1" w., discs- 5" diam. **#60788SP**
TOTAL VALUE $194.50 **SALE $119.95**

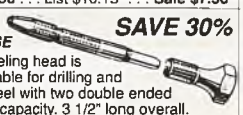
## FIBERGLASS REINFORCED CUT-OFF WHEELS — SAVE 26%





Steel industry type wheels in miniature sizes. Fiberglass reinforcement resists breakage. 1 1/2" dia. x 1/32" thick. Set includes 2 wheels for steel, 2 wheels for brass, copper, aluminum and 1/8" shank mandrel. **#50293** . . . List $10.15 . . . **Sale $7.50**

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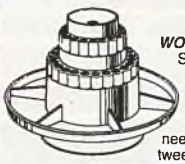


Large freewheeling head is especially suitable for drilling and tapping. All steel with two double ended collets. 0-1/8" capacity. 3 1/2" long overall.

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***ROTARY TRAY ENDS WORKBENCH CLUTTER***



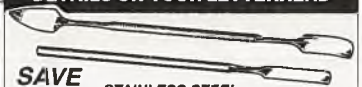
Store and organize your most used small tools. Holds just about everything in less than 1 sq. ft. of space. Great for needle files, model knives, tweezers, scribers, pencils, rulers and more. 10" dia. X 6 1/2" h. Made of high impact plastic with Lazy Susan type base.

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## SAVE 50%

***STAINLESS STEEL MINIATURE PUTTY KNIVES***



Use for mixing, applying, spreading and smoothing epoxy, wood filler, plastic filler, body filler etc. Use on models, miniatures, dioramas, fillet forming, etc. Made of polished stainless steel. Single end: flat, flexible blade, 6 1/8" long. Double end: curved rigid blades, 7 1/2" long. Set of 2.

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Delta's 10" band saw is priced and sized especially for the model builder. It's easy to operate and has many of the features of Delta's commercial machines. Has a sturdy cast aluminum frame, a table that tilts up to 45°, a 1/5 hp quiet, long-lasting induction motor and ball bearing mounted wheels for long life. You'll find it easy to cut intricate curves, bevels, miters and straight rip cuts in metal, plywood and balsa up to 3" thick. Includes miter gage, locking switch, blade tensioning knob and one 1/4" x 6 tpi blade. 23" w. x 13" deep x 23" high.11 1/2" x 11 1/2" table.

**#60557** . . . . . List $210.00 . . . . . **Sale $168.00**
(Shipped to Cont. U.S.A only)

**BAND SAW BLADES $7.95 each.**
**#60558** 1/8" x 14 tpi. **#60559** 1/4" x 6 tpi
**#60560** 1/4" x 14 tpi **#60561** 1/4" x 32 tpi

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***ROYAL HEAT GUN***



Chrome plated with adjustable baffle, 3-position switch and removeable heat concentrator. 400° top end temperature. Works even with todays high temperature fabric coverings.

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Marks a perfect 90° angle and sets up table saws, sanders etc. for accurate, square cuts. Ground and polished carbon steel 4" blade, 2 1/2" beam.

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The smallest, lightest Moto-Tool ever and it's cordless! Has two speeds (approx. 5,000 & 10,000 rpm-tested slow enough to drill plastic without melting), 1/8" collet, ball bearings and a removable battery pack that charges in a wall mount charger (included). Runs for one hour, no-load on a full charge. Only 6 1/2" long. Weighs just 9 ozs.

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**#60703** Extra Battery. Lets you keep one charging while using the other. . . **$14.95**

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***ELECTRIC FUEL PUMP***



Includes fuel nozzle, filtered clunker, connector clips, built-in fuel can hanger clips.

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16" x 48" steel plate and magnetic holders build model aircraft straighter, faster, easier. Includes 60 magnetic holding plates, 10 vertical presses for spars, rib cap strips, leading edge planking; 10 vertical stands for fuse. sides; 10 adjustable steps for leading & trailing edges and dihedral angles; 10 rib clamps. An excellent tool for the serious model builder.

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**SATISFACTION GUARANTEED**

## SALE ENDS 15TH OF COVER MONTH!



***MICRO- SIZE SAW BLADE SET***

**SAVE 31%** Same size as a #11 blade, but with teeth! Cuts where no other saw will fit. Includes 6 assorted blades, 24 tpi to 40 tpi plus aluminum handle.
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***SUPER SPECIAL!***
***DREMEL 4" TABLE SAW with FREE Carbide Tip Saw Blade - A $19.95 Value***
***SAVE $104.00***

**FREE! CARBIDE TIP SAW BLADE!**



The perfect size table saw for the model maker. Makes rip cuts, cross cuts, miter cuts, bevel cuts, mortise and tenons & more. Cuts 1" thick @ 90° and 1 2" thick @ 45°. Includes miter gage, rip fence, blade guard, lockable on off switch, 4" combo steel blade and 4" carbide tip blade (**FREE!** from this ad only). Sleeve & ball bearing motor with 1 2" saw arbor 10" x 12" table. **#38273SP**
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These surgical quality probes have hundreds of uses for modelmakers, miniaturists, electronic hobbyists, etc. Use them for positioning, soldering, gluing, adjusting. . . for any type of micro-manipulation in tiny, hard-to-reach places. Polished and hardened stainless steel with needle sharp points. Set of five, 6" long overall.
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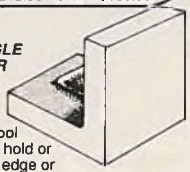
**SAVE 25%** ***THE CHOPPER***
One of the most useful tools for the hobbyist working in wood or plastic strip material. Makes clean, neat, feather-free, accurate cuts easily, inexpensively. Uses readily available single edge razor blades. Perfect mitre cuts with the 30, 45 and 60 guides included. An adjustable stop permits the exact duplication of pieces up to 3 1/2" long. Excellent for model airplanes, model railroad structures, doll house furniture and hundreds of other uses 7 1/2" x 7 1/2".
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Get perfect 90 cross cuts. Guides on the bottom slide in the grooves of the saw. The supplied triangles also give you precise 30 , 45 & 60 angle cuts without resetting a miter gage. For cuts up to1/2" thick. 10" x 12" table. 1 1/2" h. fence.
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**SAVE 40%** ***TOOLMAKER'S ANGLE PLATE HOLDS YOUR WORK AT A PERFECT 90° ANGLE***



Use this hard-to-find tool whenever you want to hold or join two parts edge-to edge or edge to-surface at a 90 degree angle. Also used to square-up table saw or disc sander. Precision cast with machined faces and edges. 2" x 2" x 2".
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**SAVE 25%** ***PROTECTIVE CUTTING PAD HEALS ITSELF AFTER EACH CUT!***



Stays smooth after thousands of cuts. . .and blades will last far longer. 3 ply non-glare polyvinyl. Double sided for twice the life. You've got to try it to believe it. Large 12" x 18" size.
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**SAVE 25%** ***SOLID BRASS BAR CLAMPS***



The finest clamps you can own for clamping model RR structures and rolling stock, miniature furniture, ship models, plastic models, small boxes, model airplanes and more. Price is for set of 2.
**#14256** 10 1/2" capacity. List $10.95. **Sale $8.20**
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**SAVE 40%** ***JEWELER'S PLIER SET***



You won't find a better set of pliers anywhere for this price! Made of steel with cushion grip vinyl covered handles and spring return. Set includes needle nose, bent nose, flat nose, end nipper and diagonal cutter. Al are approximately 5" long.
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***BULK PACK #11 BLADES SAVE YOU MONEY*** **SAVE 37%**



Includes 100 of the world' favorite blade design at less than 13 cents each! Honed to razor sharpness
**#14178** List $19 95 . . . . . **Sale $12.50**

**SAVE 40%** ***ALUMINUM MICRO STORAGE***



Avoid losing your micro size model parts, nuts and screws and keep them organized. Aluminum snap-lock case with hinged lid holds 24 containers neatly in place. Each container is one inch dia. x 5/8" deep. Case is 6 1/2" x 4 1/4" x 3/4" deep. **#14245** . . . List $12.95 . . . **Sale $7.75**



***ROYAL ESCORT FIELD BOX*** **SAVE 34%**
Keeps flight gear organized. Has divided compartments for starter battery, power panel, gallon fuel can or jug, transmitter, engine starter and accessories. Also has 2 drawers for small items, carry handle, padded adjustable cradle, rubber feet, hardware and assembly instructions. 23" L. x 7" W. x 20" H. Made of pre-cut 1/4" mahogany.
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**SAVE 31%** ***INDUSTRIAL RAZOR BLADES***

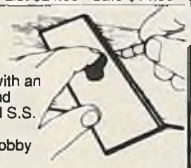


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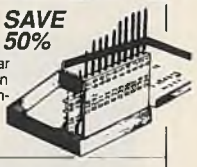
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**continued from page 27/22**

to sit on. Hidden inside of the "seat" are two 12V batteries in parallel. So why are there two wheels on the bottom of the "seat?"

Take a look at Photo #15. You will see an identical winch now attached as a trailer to an automobile! The winch frames double as the trailer frame and hitch, and the winches are fully licensed and street legal trailers! Anyone who has back problems or is tired of loading and unloading winch parts is sure to appreciate just driving to the preferred location, unhitching the winch, and flying. The winches were designed by George Ritter and built as a club project. The club members said that they might be interested in building winches for others, but they will not be cheap. Write to me c/o RCM if you'd like more information. If the photo comes out okay, you may be able to see that there is a foot operated brake on the right side of the forward box (in front of the right wheel).

The backdrop of the photos is the club's beautiful grass field, which is a portion of a polo field . . . one of the finest flying fields that I have ever seen. These guys are truly lucky to have such a nice field. An interesting restriction on flying on the D.U.S.T. field is that "zoom" launches are prohibited. This was enforced by not allowing a towing model's fuselage angle to drop below the horizon. This is a safety concession to the owner of the field, and didn't cause any problems except to those of us who do zooms almost without thinking. I had to really concentrate to not tow in my normal fashion.

Coming back from Palm Springs my family drove past a "wind farm," literally thousands of wind turbines used to generate energy. I had to detour from the interstate so that I could stop and check it out. The sound was unlike any I have ever heard. I don't know the size of the rotors, but I'd guess that they are about 25' or 30' in diameter. Each turbine produces somewhere around 10 to 25 kilowatts of power, without any smog or damage to the environment. All the energy comes from the sun, just like soaring!

★

**Support Your 1991 U.S. R/C Soaring Team!**

Last month I mentioned that the United States F3B Team was preparing for the World Championships in Holland, and the August contest is approaching very fast. While the airfare, meals, and lodging during the contest are covered by the Academy of Model Aeronautics, there are still a number of other substantial expenses, such as shipping of model boxes and equipment, car rentals, and transportation, and team practices that are **not** covered. In order to help pay for these expenses, the 1991Team is selling merchandise and conducting a drawing.

The best information on the drawing is that the winner of the Grand Prize will win a **round-trip** airline ticket from the U.S. to Holland so that he or she may personally attend the 8th F3B World Championships! If that isn't enough, other winners will receive radio control sets, model kits, and discount certificates! The donation for a single ticket for this drawing is $10.00 (U.S.).

In addition to the drawing, the '91 Team is selling Official Patches, Pins, and Tee-shirts. Patches and Pins are $5.00 (U.S.) and $3.00 (U.S.) respectively, while the shirts are $12.00. The shirts are available in sizes S, M, L, XL, XXL, and are very good quality. All of these items feature the '91 team logo in color. For those on a budget, $1.00 will buy you one 1989 Team Patch, pin, or 1987 official World Champs pin.

If you'd like to support the team, please send your donation payable to USA F3B Team Fund, P.O. Box 3242-R, Lakewood, California 90711-3242. Please add 10% for shipping and handling, and be sure to specify your desired shirt size. This merchandise may also be available at the trade shows, but order by mail if you want to be sure.

The 1991 Team would like to **Thank You** for your support!

□



***Photo #12: The balsa shear web is sticking out of the broken area, next to a fitted wood patch piece and a precured carbon reinforcement piece.***

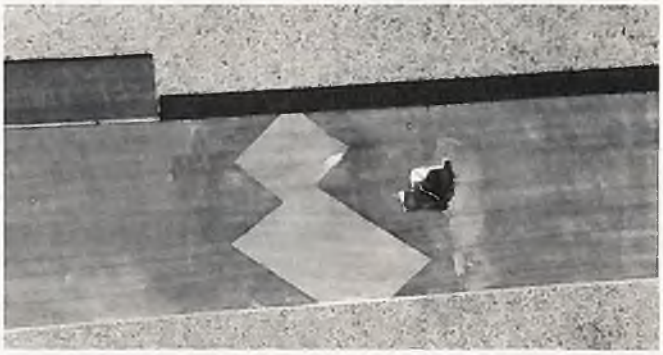


***Photo #13: The repaired creased wing. Note lighter color wood patch, and hole for mounting servo.***



***Photo #14: A very well designed winch set-up manufactured by the Desert Union of Soaring Thermalists (D.U.S.T.), Palm Springs, California. This package contains one complete winch, retriever, several batteries . . .***



***Photo #15: . . . and is street legal! The whole enchilada may be towed behind an automobile right onto the field. And what a field --- these guys get to fly on a beautifully manicured grass polo field.***



***Photo #16: Wind farm located between Palm Springs and Los Angeles.***

# Steve Gawlik tells us why he switched to UltraCote.™

To hear Steve tell it, he's just an average RCer.

But if you talk to modelers around Chicago's western suburbs, you'll learn that Steve's building skills are anything but ordinary, and anyone lucky enough to talk him out of a plane is likely to be the envy of his peers.

Needless to say, when we learned that Steve had switched to UltraCote, we were eager to hear the reasons for his choice.

"With all of UltraCote's advantages," he began, "I can't imagine *not* using it. UltraCote handles and applies like a dream and its tolerance for repositioning is unmatched by any other film covering. Plus it looks terrific and I still get the permanent 'set' of a true, high-temp polyester base."

Would Steve recommend UltraCote for beginners as well as experienced modelers?

"Absolutely," he replied. "But why rely on *any* expert's choice? My real recommendation is that modelers try UltraCote and judge for themselves!"

Steve, we couldn't have said it better ourselves.

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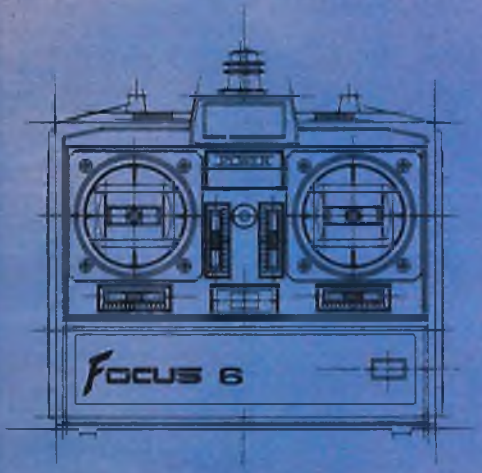
***Isn't it time to find out for yourself?***

# Design...

## A New Starting Point

Quality begins with design. In RC, no design is more important than the one that serves the flying modeler. At Hitec, we put you in the center of our design effort. We heard all the talk about radios and the 1991 flying environment. And we listened.

With this in mind, we designed a sport radio series that is tops in performance and reliability. From form to function, the Focus Series is unsurpassed in quality and value.

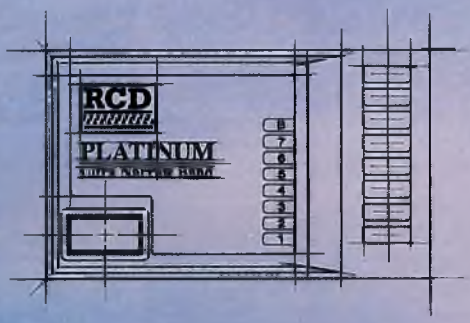


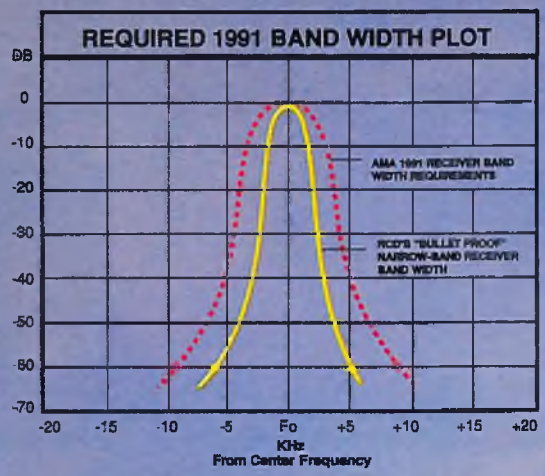

*Feel the comfort of the slimline design in the Focus case. Engineered for both function and comfort, the quality craftsmanship is obvious. Pick up a Focus transmitter and you won't want to put it down.*

## Focus on Features

For sport flyers seeking the most bang for the buck, Focus is the answer. The Focus Four FM features servo reverse and ATV on all channels, comes standard with the 1991 RCD Platinum Receiver, is trainer capable and includes three super accurate HS-500 servos. The Focus Six FM includes four HS-500 servos and the RCD Platinum Receiver. Our Focus Four FM-E, design for moter-powered gliders and electrics, includes two HS-101 micro servos. On-Off/auto-cutoff switch and the RCD Micro 535 Receiver. All systems feature full NiCDs and Charger.

*The ability to reject unwanted RF signals is the single most important feature of any RC system. Nothing does it better than the RCD's Ultra-Narrow Band Dual Conversion Platinum Receivers.*



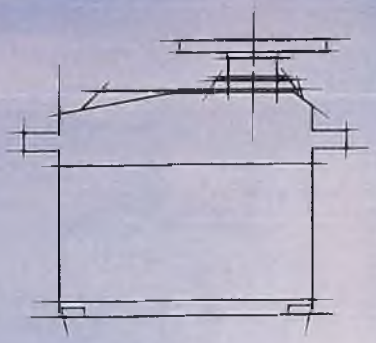




*RCD is at the leading edge of narrow band dual conversion technology. RCD receivers surpass AMA guidelines and are virtually immune from stray RF signals.*

## Focus On Performance

There is no greater danger to the model flyer than radio interference. Stray signals, local pager systems and third order interference can spell instant disaster for you and your model. Fear no more. Focus radios come equipped with RCD Dual Conversion Platinum Receivers. Dual Conversion means no threat from 3IM. Platinum means they surpass the AMA guidelines for 1991 narrow band acceptance. When it comes to "narrow band", these receivers are the narrowest.

*The HS-500 is simply the finest, most reliable standard servo available for airborne use. With iron/oilite bearing-supported output shaft, indirect drive and custom IC for 1/4 degree centering accuracy, the HS-500 assures superior tracking, long life and constant high torque.*



## Focus On Value

There's one thing that we didn't design into the Focus radios—a price tag with a big number. That makes Focus the value leader in affordable radio systems. Come and see for yourself. The Hitec Focus Series is available at finer hobby shops across the country.

# Development.




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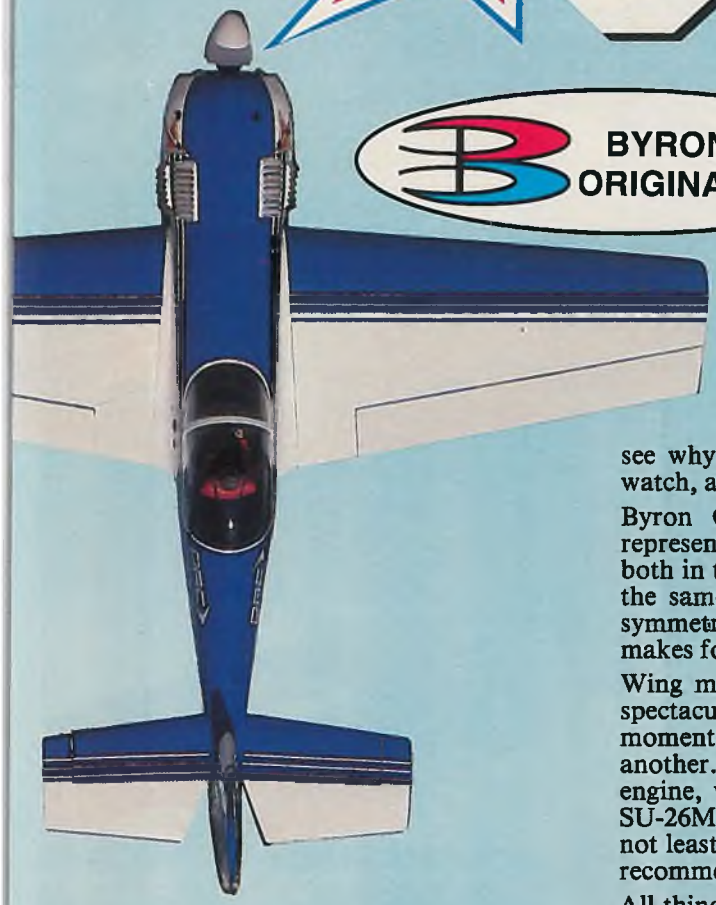
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# SU-26M

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BYRON ORIGINALS INC.

The SUKHOI SU-26M, the newest addition to the Byron fleet, signals the beginning of a new era in R/C aerobatics. The U.S. is now importing the full scale version of this spectacular Russian aircraft. And for good reason. Over the past four years, the SU-26M has won 59 gold medals and first place trophies in World Aerobatic Championships and European Championships. Experts admit the Extra 230/300 series comes close, but no other aircraft matches the overall performance and agility, especially on vertical lines, of this new monoplane. The 9 cylinder 360 hp radial engine, roll rate of 343 degrees/second and climb-out rate of 3,500 fpm make it easy to see why. Without a doubt, the SU-26M is the most exciting aircraft to watch, and the sound of the big radial is spectacular in itself.

Byron Originals' quarter scale version of this awesome monoplane represents the finest efforts ever to duplicate this high performance aircraft, both in terms of appearance and performance. Construction follows much the same format as other fiberglass fuselage/foam wing kits. The fully symmetrical wing sheets easy, as do the stabs. Exclusive plug-in wing design makes for ease of transport and assembly.

Wing mounted aileron servos team with full span ailerons to produce a spectacular roll rate and precision four and eight-point rolls. The long tail moment produces exceptionally smooth transitions from one maneuver to another. Spins in either direction are predictable, and with the proper engine, vertical penetration is awesome. Everyone who has witnessed the SU-26M in action agrees it is one smooth handling machine. And last, but not least, superb stability at both ends of the envelope makes executing the recommended three-point landing a breeze.

All things considered, this revolutionary monoplane promises to be one of model aviations' most talked about kit releases.

**Ken Bryan**
**SU-26M**
**project engineer**

### Complete SU-26M info pack - $3.00

| Item No. | Description |
|---|---|
| 6130214..... | SUKHOI Kit |
| 6130136..... | Q-50S PurrrPow'r System |
| 6030359..... | Custom Mount for A&M 3.7 and 4.2 |
| 6030465..... | Custom Mount for G-62 and Q-50S |
| 6030459..... | Universal Engine Mount, 14" |

**Suitable engines:**
Saito 270 & 300 Twin 4-cycle
O.S. 240 & 300 Twin 4-cycle
Q50S (PurrrPow'r optional)
A&M 3.7 and 4.2
Zenoa G62




**Specifications**

| | |
|---|---|
| Wing Span | 82" |
| Length | 72" |
| Wing Area | 1340 sq. in. |
| Weight | 20-22 lbs. |
| Channels | 4 |

**Byron Originals, Inc. • P.O. Box 279 • Ida Grove, IA 51445 U.S.A. • Ph: 712-364-3165 • FAX: 712-364-3901**

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*Engine: .40-.60 2 cycle, .60-.90 4 cycle*

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*Engine: .40-.50 2 cycle, .60 4 cycle*

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Engine - .20-.29 2 cyc
.40-.50 4 cyc
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Engine - .25-.29 2 cyc
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Wingspan-63 in.
Radio-4 ch.
Engine - .40-.50 2 cyc
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Wingspan-55 1/4 in.
Radio-4 ch.
Engine - .40-.60 2 cyc
.60-.90 4 cyc
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**COVERED CLIPPED WING CUB**
Order #21880
Wingspan-79.2 in.
Radio-4-5 ch.
Engine - .75-.90 2 cyc
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Radio-4-5 ch.
Engine - .75-.90 2 cyc
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Wingspan: 57 in. • Radio: 4-5 ch.
Engine: .45-.60 2 cyc/.60-.90 4 cyc
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Order #10052
Wingspan-63 in.
Radio-4 ch.
Engine - .40-.50 2 cyc
.60-.90 4 cyc
~~List:$204.95~~

**INDY $119.95**




## CAP 21

Order #21872
Wingspan-58 in.
Radio-4 ch.
Engine - .40-.50 2 cyc
.60-.90 4 cyc
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Order #10499
Wingspan-57.5 in.
Radio-4 ch.
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Cat. # Description List INDY

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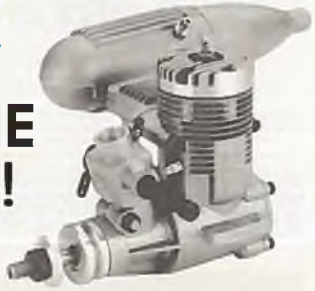
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**Expert S-91BB Servos**

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22609 ASP 61R .... ~~$120.95~~ **$83.95**
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Cat. # Description List INDY

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.15 Speed Shown

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12085 FA-80G Gold Head .. 294.95 **$217.95**
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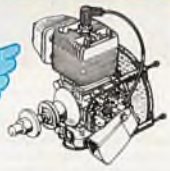
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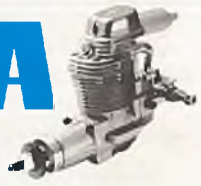
Cat. # Description List INDY

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|---|---|---|---|

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| CAT. # | | List | INDY |
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# INDY

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|---|---|---|---|

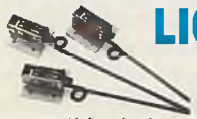
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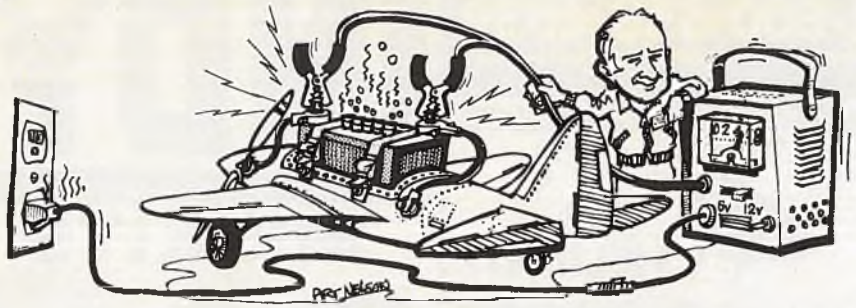
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**21643 INDY SPECIAL .....$29.95**

TED DAVEY



# SILENT POWER

This month I have more good news from the A.M.A., official electric flight is coming to the NATS! This column is being written in January but you'll still have time to prepare for the events as they are scheduled for July 12th to the 20th. Electric processing is at 2 p.m. on Saturday the 13th, except for pylon, which is at 4 p.m. on Tuesday the 16th.

The electric events will be held concurrently with the sailplane events. Class A and B old time and sailplane limited motor run events will be held on Sunday the 14th. The F3E-FAI event will be on Monday the 15th as will be the F3B-FAI 7 CELL, which will be an unofficial event this year. R/C class A pylon will be held on Wednesday the 17th. More detailed information will be available as to times, places etc., so contact them for the schedule and entry forms.

Having official electric events at the NATS is the result of a lot of hard work by a few people and they are to be congratulated for their perseverance. Cal Ettel, in particular, must be mentioned by name. He not only supplied me with this information but was a driving force in making it happen. Cal also directed the Inter-Nats at St. Louis, Missouri, in 1988 and represents the AMA in electric matters at the FAI in Europe.

The First Annual Electric Competition and Fun-Fly of St. Louis, Missouri, will be held Sept. 14 and 15, 1991. Plans are to hold this event on the second weekend of Sept. in following years. The Mississippi Valley Soaring Assoc., in conjunction with other clubs of the Greater St. Louis Modelling Ass'n., will be hosting the competition.

This group was responsible for administering the very successful FAI-F3E World Championships, and the First American Continental Championship in St. Louis in August 1988. Current plans are to provide for competition in thermal duration, old timer and 7 cell pylon events in accordance with AMA rules. Additionally, there will be 7 cell F3E and possibly FAI-F3E flown. There will also be fun-fly periods on both days of the contest. For further information contact Cal Ettel, 3 Castle Dr., RR2, Florissant, Missouri 63034.

The 17th Annual Astro Flight Electric Flight R/C Championship will be held on Saturday and Sunday, May 18th and 19th at Fairview Regional Park, Costa Mesa, California. The events will be: 7 cell sailplane and old timer; unlimited sailplane and old timer and 7 cell pylon. Write to the CD, Bob Sliff, P.O. Box 9, Midway City, California 92655, or call (714) 895-6569, Fax (714) 895-6629. This event is very well thought of by many who tell me about it every year. If you live any where near Southern California try to make it.

I have some more data collected on the use of the test stand that incorporates the fish scale to measure "pull" or prop thrust in ounces. Since prop selection is a major part of determining the best power package for the model, perhaps a little more information on props is in order. An 8 x 4 prop is an 8" diameter prop with a 4" pitch. Theoretically, pitch is the distance a prop will travel forward in one revolution. In other words, the 8 x 4 will go forward 4" in one revolution. If you look down the blade of a prop from the tip to the hub, it's obvious that the angle of the blade increases as it approaches the hub. The angle at the tip must be less because the tip is traveling farther than the hub. If the blade did not have a varying angle the whole prop could not go forward at the same speed.

This change in pitch is particularly noticeable on the folding prop made especially for electric flight because the area near the hub is significantly wider than the tip and the difference is more obvious. Most props also have an undercambered type of airfoil as well to better pull their way through the air. The test results shown in Charts 1 and 2 were run with a new Mabuchi motor that will soon be on the market, an RPB gear box and a Sanyo 7 cell 1200 mAh pack. Chart 2 clearly shows how increasing the pitch improves performance up to a point and then drops off when the prop overloads the motor/battery combination.

At this point, information has been presented showing only a 7 cell pack 1200 mAh pack and the popular 075 size motor.

## CHART 1

| 075 MOTOR, 2½/1, 7 CELLS | AMPS | RPM | PULL IN OZ. |
|---|---|---|---|
| Rev-Up 10 x 6 EW Prop | 16 | 5800 | 24 |
| Rev-Up 10 x 8 W Prop | 20 | 5300 | 23 |
| Rev-Up 11 x 4 Prop | 16 | 5900 | 23 |
| Rev-Up 11 x 6 Prop | 18 | 5500 | 32 |
| APC 11 x 6 Prop | 18 | 5500 | 34 |

## CHART 2

| 075 MOTOR, 2½/1, 7 CELL SCR | AMPS | RPM | PULL IN OZ. |
|---|---|---|---|
| Top Flite 11 x 4 Prop | 16 | 6200 | 19 |
| Top Flite 11 x 5 Prop | 18 | 5900 | 23 |
| Top Flite 11 x 6 Prop | 19 | 5500 | 25 |
| Top Flite 11 x 7 Prop | 21 | 5300 | 24 |
| Top Flite 11 x 8 Prop | 22 | 5000 | 21 |

The data will change by simply changing to 800 or 1500 mAh packs of the same type, much less by going to 6 or 8 cell packs. Different results are also evident when changing between battery manufacturers, using cells that are all rated with the same voltage and mAh rating. Different results are also shown between Sanyo SC, SCE, and SCR batteries of the same rating. Consequently, with enough equipment it's obvious that the available variations become almost endless. Fortunately, the variations also become rather small and there will still be the unknown of the effects of a prop "unloading" in the air as compared to the readings taken on a test stand.

By limiting the equipment to be tested to a few variables such as those shown in both charts, it is easy to collect some data, form a conclusion and then verify the results at the field. The differences in performance will show up quickly in take-off run length, climb-out rate, and ability to perform loops. With enough flying time, length of flight, and relative flight speed will also be quite obvious.

The data shown in both charts is consistent with the flight performance of the equipment in a 54" Curtiss Robin. The differences with the props listed in Chart 1 shows up quickly on the take-off run, which verifies that the 10" props are not the best choice for this size model.

It is obvious that some interpretation of the data is required when working with the

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**1/5 SCALE P-51D MUSTANG**



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| | |
|---|---|
| Wing Span | 89" |
| Wing Area | 1356 sq." |
| Fuse Length | 77.5" |
| Weight | 15 - 18 lbs. |
| Engine | 1.08 - 1.8 2C |

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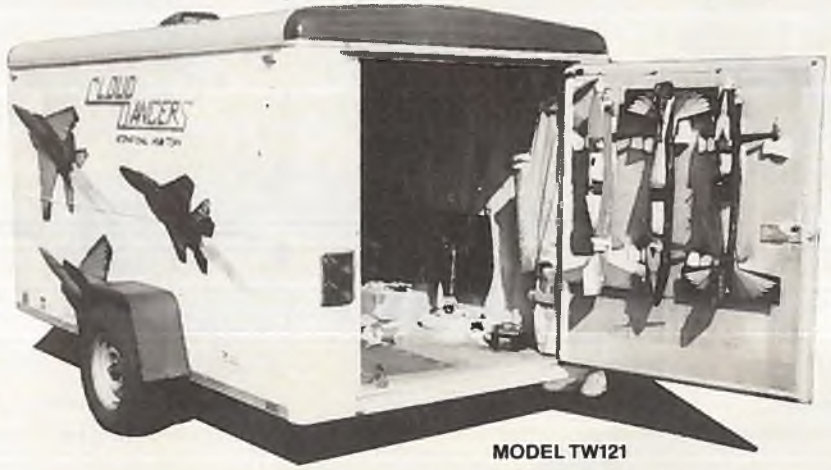
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inexpensive meters that are readily available. For example, the last two props in Chart 1 have the same amp draw and rpm but the APC pulls 2 ounces more. The actual numbers may be slightly different because the ammeter is an analog type and it's difficult to properly read the exact results with the small pointer. My new digital tachometer reads only to the nearest hundred and the scale reads only whole ounces. Consequently, it is possible that there will be a small accumulated error.

The information in Chart 2 is interesting because it clearly shows the results of excessive pitch in all of the three criteria. Based on this chart, it would be foolish to fly with the 11 x 4 or the 11 x 8 prop because it is obvious that the other three will give better performance.

Next month's column will include data on some larger motors as well as some little known ferrite motors. Hopefully, some folding props will also be tested with a geared 05 or 075 ferrite and a 05 cobalt.

I've just returned from the International Modelers Show in Pasadena, California, Michael Shuck, the owner of Precision Innovation, P.O. Box 1185, Cave Junction, Oregon 97523, had two motor heat sinks that were designed primarily for cars but could be adapted for airplane use. The smaller of the two, the HD 1000 is for the R/C-10 and the JR-X2 cars. The HD 500 is larger, fits most other cars and has over 19 sq. in. of heat dissipation area. Both are machined to fit snugly onto a motor and are held in place by a Ty-Rap. Mike is in the process of designing more units that will readily fit airplanes as well as boats. Write to him for more information.



Airtronics is about to release another Battery Eliminator Circuit (BEC) which will probably be available by the time you read this. This new unit, the MA-6, is for 7.2 to 12 volt operation and incorporates six FET's, one of which is for the brake. The unit is rated at a continuous 40 amps for 8 minutes and weighs less than 2 oz. A picture is not yet available but I thought I would mention its availability because the MA-3 works great in my Eindecker, and the flying season is just starting in much of the country so some of you may need some new equipment.

Airtronics also has a new series of servos coming called the Pro-Series. Initially there are three servos available, two of which have features designed to attract the car and boat market. These include: coreless motors, high speed transit time, double ball-bearing supported output shafts, and

# SIG BALSA

## THE LARGEST SELECTION OF AAA AIRCRAFT BALSA ANYWHERE

### STICKS - 36" Lengths

| | | |
|---|---|---|
| B-001 | 1/16 x 1/16 | .10 |
| B-002 | 1/16 x 1/8 | .11 |
| B-003 | 1/16 x 3/16 | .14 |
| B-004 | 1/16 x 1/4 | .17 |
| B-005 | 1/16 x 3/8 | .21 |
| B-006 | 1/16 x 1/2 | .26 |
| B-007 | 1/16 x 3/4 | .33 |
| B-008 | 1/16 x 1 | .42 |
| B-009 | 3/32 x 3/32 | .11 |
| B-010 | 3/32 x 1/8 | .12 |
| B-011 | 3/32 x 3/16 | .14 |
| B-012 | 3/32 x 1/4 | .17 |
| B-013 | 3/32 x 3/8 | .25 |
| B-014 | 3/32 x 1/2 | .29 |
| B-015 | 3/32 x 3/4 | .38 |
| B-016 | 3/32 x 1 | .47 |
| B-017 | 1/8 x 1/8 | .12 |
| B-018 | 1/8 x 3/16 | .17 |
| B-019 | 1/8 x 1/4 | .21 |
| B-020 | 1/8 x 5/16 | .26 |
| B-021 | 1/8 x 3/8 | .28 |
| B-022 | 1/8 x 1/2 | .30 |
| B-023 | 1/8 x 3/4 | .43 |
| B-024 | 1/8 x 1 | .53 |
| B-025 | 3/16 x 3/16 | .21 |
| B-026 | 3/16 x 1/4 | .28 |
| B-027 | 3/16 x 3/8 | .29 |
| B-028 | 3/16 x 1/2 | .38 |
| B-029 | 3/16 x 3/4 | .46 |
| B-030 | 3/16 x 1 | .58 |
| B-031 | 1/4 x 1/4 | .29 |
| B-032 | 1/4 x 3/8 | .35 |
| B-033 | 1/4 x 1/2 | .42 |
| B-034 | 1/4 x 3/4 | .61 |
| B-035 | 1/4 x 1 | .70 |
| B-036 | 5/16 x 5/16 | .38 |
| B-037 | 5/16 x 3/8 | .47 |
| B-038 | 5/16 x 1/2 | .58 |
| B-039 | 5/16 x 5/8 | .71 |
| B-040 | 5/16 x 1 | .81 |
| B-041 | 3/8 x 3/8 | .55 |
| B-042 | 3/8 x 1/2 | .64 |
| B-043 | 3/8 x 3/4 | .77 |
| B-044 | 3/8 x 1 | .92 |
| B-045 | 1/2 x 1/2 | .72 |
| B-046 | 1/2 x 3/4 | .95 |
| B-047 | 1/2 x 1 | 1.16 |
| B-048 | 5/8 x 5/8 | .86 |
| B-049 | 5/8 x 1 | 1.28 |
| B-050 | 3/4 x 3/4 | 1.20 |
| B-051 | 3/4 x 1 | 1.40 |

### BAGS OF BALSA

| | | |
|---|---|---|
| B-524 | Bags of Balsa | 3.75 |

### ODDS & ENDS PACKAGE OF BALSA

| | | |
|---|---|---|
| B-534 | Packages | 2.65 |

### SHEETS - 18" Lengths

| | | |
|---|---|---|
| B-173 | 1/32 x 2 | .26 |
| B-174 | 1/16 x 2 | .28 |
| B-175 | 3/32 x 2 | .33 |
| B-176 | 1/8 x 2 | .38 |
| B-177 | 3/16 x 2 | .48 |
| B-178 | 1/4 x 2 | .61 |
| B-179 | 3/8 x 2 | .66 |
| B-180 | 1/32 x 3 | .37 |
| B-181 | 1/20 x 3 | .40 |
| B-182 | 1/16 x 3 | .42 |
| B-183 | 3/32 x 3 | .46 |
| B-184 | 1/8 x 3 | .56 |
| B-185 | 5/32 x 3 | .61 |
| B-186 | 3/16 x 3 | .67 |
| B-187 | 1/4 x 3 | .77 |
| B-188 | 5/16 x 3 | .93 |
| B-189 | 3/8 x 3 | 1.04 |
| B-190 | 1/32 x 4 | .55 |
| B-191 | 1/16 x 4 | .64 |
| B-192 | 3/32 x 4 | .67 |
| B-193 | 1/8 x 4 | .78 |
| B-194 | 3/16 x 4 | .95 |
| B-195 | 1/4 x 4 | 1.19 |
| B-196 | 3/8 x 4 | 1.47 |

### SHEETS - 36" Lengths

| | | |
|---|---|---|
| B-134 | 1/32 x 2 | .50 |
| B-135 | 1/16 x 2 | .55 |
| B-136 | 3/32 x 2 | .65 |
| B-137 | 1/8 x 2 | .73 |
| B-138 | 3/16 x 2 | .95 |
| B-139 | 1/4 x 2 | 1.20 |
| B-140 | 3/8 x 2 | 1.32 |
| B-141 | 1/32 x 3 | .73 |
| B-142 | 1/20 x 3 | .75 |
| B-143 | 1/16 x 3 | .81 |
| B-144 | 3/32 x 3 | .93 |
| B-145 | 1/8 x 3 | 1.11 |
| B-146 | 5/32 x 3 | 1.20 |
| B-147 | 3/16 x 3 | 1.32 |
| B-148 | 1/4 x 3 | 1.54 |
| B-149 | 5/16 x 3 | 1.81 |
| B-150 | 3/8 x 3 | 2.03 |
| B-151 | 1/32 x 4 | 1.03 |
| B-152 | 1/16 x 4 | 1.26 |
| B-153 | 3/32 x 4 | 1.32 |
| B-154 | 1/8 x 4 | 1.54 |
| B-155 | 3/16 x 4 | 1.88 |
| B-156 | 1/4 x 4 | 2.33 |
| B-157 | 3/8 x 4 | 2.89 |
| B-158 | 1/16 x 6 | 2.10 |
| B-159 | 3/32 x 6 | 2.37 |
| B-160 | 1/8 x 6 | 2.65 |
| B-161 | 3/16 x 6 | 3.06 |
| B-162 | 1/4 x 6 | 3.49 |
| B-163 | 3/8 x 6 | 4.47 |

### STICKS & MORE

| | | |
|---|---|---|
| B-643 | Package | 3.95 |

### STICKS - 48" Lengths

| | | |
|---|---|---|
| B-061 | 1/8 x 1/8 | .17 |
| B-062 | 1/8 x 1/4 | .26 |
| B-063 | 1/8 x 1/2 | .38 |
| B-064 | 3/16 x 3/16 | .28 |
| B-065 | 3/16 x 1/2 | .46 |
| B-066 | 3/16 x 3/4 | .61 |
| B-067 | 1/4 x 1/4 | .40 |
| B-068 | 1/4 x 1/2 | .55 |
| B-069 | 1/4 x 3/4 | .78 |
| B-070 | 5/16 x 5/16 | .50 |
| B-071 | 3/8 x 3/8 | .70 |
| B-072 | 3/8 x 1/2 | .81 |
| B-073 | 3/8 x 3/4 | .96 |
| B-074 | 1/2 x 1/2 | .95 |
| B-075 | 1/2 x 3/4 | 1.27 |

### 48" AAA SHEETS

| | | |
|---|---|---|
| B-388 | 1/32 x 3 | .92 |
| B-389 | 1/16 x 3 | 1.06 |
| B-390 | 3/32 x 3 | 1.25 |
| B-391 | 1/8 x 3 | 1.47 |
| B-392 | 3/16 x 3 | 1.80 |
| B-393 | 1/4 x 3 | 2.08 |
| B-394 | 3/8 x 3 | 2.74 |
| B-395 | 1/16 x 4 | 1.76 |
| B-396 | 3/32 x 4 | 1.98 |
| B-397 | 1/8 x 4 | 2.22 |
| B-398 | 3/16 x 4 | 2.82 |
| B-399 | 1/4 x 4 | 3.23 |
| B-400 | 3/8 x 4 | 4.62 |
| B-401 | 1/16 x 6 | 3.02 |
| B-402 | 3/32 x 6 | 3.52 |
| B-403 | 1/8 x 6 | 3.66 |
| B-404 | 3/16 x 6 | 4.50 |
| B-405 | 1/4 x 6 | 4.94 |
| B-406 | 3/8 x 6 | 6.35 |

### TRIANGULAR CUT BALSA 36"

| | | |
|---|---|---|
| B-416 | 1/4 x 1/4 | .47 |
| B-417 | 3/8 x 3/8 | .56 |
| B-418 | 1/2 x 1/2 | .70 |
| B-419 | 3/4 x 3/4 | .88 |
| B-420 | 1 x 1 | 1.15 |

### LAPPED EDGE BALSA SHEETS

| | | |
|---|---|---|
| B-610 | 1/16 x 3-1/4 x 36 | 1.25 |
| B-611 | 3/32 x 3-1/4 x 36 | 1.51 |

### BULK BALSA - 3" x 36"

Not Stamped or Sorted

| | | |
|---|---|---|
| B-506 | 1/32 x 3 | .65 |
| B-509 | 1/16 x 3 | .70 |
| B-510 | 3/32 x 3 | .81 |
| B-511 | 1/8 x 3 | .96 |
| B-512 | 3/16 x 3 | 1.17 |
| B-513 | 1/4 x 3 | 1.33 |
| B-514 | 3/8 x 3 | 1.75 |

### BLOCKS - 3" Lengths

| | | |
|---|---|---|
| B-251 | 1 x 1 | .16 |
| B-252 | 1 x 2 | .31 |
| B-253 | 2 x 2 | .44 |
| B-254 | 1 x 3 | .44 |
| B-255 | 2 x 3 | .58 |
| B-256 | 3 x 3 | .92 |

### BLOCKS - 6" Lengths

| | | |
|---|---|---|
| B-266 | 1 x 1 | .31 |
| B-267 | 1/2 x 2 | .42 |
| B-268 | 3/4 x 2 | .47 |
| B-269 | 1 x 2 | .58 |
| B-270 | 1-1/2 x 2 | .70 |
| B-271 | 2 x 2 | .80 |
| B-272 | 1/2 x 3 | .54 |
| B-273 | 3/4 x 3 | .64 |
| B-274 | 1 x 3 | .80 |
| B-275 | 1-1/2 x 3 | .94 |
| B-276 | 2 x 3 | 1.08 |
| B-277 | 3 x 3 | 1.74 |
| B-278 | 1/2 x 4 | .79 |
| B-279 | 3/4 x 4 | .90 |
| B-280 | 1 x 4 | .98 |
| B-281 | 1-1/2 x 4 | 1.26 |
| B-282 | 2 x 4 | 1.51 |
| B-283 | 3 x 4 | 2.37 |
| B-284 | 1/2 x 6 | 1.13 |
| B-285 | 3/4 x 6 | 1.33 |
| B-286 | 1 x 6 | 1.57 |
| B-287 | 1-1/2 x 6 | 2.15 |
| B-288 | 2 x 6 | 2.38 |
| B-289 | 3 x 6 | 3.35 |

### BLOCKS - 12" Lengths

| | | |
|---|---|---|
| B-299 | 1 x 1 | .59 |
| B-300 | 1/2 x 2 | .80 |
| B-301 | 3/4 x 2 | .94 |
| B-302 | 1 x 2 | 1.14 |
| B-303 | 1-1/2 x 2 | 1.38 |
| B-304 | 2 x 2 | 1.57 |
| B-305 | 1/2 x 3 | 1.01 |
| B-306 | 3/4 x 3 | 1.26 |
| B-307 | 1 x 3 | 1.57 |
| B-308 | 1-1/2 x 3 | 1.89 |
| B-309 | 2 x 3 | 2.29 |
| B-310 | 3 x 3 | 3.48 |
| B-311 | 1/2 x 4 | 1.59 |
| B-312 | 3/4 x 4 | 1.78 |
| B-313 | 1 x 4 | 1.94 |
| B-314 | 1-1/2 x 4 | 2.50 |
| B-315 | 2 x 4 | 3.04 |
| B-316 | 3 x 4 | 4.82 |
| B-317 | 1/2 x 6 | 2.20 |
| B-318 | 3/4 x 6 | 2.70 |
| B-319 | 1 x 6 | 3.22 |
| B-320 | 1-1/2 x 6 | 4.39 |
| B-321 | 2 x 6 | 4.98 |
| B-322 | 3 x 6 | 7.32 |

### BLOCKS - 18" Lengths

| | | |
|---|---|---|
| B-333 | 1 x 1 | .91 |
| B-334 | 1 x 2 | 1.75 |
| B-335 | 2 x 2 | 2.37 |
| B-336 | 1 x 3 | 2.37 |
| B-337 | 2 x 3 | 3.49 |
| B-338 | 3 x 3 | 5.23 |
| B-339 | 1 x 4 | 3.00 |
| B-340 | 2 x 4 | 4.58 |
| B-341 | 3 x 4 | 7.32 |
| B-342 | 1 x 6 | 5.34 |
| B-343 | 2 x 6 | 8.20 |
| B-344 | 3 x 6 | 13.20 |

### BLOCKS - 24" Lengths

| | | |
|---|---|---|
| B-354 | 1 x 1 | 1.20 |
| B-355 | 1 x 2 | 2.30 |
| B-356 | 2 x 2 | 3.20 |
| B-357 | 1/2 x 3 | 2.11 |
| B-358 | 1 x 3 | 3.20 |
| B-359 | 2 x 3 | 4.61 |
| B-360 | 3 x 3 | 6.98 |
| B-361 | 1 x 4 | 3.95 |
| B-362 | 2 x 4 | 6.12 |
| B-363 | 3 x 4 | 9.70 |
| B-364 | 1 x 6 | 6.55 |
| B-365 | 2 x 6 | 9.77 |
| B-366 | 3 x 6 | 14.42 |

### TAPERED CUT SHEETS - 36"

| | | |
|---|---|---|
| B-430 | 1/4 x 3 | 1.48 |
| B-431 | 1/4 x 4 | 2.29 |

### LEADING EDGE - 36" Lengths

| | | |
|---|---|---|
| B-085 | 1/2 x 3/8 | .75 |
| B-086 | 3/4 x 5/8 | 1.30 |
| B-087 | 1 x 3/4 | 1.67 |

### 36" ROUNDED EDGE AILERON & ELEVATOR STOCK

| | | |
|---|---|---|
| B-441 | 1/4 x 1 | .98 |
| B-442 | 3/8 x 1 | 1.13 |
| B-443 | 1/4 x 2 | 1.51 |
| B-444 | 3/8 x 2 | 1.72 |

### AIRFOILED SHAPED SHEETS

| | | |
|---|---|---|
| B-111 | 3/16 x 3 x 36 | 1.51 |
| B-112 | 1/4 x 3 x 36 | 1.72 |
| B-113 | 1/4 x 4 x 36 | 2.54 |

### TAPERED TRAILING EDGE 36" Lengths

| | | |
|---|---|---|
| B-097 | 1/8 x 1/2 | .45 |
| B-098 | 3/16 x 3/4 | .58 |
| B-099 | 1/4 x 1 | .78 |
| B-100 | 5/16 x 1-1/4 | .92 |
| B-101 | 3/8 x 1-1/2 | 1.07 |

### MODEL BUILDER'S ASSORTMENT

| | | |
|---|---|---|
| B-600 | Balsa Wood Assort. | 12.95 |

### PLANKS - 36" Lengths

| | | |
|---|---|---|
| B-206 | 1 x 1 | 1.78 |
| B-207 | 1/2 x 2 | 2.39 |
| B-208 | 3/4 x 2 | 2.80 |
| B-209 | 1 x 2 | 3.51 |
| B-210 | 1-1/2 x 2 | 4.20 |
| B-211 | 2 x 2 | 4.75 |
| B-212 | 1/2 x 3 | 3.08 |
| B-213 | 3/4 x 3 | 3.78 |
| B-214 | 1 x 3 | 4.75 |
| B-215 | 1-1/2 x 3 | 5.72 |
| B-216 | 2 x 3 | 6.91 |
| B-217 | 3 x 3 | 10.53 |
| B-218 | 1/2 x 4 | 4.75 |
| B-219 | 3/4 x 4 | 5.35 |
| B-220 | 1 x 4 | 5.95 |
| B-221 | 1-1/2 x 4 | 7.56 |
| B-222 | 2 x 4 | 9.18 |
| B-223 | 3 x 4 | 14.53 |
| B-224 | 1/2 x 6 | 7.50 |
| B-225 | 3/4 x 6 | 8.98 |
| B-226 | 1 x 6 | 10.49 |
| B-227 | 1-1/2 x 6 | 14.75 |
| B-228 | 2 x 6 | 15.95 |
| B-229 | 3 x 6 | 25.95 |

### 36" C-GRAIN AAA 8 - 12 LBS.

| | | |
|---|---|---|
| B-470 | 1/32 x 2 | .58 |
| B-471 | 1/16 x 2 | .64 |
| B-472 | 3/32 x 2 | .75 |
| B-473 | 1/8 x 2 | .83 |
| B-474 | 3/16 x 2 | 1.03 |
| B-475 | 1/4 x 2 | 1.30 |
| B-476 | 3/8 x 2 | 1.43 |
| B-477 | 1/32 x 3 | .83 |
| B-478 | 1/16 x 3 | .89 |
| B-479 | 3/32 x 3 | 1.05 |
| B-480 | 1/8 x 3 | 1.19 |
| B-481 | 3/16 x 3 | 1.42 |
| B-482 | 1/4 x 3 | 1.64 |
| B-483 | 3/8 x 3 | 2.15 |

### VH - VERY HARD

| | | |
|---|---|---|
| B-493 | 1/16 x 3 | .88 |
| B-494 | 3/32 x 3 | 1.00 |
| B-495 | 1/8 x 3 | 1.17 |
| B-496 | 3/16 x 3 | 1.39 |
| B-497 | 1/4 x 3 | 1.61 |
| B-498 | 3/8 x 3 | 2.10 |

### CONTEST BALSA - 36"

Very Light 4 - 6 Lb. Stock

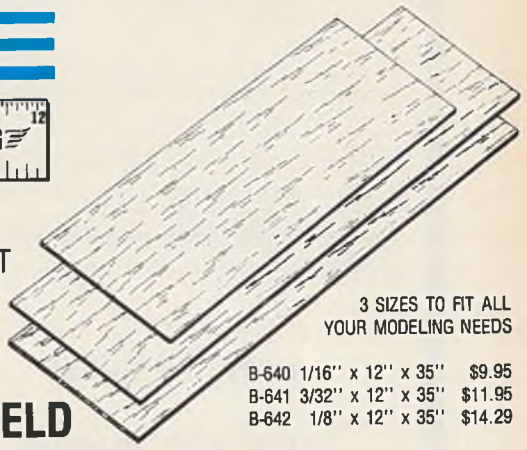
| | | |
|---|---|---|
| B-454 | 1/32 x 3 | .99 |
| B-455 | 1/16 x 3 | 1.05 |
| B-456 | 3/32 x 3 | 1.15 |
| B-457 | 1/8 x 3 | 1.45 |
| B-458 | 3/16 x 3 | 1.60 |
| B-459 | 1/4 x 3 | 1.85 |
| B-460 | 3/8 x 3 | 2.39 |

All prices subject to change without notice.

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# SIG BALSA GOES WIDE



## SIG'S NEW 12" WIDE SHEETS

PRECISION MADE BY A NEW METHOD OF SAWING AND SANDING THAT HELPS INSURE EVEN THICKNESS THROUGHOUT THE SHEET.

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| | | |
|---|---|---|
| B-640 | 1/16" x 12" x 35" | $9.95 |
| B-641 | 3/32" x 12" x 35" | $11.95 |
| B-642 | 1/8" x 12" x 35" | $14.29 |

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**SIG MANUFACTURING COMPANY . . . . Montezuma, IA 50171**

PH: 515-623-5154 FAX: 515-623-3922 Toll Free Orders: 1-800-247-5008 For Complete SIG Catalog - Send $3.00

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| 5% | $ 6.00 | 25% Boat | $12.75 |
| 10% | 7.89 | 40% Boat | 16.25 |
| 15% | 9.35 | 50% Boat | 19.59 |
| 25% | 11.89 | 60% Boat | 23.59 |
| 40% | 17.00 | Helicopter | 8.30 |
| 10% 4-cycle | 7.49 | FAI | 5.25 |
| 15% 4-cycle | 8.89 | Tartan | 6.00 |
| 1/2 A | 12.49 | Methanol | 2.99 |
| 1/2 A (Quart) | 3.35 | Nitromethane | 36.00 |

VISA/MASTERCARD-CODs Welcome
Personal checks require 2 weeks for bank clearance
Prices do not include shipping. We ship in four gallon case lots, mixed or matched. Listed prices subject to change without prior notice.

*Special Offer: with every case ordered, get a $10.00 "FUEL WIZARD" fuel pump for $5.00.*

metal gear trains. The model 94151 servo weighs 1.9 oz., has a torque of 75 oz./in. and uses a molded output gear. The model 94152 servo weighs 2.4 oz., has a torque of 105 oz./in. and uses a metal output gear. The third, model 94161 caught my eye because its torque is 135 oz./in. weighs 2.5 oz. and has a metal output shaft. All three of these Pro-Series servos are waterproof and feature advanced electronics and Surface Mount Technology. Their address and telephone number are listed in advertisements in this issue.

If any one is interested in acquiring more batteries, a call to the Hobby Division of Progressive Technologies, 1325 Ivy Ave., Winston-Salem, North Carolina 27115, might be helpful. These folks do not sell batteries directly but they will be glad to send you to one of their dealers who handle their extensive line. Using computerized LAVco matching equipment, the folks at PT match primarily Sanyo cells to maximize the performance of the packs.

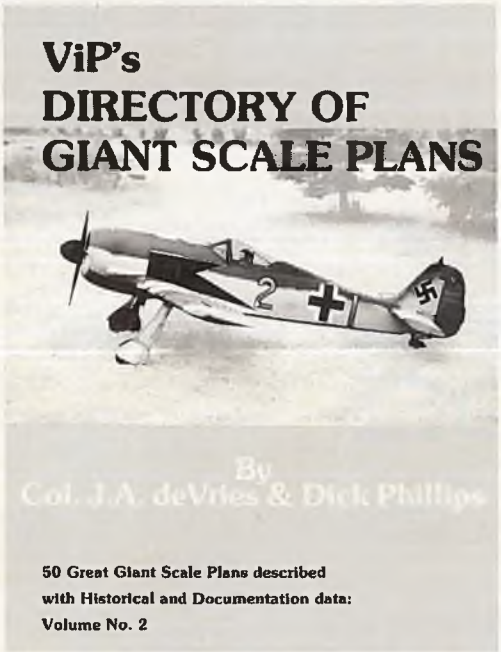
In addition to sizes from 700 to 4700 mAh in SC, SCE, and SCR configurations, they also have racing packs that utilize shotgun tube wrappers, plastic separators, silicone wire, and end caps designed to seal the pack. They also have specially constructed cells for their R/C-1400 SC packs that can be charged at 6 amps for 15 to 18 minutes and are advertised as such. Their distinctive logo is shown on the 4 cells in Photo #2.



These are the folks who have supplied matched packs to JR Radio Control for use in the Kalt Whisper electric helicopter.

Until next time, let's do it silently. □

ViP's DIRECTORY OF GIANT SCALE PLANS



By Col. J.A. deVries & Dick Phillips

50 Great Giant Scale Plans described with Historical and Documentation data: Volume No. 2

only $14.95

For Ordering Info, see page 251

# ViP's DIRECTORY OF GIANT SCALE PLANS
## VOLUME NO. 2

Now available from R/C Modeler is ViP's newest Directory of Giant Scale Plans. From Warbirds to Racers, Golden Age to Civilian, this book covers 50 new plans from such names as: Holman, Hostetler, Hangar One, and DP Systems. Each plan tells about the full scale aircraft, has a review of the plans, and is rated by the authors on degree of difficulty.

# THE MAKINGS OF A WORLD CHAMPION. TEAM ASSOCIATED RC12L.




Custom painted and detailed Associated Corvette GTP body shown. RC12L kits do not include body, electronic speed control and radio equipment.

## RC12L

*IFMAR WORLD CHAMPION*
*ROAR NATIONAL CHAMPION*



Offset motor design balances weight between the rear wheels.

New superlight front and rear wheels.

Carbon fiber and fiberglass versions of the RC12L give the serious racer a choice.

Not all kits contain batteries and/or motor.
Electronic speed control required and not included.




REEDY motors have powered 1:10 and 1:12 scale World Champions.



What does it take to win the 1:12 Scale World Championships?

Factory ace Tony Neisinger found the new Associated RC12L to his liking in leading the Team's dominating 1, 2, 3, 5 finish.

Tony's edge on the carpet at Las Vegas's Tropicana wasn't luck.

His carbon-fiber RC12L is our most advanced and best balanced 1:12 scale race car ever.

Innovative new T-ball, 360 degree-damped rear suspension, saddle-pack battery configuration and centered motor design all helped the Neisinger RC12L out-handle the World's best.

Now, joining the World Champion carbon fiber RC12L is an even newer, fiberglass version. Already victorious in three straight SoCal region events in the able hands of Kent Clausen, the 'glass RC12L is just plain hot on asphalt.

So pick a winner. Carbon fiber or fiberglass, the RC12L has the makings of a World Champion.



CNC-machined motor carrier (Carbon fiber version only) also functions as a heat sink. Axle height adjustment inserts give you a choice of five settings.




2-time World 1:12 Champion, Tony Neisinger shows off his winning, Reedy-powered RC12L.



T-ball suspended rear pod incorporates precision tweak adjustment.

*Associated Electrics*
*3585 Cadillac Avenue/Costa Mesa, CA 92626*

TEAM ASSOCIATED

WINNERS OF **6** WORLD CHAMPIONSHIPS!

©1987 Associated Electrics

# If you could only have one R/C airplane
# *TELEMASTER 40* should be the one!




HLA111 Hobby Lobby **Telemaster 40** . . . . . **$79.50**
List price $99.95

There are beginners who could probably solo fly a fast RC pattern plane successfully. And there are other beginners who may not be able to solo fly anything. But, if ever there was an airplane that could be said to have the best chance of being flown (i.e.; **landed**) successfully by a beginner **Telemaster 40** is the one.

**Telemaster 40** will take off, fly itself, and land itself. If you are a beginner, build it fairly well, and do some imaginary flights before the actual first flight, you will probably have no problems soloing the Telemaster 40 on your first RC flight.

If this sounds boring and you'd like a bit more action we can assure you that **Telemaster 40** will also do loops, rolls, tail slides, inverted flight, Cuban Eights, Immelmans and other aerobatics as yet unnamed. At full power with a .40 engine it will fly 70 mph. But, it will not stall at 10 mph. It's big enough to be clearly visible in the air, and is readily discernible to be inverted or right side up at a distance.

**Telemaster 40** has an Assembly Instruction book that describes and pictures every building step. And the wood parts are as precisely cut as the most expensive kits on the market. Quality is tops — the Telemaster 40 is made for us by Great Planes Model Manufacturing Company.

**Telemaster 40** has a wing loading lighter than most gliders. Light airplanes simply fly better than heavy ones. We have seen Telemaster 40's fly successfully that were so badly assembled we could hardly believe they would fly. But they do fly. One in particular: The pilot's little brother sat on the tail and broke it off. The field repair was a piece of 2" by 4" balsa block under each side of the horizontal stab. The builder flew this repaired Telemaster 40 three times successfully and unassisted and these were his first RC flights ever.

**Telemaster 40:** 73" wing span, 848 sq. in. wing area. 53½" long fuselage (the airplane is big), all balsa and hardwood RC model airplane kit. For 3 to 5 RC channels. It flies well on only 3 channels —rudder, elevator and throttle. But the kit includes both wing flaps and ailerons. With flaps extended Telemaster 40 can land in a headwind at zero groundspeed. It flies nicely on .19 through .40 size engines. It comes with tricycle landing gear, but can also be flown as a taildragger.

We have sold over 9,000 Telemaster 40's and most of them were bought because of recommendations from modelers who own them. We figure that a fourth of them are bought by beginners. But, most Telemaster 40's are bought by long-time RCers who seem to like airplanes that build up the way they're supposed to and fly like airplanes ought to.

HLA111WI **HL Wing Kit Only for Telemaster 40** . . . . . **$44.00**
List price $51.95

## *Electric Power for Telemaster 40!*

Telemaster 40 seems to have been made for **electric power!** The following are the recommended items for the **complete outfit:**

HLA111 Telemaster 40 kit
HLA111AP Accessory Pack for Telemaster 40
AST6625G Astro Flight Cobalt 25 Geared Motor
AST4008R Thru-bulkhead Motor Mount for Astro 25
GP11070 Graupner 11-7 Prop
ROA500 Robart Electric Speed Control
BAT607 (two) 7 Cell Nicad Packs
SER001 (two packs) Sermos connectors
AST112 Astro Constant Amp field charger



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Fax: (615) 377-6948

**NEW!**

*The very best biplane kit we've ever seen!*




HLA3731 HL/MFA **"Golden Eagle" Biplane** . . . . . **$226.00**
List price $284.95

Top quality throughout the kit results in a model that will be very long lasting and a source of pride to you. **Golden Eagle** has a beautifully molded fiberglass fuselage with molded fabric effect in the rear top. It has foam wing panels that are presheeted with obechi veneer.

This may be the easiest biplane kit ever to align correctly. It has preformed and predrilled aluminum wing struts that fit into molded slots in the fuselage. Every balsa part is cut to shape. All linkages, horns, hinges, as well as engine mount, fuel tank and aluminum main gear are included. Excellent instructions are included. MFA took two years to perfect this kit. You'll see the results when your kit arrives.
Golden Eagle is highly aerobatic as any great biplane should be.

| Wingspan | Length | Wing Area | Flying Wt. | For engines | RC Functions req'd. |
|---|---|---|---|---|---|
| 47" | 39" | 800 sq. in. | 88-104 oz. | .40 2-stroke<br>.40-.46 4-stroke | 4 channels:<br>R,E,A,M |

*You'll be surprised by the quality of this kit. You'll be surprised by its low price!*



HLA303 HL/MFA **High Sierra Sailplane** . . . . . **$132.00**
List price $164.95

**An incredible amount of prefabrication for a most reasonable price:** the fuselage is pre-colored fiberglass; and the foam wings come precovered with hardwood veneer. **High Sierra** flies extremely well in thermals, but its durability makes it a natural for slope soaring and beginners' hard landings.

**It is a slow flying sailplane that is excellent for beginners** particularly if the CG is kept forward to about 2½" back from the leading edge of the wing (measured at the root). Launch it with **HLH722 HI-Start,** or throw it off a slope, or tow it aloft behind a tow plane, or use **HLA3031 Power Pod for High Sierra** (for .049 - .06 glow engine) (see price list in back of catalog). Also included are; formed canopy, tow hook, balsa precut flying stab, rudder, wing tips, a simple plan with clear instructions, pushrods, clevises, horns, hinges, and decals. Unique to High Sierra is the mounting system for the wing rods. These mount the 2-piece wing accurately without the usual difficulty in locating the sockets.

| Wingspan | Length | Wing Area | Airfoil: | RC Functions req'd. |
|---|---|---|---|---|
| 79" | 42½" | 490 sq. inches | 15% flat | Rudder, elevator |

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Fax: (615) 377-6948

# HERE is the very best R/C helicopter for the modeler who has never built or flown an R/C helicopter!






HLA400 Hobby Lobby/MFA

**SPORT 500 HELICOPTER ..... $199.00**

List price $249.50

**Here are the reasons that SPORT 500 is the best helicopter for a beginner helicopter flyer:**

### It flies well!

SPORT 500 is **lightweight,** has a **proven Hiller teter-rotor control system,** and was designed by an active RC helicopter flyer and engineer — Chris Baker — with **beginning helicopter flyers in mind the whole time.** Its light weight means that SPORT 500 is never marginal — it flies easily and lightly, not just barely and "on the edge"

### Construction is easy.

For example: Instead of a special adapter to fit the cooling fan, drive takeoff, and starter pulley to the engine shaft, they simply mount like a propeller — the shaft goes through the holes (which can be drilled larger to fit any conceivable engine) and the whole works is held with the prop nut.

Another example: Every construction step **(there are only 31 steps!)** is described in very few words and accompanied by one or more **photographs** that show that step!

### It works well:

SPORT 500 is "over-designed" — there are **ball bearings** instead of the more maintenance prone bushings in almost every possible shaft support. The clutch is all steel (except the lining) for **durability.** The chassis, engine mount, landing gear, rotor head, and other assemblies are **so strongly made** that minor accidents and jolts will not "ground" your SPORT 500.

**Starting the engine is easy** because of the sensible engine location and the use of a simple starting belt.

**Adjustments are easy** because the cabin only encloses the radio gear — all the mechanics are open and reachable.

The fixed-pitch rotor head is **damage resistant and easy to adjust.**

**The engine cooling shroud fits close to the engine head and eliminates engine cooling problems.**

The rotor runs at about **half the speed** of other helicopters because of the belt reduction system. This not only makes **clutch engagement more progressive** and **puts less strain on the mechanics,** but also makes SPORT 500 **sound more realistic** in flight.

The teter damper is spring steel not unpredictable plastic or rubber and you'll notice **more predictable control response** because of this. The rotor blades are preshaped, predrilled, composite hardwood and balsa and are supplied in matched pairs. The tail rotor blades are preshaped and drilled hardwood.

Because SPORT 500 uses a fixed-pitch head it does not have auto rotation capability. However, few beginners could use auto rotation even if their helicopter was equipped to do it, and the gain in **simplicity and durability** makes it worthwhile **not** to have it.

SPORT 500 takes any .40 or .45 2-stroke model airplane engine (Schnuerle ported engines are recommended), and any 4 channel radio (a gyro is recommended). Rotor diameter is 42". Flying weight (including gyro and oversized receiver nicads) is only 7 pounds.

***In stock for IMMEDIATE shipment!***

***Call (615) 373-1444 and order SPORT 500 now!***

**(Charge it to M/C, Visa, American Exp., Discover)**

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## SUPERKOTE®

***Superkote:** the **easiest** covering material to apply, the **best-looking** colors!*




***SALE! Order 4 rolls, pay for 3!***

**Hobby Lobby SUPERKOTE, 26" wide, 6'roll . . . . . $7.10 each**

HLC601 **Cessna White**
HLC602 **Beechcraft Red**
HLC603 **Piper Yellow (Lt.)**
HLC604 **Waco (med.) Blue**
HLC605 **Ryan Orange (light)**
HLC606 **Lux (light) Blue**
HLC607 **Metallic Gold**
HLC608 **U.S.A.F. Aluminum**
HLC609 **Midnight Black**
HLC610 **Circus Pink**
HLC611 **Terra Green (light)**
HLC612 **Blue Gray**
HLC613 **Metallic Blue**
HLC614 **Metallic Green**
HLC615 **Violet**
HLC616 **Champion Yellow (Dk.)**
HLC617 **Metallic Red**
HLC618 **Dark Red**
HLC619 **Airforce Blue**
HLC620 **Dark Blue**
HLC621 **Midnight Blue**
HLC630 **Trans. Yellow**
HLC631 **Trans. Orange**
HLC632 **Trans. Red**
HLC633 **Trans. Blue**

**FLUORESCENT COLORS!**
**26" wide, 6' foil . . . . . $7.80**
HLC640 **Fluorescent Red**
HLC641 **Fluorescent Yellow**

**Superkote** is a plastic, iron-on heat-shrink model covering material that has a strong adhesive to bond it to the model, and vibrant colors with a very high gloss finish. Each roll is 26" wide and 6 feet long.

Superkote is the **easiest covering material to apply** because:

1. Superkote keeps shrinking while you apply heat from your iron or heat gun so that **every wrinkle disappears.**
2. Superkote has **easy to understand instructions** with each roll.
3. Superkote adheres to itself with such strength that overlapping **joints are not only permanent, but are nearly invisible.**
4. Superkote is **easy to repair** in case of minor punctures and crash damage.
5. Superkote is ironed on to airplane structures with low heat and then shrunk with medium iron heat — so applying it **won't damage heat sensitive foam and sheeted foam airplane structures.**

## SUPERFABRIC®

***Superfabric:** easily applied, this incredibly **strong** covering **may improve your plane's flight!***




**Hobby Lobby SUPERFABRIC, 78" x 26'' roll . . . . . $11.80**

HLC501 **Superfabric, WHITE**
HLC502 **Superfabric, YELLOW**
HLC503 **Superfabric, RED**
HLC504 **Superfabric, ORANGE**
HLC505 **Superfabric, BLUE**
HLC506 **Superfabric, OLD TIMER (buff)**

**Superfabric** is a woven fabric iron-on heat-shrink model covering material that has a strong adhesive to bond it to the model. The colors are slightly transparent. Each roll is 26" wide and 6-1/2 feet long.

Superfabric has some highly desireable characteristics:

1. It is very easy to apply because it keeps shrinking while you apply heat from your iron or heat gun so that **every wrinkle disappears.**
2. Once in place it is extremely strong and puncture resistant, and greatly **increases the strength of your airplane's structure.**
3. It has a **scale weave** for scale models of fabric covered aircraft.
4. Superfabric should be considered for covering the wings of high speed model airplanes. The texture of its weave promotes **good boundary layer airflow and lower drag** than smooth coverings.

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***NEW!*** *Taxis out, takes off, flies in thermals, flies aerobatically, lands, and taxis back to you!* ***Electrically!***



HLAN1114 HL/Aeronaut **Elektro-Cat . . . . . $115.00**
List price $149.95

A conventional balsa and plywood construction kit, **Elektro-Cat** will fly in thermals or on slopes, and will do gentle aerobatics. It is an excellent trainer but also will fly at high speeds if you want. Its landing gear gives it the ability to taxi and to do landings and touch-and-go's.

The kit contains die cut balsa parts, die-marked plywood pieces, non-deforming fiberglass main landing gear, deep drawn ABS parts, decals, numerous small hardware parts and wheels, excellent plan with English language instructions, and an exploded drawing.

**We recommend: GR1789 Motor, $14.30; GP08040 Prop, $3.40; B7900RN Nicad, $39.00; HT1801 Proportional motor control/-receiver Battery Eliminator, $53.40.**

| Wingspan | Length | Wing Area | Flying Wt. | Wing loading | RC Functions req'd. |
|---|---|---|---|---|---|
| 69" | 39" | 488 sq. in. | 53 to 60 oz. | 15 to 18 oz. per sq. ft. | 3 channels: Rudder, Elevator, Throttle |

*Ready-built and covered —* ***great*** *soaring and our best electric glider for beginners!*



GR4270 HL/Graupner **Elektro-Junior Sailplane . . . . . $179.00**
List price $230.00

Almost ready to fly — and the wing is a handbuilt and hand-covered balsa rib and spar structure. You have to construct the cockpit and install the motor/prop unit and your radio. Elektro-Junior has the nearly indestructable UHU ready built plastic fuselage.

Elektro-Junior is one of the best planes we can think of for RC beginners. And, among expert flyers it is becoming one of the most wanted electric thermal soarers. We have all flown this one. Ask us how we like it!

**We recommend: GR1162 Motor and Propeller outfit, $34.00; B71200RN Nicad, $38.00; GR3871 Power Switch 20 Motor Control/-Receiver Battery Eliminator, $54.90.**

| Wingspan | Length | Wing Area | Flying Wt. | Wing loading | RC Functions req'd. |
|---|---|---|---|---|---|
| 83" | 40" | 521 sq.in. Eppler 193 | 49 oz. | 13.5 oz./sq.ft. 20 oz./sq.ft. | Rudder, Elev., Motor control |

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***HUGE Taurus-PLUS:** the kind of aerobatic **monster** RC plane you've only dreamed of flying!*






HLSC232 HL/Scorpio **Taurus PLUS** . . . . . **$309.00**
List price $389.00

BIG! Taurus PLUS is a 7-1/2 foot wingspan, 12 pound **giant!** It was designed for unlimited aerobatics with large engines. It has turned out to be such a great flyer that Scorpio has trouble keeping up with the demand and there is occasionally some delay in getting these.
Taurus PLUS has a two-piece wing that plugs into a big 1" diameter dihedral brace. This allows the airplane to be carried in a small automobile. The largest single part — the fuselage — is 5 feet long and each wing half is smaller than that.

| Wingspan | Length | Wing Area | Flying Wt. | Wing loading | For engines | RC Controls |
|---|---|---|---|---|---|---|
| 90" | 59" | 836 sq.in. | 172-206 oz. | 23-28 oz/sq.ft. | .60-.80 2-stk.<br>.80-1.20 4-stk. | 4-5 channel<br>(opt.flaps) |

*Every RCer should own a **Due***




HLSC233 HL/Scorpio **DUE** . . . . . **$84.00**
List price $105.00

"Due" (pronounced doo-ay) means "two" in Italian — this is a 2 channel airplane. It is the easiest RC airplane to carry in your car. It's basically a glider and can be flown anywhere; on slope updrafts, as an .049 boosted sailplane for thermal flying, hi-start launched, or hand-thrown. DUE has a solid fuselage and Jedelsky wing so it's practically unbreakable. As in Top Quark the Jedelsky wing gives outstanding long, handing glides.
DUE is a great place to install an unused 2-channel RC system. The open radio installation is novel and lets you make radio adjustments and change dry cell batteries in the airborne battery pack instantly.

| Wingspan | Length | Wing Area | Flying Wt. | Wing loading | For engines | RC Controls |
|---|---|---|---|---|---|---|
| 57" | 38" | 247 sq.in. | 31-36 oz. | 12-15 oz/sq.ft. | .049 | 2 channel<br>Rud.,Elevator |

**Recommended major items to complete for RC flying:** Radio, FUT406; Engine, COX108; Prop, GP06040; Accessory Pack: (everything but RC 7 engine), HLSC233A.

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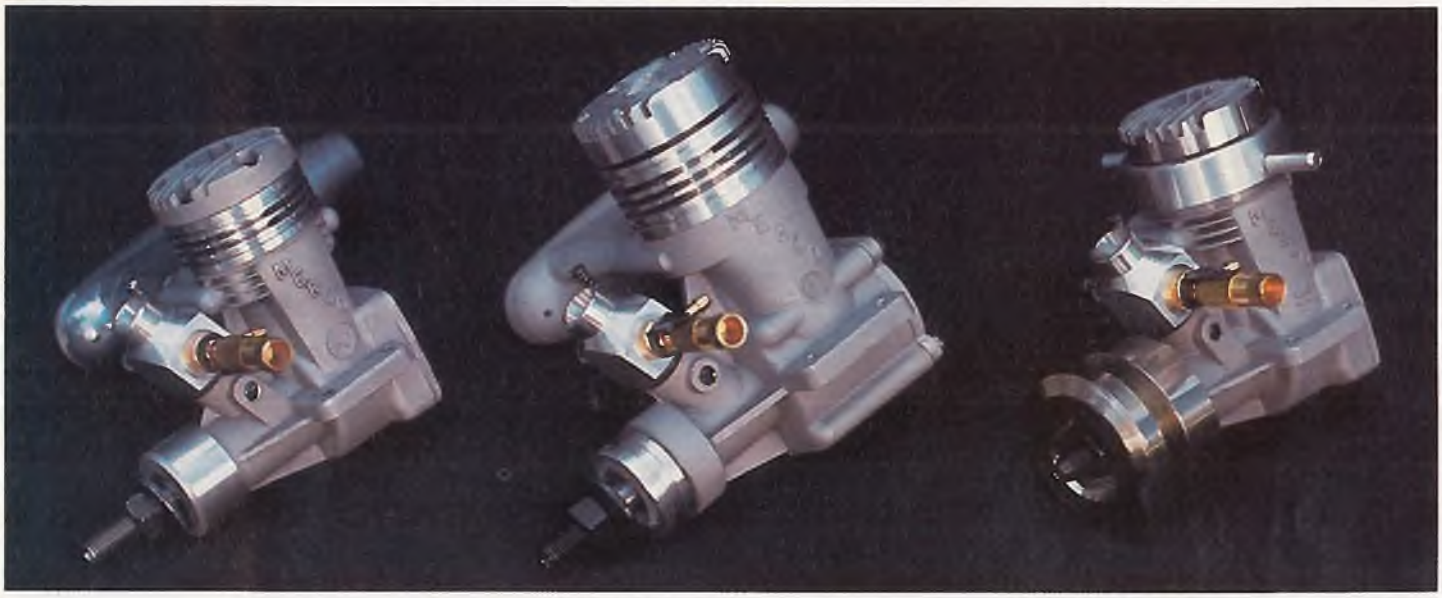
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# Buy other engines to add to your collection, but, buy a Merco to USE it!

Merco engines are **made to be used;** they are easy to start; they have lots of torque throughout their RPM range; they draw fuel well without the use of fuel pumps; they idle reliably at low RPM; they accelerate well; they are lightweight; they are simple to use and to adjust; they are durable; they last a long time; parts are readily available; and in the USA Hobby Lobby guarantees them for the life of the engine.

So, those other engines that are too fancy and too expensive to use — just have them bronzed like the baby's shoes, and display them in your engine collection.

## And, what to do with your Hobby Lobby Merco engine? USE IT!



**Merco Radio control engines** with throttles:

| | | List price: | HL Price: |
|---|---|---|---|
| MER30RC | **30 RC** | $74.95 | **$59.00** |
| MER35RC | **35 RC** | $74.95 | **$61.00** |
| MER40RC | **40 RC** | $79.95 | **$63.00** |
| MER50RC | **50 RC** | $136.95 | **$109.00** |
| MER61RC | **61 RC** | $139.95 | **$111.00** |

**Merco Marine RC engines** with throttles, water jackets, flywheels:

| | | List price: | HL Price: |
|---|---|---|---|
| MER30M | **30 Marine** | $124.95 | **$99.00** |
| MER35M | **35 Marine** | $139.95 | **$110.00** |
| MER40M | **40 Marine** | $154.95 | **$123.00** |
| MER50M | **50 Marine** | $179.95 | **$143.00** |
| MER61M | **61 Marine** | $189.95 | **$151.00** |

**Merco Control line engines** (no throttles):

| | | List price: | HL Price: |
|---|---|---|---|
| MER30S | **30 Stunt** | $74.95 | **$59.00** |
| MER35S | **35 Stunt** | $74.95 | **$61.00** |
| MER40S | **40 Stunt** | $79.95 | **$63.00** |
| MER50S | **50 Stunt** | $136.95 | **$109.00** |
| MER61S | **61 Stunt** | $139.95 | **$111.00** |

All Merco aircraft engines come with mufflers, and without glow plugs. 50 and 61 size Merco engines have crankshaft ballbearings and piston rings. 30, 35, 40 size Merco engines have ABC matched pistons and cylinder liners. All RC carburetors have adjustable idle stops and adjustable and variable idle mixture needle valves. Merco engines are made in England.

MERCO

| Merco engine: | Stroke ("): | Bore ("): | HP: | ¢ max. RPM:* |
|---|---|---|---|---|
| .30 | .704 | .735 | .60 | 13,500 |
| .35 | .704 | .800 | .65 | 13,500 |
| .40 | .704 | .850 | .75 | 13,500 |
| .50 | .806 | .880 | .85 | 13,500 |
| .61 | .875 | .940 | 1.00 | 13,500 |

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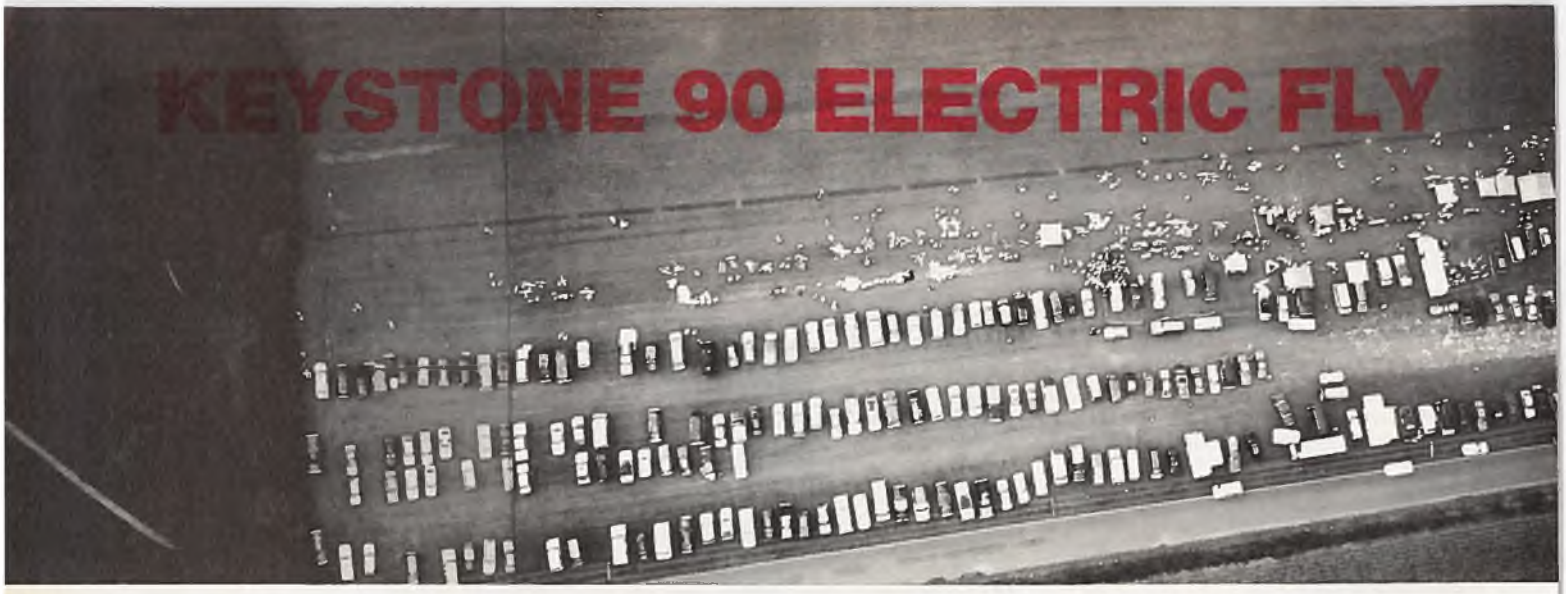
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# KEYSTONE 90 ELECTRIC FLY



## By Ted Davey

Awesome, huge, incredible, crowded, and enormous are a few of the descriptions that you heard if you were at this year's version of a classic electric fun fly north of Quakertown, Pennsylvania in the middle of September. The Keystone R/C Club had a real job on their hands to keep an affair of this size running smoothly and they did it! This year there were 134 registered pilots and over 300 models, which is about a 15% increase over last year.

There were all types, sizes, and descriptions of models with a very large percentage of them scratch built. In the past the 05/075 size motor driven model has been the most popular and I think it still has an edge over the larger motors, but not for long. The 25, 40, and 60 sizes , as well as a sprinkling of 15's are soon going to have the largest share on the field. There are also more of the smaller motors being run on more cells with electronic throttles. Eight and nine cell packs are becoming more commonplace as they work well when used with a throttle and a carefully selected prop.

The club supplies on-site charging batteries that are wired to generators that were kept running all day. They also supplied many helping hands, a snack bar, and porta-potties along with an enormous parking lot which was overflowing. They also had a number of events as you can see from the listing later on in this article.

Every year club members sell raffle tickets for completed, built up and ready to fly models. These models include the radio and are test flown. This year there were two on both Saturday and Sunday. This year Bill Passarelli from New York won the Astro Porterfield, powered by a cobalt 25 and Ben




Photo #2

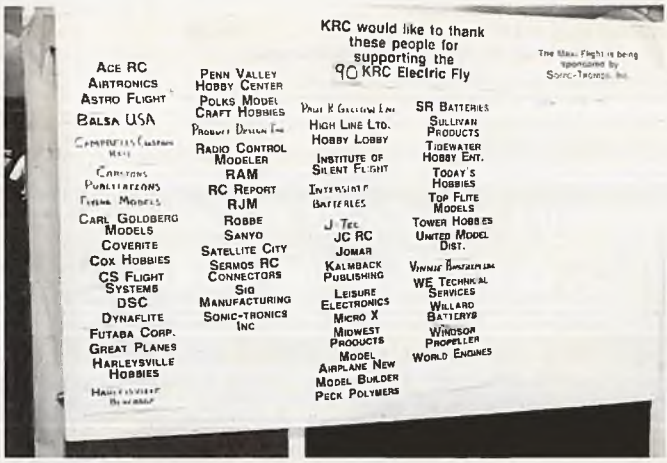



Photo #3



Photo #4



Photo #5



Photo #6



Photo #7




Photo #8

Bendit, also from New York won the Electro Junior. On Sunday, Connie Sylvia, the charming wife of Charlie Sylvia of C.S. Flight Systems fame, won a Skyvolt and Bob Grannascoli of Philadelphia, Pennsylvania, won an Amptique. Last year Bob won an Eclipse at the Sunday raffle! He's been trying to get some help to learn how to fly but the club members at a field near him don't have much interest in electrics. I can't tell you how many times I've heard that. Some of the Keystone group have graciously offered to lend a hand.

The aerial shot of the field is actually a composite of two photos to show the size of the field. They were taken almost at the same altitude so it's not a bad match. There is still about sixty feet of field missing on the right side. I thought I had it all but apparently I should have been higher. I have decided that there are two very basic rules that must be followed when attempting this type of photography. First use a 36 exposure roll of film and if you think that you are high enough, go higher. The Powerhouse shown in Photo #2 is the camera ship. It is an 84" oldtimer designed by Sal Taubi in the late thirties and it is one of my kits. It flies on an Astro Cobalt 40 with gears on 21 cells. The Fuji camera mounts in a little box that is bolted to the fuselage with a servo mounted to the box. The camera automatically advances the film after each shot and the servo is actuated with the rudder control. It helps to use the flash to tell you that the camera is working. The flash also gives an indication of whether or not you are level as you can tell from the intensity if you are aimed down or to the side.

The Eindecker behind the Powerhouse actually has a wing over the oldtimer's stab but it still looks tiny. The span is 40" and it flies on an 075 with seven SR Batteries, 1250 mAh cells. This model has the new Airtronics model MA-3 BEC speed controller and it works great. This unit is designed to work with Airtronics radios on

**continued on page 58**



Photo #9



Photo #10



Photo #11



Photo #12



Photo #13

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by Ray Hostetler (Contributing Editor)

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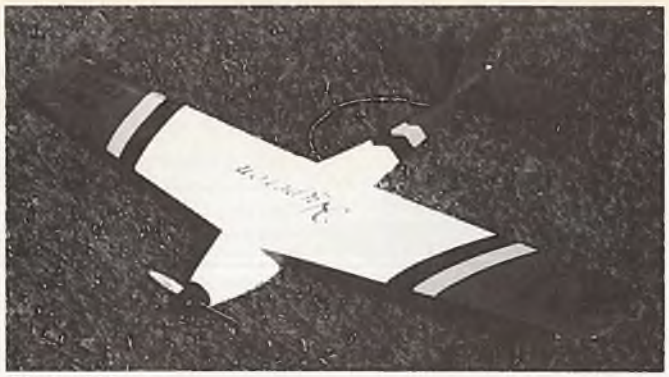


Photo #14



Photo #15



Photo #16




Photo #17




Photo #18



Photo #19



Photo #20




Photo #21



Photo #22



Photo #23

continued on page 60

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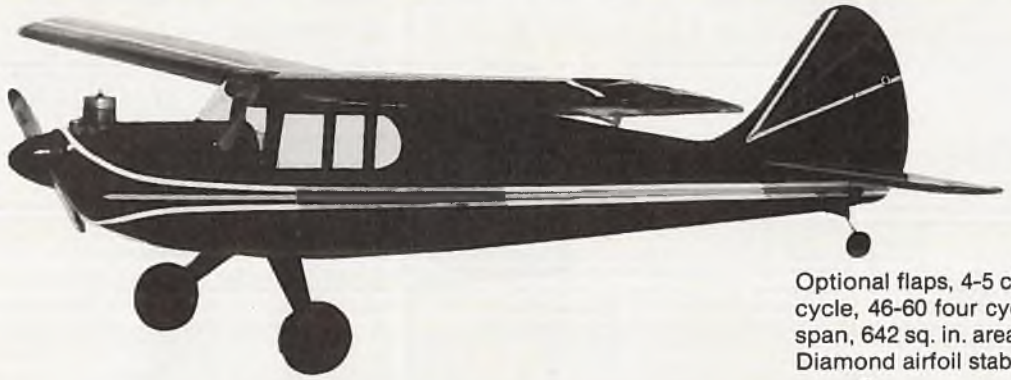
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Photo #24



Photo #25

020 to 05 motors and with up to 7 cells.

The aerial shots were taken on Sunday at noon time and you can see the crowd had already filled up the lot. Saturday was bright and clear, unlike the last couple of years, but the wind was terrible. It not only kept a lot of pilots grounded, it also wiped out all of the canopies and cleared the tables. It also blew the models around to the point where you had to tie them down or remove the wings.

As in the past, the Keystone club was very successful in collecting donations from many of the suppliers in the industry. Photo #3 shows the donor's list which was posted near the field. They also had typed lists of what was received on the other side of the board. Unfortunately the board was not near the display of the four models that were to be raffled and none of the items that were donated were on display. Consequently, I doubt that many people have any idea of



Photo #26



Photo #27

what was available as donations as nothing was displayed until the drawing started for the pilots.

The photos that follow are a small sample of some of the beautiful models that were there. Unhappily not all of them can be shown and I hope that those modelers who do not have their creations shown here will understand why.

Photo #4 is a **Fantrainer 600** by Ken Stinson of Telford, Pennsylvania. It has a 48'' span, 336 sq. in. area, and weighs 40 oz. Power is a 9 turn cobalt 05 which he rewired turning three Cox 6 x 4 props bolted together, an 8 cell 1200 mAh pack and a Jomar SC-4 throttle.

Photo #5 is a **Grandson** by Ellis Grumer of Phillipsburg, New Jersey. This is his own design with a 54'' top wing and a 50'' bottom wing. It weighs 5 lbs. and flies on an Astro geared 15 with a 12 x 8 prop and fourteen 900 SCR cells.

Photo #6 is Charles Evans' of Clarcona, Florida, own design and has no name yet. It has a 54'' span and a 2414 airfoil. It flies on an Astro Cobalt 25, a 9 x 5 prop and fourteen SR Batteries 1250 mAh cells.

Photo #7 is a Goldberg **Ultima Blue Hawk** by Chris True of Peekskill, New York. It weighs 10¾ lbs., and flies on an Astro sport 60 with twenty-nine 1200 SCR mAh cells and a Graupner 15 x 8 prop.

Photo #8 is a **Tsunami** by Bob Ramsey of Randolph, New Jersey. This 9 lb., 2 oz., 66'' span converted kit flies on an Astro pattern 60 with twenty-eight 1200 mAh SCR cells and a 12 x 9 prop. He used a Jomar SC-6 throttle and Hanno Prettner Supra retracts.



Photo #28


# Take A Load Off.




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*Checks should be made payable to MINICRAFT. If paying by check please allow 3 weeks for your order to be processed.

**MINICRAFT™**

**Built by Craftsmen for Craftsmen**

Photo #9 is of Martin Bamert of Switzerland who represented Robbe Model Sport. The model is a Robbe two meter **Argus** with a Keller 35/6 motor on seven SCR cells and a Freudenthaler 11 x 6.5 prop.

Photo #10 is a Robbe **ASW 17W Royal** also flown by Martin Bamert. It is flown on a Keller 100/6 motor on twenty-one 1200 mAh SCR cells and a Freudenthaler 11 x 6.5 prop. The 700 watt Keller motor powered this 10.5 lb. model with authority.

Photo #11 is a Leisure **Amptique** built by Tom Williams of Skipack, Pennsylvania. This model was one of the raffle prizes. It has a 61'' span and a Leisure geared 05 motor on seven cells.

Photo #12 is a low wing Amptique also designed and built by Tom. It has the same span but no polyhedral in the 61'' wing. It also flies on a geared Leisure 05 with seven cells.

Photo #13 is an Astro **Porterfield** built by Dennis Carlson of Harleysville, Pennsylvania. This model was one of the raffle prizes complete with an Astro geared 25, 13 x 6 prop, and fourteen 1500 mAh SCR cells. It has a 68'' span, 612 sq. in. area, weighs 15 lbs., and is covered with Super Coverite.

Photo #14 is a **Hyperon** by Keith Shaw of Ann Arbor, Michigan. On the speed course this little beauty had a downwind run of 132.34 mph. It has a 36'' span, 220 sq. in. area, and weighs 2 lbs. Keith uses an Astro FAI 05 Cobalt, Graupner 6 x 6 prop, and seven 1200 mAh SCR cells.

Photo #15 is a Simprop **High Speed** by Ron Farcus of Corum, New York. This highly prefabricated kit has a 47'' span, 418 sq. in. area, and weighs 4 lbs., 4 oz. Power is an Ultra 900 with twelve 1000 mAh SR cells turning a 9 x 5 Graupner Scimitar prop.

Photo #16 is a Kalt **Whisper** helicopter from Hobby Dyanmics and was flown by David Eltringham from Hyatts Hobbies here in S.E. Pennsylvania. The kit features a micro gyro and collective and cyclic pitch and is powered by eight 1100 mAh cells. Dave did a tremendous job flying it in the wind on Saturday and really put it through its paces on Sunday.

Photo #17 is a scale **Messerschmidt**

**KRC ELECTRIC FLY RESULTS 1990**

**SATURDAY:**
**Most Rolls:**
1. (47) Keith Shaw, Hyperon
2. (37) Dick Allen, Electro-Streak
3. (36) Chris True, Electro-Streak
4. (34) Bruce Fenstermacher, His Blue Fuse Popper

**All Up, Last Down:**
1. Russ Pribanic
2. John Fleming
3. Arthur Knowles
4. Fritz H. Mueller

**Best Gas Design Conversion:**
1. Chris True, Ultimate Bipe
2. Bob Rumsey, Phantom
3. Arthur Knowles, Ex Reno 250

**Pilot's Choice:**
1. Bob Rumsey, Tsunami
2. Chris True, Ultimate Bipe
3. Peter O'Shea, Astro Porterfield

**Best Kit Trainer:**
1. Joe Pasquito, Mirage 550

**Best Old Timer:**
1. Don Belfort, Viking
2. Peter O'Shea, Astro Porterfield

**SUNDAY:**
**Most Loops:**
1. (24) John Liberg
2. (22) Evertt Rubendunst
2. (22) Jim Parker
2. (22) Chris True

**Maxi-Flight:**
**(4-minute segments)**
1. (9 + 3.29) Dave Baron
2. (9 + .18) John E. McCullough
3. (7) Russ Pribanic
4. (6) Doug Holland

**Best Kit Aerobatic:**
1. Ron Farkas, Simprop High Speed
2. Chris True, Electro-Streak
3. Don Belford, PR Watt

**Best Kit Sailplane:**
1. Richard Graves, Astro Challenger
2. John Liberg, Astro Challenger
3. Peter O'Shea, Airtronics Eclipse

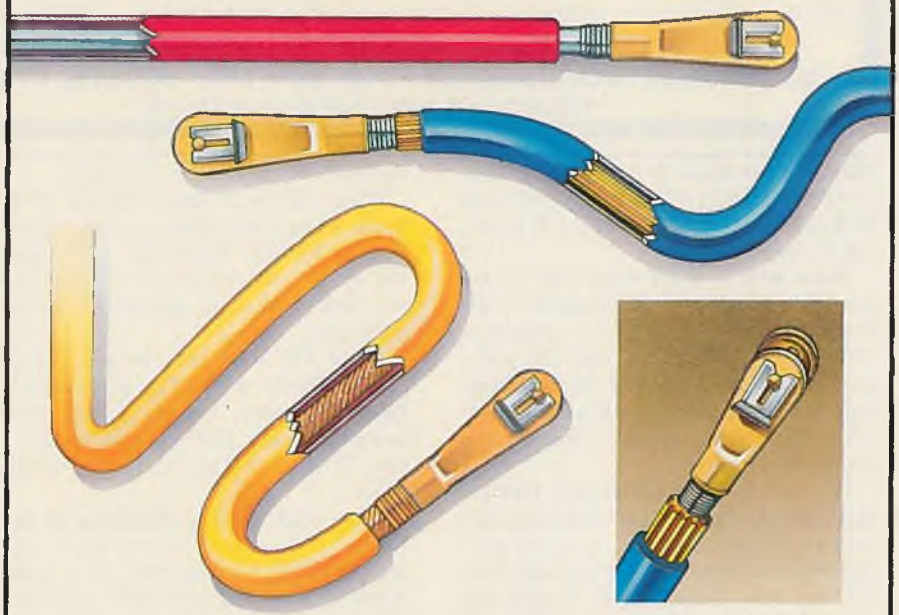
**Fastest Aircraft:**
**(Avg. MPH)**
1. (128.28) Keith Shaw
2. (98.63) Toni Fiori
3. (96.80) Ron Farkas

*Keith's fastest run downwind was 132.34 mph.*

**Most Imaginative Kit Variation:**
1. Bob Rumsey, Electric Cub
2. Joe Pasquito, Super Hots
3. Tony Fiori, BD-5

**Pilot's Choice:**
1. Martin Irvine, Heinkel 219
2. Tony Fiori, Mustang
3. Bill Whitehouse, Yogi


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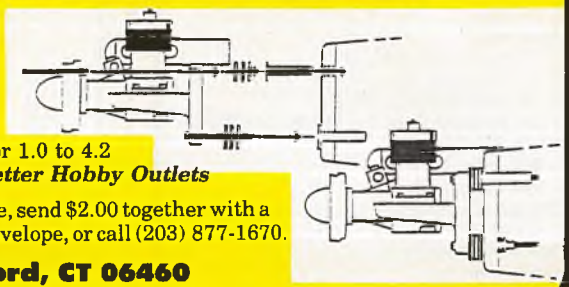
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**M35** by Keith Shaw. It flew beautifully on an Astro geared 25 with fourteen 1800 mAh SCR cells. Span is 66", area is 630 sq.in., and it weighs 5¼ lbs.

Photo #18 is a 1/4 scale copy of the homebuilt **Stratos** by Joe Utasi of Jomar Products fame. Power is a Graupner 300 x 10 on sixteen 1200 mAh SR cells, swinging a handmade four bladed Zinger prop made from cutting two 9 x 6's down to 7 x 6. The Stratos weighs 5.5 lbs. and is a really unique model.

Photo #19 is the Cox Hobbies **Electric Sundance** ARF assembled by this reporter. This great flier has a 55" span and goes together in 10 minutes. This one came with a Cobra two channel radio, charger and power batteries, and flies on rudder and elevator with a geared 7 x 4.5 prop.

Photo #20 is an Easy Built Kit of the **Ryan St.** by Carl Small of Stoney Creek, Ontario, Canada. The kit has a 54" span, 442 sq. in. area, weighs 50 oz., and flew very well on an Astro geared 05 Cobalt on eight cells.

Photo #21 is an Easy Built Kit of the **Pilatus Porter** by Laddie Mikulasko of Dundas, Ontario, Canada. It has an 05 ferrite and seven 1200 mAh SCR cells. It has a 53" span, 344 sq. in. area, and weighs 40 oz.

Photo #22 is a Sig **Seniorita** by Bob Kopski of Lansdale, Pennsylvania. Bob really had this one humming on a geared Astro 25 with fourteen 1200 mAh SCR cells. It weighs in at 5 lbs., 6 oz. and uses a new Astro 205 speed control.

Photo #23 is an old rudder only design **Beam** built by Bob Kopski from the plans he had from when he first built it when we all flew with escapements. He reworked a circuit and flew it on an escapement again on rudder only using an original Bonner SN escapement. It has a 50" span, 44 oz., 075 ferrite power with six 800 mAh SCR cells.

Photo #24 is a scratch built **Fokker D8** by Martin Irvine from Kingston, Ontario, Canada. It flew beautifully on a geared Astro 40 with eighteen 1200 mAh SCR cells. Span is 66" and it weighs 6.5 lbs.

Photo #25 is a scratch built oldtimer **Yogi** by Bill Whitehouse of Philadelphia, Pennsylvania. Bill did a really nice job with a difficult model and it flew on a geared Astro 05 Cobalt on seven 900 mAh SR cells which was plenty of power for this 50" beauty. (RCM plan No. 1018.)

Photo #26 is a scratch built **Heinkel 219** by Martin Irvine. This one has a 57" span, 500 sq. in. area, and weighs 4 lbs., 11 oz. It flies on two Leisure LT 50 Ferrites, 6 x 4 Cox props, and twelve 900 mAh SCR cells.

Photo #27 is a Davey Systems **Curtiss Robin** by your reporter. Power is a 075 ferrite, RPB gearbox with a Windsor 12 x 6 antique prop on eight 1250 mAh SR cells. The span is 54", area is 390 sq. in., and it weighs 44 oz.

Photo #28 is a Digicon kit of the **Bede 5** by Tony Fiori of Gilbertsville, Pennsylvania. It has a 48" span, weighs 45 oz., and is powered by an Astro 15 Cobalt on twelve 800 mAh cells. □

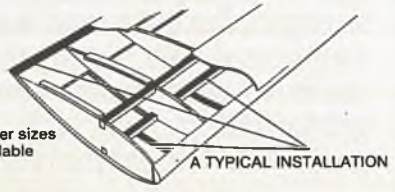
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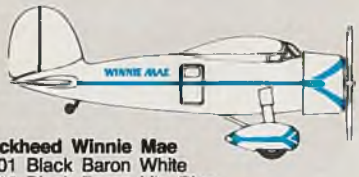


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**P-61 Black Widow**
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**Marcoux Bromberg**
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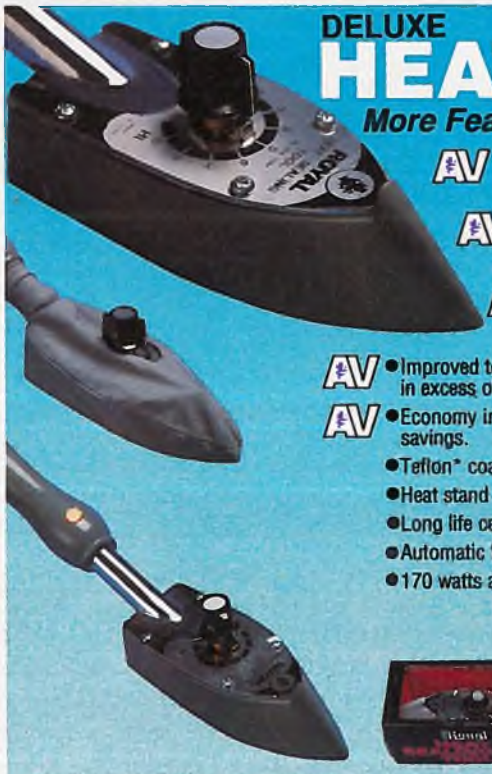
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# WHAT YOU CAN LEARN FROM YOUR MODEL AIRPLANE

Lessons are not always learned in school. Fact is, most of the stuff that really counts is learned in the streets where the action is, the flying field, or your workshop. You have learned a lot from your teachers (at least we hope so) and from past experiences, but have you thought about what you have learned from your model airplane?

Okay, you're in the toy airplane hobby (we hobbyists can call it that when among ourselves) but have you really thought about how that is benefitting you? If you're one of the millions who have spent some money on one of the dozens of self-help books currently out, give this some thought. You know the type of book I'm talking about with titles like "Think and Grow Into Donald Trump," or "Positive Deception Without Guilt." Yes, today everyone wants to have a high fiber diet with a well adjusted life. Your modeling hobby can't do much for the high fiber diet, unless you're into eating balsa and spruce, but it can help give you a happier more positive life.

"Well," you might say, "how the heck is that? I mean how does building and flying planes keep me from going stark raving mad?"

Simple, anything you do that is positive is going to benefit you, and the model plane hobby is very positive, **if** you make it positive. Oh yes, you can make it negative. Some people can make a hot fudge sundae into yogurt, but that's their problem, don't make it yours.

Working with something as intricate and complex as a model plane, making it straight and true, light and strong, and mastering control over it takes more than you're giving yourself credit for. The first attribute a model plane builder/pilot has to have is patience. If he doesn't have this to start, he'd better learn it. If he can't learn patience he'd better take up habitual sleeping. All good things come in time. If you try your first kit and hurry it, at best it's not going to fly very well, or look very good, at worst it's going to fly like a board and look like Auntie's old wooden fence. If you've already been around the old hobby block or if you are just beginning to pick the glue off your fingers, you have found you have to take your time, you have to have patience or you're going to screw the thing up. If you realize former "A" has to be straight or your fuselage is going to look like a banana you already have come a long way baby, because you are one, an accurate person, and, two, a patient person because you are going to take the time to do it right. If you fall into the previous, skip chapter three in the self-help book, your model airplane has either taught you patience or you already had it.

Now, what's the first thing you check before you test fly your plane? If you're like me, you check to be sure you brought the wing to the field. If you're past that stage, you check the C.G., the balance of the plane (be sure to check wing tip balance from the center of the wing too). As your plane has a balance point so does your life. If your balance point is off you can **snap** roll real easy, and possibly go into a flat spin, just like your plane. Now patience you either have or you may acquire, but balance is a gift few of us have. The people of the Far East who make our radios and most of our engines have learned the importance of balance and have taught its virtures for centuries.

Your plane can be neither tail heavy (hung up on the sensual?) or nose heavy (too much emphasis on the cerebral?). Either way your plane and/or you lose. You have to balance your life. The wise old man in "Karate Kid" stressed balance to Daniel, not in just karate, but life. Balance is critical in model aeronautics and in living. Too much hobby, too much money, too much work, too much play will alter your C.G. and, eventually, you will stall. When you check your plane's C.G. and see it's right on, think of your own C.G. (you have one that's right for you) and see that it's right on. You will be flying better, both at the field and through life.

The Orient has also taught, "dripping water can make a great hole in a stone." That's a lesson on persistence. If you have built a plane and mastered taking off, flying around and landing on the same field you departed from and most of the pieces are still on it, you have persistence. Skip chapter four in the self-help book.

There are a lot of people out there who **have** been in the model plane hobby, but not so many who **are** in the model plane hobby. Let's face it, it's darned hard to put all those little parts in just the right place, in just the right way and then take this creation out and expose it to the dangers of gravity, wind, freak radio signals, shorted NiCds and the Fickle Finger of Fate. Those of you who have done this, then did it again are persistent.

If you are just starting out in this hobby, consider this. If you finish that trainer, give it a preflight check, and learn to fly it, break it and build another one, plus renew your AMA membership and your magazine subscription. Give yourself an award! You deserve it. You are persistent. Your wife may call you stubborn and other names, but take heart fellow flier, you are persistent and that is a rare quality in America. We need a few more persitent people to see through dreams to build radios, engines, cars, VCRs, cameras, and a boat load of other items. □

**By Duke Iden**

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| 131 1/8x3/8 | .13 | 161 | .19 |
| 132 1/8x1/2 | .18 | 162 | .23 |
| 133 3/16 SQ | .12 | 163 | .19 |
| 134 3/16x3/8 | .18 | 164 | .21 |
| 135 3/16x1/2 | .21 | 165 | .31 |
| 136 1/4 SQ | .18 | 166 | .26 |
| 137 1/4x3/8 | .21 | 167 | .28 |
| 138 1/4x1/2 | .22 | 168 | .32 |
| 139 1/4x3/4 | .34 | 169 | .45 |
| 140 1/4x1 | .42 | 170 | .57 |
| 141 5/16 SQ | .23 | 171 | .30 |
| 142 3/8 SQ | .29 | 172 | .39 |
| 143 3/8x1/2 | .33 | 173 | .49 |
| 144 3/8x3/4 | .44 | 174 | .58 |
| 145 1/2 SQ | .38 | 175 | .55 |
| 146 1/2x3/4 | .48 | 176 | .66 |
| 147 1/2x1 | .60 | 177 | .82 |

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|---|---|
| 105 1/4x1/4 | .27 |
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| 109 1x1 | .58 |

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|---|---|
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|---|---|---|---|
| 224 1/4x1 | .51 | 236 | .72 |
| 225 1/4x1 1/4 | .59 | 237 | .79 |
| 226 1/4x1 1/2 | .66 | 238 | .92 |
| 227 1/4x2 | .72 | 239 | 1.00 |
| 228 5/16x1 1/2 | .67 | 240 | .78 |
| 229 5/16x2 | .76 | 241 | 1.04 |
| 230 3/8x1 1/2 | .74 | 242 | 1.01 |
| 231 3/8x2 | .84 | 243 | 1.16 |
| 232 3/8x2 1/2 | .91 | 244 | 1.25 |

| BALSA TRAILING EDGES | 36" |
|---|---|
| 118 1/4x1 | .33 |
| 119 5/16x1 1/4 | .41 |
| 120 3/8x1 1/2 | .48 |
| 121 1/2x2 | .73 |

| BALSA BLOCKS | 36" | | 12" |
|---|---|---|---|
| 112 1x2 | 1.57 | 198 | .58 |
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|---|---|
| 98 3x3 | 5.15 |
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| LANDING GEAR BLOCKS GROVED BIRCH | |
|---|---|
| 208 1/8 | .42 |
| 209 5/32 | .42 |
| 210 3/16 | .42 |

| SPRUCE TRIANGLES | 36" |
|---|---|
| 315 3/8x3/8 | .47 |
| 316 1/2x1/2 | .64 |
| 317 3/4x3/4 | .81 |

| HARDWOOD | |
|---|---|
| 748 3/8x3/4x12 | .40 |
| 749 1/2x3/4x12 | .45 |
| 750 5/8x3/4x12 | .49 |
| 751 3/4x3/4x12 | .55 |

| SPRUCE STICKS | 36" | | 48" |
|---|---|---|---|
| 278 1/8 SQ | .18 | | .28 |
| 279 1/8x1/4 | .21 | 300 | .20 |
| 280 1/8x3/8 | .23 | 301 | .35 |
| 281 3/16 SQ | .30 | 302 | .41 |
| 282 1/4 SQ | .37 | 303 | .53 |
| 283 1/4x3/8 | .43 | 304 | .58 |
| 284 1/4x1/2 | .47 | 305 | .67 |
| 285 3/8 SQ | .52 | 306 | .73 |
| 286 3/8x1/2 | .64 | 307 | .82 |
| 287 1/2 SQ | .70 | 308 | .93 |
| 288 1/2x1 | 1.34 | 309 | 1.73 |

| MUSIC WIRE 36" | |
|---|---|
| 320 1/16 DIA | .12 |
| 321 3/32 DIA | .19 |
| 322 1/8 DIA | .25 |
| 323 5/32 DIA | .35 |
| 324 3/16 DIA | .50 |

| BIRCH DOWELS | 36" | | 48" |
|---|---|---|---|
| 355 1/8 DIA | .08 | 360 | .12 |
| 356 3/16 DIA | .10 | 361 | .16 |
| 357 1/4 DIA | .13 | 362 | .18 |
| 358 5/16 DIA | .24 | 363 | .32 |
| 359 3/8 DIA | .33 | 364 | .40 |

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|---|---|---|---|
| 333 1/64 [3] | 4.17 | 344 | 8.29 |
| 334 1/32 [3] | 2.35 | 345 | 4.69 |
| 335 1/16 [3] | 2.35 | 346 | 4.69 |
| 336 3/32 [5] | 3.49 | 347 | 6.99 |
| 337 1/8 [5] | 3.84 | 348 | 7.69 |
| 338 3/16 [4] | 3.12 | 349 | 6.19 |
| 339 1/4 [5] | 3.12 | 350 | 6.19 |
| 340 3/8 [7] | 3.59 | 351 | 7.19 |

| 24" LONG PLYWOOD | 6" | | 12" |
|---|---|---|---|
| A333 1/64 [3] | 2.20 | A344 | 4.39 |
| A334 1/32 [3] | 1.35 | A345 | 2.69 |
| A335 1/16 [3] | 1.35 | A346 | 2.69 |
| A336 3/32 [5] | 1.99 | A347 | 3.95 |
| A337 1/8 [5] | 2.15 | A348 | 4.25 |
| A338 3/16 [4] | 1.75 | A349 | 3.45 |
| A339 1/4 [5] | 1.75 | A350 | 3.45 |
| A340 3/8 [7] | 2.09 | A351 | 4.15 |

| 12" PLYWOOD | 6" | | 12" |
|---|---|---|---|
| B333 1/64 [3] | 1.20 | B344 | 2.39 |
| B334 1/32 [3] | .79 | B345 | 1.55 |
| B335 1/16 [3] | .79 | B346 | 1.55 |
| B336 3/32 [5] | 1.15 | B347 | 2.25 |
| B337 1/8 [5] | 1.19 | B348 | 2.35 |
| B338 3/16 [4] | 1.09 | B349 | 2.15 |
| B339 1/4 [5] | 1.09 | B350 | 2.15 |
| B340 3/8 [7] | 1.19 | B351 | 2.35 |

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| B27 | 15 | 3/32x4x36 | 9.44 |
| B15 | 15 | 1/8x3x36 | 7.51 |
| B28 | 10 | 1/8x4x36 | 7.02 |
| B16 | 15 | 3/16x3x36 | 9.44 |
| B29 | 10 | 3/16x4x36 | 8.39 |
| B17 | 10 | 1/4x3x36 | 6.60 |
| B30 | 10 | 1/4x4x36 | 9.33 |
| B19 | 10 | 3/8x3x36 | 8.91 |
| B32 | 5 | 3/8x4x36 | 6.55 |
| B20 | 5 | 1/2x3x36 | 5.24 |
| B33 | 5 | 1/2x4x36 | 11.13 |

| STICKS | | | |
|---|---|---|---|
| B129 | 30 | 1/8SQ.x36 | 2.19 |
| B130 | 20 | 1/8x1/4x36 | 2.09 |
| B133 | 20 | 3/16SQ.x36 | 2.09 |
| B134 | 20 | 3/16x3/8x36 | 2.51 |
| B136 | 16 | 1/4SQ.x36 | 2.51 |
| B137 | 16 | 1/4x3/8x36 | 2.62 |
| B138 | 16 | 1/4x1/2x36 | 2.83 |
| B142 | 12 | 3/8SQ.x36 | 2.72 |
| B143 | 12 | 3/8x1/2x36 | 3.14 |
| B144 | 8 | 3/8x3/4x36 | 3.35 |
| B145 | 8 | 1/2SQ.x36 | 2.84 |
| B146 | 6 | 1/2x3/4x36 | 2.83 |
| B147 | 4 | 1/2x1x36 | 2.30 |

| TRIANGLES | | | |
|---|---|---|---|
| B105 | 8 | 1/4x1/4x36 | 2.06 |
| B106 | 8 | 3/8x3/8x36 | 2.30 |
| B107 | 8 | 1/2x1/2x36 | 2.83 |
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| B109 | 4 | 1x1x36 | 2.23 |

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SPAN: 9'- 0" WEIGHT:14# POWER: .80 - 2.0 CU. IN.

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MODEL BY
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*ON LAND OR WATER YOU'LL LOVE IT*

*Laddie Mikulasko's*

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LENGTH: 54" AREA: 750 SQ. IN.

KIT NUMBER 455



MODEL BY SKIP BLACK
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*DESIGNED FOR .90 4 STROKES*

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WEIGHT: 6 LBS. .90 4 CYCLE

KIT NUMBER 458 11 X 7 Pusher Prop 3.15
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KIT NUMBER 450



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KIT NUMBER 437



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THE EAA BIPLANE IS A FULLY AEROBATIC 1/4 SCALE MODEL. OUR DELUX KIT INCLUDES: ABS COWL, DECALS, 3 VIEW, FORMED WIRE AND FULL SIZE ROLLED PLANS WITH INSTRUCTIONS.

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.50 - .71 2 CYCLE WEIGHT: 7LBS.

KIT NUMBER 449



## BRISTOL M-1 37.99

WORLD WAR I FIGHTER, FAST BUILDING KIT INCLUDES ABS COWL & STATIC SPINNER.

SPAN: 62" POWER: .40 - .60 2 CYCLE
.60 4 CYCLE

KIT NUMBER 436



*Laddie Mikulasko's* SALE

## EASY 100 39.99

*AS FEATURED IN JULY '88 R/CM*

LADDIE MIKULASKO'S EASY 100 WAS DESIGNED AS AN EASY TO BUILD AND FLY TRAINER. THE KIT COMES COMPLETE WITH TRICYCLE AND TAILDRAGER LANDING GEAR, OUR FAMOUS "FALL OUT" DIECUTTING AND FULL SIZED ROLLED PLANS.

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.40 - .60 4-STROKE

KIT NUMBER 459



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SOPWITH PUP SPECS: FIELD ASSEMBLY TIME: 10 MIN.
SPAN: 9'- 0" WEIGHT: 27 LBS.
SCALE: 1/3 POWER: 2.2 TO 3.7 CU. IN.

KIT NUMBER 461 PART NUMBER 487
9" WHEEL KIT.....14.99



*Laddie Mikulasko's*

## LAKER 54.95

THE LAKER WAS DESIGNED PRIMARILY AS A FLYING BOAT BUT ALSO HAS A REMOVABLE TRICYCLE GEAR FOR LAND FLYING. OFF LAND OR WATER THE LAKER FLIES GREAT. WATER FLYING IS A BREEZE WITH THE LAKER.

THE KIT IS SIMPLE AND CONSTRUCTION IS EXTREMELY FAST.

THE KIT INCLUDES ABS COWL, FORWARD DECK AND SPONSONS, CLEAR CANOPY, ROLLED PLANS, HARDWARE AND PHOTO INSTRUCTIONS FOR THE NOVICE BUILDER.

SPAN: 70" POWER: .40 TO .46 2 CYCLE WEIGHT: 6 LBS.
LENGTH: 59" 4 CHANNEL

KIT NUMBER 445


1-800-BALSA US
ORDERS ONLY
NOW! MICH. & CANADA ALSO

BALSA USA™

P.O. BOX 164, MARINETTE, WIS. 54143

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1-906-863-5878


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## COVERING

### AERO SPAN
PLASTIC IRON ON COVERING

| OPAQUES | | TRANPARENTS | |
|---|---|---|---|
| 566 | Cessna White | 590 | Trans Yellow |
| 567 | Bright Red | 591 | Trans Red |
| 568 | Dark Red | 592 | Trans Blue |
| 569 | Midnight Black | 593 | Trans Orange |
| 570 | Light Yellow | | |
| 571 | Cub Yellow | | |
| 572 | Light Blue | METALLICS | |
| 573 | Medium Blue | | |
| 574 | Dark Blue | 594 | Met Gold |
| | | 595 | Met Red |
| | | 596 | Met Blue |
| 579 | Light Orange | | |
| 580 | Brilliant Orange | 27" X 6' Rolls | |
| 581 | AF Aluminum | Retail 9.50 | |
| 582 | Antique | | |
| 583 | Olive Drab | **5.49/Roll** | |

AERO SPAN IN 5 METER ROLLS
600 Cessna White
601 Bright Red
602 Cub Yellow
**11.49/ROLL**

### SOLARTEX

| | | 2 METER | | 5 METER |
|---|---|---|---|---|
| 550 | Red | 7.79 | 558 | 21.29 |
| 551 | White | 7.79 | 559 | 21.29 |
| 553 | Yellow | 7.79 | 561 | 21.29 |
| 555 | Antique | 7.79 | 563 | 21.29 |
| 556 | Natural | 7.79 | 564 | 21.29 |
| 557 | Olive Drab | 7.79 | 565 | 21.29 |

### STRIP AILERON LINKAGE
495 ONLY ..... 2.50
A495 2 For ..... 4.89

### RUBBER BANDS #64
731 1/4 lb. (approx. 110) ..... 1.49

### FOURMOST RECOIL FUEL TUBING
Super tough fuel tubing pre-formed into a 4" coil, extends 4'.
427 List 3.95 ..... 2.79

### SAFETY PROP NUTS
805 1/4-28 ..... 3.25
806 5/16-24 ..... 2.99
807 6 MM ..... 2.99
808 7 MM ..... 2.99
809 8 X 1.25 MM ..... 2.99

### FUEL TANKS
Sullivan slant type
673 Flex Tank, 6 oz. ..... 2.79
674 Flex Tank, 8 oz. ..... 2.89
675 Flex Tank, 10 oz. ..... 2.99
676 Flex Tank, 12 oz. ..... 3.24
677 Flex Tank, 14 oz. ..... 3.49
678 Flex Tank, 16 oz. ..... 3.74
679 24 oz., Not Flex Type ..... 3.99

### NYLON HINGES
493 Standard size hinge, pk of 15 ..... 2.09
494 1/4 scale w/cotter pins, pk of 15 ..... 3.39

### MODEL MAGIC
Filler, it sands like balsa.
740 8 oz. Tub ..... 4.79

## PHONE ORDERS ONLY
## CLOSE OUT SPECIALS

### AERO SPAN

| | | |
|---|---|---|
| 575 | AF Blue | 27" X 6' Rolls |
| 576 | Midnight Blue | Retail 9.50 |
| 577 | Light Green | |
| 578 | Stinson Green | **3.25/ROLL** |
| 597 | Met Green | |

AERO SPAN IN 5 METER ROLLS
603 Brilliant Orange
608 Olive Drab
**9.00/ROLL**

### ACE KITS
**ACE 4-20 29.99**

### HEAT GUN
Royal Products, ideal for all model coverings, asbestos free.
548 Retail 23.95 ..... 14.99

### GUN AND IRON
549 Combo, Gun & Iron ..... 26.99

### BLADES
526 #11 Blades, pk of 100 ..... 9.99
527 pk of 20 .....
523 #11 Knife Handle ..... 1.15

### RAZOR BLADES
HEAVY DUTY hard to find industrial single edge blades
524 Pk of 100 ..... 6.99

### GMP INSTRUMENTS
Add the finishing touch to that cockpit, these instruments will do the job.
Regular size includes 30 each of 3/16, 1/4, 3/8
729 and 1/2" dia. faces ..... 1.20
1/4 scale size includes 20 each of 3/4 and 1" dia.
730 faces ..... 1.20

### "T" PINS
Top quality plated "T" pins
733 1 1/4" box of 100 ..... 2.59
734 1 1/2" box of 100 ..... 2.69

### BALSA USA — FUEL TUBING
516 THE BEST AVAILABLE ..... 32/FT.
517 *SALE* 8' ..... 2.39

### NOSE GEARS
5/32" Dia. wire, 3" and 8" legs.
735 Save at ..... .60
736 2 for ..... 1.10

### C.B. TAILWHEELS
Scale steerable tailwheels in 4 sizes:
722 .40 size ..... 6.99
723 Small; up to 10 lbs. ..... 7.99
724 Medium; 10 to 20 lbs. ..... 10.49
725 1/4 scale 20 to 30 lbs. ..... 15.49
NOTE: WHEEL IS NOT SUPPLIED

### TAILWHEELS
778 1" DIA ..... .89
779 1 1/4" DIA ..... .99
780 1 1/2" DIA ..... 1.09

### NI-STARTER
727 McDaniel Ni-Starter with charger ..... 17.99
727A Metered Ni-Starter ..... 20.99

### MODELERS WOOD PLANE
Not a razor plane. Hi-Speed steel blade. We guarantee you will never use your razor plane again!
499 1 1/8" X 3 1/2" ..... 5.29

### RAZOR SAWS
496 No. 500 ..... 2.49
497 No. 100 (3 in 1) ..... 3.49

### NUTS & BOLTS
**Socket head cap screws**

| | | | |
|---|---|---|---|
| 630 | #4-40 X 1/2 | 635 | #6-32 X 3/4 |
| 631 | #4-40 X 3/4 | 628 | #2-56 X 1/2 |
| 633 | #6-32 X 1 | 629 | #2-56 X 3/4 |
| Pk of 10 | | | .79 |

## CLOSE OUT SPECIALS

### SOLARTEX
2 METER
554 Orange
552 Blue
**5.00/ROLL**
5 METER
562 Orange
560 Blue
**15.00/ROLL**

### AIRTRONICS RADIOS
4 CH Vanguard PCM w/3 Servos ..... 172.95

### J-TEC ALUMINUM ENGINE MOUNTS
Designed specifically for all 4 cycle engines.
DRILLED AND TAPPED FOR:
700 ENYA .35 - .40 4 Cycle ..... 8.59
701 OS MAX .40 4 Cycle ..... 8.59
702 SAITO FA .40 - .45 ..... 8.59
703 ENYA .46 Cycle ..... 8.59
704 Undrilled for most .60 to 90's ..... 9.09
705 OS MAX FS .62 ..... 10.59
706 OS MAX FS .60 - .70 - .90 ..... 10.59
707 ENYA .60 - .80 - .90 - 1.20's ..... 10.59
708 Undrilled for most 1.20's ..... 12.89
709 ENYA R 1.20 ..... 14.95
710 OS MAX FS 1.20 ..... 14.95
711 SAITO FA 1.20 ..... 14.95
712 SUPER TIGRE 2500 - 3000 ..... 14.09
713 SAITO 65 ..... 10.59

### FOR K & B ENGINES
782 K&B .20 ..... 6.49
783 K&B .40 ..... 6.49
784 K&B .45 ..... 8.29
785 K&B .61 ..... 8.99
714 K&B .65 ..... 8.99

### "SNUF-LER" MUFFLER
715 For most .25 to .45 ..... 15.49
S.T. .60 to .90 ..... 15.49
O.S. .60 to .90 ..... 15.49

### ZINGER PROPS
408 9 X 5 ..... 1.34
409 9 X 6 ..... 1.49
412 10 X 6 ..... 1.49
413 10 X 7 ..... 1.49
415 11 X 7 ..... 1.59
416 11 X 7½ ..... 1.59
421 14 X 6 ..... 3.29

### ZINGER PUSHER PROPS
422 10 X 6 ..... 2.64
423 11 X 7 ..... 3.15
424 14 X 8 ..... 7.25

### EPOXY
544 GMP 6 min. 10 oz. ..... 6.19
545 GMP 10 min. 10 oz. ..... 6.19
546 Hobbypoxy 45 min. 8 oz. ..... 6.19

### SOLDER LUGS
NEW HI-STRENGTH STEEL
Large, fits 1/8 and 5/32 wire.
672 Pack of 10 ..... .80
Small, fits 1/16 wire
671 Pack of 10 ..... .55

### HEAT IRON
547 Royal Products, one of the best available 12.99

### UFO UFO UFO UFO
ODORLESS NON-FUMING
604 UFO 20 Gr. Thin ..... 4.20
605 UFO 20 Gr. Thick ..... 4.20
606 UFO 50 Gr. Thin ..... 8.49
607 UFO 50 Gr. Thick ..... 8.49

### HOT STUFF
507 2 oz. Hot Stuff ..... 5.10
508 2 oz. Super "T" ..... 5.10
509 4 oz. Hot Stuff ..... 9.49
510 4 oz. Super "T" ..... 9.49
512 6 oz. Hot Shot ..... 4.99
513 18 oz. Hot Shot ..... 13.49
514 Extra Tips ..... .99

### FULTS DUAL STRUT NOSEGEAR
The Fults Dual Strut Nose Gear comes complete with all hardware except wheel. Three sizes available.
800 .40 size, List 10.95 (3½) ..... 8.49
801 .60 size, List 11.95 (4) ..... 9.49
802 .90 size, List 14.95 (5) ..... 10.99

### LOCK NUTS
Nylon insert lock nuts, won't vibrate loose.

| | | | |
|---|---|---|---|
| 645 | #2-56 | 648 | #8-32 |
| 646 | #4-40 | 649 | #10-32 |
| 647 | #6-32 | | |
| Pk of 10 | | | .79 |

### BLIND NUTS

| | | | |
|---|---|---|---|
| 658 | #4-40 | 660 | #8-32 |
| 659 | #6-32 | 661 | #10-32 |
| Pk of 10 | | | .89 |

### SHEET METAL SCREWS

| | | | |
|---|---|---|---|
| 665 | #2 X 1/4 | 667 | #4 X 3/8 |
| 666 | #2 X 1/2 | 668 | #4 X 1/2 |
| Pk of 10 | | | .59 |

### WASHERS

| | | | |
|---|---|---|---|
| Flat Washers | pk of 10 | | .30 |
| 650 | #4 | 652 | #8 |
| 651 | #6 | 653 | #10 |
| Split Lock Washers | pk of 10 | | .30 |
| 654 | #4 | 656 | #8 |
| 655 | #6 | 657 | #10 |

### FOX PRODUCTS
The most popular long lasting glowplugs.
691 ..... 1.69
694 12 for ..... 16.99
781 Fox 4-cycle plug ..... 2.29
FOX 4-WAY WRENCH
770 List 7.95 ..... 6.29
FOX PROP REAMERS
425 4 step, List 7.95 ..... 6.24

### SONIC-TRONICS 12 VOLT FUEL PUMP
12 volt pump operates from power panel.
720 List 15.95 ..... 11.95
721 12 volt pump w/built-in switch ..... 14.49
719 Power Panel, List 44.95 ..... 29.99

### BALL END HEX DRIVERS
For socket head bolts, works at up to a 30 degree angle.
Order driver to match screw number.

### GUARANTEED FOR LIFE

| | | | |
|---|---|---|---|
| 531 | #2 | 534 | # 8 |
| 532 | #4 | 535 | #10 |
| 533 | #6 | 1.49 | EA. |
| 536 | Set of 5 | 6.99 | |

### "L" WRENCH SET
7 popular sizes from 5/64 to 3/16
542 List 9.15 ..... 5.89
6 piece metric set 1.5 to 5 mm
543 List 8.10 ..... 5.59

### GLASS CLOTH
38" wide, one yard minimum. The lightest available only.
518 .58 oz./sq. yd. ..... 2.99/yd

### BOOKS *By Harry Higley*
These books are all about Building, Flying, Covering, Engines, and much more.
**GETTING AIRBORNE**, Getting started in R/C
824 Retail 12.95 Volume I ..... 9.99
825 Retail 12.95 Volume II ..... 9.99
**MASTER MODELING**, About Scratch Building
826 Retail 11.95 ..... 9.49
**TOM'S TECHNIQUES**, All about Covering
827 Retail 11.95 ..... 9.49
**HARRY'S HANDBOOK**, All about Engines
828 Retail 11.95 ..... 9.49

### SULLIVAN STARTERS
Sullivan "American Made" hi-tork starters feature a heavy-duty long life 12 V motor, patented hand guard and a two year warranty.
786 Model 601, Retail 52.95 ..... 30.49
787 Model 603, Retail 79.95 ..... 42.49

### SULLIVAN GOLD-N-RODS WITH NEW GOLD-N-CLEVIS
Nylon type, semi-flexible, 2 sets
428 36" long, List 4.27 ..... 3.39
429 48" long, List 4.69 ..... 3.75
430 Cable type, 36" long, List 2.70 ..... 1.99

### SQUARE CUT TOOLS
SQUARE CUT TOOLS will save you time cutting squares and slotted holes
5 Piece Master Set — 1/8, 3/16, 1/4, 5/16, 3/8
788 List 16.98 ..... 12.99

### J'TEC SCALE INSTRUMENTS
It's easy to make museum quality instrument panels using these J'Tec kits. Each kit contains 83 assorted instruments, 20 bezels with clear faces and detailed instructions
812 1/3 Scale ..... 6.80
813 1/4 Scale ..... 6.80
814 1/5 Scale ..... 5.25
815 1/6 Scale ..... 5.25

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## LONG DRILLS

| | | 6" | Hanson Ace | 12" |
|---|---|---|---|---|
| 366 | 1/16" Dia. | 2.19 | 376 | 3.19 |
| 367 | 3/32" Dia. | 2.19 | 377 | 3.29 |
| 368 | 1/8" Dia. | 2.19 | 378 | 3.84 |
| 369 | 5/32" Dia. | 2.36 | 379 | 4.29 |
| 370 | 3/16" Dia. | 2.49 | 380 | 4.79 |
| 371 | 1/4" Dia. | 2.79 | 381 | 5.69 |
| 372 | SET OF 6 | 10.00 | 382 | 18.00 |

## DRILL "N" TAP SET

13 piece set includes: 4-40, 6-32, 8-32, 10-24, 10-32 and 1/4-20 taps with matching drill bits, tap/drill chart and "T" handle tap wrench, in case.

521 Retail 19.99 ..... 12.99

## TAP HANDLE

760 Fits #0 to 1/4" ..... 3.87

## TAPS & DIES

| | | TAPS | | DIES |
|---|---|---|---|---|
| 752 | #2-56 | 2.84 | 761 | 6.29 |
| 753 | #4-40 | 1.49 | 762 | 3.84 |
| 754 | #6-32 | 1.54 | 763 | 3.84 |
| 755 | #8-32 | 1.59 | 764 | 3.84 |
| 756 | #10-32 | 1.69 | 765 | 3.84 |
| 757 | 1/4-20 | 1.49 | | — |
| 758 | Set of 6 | 9.99 | 766 | 20.49 |

## GLO PLUG TAP

759 Hard to find 1/4-32 ..... 4.29

## GLO PLUG WRENCH

741 A good buy at ..... 3.19

## GLO PLUG DIE

804 1/4-32 — List 5.69 ..... 4.89

## VHS VIDEO TAPES

See most of our models flying. $20.00 deposit refunded in full on return of tape (You can keep it.)

| | | |
|---|---|---|
| 528 | Deposit | 20.00 |
| 997 | How to Build The Stick 40 Step By Step | 19.95 |
| 996 | Float Flying by John Sullivan | 22.99 |
| 995 | Hot Stuff Video 2 | 17.95 |

## PRIMER BOTTLE

Stop wasting fuel, get just the right amount each time

739 Value 1.50 ..... .99

# AN R/C DELICATESSEN
# BALSA USA



FREE WHEEL PANTS INCLUDED

## PIPER CUB J-3 — 89.99

THE WORLDS MOST POPULAR LIGHTPLANE 1/4 SCALE KIT INCLUDES: FULL COLOR "CUB" DECALS & ABS COWL.

SPAN: 9' - 0" WEIGHT: 13#
POWER: .60 - 2.0 CU. IN.
KIT NUMBER 438

773 1/4 Scale "Wave Rider" Floats ..... 34.99



MODEL BY OWEN PETERSON MENOMINEE, MICH.

## MOONRAKER — 34.99

FAST AND FULLY AEROBATIC, SYMMETRICAL AIRFOIL, SWEPT WING DESIGN, TRIKE GEAR. IF YOU LIKE A FAST, SPORTY, GOOD LOOKING MODEL THAT WILL DO ALL THE MANEUVERS WITH EASE, THE MOONRAKER IS FOR YOU.

SPAN: 54" POWER: .40 - .50
KIT NUMBER 444



## FLY BABY BIPLANE — 144.99

THIS DELUX 1/3 SCALE KIT INCLUDES: ABS COWL, DECALS, AIRCRAFT CABLE AND INSTRUMENT SHEET - FAST FIELD ASSEMBLY

SPAN: 88" WEIGHT: 19# POWER: 2.2 CU. IN. AND UP
KIT NUMBER 452



*Laddie Mikulasko's*

## EASY 200 BIPE — SALE 39.99

THE EASY 200 BIPE WAS FEATURED ON THE COVER OF R/CM IN APRIL 1990. COMPARED TO OTHER BIPES, THIS KIT HAS VERY FEW PARTS AND BUILDS VERY FAST.

THE KIT INCLUDES ABS COWL, FORMED WIRE, ROLLED PLANS, HARDWARE AND PHOTO INSTRUCTIONS FOR THE NOVICE BUILDER.

SPAN: 58" WEIGHT: 6 LBS. LENGTH: 55"
POWER: .40 – .45 2 CYCLE AREA: 1230 SQ. IN.
.40 – .60 4 CYCLE 4 CHANNEL
KIT NUMBER 462



## PHAETON II — 39.99

THIS PHAETON II IS AN UPDATED VERSION OF OUR ORIGINAL PHAETON, THE KIT INCLUDES: "N" STRUTS, WIRE CABANES, ABS COWL & PHAETON II DECALS.

SPAN: 52" POWER: .40 - .60 2 CYCLE .60 4 CYCLE
KIT NUMBER 448



*Laddie Mikulasko's*

## FORCE ONE — 39.99

THE FORCE ONE WAS FEATURED ON THE COVER OF R/CM IN MARCH 1982. DESIGNED BY LADDIE MIKULASKO, THIS MID-ENGINE DELTA HAS SUPERB FLYING CHARACTERISTICS, LOOKS GOOD AND, BEST OF ALL, IT'S EASY TO BUILD.

POWER: .40 2 STROKE WINGSPAN: 36½ IN.
AREA: 611 SQ. IN. WEIGHT: 72 OZ.
KIT NUMBER 457



SALE 13.99

## BALSA USA FIELD BOX KIT

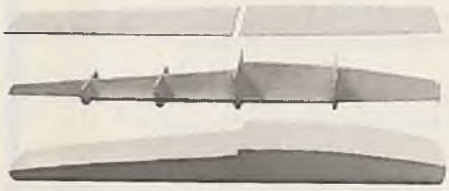
A COMPACT AND LIGHT FIELD BOX 13" WIDE, 19" LONG, AND 11" HIGH WITH A LARGE DRAWER AND A PLACE FOR EVERYTHING. ALL TOP QUALITY PLYWOOD WITH NO KNOTS AND STEP BY STEP PHOTOGRAPHIC INSTRUCTIONS FOR FAST AND EASY CONSTRUCTION.

699 PIT STOP FIELD BOX .....

*WAVE RYDER™*
## FLOATS THE PERFECT PAIR
## JOIN THE FUN . . . . . .

AS EASY AND QUICK AS 1, 2, 3.

1. Slip together the "egg crate" keel and formers, drop in the sleek white ABS cover and glue.
2. Glue six back-up strips inside.
3. Glue the bottom sheets and nose cap in place.



*WAVE RYDER™*
## FLOATS

WHY WASTE A LOT OF TIME BUILDING WOOD FLOATS OR PLASTIC FLOATS THAT LOOK LIKE PLASTIC. OUR NEW "WAVE RIDER" FLOATS ARE SLEEK, FAST AND INEXPENSIVE.

EVEN AN INEXPERIENCED BUILDER CAN BUILD A FLOAT IN LESS THAN ONE HOUR.

THE SLEEK WHITE ABS COVER IS PRECISION MOLDED IN ONE PIECE WITH NO UNSIGHTLY JOINTS.

CROSS BRACE WIRES AND MOUNTING HARDWARE ARE INCLUDED AS ARE PHOTO INSTRUCTIONS.

771 40 SIZE, 30" LONG ..... 24.99
772 60 SIZE, 36" LONG ..... 29.99
773 120 SIZE, (1/4 SCALE) 46" LONG ..... 34.99

## ATTENTION!!!

### CHECK OUT OUR NEW KIT FEATURES.

ALL OUR NEW KITS HAVE THE FOLLOWING FEATURES AND OUR OLDER KITS ARE BEING UPDATED ASAP.

1. **ONE PIECE PARTS** – Large parts are one piece, no more gluing 3 pieces together to make a stab!
2. **PLANS ARE ROLLED** – You shouldn't have to iron them before use.
3. New **PHOTO INSTRUCTIONS** – Designed for the novice builder [our Stick 40 has 80 photos].
4. New **"SOFT"** ABS cowls can take a beating without breaking.
5. New **"SCRATCH RESISTANCE"** canopys.
6. Hardware bags now include aileron linkage.
7. All parts are diecut or machine cut from AAA grade balsa and plywood. No foam is used.


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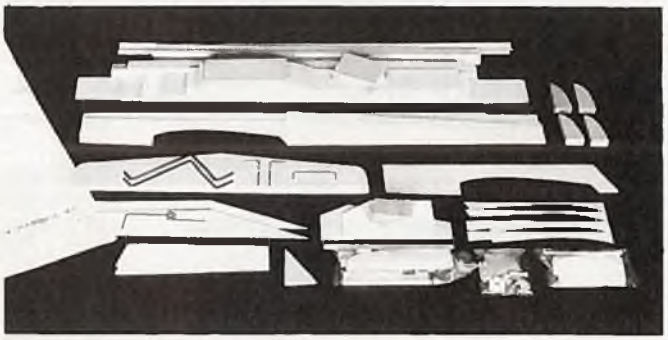
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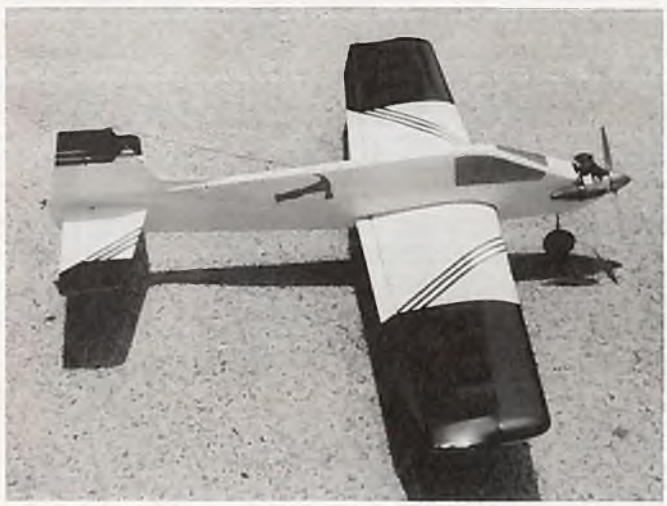
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# RCM PRODUCT REVIEW

## Davey System Corp.
## HAMMER 40





### SPECIFICATIONS

| | |
|---|---|
| Name | HAMMER 40 |
| Aircraft Type | Medium Sized Pattern |
| Manufactured By | Davey System Corp. 675 Tower Lane West Chester, Pennsylvania 19380 |
| Mfg. Suggested Retail Price | $99.95 |
| Available From | Both Mfg. & Retail |
| Wingspan | 60 Inches |
| Wing Chord | 10 Inches (Avg.) |
| Total Wing Area | 600 Sq. In. |
| Fuselage Length | 49 Inches |
| Stabilizer Span | 24 Inches |
| Total Stab Area | 128 Sq. Inches |
| Mfg. Rec. Engine Range | .35-.60 |
| Recommended Fuel Tank Size | 8-10 Oz. |
| Recommended No. of Channels | 4 |
| Rec. Cont. Funct. | Rud., Elev., Throt., Ail. |
| Basic Materials Used In Construction: | |
| Fuselage | Balsa & Ply |
| Wing | Balsa |
| Tail Surfaces | Balsa |
| Building Instructions on Plan Sheets | No |
| Instruction Manual | Yes (4 pages) |
| Construction Photos | No |

### RCM PROTOTYPE

| | |
|---|---|
| Radio Used | Futaba "J" |
| Engine Make & Disp. | Fox .40 BB |
| Tank Size Used | 10 Oz. |
| Wt. Ready to Fly | 80 Oz. (5 Lbs.) |
| Wing Loading | 19.2 Oz./Sq. Ft. |

### SUMMARY

**WE LIKED THE:**
Flight characteristics and the looks.
**WE DIDN'T LIKE THE:**
No particular problems.

The Hammer 40 by Davey Systems Corp., is a medium sized pattern aircraft with a design similar to the popular large pattern models. The clean, smooth design provides for a wide flight envelope, with generous side area for knife-edge flight.

The box was neatly packed with large stripwood rolled in the plans. Four plastic bags contain hardware, landing gear, and other wire parts, small wood wing parts, and small wood fuselage parts.

**Construction:**

The 36" x 62" plan sheet is accompanied by four pages of instructions and a parts list.

The quality of balsa and the fit of the parts was good.

Fuselage construction is quite simple since it is a basic box with the upper fuselage sides and top blocks added to it. The three cowl blocks fair the nose section nicely into the spinner.

Be sure the nosewheel steering is **secure** before sheeting the forward bottom of the fuselage.

The wing is built in two separate panels, with the dihedral angle set by the two center ribs. For this angle to be accurate, you must make a template. The wing is easily built on a flat surface, thanks to tabs on the bottom of each rib. The wing panels are butt glued together and the center section wrapped with fiberglass cloth and epoxied. Strong!

The tail parts are all pre-cut 1/4" sheet balsa, with the elevators joined with a 3/32" wire. Simply sand them to shape.

**Covering:**

Our model was covered with white and metallic green MonoKote, with 1/4" gold Pro Stripe trim tape for accent.

**Engine:**

A Fox .40 BB with stock muffler was selected for our model. This engine is the smallest and lightest .40 size engine we've encountered and it's really a **powerhouse**! Though .35 to .60 size engines are mentioned in the instructions, the .40 size engine seems ideal.

Make sure that your fuel tank will fit through the hole cut in former F-2. We selected a Du-Bro S-10 tank and had to install it through the bottom of the fuselage, though we're sure that other brands of fuel tanks will fit through the former.

**Radio:**

We used a Futaba "J" series radio with S-148 servos in our model. There was plenty of room for radio installation in the fuselage. Though the battery location is shown in the fuel tank area, that might crowd things a bit and make battery access difficult. There was no C.G. problem on our model with the battery at the forward end of the radio compartment.

THIRTY
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FIFTY
SIXTY

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TRIUMPH/XL-PRO

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***FLASH!***
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**2nd Intermediate** - Tom Erb - X-Cell
***X-Cell dominates other makes by 2 to 1***

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**2nd Expert** - X-Cell .60
**3rd Expert** - X-Cell .60
**1st Intermediate** - X-Cell .60

**'90 MICHIGAN FUN FLY**
***X-Cell dominates other makes by 2 to 1***

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**2nd Novice** - X-Cell .60
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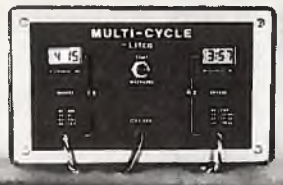
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# Litco Systems BOX 90, EAST HANOVER, NEW JERSEY 07936


**Flying:**

The C.G. was at the proper location on our model without the addition of ballast. Recommended control throws were not listed in the instructions. We started out with the elevator 3/4" each way, rudder 1", and aileron 3/8". After a couple of flights we reduced the elevator throw. Since the Hammer is a fast airplane, it doesn't take a lot of elevator.

**Conclusion:**

The Hammer 40 will present no particular problems for a reasonably accomplished builder or flier. It is certainly an inexpensive way to get started in pattern flying since almost any of the current .40 size 2-stroke engines will give very good flight performance.

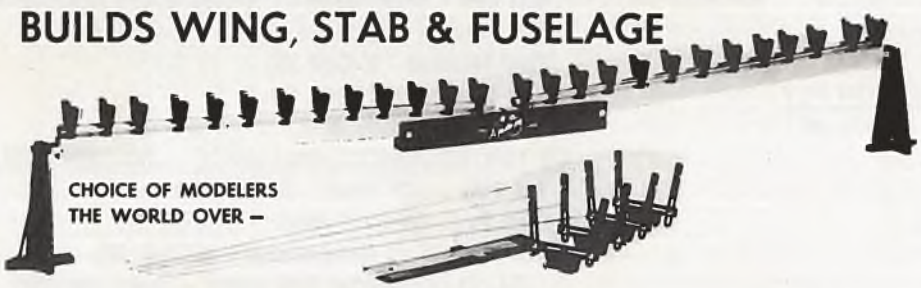
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Micro-Cut Quality Wood

Success Series®




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400 S Indiana St. Hobart, IN 46342

1990, Midwest Products Co., Inc. 9-90-194

Specifications:
Wingspan: 54"
Wing Area: 521 sq. in.
Flying Weight.: 5-5½ lbs.
Radio: 4 Channel

Motor Range:
35 - 45 2-Stroke
40 - 50 4-Stroke

Kit includes: Vacuum-formed canopy, Exhaust stacks & 4-color pressure sensitive military markings

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Specifications:
Wingspan: 54"
Wing Area: 521 sq. in.
Flying Weight: 5-5½ lbs.
Radio: 4 Channel
Motor Range:
35 - 45 2-Stroke
40 - 50 4-Stroke

Kit includes: Vacuum-formed canopy, exhaust stacks & authentic, pressure sensitive military markings

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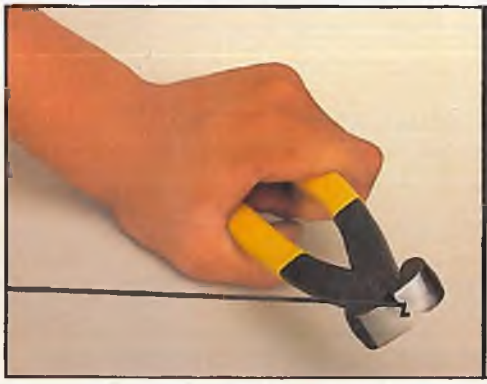
### THE FINEST COMPONENT PARTS AVAILABLE...

The Excell-7 airborne components utilize surface mount construction making them virtually immune to vibration damage. The standard servos weigh 1.5 ounces, yet they deliver a powerful 42 ounce-inches of torque. The 1991 dual conversion receiver is a multiple IC design with ceramic and crystal IF filters. FM or PCM...the choice is yours, at an unbeatable price!

*Cirrus Hobby Shack Excell-7 radio systems include: 7 channel transmitter, 7 channel 1991 dual conversion receiver, all Ni-Cd (500 mAH) operation, dual charger, (4) CS-248 standard servos, aileron extension wire, switch harness, servo trays, servo wheels, mounting hardware, neck strap, and frequency flags.*

HOBBY SHACK CIRRUS EXCELL-7 FM
LIST $399.95 ..... *Now Only!* **189.99**

HOBBY SHACK CIRRUS EXCELL-7 PCM
LIST $489.95 ..... *Now Only!* **229.99**







Thunder Tiger

## Z-BENDER

### Create Instant Z-bends

Make quick, easy work of making Z-bends for all your control linkage needs. Z-bends produce the simplest most positive, "slop-free" linkages you can use. Made of special heat-treated steel for years of service.

NO. 110551
LIST $14.95 ..... *Only!* **12.99**

QUALITY KITS

## FIELD BUDDY

### A True Value for the Money!

All of your basic field support equipment fits neatly in the compartments provided. High quality plywood parts are machine cut for precise fit. The simple design is easy to build and only requires a couple of hours to frame up. Get your equipment organized with a Field Buddy.

NO. 233072
LIST $29.95 ..... *Only!* **14.99**

Hobby Shack

## 12 VOLT STARTERS

### The Best Starters, The Best Prices!

The Deluxe 12 Volt starter is perfect for .10—.60 size engines. The Heavy Duty 12V Starter is for the larger .40—1.20 size engines. For the quickest start at the best price ... it's a Hobby Shack 12 Volt Starter for you!

**DELUXE STARTER**
NO. 114595, LIST $39.95 ..... **22.99**

**HEAVY DUTY STARTER**
NO. 114600, LIST $59.95 ..... **34.99**

# Hobby Shack ARF's For The Best Value In America.

## *Choose From Balsa Built-up & Covered, EZ-Type, or Injection Molded Foam*



### SWEET STIK 40S ARF

Enjoy the easy handling of the Sweet Stik without the hassles of building. The Sweet Stik 40S ARF is built-up from the best balsa, spruce, and plywood; and then carefully covered by factory craftsmen. All you need is your engine, radio, and a few hours for final assembly and equipment installation. Span: 52 in., Area: 595.5 sq.in., Engine: .30-.45 2C, .45-.65 4C, Radio: 4 ch. req'd.

NO. 111773, LIST $139.95 *Only!* **89.99**

★COMBO★

Sweet Stik 40S + Magnum GP .40
NO. 981103 ..... **134.99**



### RIGHT FLYER 40T ARF

The best ARF bargain available! A superbly crafted ARF for about the same price as many popular .40 size kits. It's an excellent trainer and Sunday sport model. Prebuilt, precovered parts can be assembled in a few hours. Add your radio gear and engine, and you're ready to fly! Span: 68 in., Area: 736 sq.in., Engine: .40-.45 2C, .60-.90 4C, Radio: 4 ch. req'd.

NO. 114625 LIST $139.95 *Only!* **89.99**

★COMBO★

Right Flyer 40T + Magnum GP .40
NO. 982127 ..... **134.99**

**QUALITY/BALSA BUILT-UP and COVERED**



### ELITE ARF GLIDER

The best ARF glider you can buy! EZ-Type construction makes final assembly fast and easy. Just add your radio and you are ready to go. Its efficient, fully sheeted wing, and Eppler 207 airfoil offer great thermaling or slope performance. Span: 72.75 in., Area: 530 sq.in., Weight: 32 oz., Radio: 2 ch. req'd.

NO. 101114, LIST $125.00 *Only!* **79.99**

★COMBO★

Elite 1.8 + Dynaflite Std. Up-Start
NO. 980718 ..... **94.99**




### CESSNA 40T ARF

Tricycle landing gear and high wing planform give the Cessna 40T the stability needed during training flights. Fly it on a .40 R/C engine or try a four cycle. Beautiful prefinished EZ construction means it can be ready to fly in just a few hours. Span: 54 in., Area: 610 sq.in., Engine: .40-.45 2-C, .60-.70 4-C, Radio: 4 ch. req'd.

NO. 101108, LIST $200.00 *Only!* **139.99**

★COMBO★

Cessna 40T + Magnum GP .40
NO. 982163 ..... **184.99**

**EZ-TYPE HOBBY SHACK ARF'S**

## INJECTION MOLDED, ALL FOAM, GREAT FLYING ARF AIRPLANES

## *Absolutly the lowest priced ARF found in the world-The Best Value!*



### ALL FOAM SPIRIT OF 76 ARF

Injection molded all foam fuselage, wings, and stabilizer. Easy assembly only takes about 2-4 hours. Features: clear vacuum formed canopy, instruction guide, color transfers, and hardware. Span: 76 in., Area: 504 sq.in., Weight: 32 oz., Radio: 2 ch. req'd.

NO. 115337, LIST $49.95 *Only!* **21.99**

★COMBO★

Sprit + Dynaflite 2M Up-Start
NO. 984846 ..... **39.99**



### ALL FOAM CESSNA 150 ARF

The injection molded all foam Cessna 150 is perfect for the novice or sport flyer. It features: foam wing, two foam fuselage halves, hardware, steerable nose gear, and aluminum main gear. Span: 45.5 in., Area: 315 sq.in., Engine: .09-.15, Radio: 3 ch. req'd.

NO. 115303, LIST $44.95 *Only!* **19.99**

★COMBO★

Cessna 150 + Magnum GP .10
NO. 982130 ..... **57.99**



### ALL FOAM CESSNA 177 ARF

Injection molded all foam model includes: foam wing, foam tail parts, two-part fuselage, formed aluminum main landing gear, and a prebent steerable nose gear. Easy to assemble and fly! Span: 48 in., Area: 384 sq.in., Engine: .19-.25, Radio: 3 ch. req'd.

NO. 115329, LIST $49.95 *Only!* **21.99**

★COMBO★

Cessna 177 + Magnum GP .25
NO. 982131 ..... **66.99**

NEW

## SPORT FLYER 40L

BALSA BUILT-UP ARF




NO. 111805 LIST $215.00

*Only!* **139.99**

★ COMBO ★

Sport Flyer 40L+
Magnum PRO .45 R/C

NO. 981096 LIST $344.95

*Only!* **209.99**

**BEST BUY IN AN AEROBATIC ARF!**

Now you can enjoy the great flying characteristics of the Sport Flyer 40L in a balsa built - up ARF. The Sport Flyer 40L is one of the very best aerobatic models available ... loops, spins, rolls, Lomchevaks, and more! Assembly of the prebuilt and prefinished parts only takes a few hours. Then install your engine, prop, and radio; and you're ready to go! You can't buy a better aerobatic ARF for the money! Span: 59½ in., Area: 565 sq.in., Engine: .40-.60, Radio: 4 channel required.

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NEW

Thunder Tiger

## WOOD ARF SKYLARK 40T M.K. II





**THE BEST LOOKING, GREATEST FLYING, WOOD ARF TRAINER EVER MADE!**

The Skylark 40T Mk II is the best looking, best flying, wood ARF trainer available! It has a roomy fuselage, molded cowl and windshield, and terrific looking graphics. Its flat bottom airfoiled wing will allow the novice to fly slow enough that learning to fly is a snap! Prebuilt, prefinished parts make construction fast and easy. Just add your engine and radio, and you'll be ready to fly in just a few hours! Span: 62.8 in., Area: 700 sq.in., Engine: .40-.60, Radio: 4 ch. req'd.

NO. 111810 LIST $174.95

*Only!* **109.99**

★ COMBO ★

Skylark 40T Mk II +
Magnum GP .40 R/C

NO. 981095 **154.99**

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Thunder Tiger

## ELECTRIC ARF's

**BEST VALUE! BEST PERFORMANCE! SIMPLY THE BEST ELECTRIC ARFs!**

### CESSNA 177 ARF

The best flying "power" type electric ARF available. 540PH motor, 3:1 gear drive, and specially designed prop produce high thrust with low current draw for extra long flights. Balsa built-up flying surfaces and an ABS molded fuselage keep flying weight to a minimum. Span: 47.3 in., Area: 360 sq.in., Weight: 44-48 oz., Radio: 3 channel required.



NO. 111787 LIST $159.95 *Only!* **109.99**

★ COMBO ★

Cessna 177 + Techni
900 mAH 7C Ni-Cd
NO. 981006 ..... **135.99**





★ COMBO ★

Gull 1900 ARF + Techni
900 mAH 7C Ni-Cd.

NO. 981007 ..... **145.99**

### GULL 1900 ARF

The same great flying characteristics that make the Gull 1900 easy to fly for the beginner, also allows experienced pilots to enjoy long, leisurely soaring flights. The all wood, built-up and prefinished Gull 1900 is powered with the 540PH motor and a highly efficient 8x4.5" Scimitar folding prop. Span: 74½ in., Area: 612 sq.in., Weight: 44-48 oz., Radio: 3 ch. req'd.

*Only!*

NO. 111785 LIST $179.95 **119.99**

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Thunder Tiger

## CESSNA .10 ARF

**w/ MAGNUM GP .10 R/C**

**QUALITY, PERFORMANCE, AND VALUE!**

NEW



The new Cessna .10 ARF is a great value! This excellent flying trainer comes prebuilt, prefinished, and even includes a Magnum GP .10 R/C engine. Based on the successful electric Cessna 177, the Cessna .10 has the flight characteristics to be a great trainer or sport model. Balsa built-up wing and tail surfaces, and a vacuum formed ABS fuselage keep weight to a minimum for an excellent power to weight ratio. Final assembly can be completed in just a few evenings! Span: 47.3 in., Area: 360 sq.in., Radio: 3 channel required.

NO. 111775
LIST $199.95 ..... *Only!* **129.99**

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Thunder Tiger

## OLYMPIC 20s

**VALUE PRICED, BALSA BUILT-UP ARFs!**

The Olympic 20s are small in size, but big in on value. Whether you're a beginner or an experienced pilot, the Olympic 20s have you covered. The Olympic 20T with its flat bottom airfoil, high wing design, and tricycle gear make it easy for the beginner to take off, fly, and land. The Olympic 20L is great for pilots who are ready to transition to low wing flying. It is stable, yet capable of exciting aerobatic performance. And best of all, Thunder Tiger has done most of the work for you. You won't have to build, cover, or paint your Olympic 20. Just a few evenings of enjoyable assembly and you're ready to go flying! Span: 20T 52¼ in., 20L 49⅝ in., Area: 20T 450 sq.in., 20L 430 sq.in., Engine: .20-.25, Radio: 4 ch. req'd.

**Olympic 20T** - NO. 111790 LIST $126.95
**Olympic 20L** - NO. 111783

*Your Choice!* **84.99**

★ COMBO ★

Olympic 20T + Magnum GP .25 R/C, NO. 981099
Olympic 20L + Magnum GP .25 R/C, NO. 981102

*Your Choice!* **129.99**

GLOBAL QUALITY KITS

# FOR THOSE WHO KNOW VALUE!

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CALIFORNIA 800-472-8456
INFO & HELP 714-963-9634



NEW

## GAS STIK-10

### SMALL SIZE, TOP QUALITY, HUGE VALUE!

The new Gas Stik-10 is one of the biggest values available anywhere! Enjoy the classic looks and performance of a "Stik" type model for a fraction of the cost. You can pay more for a bigger model, but you can't get more fun for the dollar! Great die cutting, easy building, and terrific flight performance ...nothing beats the Gas Stik-10. Span:44 in., Area:352 sq.in., Engine: .10, Radio:3-4 ch. req'd.

NO. 232145
LIST $38.95 ..... Only! **24.99**

★COMBO★ Gas Stik-10 & Magnum GP .10
NO. 980671 ..... **62.99**



NEW

## SKYLANE

### A BIG MODEL, AND A BIGGER BARGAIN!

The Skylane is the biggest value to hit the R/C scene in ages. This is one "BIG" model! Yet, it cost about the same as most smaller .25-.40 size kits. If you want a trainer with real aircraft looks, not just another box with wings, then the Skylane is for you. Easy to build, and even easier to fly...the perfect trainer or first scale model! Span:72 in., Area:700 sq.in., Engine:.45-.60, Radio:4 ch. req'd.

NO. 232310
LIST $89.95 ..... Only! **59.99**

★COMBO★ Skylane & Magnum PRO .45 R/C
NO. 980674 ..... **134.99**





PRICES SUBJECT TO CHANGE WITHOUT NOTICE

## BIRDIE TEN

### QUICK BUILDING, SLEEK, AND VERY AEROBATIC!

The Birdie Ten is the perfect size whether your field is big or small, it can make the best of it. Just the right size to be your favorite "everyday" plane. Big plane performance in a small package that's as much fun to build as it is to fly. Features machine and die cut wood parts, full size plans, building instructions, hardware, motor mount, and clear canopy. Span: 49 in., Area:300 sq.in., Engine: .10, Radio:3-4 ch. req'd.

NO. 232180
LIST $41.95 ..... Only! **27.99**

★COMBO★ Birdie Ten & Magnum GP .10 R/C
NO. 980672 ..... **65.99**

## STIK-E

### THE VERY BEST AEROBATIC ELECTRIC!

The Stik-E will perform most sport aeobatic maneuvers unlike any electric you've ever seen. Loops, rolls, inverted flight...the Stik-E does it all! Comes complete with a powerful "05" "Silver 500" electric motor, prop adaptor, and spinner. Features: machine and die cut wood parts, full size plans, building instructions, hardware, and motor mount. Span: 44 in., Area:352 sq.in., Weight: 40-46 oz RTF, Radio:3-4 ch. req'd.

NO. 232150
LIST $59.95 ..... Only! **39.99**

★COMBO★ Stik-E + Techni 900 maH 7C
NO. 980669 ..... **69.99**



## EXPLORER 2M

The Explorer 2M is designed for the beginner or the expert. In one model you get the best of both worlds. Stability and slow landing speed for the beginner, and an extremely strong airframe and broad flight envelope for contest flying. Span:77-1/4 in., Area:574 sq.in., Radio:2 ch. req'd.

NO.232101, LIST $52.95 ..... Only! **29.99**

★COMBO★
Explorer 2m & Dynaflite Std. Up-Start
NO.982128 ..... **46.99**



## 1/2A BABY BIRDIE

The Baby Birdie is fast building, easy to transport, and economical; fun not only to build, but to fly! With a Tee Dee .049 or .051, and elevator aileron control, the Baby Birdie will perform all two channel style aerobatics. Span:37 in., Area:200 sq.in., Engine:.049-.051, Radio:2 ch. req'd.

NO.232161, LIST $32.95 ..... Only! **21.99**

★COMBO★
1/2A Baby Birdie & Cox T.D. .049
NO.098671 ..... **45.99**



## SPORT FLYER 40L

The Sport Flyer 40L is the best flying aerobatic sport model you can buy! Its 14% symmetrical airfoil and tapered wing give it unsurpassed aerobatic capabilities, yet allow it to make slow, easy landings. Span:59-1/2 in., Area: 565 sq.in., Engine:.40-.45 2C, .60-.90 4C, Radio:4 ch. req'd.

NO.232221, LIST $84.95 ..... Only! **59.99**

★COMBO★
Sport Flyer 40L & Magnum PRO .45 R/C
NO.982129 ..... **134.99**

## Thunder Tiger EXPANDED SCALE VOLTMETER



*Save Your Model, Know The Condition Of Your Batteries!*

With your Thunder Tiger Expanded Scale Voltmeter you can monitor the condition of your transmitter and airborne battery packs. Use with almost any R/C system. Attach your radio charge cords to the heavy duty hook-up terminals, and just plug it into your R/C system charge jacks to read your battery's condition on the large, easy-to-read meter. Scale upper half reads transmitter battery condition, while the lower half reads your airborne battery's condition. Features: stylish hi-impact case, exactly calibrated expanded scale meter, and sturdy connector jacks.

NO. 110410, LIST $22.95 ..... *Only* **12.99**

## Thunder Tiger COVERING TOOLS



### SEALING IRON

- Dial thermostat for best working temperature and heat maintenance.
- Teflon coated shoe glides over covering film, preventing scratching.
- Special shoe designed for easy handling, gets into tight problem areas that large irons can't.

NO. 110452
LIST $21.95 ..... *Only* **10.99**



### HEAT GUN

The Hobby Shack Heat Gun is a quality product designed specifically for use in heat shrinking all popular brand covering materials.

- Motor on-off heat control switch.
- Spreader bar for even heat flow.
- Air flow control.
- 1000 Watts of lightweight power.
- Correct heat for all covering materials.

NO. 110445
LIST $32.95 ..... *Only* **12.99**

**★COMBO★**
**SEALING IRON + HEAT GUN,** NO. 984773, LIST $54.95 ..... **22.98**

## MAGNUM 12 VOLT STARTERS



*High Quality And Dependable!*

Magnum starters are made of the finest materials available. Both feature heavy duty 12 volt motors, V-belt groove cone, rubber spinner insert, chrome clamps, strip switch, and finger guard plate. For boats, cars helicopters, and airplanes.

**HIGH-TORQUE STARTER, .10-.60 engines**
NO. 213500, LIST $47.95 ..... **25.99**

**MAXI SUPER STARTER, .40-.120 engines**
NO. 213510, LIST $64.95 ..... **36.99**

## Thunder Tiger REPLACEMENT SERVOS



Thunder Tiger servos are perfect replacements for your Futaba, Cirrus, and Airtronics servos!

| S-188 STD. SERVO | S-189 MINI SERVO |
|---|---|
| Size: 40.5x20x35.3 mm | Size: 35x16x34 mm |
| Torque:2.5 Kg/cm | Torque: 2.2 Kg/cm |
| Speed:.23 sec./60° | Speed:.22 sec./60° |
| NO. 110299 ....Futaba/J-Cirrus | ....NO. 110298 |
| NO. 110304 .....Futaba/G-F | .....NO. 110303 |
| NO. 110309 .....Airtronics | .....NO. 110308 |
| LIST $29.95 each | LIST $37.95 each |
| **12.99** ea. | **16.99** ea. |

## Thunder Tiger DIGITAL TACHOMETER



NO. 110415
LIST $59.95
*Only* **34.99**

*Measure Your Engine's Performance!*

Liquid crystal display is easy to read even in bright sunlight. Get accurate RPM readings from 100-29,000 in increments of 100 RPM. A photocell pick-up allows you to keep a safe distance from your engines propellor when taking readings. Now you can check your engine for best glow plug, best fuel, and best prop. 9 volt battery required.

## Futaba 4NBL ATTACK *With 3 S148 servos*



LIST $224.95 *Only* **98.99**

**4NBL ATTACK-G**
With 2 S133 micro servos & 250 mAH battery ..... **139.99**

**4NBL ATTACK-E**
With MCR-4A 4 ch. speed control Rx & 2 S133 micro servos ..... **169.99**

## CONQUEST 4NBF FM *With 3 S148 servos*



LIST $249.95 ..... **119.99**

**4NBP PCM**
With 3 S148 servos ..... **189.99**

| | | |
|---|---|---|
| **5UAF FM** | LIST $399.95 | **219.99** |
| **5UAP PCM** | LIST $499.95 | **269.99** |
| **5NLH FM** | LIST $399.95 | **224.99** |
| **6NFK FM** | LIST $329.95 | **169.99** |
| **6NPK PCM** | LIST $459.95 | **234.99** |
| **7UHF HELI** | LIST $649.95 | **349.99** |
| **7UHP HELI** | LIST $799.95 | **429.99** |
| **7UAFS** | LIST $599.95 | **319.99** |
| **7UAPS** | LIST $699.95 | **379.99** |

## AIRCORE CORO STAR 40



Nearly indestructible corrugated plastic building material. Span: 56 in., Area: 560 sq.in., Engine: .40-.50, Radio: 4 ch. req'd.
NO. 855390
LIST $89.95 ..... **59.99**

## AJUSTO FULL HOUSE AJUSTO JIG



Build straight wings and fuselages in less time than you would believe possible. Guarantees freedom from warps and twists.
NO. 509026
LIST $89.95 ..... **64.99**

## AIRTRONICS OLYMPIC 650



A rugged, crash resistant structure with forgiving flight characteristics. Span: 72 in., Area: 650 sq.in., Radio: 2 ch. req'd.
NO. 554683
LIST $52.95 ..... **37.99**

## ANNIVERSARY J-3 CUB



Fast assembly, complete hardware, and materials for scale detailing. Span: 76½ in., Area: 744 sq.in., Engine:.40-.60, Radio: 4 ch. req'd.
NO. 579938
LIST $99.99 ..... **55.99**

## GENTLE LADY



Very easy to build and fly. An exceptionally stable model. Span: 78¼ in., Area: 663 sq.in., Weight: 22-25 oz., Radio: 2 ch. req'd.
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LIST $34.99 ..... **22.99**

## DAVE BROWN SIX SHOOTER PUMP



Features a silicone pumping element for fuel resistance, no valves or seals to wear out. For use with glow fuel only.
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LIST $11.95 ..... **7.99**

## INVENTURE PRIMARY FLIGHT TRAINING PROGRAM




A video presentation of training procedures and lessons. Practical "ground school" and "in flight" training and safety.
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LIST $31.95 ..... **21.99**

## Dynaflite FUN SCALE SPITFIRE



Simple construction makes WWII fighter a great Sunday fun flier. Span: 50 in., Area: 483 sq.in., Engine: .30-.45, Radio: 4 ch. req'd.
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LIST 99.95 ..... **62.99**

## MIRAGE 550



Super complete electric kit includes motor and all hardware. Span: 54 in., Area: 464 sq.in., Weight: 40-46 oz., Radio: 3 ch. req'd.
NO. 579756
LIST$ 79.99 ..... **47.99**

**SHIPPING & HANDLING:** Continental U.S. $5.25; UPS 2nd day air, std. size pkg. to 10 lbs., add $10.00; Alaska & Hawaii 2nd day air, to 10 lbs., add $15.00; C.O.D available on minimum orders of $25.00, add $4.95 more. Calif. residents add 6% sales tax.

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**Fast Service By Mail Or Order Toll Free And Charge It!**

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## COVERING MATERIAL

Super finish, versitile, and easy to use. Silk-looking material has a special powerful new adhesive found only on this product. The adhesive is activated over a wide temperature range, giving it the unique advantage of being used with low heat.

***The Look Of Real Cloth Covering!***

**2-METER ROLL (27"× 79")**

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| NO. 115785 ....Yellow | NO. 115780 Vintage Blue |
| NO. 115786 ....Orange | NO. 115781 Vintage Yellow |
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1 Roll LIST $14.95/roll 3 Rolls for

**9.56** **26.97**

# FLITE-KOTE
## FINEST COVERING MATERIAL

FLITE-KOTE is one of the easiest to use finishing materials you will ever apply. As you work with FLITE-KOTE you will quickly become familiar with the techniques of using it, and in a short amount of time you will be getting professional looking results.

***• Easy to Use •***
***• Strong •***
***• Lightweight •***

**TRANSPARENTS**

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|---|---|
| NO. 115741 .....Red | |
| NO. 115758 ....Yellow | |
| NO. 115766 ....Orange | |
| NO. 115774 .....Blue | |

Retail $10.95/roll

**OPAQUES**

| | |
|---|---|
| NO. 115642 .....Bright Red | |
| NO. 115659 .....Dark Red | |
| NO. 115667 .....Black | |
| NO. 115675 Bright Yellow | |
| NO. 115683 Stinson Green | |
| NO. 115691 .....Light Blue | |
| NO. 115709 .....White | |
| NO. 115717 .....Orange | |
| NO. 115725 .....Dark Blue | |
| NO. 115733 .....Silver | |

*Just* **5.99**/roll 3 Rolls For **12.99**

Thunder Tiger

# DELUXE MOSFET POWER PANEL



***Latest State-Of-The-Art Technology!***

Solid state IC design and a MosFET controlled glow driver make the Deluxe MosFET Power Panel the finest unit you can buy. This new design is one of the most efficient, operates with no heat build up, and is more dependable than standard panels. Operates from any 12VDC power source and features: 12V starter & fuel pump operation, 6V pump operation with in/out switch, adjustable MosFET output for glow plug with large ammeter.

NO. 110439, LIST $39.95 *Only* **19.99**

Thunder Tiger

# 12 VOLT GLOW FUEL PUMP




The 12V fuel pump will operate from any 12VDC power source. Includes: on/off switch, plug, fuel probe and filter. For use with glow fuel only.

NO. 110431, LIST $22.95 *Only* **12.99**

# LIGHTNING ADHESIVES

***Quality Glue Products At Super Prices!***



Lightning glues are formulated using the latest technology to assure you of the best product available. Build your models with confidence, build with Lightning CA and Epoxy.

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1 oz. NO. 294181, LIST $4.59 .....**3.29**
2 oz. NO. 294220, LIST $8.49 .....**5.99**

**LIGHTNING THICK CA**
1 oz. NO. 294183, LIST $4.59 .....**3.29**
2 oz. NO. 294222, LIST $8.49 .....**5.99**

**LIGHTNING SLOW CA**
1 oz. NO. 294185, LIST $4.59 .....**3.29**
2 oz. NO. 294224, LIST $8.49 .....**5.99**

**LIGHTNING ACTIVATOR**
2 oz. pump NO. 294245, LIST $4.69 .....**3.39**
8 oz. refill NO. 294250, LIST $7.99 .....**6.99**

**LIGHTNING DEBONDER**
2 oz. NO. 294234, LIST $4.69 .....**3.39**

**LIGHTNING EPOXY**
9 oz. 5 min. NO. 294270, LIST $10.95 ....**6.89**
9 oz. 30 min. NO. 294272, LIST $10.95 ....**6.89**

DURACRAFT **DURAPLANE II**



Nearly indestructible trainer is perfect for the novice pilot. Span: 45 in., Area: 504 sq.in., Engine: .20-.35, Radio: 3 ch. req'd.
NO. 222015
LIST $64.95 .....**39.99**

DU-BRO **TRU-SPIN BALANCER**



Adjustable locking cones for precise balancing. Fully adjustable height for balancing props of all sizes, wheels, or spinners.
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LIST $26.95 .....**17.99**

CARL GOLDBERG **ELECTRA DELUXE**



Great flying 6 or 7 cell electric sailplane complete with motor. Span: 78¼ in., Area: 663 sq.in., Radio: 3 ch. req'd.
NO. 579748
LIST $79.99 .....**42.99**

AIRTRONICS

**VANGUARD VG4R FM** *With 3 102 servos*



LIST $249.95 .....**119.99**

**ULTIMATE**



CARL GOLDBERG

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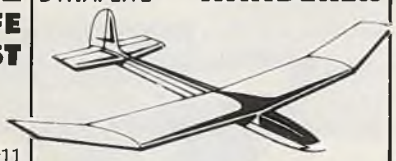
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**KEN RUNESTRAND**

**Wires, Wires, Wires . . .**

I get so tired of them! My biggest headache seems to come with charging operations. Even if not charging to go flying, having a number of radios makes it necessary to keep the batteries operational. My model size usually requires that wires be lengthened to reach the plane rather than disembowel the fuselage to charge flight batteries. Differing radio brands and connectors may mean that



*Gorgeous big Spitfire by Ralph Ropp. 1/4 size, 110 in. span with plans and parts to be available. Details in text.*



*Rich Morrell, New York, with his pretty Pober Pixie. 10' span and Zenoah G-38 for power.*




*Gilbert Appleson's version of Effinger plan, a 1930 Curtiss "Falcon". Large and classic!*



*Another view of Appleson's huge Curtiss Falcon. Lift off straight, and wings level, with G-62 for power. Has to be a wonder in flight.*



*Another masterpiece from Claude McCullough. This time it's the Cuban Waco D. Still lots of small details to complete before the '91 Nats. Weighs 30 lbs., Saito 300 for power, and covered with Sig Koverall, with Sig Supercoat Butyrate dope.*




*Beautiful scratch-built 1/4th PA-20 by John Bombardo, S. St. Paul. Flies terrific on a G-23. More in text.*

two or three chargers may have to be hooked up to a single plane for charging batteries for flight pack, ignition and smoker systems as well as the transmitter. Just charging a couple of planes at one time can have over 20' of wires strung across everything. Now, when it's all over, how do you store chargers with all that wire? To be neat and sanitary, I wrap wires around the charger and hold the bundle together with a rubber band. This works fine . . . for a while anyway. Sooner or later though, any wire wrapping and continued flexing of cables can cause even multi-strand wire to break inside of the insulation and functionality fails. Sometimes the failure can be intermittent. All can be working fine . . . until you walk away and wires warm up. The weak point is usually the power cord and close to the charger where flexibility is tested to the utmost. If you do the same thing, keep a short loop in the wire next to the charger and never make that first wrap very tight. I have tried for years to figure a neat way to handle chargers and charge operations but everything that comes to mind means hanging wires or some kind of strain, usually from pulling on the wires. Why can't we go back to chargers that are built into the transmitters? I would think it would be cheaper and room shouldn't be a problem. Then you only have a couple cords that store easily. Interchangeable resistors in that charge line could make it easy to adjust rates for any battery capacity. The only drawback I can think of would be internal heat when the charger is in operation but I would think that could be circumvented.

**Glue Strength**

Letters from new giant scalers often express concern regarding this topic, especially with use of hardwoods. The technicalities are not within my expertise but from experience, the larger model presents no particular problem. The secret to a good glue joint seems to be the use of close fitting parts and is not dependent on the cohesive strength of the glue itself. An avid user of CA glue, I don't hesitate to use it in giant construction and have no particular problems with hardwood joints. When building a kit, I usually replace balsa longerons/stringers, especially the outside fuselage corners, with hardwood. As I cut a lot of my own stock, the only care I really watch for is to use seasoned straight grain wood and not a new 2 x 4 oozing pitch and so wet that it weighs 15 pounds itself.

I have a half dozen epoxy tubes lying around unused. It is usually relegated to jobs such as fuelproofing tank compartments and engine areas. Even then it is easier and less messy to use some polyurethane paint if it is compatible with your finish. Aliphatic resin glues like Titebond and Carpenter's Glue are great and plenty strong . . . if kept dry, but as I have a habit of occassionally dunking a float plane, I avoid their use if at all possible.

I used to use a lot of "yellow" glue as I appreciated its strength and the slow cure for


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| 33 | Stin A Trimotor | 30"$30 | 45"$38 | 90"$62 | 120"$75 | |
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| 32 | Howard Ike&Mike | 10½$12 | 15½$15 | 31"$26 | | 62"$45 |
| 34 | Turners WW Racer | 13"$12 | 19½$16 | 39"$28 | 52"$40 | 78"$52 |
| 35 | How Mr. Mulligan | 16"$15 | 23½$20 | 47"$32 | 64"$44 | 94"$56 |
| 33 | Boe P26A Low Wng | 14"$15 | 21"$20 | 42"$32 | 63"$45 | 84"$58 |
| 35 | Stinson T-W SR-7 | 20½$16 | 31½$25 | 62"$45 | 82"$55 | 123"$66 |
| 42 | DH Mosquito Bomb | 37½$24 | 41"$35 | 81"$50 | 108"$65 | |
| 37 | Stearman PT-17 * | 16"$18 | 24½$22 | 49"$38 | | 98"$59 |
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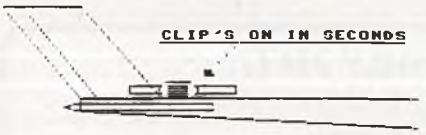
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allowing parts placement and handling, especially on inside surfaces such as rib cap strips. That convenience is now available with CA glues such as Satellite City's UFO with both thick, slower 60 second set, and thin, 7 second set, viscosities. And, joints are waterproof. I no longer hesitate to build a complete giant model using only UFO. Balsa to hardwood, hardwood to hardwood, and even laminating or glass cloth applications, all wrapped up in a couple bottles! Strong? I have made a "T" out of scrap 1/16" ply, added glue fillets and once cured, the ply will break before the glue joint every time. That means joints are tougher than the building material itself. If care is taken with joint fits, gusseting may not even be necessary and my building weights have been reduced accordingly. I have taken one of my nine footers, complete sans covering, and could lift the model by wing spars just three bays in from the wing tip with no harm whatsoever.

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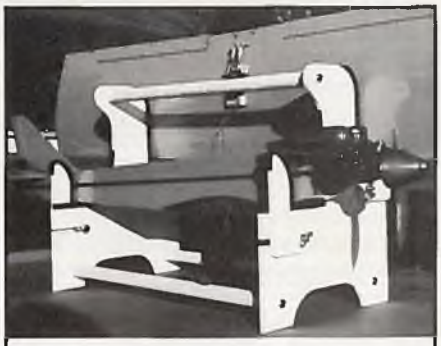

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dedicated builders. Still, I keep seeing new plans surfacing and when you think it's all been done, someone will come up with a different sized plan. One thing that bugs me is how giant designs can become complicated by the designer. The plan will show the designer to be skilled and experienced, but it must be only with smaller models, and just a card table to build on. I can see that kit manufacturers may limit stock length because of shipping sizes and availability, but a scratch-built design should not have that limitation. Giant designs can be better thought of as a small version of a full size aircraft rather than a larger "model." About the only thing that changes is the type of building materials.

If building table size is a problem, use a door and put a set of folding metal legs on it. You might have to scab some hard points for leg mounting on a hollow core door but that's no big deal. That table stores easily and will also come in handy for everything from yard sales to patio dining and work tables at flying sites. A 7' door means you can easily build a 12' span model, a wing panel at a time (who's gonna make it a one piece wing?). Fuselage too long? Build from the tail end and then shove it out over the table edge to work on the rest of it. Needless to say, I'm not much for jig building a model and have no problem with a door sized building board. Even then, the

**continued on page 92**


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| MRC1851 | NISSAN KING CAB PKG. | 264.99 |
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continued from page 89/86

table is usually half full of other stuff during model building.

Speaking of designs, Ed Volmer, IMAA Safety Officer, is scaling up a 1.5 size Norm Page designed "Mach 1" pattern machine. I'm kind of anxious to see how it operates. You may recall that the last column mentioned that as model size increased, snappy airbatics suffered. Once, years ago, I saw a 1.5 size pattern design fly. As I recall, it just flew but at that time engine choice was very limited. Ed plans to use a Sachs 4.2 and that should certainly make it jump. Ed is going for flaps, retracts, smoke . . . the whole works. Anyone have experience with such an endeavor? I think the trick to be big and airbatic will be plenty of power and possibly enlarging control surfaces to make things move a little faster. Otherwise, I would consider keeping it as light as possible to get at least the 1/3 size Laser snappishness.

John Bombardo's pretty scratch-built is pictured here. Powered by a G-23, the 1/4 size Piper PA-20 is modeled after John's brother's full sized one. A jewel with full interior and even finished with Randolph's dope just like the big one.

Had to put a couple pics of Gil Appleson's 1930 Curtiss Falcon. That way you can see the relative size of the beauty's 9.5' span next to Big John.

I know there will be questions regarding the big 110" span Spitfire, so write to Ralph Ropp, P.O. Box 608, Rocklin, California 95677. It has been a while in coming but the design is now ready for flight tests and Ralph hopes to have plans and parts available by the time you read this. He is just down the road from me and I can't wait to see the big Sachs 5.8 take it to the air. But you'll have to wait until next time and maybe I can tell you about it. □


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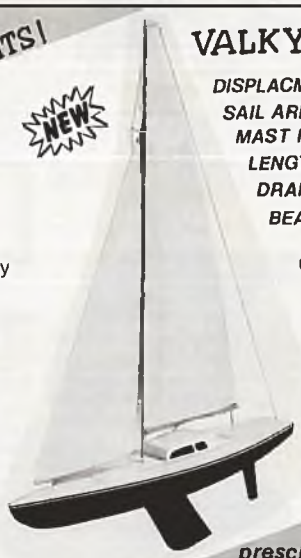
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2. I'D RATHER BE FLYING MY R/C
3. MY WIFE SAYS I'M JUST PLANE CRAZY.
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# THE FUN OF AN R/C VACATION

## By Stu Richmond

If you want to take your wife on a great R/C vacation . . . if you want to fly R/C and visit a gold museum . . . if you want to fly R/C and visit volcanoes . . . if you want to fly R/C and eat flame broasted chicken fired with coffee root wood . . . if you want to fly R/C and see balsa wood growing . . . you really ought to plan to visit the 9th Tropical R/C Fun-Fly in Costa Rica in May of 1991 . . . it's not too soon to start your planning!

Costa Rica is a friendly country located between Nicarauga and Panama in Central America. LACSA is the national airline of Costa Rica and a major contest sponsor. They will not charge you excess baggage for your crated R/C model and they fly to Costa Rica from New York, Miami, New Orleans, and Los Angeles. The gang stays at Hotel Irazu and the 30¢ shuttle bus gets you to downtown San Jose for fun and action. The R/C flying takes place over a Saturday and Sunday and is aimed more at having fun and meeting people than at competition . . . it's a **real** fun-fly. People come to fly as well as watch. This year saw RC'ers from Holland, France, Mexico, Panama, the United States and elsewhere -- all visiting and R/C vacationing for about five total days. The sponsoring club throws a great party (lots of dancing girls this year) and couples it with a classy awards banquet.

If you don't speak Spanish — it's no problem, as everybody seems to speak some English.

For further information on the 1991 Ninth Tropical R/C Fun-Fly in Costa Rica you can write to: Julio Pastore, el Presidente, Aeromodelismo Costa Rica, P.O. Box 44-1017 San Jose 2000, San Jose, Costa Rica, Central America.

It'll take 50¢ postage on your letter. For airline reservations call LACSA at 1-800-225-2272 or your local travel agent. And if you want to visit the local hobby shop . . . there's only one in all of Costa Rica . . . it's El Hobby Shop . . . and it's just around the corner from the Hotel Irazu! □



*Julio Pastora and his lovely wife Maria, were there for the R/C fun-fly in Costa Rica.*



*Dave Scully of Ohio, repairs his "injured" Miss Martha while Otto Van den Akker of Holland watches.*





*LEFT: The Miss Martha was jig-saw puzzled back together with Bob Smith CA glue in about 95 minutes. Cardboard reinforcing made a flying billboard of the model. RIGHT: The Mexican modelers brought beautiful models and team shirts. Back row (left to right) are Luis Brunner, Erick Lujan, Rene Flaheng, David Heredia. Front row is Pedro Ramirez, Hector Ruis, and Salvador Preciado. That's Hector's Zero . . . Rene made his own R/C system!*





*LEFT: In 1989, the Panamanians were not allowed to leave their country due to political restrictions . . . but this large group flew in the 1990 Tropical R/C Fun-Fly in Costa Rica, and were awarded the new LACSA President's Award for funmanship! Rafael (Pepo) Cano built the beautiful centerpiece aluminum P-51 from a Top Flite kit. RIGHT: Adalberto Alguero Lourdes (everybody called him "Al") brought this prop-pulled American jet fighter. Al is an anatomy professor in Panama . . . his lovely wife is a children's nurse. The Manual Noriega imposed travel restrictions prohibited their visiting Costa Rica in 1989 . . . they're free now!*

# HOW TO GET H



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**The heart of the new R124DP/R127DP PCM receivers is Futaba's custom microprocessor circuitry.**

**Release the trainer switch and control of the airplane is instantly and safely transferred to the instructor.**

**The Conquest 4NBF**




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**PCM**
**The Conquest 4NBP and 6NPK**




## Conquest System Specs

| System | Signal | Receiver | Servos(#) |
|---|---|---|---|
| 4NBF | FM | R127DF | S148(3) |
| 4NBP | PCM | R124DP | S148(3) |
| 6NFK | FM | R127DF | S148(4) |
| 6NPK | PCM | R127DP | S148(4) |

The Conquest 4NBP is identical to the 4NBF, except it's Futaba's first 4 channel PCM system and includes our R124DP receiver. If it's more channels and features you need, consider the Conquest 6NFK or 6NPK.

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**The Conquest 6NFK**



# KARI-KEEN




# SIOUX COUPE




*Full scale Karl Keen appeared on the cover of Sport Aviation, publication of the EAA. Specs are: 30' span, root chord 7½'; tip cord 4' 6", with fuselage length of 23'. Power was 90 H.P. Warner.*

It was while browsing through a pile of old "Sport Aviation" magazines (the monthly one issued by the Experimental Aircraft Association of America) given to me by a good friend, that I was suddenly confronted by this Kari Keen. It fairly oozed with character (to me anyway) one of many born in a bygone age of free and easy flying, long gone now of course, but it must have been marvelous. Anyway, enough of the melodrama, I felt that I had to build a model of it.

My first priority was a 3-view; but having tried the owner of the Kari Keen, the E.A.A. library, the Smithsonian Institute, and countless friends both here and in the USA with good private libraries, I drew a complete blank. In desperation, I actually drew up my own from the information that I had, dimensions, and many photos in "Sport Aviation" magazine (Nov. 1977). The owner of the Kari Keen, Forest Lovely, was kind enough to correct them for me, using the full size aircraft as a reference. The results were very good, so I went ahead with the project.

The aircraft was one of about 30 built between 1929 and 1931 powered by a Warner Scarab Junior of 90 hp, and the owner says it was, as far as he knows, the only one to have been built with a cowl they call a "Speed Ring." If you fancy building this really rare golden era aircraft, we can make a start with the fuselage.





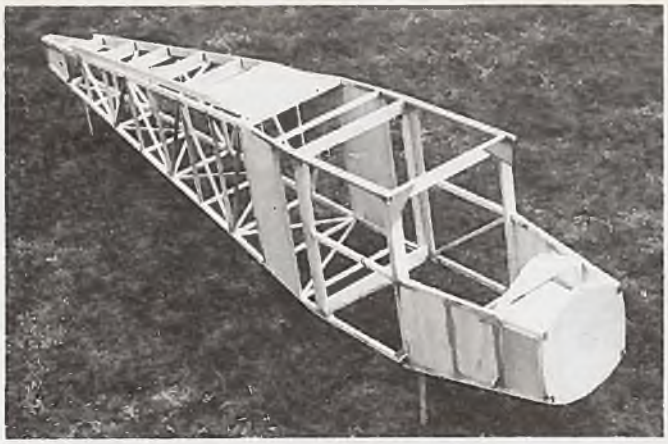



**A 1/4 Scale model of a 30's classic design. For .65 2-stroke/.90 4-stroke engines.**

**By Dennis Tapsfield**

## KARI-KEEN SIOUX COUPE

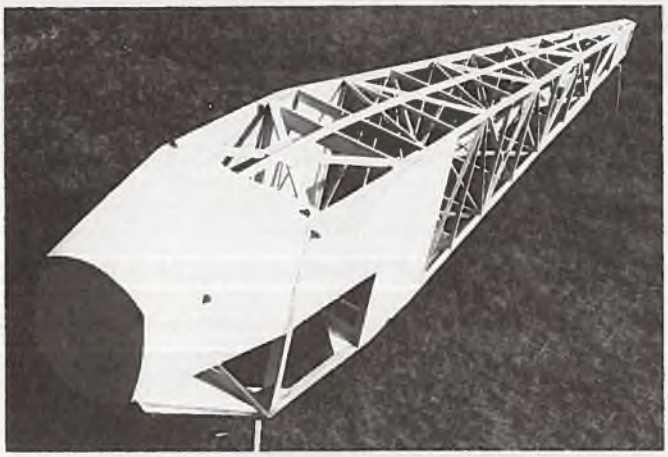
**Designed By:**
Dennis Tapsfield
**TYPE AIRCRAFT**
1/4 Sport Scale
**WINGSPAN**
90 Inches
**WING CHORD**
18¼ Inches (Avg.)
**TOTAL WING AREA**
1584 Sq. In.
**WING LOCATION**
High-Wing
**AIRFOIL**
NACA 4415 Root, 4412 Tip
**WING PLANFORM**
Tapered
**DIHEDRAL EACH TIP**
Top of Wing Flat
**OVERALL FUSELAGE LENGTH**
68 Inches
**RADIO COMPARTMENT SIZE**
Ample
**STABILIZER SPAN**
27½ Inches
**STABILIZER CHORD (Incl. elev.)**
9½ Inches (Avg.)
**STABILIZER AREA**
240 Sq. In.
**STAB AIRFOIL SECTION**
Flat
**STABILIZER LOCATION**
Top of Fuselage
**VERTICAL FIN HEIGHT**
13 Inches
**VERTICAL FIN WIDTH (Incl. rud.)**
10½ Inches (Avg.)
**REC. ENGINE SIZE**
.65 2-stroke, .90 4-stroke
**FUEL TANK SIZE**
11 Oz.
**LANDING GEAR**
Conventional
**REC. NO. OF CHANNELS**
4
**CONTROL FUNCTIONS**
Ail., Rud., Elev., Throt.
**BASIC MATERIALS USED IN CONSTRUCTION**
Fuselage ..... Balsa, Ply & Hardwood
Wing ..... Balsa, Ply & Hardwood
Empennage ..... Balsa & Hardwood
**Wt. Ready To Fly** ..... 176 Oz. (11 Lbs.)
**Wing Loading** ..... 16 Oz./Sq. Ft.



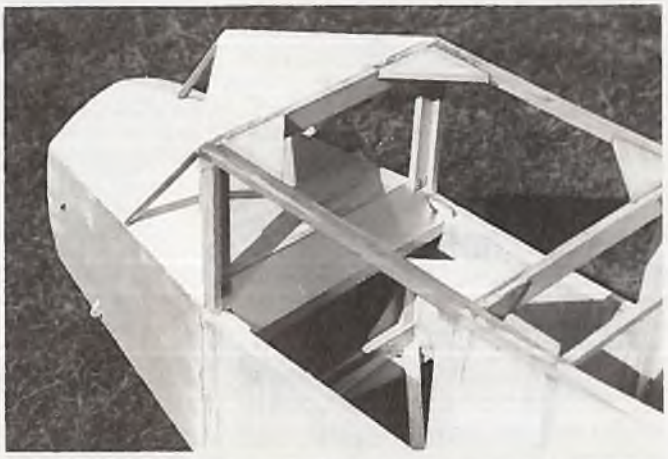
*Conventional fuselage frame in the early stages.*



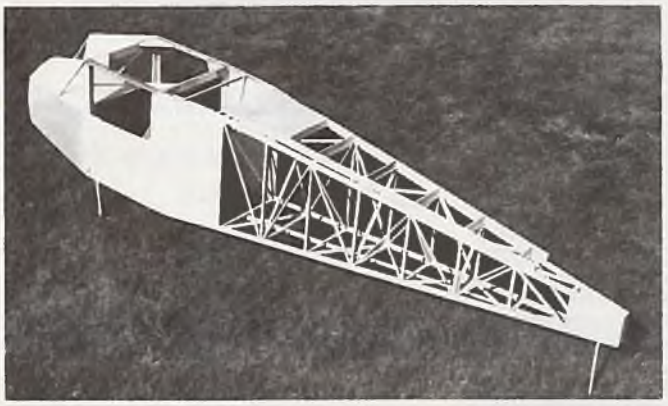
*Dural landing gear brackets are shown in place using 4-40 bolts.*



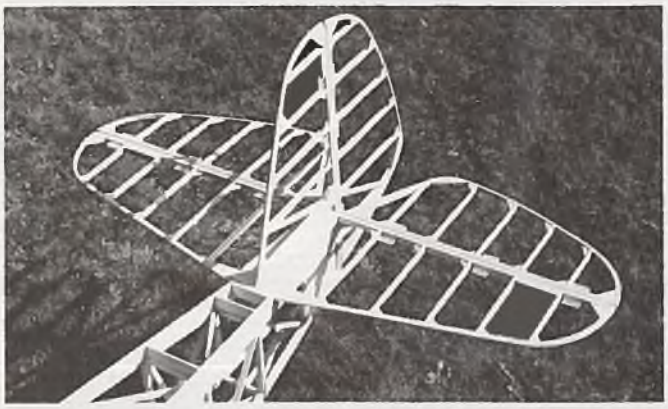
*Underside of fuselage showing stringers and sheeting.*



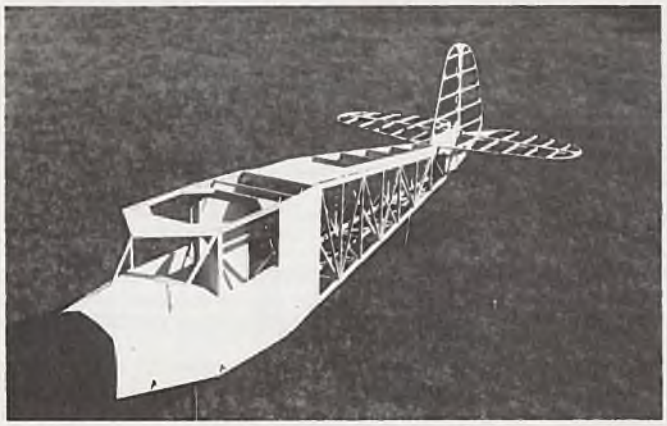
*Cabin area with aluminum instrument panel screwed in place.*



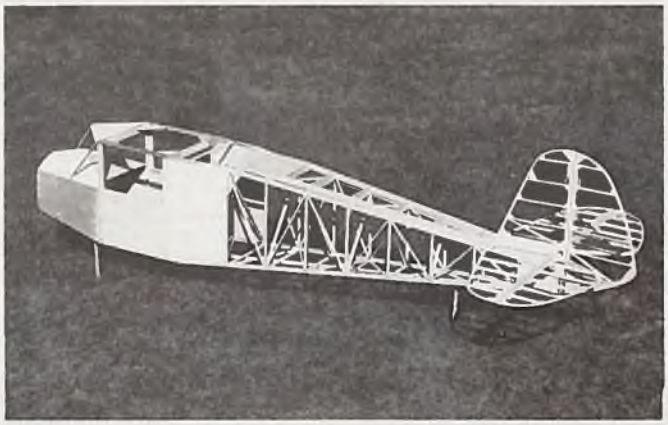
*Nearly completed fuselage.*

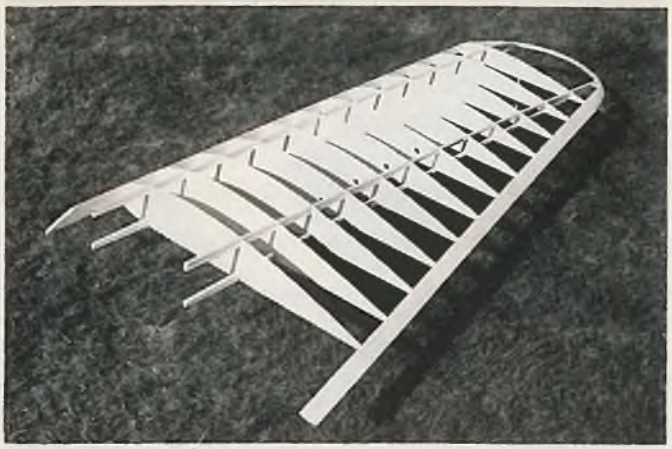


*Tail unit completed and shown in place on fuselage.*

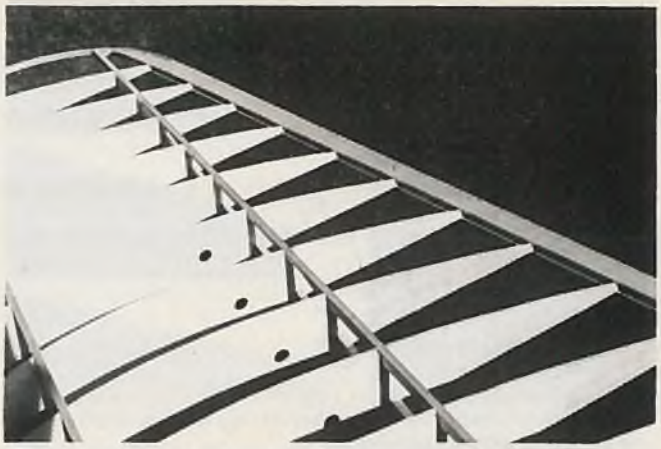


*Fuselage and tail unit are shown assembled.*

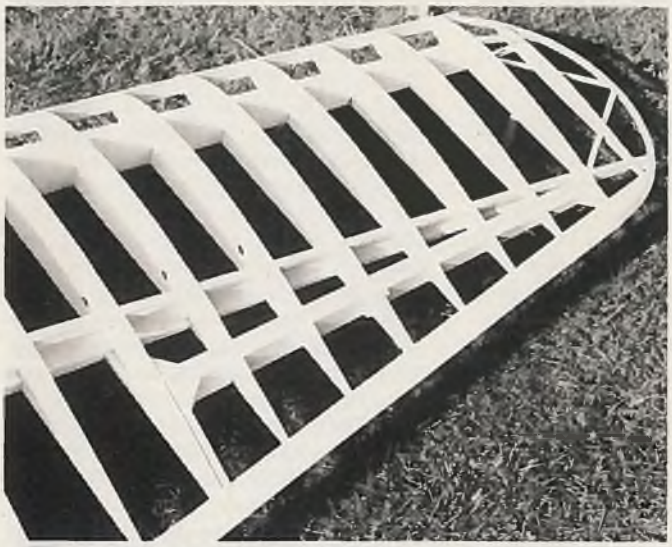


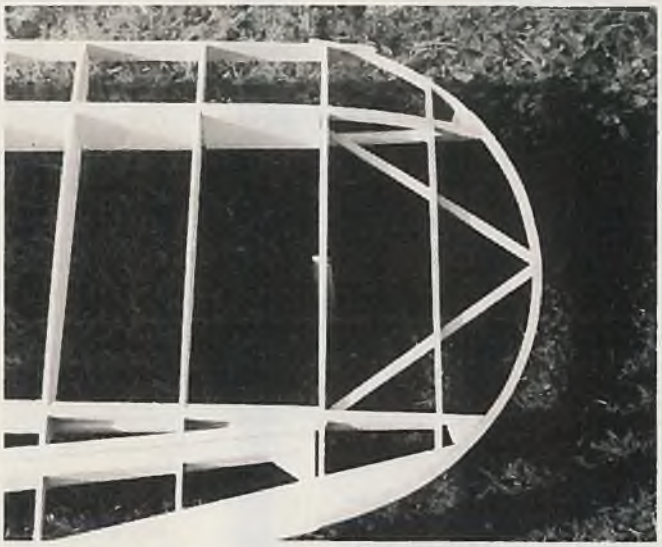


*Early stages of wing.*

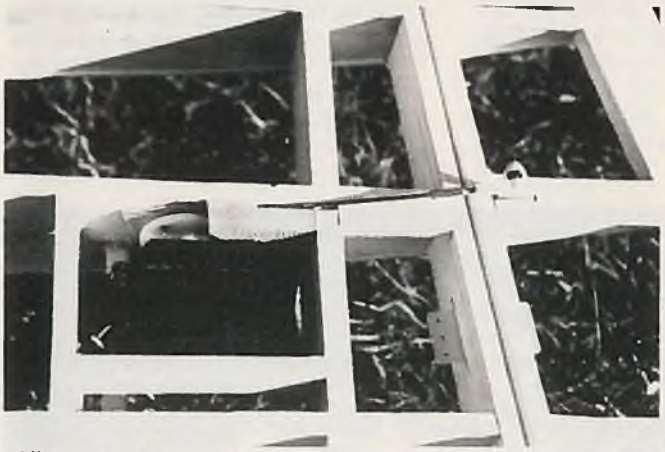


*Wing ribs are marked for location of aileron false spars.*

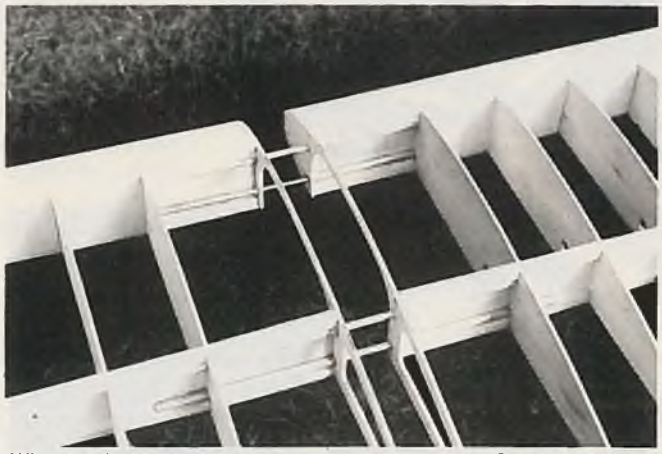




*LEFT: Aileron false spars are shown fitted (note trailing edge is still in one piece), and shear webs attached to main spars. RIGHT: Laminated wing tip bow and support bracing shown.*



*Aileron servo and pushrod fitted in place. (Note: Do not cut out aileron until ready to cover.)*



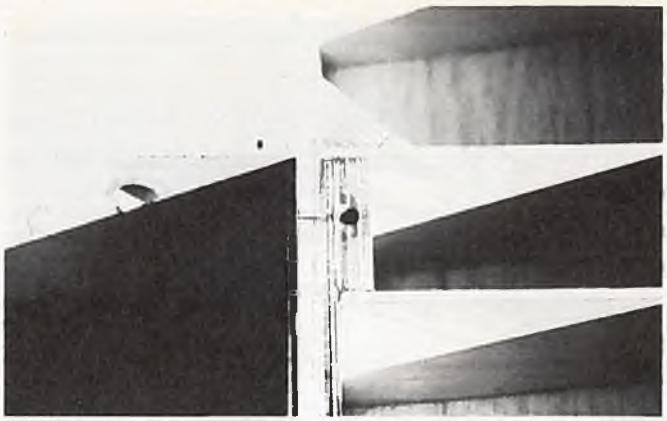
*Wing joining tubes are shown epoxied in place. Space between tubes will be filled with balsa.*

**Fuselage:**

First cut the formers and firewall from ply as shown. If you want to make formers 3 and 4 in one piece from 1/4'' ply, do so, but it is wasteful, and not really necessary. Cut the landing gear mounting plates from either 1/8'' or 3/32'' dural, and bolt in place as shown. Make the fuselage sides. Due to the abrupt bends you must splice the longerons where shown, make a good joint here to ensure adequate strength, but do be sure to use hardwood where indicated. The structure is quite conventional and should not present any problems. When joining the sides together using formers 3 and 4, note the reinforcements; these are necessary for the integrity of the fuselage. Drill the firewall to suit your engine, and position the tank shelf so that the tank height is correct relative to the engine carburetor. Finish the fuselage according to the plan, and proceed with the tail unit.

**Tail:**

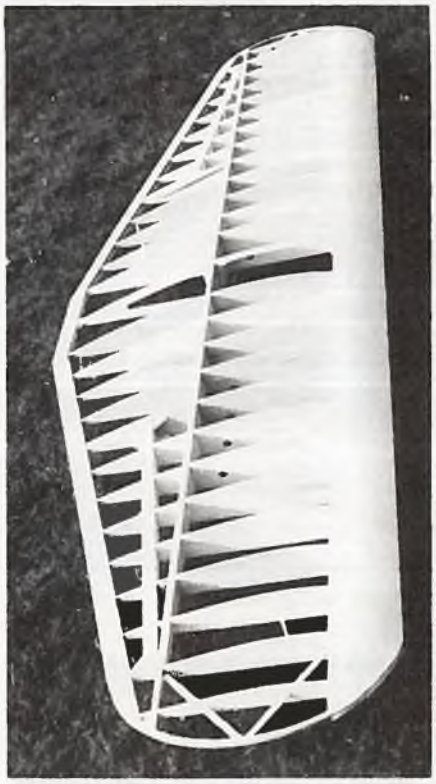
This is very straightforward and should not pose any problems. Just be sure to use the right material as shown on the plan; be sure to set the angle of the elevator horn correctly when joining the elevators together. The outlines of the rudder and elevators are made from laminations of either 1/16'' balsa or 1/32'' hardwood. Decide on what you intend to use, and measure how thick they will be (about 1/4''



*3/8" plywood wing mount block. Drill and tap for wing bolt before application of bottom sheeting.*



*Forward wing mount (W-15) shown in place. (Note: Wing mount key not shown.)*



*Nearly completed wing shown joined.*

inserting pins on the outside as you go, and allow to set. The wing tips are made in the same way. This method is very light and strong.

**Wing:**

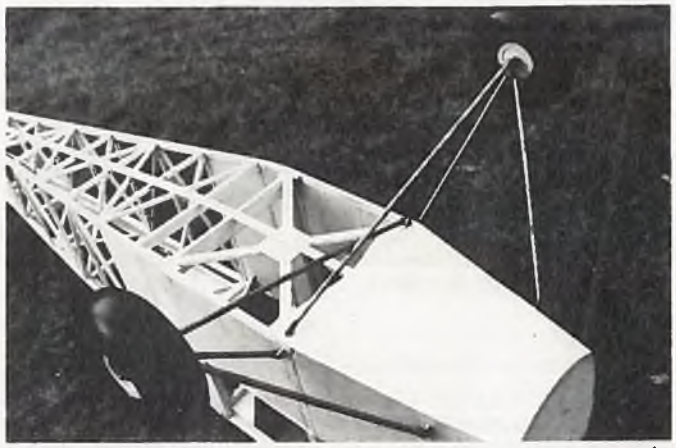
The wing is made in two halves for convenience. Cut out the balsa and ply ribs to drawing, and make the notching jig from 1/16" ply. Make the rib to be notched and lay the jig on the top of the rib, with the 1/16" ply stop against the nose of the rib. The appropriate center of the rib nose is in line with the arrow, and the trailing edge is in line with the sloping rear edge of the jig. The notches can now be cut to the correct depth depending on the rib being notched. Cut all the notches for the spars, note that they are double depth at the root ribs, also that ribs 5 to 10 inclusive are partly cut through at the chain lines for later fitting of the aileron and false spars.

The wing has no dihedral on top, only on the underside due to the thinning of the wing out towards the tip. Because of this, when building the wing, the ribs must all lean towards the tip (the angle is shown on the plan). Lay down the bottom rear and bottom front spars, having made them double thickness where shown, and trimmed to the underside angle at the roots. Glue all the ribs in place, but not the 1/8" ply center root rib; allow to set. Next, gently lift the front spar off the plan and insert a piece of 1/4" x 1/4" just to support it. Pin the bottom of the trailing edge in place, and glue the ribs to it. Chamfer the top of the trailing edge and glue that in place. Build out the trailing edge and cut it at the centerline. Also cut the bottom spars, but leave the top spars for the moment. Lift the wing from the plan, and repeat for the other wing. The tips can now be fitted and glued in place. Carefully cut the ribs through completely where they were partly cut before.

The false spar and aileron spars are now glued in and gussetted where shown. Glue the vertical grain webbing in place at this time. Turn your attention to the roots of the wing. The top spars and leading edge should now be cut so that they butt up correctly with the top of the front spars flat (no dihedral or anhedral on this spar). The 1/8" ply root (centerline) ribs can then be glued in place. Take your time for this operation and get it right. **Do not fit the joining tubes yet.** Cover the bottom of the leading edge first and allow to set. Next cover the top of the leading edge using a slow setting white glue and pin or tape in place, and, while still wet, lay the wing over the plan on a **flat** surface with no warps. Place a 1/4" x 1/4" strip under the front main spar, then place a



*Steel tube landing gear is attached with 4-40 nuts and bolts.*

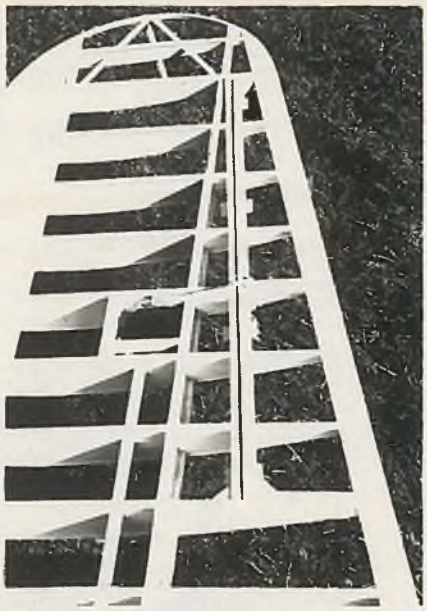


*Completed landing gear assembly. Three wheel collars are used on each side to retain struts, axle, and wheel.*

is okay). Place a series of pins around what will be the **inside** of the curve. Use a white glue to laminate the pieces, and while still wet, gently wrap it around the pins, leave the spars clear for the moment. Glue the top spars in place (don't forget that rib lean). Glue the inside leading edge in place (having shaped it to section) and taper; weight on the root end and lift the tip trailing edge by about 5/16" at rib number 11 to produce some 1 degree to 2 degree washout at the tip.



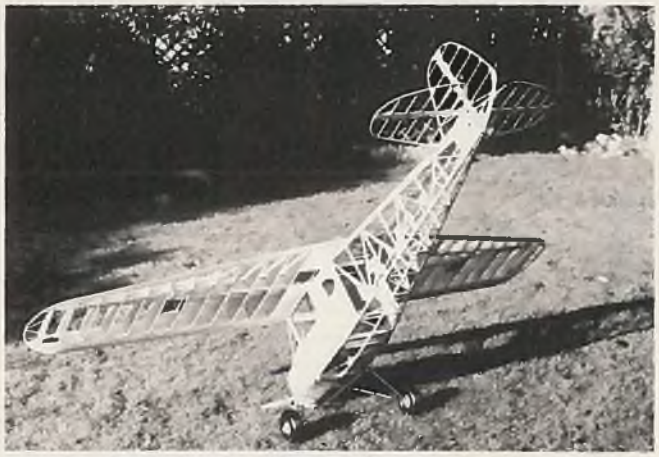
*Tailwheel insures good ground handling. (Note: 1/2" access hole in side of fuselage for elevator clevis.)*



*Finished wing shows ailerons cut out, servo lead tube, and aileron servo.*



*K&B .65 Sportster and homemade silencer shown mounted to firewall.*



*A good, light, and strong structure.*

When the glue sets, the wing is very torsionally stiff; repeat for the other wing. The joining tubes can now be fitted. Take the four 12" lengths of 1/4" bore 1/64" wall tube and cut them in half. Position them in the wing where shown, and use the 11" long 1/4" diameter alloy joining rods to assemble the two wings together. When you are satisfied with the alignment, epoxy the tubes in place. Take care to oil the rods so the epoxy will not stick to them, or you will have a 90" wing in one piece! You can now finish off the wings with servo boxes, paper tube for the servo leads, capstrips, plywood root fixings, wing mounts, etc. Fill in the trailing edge gaps, fit the center root rib forward of the front spar and aft of the rear spar (do not fit the supports "S" prior to covering). Fit the outer leading edge and blend to the section. Fit the 3/8" hardwood blocks for the wing fixings and cover the roots with 3/32" sheet, but leave the area around the 3/8" wing blocks until they are drilled and tapped. The most difficult part of the model is now complete. Leave the separation of the ailerons until last.

**Landing Gear:**

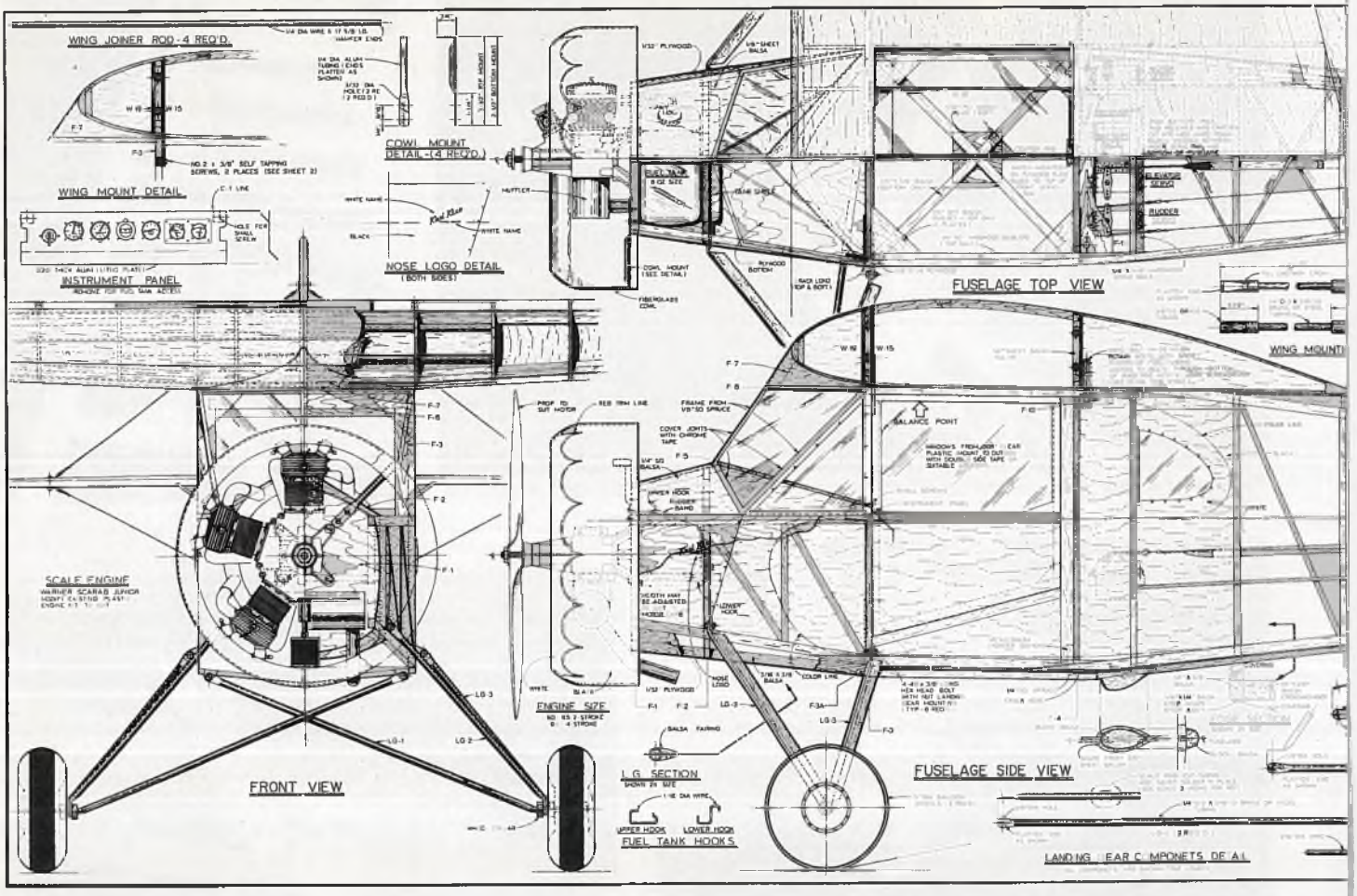
This has been kept as simple as possible. Try to acquire some steel tube if you can. If not, brass will be fine, but not the very thin wall stuff that is normally on sale; it must have a 1/32" wall giving a 3/16" bore to be strong enough. You just have to flatten the ends in a vice and drill the fixing holes. The piano wire axles that I used were a hammer fit in the diagonal braces, so I was lucky. If yours are slack, a good cleanup and soft solder will be alright, and the whole thing just bolts into place. The collars keep it all together; however, it's a good idea to file a notch where the screws touch the axle to prevent the collars from sliding. To be true to scale, one diagonal should pass through a ring in the other as shown on the plan (there was no springing in the full size landing gear, just big spongy tires). Streamline the tubes (not the diagonals) with balsa as shown on the plan.

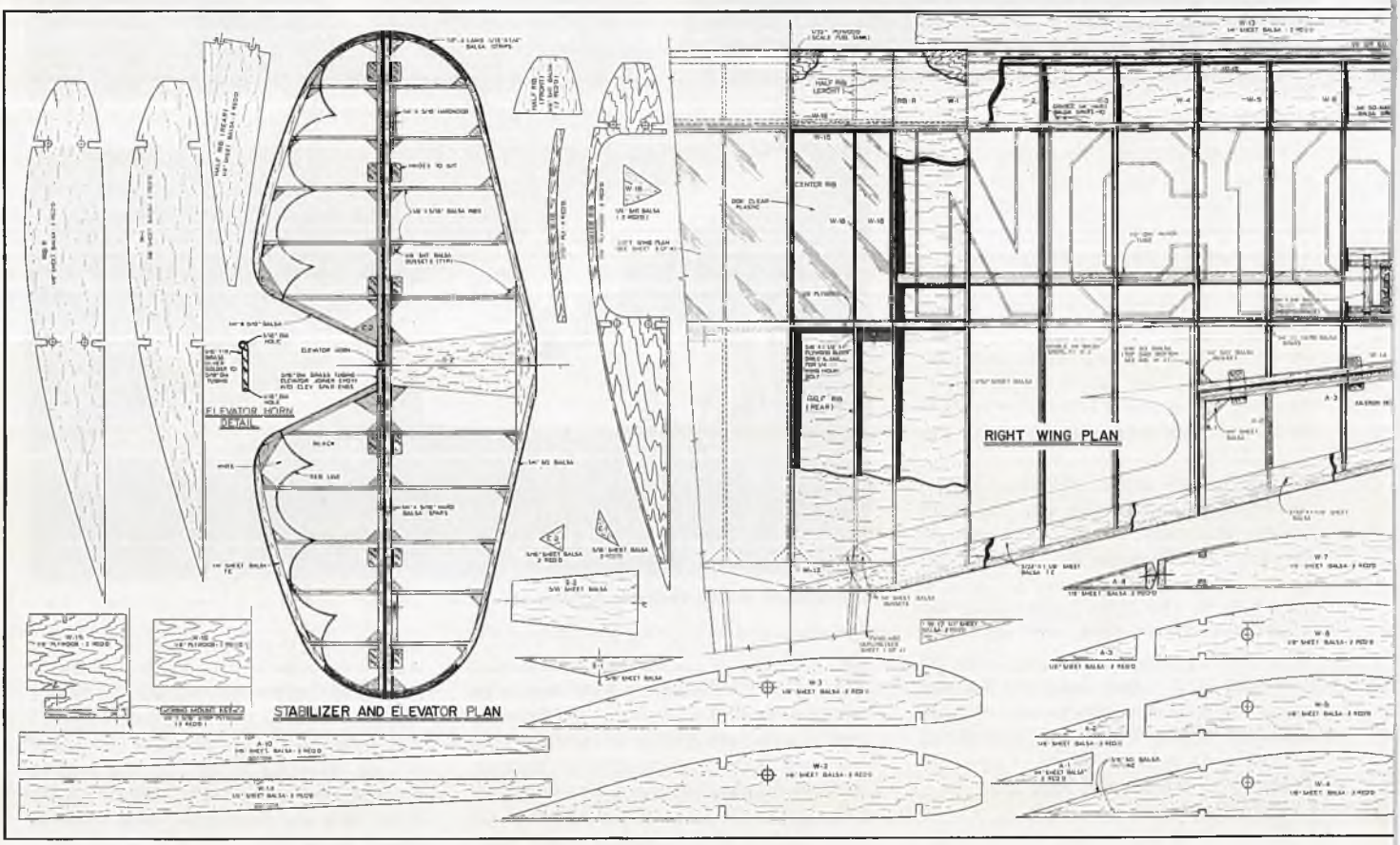


*Completed model before covering.*

We can now get the model together prior

FULL SIZE PLANS AVAILABLE SEE PAGE 248



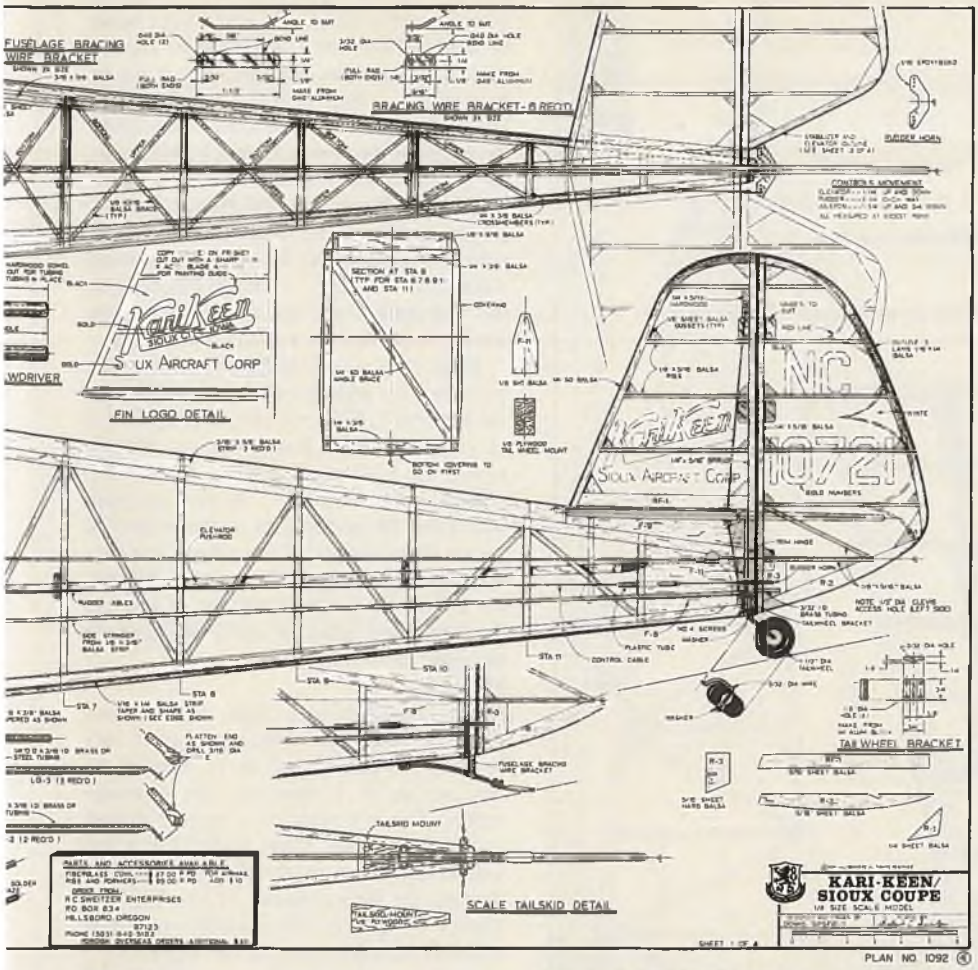



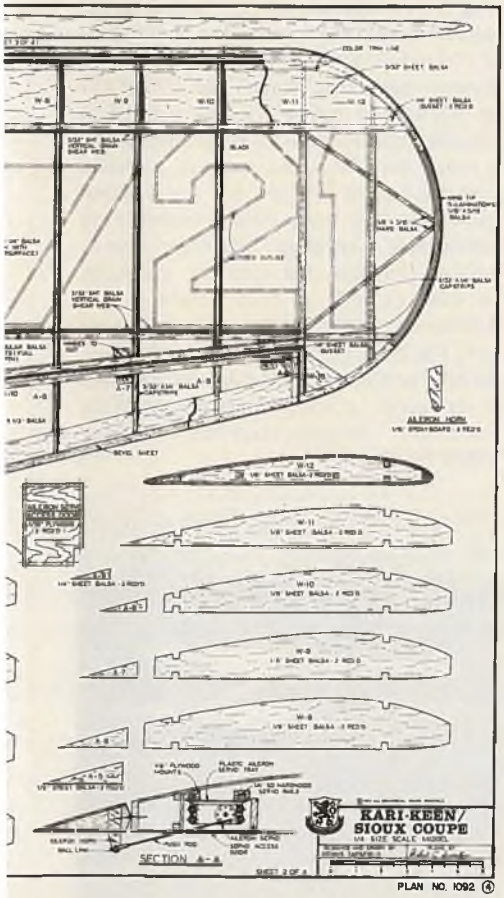
to covering. With the wing set in place, drill and tap the hardwood blocks for the 1/4'' nylon bolts. (The 1/4'' ply blocks are glued and screwed to the 1/8'' ply wing mount under former #3 where shown.) I always install the radio at this stage, so do that now, and make sure everything works okay. Glue in a plastic tube about 1/16'' bore for the radio antenna inside the fuselage, in a bottom corner. Make sure your radio does not glitch with the long servo leads out to the aileron servos. My Fleet PCM works fine, but some radios do object, and need a choke to correct the trouble. ''Egg box'' the elevator pushrod about every 10'' to prevent excessive harmonic vibration. I used closed loop cable for the rudder.

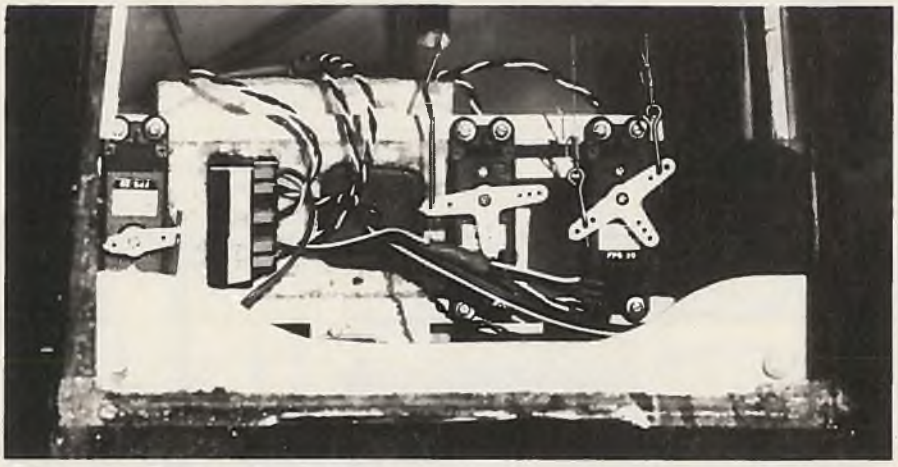
Check the general squareness and symmetry of the assembly. Fit the cowl, engine, fuel tank, radio gear — in fact, everything — before you cover, so that it will all go together when finished. I always leave the servos in place while covering! The wing servos must be left in unless you wish to use removable hatches for them.

**Covering:**

I wanted this model to weigh less than 11 lbs., so I chose to cover it using Solarspan and black enamel. I think it would have looked more realistic using one of the ''textured'' materials, but I could not afford the extra weight (final weight was 10 lbs., 14 oz.). The cheat lines are 1/16'' wide Solartrim or Presto, cut with a straightedge and balsa knife. Try not to handle the adhesive face; I use a pair of tweezers. Be sure that the surface you are sticking it to is



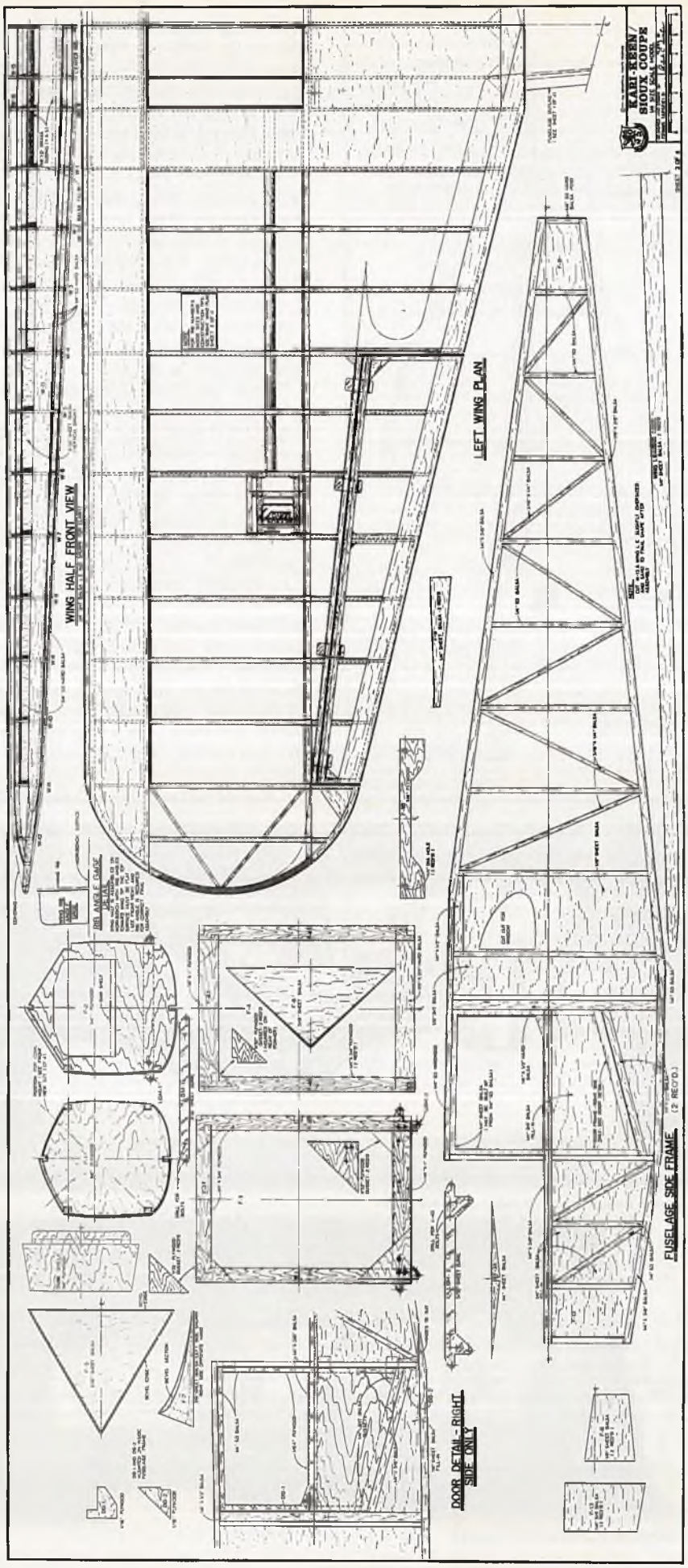



***Radio installation is neat and simple.***



***Completed instrument panel.***

FULL SIZE PLANS AVAILABLE SEE PAGE 248




clean and not greasy, even finger marks are bad news! The registration letters on the wing are black with a 1/8'' red border made by cutting from black Solartrim or Presto, then sticking them onto red Solartrim or Presto and cutting to leave the 1/8'' red border. It helps to use a good warm iron over the edges of the trim to ensure a good seal, but not hot enough to shrink it.

The Kari Keen logo and the registration letters on the rudder were cut from self adhesive gold trim, the remainder were waterslide transfers. All the windows and the windshield are stuck in place with double sided tape or a suitable adhesive.

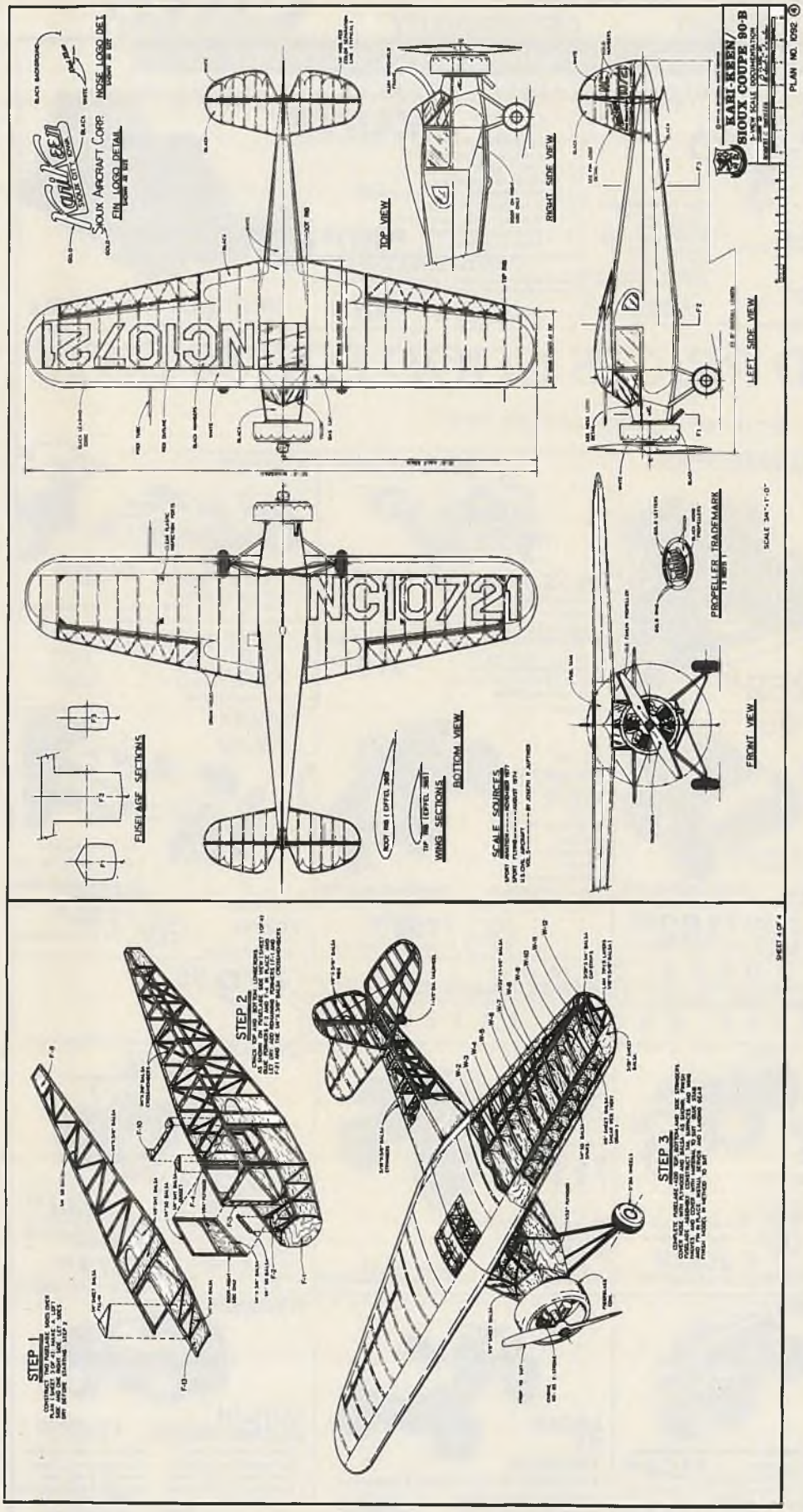
With the model finished, check the balance point and adjust it by either moving the battery or adding weight as required; this is very important. Bear in mind that the model will probably finish up tail heavy, so do choose the wood aft of the balance point with care. Remember, an ounce at the tail means four ounces in the nose! The less weight you need to put in the nose to balance the model, the better it will fly. If you use the fabric and paint, be extra sparing with the paint at the tail end.

**Flying:**

This model is very light. Even if you build it to 14 lbs., the wing loading will only be about 20 ounces per sq. ft. Mine is 16 ozs. per sq. ft. It flies just like a vintage model. This is a model of a vintage aircraft and it has realistic flight performance and will do really slow fly-bys that get the guys' dashing for their cameras. If you like that kind of flying, this is the model for you. You will find the K&B Sportster turning a 13 x 5 prop is more than enough power. The model just flies itself off the ground in about 25 ft. at a very low speed. I've not fitted a scale dummy engine (the original had a 90 or 110 hp Warner) so that most of the prop blast goes through the speed ring unrestricted. As is usual, the ailerons are not very powerful with this type of airplane, but you will find spins are good with instant recovery on neutralizing everything. Loops are okay as well as chandels, but rolls are not to be recommended! A true scale flight performance with landings that are very soft. The building time is well rewarded by the final performance. The ground handling is very good, so you will not be one of the ''nose-over'' brigade. Have fun with many happy landings. □



**FULL SIZE PLANS AVAILABLE SEE PAGE 248**




## Other Plans Available By Dennis Tapsfield



**GRUMMAN AMERICAN COUGAR**
**#807** **AUG. 1980** **$13.50**

This 1/6 Stand-off Scale model of Grummans light twin builds into a perfect size twin. Utilizing .20-.25 size engines, makes it economical to fly. Has excellent single engine performance. Span is 76", area 815 sq. in., weight 148 oz. By Dennis Tapsfield. Two sheets: 34" x 60".



**FAIREY JUNIOR**
**#919** **AUG. 1984** **$12.50**

Presented in 3½" = 1' scale, this Post WW II British light plane designed by Dennis Tapsfield, makes a most desirable scale model for the .90 to 1.2 4-strokes. Wingspan 80", area 1420 sq. in., weight 232 oz. with W/L of 24 oz. Two sheets: 34½" x 63½"; 34½" x 60½".



**SCRAM X 1.3**
**#1003** **OCT. 1987** **$23.50**

For relaxing and enjoyable flying, give Dennis Tapsfield's 1.3 enlargement of the old timer Scram a try. With the 107" span, 1490 sq. in. area, and an old, used .61, you can putt around the sky on idle. It weighs 134 ozs. which gives it a 13 oz. wing loading. Three sheets: 34¼" x 112⅜"; 67½"; 59¼".




**ZLIN XII**
**#1044** **JUNE 1989** **$15.25**

With only about 100 built in the period between 1935-1939, this Czechoslovakia club/sport aircraft was ideal for what Dennis Tapsfield was looking for at 23%, it has a 91" span, fuselage length of 69", 1134 sq. in. area, and weighs a mere 160 oz. At 20 oz. wing loading, a good sport .60 2-stroke works great. Two sheets: 35½" x 76".



**ANDERSON KINGFISHER**
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This 1/4 scale amphibian has a span of 108" and a wing area of 1584 sq. in. Designed by Dennis Tapsfield, this beautiful model uses a .90 2-stroke or 1.20 4-stroke engine for power, and flies much like a Cub. Built-up construction throughout using standard building techniques. Three sheets: (2) 35" x 76"; 34½" x 69½".

**See page 251 for ordering information**

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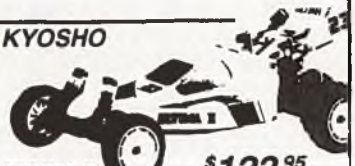
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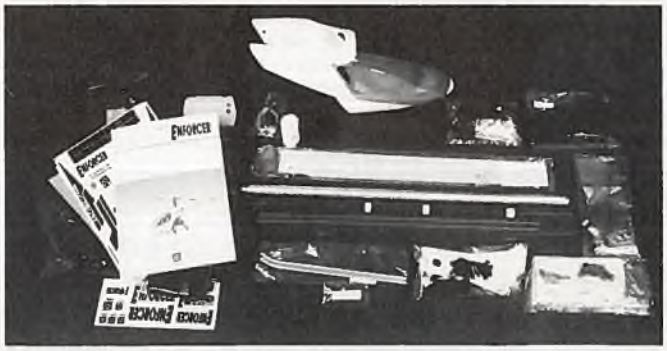


*Webra Speed .28 heli engine used.*

instruction books that come with Japanese kits, this one is very good and explains everything in readable English. The



*The Kalt Enforcer. Revolutionary design and construction.*




*Plenty of parts to make an interesting project.*

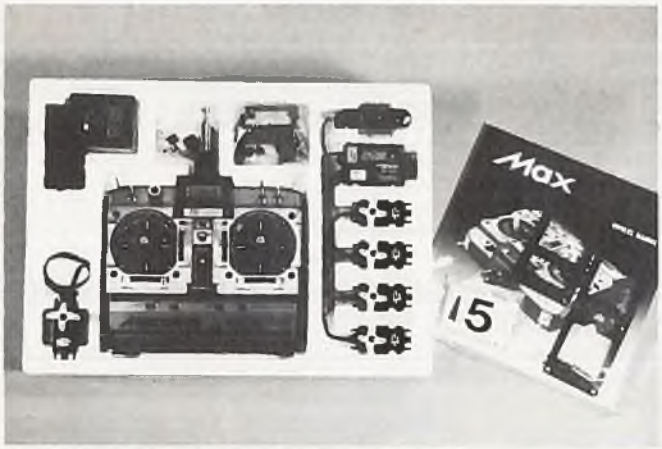
**Kalt Enforcer**

This month will be a review of the Kalt Enforcer. It is a good thing I have two weeks off every month to build helicopters or I couldn't keep up with all the new kits coming out.

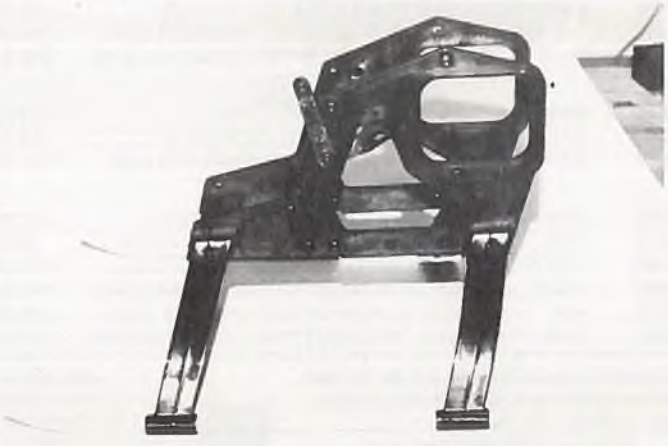
The Enforcer is Kalt's latest 30 sized helicopter and is a radical departure from their old Baron 20, or any other helicopter made for that matter. The Enforcer is available as a kit and in a ready to fly form. I was provided the kit version, but the kit assembled so easily it was as if it was almost ready to fly.

The instruction book is arranged in an unusual manner in that the first half contains the steps necessary to complete the ready to fly version and the second half contains the steps to build the helicopter to the same stage that the ready to fly one comes as. After the second half of the manual is completed you go back to the first half of the manual for the final assembly. Unlike most difference is the **readable** English.

I have built just about every helicopter made since I started in 1978 and I can say that the Enforcer is the most unique kit I have put together. The helicopter uses a plastic main frame assembly into which bolts a plastic sealed planetary transmission and a plastic servo tray assembly. The gyro sits on a platform that is directly under the main shaft. An unexpected item that the Kalt engineers provided is a vacuformed cover for the gyro so that the gyro is protected from engine exhaust and dirt.




*To complete the necessary items was this JR Max heli radio.*



*The main frame. Note wide spacing and collective bellcrank.*

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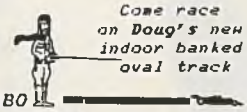
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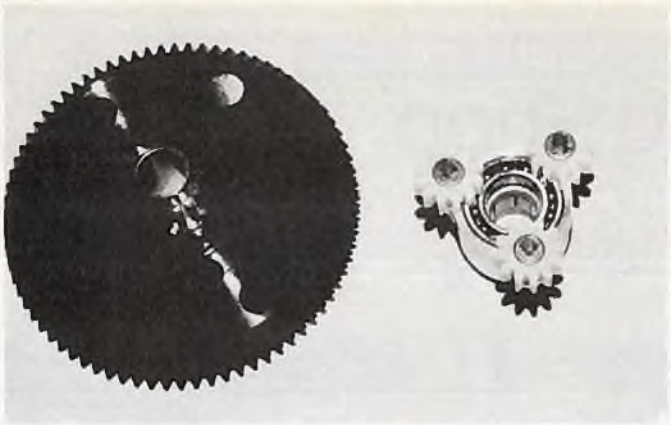
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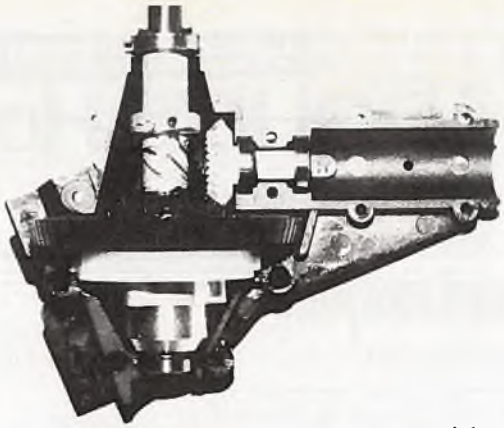
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***LEFT: The planetary gear arrangement. Plastic main gear with brass pinion on left, planetary carrier with planetary gears right. Outside plastic gear ring not shown. The protrusions on the gear ring fit into recesses in the transmission case to prevent it from rotating. RIGHT: The gears assembled into the right transmission case. The tail rotor take-off gear is upper right. The instructions say to grease the 90 degree tail rotor gears.***

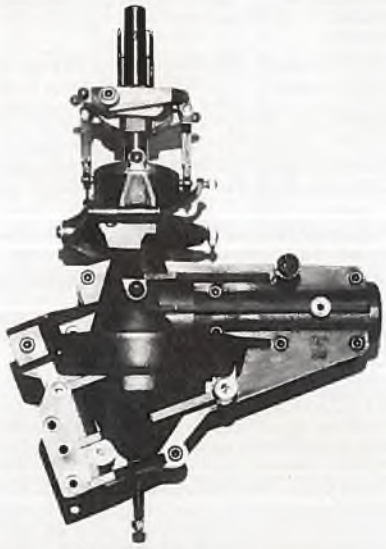


***The mixing assembly and the collective control rod. Note the 90 degree bent part of the two rods going into the collective control rod are shiny from being sanded.***

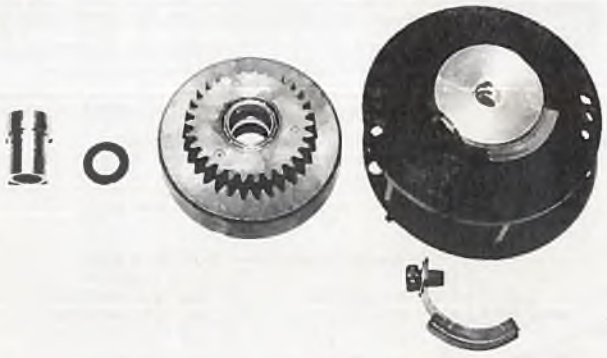
transmission, radio tray, and tail boom all bolt onto the completed main frame assembly. The fuel tank slides into holes in the upper rear portion of the side frames. The only item that is attached to the main frame which is not a completed subassembly is the collective bellcrank which rotates in metal bushings that are pressed into the side frames.

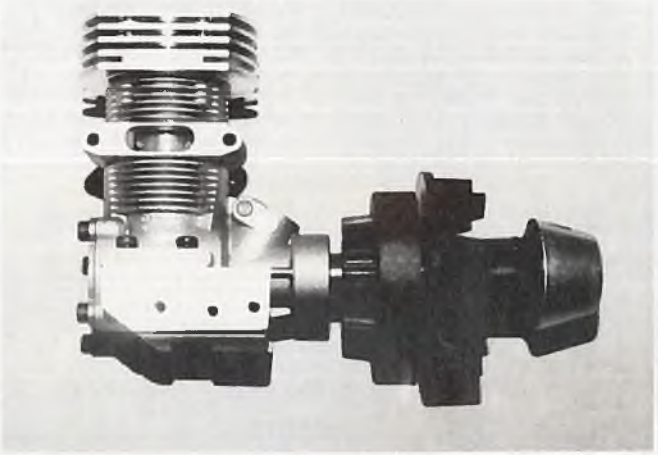
**Transmission**

The Enforcer uses a planetary gear arrangement instead of the usual pinion gear and main gear. The transmission assembly uses a fibre filled plastic pinion gear on the clutch bell driving a large plastic main gear. The main gear is attached to a brass pinion gear which acts as the sun gear for the planetary arrangement. There are three small plastic gears with needle bearings which rotate on the planetary carrier. The planetary carrier is machined aluminum with three steel pins pressed in for the planetary gears. A plastic outer gear ring is held stationary by the transmission case.



***Completed transmission with swashplate and mixing assembly installed.***





***LEFT: Engine clutch spacer, washer, clutch bell/drive gear with bearings installed and cooling fan. One clutch shoe is bolted to the fan, and the other is in front of the fan. The washer goes between the clutch spacer and the fan. RIGHT: Webra .28 with the clutch, fan, and starting cone attached. Note the metal surface on the starting cone.***

This kit was genuinely fun to put together because it is so different from previous helicopters.

**Main Frame**

The main frame uses fibre filled plastic side frames with plastic cross pieces and plastic landing gear struts. The

The large plastic gear turns the brass sun gear which causes the three planetary gears to turn and drives the planetary carrier at a reduced rpm. The sprague bearing (autorotation clutch) is inside the planetary carrier and drives the main shaft. This whole assembly, including the tail rotor drive gear, is contained inside two fibre filled plastic transmission halves.

**Clutch**

The clutch/fan assembly is similar to the Schluter Magic and Concept in that the drive gear is next to the engine front bearing to reduce bending stresses on the crankshaft.

# ONLY THE STRONG SURVIVE




**Devcon**

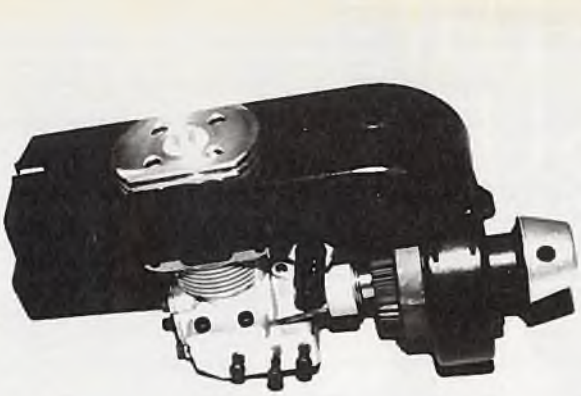
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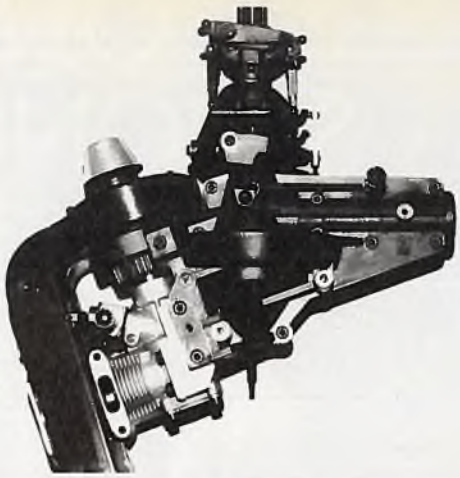
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*LEFT: Cooling shroud fitted around the engine. There is a screw boss that holds the halves together behind the cylinder head, but it was cut off to provide clearance for the heat sink head. RIGHT: Engine and shroud installed onto the transmission.*

However, the Enforcer's clutch is different from the Magic or the Concept. The clutch is composed of two separate shoes that are bolted to the outside surface of the fan hub below the fan rather than on the face of the fan hub as is the norm. The drive gear/clutch bell rotates on a clutch spacer that seats against the engine front bearing, the fan is screwed onto the crankshaft and locked by the prop nut (fan nut?) and the starter cone is screwed into the fan.

The clutch bell/drive gear is molded out of fibre filled plastic and runs on two ball bearings that ride on the clutch spacer. The starting cone is plastic but it has a metal cap on the surface that the starter cone contacts so durability should not be a problem.

**Control System**

The control system is very similar to the Concept's with a few notable differences. The swashplate is non-sliding and is held by an ingenius assembly of bellcranks for pitch and roll. The swashplate is plastic with molded-on balls. The mixing assembly is the same type as the Concept with the mixing levers on the collective slider. The Enforcer uses a 10 mm hollow shaft through which a collective control rod slides. The top of the collective rod as a hole perpendicular to the rod. The collective slider has two rods fitted to it similar to the Concept, except that on the Concept the rods go down through the swashplate and on the Enforcer the rods go up into the rotor head and fit into the hole in the top of the collective control rod.

**Radio Tray**

The radio tray is all plastic and bolts to the main frame as a complete unit. The gyro sits on a plastic tray that is directly below the main shaft.

**Tail Rotor**

The tail rotor uses a drive wire and a 90° gearbox similar to the Concept. The drive wire uses loops on each end to mate with the slots in the gear shafts. There are three plastic bushings in the tail boom to support the drive wire. The tail rotor drive gear in the transmission and the input gear in the tail rotor transmission are plastic with the gear shaft molded as an integral part of the gear and are each supported by two ball bearings.

The gear on the tail rotor shaft is plastic and is pinned to the shaft. These plastic gears are very smooth and free running.

The tail rotor hub assembly and pitch control assembly are conventional, with the tail rotor blade grips rotating on two ball bearings each. The method of attaching the tail rotor hub to the tail rotor shaft is new; however, it is not such a good method. The tail rotor blade grips rotate on studs that are screwed into the tail rotor hub and into a hole in the tail rotor shaft to secure the hub to the shaft. The studs have to be installed in the hub with the hub on the shaft to attach the blades, but the hub is not removable when the studs are in place. Consequently, it is somewhat difficult to balance the tail rotor. More on this later.

**Rotor Head**

The rotor head resembles the head that is on the Concept and operates in a similar fashion, but the blade axles are supported differently. On the Concept the blade axles are freely pivoting with a rubber bushing to provide dampening. On the Enforcer head, the blade axles are supported by a thick piece of sheet steel that is captured by the bolts that hold the top and bottom head pieces together.

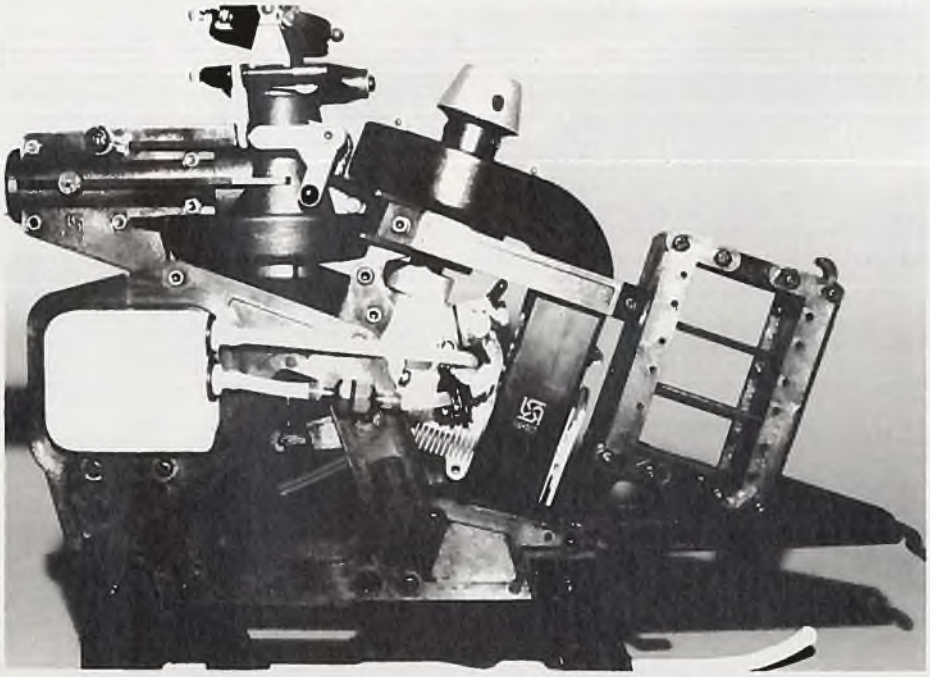
The flybar rotates on bushings in the see-saw. The see-saw rotates on two large ball bearings. The blades grips rotate on two ball bearings each. There are no thrust bearings in the blade grips, but, similar to the Concept, there are spacers between both the inner and outer races of the two ball bearings to help distribute the centrifugal loads.

**Canopy**

The canopy is made of a plastic similar to plastic milk jug material and seems to be indestructible. The windshield has to be trimmed to fit the canopy and is attached to the canopy with six screws. The canopy slides into a molded notch under the radio tray and two holes in the rear portion fit over two stand-offs.

The kit went together very quickly by

**continued on page 118**



*The transmission installed in the main frame. Note the lower end of the collective control rod attached to the collective bellcrank.*

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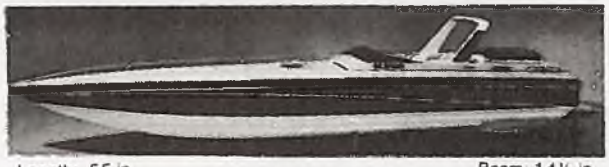
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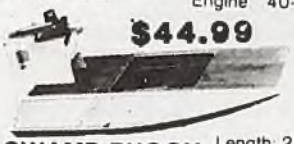
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**continued from page 112/108**

following the instructions, with only a few items that warranted special attention. During assembly make sure to grease all the bearings and bushings and to Loctite all the set screws and the bolts that do not go into lock nuts. Also, be careful when tightening the self tapping screws into the plastic so the plastic is not stripped out.

The main frame and the transmission went together without a hitch.

I assembled the mixing levers and the swashplate assembly per the instructions; however, after everything was together there was a lot of friction. Since everything is plastic, a little work with sandpaper will cure any ill.

The elevator lever molding was distorted slightly from its proper shape and was rubbing on the lever bracket. Careful sanding of the elevator lever inside surfaces at the bushing holes solved that problem. The rest of the friction in the swashplate/mixer assembly was caused by the balls being tight inside the ball links. I sanded the balls to loosen the fit with the links. Be very careful when sanding the balls because the balls are not replaceable without replacing the component the ball is on. Don't sand any ball without first checking the link that it is going to mate with. Not all of the balls on the helicopter need to be sanded. A slight bit of drag on the links is optimum as they will loosen slightly as the helicopter is flown.

The two wires that screw into the mixing base and fit into the collective control rod have small burrs from the cutting process on the small 90° bent part. I filed and sanded the bent ends until they fit smoothly into the collective control rod.

I ran into a problem installing the fan assembly onto the engine. Hobby Dynamics supplied a Webra 28 with the Enforcer. The only problem is that the people at Kalt had either the O.S. 32 or the Enya 35SS in mind. The clutch bell rotates on a spacer that slides onto the crankshaft after the engine drive washer is removed. The kit comes from Kalt with spacers for the O.S. and Enya and then Hobby Dynamics adds the spacer for the Webra. The problem with the Webra is the fan cannot screw far enough onto the crankshaft because the crankshaft is not threaded far enough. My first solution was to put washers between the front bearing and the spacer to take up the unthreaded portion of the crankshaft. This fix turned out not to work because the raised clutch bell/drive gear did not mesh properly with the main gear.

I did not know how successful I would be at threading the hardened steel crankshaft so I drilled out enough threads in the fan with a 1/4'' bit to clear the shoulder on the crankshaft. This fix is simple and quick, just be careful not to remove too many of the threads in the fan.

The drive washer on the Webra is held on by a split collet which holds it very, very tightly and needs a gear puller to remove it. Since I do not own a gear puller I went to my local auto repair shop and borrowed one from them.

I cut a hole in the top of the cooling shroud to clear the heat sink head of the Webra.

The engine mounts on an aluminum mount which then bolts onto the plastic transmission case. Be careful when tightening the bolts that hold the mount to the transmission case. The plastic will deform if the bolts are tightened too much. I tightened the bolts until the plastic had just started to deform.

Next month I'll finish up and give a report on how the Enforcer flies.

Keep burning the fuel. □


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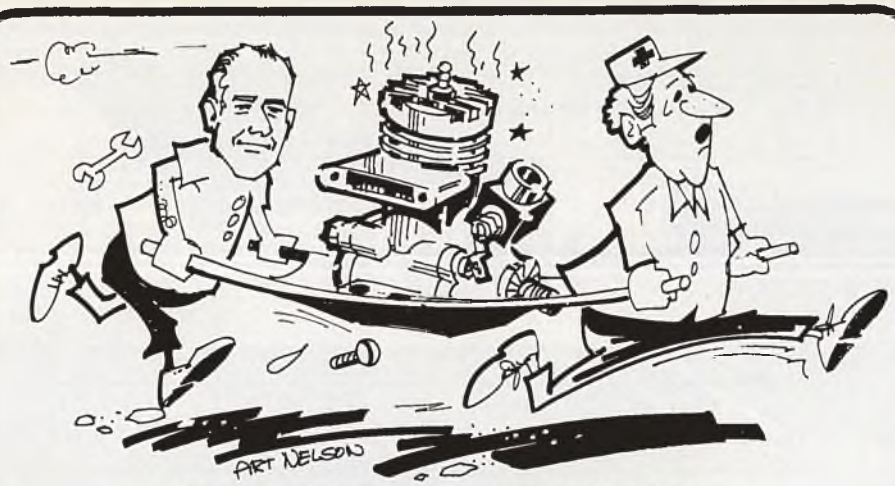
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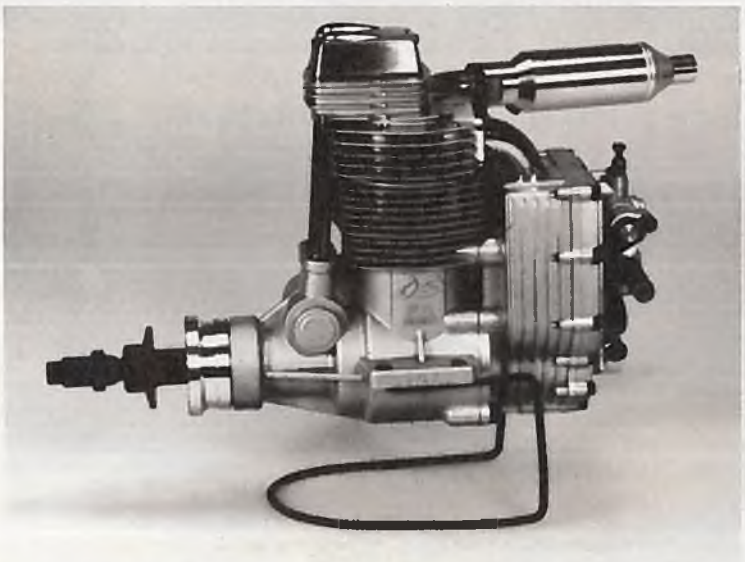
**CLARENCE LEE**

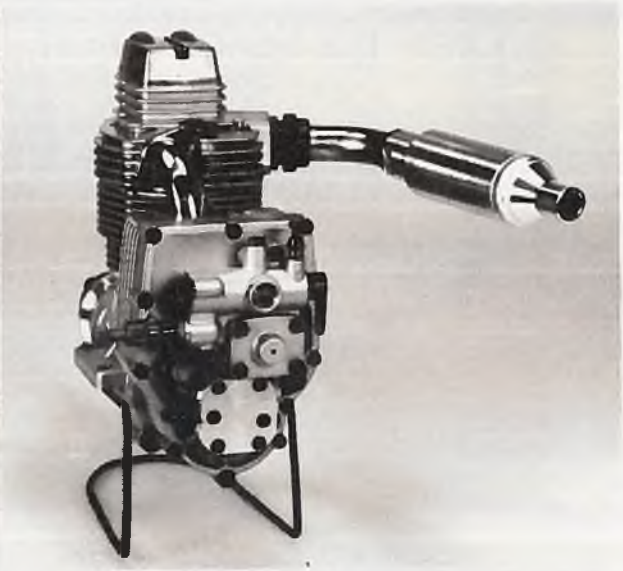
*The Pup calls for a 2.2 to 3.7 cubic inch engine. I was thinking of using a Zenoah G-62 engine, but the price is a little high. I have heard from other modelers that I can substitute the G-62 with a chain saw engine which is cheaper.*

*My question is if this is possible, and if so, what kind of modification would I have to make to use one on my airplane.*

*Sincerely,*
*Bobby Hood*
*Houston, Texas*

I believe whoever told you that you could substitute a chain saw engine for the Zenoah G-62 did not give you completely accurate information. First off, most all of the larger displacement 2-stroke gasoline burning engines used in quarter scale and giant scale aircraft are already utility engines intended





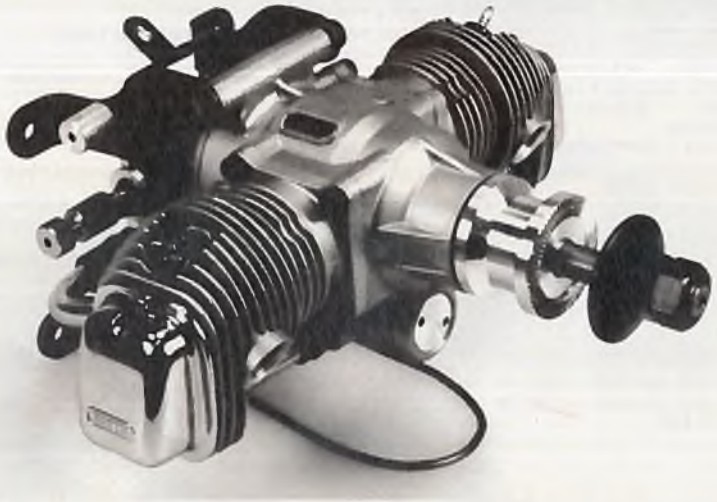
***O.S. FS-120 Surpass SP (supercharged) now in full production. Original pilot run of 300 engines released late last summer were sold out immediately. A full review of one of these pilot run engines appeared in the October '90 issue. Production version differs in that the supercharger and carburetor are now die cast rather than machined from bar stock aluminum. All other specifications remain the same. The FS-120 Surpass SP is the most powerful 4-stroke 120 currently available. Also expensive.***

**Questions & Answers**

Our first letter this month is typical of many I have been receiving lately from readers wanting to know if an ordinary chain saw or leaf blower engine couldn't be converted to model aircraft use. Naturally they could if one has the necessary equipment and expertise to do so. However, for the average modeler it is not really all that practical and it is best to purchase an engine already set up for model aircraft use as pointed out in my answer to the fellow sending the letter.

*Dear Mr. Lee:*

*I recently built a Carl Goldberg Cub. It was my first kit and was very successful. Now I would like to build larger scale airplanes and was thinking of building Balsa USA's Sopwith Pup, which is a project that I and some of my fellow fliers think that I can handle.*



***First advertised almost a year ago, the new Saito FA 60 twin is now available. The smallest displacement twin currently available. Perfect for the smaller scale models of more conventional size. Utilizes a double throw crank like its big brothers the FA 270 and FA 300 which results in smoother vibration level, unlike the Saito FA 80 and FA 90 that used a single throw crank. Engine will be the subject of an upcoming review.***

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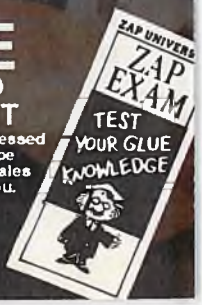
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for one application or another such as chain saws, leaf blowers, etc. They have already been converted to aircraft use including the Zenoah G-38 and G-62 and engines of various displacement sizes produced by Quadra, Sachs Dolmar, Kawasaki, etc. On occasion you will see one of the large retailers such as Sears offering a chain saw or leaf blower at a very attractive price. However, by the time you remove the unnecessary cooling shrouds and other related paraphernalia and make, or have made, a prop adapter, etc., the end result is not always as practical as might be anticipated. Many of your bargain price chain saw and leaf blower engines are not of the highest quality, being made to sell for a price. Most all are intended for radial loads — not thrust loads as required for model aircraft use. This was one of the problems with the early Quadras until those converting the engine to aircraft use incorporated a thrust bearing. This is something that is not always easy to do without extensive modification to the engine. Chain saw and leaf blower engines do not have provisions for driving a propeller. If a person has a lathe, or access to one, then a prop drive adapter could be easily fabricated. However, if one does not, the prices a machine shop will charge would knock your socks off. Frankly, this is a case where if you cannot afford to buy the Zenoah G-62, you would do best to stay with a smaller engine in an area of the hobby you can afford. I faced a similar situation many years ago in the 50's when involved in fuel drag racing. Even with two partners and a partial sponsorship from the local Dodge-Plymouth dealer, the operating costs to stay competitive got beyond our means and we had to call it a day. The decision was made at a race where we put the cranshaft of our Dodge truck engine (same as a Chrysler Hemi) through the bottom of the pan after tipping the nitro can a little too heavy.




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*Dear Mr. Lee:*

*Thank you for taking the time to read my letter. I have a question for you regarding glow plug selection for use in a ducted fan engine.*

*My situation is this; this past Saturday I lost (crashed) my ducted fan jet when the engine "flamed-out" on the turn from downwind to base while preparing to land. As the wing loading is quite high in this particular plane (A-4 from Yellow) a flame-out during this phase of the flight can be catastrophic. Anyway, upon examining the wreckage, I found that the glow plug element was burnt and deformed and probably caused the engine to die when power was reduced in preparation for landing.*

*Some of the particulars: O.S. 91 ducted fan engine turning a Dynamax fan at 22,400 rpm. (This was the fourth successful flight of the plane and I had previously broken it in on the bench per the "Break-In" instructions that came with the engine.) Fuel was by Mach-7, their 12½% nitro, ducted fan fuel. Tuned pipe was Tom Cook quiet pipe. Glow plug was a K&B 1L. Air temp was around 65°F and the humidity was pretty low.*

*I have tried Red Max 10% ducted fan fuel and I couldn't get sufficient rpm's/thrust out of the fan to fly the plane! The Mach-7, 12½% works just fine for me so I would hate to have to switch fuels.*

*I have used O.S. R8 plugs (as recommended in the O.S. engine manual) in previous flights but the elements failed in those too, either during engine set-up (mixture adjusting), or on final approach during a landing. A K&B 1L plug used on the flight prior to the fatal one also burnt out on final, but just prior to touch down.*

*Can you suggest what my problem might be? Is the idle too lean? The engine has very good throttle response just prior to take-off. She starts fairly easily and runs consistent at high rpm's.*

*What should I be looking for in deciding on what glow plugs to use? I don't mind spending extra and/or replacing the plug after each run if I could get the engine to run through the whole flight! I read in the December 1990 RCM magazine that Bob Fiorenze recommends Rossi R8 or McCoy 104-9 plugs. What's so good about these? Is their design/material selection so much better than O.S., Fox, K&B, or Glo Bee?*

*Will I have to use different plugs when I fly in the Spring and Fall (cool and not too muggy) as compared to the Summer (hot and muggy here in Michigan)?*

*Thank you in advance for any information you can supply me.*

*Sincerely,*
*Arthur Gajewski*
*Canton, Michigan*

If you are having trouble keeping the glow plug for the whole flight, you are probably running your engine a little too lean trying to get every last rpm out of it.

**continued on page 126**




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| 79-537 | EASYSOAR ARF | 84.04 |
| 79-538 | POWERSOAR ARF | 84.04 |

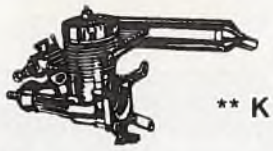
# AIRPLANE ENGINES

### ** COX **

| | | |
|---|---|---|
| 23-573 | BLACKWIDOW .049 | 19.54 |
| 23-571 | BABE-BEE .049 | 18.20 |
| 23-555 | DRAGON FLY .049 | 20.07 |
| 23-938 | TEE-DEE .010 | 29.99 |
| 23-564 | TEE-DEE .020 | 23.99 |
| 23-565 | TEE-DEE .049 | 24.99 |
| 23-566 | TEE-DEE .051 | 24.99 |
| 23-567 | TEE-DEE .09 | 25.99 |
| 23-574 | QRC .049 | 15.99 |
| 23-845 | MEDALLION .049RC | 25.99 |
| 23-846 | MEDALLION .09RC | 29.99 |
| 23-552 | QUEEN-BEE .074 | 29.99 |
| 23-554 | TEXACO .049 ENDURO | 19.99 |

### ** FUTABA-YS **

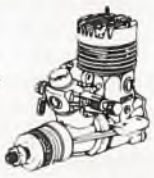
| | | |
|---|---|---|
| 97-258 | .61 LNG/STRK SIDE EXHAUST | 249.95 |
| 97-259 | .61 LNG/STRK REAR EXHAUST | 249.95 |
| 97-250 | .45 FS SIDE EXHAUST | 129.95 |
| 97-251 | .45 FR REAR EXHAUST | 129.95 |
| 97-257 | 4 CYCLE SUPER CHGR | 359.99 |



### ** K & B **

| | | |
|---|---|---|
| 49-163 | .20 SPORTSTER | 40.94 |
| 49-182 | .28 SPORTSTER | 43.94 |
| 49-165 | .45 SPORTSTER | 50.22 |
| 49-178 | .65 SPORTSTER | 63.60 |
| 48-668 | .40 R/C | 66.96 |
| 48-341 | .61 R/C | 75.34 |

### ** ROYAL PRODUCTS **



| | | |
|---|---|---|
| 79-652 | .25 R/C ABC | 53.59 |
| 79-659 | .28 R/C ABC | 55.28 |
| 79-650 | .40 R/C ABC | 63.72 |
| 79-651 | .45 R/C ABC | 67.48 |

# AIRCRAFT ACCESSORIES

### ** DUBRO **

| | | |
|---|---|---|
| 28-531 | 1 INCH TAIL WHEEL | 1.30 |
| 28-771 | 2" WHEEL/TREAD [2] | 2.60 |
| 28-772 | 2-1/4' WHEEL/TREAD [2] | 3.40 |
| 28-773 | 2-1/2" WHEEL/TREAD [2] | 3.60 |
| 28-775 | 3" WHEEL/TREAD [2] | 4.00 |

### ** GOLDBERG **

| | | |
|---|---|---|
| 38-554 | 1-3/4 SPINNER | 2.22 |
| 38-558 | 2 INCH SPINNER | 2.72 |
| 38-562 | 2/1/4 SPINNER | 2.98 |
| 38-566 | 2-1/2 SPINNER | 3.12 |
| 38-690 | 2-3/4 SPINNER | 3.71 |
| 38-695 | 3 INCH SPINNER | 3.94 |

* spinners available in blk, red, yel, blu and white *

### ** J/Z **

| | | |
|---|---|---|
| 45-852 | 9-4 WOOD-PROP [6] | 9.00 |
| 45-853 | 9-6 WOOD-PROP [6] | 9.00 |
| 45-854 | 10-6 WOOD-PROP [6] | 10.32 |
| 45-856 | 11-6 WOOD-PROP [6] | 10.56 |
| 45-857 | 11-7 WOOD-PROP [6] | 10.56 |

### ** MASTER AIRSCREW **

| | | |
|---|---|---|
| 60-166 | 7-6 NYLON PROP | .74 |
| 60-168 | 8-6 NYLON PROP | .83 |
| 60-170 | 9-6 NYLON PROP | 1.01 |
| 60-172 | 10-6 NYLON PROP | 1.24 |
| 60-191 | 11-6 NYLON PROP | 1.39 |
| 60-185 | 12-6 NYLON PROP | 2.14 |
| 60-187 | 13-6 NYLON PROP | 2.48 |
| 60-181 | 14-6 NYLON PROP | 3.26 |
| 60-182 | 16-6 NYLON PROP | 4.24 |
| 60-207 | 9-6 WOOD PROP | 1.46 |
| 60-210 | 10-6 WOOD PROP | 1.69 |
| 60-213 | 11-6 WOOD PROP | 1.91 |
| 60-217 | 12-6 WOOD PROP | 2.44 |
| 60-220 | 13-6 WOOD PROP | 2.96 |
| 60-223 | 14-6 WOOD PROP | 3.71 |
| 60-226 | 16-6 WOOD PROP | 5.96 |
| 60-229 | 18-6 WOOD PROP | 10.46 |

# RADIOS







### ** FUTABA **

| | | |
|---|---|---|
| 37-325 | 2NCS 2 CHANNEL 72 MHZ am | 49.99 |
| 36-885 | 4NBL 4 CHANNEL 72 MHZ am | 99.95 |
| 37-516 | 4NBF 4 CHANNEL 72 MHZ fm | 129.99 |
| 36-922 | 4NBL 4 CHANNEL GLIDER am | 167.16 |
| 37-453 | 4 NBL 4 CHANNEL w/ESC am | 169.95 |
| 36-904 | 4UA 5 CHANNEL 72 MHZ am | 195.19 |
| 37-477 | 5 UAF 5 CHANNEL 72 MHZ fm | 225.44 |

### ** AIRTRONICS **

| | | |
|---|---|---|
| 11-859 | VG4R-102 4CH 72 MHZ fm | 136.80 |
| 11-601 | VG4R-831 4CH 72MHZ fm | 181.20 |
| 11-873 | VG6DR-102 6CH 72MHZ fm | 170.96 |
| 11-600 | VG4R-102 4CH 72MHZ pcm | 214.80 |
| 11-986 | VG6P-102 6CH 72MHZ pcm | 268.00 |

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# FIELD EQUIPMENT

### ** ROYAL PRODUCTS **

| | | |
|---|---|---|
| 80-032 | ESCORT FIELD BOX | 24.95 |
| 80-150 | HEAT GUN | 15.23 |
| 80-151 | HEAT IRON | 12.99 |
| 79-003 | ENERGIZED LOCKING SCKT | 17.87 |
| 79-009 | GLO-PLUG CLIP | 3.95 |
| 78-461 | HVY DUTY ENGINE STARTER | 28.07 |
| 78-460 | JUMBO ENGINE STARTER | 37.23 |
| 80-030 | POWER PANEL | 18.35 |
| 79-240 | 12 VOLT FUEL PUMP | 13.95 |
| 79-055 | DIGITAL TACH | 32.83 |
| 79-238 | 12 VOLT WET CELL BATTERY | 13.56 |
| 79-194 | WET CELL CHARGER | 10.06 |

### ** SULLIVAN **

| | | |
|---|---|---|
| 84-978 | 600-HT ENGINE STARTER | 28.63 |
| 84-979 | 601-HTD ENGINE STARTER | 32.10 |
| 85-072 | 603 DYNATRON STARTER | 47.89 |

# GAS BOATS

### ** DUMAS **



| | | |
|---|---|---|
| 29-498 | HOT-SHOT IV 3.5 cc O/B | 51.00 |
| 29-929 | HOT-SHOT SPRING 3.5cc O/B | 54.99 |
| 29-497 | HOT-SHOT 45 7.5cc O/B | 63.60 |
| 29-926 | HOT-SHOT SPRINT 7.5cc O/B | 71.61 |
| 29-491 | BIG SWAMP BUGGY | 44.99 |
| 29-490 | LIL SWAMP BUGGY | 17.46 |



### ** MRP **

| | | |
|---|---|---|
| 66-506 | MACH I MIRAGE 3.5cc O/B | 92.95 |
| | w/pkg - | 119.95 |
| 66-510 | MACH II 7 5cc O/B | 110.95 |
| | w/pkg - | 149.95 |
| 66-509 | PYTHON 3.5cc or 7.5cc O/B | 101.50 |
| | w/pkg - | 126.95 |
| 66-505 | FAST CAT 3.5cc O/B | 92.95 |
| | w/pkg - | 119.95 |

### MRP PACKAGES INCLUDE

*fuel tank, fuel line, motor mount and cable set*





### ** PRATHER **
### ** TUNNEL HULLS **



| | | |
|---|---|---|
| 73-938 | LAP-CAT I | 115.98 |
| 73-93B | with ACCESSORY KIT | 199.95 |
| 73-878 | LAP-CAT II | 133.26 |
| Z3-878 | with ACCESSORY KIT | 223.21 |
| 73-919 | LAP-CAT III | 140.68 |
| 73-91B | with ACCESSORY KIT | 230.63 |

### ** HYDROS **



| | | |
|---|---|---|
| 73-942 | SPITFIRE I HYDRO 3.5 cc OB | 169.95 |
| 73-94B | with ACCESSORY KIT | 250.07 |
| 73-704 | PIRANHA HYDRO I/B | 181.09 |
| 73-70A | with RUNNING HARDWARE | 239.54 |



### ** VEE BOTTOMS **

| | | |
|---|---|---|
| 73-866 | 31 inch O/B | 92.70 |
| 73-86A | with PACKAGE | 135.45 |
| 73-865 | 31 inch I/B | 96.56 |
| 73-86B | with PACKAGE | 175.20 |
| 73-852 | 40 inch O/B | 115.88 |
| 73-85A | with PACKAGE | 163.33 |
| 73-85C | 40 inch I/B | 115.88 |
| 73-85B | with PACKAGE | 204.86 |
| 73-854 | 46 inch I/B | 139.07 |
| A3-865 | with PACKAGE | 229.73 |




**PRATHER DEEP-VEE PACKAGES INCLUDE:**

*hatch cover, radio box, running hardware*

# ELECTRIC BOATS

### ** MRP **




| | | |
|---|---|---|
| 66-528 | BUD LIGHT TUNNEL | 124.99 |
| 66-518 | FASTCAT TWIN (w/2 packs) | 159.99 |
| 66-517 | PANTERA (w/1 pack) | 119.99 |
| 66-523 | HYDRO SPORT (w/1 pack) | 123.99 |
| 66-525 | MISS BUDWEISER | 161.74 |
| 66-527 | MR. PRINGLE | 161.74 |

### ** TRAXXAS **



| | | |
|---|---|---|
| 88-216 | VILLIAN KIT | 129.99 |
| 88-217 | assembled WITH RADIO | 229.99 |

# MARINE ENGINES

### ** CMB **

| | | |
|---|---|---|
| 73-601 | CMB .21 VOLVOLA F.E. GRAND PRIX | 170.40 |
| 73-602 | CMB .45 MARINE | 176.40 |
| 73-605 | CMB .45 GRAND PRIX | 252.00 |
| 73-607 | CMB .67 GRAND PRIX | 300.00 |
| 73-609 | CMB .85 MARINE | 220.80 |
| 73-603 | CMB .90 MARINE | 276.00 |
| 73-604 | CMB .90 GRAND PRIX | 361.20 |

### ** K & B **



| | | |
|---|---|---|
| 48-805 | .40 SPORT MARINE | 68.28 |
| 49-158 | .45 R/C INBOARD | CALL |
| 48-207 | .67 R/C INBOARD | 206.70 |
| 48-216 | 3.5cc OUTBOARD | 91.04 |
| 48-215 | 7.5cc OUTBOARD | CALL |
| 48-159 | 11cc OUTBOARD | 199.95 |



### ** PICCO **

| | | |
|---|---|---|
| 73-612 | .21 MARINE | 199.20 |
| 73-613 | .45 MARINE | 168.00 |
| 73-614 | .67 MARINE | 199.20 |
| 73-615 | .80 MARINE | 211.20 |
| 73-616 | .90 MARINE | 260.40 |
| 73-6HY | .90 HYDRO | 330.00 |

# RADIOS

### ** FUTABA **

| | | |
|---|---|---|
| 37-326 | 2NCS 2 CHANNEL | 49.95 |
| 36-879 | 2NBL 2 CHANNEL | 59.65 |
| 36-961 | 2NBR 2 CHANNEL | 63.50 |
| 36-967 | 2P MAG-SPORT | 64.95 |
| 37-225 | 2PB MAG-JR | 98.95 |
| 37-300 | 4NBL 4 CHANNEL | 99.95 |







### ** MRC **

| | | |
|---|---|---|
| 59-226 | PK-151 TOP GUN | 59.95 |

# PROPS

### ** PRATHER **

| | | |
|---|---|---|
| 73-888 | S-215 | 10.36 |
| 73-890 | S-220 | 10.36 |
| 73-892 | S-225 | 10.36 |
| 73-894 | S-230 | 11.16 |
| 73-896 | S-235 | 11.16 |
| 73-898 | S-240 | 11.16 |
| 73-900 | S-245 | 11.96 |
| 73-902 | S-250 | 11.96 |
| 73-904 | S-255 | 11.96 |
| 73-906 | S-260 | 12.76 |
| 73-908 | S-265 | 12.76 |
| 73-910 | S-270 | 12.76 |
| 73-887 | B-215 | 9.56 |
| 73-889 | B-220 | 9.56 |
| 73-891 | B-225 | 9.56 |
| 73-893 | B-230 | 10.36 |
| 73-895 | B-235 | 10.36 |
| 73-897 | B-240 | 10.36 |
| 73-899 | B-245 | 11.16 |
| 73-901 | B-250 | 11.16 |

# TUNED PIPES

### ** PICCO **

| | | |
|---|---|---|
| NP-615 | .21 to .45 ENGINES | 27.00 |
| NP-616 | .67 to .80 ENGINES | 29.00 |
| NP-618 | .90 ENGINES | 33.00 |

### ** PRATHER **

| | | |
|---|---|---|
| 73-885 | .21 ENGINES | 19.96 |
| 73-886 | .45 ENGINES | 29.56 |
| 73-911 | .67 to .90 ENGINES | 29.95 |

# MOTOR MOUNTS

### ** PRATHER **

| | | |
|---|---|---|
| 73-931 | 3.5 MOTOR MOUNT I/B | 11.96 |
| 73-934 | 7.5 MOTOR MOUNT I/B | 12.76 |
| 73-937 | 11 cc MOTOR MOUNT I/B | 13.56 |
| 73-775 | 3.5 O/B ADJ MOUNT | 19.95 |
| 73-860 | 7.5 O/B ADJ MOUNT | 19.95 |

# MARINE ACCESSORIES

### ** K & B **

| | | |
|---|---|---|
| 48-762 | SUPER POXY 1qt | 10.58 |
| 49-160 | SUPER POXY 1pt | 6.75 |
| 48-773 | 2oz GLASS CLOTH | 4.95 |
| 48-782 | 8oz MIXING CUPS W/LIDS | 2.97 |
| 49-157 | MICRO BALLOONS | 2.25 |

### ** PRATHER **

| | | |
|---|---|---|
| 73-811 | 12 inch FLEX CABLE 3/16 | 10.33 |
| 73-829 | 17 inch STARTING BELT | 4.55 |
| 73-862 | O/B CABLE SET | 12.95 |
| 73-728 | DRIVE DOG | 3.14 |
| 73-825 | MED. FUEL LINE 36 in | 1.97 |
| 73-880 | PROP BALANCER | 5.56 |
| 73-868 | CABLE GREASE | 2.96 |
| 73-774 | AFTER RUN OIL | 1.78 |

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**continued from page 123/120**

This is something that is pretty common with most of the ducted fan fliers. The engine should be brought up to peak rpm and then backed off 500-600. Pinch the fuel line and make sure the engine picks up rpm. If it doesn't, you are too lean. If, in the air, the engine is not running cleanly and is leaving a heavy smoke trail it is probably rich, so on the next flight try leaning the mixture by 300-400 rpm. On the other hand, if, in the air, the engine sags everytime you point the nose of the aircraft up, you are also too lean and need to back off the mixture adjustment even more.

The KB-1L plug is a higher heat range plug but you should be able to get one or two flights using it. However, as you mention, many of the fellows are using the Rossi R8 as well as the McCoy 104-8 or 104-9 with good luck. These are colder heat range glow plugs with heavier elements than the KB-1L and should hold up for at least five or six flights providing you do not run the engine too lean. If you are sure you are not running the engine too lean and are using one of the heavy element glow plugs and still have plug problems, then try installing another .016" head gasket to lower the engine's compression. As far as using different glow plugs for different seasons, this should not

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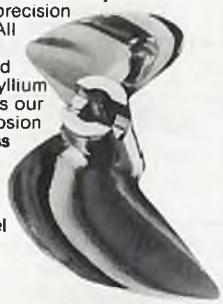







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| A1002 | XL-60 Elevator Servo Mount | 10.00 |
| A1003 | XL-60 Tail Fin | 12.50 |
| A1004 | XL-60 Horizontal Stabilizer | 8.50 |
| A1005 | XL-60 Switch/Charger Plate | 9.00 |
| A1006 | Servo Tray XL-30/XL-60 Univ | 59.00 |
| A1008 | X-Cell 30 Tail Fin | 10.50 |
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be necessary except possibly in very cold weather when you could probably get away with a slightly higher heat range plug.

I am a little puzzled as to why Red Max 10% nitro fuel did not provide sufficient thrust to get off the ground whereas Mach-7 12½% did. The difference between 10% and 12½% nitro should be only a matter of less than 100 rpm. Some of the fuel manufacturers mix their fuels by weight and others by volume. In my opinion, fuel should always be mixed by volume. When mixing by weight you will actually have a lower nitro content than when mixing by volume. 10% nitro by weight would only be about 7%-8% by volume. This is the main difference between some of the fuel manufacturers economy or sport fuel and their contest or premium fuels; the economy is mixed by weight and the premium by volume. I do not know which method Red Max is using but this might account for the difference in performance between the Red Max 10% and Mach-7 12½%. Even then, the difference in power should be only a matter of 300-400 rpm. I would suspect that the Red Max you used may have been old, absorbed some water, etc.

*Mr Lee:*

*I really enjoy your column. It's the first thing I turn to with each new issue. Keep up the good work!*

*Now my problem. I recently purchased an O.S. 61FS ABC. I increased the exhaust duration to 154°, installed it in a Super Hots with a Mac pipe. The engine performed beautifully with an 11 x 9 prop and 10% Cool Power/Omega fuel. With about 2.5-3 hours time on the engine, disaster struck. During a flight, the engine sagged. I chopped the throttle and brought it in. But no matter how I set the needle, the engine wouldn't run properly. That evening, I disassembled the engine to find much of the chrome off the liner, especially toward the top of the cylinder. The next day I took the engine back to my dealer (one of the top pattern/pylon fliers in the southeast and local engine expert). He suggested that the failure was due to defect and sent the engine back for warranty repairs. Soon, the engine was returned with a new piston and cylinder. I reinstalled the engine. With less than one hour of rich running. Deja vu, it happened again!*

*What am I doing wrong? I have O.S. engines over 15 years old that still perform well, and I didn't treat this one any different. I guess it is possible for two liners in a row to be defective, but it doesn't seem likely.*

*Any ideas? I've enclosed an SASE for reply.*

*Thanks,*
*Chip Sloan*
*Dalton, Georgia*

Chip, I am afraid you have just found out the hard way the shortcomings of the ABN piston/sleeve metalurgy that O.S. and some of the other engine manufacturers use rather than true ABC. O.S. uses an electroless nickel plating process rather than true

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chrome. The nickel is supposed to be harder and have all kinds of advantages over chrome. Its shortcoming, however, is it does not adhere to either steel or brass as well as chrome. I personally would never design an engine around its use. You may be running your engine a little leaner and consequently hotter than you should which contributes to the nickel peeling. Cool Power/Omega, like the Red Max mentioned in our previous letter, are top quality fuels. However, most of the fuel manufacturers nowadays are only using 17%-18% oil in their fuels feeling that the ball bearing ABC type engines do not require more. This is fine as long as you always set the mixture properly and do not run the engine too lean. I still like to see at least 20% oil and preferably 22% myself. It gives you the necessary margin of protection. One of the functions of the oil is to carry away heat as well as provide lubrication. Lugging the engines down with larger diameter or higher pitch props, as is becoming common practice nowadays, does not help matters any. If you are using a tuned pipe and a higher pitch prop, it would be a good idea to add a couple extra ounces of castor oil to your fuel. It would help the nickel peeling problem on a lean run.

*Hello Clarence:*

*I am writing to ask for your advice on a vibration problem. The engine is a Super Tigre S 90 K. I am experiencing bad vibration from this engine. I have tried balanced Master Airscrew props in sizes 12 x 6, 13 x 6, 13 x 8, and 14 x 6. This vibration is noticeable with all of these props althought it is more apparent with the smaller sizes and higher rpm. Other than vibration the engine cranks and runs fine. I have run it in a plane and on a solid bench with the same results.*

*I read in your engine review on the Super Tigre X61 (RCM November 1989) that the crankshaft counterbalance would balance out the weight of the connecting rod plus 50% of the wrist pins. You stated that this seemed a little on the light side although the engine seemed to run fairly smooth. Also in your K&B 65 Sport review (RCM August 1988) you stated that the counterbalance would balance the connecting rod, the wrist pin, plus 10% of the piston weight which made for a smooth running engine.*

*I suspected that the counterbalance on this engine was too light. I disassembled the engine to determine how much the crank would balance. I did so by first taking the front end, crank, and bearings apart as a unit from the motor. I then used a solvent to flush the oil from the bearings. After doing so, the crank would spin freely in the bearings and, as it slowed down, the counterbalance would rock to a stop at the bottom. Then I took just the con rod and hung it on the crankpin. This slowly pulled the crankpin to the bottom. I tried this several times and each time it pulled the crankpin to the bottom. This would seem to indicate that the counterbalance would not quite balance out the weight of the con rod alone much less the con rod and the wrist pin.*

*Is this an acceptable method to determine how much the crankshaft will balance? If not, how should it be done? Would this be the likely cause for the vibration I am experiencing? If so, how could this be corrected? How much should the crankshaft counterbalance balance? What else could contribute to vibration?*

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*the oil being 1/4 castor, 3/4 synthetic. I have also run this engine with and without a spinner with no change in vibration level. I use Fox RC Long glow plugs. The crankshaft is similar in design to the X61 in that it also has a solid disk section on the side facing the rear bearing.*

*Any information and/or advice you give would be greatly appreciated. I read all of your columns and particularly enjoy your engine reviews. Enclosed is a self addressed stamped envelope for the convenience of your reply. Thanks again.*

*Harvey S. Cowart*
*Independence, Louisiana*

Your method of checking the counterweight action of your S.T. S-90 is fine. I do essentially the same thing but support the crank on two knife-edges so as to eliminate any bearing drag. If the counterbalance will only balance out part of the rod weight it is safe to assume this is the main cause of your vibration. You want to balance out the full weight of the rod and wristpin and preferably a small portion of the piston's weight. Drilling a hole(s) in the counterbalance and filling with lead would increase the counterbalance action. Lightening the rod and piston would also help but I do not recommend going this route as you might suffer a structural failure. As long as you are using a spinner, try adding a piece of stick-on wheel weight inside the spinner. You can obtain this at any auto shop that does wheel balancing or Prather Products markets it through the hobby shops.

*Dear Mr. Lee:*

*First, hope you had a happy holiday this season. The weather here in the northeast has been very cold this past month. Some consider it only a temporary setback. Others, however, do go out and fly with skis and enjoy flying on the snow.*

*I read and enjoy your column monthly. I have a few questions and would like your opinion.*

*After a flying session, I remove the fuel line from the engine carburetor and run the engine dry to remove residual nitro and methanol. I squirt some Marvel Mystery Oil in the carburetor and turn the prop over by hand a half dozen times to distribute the oil.*

*Instead of my method, a fellow club member suggested the following technique described below. The idea here is to run a small amount of 50:50 mixture of Marvel Mystery Oil and lighter fuel (which will burn) in the engine to purge out any remaining fuel and leave a residue of Marvel Mystery Oil.*

*The technique is as follows:*

1. *Remove the fuel line from the carburetor.*
2. *Attach a 6" piece of fuel line to the carburetor.*
3. *Fill the 6" line with 50:50 mixture using a convenient squirt bottle such as a lighter fuel bottle.*
4. *Flip the prop with a glow plug battery and run out this small amount of 50:50 mixture.*




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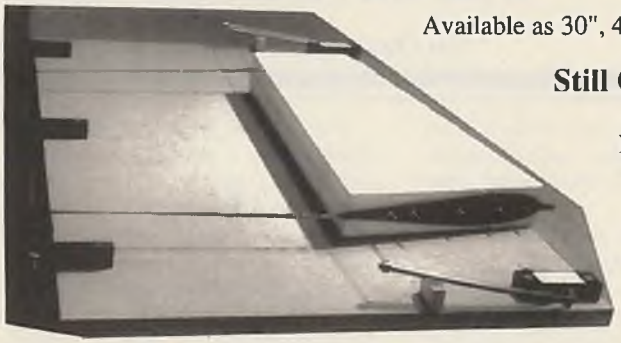
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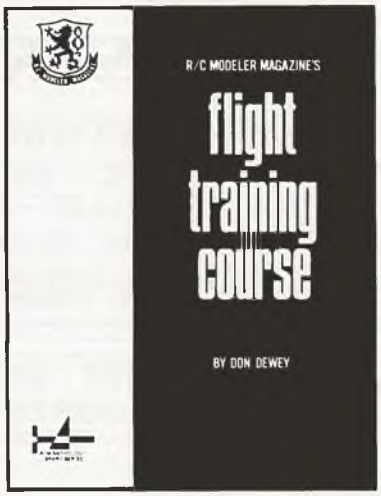
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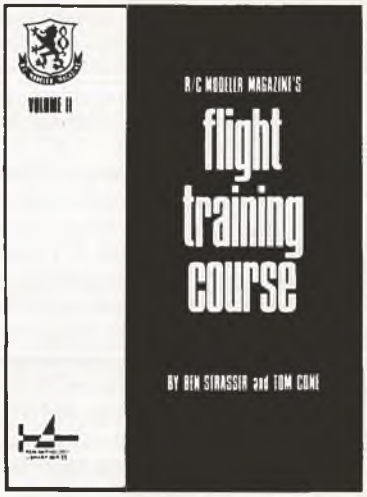
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5. *This purges out any residual fuel. What would be left in the engine would be Marvel Mystery Oil and possibly some lighter fuel.*
6. *The process is complete and nothing further is necessary.*

*This is fairly easy and sounds very thorough. The question is, "Do you think burning the Marvel Mystery Oil this way reduces any of the protective properties of the oil?"*

*Also another technique another fellow member uses is to squirt WD-40 into the carburetor, run the engine with it, then squirt Marvel Mystery Oil in the carburetor and flip the prop a half dozen times to distribute it. Using WD-40 first also sounds excellent. What is your opinion on this?*

*As per your January column, I plan to use the 50:50 mixture of Marvel Mystery Oil and automatic transmission oil as an after run oil. Thanks for the suggestion.*

*Thanks again for a great monthly column. Enclosed is a stamped self-addressed envelope if you wish to reply.*

*Sincerely,*
*David M. Cardarelli*
*Bridgewater, Massachusetts*

Quite a few fellows run lighter fluid and oil through their engines following a flying session. I have mentioned this several times in years past. I sure would not do this with a




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low viscosity oil like Marvel Mystery Oil or WD-40, however. The lubrication qualities are about next to nothing. They are okay as an after run oil when added to an engine as they dilute the existing oil already in the engine. However, they should not be used as lubrication exclusively as would occur when the engine is running. Best to use a mixture of lighter fluid and automatic transmission oil. As for burning destroying any of the properties of Marvel Mystery Oil — I doubt it. After all, it can be added to gasoline for burning in your car engine, although you would not want to do this with a catalytic converter equipped car. Marvel Mystery Oil was developed in the days before catalytic converters as an oil and gas additive. I once used it in a 1936 Ford I had back in the 40's. It had a rebuilt engine that would not turn over with the starter when it got hot. A can of Marvel Mystery Oil in the crankcase cured the problem.

*Dear Mr. Lee:*

*First, let me say that I enjoy reading your regular Engine Clinic column. Being a relative newcomer to the R/C airplane hobby (about three years), I have found much useful information in them.*

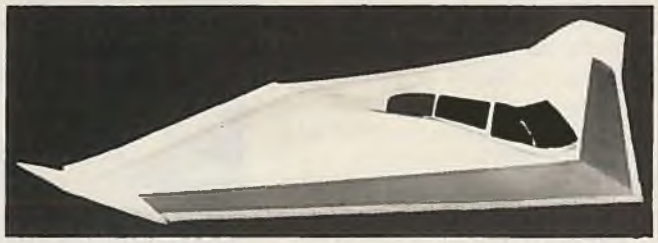
*Now to my questions: (1) I have two engines which I run regularly, an O.S. 40 FP and a Royal .45 ABC. During the cold winter weather here in Virginia, these engines are very likely to start backwards*


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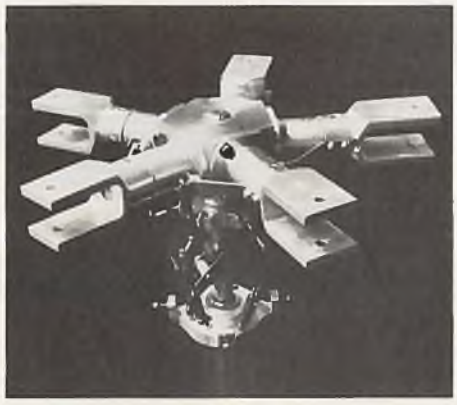
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*most of the time until they are warmed up. Is this normal and is it harmful to the engines? I probably should mention that I do not have an electric starter, although most of the fellows I fly with use one regularly. Unless I feel a real need for one, I see no reason for me to go to the extra expense, or the bother to lug the extra weight around in my flight box. The hazard associated with the lead acid battery is also a deterrent.*

*(2) Although I try to avoid it, I have found it necessary to add some weight to the nose of some planes so they will have the correct balance point. It stands to reason that placing the weight as far forward as possible will take the least weight to achieve the proper balance. I have seen two types of weights which fit on the prop shaft of engines, a screw on type which replaces the prop nut, and a washer type which is fastened on by the regular prop nut. Can you tell me if you have had any experience using these and give me your advice? I wonder what effect this might have on engine balance, bearing loading, and/or engine wear.*

*Enclosed is a SASE for your reply in the event it is not published in your column.*

*Sincerely,*
*Lonnie D. Goad*
*Strasburg, Virginia*

Starting backwards is a pretty common occurrence in cold weather and is usually caused by over-choking or priming the engine which is necessary more in colder weather than in warm weather. In warm weather you choke the engine a couple of times and vaporized fuel reaches the combustion chamber. In cold weather the fuel does not vaporize and just lays in the bottom of the crankcase. As a result, fellows keep choking trying to get the engine to fire. When it does, the excess fuel now in the combustion chamber raises the compression ratio and the engine fires prematurely


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sending it off running backwards. Running backwards will not particularly hurt anything. The easy solution here is to just flip the engine backwards if it shows this tendency. It will take off running in the proper direction. It is easy to avoid the problem altogether, however, if you start using a small prime bottle. With the starting battery disconnected, choke the engine once or twice to bring fuel to the carburetor. Then with the prime bottle, squirt a few drops of fuel in the exhaust. If the engine has a muffler or tuned pipe, remove the glow plug and place a few drops of fuel through the plug hole. Connect the starting battery and, with a firm grip on the prop, pull it through. You should feel a kick. If not, you need a few more drops of fuel on top of the piston. When you feel the kick, flip the prop hard and the engine will take off running every time — in the right direction. With a little experience you can determine exactly how much prime the engine needs. This method avoids flooding the crankcase, especially in cold weather. Some fellows use lighter fluid or gasoline as a prime medium in really cold weather. However, you can't beat an electric starter for firing up a balky engine, especially in cold weather. Lead acid batteries are available in sealed versions and there are always the Gelled-Cell type which do not present any particular hazard.

I am afraid I am not an advocate of adding weight to the nose of the crankshaft as a means of balancing an aircraft. A spinner or spinner nut is about the most weight you would want to use. Heavier weight only stresses the crankshaft and front bearing of the engine many times causing the front bearing to loosen in its housing. This is a problem I see all the time in boat and R/C car engines due to the flywheel. In an aircraft the heavy weight becomes a gyroscope and does not want to be displaced from its direction of rotation. Any aircraft maneuver wants to tip the gyro, stressing the front bearing and crankshaft. If you have a tail heavy aircraft it is best to add weight in the form of lead under the engine, in the backplate, etc. I have balanced out a lot of aircraft by filling the backplate with molten lead and then covering with a piece of tin can stock to hold in place. □

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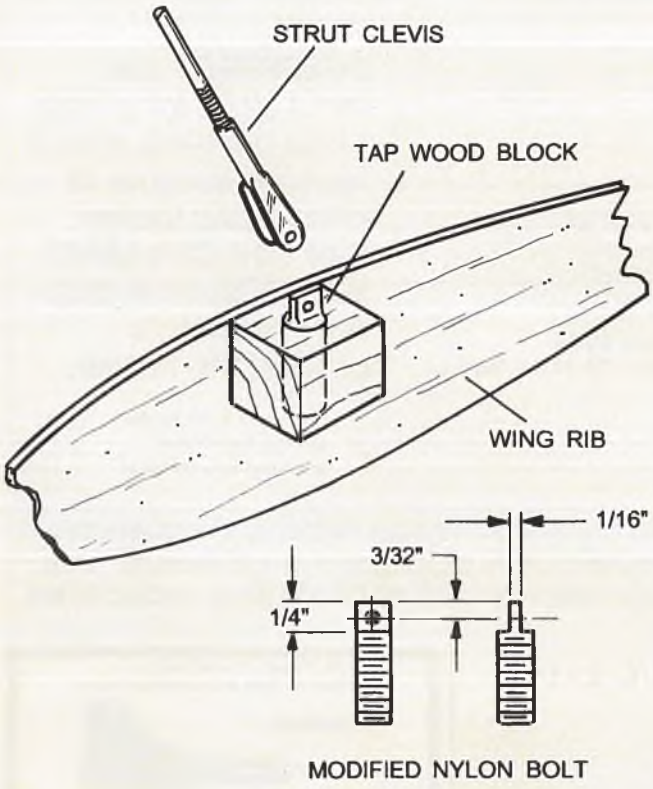
# FOR WHAT IT'S WORTH



**From RCM Readers**
**Edited By Jerry Smith**

### INTERPLANE STRUT CONNECTOR

Here is an idea you might try the next time your bipe requires interplane struts (as shown in the sketch). Cut the head off a 1/4'' - 20 nylon bolt. Sand flats on each side, equally spaced, to fit inside a Du-Bro #4-40 solder link. Drill a hole to fit the link with a small amount of clearance to ease assembly. Drill the hole down far enough to leave 3/32'' material above it. The modified bolts are then attached to plywood or hardwood blocks mounted in the wing at the appropriate locations. Another benefit: The threads make adjustment possible due to warped wings or, in fact, just plain building tolerance! Submitted by Pete Whitley, Quincy, Illinois.



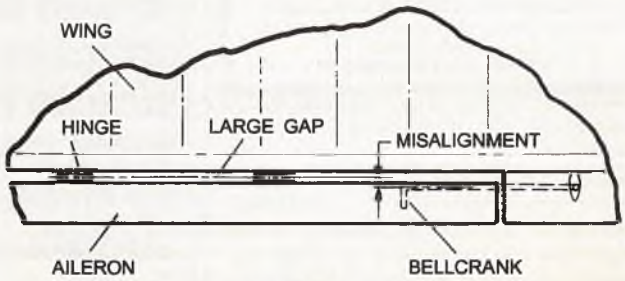

MODIFIED NYLON BOLT

### AILERON WITH ZERO BINDING

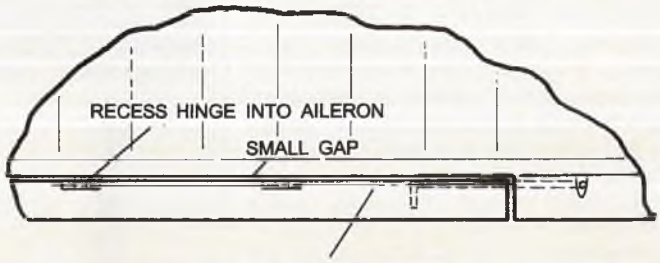
Sound too good to be true? Well, as a matter of fact it's easy to do. Most aileron installations bind up as the aileron is deflected. This is because the aileron is not on the same axis of rotation as the bellcrank. The misalignment causes it to bind as the bellcrank is rotated.

The correct way is to recess the hinge into the aileron so that the hinge centerline is in line with the bellcrank centerline. It's that easy. The bellcrank should also be recessed so that it's flush with the edge of the aileron.

Ailerons installed this way will not have any binding, and because the hinge is recessed, you can butt the aileron right up against the trailing edge of the wing for a near gapless installation. Submitted by H.W. Armstrong Jr., Luling, Louisiana.




WRONG




RIGHT

### HELICOPTER TRANSPORT STAND

Here is a neat and easy to build Helicopter Transport Stand that can be used with any helicopter. The base is made from 1/4"-1/2" plywood approx. 12" x 53". Pine blocks were routed out to capture the landing gear, or strips could be placed on either side to simplify matters. The tail boom support is made of plywood, a dowel, and pine. The helicopter is tied down with Velco straps to hold it secure. Extra features such as, an oil drip pan, X-mitter holder, spare parts, could easily be added. Your imagination is the limit. Be sure to paint it. Submitted by David Datson, King City, California.



## MONOKOTING THE UNUSUAL

After completing a great MonoKote covering job, it's frustrating to try and find paint for the wing hold-down dowels that will match the covering. Especially when using some of the more fascinating colors. It is easy to MonoKote the dowels using a strip of covering the width of the dowel length. A Top Flite Trim Seal Tool works best. Seal one edge down and go around the dowel slowly several times. Cover the end with a circle slightly larger than necessary. A blast from your heat gun will cause the excess to curl around the edge so that you can make a neat seal. Submitted by Joel Rindler, Freeport, New York.

## SAFETY FIRST IN THE FLIGHT BOX

Here is an interesting story that some of you may relate to: Four of us were going to a Fly-In in Houston, about a hundred miles away, two hours driving time. We went in my van, pulling a trailer with five giant scale airplanes and all our gear, flight boxes, folding table, lawn chairs, canopy tent, and our mosquito fogging machine.

In my wooden flight box, I carry the usual tools. Tape, glue, extra nuts, bolts, a prop or two, and a dry rechargeable motorcycle battery to quick charge the planes at the field. I also carry a can of insect repellent, paper towels, a small container of Glass-Plus to wipe the planes.

We arrived at the flying field and opened the trailer. I felt the heat in my flight box and opened it quickly. The can of insect repellent had moved over next to the battery (which I had put flat on its side to save room). The metal can had two holes burned in it, caused by it shorting out the battery. The battery case was puffed out and split. We were fortunate to find this little hot box before it caught the paper towel on fire, then the flight box. We could have lost planes, vehicles, even lives. **Worst of all** we could have been towing a roaring fire while we were driving and we wouldn't have known until too late! Submitted by C.J. Pinkston, Port Neched, Texas.

## BATTERY STRAPS

Recently, Jerry Jenkins of Plainwell, Michigan, became involved in making up his own battery receiver packs. While doing so, he ran across a super neat product to make solder tabs/connectors. This item can be purchased at any office supply store and is known as an Acco #22 fastener. Basically used for securing documents in a file folder. Use the 2" sections off each end. They drill easily, are very flexible and solder like a breeze. Absolutely ideal for battery tabs and connectors.

## TINTING CANOPIES

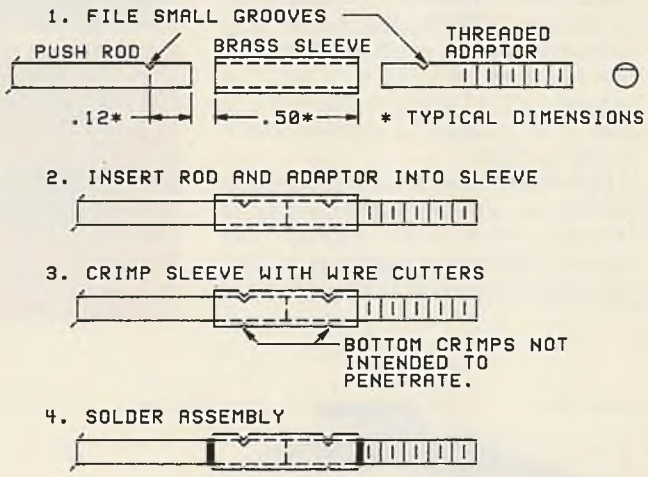
Don White, Houston, Texas, uses Rit Dye to tint the canopies on his models to make them more realistic and match the many color schemes he comes up with. Here's how Don does it: Use one half of the 1 oz. package to 3 cups of boiling water. Stir to mix the dye and allow to cool to 140 degrees. Wash the canopy thoroughly in warm water and soap to remove any mold release or other material that might interfere with the dying process. When the dye cools sufficiently submerge the canopy for two minutes and let nature take its course. You'll be surprised how easy it is.

## ATTACHING THREADED ADAPTORS TO PLAIN PUSHRODS

Strong solder joints are not always easy to achieve when steel is used, and this can mean disaster if the control mechanism is involved. As a margin of safety, a mechanical crimp can be added to the joint between a plain end pushrod and a threaded adaptor. Besides a bit of "belt-and-suspenders" approach, the crimps hold the pushrod and the threaded adaptor in place in the sleeve while the joint is being soldered.

As shown in the sketch, file a small groove, about one fourth as deep as the rod and threaded adaptor diameter, on one side at the end of the rod also on the adaptor. Locate the grooves such that the matching crimps on the sleeve will be away from the edge of the sleeve. For a 1/2" long sleeve, for instance, make the grooves about 1/8" from the end of the rod and of the adaptor. This way crimps will be 1/8" away from the sleeve ends.

Insert either the rod or the adaptor into the sleeve and crimp the sleeve on it using wire cutters. (If using solder paste, apply some now.) Insert the other part into the sleeve, position the wire cutters slightly on the inside of where the groove should be (to draw it tight against the already crimped-in part), and crimp the sleeve on it. Solder the assembly. Note: Do not rely on the crimps alone. Submitted by Alexander Muller, Ellisville, Missouri.




## TRIM COVERING

When covering with two colors of heat shrink material (MonoKote, Black Baron, etc.) on one side of a surface, don't you hate it when the darker color feathers onto the lighter one while you're ironing it down? It would have looked great but, in order to hide it you put trim tape over the seam. Next time you have this problem use a pencil eraser and lightly rub the darker feathering off the lighter color. You'll find a crisp clean line and won't have to worry about that trim tape. Submitted by John Galvin, Cranston, Rhode Island.

**Send your hints & kinks to R/C Modeler, Attn: FWIW, P.O. Box 487, Sierra Madre, CA 91025 — win a free book from RCM's Anthology Library series if your idea is used.**



Nick Ziroli 1/8 scale DC-3 kit. Powered by two Zenoah G-38's. David hand built the scale EDO-78 floats from information gathered at work.

The 51 pound mixture of balsa wood, metal, and electronics comes "unglued" from the water after a run of 60 feet. Controlling this scale seaplane is a Futaba FP 7UAF radio system, seven flights have been made so far to date.

In the future, amphibious landing gear will be added for more realism. Also, Nick Ziroli has an EDO-78 float kit available in 1/8 scale for the DC-3. Will this mean more than five C-47's will get off the building board and into the water? □



# AMPHIBIOUS DC-3 COMES IN TWO SIZES

By RCM Staff Photos by David Hall

During the second World War, some C-47's had received sets of floats. EDO Manufacturing was contracted to handle the task of making the largest of aircraft pontoons. The 42 foot EDO-78 Amphibious float was originally contracted for 150 sets but it appears that only five sets were actually fitted to the C-47's. Of these five, the prototype crashed, three had gone to New Guinea, and one went to Elmendorf Air Force Base in Alaska. There are no known surviving C-47 seaplanes.

In 1985, Folsoms Air Service in Greenville, Maine, found a set of the surplus EDO-78 floats and saved them from the scrapper. After figuring out the strut arrangement (notice no spreader bar), the floats are now attached to a DC-3 to simulate the C-47 seaplane. This full size plane is set to appear at airshows after a sponsor is found.

David Hall, an employee at Folsoms Air Service, has also completed the task of attaching floats to his aircraft. The difference? His plane is eight times smaller. The radio control model C-47 seaplane is a





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**The PT-40 was named 1990's International "Model of the Year" at the Nuremberg Toy Fair!**




Great Planes PT-20, PT-40, & PT-Electric make building and flying fun, fast, and easy. With detailed instructions, perfectly-fitting machine-cut and sanded or razor-cut wood parts, sturdy tricycle landing gear and smooth, steady flight characteristics, Great Planes Perfect Trainers give you the best opportunity for building and flying success. Sturdy tricycle landing gear helps take the worry out of takeoffs and landings, too!

The gas-powered PT-20 and PT-40 require 3-4 channel radios. The PT-20 spans 52" and takes a 2-cycle .15-.20 or 4-cycle .20-.40 engine. Spanning 60", the PT-40 requires a 2-cycle .25-.40 or 4-cycle .30-.45 engine. The convenient, electric-powered PT-Electric spans 56" and includes a complete Thrustmaster 550 motor package. Add a 3-channel radio, 6-cell battery, and charger, and you've got everything you need for exciting first flights. With the PT-E, easy takeoffs lead naturally to 5-7 minutes of flying fun, and gentle, low-speed landings at the end of the flight. Get the PT-E and all required items at a special low price in the PT-E Combo!

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RZ0302 | PT-20/O.S. .25 FP Engine Combo..... | $159.90 | $102.98 |
| RC1920 | Great Planes PT-20 Trainer..... | 59.95 | 43.99 |
| RZ0303 | PT-40/O.S. .40 FP Engine Combo..... | 184.90 | 114.98 |
| RC1921 | Great Planes PT-40 Trainer..... | 69.95 | 49.99 |
| RZ0301 | PT-E/6 Cell Battery/Multi Chrg..... | 164.85 | 114.97 |
| RC1919 | Great Planes PT-Electric Trainer ..... | 79.95 | 56.99 |
| RC1612 | VHS "How To" Video – PT-40..... | 19.95 | 16.99 |

## GREAT PLANES™ P-51D MUSTANG

**Sport scale aerobatics with an authentic military design.**




Now sport fliers can enjoy the authentic thrills of flying a World War II fighter plane. The new Great Planes **P-51D Mustang** combines the full aerobatic potential of a sport flier with the realistic scale looks of a famous military fighter. Based on the proven airfoil of the Ultra Sport 40, the P-51D offers the same correct wing and power loadings for great low-speed stability and smooth landings.

Unlike precision scale models, the P-51D looks great without being highly complex. It features wing cannons, exhaust stacks and optional retractable landing gear. It also includes a detailed, computer-generated instruction book, and Great Planes quality interlocking construction.

**Stock#RC1928 • Retail price $109.95 •Tower Price $74.99**

## KYOSHO® CONCEPT 30 HELICOPTERS

**6 versions bring exciting helicopter performance to all skill levels!**



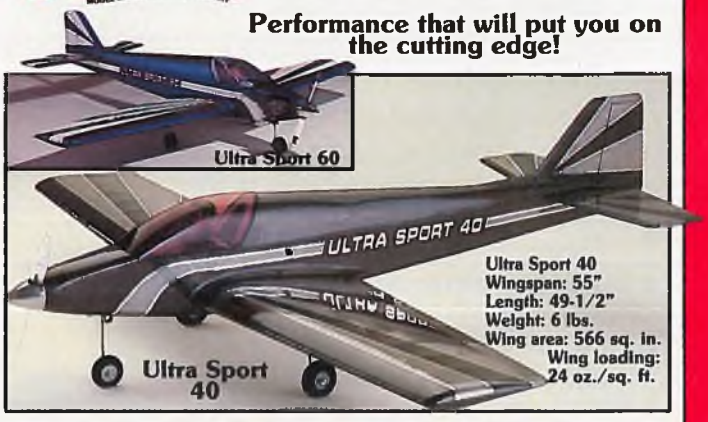

Kyosho now offers top performance in an electric-powered heli, with the EP Concept . Designed for seasoned pilots, the EP Concept requires a heli radio w/4 mini servos, gyro, electronic speed control, 7-cell battery, and charger.

Available 90% assembled with or without an O.S. .32 F-H engine the Concept 30 DX offers entry level pilots a heli designed for flying success. The Concept 30 SE, with lighter weight stabilizer paddles and 28 total ball bearings, offers the expert pilot the perfect machine for loops, rolls and inverted flight, while the incredibly sophisticated Concept 30 SX gives serious hot doggers the lightning-fast response and control necessary for truly amazing performances. All gas models require a helicopter radio, gyro, and a .32-34 helicopter engine.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RZ0306** | Concept DX Assm. w/O.S. .32 F-HEngine Airtronics VG6H-FMw/SGX Gyro/Milt VHS "How to" Heli Video Combo .... | $1094.75 | $761.95 |
| RC1924 | Concept 30 DX Assembled w/.32FH .... | 529.95 | 439.99 |
| RC1923 | Concept 30 DX Assembled w/o.Engine. | 429.95 | 299.99 |
| RC1926 | Concept 30 SE Kit ..... | 439.95 | 359.89 |
| RC1922 | Elec. EP Concept Assembled..... | 469.95 | 349.99 |
| RC1927 | Concept 30 SX Kit ..... | 519.95 | 409.99 |

## GREAT PLANES™ ULTRA SPORTS

**Performance that will put you on the cutting edge!**




With the Great Planes Ultra Sport 40 and Ultra Sport 60, your flying skills will expand faster than ever before.

Sophisticated design features – correct wing and power loadings, correct moments and symmetrical airfoils for smooth wind penetration – will enable you to perform the most advanced maneuvers with startling precision, and still enjoy very stable, low speed landing.

Kit quality matches performance in excellence, featuring aircraft-quality wood and an interlocking parts design for accurate alignment. Extensive hardware, computer-generated plans and photo-illustrated instructions are also included.

The 55" Ultra Sport 40 requires a 2-cycle .40-.46 or 4-cycle .60-.70 engine; the 62" span Ultra Sport 60 requires a 2-cycle .60-.65 or 4-cycle .70-.91 engine. Both require a 4-5 channel radio.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RZ0304 | Ultra Sport 40/O.S..46SF Engine Combo.....SAVE $8.00! | $334.90 | $204.98 |
| RC1929 | Great Planes Ultra Sport 40..... | 109.95 | 74.99 |
| RZ0305 | Ultra Sport 60/O.S..91Surpass Engine Combo .....SAVE $13.00! | 554.90 | 339.98 |
| RC1930 | Great Planes Ultra Sport 60..... | 124.95 | 87.99 |



**Complete Information in our Tower Talk**
Refer to Ad # 06D01
See first page of this ad!



# Call 1-800-637-4989

## EXCITING FLIGHTS ARE JUST HOURS AWAY WITH...

## HOBBICO® ASAP ARFS

*•Top quality and convenience for all fliers.*
*•9 outstanding performers, including the new Hobbico P-40E ASAP ARF!*










In just hours, your Hobbico ASAP can be ready for flight. The protective pre-covering over the sturdy balsa and ply basic structure is a lightweight shell merging a foam core, synthetic plastic covering with with brilliant, bonded-in color, and a fuel-resistant film surface. Complete instructions and generous hardware package complete the package, opening up the way to hundreds of satisfying flights.

With 9 models to choose from, ASAPS can satisfy virtually all fliers with their versatile looks and performance. There's the Extra 300 which vividly recreates the West German original, from the dynamic trim and color scheme to its snappy aerobatic performance, and Hobbico's newest ASAP, the P-40E, which brings a WWII legend to life with its authentic looks and performance.

For an ARF you'll be proud to own–and absolutely thrilled to fly–choose a Hobbico ASAP. Add savings to top looks and performance with a Tower Combo!

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| **RZ0311** | **Super Chipmunk 25/O.S..25 SF Combo** | **$302.90** | **$199.98** |
| RC1931 | Hobbico ASAP Super Chipmunk 25..... | 159.95 | 119.99 |
| **RZ0315** | **Super Chipmunk 40/O.S..40 SFCombo** | **439.90** | **299.98** |
| RC1935 | Hobbico ASAP Super Chipmunk 40..... | 229.95 | 179.99 |
| **RZ0312** | **Telestar 25/O.S..25 SF *SAVE $8.00!*** | **302.90** | **199.98** |
| RC1932 | Hobbico ASAP Telestar 25 ..... | 159.95 | 119.99 |
| **RZ0316** | **Telestar 40/O.S..40 SF*SAVE $13.00!*** | **419.90** | **279.98** |
| RC1936 | Hobbico ASAP Telestar 40 ..... | 209.95 | 159.99 |
| **RZ0314** | **Diabolo 40/O.S..46 SF*SAVE $13.00!*** | **454.90** | **304.98** |
| RC1934 | Hobbico ASAP Diabolo 40 ..... | $229.95 | $179.99 |
| **RZ0313** | **Cherokee /O.S..25 SF Combo .....** | **302.90** | **199.98** |
| RC1933 | Hobbico ASAP Cherokee 25..... | 159.95 | 119.99 |
| **RZ0317** | **Cessna 182-40/O.S..40 SF *SAVE $13.00!*** | **419.90** | **279.98** |
| RC1937 | Hobbico ASAP Cessna 182-40 ..... | 209.95 | 159.99 |
| **RZ0318** | **Extra 300/O.S..46 SF .*SAVE $13.00!*** | **484.90** | **324.98** |
| RC1938 | Hobbico ASAP Extra 300-40 ..... | 259.95 | 199.99 |
| **RZ0319** | **P-40E Warhawk/O.S..46SF/90°Rotating Retracts Combo .....*SAVE $18.00!*** | **569.85** | **389.97** |
| RC1939 | Hobbico ASAP Curtis P-40E Warhawk .. | 299.95 | 239.99 |

## GREAT PLANES™ SUPER DECATHLON 40

### Airshow Realism With Great Planes Performance!



The classic lines and breathtaking performance make the 64"-span **Great Planes Super Decathlon 40** a perfect sport-scale aircraft. Interlocking construction and top-quality balsa and ply parts make building a pleasure. Features pre-shaped and notched wing leading and trailing edges, aluminum main gear, ABS cowl and wheel pants, and more. Required are a 2-cycle .40-.45 or 4-cycle .48-.70 engine and a 4-channel radio.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| **RZ0307** | **Super Decathlon 40/O.S..70 Surpass Combo.....*SAVE $10.00!*** | **$459.90** | **$284.98** |
| RC1940 | Great Planes Super Decathlon 40 ..... | 109.95 | **74.99** |

## HOBBICO® STURDY BIRDY & STURDY BIRDY II




The 53" span **Sturdy Birdy** trainer lives up to its name, with a rugged aluminum channel tail boom and molded-foam wing designed to survive first-time flights. These features, plus pre-cut tail feathers, minimize assembly time as well. The Sturdy Birdy is also much easier to fly than its competitor, with a self-righting attitude to keep you in control and an extra-large wing area for smooth, easy flights.

Ailerons on the **Sturdy Birdy II** give you even greater control, especially during landing approaches. Like the Sturdy Birdy, the Sturdy Birdy II includes extensive hardware and a complete, easy-to-follow instruction sheet.

Both require a .20-.25 engine and a 4-channel radio with three servos (four required for Sturdy Birdy II.)

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC1941 | Hobbico Sturdy Birdy ARF Trainer..... | $69.95 | **$49.99** |
| RC1942 | Hobbico Sturdy Birdy II ARF w/Ailerons | 79.95 | **59.99** |

## HOBBICO® AWARF KITS







Hobbico AWARF (All-Wood-Almost-Ready-to-Fly) kits get you to the flying field faster, for more flying time! Handcrafted of premium-quality woods, AWARFS arrive 90% pre-built, pre-covered in a colorful polyester film that minimizes assembly time even as it adds great looks.

Powered by a .40 engine (required), the 60" span **Avistar 40** features a semi-symmetrical airfoil that offers intermediate fliers comforting stability and aerobatic potential. Exceptionally stable and easily repairable, the 64" span **Flightstar 40** trainer requires a .40-46 engine for great first flights. And with the addition of a .60 engine, the 71" span **Hobbistar 60** offers intermediates aerobatic capabilities combined with trainer-like handling. All require a 4-channel radio...and all offer the convenience, performance, and quality you'd expect from Hobbico!

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| **RZ0310** | **Flightstar 40/O.S..40SF *SAVE $13.00!*** | **$359.90** | **$219.98** |
| RC1944 | Hobbico Flightstar 40 AWARF ..... | 149.95 | **99.99** |
| RC1943 | Hobbico Avistar 40 AWARF..... | 149.95 | **109.99** |
| RC1945 | Hobbico Hobbistar 60 AWARF..... | 199.95 | **149.99** |


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# TOWER HOBBIES

## O.S. ENGINES™

*•2-year warranty on parts and workmanship.*







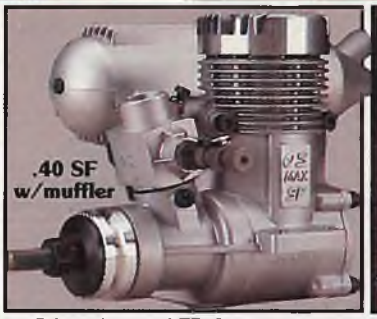
O.S. TWO YEAR WARRANTY







| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC1946 | .10 FP ABC w/Muffler | $79.95 | $49.99 |
| RC1947 | .15 FP RC w/Muffler | 89.95 | 56.99 |
| RC1948 | .20 FP RC w/Muffler | 94.95 | 59.99 |
| RC1949 | .25 FP RC w/Muffler | 99.95 | 62.49 |
| RC1950 | .35 FP ABC RC w/Muffler | 107.95 | 66.99 |
| RC1951 | .40 FP ABC RC w/Muffler | 114.95 | 69.99 |
| RC1952 | .25 SF RC w/Muffler | 142.95 | 87.99 |
| RC1953 | .40 SF RC w/Muffler | 209.95 | 132.99 |
| RC1954 | .40 SF RC w/Muffler | 224.95 | 137.99 |
| RC1955 | .46 SF-P RC w/Pump | 284.95 | 174.99 |
| RC1956 | .61 SF Long Stroke w/Muffler | 309.95 | 189.99 |
| RC1957 | .61 SF RC Long Stroke w/Pump | 374.95 | 237.99 |
| RC1958 | 1.08 FS RC w/Muffler | 399.95 | 249.99 |
| RC1959 | BGX-1 3500 | 499.95 | 319.99 |
| RC1960 | .25 SF ABC RC w/Muffler | 174.95 | 99.99 |







Schnuerle-ported **FP Series** engines were designed for sport fliers. Easy to start and break-in, FP series engines offer efficient barrel carbs, expansion-type mufflers, and 6 popularly-sized models for across-the-board quality and value.

Pump versions...Long Stroke .61 models...ABC construction or ringed piston engines...sizes ranging from .25-.61...the **SF Series** offers incredible diversity in choice, with undeniable quality in construction. Schnuerle porting and dual ball bearing-supported crankshafts are just the beginning!

Invest in the gold standard of 4-cycle power...the **Surpass Series** from O.S. Max. Low noise, good fuel economy, longer flights, and undeniable power are available for all fliers, from the small .26 to the mighty **Surpass 120 II w/Pump**. Exceptionally reliable and easy to start, the **1.08 FSR** is a durable classic; just 1.7 lbs in weight, it develops a full 3.0 HP for large-scale fliers. The 35cc, 2.135 cu. in. **BGX-1 3500** offers less vibration and a higher power-to-weight ratio than similar-sized engines to meet the most demanding giant-scale applications.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC1961 | .40 SF ABC RC w/Muffler | $214.95 | $137.99 |
| RC1962 | .46 SF ABC RC w/Muffler | 229.95 | 144.99 |
| RC1963 | .46 SF ABC-P RC w/Pump | 289.95 | 182.99 |
| RC1964 | .46 SF ABC Reverse w/Muffler | 234.95 | 144.99 |
| RC1965 | .61 SF ABC RC LS w/Muffler | 309.95 | 189.99 |
| RC1966 | .61 SF ABC RC LS w/Pump | 374.95 | 237.99 |
| RC1967 | .61 RF ABC RC LS Rear Exhaust | 289.95 | 184.99 |
| RC1968 | .61 RF ABC Hanno Special | 549.95 | 344.99 |
| RC1969 | FS-26 Surpass RC 4-cycle w/Muffler | 209.95 | 124.99 |
| RC1970 | FS-40 Surpass RC 4-cycle w/Muffler | 279.95 | 159.99 |
| RC1971 | FS-48 Surpass RC 4-cycle w/Muffler | 309.95 | 187.99 |
| RC1972 | FS-70 Surpass RC 4-cycle w/Muffler | 349.95 | 219.99 |
| RC1973 | FS-91 Surpass RC 4-cycle w/Muffler | 429.95 | 264.99 |
| RC1974 | FS-120 Surpass II w/Pump | 579.95 | 374.99 |
| RC1975 | FS-120 Surpass w/o Pump | 529.95 | 349.99 |

## Super Tigre™ ENGINES 2-Year Warranty

*•Built with the Italian passion for performance!*
*•Sport or pattern, heli or airplane...Super-Tigre has the engine you need!*







SuperTigre Engines are protected by a full 2-year warranty on parts and workmanship. S-Series engines are equipped with ball bearing-supported crankshafts, lightweight cast heads and Schnuerle-porting for top power. In addition, SuperTigre also offers the **G-34** and **G-51** Ring Engines, which are Schnuerle-ported and ball bearing-equipped for top sport power. All include muffler. When the need is raw power for giant-scale models, SuperTigre can offer the 1.5 cu. in. **S-2500**, the 1.8 cu. in. **S-3000**, and the 2.76 cu. in. **G-4500**; each features ball bearings, Schnuerle porting, and the reliability your craft requires. The **G34-H** helicopter engine has the power to provide smooth, powerful transitions from hover to climb at constant RPMs, while the **X-61K ABC** has the potent power to move pattern ships through their paces with confidence. All include glow plug.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC1977 | Supertigre G-34 Ring RC w/Muffler | $154.95 | $97.99 |
| RC1978 | Supertigre S-40K Ring RC w/Muffler | 184.95 | 109.99 |
| RC1979 | Supertigre S-45K ABC RC w/Muffler | 197.95 | 119.99 |
| RC1980 | Supertigre G-51 Ring RC w/Muffler | 187.95 | 119.99 |
| RC1981 | Supertigre S-61K Ring RC w/Muffler | 209.95 | 129.99 |
| RC1982 | Supertigre S-61K ABC RC w/Muffler | 244.95 | 149.99 |
| RC1983 | Supertigre S-75K Ring RC w/Muffler | 269.95 | 169.99 |
| RC1984 | Supertigre S-90K Ring RC w/Muffler | 279.95 | 174.99 |
| RC1985 | Supertigre S-2500 1.5 cu. in. RC w/Mount | 339.95 | 209.99 |
| RC1986 | Supertigre S-3000 1.8 cu. in. RC w/Mount | 369.95 | 229.99 |
| RC1987 | Supertigre G4500 2.8 cu. in. RC w/Mount | 499.95 | 319.99 |
| RC1988 | Supertigre G34H ABC Ring w/Muffler | 209.95 | 129.99 |
| RC1989 | Supertigre X-61K ABC Rear Exhaust | 244.95 | 154.99 |

## TOWER HOBBIES® DELUXE POWER PANEL

*•Install on your field box for one handy power source.*




Power your electric field equipment from a single 12V source with the **Deluxe Power Panel**. It provides 12V power to your electric starter, 12V or 6V power to your fuel pump, and 1½ V pulsed power to your glow plug. It comes complete with six banana plugs and two alligator clips. A variable control knob and meter let you adjust glow plug current, detect engine problems, and check for burned-out plugs. Measures 6" wide x 3¾" high.

Tower's Price **$19.99**

**Stock#RC1990 • Retail price $41.95 •**

## TOWER HOBBIES® 12V BATTERIES & CHARGER

*•Dependable 12V power...for less!*
*•Compact, portable units fit in a field box for go-anywhere convenience.*




**Hobbico's Mafrec 12V Battery** features a full 6 Ah of capacity. Just 5.9" x 2.5" x3.6", this sealed, lead-calcium unit is the ultimate in convenience! Tower's lead-acid **12V 5 Ah Starter Battery** is an economical way to power all your field box equipment. (Electrolyte required.) Recharge both safely overnight, with **Tower Hobbies 12V Charger**. The unit's charging rate is 500 mAh with household current; comes with 6' cord and clips. UL approved.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC1991 | Hobbico Mafrec 12 Volt 6 Ah Sealed Battery | $37.95 | $24.99 |
| RC1992 | Tower Hobbies 12 Volt Field Battery | 25.95 | 12.99 |
| RC1993 | Tower Hobbies 12 Volt Field Charger | 14.95 | 8.89 |



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# Call 1-800-637-4989

## Flitecraft™ ARF KITS




For quality, durability, and fun at a very low price, you can't go wrong with a . Each **Flitecraft** kit features a rugged, one-piece RSTP fuselage, unique bolt-on wings, generous hardware, graphics and decals. Durable, new, 56" span **Minute Man .40** ARF trainer with pre-installed ailerons and pre-covered foam-core wings cut assembly time to just 4-6 hours. It requires a .35-.40 engine and 4-channel radio. The 57" span, forgiving **Solo III** is ideal for beginners. Required are a 2-cycle .35-size engine and 3-channel radio. The 58" span **Cardinal III** is a durable sport plane for intermediates and the aerobatic low wing **Arrow III** both require a .25-.40 size 2-cycle engine and 4-channel radio. The **Shadow** is a 59" span sport and aerobatic aircraft with a fully symmetrical, tapered wing. Its realistic appearance is highlighted by included wheel pants. Required is a .40-size engine and 4-channel radio. All come with pushrods, wheels, adjustable servo rails, hardware, and engine mount.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| **RZ0320** | **Arrow III/ O.S..35FP ...*SAVE $5.00!*** | **$217.90** | **$136.98** |
| RC1994 | Flightcraft Arrow III ARF | 109.95 | 74.99 |
| **RZ0321** | **Cardinal III/ O.S..35FP *SAVE $5.00!*** | **217.90** | **136.98** |
| RC1995 | Flightcraft Cardinal III ARF | 109.95 | 74.99 |
| **RZ0322** | **Solo III/ O.S..35FP.....*SAVE $5.00!*** | **207.90** | **126.98** |
| RC1996 | Flightcraft Solo III ARF | 99.95 | 64.99 |
| RC1997 | Flightcraft Shadow ARF | 115.95 | 79.99 |
| **RZ0323** | **Minute Man/ Sup G34 .*SAVE $6.00!*** | **254.90** | **161.98** |
| RC1998 | Flightcraft Minute Man .40 ARF...*NEW!* | 99.95 | 69.99 |

## KYOSHO® SERIES 91 ADVANCE RADIOS

### MORE THAN 1991-READY, THEY'RE CERTIFIED GOLD!




Kyosho **Advance 5-Channel PCM**, **6-FMH Helicopter**, and **7-Channel FM** radio recievers are AMA certfied and listed. All offer servo reversing, power output meter, dual rates, and full NiCds. The 5-channel system offers PCM precision control, dual rates for elevator and ailerons, plus a variable hold/fail-safe feature. The 7-channel FM system includes aileron/rudder mixing, V-tail mixing engaged by a simple on/off switch, and more. Automatic collective pitch and throttle mixing, one-button pitch trim, and revolution mixing highlight the 6FM-H helicopter system. Also included are 5 KS100 servos and a 1000 mAh reciever battery, making the 6FM-H one of the most complete beginner helicopter systems available. Both the 5-channel and 7-channel systems include four KS100 servos...and all three include dual-conversion, narrow-band receivers for top performance in 1991 and beyond.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2003** | Advance 5 Ch PCM 4-KS100 Servos | $299.95 | $179.99 |
| RC2005** | Advance 6 FM-H w/5 KS100 Servos | 399.95 | 249.99 |
| RC2004** | Advance 7Ch, FM 4 KS100 Servos | 319.95 | 189.99 |

## KYOSHO® KYOSHO STRATUS

### ARF Electric Sailplane

- ***Totally new design for outstanding performance.***



The **Stratus** electric sailplane, which has a 74.8" span Schumann wing with a S-3021 airfoil and folding scimitar prop, offers exceptional climbing and soaring. The fuselage is made of blow-molded polypropylene, wing is professionally covered, pre-built balsa and a powerful Kyosho electric motor is included. A 2-3 channel radio, 6- or 7-cell battery (SCR type recommended), and charger are required.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| **RZ0324**** | **Stratus/6-Cell Sprint/Multi-Charger II .....*SAVE $12.00!*** | **$324.85** | **$229.97** |
| RC1999 | Kyosho Stratus 2000 Sailplane | 239.95 | 179.99 |

## KYOSHO® CESSNA CARDINAL ARF

### ALMOST READY-TO-FLY ELECTRIC!



The 1/9 scale, 47" span electric **Kyosho Cessna Cardinal** high-wing features a tough, molded fuselage, pre-built and pre-covered balsa tail and wings, LeMans Stock 05R motor and Kyosho Superprop. This stable trainer requires a 2- or 3-channel radio with standard servos, electronic speed control or Kyosho Auto Cut-off Circuit, 6-cell battery, and charger. Save with the **Combo**, or with the **Ultimate Combo**, which includes the kit, a 2-channel radio, 8 'AA" batteries, and Kyosho's 6-cell Sprint battery, Multi-Charger II, Auto Cut-Off Relay, and Field Bag.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| **RZ0328**** | **Cessna Cardinal Ultimate Combo ..** | **$423.60** | **$279.99** |
| **RZ0325** | **Cessna Cardinal/6 Cell Sprint Batt /Multi-Chgr II Combo ..*SAVE $5.00!*** | **284.85** | **196.97** |
| RC2006 | Cessna Cardinal ARF Electric | 199.95 | 139.99 |

## TOP FLITE® MONOKOTE® COVERINGS

- ***The #1 choice of modelers worldwide!***
- ***Stronger and more puncture-resistant than any other film covering!***




**Top Flite MonoKote®** has been the modeler's first choice for more than 20 years. MonoKote is not only stronger and more resistant to puncture than other film coverings, it offers you more color choices, as well! Superb adhesion means that only MonoKote sticks and stays stuck! See page 12 for Top Flites other popular colors. All are on sale now... and you won't find a lower price anywhere.

| Stock# | Color | Stock# | Color | Stock# | Color | Stock# | Color |
|---|---|---|---|---|---|---|---|
| RC2000 | Red | RC2002 | White | RC2135 | Insignia Blue | RC2138 | Maroon |
| RC2132 | Orange | RC2133 | Aluminum | RC2136 | Black | RC2139 | Pink |
| RC2001 | Yellow | RC2134 | Sky Blue | RC2137 | Cream | RC2140 | Dark Red |

## SANYO® NICD BATTERIES



Sanyo's 4-cell NiCd receiver packs deliver 4.8V of power! The **600 mAh NiCd Pack** is for most average-sized models. The **800 mAh Pack** is for heavy-duty applications. The **1200 mAh Pack** is ideal for 1/4 scale applications. Leads are already attached; just add connectors. Use shrink wrap and connectors with **Sanyo 600 mAh "AA" NiCds** to build 4-cell, 4.8V receiver packs, or 8-cell, 9.6 volt transmitter packs! Save more with multiples!

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2007 | Sanyo 600 mAh 4.8V Receiver NiCd | $16.50 | $8.99 |
| RC2008 | Sanyo 800 mAh 4.8V Receiver NiCd | 22.95 | 14.99 |
| RC2009 | Sanyo 1200 mAh 4.8V Receiver NiCd | 25.95 | 16.99 |
| RC2010 | Sanyo "AA"600 mAh 1.2V NiCd | 2.99 | 2.29 |
| **RM0301** | *** 12"AA"NiCds .....*SAVE $7.49!*** | **35.88** | **19.99** |

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# Futaba® RADIOS AND SERVOS

## 4NBL ATTACK w/S148 SERVOS $99.99

RC2029**




- ***Affordable, dependable...Futaba!***
- ***NiCd-equipped, and 1991-ready!***

This dependable 4-channel AM system puts Futaba quality in your hands at an affordable price. Designed for conventional craft, the 4NBL features servo reversing, and includes 3 S148 precision servos, a 1991-ready R114H receiver, and full NiCds. 72 MHz or 75 MHz.

## 4NBF-FM w/S148 SERVOS $119.99

RC2030**

- ***Includes R127 DF dual-conversion receiver and trainer system.***

The 1991-ready 4NBF 4-channel FM system features an R127DF dual-converison receiver that strengthens and filters signals for improved control and response. Other features include adjustable sticks, servo reversing, trainer system, 3 S148 servos, and full NiCds.




## 7UAF FM w/4 S148 SERVOS $269.99

RC2038**

- ***'91-ready 7-channel offers programmable mixing and snap roll function.***
- ***Computer LCD screen displays all programming and mixing functions.***

For seasoned pilots, the 7UAF FM's programmable mixing means extra convenience in aerobatic flying. The computer LCD screen displays all functions for easy reference; timer, dual rates, snap roll function, exponential rates, NiCds, and more enhance this 7-channel's incredible versatility. 72 MHz.




## 7UAFS FM w/4 S148 SERVOS $319.99

RC2042**




- ***Program for airplanes, sailplanes, or helicopters...up to 4 models in all!***

The perfect system for the multi-talented flier! Stores data on up to 4 airplanes, sailplanes, or helicopters...or any combination...in memory, and also offers additional Idle Up and Pitch Idle up for helicopter flying, Air Brake, programmable mixing, NiCds, and much, much more!

## 5UAP PCM w/S148 SERVOS $269.99

RC2034**




- ***Stepless 1024 aircraft system offers superior control and response.***
- ***Features dual rates and plug-in RF module.***

Futaba's ultimate 5-channel system includes the smooth, precise control of stepless 1024 PCM technology. Convenient tuning panel covers, all adjustments; other features include R129DP 1024 narrow-band receiver, four S148 servos, RF module, ATV, dual rates, full NiCds and more. 72 MHz.

## 6NFK FM w/S148 SERVOS $169.99

RC2036**

- ***Full-featured 6-channel offers extra value.***
- ***NiCd-equipped FM system includes retract switch, dual rates, and more!***
- ***The convenient trainer system makes learning easy.***

The 6NFK FM offers seasoned fliers extra value in 6-channel systems. System features include adjustable sticks, servo reversing, dual rates on two channels, and full NiCds, plus retract switch, four S148 servos, R127DF dual-conversion receiver, and trainer system. 72 MHz.




| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2014** | 2PBKA/2-Channel/1 S148/MC112B | $199.95 | $109.99 |
| RC2011** | 2PBKA/2-Channel/2 S132H/Pistol | 189.95 | 109.99 |
| RC2012** | 2PBKA/2-Channel/2 S148 /Pistol | 159.95 | 78.99 |
| RC2013** | 2PBKA/2-Channel/S132H/MC112B/Pistol | 214.95 | 118.99 |
| RC2016** | 2PB/2-Channel/2 S148/Pistol | 119.95 | 53.99 |
| RC2017** | 2PB/2-Channel/1 S148 /MC112/Pistol | 169.95 | 84.99 |
| RC2015** | 2PB/2-Channel/1 S148 /1 S9301/Pistol | 164.95 | 79.99 |
| RC2018** | 2PD/2-Channel/2 9301/Pistol | 299.95 | 159.99 |
| RC2019** | 2PD/2-Channel/2 S132H/Pistol | 249.95 | 137.99 |
| RC2020** | 2PD/2-Channel/1 S132H/Pistol | 224.95 | 119.99 |
| RC2021** | 2NBR/2-Channel/2 S148/2-Stick | 114.95 | 54.99 |
| RC2022** | 2NCS/2-Channel/2 S148/2-Stick | 89.95 | 39.99 |
| RC2023** | 3EGX/AM/3-Channel/2 S31S/2 Stick | 449.95 | 279.99 |
| RC2024** | 3PB PCM/3-Channel/2 S9301/Pistol | 499.95 | 264.99 |
| RC2025** | 3PB PCM/3-Channel/2 S9601/Pistol | 499.95 | 264.99 |
| RC2026** | 3PB PCM/3-Channel/2 S132H/Pistol | 449.95 | 234.99 |
| RC2027** | 4 NBL/4-Ch/2 S133 Servos/Speed Ctrl | 299.95 | 164.99 |
| RC2028** | 4 NBL 4-Channel/2 S133 Servos/2 Stick | 259.95 | 139.99 |
| RC2029** | 4 NBL 4-Channel/3 S148 Servos/2 Stick | 244.95 | 99.99 |
| RC2030** | 4 NBF FM/4-Ch/3 S148 Servos/2 Stick | 249.95 | 119.99 |
| RC2031** | 4 NBP PCM/4-Ch/3 S148 Servos/2 Stick | 359.95 | 189.99 |
| RC2032** | 5NLH 5-Channel/4 S148 /2 Stick-Heli | 399.95 | 224.99 |
| RC2033** | 5UAF FM/5-Channel/4 S148 Servos/2 Stick | 399.95 | 219.99 |
| RC2034** | 5UAP PCM/5-Channel/4 S148 Servos/2 Stick | 499.95 | 269.99 |
| RC2036** | 6NFK FM/6-Channel/4 S148 Servos | 329.95 | 169.99 |
| RC2037** | 6NPK PCM/6-Channel/4 S148 Servos | 459.95 | 234.99 |
| RC2035** | 6NHP PCM/6-Channel/4 S148 /2 Stick-Heli | 599.95 | 289.99 |
| RC2038** | 7UAF FM/7-Channel/4 S148/2 Stick | 499.95 | 269.99 |

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2039** | 7UAP PCM/7-Channel/4 S148/2 Stick | $699.95 | $369.99 |
| RC2040** | 7UHF FM/7-Channel/4 S5101/2 Stick-Heli | 649.95 | 349.99 |
| RC2041** | 7UHP PCM/7-Channel/5 S5101/2 Stick | 799.95 | 434.99 |
| RC2042** | 7UAFS FM/7-Channel/4 S148 Servos | 599.95 | 319.99 |
| RC2043** | 7UAPS PCM/7-Channel/4 S148 Servos | 699.95 | 379.99 |
| RC2044** | 8SSA/8-Channel/4 S5101/1 Stick | 999.95 | 699.99 |
| RC2045** | 8SSA/8-Channel/4 S9201/1 Stick | 1079.95 | 749.99 |
| RC2046** | 8SSH/8-Channel/4 S9201/1 Stick-Heli | 1179.95 | 799.99 |
| RC2048** | 9VAP PCM/9-Channel/4 S5101/2 Stick | 999.95 | 649.99 |
| RC2049** | 9VHP PCM/9-Channel/5 S9201/2 Stick-Heli | 1199.95 | 749.99 |
| RC2047** | 9VAP PCM/9-Channel/4 S9101/2 Stick | 1079.95 | 669.99 |
| RC2050 | S9201 Coreless Ball Bearing Servo,J | 79.95 | 43.99 |
| RC2051 | S5101 Ball Bearing Servo,J | 59.95 | 28.99 |
| RC2052 | S9601 Ball Bearing Mini Coreless Servo-J | 79.95 | 44.99 |
| RC2053 | S-28 Standard Servo-G | 39.95 | 15.99 |
| RC2055 | S-33 Servo Micro-G | 59.95 | 28.99 |
| RC2056 | S-34 Servo-1/4 Scale-G | 64.95 | 33.99 |
| RC2057 | S-125 Sail Servo w/Arm J,FM | 59.95 | 47.99 |
| RC2058 | S-128 Servo Standard J,FM | 39.95 | 15.99 |
| RC2059 | S-130 Servo Ball Bearing J,FM | 59.95 | 29.99 |
| RC2060 | S-131S Servo BB Coreless J,FM | 79.95 | 42.99 |
| RC2061 | S-132 Servo-Mini J, FM | 54.95 | 29.99 |
| RC2062 | S-132H Servo High Speed, Mini J,FM | 54.95 | 29.99 |
| RC2063 | S-133 Servo Micro J,FM | 59.95 | 28.99 |
| RC2064 | S-134 Servo-1/4 Scale J,FM | 64.95 | 33.99 |
| RC2065 | S-136G Servo-Compact,Retract, J | 69.95 | 49.99 |
| RC2066 | S-148 Precision Standard J,FM | 39.95 | 15.99 |

# Call 1-800-637-4989

## AIRTRONICS® INC RADIOS




### VG6DR FM AIRCRAFT SYSTEM

The 6-channel, 1991-ready VG6DR FM system features dual rates for aileron and elevator, servo reversing, smooth, open gimbal sticks, NiCds, charger, and switch harness. Comes with four #102 servos, and is compatible with existing Airtronics Systems. 72 MHz.

### INFINITY 600 PROGRAMMABLE RADIO

Fully-programmable Infinity 600 6-channel FM system offers selectable Mode I or Mode II operation, plus non-volatile memory for up to 4 different airplanes. LCD computer display, electronic servo centering, dual rates, programmable failsafe, full NiCds, and more make this sophisticated system a top value. 72 MHz.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2067** | VT2R AM 2-Channel/2 Std Servos/2 Stick | $109.95 | $53.99 |
| RC2068** | VT2S AM 2-Channel/2 Std Servos/2 Stick | 99.95 | 52.99 |
| RC2069** | XL2P AM 2-Channel/2 Std Servos/Pistol | 159.95 | 78.99 |
| RC2070** | VT2P AM 2-Channel/2 Std Servos/Pistol | 119.95 | 51.99 |
| RC2071** | CL3P FM 3-Ch/2 102 Servos/Pistol | 399.95 | 239.99 |
| RC2074** | VG4R PCM 4-Ch/3 102 Servos/2 Stick | 349.95 | 149.99 |
| RC2072** | VG4R FM 4-Ch/2 501 Servos/2 Stick | 329.95 | 189.99 |
| RC2075** | VG4R FM 4-Ch/3 102 Servos/2 Stick | 249.95 | 118.99 |
| RC2073** | VG4R AM 4-Ch/2 501/MA-6/2 Stick | 329.95 | 189.99 |
| RC2076** | VG6H FM /4 102 Servos/Heli/2 Stick | 399.95 | 229.99 |
| RC2077** | VG6H PCM /4 102 Servos/Heli/2 Stick | 499.95 | 289.99 |
| RC2078** | VG6H FM /3 407 Srvs/SG-X/MA-5/Heli | 649.95 | 379.99 |
| RC2079** | VG6P PCM 6-Ch/4 102 Servos/2 Stick | 449.95 | 233.99 |
| RC2080** | VG6DR FM 6-Ch/4 102 Servos/2 Stick | 319.95 | 158.99 |
| RC2081** | IN600A FM 6-Ch/4 102 NiCd | 599.95 | 349.99 |
| RC2082** | IN600A PCM 6-Ch/4 102 NiCd | 649.95 | 379.99 |
| RC2083** | VG7P FM 7-Ch/4 102 NiCd/2 Stick | 399.95 | 229.99 |
| RC2084** | SP7P PCM 7-Ch/4 102 Servos/2 Stick | 679.95 | 299.99 |
| RC2085** | SP7P PCM 7-Ch/4 732 Servos/2 Stick | 919.95 | 479.99 |
| RC2086** | VS8P PCM 8-Channel/4 102/2 Stick | 919.95 | 519.99 |
| RC2087** | VS8SP PCM 8-Channel/4 102/2 Stick | 919.95 | 559.99 |

## CARL GOLDBERG MODELS INC. AIRPLANE KITS




"Designed for Success" is one of **Carl Goldberg's** mottos. Both beginning and experienced modelers know the truth behind their motto...and the wisdom of buying those kits at Tower's incredible low prices. Our massive buying power means that we can offer Goldberg's entire range of sailplanes, sport models, aerobats, and trainers at prices that most other companies can't touch!

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2092 | Goldberg Falcon 56 MKII .19-.40 | $89.99 | $49.99 |
| RC2093 | Goldberg Eaglet 50 .09-.25 | 59.99 | 32.99 |
| RC2094 | Goldberg Electric Mirage | 79.99 | 48.99 |
| RC2095 | Goldberg Freedom 20,.20-.30 | 59.99 | 34.99 |
| RC2096 | Goldberg Eagle 2 .29-.45 | 89.99 | 47.99 |
| RC2097 | Goldberg Senior Falcon .35-.60 | 119.99 | 69.99 |
| RC2098 | Goldberg Sky Tiger .40-.61 | 99.99 | 59.99 |
| RC2099 | Goldberg Piper J-3 Cub Anniv.Ed. .40-.61. | 99.99 | 54.99 |
| RC2100 | Goldberg Super Chipmunk .45-.60 | 139.99 | 69.99 |
| RC2101 | Goldberg Ultimate Bi-Plane .60 | 199.99 | 107.99 |
| RC2102 | Goldberg Sophisticated Lady Sailplane | 49.99 | 29.99 |
| RC2103 | Goldberg Gentle Lady Sailplane | 34.99 | 21.99 |
| RC2104 | Goldberg Electra-Deluxe Electric Sailplane | 79.99 | 42.99 |

## Duracraft ARF AIRPLANES




Trainer II & Dura-Bat now available with Dura-Hide Wing! Build a top-notch trainer or aerobat in just 6-10 hours.Spanning just 45", all 5 DuraCraft ARFs feature foam wings, balsa tails, PVC fuses, and aluminum main channels. Both **Dura-Plane II** models and **Dura-Trainer 40** require a .20-.40 engine and a 3-4 channel radio. Both aerobatic **Dura-Bats** feature an enclosed PVC fuse and require a .40-.46 engine and a 4-channel radio.

| Stock# | Description | Tower | Stock# | Description | Tower |
|---|---|---|---|---|---|
| RC2105 | Dura-Plane Trainer II | $44.99 | RC2108 | Dura-Plane Dura-Bat | $49.99 |
| RC2106 | Dura-Trainer 40 | 49.99 | RC2109 | Dura-Bat w/D.Hide wing | 64.99 |
| RC2107 | Dura-Plane II w/D.Hide wing | 57.99 | RC2110 | "Dura-Plane:The Movie"VHS | 19.99 |

## U.S. AirCore COROSTAR .40 & .40 FAMILY TRAINER




**U.S. AirCore CoroStar 40** and .40 **Family Trainer** are made of tough, light and fuelproof AirCore™, for fast, easy, "Fold & Fly" assembly. Power Cartridge for on-board gear slides into nose in minutes. 56" span CoroStar 40 low-wing performs stunning aerobatics; beginner's pre-decorated, 64" span AirCore 40 Family Trainer offers stable, high-lift wing and two unique manufacturer guarantees. Both require 4-channel radio and a .40-.45 2-cycle or .50 4-cycle engine.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RZ0327 | Corostar 40/O.S .40SF Combo*SAVE $11.00!* | $299.90 | $179.98 |
| RC2088 | U.S. AirCore CoroStar 40 | 89.95 | 57.99 |
| RC2089 | U.S. AirCore 40 Family Trainer | 119.95 | 74.99 |

## GREAT PLANES MASTER CADDY W/APS



Just 25" x 15" x 8¼", plywood Master Caddy organizes all field equipment for easy access. Auxilary Power Station holds all essentials, and detaches for light, compact carrying.

**Retail $39.95** **Tower Price $28.99**
**RC2111**

## pica MK.9 SPITFIRES



Stand-off scale **Spitfire MK.9** spans 65", and requires a .40-.60 2-cycle or .90 4-cycle engine. All-balsa **1/5 Spitfire MK.9** takes a .90-1.2 2-cycle or 1.2-1.6 4-cycle engine. Both require 4-6 channel radios.

Pica Spitfire MK.9 **Retail $154.95**
**RC2112** **Tower Price $99.99**

1/5 Pica Spitfire MK 9 **Retail $289.95**
**RC2113** **Tower Price $169.99**

## DREMEL® #3950 & SUPER MOTO-TOOL KITS




Both sets feature Moto-Tools with powerful 1.15A ball bearing motors, and 5,000-30,000 RPM variable speed range. Model **#3950** Set includes 40-piece bit/accessory assortment and tough, double-walled storage and carrying case. New **Super Kit** offers versatile flex-shaft attachment, 32-popular bits/accessories, and deluxe carrying case that features removable, 92-accessory storage tray. Both include keyless chuck.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2090 | Dremel 3950 Moto Tool Set–40 Access. | $127.50 | $77.99 |
| RC2091 | Dremel Variable Speed Super Kit | 144.95 | 89.99 |

## TOWER HOBBIES® DELUXE HEAT GUN & CUSTOM SEALING IRON



**Deluxe Heat Gun** with 1000 watts of power and wide nozzle shrinks popular coverings without scratching. Get a smooth, tight finish right up to the corners with the **Custom Sealing Iron**. Non-stick coating prevents scratching. Both are backed by Tower Hobbies one year warranty. Get both at one low price in the Heat Gun/Sealing Iron Combo.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RZ0326 | Heat Gun/Sealing Iron Combo | $54.90 | $24.98 |
| RC2114 | Tower Hobbies Deluxe Heat Gun | 32.95 | 14.99 |
| RC2115 | Tower Hobbies Custom Sealing Iron | 21.95 | 12.99 |

# Tower Hobbies: The World's Largest Hobby Shop

## WHITMAN HELICOPTER STAND



The Whiteman Helicopter Stand is ideal for R/Cers new to helicopter modeling. Why risk damaging your model when you're first testing your control skills? Learn without risk with this all-aluminum training stand. It will hold your model firmly, yet still allow almost complete freedom of movement. The stand is 42" in length and is fully portable.

**Retail $197.99** **Tower Price $187.99**
**RC2116**

## HOBBICO® ALUMINUM RADIO CASES

*•Single and Double radio cases available.*



Protect your transmitter with these stylish, rugged cases. The **Single Radio Case** has three 5/8" thick full-size interior foam pads and accepts single, dual stick and pistol transmitters. The **Double Case** has four 5/8" thick half-size foam pads for dual transmitter installation. Both feature mahogany interior panels with an attractive, durable, aluminum outer skin and frame.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2117 | Hobbico Custom Radio Case (Single) | $64.95 | $49.99 |
| RC2118 | Hobbico Custom Radio Case (Double) | 79.95 | 59.99 |

## TOWER HOBBIES® MINI-TACH



Test your engine's performance with this easy-to-use Mini-Tach. Peak your engine for maximum RPM and evaluate the effects of different props and fuels, and achieve a slow, idle. Just point it at the spinning propeller and read the RPM shown on the digital LCD display (in increments of 100). It has an operating range of 0-29,000 RPM, comes assembled with batteries included, and is ready to use right out of the box.

**Retail $59.95** **Tower Price $36.99**
**RC2119**

## TOWER STOCKS OVER 18,000 ITEMS – IF YOU DON'T SEE IT HERE, CALL US!

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **ACE** | | |
| RC1001 | Whizard .049-.051 | $32.95 | $22.99 |
| RC1002 | Alpha .049 | 34.95 | 24.99 |
| RC1003 | Air Scout Trainer .15-.25 | 54.95 | 39.99 |
| RC1004 | Seamaster 40 .40-.45 | 99.95 | 69.99 |
| RC1005 | Seamaster 120 1.08-2.5 | 199.95 | 132.99 |
| RC1006 | Bingo .40-.60 | 89.95 | 63.99 |
| RC1007 | Easy Eagle 2-Meter Sailplane | 54.95 | 39.99 |
| RC1008 | All Star Bipe .09-.15 | 39.95 | 27.99 |
| RC1009 | 4-40 Biplane .35-.40 | 79.95 | 56.99 |
| RC1010 | 'Ace High' MK II Sailplane .049 | 34.95 | 22.99 |
| RC1011 | Chargemaster-Assembled | 59.95 | 47.99 |
| RC1012 | 34K62C AT2000 Charger w/Auto Trickle | 49.95 | 39.99 |
| RC1013 | 20/50MA Digipace | 109.95 | 84.99 |
| RC1014 | 50/120MA Digipace | 109.95 | 84.99 |
| RC1015 | 50/120MA Digipace w/Auto Trickle | 139.90 | 107.99 |
| RC1016 | 20/50MA Digipace w/Auto Trickle | 139.90 | 107.99 |
| RC1017 | Voltmaster-Assembled | 39.95 | 31.99 |
| RC1018 | Tachmaster II Assembled | 46.95 | 39.99 |
| | **AEROTREND** | | |
| RC1019 | Medium Fuel Tubing-3' | 1.99 | 1.69 |
| | **AIRTRONICS** | | |
| RC1020 | Sagitta 600 Sailplane | 89.95 | 58.99 |
| RC1021 | Cumic Plus Sailplane | 199.95 | 127.99 |
| RC1022 | Olympic II Sailplane | 84.95 | 53.99 |
| RC1023 | Eclipse Deluxe | 99.95 | 64.99 |
| RC1024** | 92765 6 Ch FM DC Receiver | 89.95 | 59.99 |
| RC1025** | 92785 8Ch DC Receiver FM | 129.95 | 89.99 |
| RC1026** | 92985 8 Ch PCM DC Receiver | 189.95 | 119.99 |
| RC1027** | 93110 AM Crystal Set | 19.95 | 14.99 |
| RC1028 | 94141 BB Micro Servo | 79.95 | 38.99 |
| RC1029 | 94403 Micro BB Fast Servo | 79.95 | 39.99 |
| RC1030 | 94407 Micro Servo-Elec. Helis | 69.95 | 49.99 |
| RC1031 | 94510 HD BB Fast,Servo | 89.95 | 52.99 |
| RC1032 | 94102 Precision HD Std Servo | 34.95 | 16.99 |
| RC1033 | 94732 HD BB Coreless Servo | 89.95 | 49.99 |
| RC1034 | 94831 HD BB Mini Servo | 49.95 | 24.99 |
| RC1035 | SG-1 Gyro System | 149.95 | 104.99 |
| RC1036 | SGX Gyroscope | 99.95 | 69.99 |
| RC1037 | SG-X Gyro w/Micro Servo | 119.95 | 79.99 |
| RC1038 | MA-3 Aircraft Speed Control | 79.95 | 54.99 |
| RC1039 | MA-5 Speed Control-Helicopters | 99.95 | 74.99 |
| RC1040 | MA-6 Speed Control-Airplanes | 99.95 | 74.99 |
| RC1041 | 6 in Extension Cable | 4.95 | 3.79 |
| RC1042 | Trainer Cord | 10.95 | 8.99 |
| RC1043 | Heavy Duty Super Starter | 59.95 | 39.99 |
| | **A-JUSTO-JIG** | | |
| RC1044 | Wing & Fuse Jig | 89.95 | 63.99 |
| | **A.P.C.** | | |
| RC1045 | 10 X 6 Sport Prop | 2.29 | 1.99 |
| RC1046 | 10 X 7 Sport Prop | 2.29 | 1.99 |
| RC1047 | 10 X 8 Sport Prop | 2.29 | 1.99 |
| RC1048 | 11 X 10 Pattern Prop | 7.95 | 6.99 |
| RC1049 | 12 X 8 Sport Prop | 2.89 | 2.49 |
| RC1050 | 12 X 11 Pattern Prop | 7.95 | 6.99 |
| | **AEROTECH PERFORMANCE** | | |
| RC1051 | SR40/60 Tunnel Hull White | 300.00 | 259.99 |
| RC1052 | SR40/60 Tunnel Hull Red/White | 300.00 | 259.99 |
| | **ARISTO-CRAFT** | | |
| RC1053 | Piper J3 Cub ARF .19-.25 | 109.95 | 84.99 |
| RC1054** | 550 5 Channel PCM,3 Servo | 219.95 | 99.99 |
| RC1055 | 410 Servo w/Universal Connector | 10.95 | 8.99 |
| RC1056 | 150 Amp Speed Control | 59.95 | 32.99 |
| | **ASSOCIATED** | | |
| RC1057 | RC10 Kit w/Graphite Chassis-BB | 325.00 | 174.99 |
| RC1058 | Champ RC10 Basic | 188.00 | 109.99 |
| RC1059 | Champ RC10 w/Body | 225.00 | 117.99 |
| RC1060 | Champ RC10 w/Ball Bearing & Body | 290.00 | 157.99 |
| RC1061 | Champ RC10 w/Battery & Body | 265.00 | 154.99 |
| RC1062 | RC250 .21 Club Racer II. | 99.00 | 64.99 |
| RC1063 | RC500 1/8 .21 Gas Car Kit | 475.00 | 249.99 |
| RC1064 | RC500 4WD 1/8 On-Road Kit | 625.00 | 349.99 |
| RC1065 | RC10L On Road Kit-Fiberglass | 170.00 | 94.99 |
| RC1066 | "Stealth" Transmission | 120.00 | 78.99 |
| | **ASTRO-FLIGHT** | | |
| RC1067 | Porterfield Collegiate Deluxe | 249.95 | 179.99 |
| RC1068 | 05 Cobalt Motor | 99.95 | 69.99 |
| RC1069 | 05 Cobalt Geared Motor | 129.95 | 87.99 |
| RC1070 | 40 Cobalt Geared Motor | 179.95 | 124.99 |
| RC1071 | 05 Cobalt Geared System | 179.95 | 119.99 |
| RC1072 | 7 Cell 05 Cobalt System | 149.95 | 102.99 |
| RC1073 | 205 Elect.Spd Contrl 7-28 Cell | 199.95 | 129.99 |
| RC1074 | DC/DC Constant Amp Charger | 129.95 | 71.99 |
| RC1075 | AC/DC 6-7 Cell Charger | 59.95 | 31.99 |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **ASTRO-FLIGHT (Cont'd)** | | |
| RC1076 | AC/DC Variable Charger | $79.95 | $46.99 |
| | **BADGER** | | |
| RC1077 | 150IL Paster Airbrush | 80.00 | 59.99 |
| RC1078 | 150-4PK 1L/HD Pro Air Brush | 110.00 | 74.99 |
| RC1079 | 200-3 Deluxe Airbrush Kit | 62.95 | 39.99 |
| RC1080 | 350-3 Deluxe Kit | 48.95 | 29.99 |
| RC1081 | Basic Air Brush Gift Set | 130.00 | 79.99 |
| RC1082 | 400-2 Detail Gun | 99.95 | 59.99 |
| RC1083 | 180-1 Compressor | 159.95 | 104.99 |
| RC1084 | Whirlwind II Compressor | 120.00 | 82.99 |
| | **BLUE BIRD** | | |
| RC1085 | Firebird Electric Boat w/Motor | 89.95 | 69.99 |
| | **BOLINK** | | |
| RC1086 | 1/10 1991 Sport-No Electric | 99.95 | 51.99 |
| RC1087 | 1/10 1991 Sport-Motor/Speed Control | 129.95 | 67.99 |
| | **DAVE BROWN** | | |
| RC1088 | Six Shooter Pump-Glow | 11.95 | 8.49 |
| RC1089 | Pour'N Pump System Glow | 21.95 | 15.99 |
| RC1090 | Retracts-2 Gear Main | 55.95 | 39.99 |
| RC1091 | 5 Min. Fastmatic Epoxy 10 oz | 10.95 | 8.99 |
| RC1092 | Plane Flight Simulator-Commodore | 139.95 | 109.99 |
| RC1093 | Plane Flight Simulator-Apple | 139.95 | 109.99 |
| RC1094 | Plane Flight Simulator-IBM | 152.95 | 119.99 |
| RC1095 | Heli Flight Simulator-IBM | 152.95 | 119.99 |
| RC1096 | Plane Flight Simulator-Tandy | 152.95 | 119.99 |
| RC1097 | Heli Flight Simulator-Tandy | 152.95 | 119.99 |
| | **COUGAR MOUNTAIN PRODUCTS** | | |
| RC1098 | Pro Auto Peak Converter | 34.95 | 27.99 |
| RC1099 | Accu Spec Discharger 6-7 Cell | 15.00 | 9.99 |
| | **CONCEPT MODELS** | | |
| RC1100 | 1/4 Fleet Biplane | 197.95 | 179.99 |
| RC1101 | 1/6 Electric Fleet Biplane | 99.95 | 89.99 |
| | **COMPETITION ELECTRONICS** | | |
| RC1102 | Turbocharger | 299.95 | 189.99 |
| RC1103 | Linear Turbocharger | 329.95 | 224.99 |
| RC1104 | Turbo Thirty Charger | 525.00 | 359.99 |
| RC1105 | Stock Cop Charger | 125.00 | 87.99 |
| | **COVERITE** | | |
| RC1107 | Black Baron Film White-6' | 12.99 | 6.99 |
| RC1108 | Black Baron Film Fire Red-6' | 12.99 | 6.99 |
| RC1109 | Black Baron Film Blue-6' | 12.99 | 6.99 |
| RC1110 | Black Baron Film Cub Yellow-6' | 12.99 | 6.99 |
| RC1111 | Black Baron Presto-4' Red | 7.95 | 5.49 |
| RC1112 | Super 38"x 47"-White | 9.95 | 5.99 |
| RC1113 | Super Coverite White-46"x15' | 47.15 | 24.99 |
| RC1114 | Super Shrink White-46"x15' | 47.15 | 24.99 |
| RC1115 | Pocket Thermometer | 7.50 | 5.99 |
| RC1116 | Balsarite-8 oz | 4.35 | 3.29 |
| RC1117 | Balsarite-16 oz | 7.75 | 5.29 |
| RC1118 | Black Baron Sealing Iron | 22.95 | 14.99 |
| | **COX** | | |
| RC1119 | Cessna 2 Skylane w/.049 | 209.95 | 124.99 |
| RC1120 | Fairchild F-24 ARF w/.049 | 204.95 | 119.99 |
| RC1121 | Flyboy w/1 Channel Radio | 226.99 | 129.99 |
| RC1122 | Electric Sundance ARF w/.049 | 184.95 | 109.99 |
| RC2141 | EZ Bee w/Radio ***WOW!*** | 229.95 | 99.99 |
| RC1123 | EZ Bee 2 Plane Kit w/.049 | 109.95 | 62.99 |
| RC1124 | EZ Bee 2 w/2Ch Silver Cobra Radio | 259.95 | 149.99 |
| RC1125 | Typhoon w/.049 Engine | 199.95 | 119.99 |
| RC1126 | E/Z Flyer Cessna 150 C/L .049 | 34.95 | 19.99 |
| RC1127 | Super Chipmunk C/L w/Engine | 53.95 | 39.99 |
| RC1128 | Sky Jumper Helicopter | 55.50 | 39.99 |
| RC1129 | Airwolf Freeflight Helicopter | 44.50 | 29.99 |
| RC1130 | Fokker Triplane Cntl Ln w/Eng | 37.95 | 27.99 |
| RC1131 | Dragonfly .049 R/C w/Muffler | 33.95 | 18.99 |
| RC1132 | Queen Bee .074 w/Muffler | 54.95 | 29.99 |
| RC1133 | Medallion .09 w/Throttle&Muffler | 49.95 | 32.99 |
| RC1134 | QRC .049 w/Muffler | 28.50 | 15.99 |
| RC1135 | Black Widow .049 | 26.50 | 15.99 |
| RC1136 | Tee Dee .010 | 49.95 | 28.99 |
| RC1137 | Tee Dee .049 | 42.50 | 24.99 |
| RC1138 | Tee Dee .051 | 42.50 | 24.99 |
| RC1139 | Tee Dee .09 | 49.95 | 25.99 |
| RC1140 | .049 Medallion w/Thr&Muf | 39.95 | 24.99 |
| RC1141** | Cobra Three,3Ch,2Micro,1Stick | 149.99 | 89.99 |
| RC1142 | Micro Servo | 41.50 | 29.99 |
| RC1143 | Super Power Start Kit | 11.95 | 7.99 |
| RC1144 | Power Pod | 6.50 | 5.49 |
| | **CRESSLINE** | | |
| RC1145 | Long-EZ .40-.45 | 129.00 | 109.99 |
| RC1146 | 1/4 Scale Quickee .35-.45 | 99.00 | 86.99 |
| | **CUSTOM MODEL PRODUCTS** | | |
| RC1147 | Z-Pliers | 18.95 | 14.99 |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **DAVEY SYSTEMS** | | |
| RC1148 | R/C Special | $99.95 | $59.99 |
| RC1149 | Hammer 40 .35-.45 | 99.95 | 54.99 |
| RC1150 | P-47 Thunderbolt .40-.60 | 99.95 | 59.99 |
| RC1151 | Great Lakes Special .45-.60 | 134.95 | 84.99 |
| RC1152 | Fly Baby Complete Electric | 57.95 | 34.99 |
| | **DEANS** | | |
| RC1153 | 3-Pin Deans Connector Set | 1.60 | 1.39 |
| RC1154 | 4-Pin 'Power Plug' | 1.85 | 1.49 |
| RC1155 | 2-Piece Antenna 72/75MHz | 8.95 | 7.99 |
| | **DEVCON** | | |
| RC1156 | 5 Min. Epoxy-9 oz | 11.94 | 7.99 |
| | **DREMEL** | | |
| RC1157 | 395 Deluxe Moto-Tool Only | 111.00 | 72.99 |
| RC1158 | 750 Mini Mite Cordless Tool | 48.00 | 29.99 |
| RC1159 | 850 Freewheeler Moto Tool | 77.00 | 49.99 |
| RC1160 | 8508 Freewheeler w/Charge Case | 108.00 | 64.99 |
| RC1161 | 2850 Moto-Tool Kit | 101.00 | 62.99 |
| RC1162 | 572 Deluxe Moto-Shop | 165.00 | 94.99 |
| RC1163 | 1571 Scroll Saw/Moto-Shop | 127.00 | 79.99 |
| RC1164 | 580 Table Saw | 224.00 | 129.99 |
| RC1166 | 1731 Disc-Belt Sander Deluxe | 178.00 | 114.99 |
| RC1167 | 16" Two Speed Scroll Saw | 270.00 | 179.99 |
| RC1168 | 212 Drill Press-3950 Deluxe | 53.50 | 35.99 |
| RC1169 | 219 Speed Control.Table Top | 60.00 | 41.99 |
| | **DURATRAX** | | |
| RC1170 | Bearings-Blackfoot/Beetle (10) | 29.95 | 19.99 |
| RC1171 | Bearings-Gh/Hnt/Lbx/Bw (10) | 29.95 | 19.99 |
| RC1172 | Bearing Set-Clodbuster (20) | 74.95 | 49.99 |
| RC1173 | 6-Cell 1500mAh Pack-Tamiya | 24.95 | 17.99 |
| RC1174 | 6-Cell 1500mAh Pack-Kyosho | 24.95 | 17.99 |
| RC1175 | 6-Cell 1500mAh Hump Pack-Tam | 24.95 | 17.99 |
| RC1176 | 7-Cell 1500mAh Pack-Tamiya | 29.95 | 21.99 |
| RC1177 | 7-Cell 1500mAh Hump Pack-Tamiya | 29.95 | 21.99 |
| RC1178 | 7-Cell 1500mAh Pack-Kyosho | 29.95 | 21.99 |
| RC1179 | 7-Cell 1500mAh Hump Pack-RC10 | 29.95 | 21.99 |
| RC1180 | Sanyo 1400 SCR 6-Cell-Tamiya | 49.95 | 29.99 |
| RC1181 | Sanyo 1700 SCE 6-Cell-Tamiya | 51.95 | 31.99 |
| RC1182 | Kyosho Charger-Tamiya Battery Adapter | 2.95 | 2.39 |
| RC1183 | Tamiya Charger-Kyosho Battery Adapter | 2.95 | 2.39 |
| RC1184 | 7.2 Volt Connectors-Unwired | 1.95 | 1.79 |
| RC1185 | Y-Harness Kyosho Batt-Kyosho Spd Cntrl | 4.95 | 3.99 |
| RC1186 | Blast-Off Motor Cleaner | 5.49 | 3.99 |
| RC1187 | Front Competition Shocks-3"(2) | 24.95 | 14.99 |
| RC1188 | Rear Competition Shocks-4" (2) | 24.95 | 14.99 |
| RC1189 | DTX-4 Electronic Speed Control Ful-J | 99.95 | 59.99 |
| RC1190 | DTX-4 Electronic Speed Control Airtronics | 99.95 | 59.99 |
| RC1191 | DTX-4 Electronic Speed Control Kyosho | 99.95 | 59.99 |
| RC1192 | DTX-4 Electronic Speed Control JR Propo. | 99.95 | 59.99 |
| RC1193 | Deluxe Field Bag Turquoise/Navy | 24.95 | 16.99 |
| RC1194 | Deluxe Field Bag Red/Black | 24.95 | 16.99 |
| RC1195 | Deluxe Field Bag Orange/Navy | 24.95 | 16.99 |
| RC1196 | Extra Large Field Bag Turquoise/Navy | 29.95 | 22.99 |
| RC1197 | Extra Large Field Bag Red/Black | 29.95 | 22.99 |
| RC1198 | Extra Large Field Bag Orange/Navy | 29.95 | 22.99 |
| | **DUBRO** | | |
| RC1199 | Super Smoker | 9.00 | 7.99 |
| RC1200 | Kwik-Switch Mount | 2.50 | 1.99 |
| RC1201 | E/Z Fill Fuel Pump | 12.95 | 9.99 |
| RC1202 | E/Z Fuel Pump w/Gal Container | 19.95 | 14.99 |
| RC1203 | Hand Operated Fuel Pump | 31.95 | 20.99 |
| RC1204 | Fuel Can Fittings | 2.60 | 2.29 |
| RC1205 | 4-Way Wrench | 4.25 | 3.69 |
| RC1206 | Tru-Spin Prop Balancer | 26.95 | 18.99 |
| RC1207 | Fuel Valve-Glow | 12.50 | 8.49 |
| RC1208 | 2 in Treaded Wheels (2) | 4.00 | 3.19 |
| RC1209 | 2-1/4in Treaded Wheels (2) | 4.25 | 3.59 |
| RC1210 | 2-1/2in Treaded Wheels (2) | 4.50 | 3.69 |
| RC1211 | 3 in Treaded Wheels (2). | 5.00 | 4.29 |
| RC1212 | Dura Collars 5/32in (4) | 1.10 | .89 |
| RC1213 | Flex Cable-20in | 1.90 | 1.49 |
| RC1214 | Threaded Ball Link | 1.25 | .99 |
| RC1215 | E-Z Connectors (2) | 1.10 | .89 |
| RC1216 | Large Hinges (15) | 2.90 | 2.49 |
| RC1217 | V-Tail Mixer | 6.25 | 5.49 |
| RC1218 | Kwik Stick Lead Wt-3 oz. | 2.90 | 2.49 |
| RC1219 | 10 Piece Tap & Drill Asst Standard | 19.95 | 14.99 |
| | **DUMAS** | | |
| RC1220 | Atlas Van Lines U-1 | 96.00 | 64.99 |
| RC1221 | Miller American Hydroplane | 210.00 | 124.99 |
| RC1222 | Miss Circus Circus Hydro | 235.00 | 139.99 |
| RC1223 | Hot Shot Sprint 3.5 | 85.00 | 49.99 |
| RC1224 | 38 Scarab KV-Fiberglass | 275.00 | 204.99 |



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## SPORTOBATICS

Ohio Superstar

***•Perform knife edge climbs right from take-off!***



Lightweight Sportabatics will fly any maneuver you can do–even knife edge climbs from take-off! Lite ply fuse, foam wing, and built-up balsa tail surfaces keep weight and assembly time down. Large wing, aileron, and tail surfaces provide stability and amazing lift. The 84" span Sportabatic requires a .90-1.08 2-cycle or 1.20 4-cycle engine; the 92" model can handle an ST2000-3000 or O.S. BGX-1. Both require a 4-channel radio.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2120 | Sportobatic 84" .90-1.08 | $179.95 | **$157.99** |
| RC2121 | Sportobatic 92" 1.20-2.10 | 189.95 | **167.99** |

## TOWER HOBBIES® POWER 12V STARTERS

Get R/C's best value in potent starting power with new **Tower Power 12V Starters. Deluxe** model handles engines up to 1.2 cu. in.; **Heavy Duty** model provides tremendous cranking power for high-performance engines up to 1.8 cu. in. Both feature deluxe aluminum starter cone with V-groove and rubber insert; easy-press start switch; durable metal case with bronze bushings; finger guards; and cable with battery clips already attached.



**ONLY $19.99**

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2122 | Tower Power Starter 12 Volt Deluxe | $39.95 | **$19.99** |
| RC2123 | Tower Power Starter 12 Volt Heavy Duty | 59.95 | **34.99** |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **DUMAS (Cont'd)** | | |
| RC1225 | Hot Shot IV-Wood | $85.00 | **$49.99** |
| RC1226 | Hot Shot 45-Glass | 190.00 | **142.99** |
| RC1227 | Swamp Buggy | 60.00 | **37.99** |
| RC1228 | Windy Swamp Buggy | 58.00 | **34.99** |
| RC1229 | Big Swamp Buggy | 75.00 | **44.99** |
| | **DYNAFLITE** | | |
| RC1230 | Piece O' Cake Complete .049 | 79.95 | **54.99** |
| RC1231 | Butterfly MK3 .09-.19 | 78.95 | **44.99** |
| RC1232 | Fun Scale Mustang 40 (.30-.40) | 79.95 | **43.99** |
| RC1233 | Fun Scale Mustang 60 (.40-.60) | 106.95 | **57.99** |
| RC1234 | Fun Scale Corsair .40-.50 | 99.95 | **59.99** |
| RC1235 | Fun Scale Spitfire .40 | 99.95 | **59.99** |
| RC1236 | Exhaust Diverter | 4.95 | **3.99** |
| RC1237 | Standard Hi-Start | 69.95 | **39.99** |
| RC1238 | Heavy Duty Hi-Start | 79.95 | **47.99** |
| | **ERNST** | | |
| RC1239 | Charge Receptacle-Futaba AM | 3.49 | **2.99** |
| RC1240 | Charge Receptacle-Futaba FM | 3.49 | **2.99** |
| | **EZ** | | |
| RC1241 | Cessna 25 ARF .20-.25 | 175.00 | **99.99** |
| RC1242 | Decathlon 40 ARF .40-.45 | 320.00 | **219.99** |
| RC1243 | P-51 Mustang ARF .40-.45 | 360.00 | **209.99** |
| RC1244 | Supra Retracts P-51 | 44.95 | **37.99** |
| | **FUTURE FLIGHT** | | |
| RC1245 | Klingberg Wing R/C Sailplane | 59.95 | **39.99** |
| | **FLITE LINE** | | |
| RC1246 | Skooter II .19-.40 | 45.95 | **26.99** |
| RC1247 | Scat Cat 500 .19-.40 | 49.95 | **28.99** |
| RC1248 | RTF Mach 40 Prebuilt .40 | 95.00 | **57.99** |
| | **FLITECRAFT** | | |
| RC1249 | Field General Flight Box | 39.95 | **29.99** |
| RC1250 | Runway Caddy Field Box | 35.95 | **27.99** |
| RC1251 | The Shuttle-Airplane Caddy | 27.95 | **19.99** |
| | **FLYLINE** | | |
| RC1252 | Great Lakes Trainer .15-.25 | 46.95 | **34.99** |
| | **FOURMOST** | | |
| RC1253 | Recoil Tubing | 4.50 | **3.59** |
| RC1254 | Bulkhead Fitting (2) | 2.95 | **2.29** |
| RC1255 | Demountable Hinge | 4.95 | **3.89** |
| RC1256 | Canopy Trim-Small | 2.95 | **2.29** |
| RC1257 | Canopy Trim-Large | 2.95 | **2.29** |
| RC1258 | Miter Master | 10.95 | **7.99** |
| RC1259 | Fuselage Fixture Mark II | 59.95 | **54.99** |
| | **FOX** | | |
| RC1260 | .25 RC w/MK Carb | 79.95 | **47.99** |
| RC1261 | .40 RC BB Schneurle | 175.00 | **104.99** |
| RC1262 | .40 RC BB Deluxe w/Muff-Spinnr | 119.95 | **66.99** |
| RC1263 | .40 RC Ball Bearing/Muffler | 104.95 | **56.99** |
| RC1264 | .45 RC BB Schneurle | 134.95 | **79.99** |
| RC1265 | .50 RC Ball Bearing | 144.95 | **84.99** |
| RC1266 | .60 RC Eagle 4 Ring | 169.95 | **99.99** |
| RC1267 | .74 RC Eagle 4 w/Muffler | 179.95 | **104.99** |
| RC1268 | .50 RC w/Heli Head | 134.95 | **79.99** |
| RC1269 | .74 RC w/Heli Head | 169.95 | **99.99** |
| RC1270 | .40 C/L BB Deluxe W/Muff | 109.95 | **69.99** |
| RC1271 | RC Long Glow Plug | 2.29 | **1.79** |
| RC1272 | 4-Stroke Special Glow Plug | 2.95 | **2.79** |
| RC1273 | 4-Step Prop Reamer/Standard | 8.95 | **6.99** |
| | **FUTABA** | | |
| RC1274 | Professor-ARF Electric | 209.95 | **129.99** |
| RC1275 | Professor 40 ARF .40-.45 | 189.95 | **124.99** |
| RC1276 | Acrostar 60 ARF .60 | 344.95 | **229.99** |
| RC1277** | R114H 4 Channel AM Receiver | 89.95 | **69.99** |
| RC1278** | MCR-4A 4 Ch Rx/Speed Control | 159.95 | **109.99** |
| RC1279** | R4F 4 Channel AM Receiver | 84.95 | **59.99** |
| RC1280** | R105IP 5 Channel PCM Receiver | 189.95 | **139.99** |
| RC1281** | R127DP 7 Channel PCM Receiver | 229.95 | **169.99** |
| RC1282** | R128DF 8 Channel FM Receiver | 179.95 | **129.99** |
| RC1283** | R128DP 8 Channel PCM Receiver | 249.95 | **179.99** |
| RC1284** | R129DP 9 Channel PCM Receiver | 259.95 | **199.99** |
| RC1285** | FM Crystal Set | 28.50 | **19.99** |
| RC1286** | AM Crystal Set | 17.00 | **13.99** |
| RC1287 | G152 Gyro Stabilizer-J,FM | 129.95 | **89.99** |
| RC1288 | G153BB Gyroscope-BB,J,FM | 149.95 | **99.99** |
| RC1289 | G154 Gyro/Single Axis J,FM | 89.95 | **64.99** |
| RC1290 | MC11B Speed Cntrl/Rv7.2-8.4V,G | 109.95 | **74.99** |
| RC1291 | MC111B Speed Cont/Rv/7.2-8.4,J | 109.95 | **76.99** |
| RC1292 | MC12B Speed Control/Rev-7.2-8.4V,G | 79.95 | **59.99** |
| RC1293 | MC112B Speed Control/Rev-7.2-8.4V,J | 79.95 | **53.99** |
| RC1294 | MC116 Comp.Speedd Control 6-9.6V,J | 159.95 | **119.99** |
| RC1295 | RX NiCd-4.8V 250Ma/Fl-J | 19.95 | **16.99** |
| RC1296 | NR4J RX NiCd-FM 4.8V 500 mAh,J | 19.95 | **16.99** |
| RC1297 | NT8H 9.6V TX NiCd J/G/PCM | 36.95 | **29.99** |
| RC1298 | FPC-8M Connector-Male,J,FM | 4.00 | **3.69** |
| RC1299 | Aileron Extension,G | 6.75 | **5.99** |
| RC1300 | Aileron Extension-J,FM | 6.75 | **5.99** |
| RC1301 | Aileron Extension-J | 7.25 | **6.19** |
| RC1302 | Dual Servo Extension-J,FM | 13.00 | **11.49** |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **FUTABA (Cont'd)** | | |
| RC1303 | Servo Adapter/Std/J,FM | $6.00 | **$4.99** |
| RC1304 | Receiver Charge Cord-J,FM | 6.75 | **5.99** |
| RC1305 | Switch Harness, SWH1-G | 9.50 | **7.99** |
| RC1306 | Switch Harness-J,FM | 10.00 | **8.49** |
| RC1307 | Trainer Cord-FM Black | 14.95 | **12.99** |
| RC1308 | Tachotimer | 89.95 | **59.99** |
| | **FIVE STAR** | | |
| RC1309 | 5500 AC/DC 4-8 Cell Charger | 69.95 | **44.99** |
| RC1310 | 5501 AC/DC 6-7 Cell Charger | 59.95 | **39.99** |
| RC1311 | 5555 AC/DC 4-8 Cell Digital Charger | 109.49 | **64.99** |
| | **GEE BEE** | | |
| RC1312 | Sea Hawk Seaplane .20-.40 | 67.25 | **39.99** |
| RC1313 | Tiger Moth Biplane .25-.35 | 67.25 | **44.99** |
| RC1314 | Dreamer Biplane .40-.45 | 67.25 | **39.99** |
| RC1315 | Floats-28" | 32.00 | **21.99** |
| | **GM PRECISION** | | |
| RC1316 | Thermal Charger Sailplane | 69.95 | **46.99** |
| | **GOLDBERG MODELS** | | |
| RC1318 | Super-Tote Field Box | 44.99 | **23.99** |
| RC1319 | Pro-Tote Field Box | 49.95 | **29.99** |
| RC1320 | Power Pod | 44.99 | **27.99** |
| RC1321 | Float Kit for J-3 Cub | 59.99 | **32.99** |
| RC1322 | Retract Twin-Gear | 29.99 | **19.99** |
| RC1323 | Spinner-White 2in | 3.59 | **2.99** |
| RC1324 | Spinner-White 2.25in | 3.99 | **3.39** |
| RC1325 | Spinner-White 2.5in | 4.49 | **3.59** |
| RC1326 | Foam Rubber-1/4in | 2.99 | **1.99** |
| RC1327 | Foam Rubber-1/2in | 3.99 | **2.59** |
| RC1328 | Hinge Slotting Kit | 4.99 | **3.99** |
| RC1329 | Super Jet Glue-2 oz | 9.99 | **5.99** |
| RC1330 | Super Jet Glue-4 oz | 17.99 | **10.99** |
| RC1331 | Jet-2 oz | 9.99 | **5.99** |
| RC1332 | Slow Jet-2 oz | 9.99 | **5.99** |
| RC1333 | Model Magic Filler-8 oz | 5.99 | **4.99** |
| | **GREAT PLANES** | | |
| RC1334 | Trainer Twenty .15-.25 | 69.95 | **49.99** |
| RC1335 | Trainer Forty .25-.45 | 84.95 | **62.99** |
| RC1336 | Trainer Sixty .45-.61 | 109.95 | **74.99** |
| RC1337 | Big Stik 20 .19-.28 | 69.95 | **49.99** |
| RC1338 | Big Stik 40 .35-.46 | 84.95 | **59.99** |
| RC1339 | Big Stik 60 .50-.61 | 104.95 | **74.99** |
| RC1340 | Electricub-Standard | 59.95 | **43.99** |
| RC1341 | Electricub-Deluxe | 79.95 | **59.99** |
| RC1342 | Cherokee 40 .35-.40 | 109.95 | **74.99** |
| RC1343 | Super Sportster 20 .20-.40 | 69.95 | **51.99** |
| RC1344 | Super Sportster 40 .40-.60 | 89.95 | **64.99** |
| RC1345 | Super Sportster 60 .60-.90 | 109.95 | **79.99** |
| RC1346 | Super Sportster 90/120 .90-1.20 | 139.95 | **99.99** |
| RC1347 | Cap 21 .40-.45 | 109.95 | **79.99** |
| RC1348 | Cap 21 .60 | 179.95 | **129.99** |
| RC1349 | Aerocomander Shrike-Glass.40 (Req.2 Eng) | 309.95 | **244.99** |
| RC1350 | T-28D Glass .60-.90 | 329.95 | **262.99** |
| RC1351 | Cosmic Wind-Glass .60-.90 | 249.95 | **196.99** |
| RC1352 | Electro-Streak w/Motor | 79.95 | **56.99** |
| RC1353 | Tiporare .60 | 219.95 | **174.99** |
| RC1354 | Illusion .60 | 249.95 | **194.99** |
| RC1355 | Super Aeromaster .45-.61 | 134.95 | **99.99** |
| RC1356 | Super Sportster Bipe 40 .35-.45 | 109.95 | **81.99** |
| RC1357 | Spirit 2-Meter Sailplane | 49.95 | **34.99** |
| RC1358 | Spectra 2-Meter Electric Sailplane | 79.95 | **57.99** |
| RC1359 | Wildcat Electric Boat w/2 Motors | 149.95 | **99.99** |
| RC1360 | Stinger Electric Boat w/2 Motors | 169.95 | **99.99** |
| RC1361 | Engine Mount-.40 | 3.80 | **3.39** |
| RC1362 | Wing Jig Kit | 24.95 | **18.99** |
| | **GUILLOW** | | |
| RC1363 | B-24D Liberator | 48.00 | **32.99** |
| RC1364 | Aeronca RC Electric Kit | 99.00 | **49.99** |
| | **HOBBICO** | | |
| RC1365 | Wing Kit-Sturdy Birdy | 17 95 | **13.99** |
| RC1366 | Wing Kit-Sturdy Birdy II | 29.95 | **23.99** |
| RC1367 | 900 AC/DC Auto-Charger | 39.95 | **27.99** |
| RC1368 | 905 AC/DC Multi-Charger | 57.95 | **37.99** |
| RC1369 | 910 Vari-Rate AC/DC Multi-Charger | 64.95 | **45.99** |
| RC1370 | 920 AC/DC Digital Multi-Charger | 94.95 | **64.99** |
| RC1371 | Banana Plugs (3 Pr.) | 3.95 | **2.99** |
| RC1372 | Exhaust Deflector (.20-.34) | 3.95 | **3.49** |
| RC1373 | Exhaust Deflector (.35-.90) | 3.95 | **3.49** |
| RC1374 | Torqmaster 90 Dix 12 V Starter | 49.95 | **27.99** |
| RC1375 | Torqmaster 180 HD 12 V Starter | 64.95 | **39.99** |
| RC1376 | Ultra-Tote Field Box | 29.95 | **19.99** |
| RC1377 | Balsa Scrap Box | 14.95 | **8.99** |
| RC1378 | Parts Box 11X7X2 18 Compartments | 5.50 | **4.59** |
| RC1379 | Parts Box 13X9X2 24 Compartments | 8.75 | **7.29** |
| RC1380 | Bullet Debonder 2 oz. | 4.49 | **3.49** |
| RC1381 | Bullet Activator 2 oz. | 4.69 | **2.99** |
| RC1382 | Bullet Activator 8 oz. Refill | 7.99 | **6.99** |
| RC1383 | Bullet Thread Locker 6 ml. | 3.95 | **2.79** |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **HELIMAX** | | |
| RC1384 | .30 Size Blade Holder | $3.95 | **$3.69** |
| RC1385 | .60 Size Blade Holder | 4.95 | **4.69** |
| RC1386 | .30-.40 Size Floats | 19.95 | **16.99** |
| RC1387 | .50-.60 Size Floats | 29.95 | **23.99** |
| RC1388 | Concept 30 Muffler-O.S. | 34.95 | **24.99** |
| RC1389 | Concept 30 Muffler-Super Tigre | 34.95 | **24.99** |
| RC1390 | Concept 30 Tuned Pipe-O.S. | 49.95 | **37.99** |
| RC1391 | Concept 30 Tuned Pipe-Super Tigre | 49.95 | **37.99** |
| RC1392 | Kevlar Main Blades-30 Size | 89.95 | **54.99** |
| RC1393 | Heliport | 99.95 | **69.99** |
| | **HOT STUFF** | | |
| RC1394 | UFO CA Thin 20 Grams | 7.95 | **4.99** |
| RC1395 | UFO CA Thin 50 Grams | 17.95 | **9.99** |
| RC1396 | UFO CA Thick 20 Grams | 7.95 | **4.99** |
| RC1397 | UFO CA Thick 50 Grams | 17.95 | **9.99** |
| RC1398 | Hot Stuff 2 oz | 9.95 | **5.99** |
| RC1399 | Super T 2 oz | 9.95 | **5.99** |
| RC1400 | Super T 4 oz | 18.95 | **10.99** |
| | **HOUSE OF BALSA** | | |
| RC1401 | T-6 Texan .15-.19 | 49.95 | **29.99** |
| RC1402 | P51D Mustang .19-.21 | 49.95 | **29.99** |
| RC1403 | Two Tee Sailplane | 39.95 | **22.99** |
| RC1404 | 2x4 Sailplane | 26.95 | **16.99** |
| | **HYPERDRIVE** | | |
| RC1405 | Hyper 10 Competition On-Road Kit | 449.95 | **249.99** |
| | **IRVINE ENGINES** | | |
| RC1406 | .20 RC BB Schnuerle w/Muffler | 109.95 | **74.99** |
| RC1407 | .20 RC BB ABC Schnuerle w/Muff | 119.95 | **74.99** |
| RC1408 | .25 RC BB Schnuerle w/Muffler | 119.95 | **74.99** |
| RC1409 | .40 RC BB Schnuerle w/Muffler | 139.95 | **89.99** |
| RC1410 | .46 RC BB Schnuerle w/Muffler | 149.95 | **104.99** |
| RC1411 | .46 RC ABC BB Schnuerle w/Muffler | 169.95 | **106.99** |
| RC1412 | .61 RC BB Schnuerle w/Muffler | 189.95 | **119.99** |
| RC1413 | .61 RC ABC BB Schnuerle w/Muff | 199.95 | **119.99** |
| RC1414 | .40 RC BB ABC Schnuerle Marine | 179.95 | **114.99** |
| RC1415 | Mills .75CC Diesel Engine | 99.95 | **64.99** |
| | **JET HANGAR HOBBIES** | | |
| RC1416 | Corsair II ZTV A-7D/E | 340.00 | **289.99** |
| | **K & B** | | |
| RC1417 | .20 RC Sportster/Muffler | 74.00 | **41.99** |
| RC1418 | .28 RC Sportster w/Muffler | 78.00 | **43.99** |
| RC1419 | .40 RC w/Muffler | 120.00 | **65.99** |
| RC1420 | .45 RC Sportster w/Muffler | 99.00 | **52.99** |
| RC1421 | .61 RC w/Muffler | 148.00 | **79.99** |
| RC1422 | .65 RC Sportster w/Muffler | 115.00 | **64.99** |
| RC1423 | .67 RC ABC Schnuerle Marine | 310.00 | **199.99** |
| RC1424 | .21 RC Outboard | 178.00 | **94.99** |
| RC1425 | .45 ABC BB Outboard | 236.00 | **129.99** |
| RC1426 | .67 ABC BB Outboard | 315.00 | **189.99** |
| RC1427 | .82 Ducted Fan F/Cooks&Jet Hng | 325.00 | **224.99** |
| RC1428 | .82 Ducted Fan F/Byrons Fans | 335.00 | **229.99** |
| RC1429 | Polyester Resin-Quart | 12.90 | **9.99** |
| RC1430 | Fiberglass Cloth Light 3/4oz | 6.50 | **4.99** |
| RC1431 | Fiberglass Cloth Medium 2oz | 6.00 | **4.79** |
| RC1432 | Fiberglass Cloth Heavy 6oz | 5.75 | **4.99** |
| | **K & S** | | |
| RC1433 | Long Nose Plier | 4.95 | **3.99** |
| RC1434 | Wire Cutter | 4.95 | **3.99** |
| RC1435 | Round Nose Plier | 4.95 | **3.99** |
| RC1436 | 12 Volt Field Iron | 5.95 | **4.99** |
| | **KYOSHO** | | |
| RC1437 | Soarus Electric ARF Sailplane | 209.95 | **159.99** |
| RC1438 | Soarus II Electric ARF w/Ailerons | 269.95 | **179.99** |
| RC1439 | Melody 1500 ARF Sailplane | 149.95 | **109.99** |
| RC1440 | Reflex ARF Elec Pylon Racer | 219.95 | **159.89** |
| RC1441 | EP Freeflight-Red Hawk | 27.95 | **19.99** |
| RC1442 | EP Freeflight-Yellow Hawk | 27.95 | **19.99** |
| RC1443 | EP Freeflight-White Star | 27.95 | **19.99** |
| RC1444 | EP Freeflight-Yellow Star | 27.95 | **19.99** |
| RC1445 | Propeller Set-Etude,Duet (2) | 5.80 | **3.99** |
| RC1446 | Fairwind ARF Sailboat | 249.95 | **179.99** |
| RC1447 | Riviera ARF Sailboat | 124.95 | **94.99** |
| RC1448 | Hurricane Twin Electric Boat | 229.95 | **179.99** |
| RC1449 | Jet Stream Boat Electric | 194.95 | **149.89** |
| RC1450 | Jet Stream Boat w/O.S. .10 | 319.95 | **239.99** |
| RC1451 | Lazer ZX 4WD Electric 1/10 | 339.95 | **249.99** |
| RC1452 | Sling Shot 4WD Dirt Oval 1/10 | 339.95 | **99.99** |
| RC1453 | Optima Mid 4WD Electric 1/10 | 289.95 | **199.99** |
| RC1454 | Porsche 962 GPC Electric 1/10 | 219.95 | **159.99** |
| RC1455 | McLaren-Honda F1 Electric 1/10 | 219.95 | **159.99** |
| RC1456 | Penske PC-19 Electric 1/10 | 219.95 | **159.99** |
| RC1457 | Lamborghini Countach Electric 1/10 | 219.95 | **159.99** |
| RC1458 | Ferrari Testarossa Electric 1/10 | 219.95 | **159.99** |
| RC1459 | ZR-1 Corvette Electric 1/10 | 219.95 | **159.99** |
| RC1460 | Nissan R89C Electric 1/10 | 219.95 | **159.99** |
| RC1461 | Toyota R89C Electric 1/10 | 219.95 | **159.99** |
| RC1462 | Ferrari F40 Electric 1/10 | 219.95 | **159.99** |
| RC1463 | Porsche 911 Turbo Electric 1/10 | 219.95 | **159.99** |
| RC1464 | Nissan 300ZX Electric 1/10 | 219.95 | **159.99** |

# Tower Hobbies: The World's Largest Hobby Shop

## HEADMASTER SPORT 40

NEW!



Designed by Ken Willard, the Top Flite Headmaster Sport 40 is a classic trainer: easy to build, stable and forgiving to fly, and easy to bring in for slow speed landings. Die-cut balsa parts add lightweight strength; generous hardware, instructions, and full-size rolled plans simplify and speed assembly. Add a .40-.60 engine and a 4-channel radio, and you've got the ideal craft for Sunday flying and beginniner's aerobatics!

**Retail $101.95** **Tower Price $59.99**
**RC2124**

## HOBBICO® BULLET CA GLUES



**Hobbico Bullet** cyanoacrylate adhesive works equally well on balsa and plastics. **Bullet CA** is thin and sets instantly. **Bullet CA+** is thicker and sets in 10-15 seconds. Super-thick **Bullet CA-** sets in 1-2 minutes.

| Stock# | Description | Retail | Tower |
|---|---|---|---|
| RC2125 | Hobbico Bullet CA Glue 2oz. | $8.49 | $5.99 |
| RM0302 | * 3 Bullet CA Glue 2 oz | 25.47 | 14.99 |
| RC2126 | Hobbico Bullet CA+ Glue 2oz. | 8.49 | 5.99 |
| RM0303 | * 3 Bullet CA+ Glue 2 oz | 25.47 | 14.99 |
| RC2127 | Hobbico Bullet CA- Glue 2oz. | 8.59 | 5.99 |
| RM0304 | * 3 Bullet CA- Glue 2 oz | 25.77 | 14.99 |

## HOBBICO® MECHANICAL 90° ROTATING RETRACTS



Priced dollars less than the competition, these handy aluminum and nylon retracts enhance scale realism affordably. Fit most .60-size models, and ideal for Hobbico's P-40E Warhawk and Super Chipmunk 40 ARFs!

**Retail $44.95** **Tower Price $29.99**
**RC2128**

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **KYOSHO (Cont'd)** | | |
| RC1465 | Ferrari F1 Electric 1/10 | $219.95 | $159.99 |
| RC1466 | Sideways 2WD Sprint Car 1/10 | 219.95 | 109.99 |
| RC1467 | Ultima II 2WD Electric 1/10 | 199.95 | 129.99 |
| RC1468 | Ultima Pro XL Electric 1/10 | 269.95 | 169.99 |
| RC1469 | Raider 2WD Electric 1/10 | 119.95 | 79.99 |
| RC1470 | Raider ARR w/Painted Body | 139.95 | 94.99 |
| RC1471 | Turbo Raider 2WD Electric 1/10 | 149.95 | 109.99 |
| RC1472 | Turbo Ultima II 2WD Electric 1/10 | 279.95 | 169.99 |
| RC1473 | Outlaw Ultima Truck Electric 1/10 | 229.95 | 164.99 |
| RC1474 | Big Brute 2WD Electric 1/10 | 169.95 | 99.99 |
| RC1475 | Big Boss 2WD Electric 1/10 | 179.95 | 119.99 |
| RC1476 | Hi-Rider Vette 2WD Electric 1/10 | 179.95 | 99.99 |
| RC1477 | Double Dare 4WD/4WS Electric 1/10 | 234.95 | 169.99 |
| RC1478 | USA-1 4WD/4WS Mnstr Trk Elec 1/10 | 319.95 | 239.99 |
| RC1479 | Blizzard Electric Snow Cat | 249.95 | 189.99 |
| RC1480 | Honda NSR500 Motorcycle 1/8 | 114.95 | 69.99 |
| RC1481 | Yamaha YZR500 Motorcycle 1/8 | 114.95 | 79.99 |
| RC1482 | Rocky 4WD Electric 1/10 | 199.95 | 129.99 |
| RC1483 | Nitro Brute w/.12 CZII 1/10 | 329.95 | 229.99 |
| RC1484 | Stinger MKII 4WD Gas 1/10 | 299.95 | 219.99 |
| RC1485 | ZR1 Corvette w/.12 CZR 1/10 | 359.95 | 269.99 |
| RC1486 | Rampage 2WD w/.12 CZR 1/10 | 359.95 | 269.99 |
| RC1487 | Outlaw Rampage Truck w/.12CZR 1/10 | 399.95 | 289.99 |
| RC1488 | Burns DX .21 4WD Gas 1/8 | 379.95 | 279.99 |
| RC1489 | Turbo Burns .21 4WD Gas 1/8 | 649.95 | 499.89 |
| RC1490 | BMT 891 .21 On Road 4WD 1/8 | 669.95 | 549.89 |
| RC1491 | 6 Cell 1400mAh Power Pack/Kyosho | 28.95 | 15.99 |
| RC1492 | 7 Cell 1400mAh Power Pack/Kyosho | 35.95 | 23.99 |
| RC1493 | 7 Cell 1200mAh Hump Pack/Tamiya | 35.95 | 23.99 |
| RC1494 | 6 Cell 1400mAh Power Pack/Tamiya | 28.95 | 15.99 |
| RC1495 | 7 Cell 1400mAh Power Pack/Tamiya | 35.95 | 23.99 |
| RC1496 | 6 Cell 1200mAh Sprint SCR-Kyosho | 44.95 | 33.99 |
| RC1497 | 6 Cell 1700mAh Speed SCE-Kyosho | 44.95 | 33.99 |
| RC1498 | 7 Cell 1700mAh Speed SCE-Kyosho | 52.95 | 38.99 |
| RC1499 | 6 Cell 1700mAh Speed SCE-Tamiya | 44.95 | 33.99 |
| RC1500 | 7 Cell 1700mAh Speed SCE-Tamiay | 52.95 | 38.99 |
| RC1501 | Fog Lights-Big Brute,Nit.Brute | 19.95 | 15.99 |
| RC1502 | Car Aids Screw & Nut Set | 15.70 | 9.99 |
| RC1503 | Shock Oil Set (L-M-H) | 12.80 | 9.99 |
| RC1504 | Gold Shocks-Short 3" (2) | 34.95 | 24.99 |
| RC1505 | Gold Shocks-Long 4" (2) | 34.95 | 24.99 |
| RC1506 | Platinum Shocks-Short 3" (2) | 39.95 | 29.99 |
| RC1507 | Platinum Shocks-Long 4" (2) | 39.95 | 29.99 |
| RC1508 | HD Speed Control MKII U2DDUS | 19.95 | 16.99 |
| RC1509 | HD Speed Control MKII SWUTF1 | 19.95 | 16.99 |
| RC1510 | Jet Ranger Fuse Kit | 179.95 | 149.99 |
| RC1511 | Hughes 500 Fuse Kit | 159.95 | 129.99 |
| RC1512 | Hughes 300 Fuse | 74.95 | 59.99 |
| RC1513 | Pulsar Fiberglass Fuse | 339.95 | 259.99 |
| RC1514 | Feathering Shaft Set | 14.95 | 11.99 |
| RC1515 | Linkage Set (A) | 11.95 | 9.99 |
| RC1516 | Stabilizer Bar (2) | 9.95 | 6.99 |
| RC1517 | Pro Main Blades II | 36.95 | 26.49 |
| RC1518 | Main Gear | 7.95 | 5.79 |
| RC1519 | Starter Cone Set | 11.95 | 8.99 |
| RC1520 | Clutch 1-Piece | 34.95 | 24.99 |
| RC1522 | 3-Pack DX Shaft Guides | 9.95 | 6.99 |
| RC1523 | Tail Rotor Blade Set | 7.95 | 5.99 |
| RC1524 | Tail Drive Shaft (2) | 7.95 | 5.99 |
| RC1525 | Tail Boom | 10.95 | 7.99 |
| RC1526 | Skid Set | 20.95 | 16.99 |
| RC1527 | Feathering Shafts (2) | 7.55 | 5.99 |
| RC1528 | Black Tail Boom | 15.95 | 12.99 |
| RC1529 | 2-Blade Sets +1 Case | 69.95 | 49.99 |
| RC1530 | Expert Blades Weighted | 42.95 | 31.99 |
| RC1531 | Sport Main Blade-Weighted | 19.95 | 15.99 |
| RC1532 | Aluminum Start Cone | 14.95 | 9.99 |
| RC1533 | Recoil Starter | 39.95 | 31.99 |
| RC1534 | Clutch Bearings (2) | 24.95 | 17.99 |
| RC1535 | Scale Fuse Muffler | 49.95 | 37.99 |
| RC1536 | Main Mast-Titanium | 28.95 | 21.99 |
| RC1537 | Blade Balancer | 38.95 | 29.99 |
| RC1538 | DX To SE Upgrade Kit | 109.95 | 79.99 |
| RC1539 | Carbon Tail Boom | 69.95 | 49.99 |
| RC1540 | Main Rotor Blade (2) EP Concept | 22.55 | 17.99 |
| RC1541 | LeMans 600E Electric Motor | 29.95 | 17.99 |
| RC1542 | LeMans 360ST Electric Motor | 27.95 | 17.99 |
| RC1543 | LeMans Stock 05 Electric Mtr | 22.95 | 13.99 |
| RC1544 | LeMans 240ST Electric Motor | 27.95 | 17.99 |
| RC1545 | Super Stock 34 Degree Motor | 27.95 | 9.99 |
| RC1546 | Mega 12X2 Paved Oval Motor | 42.95 | 27.99 |
| RC1547 | Mega 14X2 Dirt Oval Motor | 42.95 | 27.99 |
| RC1548 | Mega 16X2 4WD Off-Road Motor | 42.95 | 27.99 |
| RC1549 | Mega 18X2 2WD Off-Road Motor | 42.95 | 27.99 |
| RC1550 | Mega 20X2 On Road Motor | 42.95 | 27.99 |
| RC1551 | Mega 22X1 Outlaw Stock Motor | 29.95 | 17.99 |
| RC1552 | Mega 360 Monster Truck Motor | 29.95 | 17.99 |
| RC1553 | LeMans Gold 2WD Precision Mtr | 79.95 | 49.99 |
| RC1554** | Impulse II 2 Channel/2 Stick | 82.95 | 49.99 |
| RC1555** | Impulse II 2 Channel w/RS Set | 109.95 | 79.99 |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **KYOSHO (Cont'd)** | | |
| RC1556** | RS Set for Cycles | $69.95 | $53.99 |
| RC1557** | KR-2MB 2-Channel BEC Receiver | 39.95 | 24.99 |
| RC1558** | 5 Channel PCM Receiver | 69.95 | 59.99 |
| RC1559** | 7 Channel FM Receiver | 51.95 | 44.99 |
| RC1560 | KS-91 Servo | 27.95 | 19.99 |
| RC1561 | KS-100 Standard Servo | 27.95 | 19.99 |
| RC1562 | KS-10 Micro Servo-Futaba J | 69.95 | 39.99 |
| RC1563 | KS-31A Mini Servo-Airtronics | 39.95 | 19.99 |
| RC1564 | Auto CutOff On/Off-Futaba J | 52.95 | 38.99 |
| RC1565 | Auto CutOff On/Off-Airtronics | 52.95 | 38.99 |
| RC1566 | DC Multi-Charger II | 39.95 | 27.99 |
| RC1567 | FET Peak Charger | 139.95 | 79.99 |
| RC1568 | 6 Cell DC Power Quick Charger | 24.95 | 14.99 |
| RC1569 | Quick Charger 7.2V-270mAh | 24.95 | 17.99 |
| RC1570 | Standard Field Bag | 19.95 | 14.89 |
| RC1571 | Extra Large Field Bag | 24.95 | 17.99 |
| RC1572 | Lexan Scissors w/Sander | 13.95 | 10.89 |
| | **LANIER** | | |
| RC1573 | P-51 ARF .45-.60 | 124.95 | 64.99 |
| RC1574 | Dart ARF .40-.60 | 124.95 | 64.99 |
| RC1575 | Rebel Bipe ARF .45-.60 | 249.95 | 124.99 |
| RC1576 | Laser .45-.60 | 189.95 | 94.99 |
| RC1577 | Sea Bird ARF .40-.60 | 229.95 | 99.99 |
| | **LEISURE** | | |
| RC1578 | Playboy Old-Timer | 55.00 | 39.99 |
| RC1579 | Sanyo 800mAh 7 Cell Batt-Wired | 38.00 | 29.99 |
| RC1580 | LT50 Geared Flt System | 100.00 | 66.99 |
| RC1581 | 2.5/1 7C Flight System | 80.00 | 52.99 |
| RC1582 | 105 Charger-6 Cell | 38.00 | 26.99 |
| RC1583 | 107 AC/DC Auto Charger 6-7 Cell | 60.00 | 39.99 |
| | **ELDON J. LIND** | | |
| RC1584 | Master Magic Magnet Builder | 168.95 | 99.99 |
| | **LOSI** | | |
| RC1585 | JRX PRO 1/10 Off-Road Kit | 309.95 | 169.99 |
| RC1586 | Junior Two Off-Road kit | 199.95 | 119.99 |
| RC1587 | JR-XT Truck Kit-No Electrics | 339.95 | 182.99 |
| | **LIGHTNING RC** | | |
| RC1588 | Marinecraft Workstation | 49.00 | 39.99 |
| RC1589 | Aircraft Workstation | 49.00 | 39.99 |
| | **MACS** | | |
| RC1590 | Exhaust Diverter 5/8" | 5.99 | 4.99 |
| RC1591 | Exhaust Diverter 9/16" | 5.99 | 4.99 |
| RC1592 | Exhaust Diverter 1/2" | 5.99 | 4.99 |
| RC1593 | Exhaust Diverter 7/16" | 5.99 | 4.99 |
| | **MASTER AIRSCREW** | | |
| RC1594 | 10X6 Wood Propeller | 2.25 | 1.68 |
| RC1595 | 9x6 Nylon Propeller | 1.55 | 1.16 |
| RC1596 | 10x6 Nylon Propeller | 1.75 | 1.31 |
| RC1597 | 10x7 Nylon Propeller | 1.75 | 1.31 |
| RC1598 | 11x6 Nylon Propeller | 1.95 | 1.46 |
| RC1599 | Balsa Razor Plane | 4.95 | 3.99 |
| | **BOB MARTIN** | | |
| RC1600 | Bobcat Sailplane | 39.95 | 24.99 |
| RC1601 | Coyote Sailplane | 104.95 | 64.99 |
| RC1602 | SR-7 Sailplane | 114.95 | 79.99 |
| | **MCCOY** | | |
| RC1603 | 4-Cycle Glow Plugs (6) | 12.49 | .99 |
| RC1604 | Racing Glow Plugs (6) | 13.75 | 9.99 |
| | **MC DANIEL** | | |
| RC1605 | NI-Starter w/Charger | 29.95 | 16.99 |
| RC1606 | NI-Starter w/Meter & Charger | 34.95 | 19.99 |
| | **MILLER** | | |
| RC1607 | 2017 Spray Set | 119.95 | 73.99 |
| RC1608 | 2134 Spray Set w/3 Spray Guns | 139.95 | 77.99 |
| | **MIGHTY-LITE** | | |
| RC1609 | 1/8X6X12 Mighty-Lite Plywood-6 | 15.60 | 9.99 |
| RC1610 | 1/8X12X24 Mighty-Lite Plywd-6 | 49.50 | 32.99 |
| RC1611 | 1/8X12X48 Mighty-Lite Plywd-3 | 46.50 | 29.99 |
| | **MILT VIDEO** | | |
| RC1612 | VHS "How To" Video: PT40 | 19.95 | 16.99 |
| RC1613 | VHS 'Basic Flight' Video | 17.95 | 15.99 |
| RC1614 | VHS 'How To' Video: RC Helis | 29.95 | 24.99 |
| RC1615 | VHS Advance Heli Flight Course | 34.95 | 27.99 |
| | **MIDWAY MODEL** | | |
| RC1616 | Powerhouse .09-.15 | 44.95 | 29.99 |
| | **MRC** | | |
| RC1617 | 1/10 Electric Blackfoot 2WD | 144.95 | 99.99 |
| RC1618 | 1/10 Electric 4WD/4WS Clodbstr | 357.95 | 239.99 |
| RC1619 | 1/10 Electric Mud Blaster 2WD | 184.95 | 99.99 |
| RC1620 | 1/10 Astute 2WD | 219.99 | 149.99 |
| RC1621 | 1/10 Nissan King Cab 2WD | 259.99 | 172.99 |
| | **MRP** | | |
| RC1622 | Fountain Superboat | 189.95 | 109.99 |
| RC1623 | Bud Light Tunnel Hull | 209.95 | 124.99 |
| RC1624 | Miss Budweiser Deluxe | 264.95 | 139.99 |
| RC1625 | Miss Budweiser RTR w/Radio | 419.95 | 249.99 |
| RC1626 | Skater Outboard Deluxe | 299.95 | 179.99 |
| RC1627 | Gentry Eagle RTR w/Radio | 399.95 | 239.99 |

| Stock # | | Retail | Tower |
|---|---|---|---|
| | **NOVAK** | | |
| RC1630 | NESCT4 Econ Spd Ctr w/LED-FutG | $115.00 | $64.99 |
| RC1631 | NESCT4 Econ Spd Ctrl w/LED-Unv | 115.00 | 64.99 |
| RC1632 | 828-HV IX Hi-Voltage ESC-All | 199.95 | 124.99 |
| RC1633 | 410-M1C Hi-Freq Speed Control | 175.00 | 99.99 |
| RC1634 | 410-MXC Hi-Freq Speed Control | 200.00 | 117.99 |
| RC1635 | NEC2 Peak Charger w/Trickle | 89.95 | 55.99 |
| | **O.S. ENGINES** | | |
| RC1636 | O.S. Ryan RTF w/O.S.40FP | 399.95 | 229.99 |
| RC1637 | O.S. Laser w/25 SF Engine | 349.95 | 224.99 |
| RC1638 | .32 F ABC RC w/Muffler | 184.95 | 114.99 |
| RC1639 | .61 RF ABC RC LS w/Pump | 379.95 | 242.99 |
| RC1640 | .30 Wankel Rotary w/Muffler | 329.95 | 199.99 |
| RC1641 | .40 FP-S ABC C/L w/Muffler | 99.95 | 59.99 |
| RC1642 | .20 FP-M RC Marine w/Muffler | 114.95 | 69.99 |
| RC1643 | .25 VF-DF ABC Ducted Fan | 179.95 | 114.99 |
| RC1644 | .46 VR-DF ABC Ducted Fan | 279.95 | 174.99 |
| RC1645 | .65 VR-DF ABC RC | 399.95 | 249.99 |
| RC1646 | .91 VR-DF RC | 429.95 | 289.99 |
| RC1647 | .91 VR-DF RC Small Head | 419.95 | 282.99 |
| RC1648 | .32 F-H RC Helicopter | 209.95 | 124.99 |
| RC1649 | .32 F-HS RC Heli w/Cone | 249.95 | 144.99 |
| RC1650 | .46 SF-H RC Helicopter | 214.95 | 134.99 |
| RC1651 | .50 FSR-H RC | 224.95 | 149.99 |
| RC1652 | .61 SFN-H Heli Eng. w/6B Carb | 289.95 | 174.99 |
| RC1653 | .61 SFN-H ABC Heli w/6B Carb | 299.95 | 184.99 |
| RC1654 | .61 RFN-H ABC RC Engine | 299.95 | 184.99 |
| RC1655 | .12 CZ-2 ABC RC Buggy Engine | 129.95 | 82.99 |
| RC1656 | .12 CZ-R ABC RC Buggy Engine | 134.95 | 84.99 |
| RC1657 | .21 SE-B ABC RC Buggy Engine | 199.95 | 124.99 |
| RC1658 | .21 RF-B ABC RC Buggy Engine | 199.95 | 124.99 |
| RC1659 | .21 SE-R ABC RC Car Engine | 199.95 | 124.99 |
| RC1660 | #7D Carb for 91-1.08 RC | 53.95 | 39.99 |
| RC1661 | #4D Carb for 40-46 | 45.95 | 29.99 |
| RC1662 | #3A Carb for 35-40FP | 22.95 | 14.99 |
| RC1663 | #8 Standard Long Glow Plug | 4.95 | 4.29 |
| RC1664 | #F Glow Plug 4-Cycle | 6.95 | 5.79 |
| RC1665 | Muffler .35-.40FP | 14.95 | 11.99 |
| RC1666 | Remote Needle 20-40FP | 6.95 | 5.79 |
| RC1667 | Tuned Pipe 61 | 99.95 | 79.99 |
| RC1668 | O.S. Engine Booklet 2nd Ed. | 7.00 | 4.99 |
| | **PAASCHE** | | |
| RC1669 | H-Set Airbrush Set | 64.00 | 37.99 |
| RC1670 | VL-Set Airbrush Set | 97.00 | 59.99 |
| RC1671 | D-500 Air Compressor | 150.00 | 89.99 |
| | **PARMA** | | |
| RC1672 | 1/10 California Sport Truck | 99.95 | 58.99 |
| RC1673 | Matched SCR Unassembled-6 Cell | 33.00 | 24.99 |
| RC1674 | Matched SCR Pack-Tamiya-6 Cell | 36.50 | 27.99 |
| | **PACER** | | |
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| RC1677 | Zap a Gap CA+ 2 oz | 10.99 | 6.49 |
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|---|---|---|---|
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| RC1729 | Main 2 Gear System-3/16 Struts | 117.08 | 87.99 |
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| RC1731 | 90 Degree Mains-3/16 Strut | 165.40 | 109.99 |
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| RC1733 | 3 Gear Retracts-Belly Mount | 166.78 | 109.99 |
| RC1734 | Belly 3-Gear Retract 3/16 | 166.78 | 109.99 |
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| RC1774 | Demon .09-.15 | 29.95 | 22.99 |
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| RC1811 | Pitts Muffler .45-.80 | 21.35 | 16.99 |
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| RC1816 | TSC411P High Freq Dgtl Esc-Unv | 170.00 | 103.99 |
| RC1821 | BC100L Peak Charger-Linear | 110.00 | 66.99 |
| RC1822 | BC210 Reflex Peak Charger | 210.00 | 129.99 |
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| RC1824 | Contender 60 .40-.60 | 107.95 | 64.99 |
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| RC1827 | P-40 Warhawk .40-.60 | 135.95 | 79.99 |
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| RC1829 | F-4U Corsair .40-.60 | 158.95 | 102.99 |
| RC1830 | F8F Bearcat .60 | 159.95 | 94.99 |
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| RC1849 | EconoKote Red-6' | 11.25 | 6.89 |
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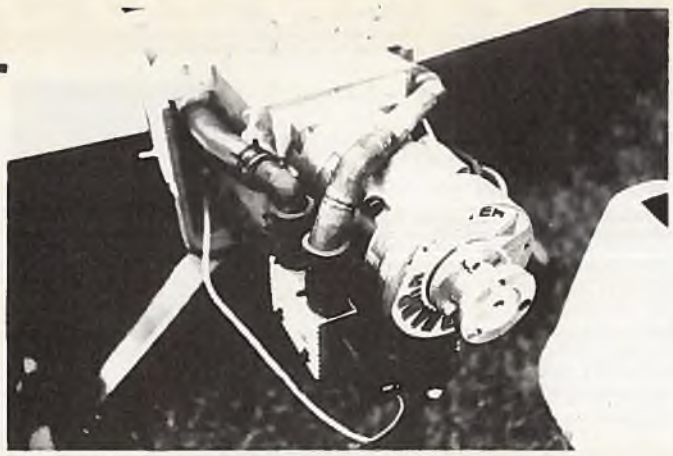
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| RC1852 | Trim Yellow | 2.39 | 1.99 |
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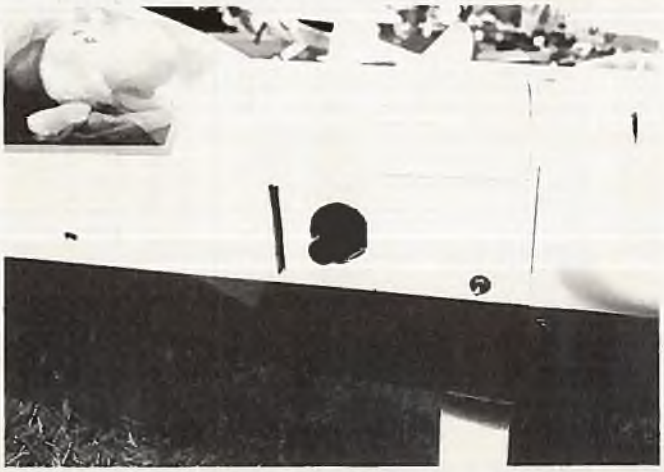
*TR260, Quadra Q50 engine, and upside-down Bennett smoke muffler start it off.*



*Attach 5/8" ID high temperature silicone tubing (same stuff as tuned pipe connectors) to muffler, and braze together 1/2" ID copper elbows/pipes to route around engine.*



*What makes it work --- Nomex® paper, a high temperature insulator. Also, more tubing. Also, notice "tee" for fuselage exit. To some, Nomex® is known as "fish paper".*



*"Tee" exits fuselage. Notice scale pilot in cockpit!*

# HOW TO BUILD A WING TIP SMOKE SYSTEM

**By John Lane**

In the never ending quest to find something new to exhibit at weekend Giant Scale Fly-Ins, a fellow modeler, Jack Kezelian (AMA 114810, and member of the Flying Pilgrims R/C Club, Canton, MI), decided to try a different approach to smoke systems last year. Jack had seen many "normal" systems over the past few years, and wanted to go the tip smoke route, but without the high cost of the so-called solid "incendiary" type devices. Therefore, Jack decided to try routing exhaust from the engine to the wing tips instead. Jack was concerned about heat, however, and sought a method to do the routing, yet still protect the wing and airframe. This was accomplished by using a product called Nomex®, an insulating paper used in the manufacture of high energy transformers — devices that give off much heat. A derivative of this product is used as



*More silicone tubing in wing, plus Nomex® wrapped hole in wing, and 5/8" OD thin wall (like from a scrapped lawn chair!) aluminum pipe.*



*At last, the business end! Aluminum tube exits wing, and out pours the smoke.*

Why should you buy an SR battery pack? That's a great question! Usually, when people call us for the first time, they want to know if our packs are really worth the $5 or $6 more than the price of an ordinary pack. They've heard from friends and read in all the R/C magazines that our packs are the best but what really makes them better? The fact that we make packs for the Space Shuttle Program, Army, Navy, Marines, Air Force, NASA, Lockheed, and Boeing, to name a few, might sound impressive. However, the important thing is that the packs we make for the Military and Aerospace Industry are identical to the packs we make for you! We use the same cells, same construction, same testing, and the same people! For over 10 years SR Batteries has been the leader in the R/C field. Here are just a few of the things that make an SR pack better: Only SR uses screened and matched Aerospace grade cells... Only SR guarantees every pack to never form a memory and gives you a one year warranty... Only SR puts every pack through 5 days of electronic testing to make sure every pack is perfect... Only SR vibration tests every pack... Only SR tests every pack for charge retention... All welded internal and external construction... All SR packs can be fast charged... All SR packs give you more flying time with less size and lighter weight... Only SR will custom make any size or shape pack to your specifications at no extra charge... Only SR maintains a Hotline phone number where you can call for help with any R/C problem or question. We'll answer your questions and help you select what you need, not what you don't. To place an order for a receiver, transmitter, Electric Flight pack or any of your other Electric Flight needs, just give us a call at (516) 286-0079 or send $5 for our new product and technical information guides for both Electric Flight as well as our Aerospace grade receiver and transmitter battery packs. We're open 9 to 5 (Eastern Time Zone), Monday through Friday.

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an insulator for fireproof garments. The product can be purchased at any electrical supply house. Jack's endeavor proved successful, as he now has been running this system for two years with great results! At every fly-in many people ask how in the world he managed to accomplish such a thing!

I believe the accompanying photos and captions are pretty much self explanatory, however I will add a couple of notes.

First, be sure to notice that the tubes and pipes are in the same compartment as the fuel tank, and that Jack has insulated it with the Nomex® paper.

He also insulated the bottom of the hatch, as it is constructed of foam and prone to melting.

Second, after he had cut the hole in the wing (an exercise for the student!), he wrapped the inside of the hole with Nomex®.

Just to make sure everything is okay, Jack pulls the canopy hatch off after every flight. This aids in cooling and allows him to do a post/pre-flight each time.

A last word on Nomex®. This stuff is quite remarkable, as right after a flight, you can pull hatch and put your hand on the side away from the pipes, and guess what? It is warm to the touch only; on the other side it is very hot. This unusual property is what keeps the foam wing cool. There has been absolutely no wing "melt down" whatsoever!



***The finished product, the TR260 in a static test, smoking away like crazy!***

Finally a word on engine performance. Jack recommends you go up one engine size for the drop in rpm's caused by the back pressure of the extra exhaust routing, although in my opinion it is not absolutely necessary if your bird is overpowered now, as many are (you loose about 300 to 400 rpm).

Although construction will vary from subject to subject, this article presents the basic method for attempting such a project.

Good luck on your next smoke system!

(Nomex® is a product of Dupont.)

□

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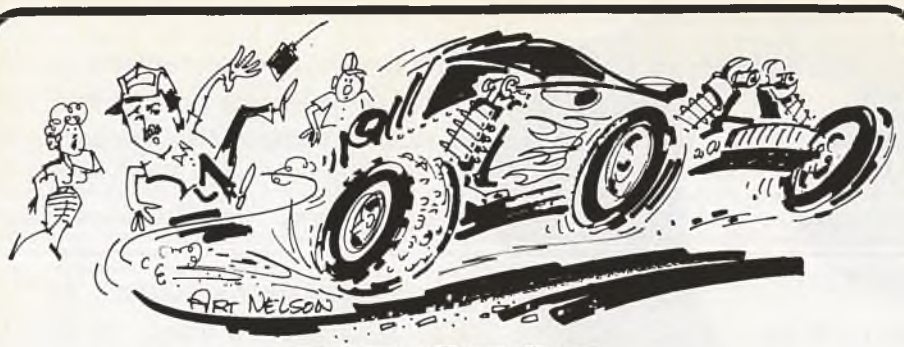
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# PIT STOP

DEAN HUGHEY

**Choosing Your First Equipment:**

Ninety-one looks like it's going to be a good year for R/C cars and there is a whole new crop of R/C rats coming into the hobby/sport looking for as much info as possible. Over the next two months I will be going over some of the things that are important for a novice to keep in mind when starting out. There are a lot of great cars out there, but always remember that just because a particular car is right for one person, that doesn't mean it is the best car for you. You must also decide whether you want to start with a stick or a wheel radio and whether or not you will want to stay with the one you start with.

Many newcomers buy either the car or the radio and then purchase the other later. Generally this is because they found one on sale and had to wait to purchase the other. Although some people are able to buy a car and radio together as a package deal, this is probably not the best way to do it unless money is the key object. And never buy a cheap package if you think one or the other might not be what you need. If necessary, hold off for a little while until you get the money or until you find a car and radio that



*Drag racing has become very popular in the 90's. This one is from Fine Design.*



*The monster truck era has made a big impact on the R/C industry. Cars such as the Kyosho "Monster Vette" have made a big splash.*



*A class that is gaining popularity is the 1/4 scale stadium trucks.*




*The RC10 is still the most popular car for the novice and expert.*



*Associated's 10L is very popular on the 10th scale on-road circuit.*

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It also has all the features you ever wanted for gliders...like 4 Programmable Mixes and Crow Mixing. And there are more mixes – for Elevator to Flap, Flap to Elevator, Flap to Aileron and Aileron to Flap.

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is closer to what you want and need. You will only be wasting money if you purchase something you know won't hold up to what you expect from it.

Let's go a little further into the selection of your radio, now. First, decide whether you can drive best with two sticks or a steering wheel. The wheel is usually the most natural for the beginner; however, some people have a natural feel for the sticks — especially if they are experienced with airplanes or certain video games.

If you are going to get into racing the most important thing to look for in a radio is whether or not it will hold up under the stress of racing. It will have to take a beating. Look for a radio that has heavy duty servos or standard servos that have a high output rating, in other words, look for a servo that has 40 oz./in. of torque or better. This is the amount of output power the servo has. The servos in an off-road vehicle, in particular, take a lot of abuse, especially when you are just learning how to drive. Therefore, if you start off with heavy duty servos your radio equipment will give you far more hours of trouble free operation. No one wants to come home early because they broke a servo.

Another thing to look for is BEC or Battery Elimination Circuit. In racing, most of us do not use a receiver battery pack in order to cut down on weight in the car. We tap our receiver power off the drive battery. The BEC is a regulator built into the radio or speed controller which controls the voltage from the six cell (7.2 volt) or seven cell (8.4 volt) pack down to the correct voltage required to operate your receiver and servos. This keeps you from burning them up.

Finally, if you are going to get serious about your driving, a radio that has some adjustments such as exponential or dual rates is vital. Dual rates do nothing more than cut the total throw of the servo down. With exponential you can make adjustments to control the throw of the servo around center. For example, when the exponential is all the way on and you turn your steering wheel one eighth of a turn, the servo might only move one sixteenth of a turn. The actual amount will vary from radio to radio, but this mechanism keeps the car from being so twitchy around neutral on your steering. This way the servo actually moves less than the wheel does. Dual rates combined with exponential give you the ability to fine tune and dial your car in for virtually any track condition and you never have to leave the drivers stand.

These options are not absolutely necessary, but they are helpful in the long run. Probably the most useful would be the dual rates. That's something you want to look for and even some of the lower priced ones have dual rates.

Most radios are set up for dry cell batteries; the standard ones like you use in flashlights and tape players. You may eventually want to get a rechargeable battery pack for the transmitter. This will save a lot of money in the long run.

Most of the brand name radios on the market are pretty well matched although some have a bit more adjustability. One might have a more comfortable feel than another or you might prefer a lighter or heavier radio but what it usually comes down to is personal preference. In the future when you purchase a radio just go with what has worked the best for you. Don't jump around from one brand to another because the equipment is not always compatible. This way you can avoid a garage full of unusable equipment.

Now we come to choosing the car or truck. Obviously with so many on the market, it can be a real headache trying to find the right one. If you just want to play around in the backyard or on the street, the main thing you want to think about is how long will this thing last and what kind of maintenance will you have to put into it for maximum enjoyment. You want a car that is going to hold together, one that you won't have to continually repair.

For someone who is serious about racing, overall performance is the thing to look for. Things like what kind of racing equipment comes standard. You don't want to end up putting out a lot of money for your hop-up parts just to be competitive. Standard items should include oversized racing shocks, a heavy-duty suspension, racing tires, and ballbearings throughout. If you can get a car that comes with a lot of high performance features then you will save money in the long run.

You also want to get a car or truck that has plenty of aftermarket products made especially for it and that are readily available. Racing puts so much strain on cars that you are eventually going to break something. You want to be able to replace that part as quickly as possible. No one wants to be left on the sidelines while everyone else is out tearing around the track.

You must also decide whether you want to start out with 1/10 scale on-road, 1/10 scale offroad (buggy or truck), 1/12 scale on-road or 1/8 scale gas. The best way for the beginner to get into racing would either be the 1/10 scale road car or the 1/10 scale off-roader. There are more places to run a 1/10 off-road car because you can go out and run in any vacant field or lot. 1/10 scale road cars are becoming more popular all the time. It just depends on your area. If you have a track that has a road course, then the 1/10 scale might be the way to go.

In general, off-road cars or trucks are the best way for a beginner to get into R/C racing. First because of price, then availability of places to run and availability of parts. In this column we will start off featuring these medium sized cars, but will eventually get into the others as well.

Right now there is so much good equipment on the market and if you take time and choose wisely you can't help but be a winner.

□

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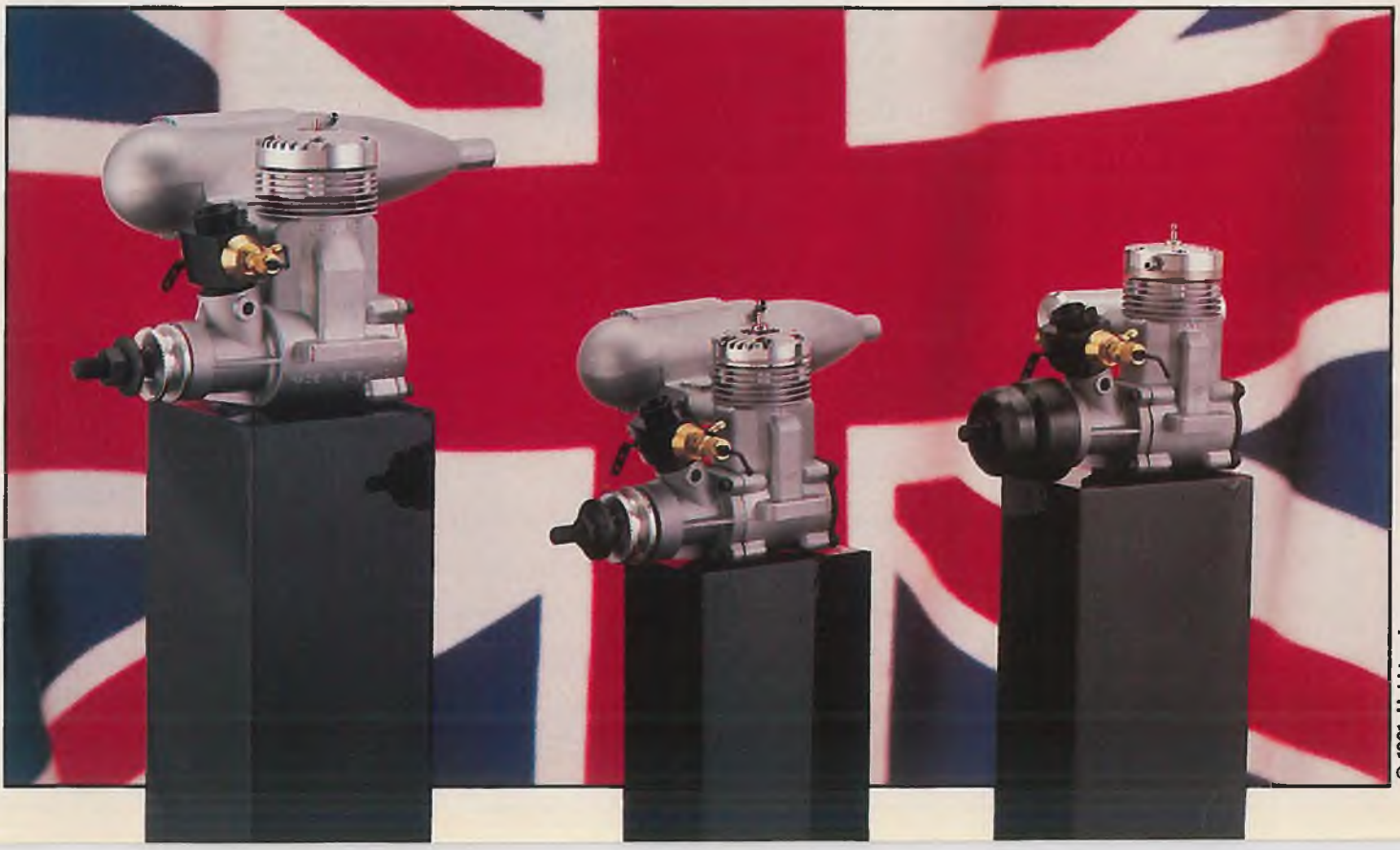
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| FUT072 | 7UAP PCM W/R129DP - 4 SERVOS | 379.96 |
| FUT074 | 7UAFS SUPER SEVEN FM SYSTEM | 329.96 |
| FUT075 | 7UAFP SUPER SEVEN PCM SYSTEM | 389.96 |

Dual conversion 1991 receiver, all nicads and charge, servo reversing, trainer system, control panel with ATV-4 standard servos, programmable mixing on 7ch systems. PCM models have a 10 bit microprocessor for high resolution.

**9 CH PCM 1024 SYSTEM**

SALE $669.96

FUT1024AP



Dual Conversion 1991 receiver. 3 dual rates, 3 Snap roll functions, LCD Screen, programmable mixing function, precision gimbals, timer and tachometer, programmable memory for up to six different models, (4)S5101 competition servos.

## FUTABA 1991

**4NBL ATTACK SYSTEMS**

SALE $109.96

FUT043




1991 Micro receiver. All NICADS and charger. Aircraft version with 3 standard servos. Glider version with 2 micro servos and 250MAH battery. Electric version with electronic speed control and two (2) micro servos. Servo reversing.

| | | |
|---|---|---|
| FUT043 | 4NBL AM SYSTEM W/3-148 | 109.96 |
| FUT045 | 4NBL AM SYSTEM W/2-133 | 154.96 |
| FUT046 | 4NBL ELECTRIC SYSTEM W/2-133 | 174.96 |

**CONQUEST SYSTEMS 1991**

**6 CH FM**

SALE $189.96

FUT061




The new 1991 series of Conquest systems from Futaba all feature dual conversion receivers, standard S148 servos, trainer system, servo reversing and full nicads.

| | | |
|---|---|---|
| FUT041 | 4NBF FM DC SYSTEM W/3-148 | 139.96 |
| FUT042 | 4NBP PCM DC STYSTEM W/3-148 | 209.96 |
| FUT061 | 6NKF FM DC SYSTEM W/4-148 | 189.96 |
| FUT062 | 6NKP PCM DC SYSTEM W/4-148 | 224.96 |

## SERVO SALE

| | | |
|---|---|---|
| **AIRTRONICS** | | |
| AIR4102 | STANDARD SMT H.D. SERVO | 17.96 |
| AIR4141 | MICRO SERVO W/METAL GEARS | 49.96 |
| AIR4401 | B.B MICRO SERVO | 39.96 |
| AIR4551 | B.B. STANDARD SERVO | 27.96 |
| AIR4635 | H.D. STD. CAR SERVO | 13.96 |
| AIR4732 | HI TORQUE CORELESSB.B. SERVO | 49.96 |
| AIR4737 | HI SPEED CORELESSB.B. SERVO | 49.96 |
| AIR4741 | H.D. CONTEST B.B. STD. SERVO | 34.96 |
| AIR4831 | MINI B.B. SERVO | 29.96 |
| **FUTABA** | | |
| FUTS30 | H.D. B.B. SERVO G | 29.96 |
| FUTS33 | B.B. MICRO SERVO G | 29.96 |
| FUTS48 | LOW PROFILE STD SERVO G | 16.96 |
| FUTS133 | B.B. MICRO SERVO J | 29.96 |
| FUTS134 | 1/4 SCALE H.D. SERVO J | 39.96 |
| FUTS136G | COMPACT 108' RETRACT SERVO | 49.96 |
| FUTS148 | LOW PROFILE STD SERVO J | 16.96 |
| FUTS5101 | SMT B.B. STD SERVO | 31.96 |
| FUTS9101 | SMT HT HS B.B. CORELESS SERVO | 44.96 |
| FUTS9201 | SMT HT B.B. AIRCRAFT SERVO | 44.96 |
| FUTS9301 | SMT HT CORELESS SERVO | 44.96 |
| FUTS9601 | SMT MINI B.B. CORELESS SERVO | 44.96 |
| **ROYAL** | | |
| ROY0061 | TITAN SERVO FUTABA G | 12.96 |
| ROY0062 | TITAN SERVO FUTABA J | 12.96 |
| ROY0063 | TITAN SERVO AIRTRONICS | 12.96 |
| ROY0064 | TITAN SERVO WORLD MOLEX | 12.96 |
| ROY0065 | TITAN SERVO WORLD/ARISTO "S' | 12.96 |
| ROY0066 | MINI TITAN II FUTABA G | 16.96 |
| ROY0067 | MINI TITAN II FUTABA J | 16.96 |
| ROY0068 | MINI TITAN II AIRTRONICS | 16.96 |
| ROY0069 | MINI TITAN II EXPERT MOLEX | 16.96 |
| ROY0070 | MINI TITAN II EXPERT/ARI "S" | 16.96 |
| ROY0091 | MICRO TITAN FUTABA G | 21.96 |
| ROY0092 | MICRO TITAN FUTABA J | 21.96 |
| ROY0093 | MICRO TITAN AIRTRONICS | 21.96 |
| ROY0094 | MICRO TITAN EXPERT MOLEX | 21.96 |
| ROY0095 | MICRO TITAN WORLD/ARISTO "S" | 21.96 |
| **ISC INTERNATIONAL** | | |
| ISC020 | S25X STANDARD SERVO | 16.96 |
| ISC020S | S25X S-STANDARD SERVO | 16.96 |
| ISC022 | S-91 BB SERVO | 21.96 |

ENGINES

## MAGNUM

**40 FSR**

**Inflation Fighters**. The Magnum Series of engines are all **Schnuerle** for **great top end** and **low reliable idle.** The Pro Series features **twin ball bearings.** All engines include a **muffler.**

$74.96

MAG401



| | | |
|---|---|---|
| MAG110 | MAGNUM GP 10FSR R/C W/MUFF | 39.96 |
| MAG210 | MAGNUM GP 21FSR R/C W/MUFF | 40.96 |
| MAG250 | MAGNUM GP 25FSR R/C W/MUFF | 44.96 |
| MAG400 | MAGNUM GP 40FSR R/C W/MUFF | 49.96 |
| MAG211 | MAGNUM PRO 21FSR CAR | 74.96 |
| MAG251 | MAGNUM PRO 25FSR-BB W/MUFF | 64.96 |
| MAG401 | MAGNUM PRO 40FSR-BB W/MUFF | 74.96 |
| MAG451 | MAGNUM PRO 45FSR-BB W/MUFF | 79.96 |

## ROYAL .45

$74.96

ROY0450



The perfect engine for the **advanced** trainer or sport airplane. **Schnuerle ported, twin ball bearing and muffler.** Easy to adjust carb for **maximum top end and low reliable idle.**

| | | |
|---|---|---|
| ROY0250 | ROYAL 25 R/C ABC W/MUFFLER | 54.96 |
| ROY0281 | 28 R/C ABC W/MUFFLER | 59.96 |
| ROY0400 | 40 R/C ABC W/MUFFLER | 69.96 |
| ROY0450 | 45 R/C ABC W/MUFFLER | 74.96 |

## RJL

**61 R/C**

Schnuerle scavenged side exhaust, front rotary valve, **double ball bearing,** 18 oz. Comes complete with muffler.

$98.96

RJL610



## SAITO

**FA-65G GOLDEN KNIGHT**

**Smooth running, excellent idle** and plenty of **power** to replace "40" size two stroke engines. An excellent choice for scale airplanes up to 8 lbs. or aerobatic midsize aircrafts.

$189.96

SAT650G



| | | |
|---|---|---|
| SAT450S | FA-45S ABC 4-CYCLE | 144.96 |
| SAT500 | FA-50 4-CYCLE ENGINE | 149.96 |
| SAT650 | FA-65 4-CYC. R/C W/MUFF | 169.96 |
| SAT800 | FA-80 4-CYCLE R/C W/MUFF | 194.96 |
| SAT900 | FA-120 4-CYCLE R/C W/MUFF | 269.96 |
| SAT901 | FA-120S GOLD SPECIAL 4-CYCLE | 279.96 |
| SAT500G | FA-50G GOLD 4-CYCLE | 174.96 |
| SAT650G | FA-65G GOLD 4-CYCLE | 189.96 |
| SAT800G | FA-80G GOLD 4-CYCLE | 219.96 |
| SAT902 | FA-120SDP DUAL PLUG & PUMP | 319.96 |
| SAT600T | FA-60T TWIN 4-CYCLE | 449.96 |
| SAT600TD | FA-60TD TWIN 4-CYC. DUAL PLUG | 489.96 |
| SAT990T | FA-90T FLAT TWIN | 349.96 |
| SAT992 | FA-130T DP TWIN PLUG | 449.96 |
| SAT993 | FA-130T TWIN ENGINE 4-CYCLE | 419.96 |
| SAT994 | FA-270TTDP TWIN PLUG & PUMP | 679.96 |
| SAT995 | FA-270T TWIN 4-CYCLE | 589.96 |
| SAT996 | FA-300T 50CC TWIN 4-CYCLE | 598.96 |
| SAT998 | FA-300TTDP TWIN PLUG & PUMP | 789.96 |
| SAT997 | FA-325-R5 RADIAL 4-CYCLE | 1299.96 |

## ISC INTERNATIONAL

**ASP 40**

The perfect engine where **high power** and a **reliable idle** are required. To insure **long life** the cylinder has been chrome plated and the crankshaft is supported with two ball bearings.

$73.96

ISC540



| | | |
|---|---|---|
| ISC540 | ASP 40RC W/MUFF | 73.96 |
| ISC541 | ASP 46 FSR ABC W/MUFF | 79.96 |
| ISC542 | ASP 46H FSR ABC WO/MUFF | 79.96 |
| ISC543 | ASP 61 FSR RING W/MUFF | 83.96 |
| ISC500 | ZENOAH G-38 | 189.96 |
| ISC501 | ZENOAH G-62 | 264.96 |
| ISC505 | ZENOAH G-23 | 184.96 |
| ISC544 | ASP 61 FSR ABC W/MUFF | 94.96 |
| ISC545 | ASP 91 FSR ABC W/MUFF | 124.96 |
| ISC546 | ASP 1.08 BX FSR W/MUFF | 179.96 |

## YS ENGINES

**.61 FS**

$249.96

YSE610



Unique pressure system, **ABC piston-sleeve, ball bearings,** excellent workmanship all add up to a **high performance long lasting** contest/sport engine.

| | | |
|---|---|---|
| YSE450 | .45 SIDE EXHAUSE ABC W/O MUFF | 129.96 |
| YSE451 | .45 REAR EXHAUST ABC W/O MUFF | 129.96 |
| YSE120F | 1.20-4C W/PUMP & SUPERCHARGER | 369.96 |
| YSE610 | 61 LONG STROKE SIDE EXHAUST | 249.96 |
| YSE611 | 61 LONG STROKE REAR EXHAUST | 249.96 |

**SHIPPING & HANDLING:** UPS Ground Continental U.S. $4.95 (Free on Total of $100+), UPS Air $4.95 plus 10% of Subtotal, UPS Next Day Air $14.00 plus $1.00 per lb. of Shipment total, C.O.D. add $4.95, U.S. Mail $4.95 plus 10% of Subtotal.

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# SHELDON'S HOBBIES

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AIRPLANE KITS

### ACE R/C INC.

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|---|---|---|
| ACE1002 | Prodigy Sailplane | 59.96 |
| ACE1004 | T-Max19-30 Sport | 47.96 |
| ACE1005 | Skyhawk 77 in. Sailplane | 31.96 |
| ACE1007 | QuasoarSailplane | 129.96 |
| ACE202 | Ace High Glider MK II | 24.96 |
| ACE203 | Whizard 1/2A Trainer | 22.96 |
| ACE205 | All Star Biplane 1/2A | 27.96 |
| ACE206 | Pacer 1/2A Sport | 24.96 |
| ACE207 | Mach None 1/2A Sport | 24.96 |
| ACE210 | GLH II Foam Wing | 19.96 |
| ACE211 | GLH II Built-Up Wing | 21.96 |
| ACE212 | Alpha 1/2A Trainer | 24.96 |
| ACE220 | Super Pacer 25 Sport | 36.96 |
| ACE222 | T-34 Scale 35-45 | 52.96 |
| ACE223 | 4-40 4/Cycle Sport Airplane | 49.96 |
| ACE224 | 4-60 4/Cycle Sport Airplane | 62.96 |
| ACE225 | 4-20 4/Cycle Sport Airplane | 41.96 |
| ACE226 | 4-40 Bipe Sport Airplane | 59.96 |
| ACE227 | 4-120 4-Cycle Sport Airplane | 114.96 |
| ACE228 | 4-120 Bipe 4-Cycle Sport Plane | 124.96 |
| ACE229 | Seamaster 40 | 74.96 |
| ACE230B | 4-60/90 4-Cycle Bipe | 87.96 |
| ACE231 | Seamaster120 | 154.96 |
| ACE232 | Bingo 40-60 Sport | 69.96 |
| ACE5025 | Extra 230 25% 72 In. | 179.96 |
| ACE5030 | Extra 230 30% 87 In. | 219.96 |
| ACE5033 | Extra 230 33% 96 In. | 229.96 |
| ACE5040 | Weeks Special 72 In. | 269.96 |
| ACE5045 | 1/4 SC Clipped Taylorcraft | 209.96 |

### ASTRO FLIGHT

| | | |
|---|---|---|
| AFI1017 | Porterfield Deluxe w/geared 25 | 179.96 |
| AFI1018 | Porterfield | 59.96 |
| AF11020 | Challenger | 35.96 |
| AF11021 | Viking Old Timer | 35.96 |
| AF11022 | Mini Challenger Standard Kit | 27.96 |
| AF11023 | DLX Mini Challenger w/Motor | 99.96 |

### AIRTRONICS

| | | |
|---|---|---|
| AIR0208 | Olympic II, Sailplane | 54.96 |
| AIR0211 | Sagitta 900 Sailplane | 64.96 |
| AIR0212 | Sagitta 600 Sailplane | 58.96 |
| AIR0213 | Olympic 650, Sailplane | 34.96 |
| AIR0218 | Eclipse Electric Sailplane | 37.96 |
| AIR0219 | Eclipse Deluxe Electric Kit | 66.96 |
| AIR0220 | Legend 113 In. Sailplane | 189.96 |

### BRIDI MODEL DESIGNS

| | | |
|---|---|---|
| BRD047 | XLT Pattern | 93.96 |
| BRD050 | Vagabond 40 | 63.96 |
| BRD053 | Tercel Sailplane | 21.96 |
| BRD054 | Kastaway Sailplane | 25.96 |
| BRD207 | Flipper Sailplane | 21.96 |
| BRD300 | Krafty 25 | 36.96 |
| BRD305 | Krafty 60 | 62.96 |
| BRD600 | Gyro Quickie 500 Racer | 41.96 |
| BRD700 | Utter Chaos 60 | 71.96 |
| BRD701 | Escape Pattern Airplane | 93.96 |
| BRD702 | The Big Bee Trainer .90-120 | 139.96 |
| BRD703 | Bizzee Bee Sport | 189.96 |

### COX HOBBIES INC.

| | | |
|---|---|---|
| COX0415 | Typhoon w/Engine | 119.96 |
| COX0420 | Cessna II Skylane | 124.96 |
| COX0421 | Cessna w/2Ch Radio System | 209.96 |
| COX0424 | Fairchild 24 w/Engine | 119.96 |
| COX0425 | Fairchild 24 w/2Ch Radio System | 198.96 |
| COX0464 | Sundance Electric | 119.96 |
| COX0465 | Sundance Electric w/2Ch Radio | 199.96 |
| COX0474 | EZ Bee II w/Engine | 69.96 |
| COX0475 | EZ Bee w/2Ch Radio System | 159.96 |
| COX0484 | J-3 Cub w/Engine | 108.96 |
| COX0485 | J-3 Cub w/2Ch Radio System | 189.96 |

### DCU MODELS

| | | |
|---|---|---|
| DCU100 | Dragon Fly Sailplane | 54.96 |
| DCU200 | Super Dragon Fly Sailplane | 84.96 |
| DCU300 | Stryker Sailplane | 74.96 |

### DOUGLAS AIRCRAFT

| | | |
|---|---|---|
| DOU100 | Silhouette Slope Sailplane | 37.96 |
| DOU200 | Quicksilver 52 In. Slope Glider | 49.96 |

### DAVEY SYSTEMS CORP.

| | | |
|---|---|---|
| DSC006 | Hammer 20 | 35.96 |
| DSC007 | Kingfisher 45-80 | 89.96 |
| DSC008 | Stampe SV4 45-60 | 83.96 |
| DSC009 | Powerhouse | 59.96 |
| DSC010 | Hammer 40 | 54.96 |
| DSC011 | 1 /2-A Eindecker | 19.96 |
| DSC012 | 1/5 Piper PA-12 | 119.96 |
| DSC014 | P-47 Thunderbolt | 59.96 |
| DSC015 | Stearman 75 | 77.96 |
| DSC016 | Bearcat F-8 | 59.96 |
| DSC017 | Focke-Wolff FW-190 | 59.96 |
| DSC018 | Great Lakes Special | 79.96 |
| DSC401 | Prophet Sailplane | 41.96 |

### DAVEY SYSTEMS CORP. cont'd.

| | | |
|---|---|---|
| DSC501 | Phophet 941 Sailplane | 64.96 |
| DSC502 | LeCrate Sport | 29.96 |
| DSC503 | Lucifer | 28.96 |
| DSC601 | Ariel Sailplane | 21.96 |
| DSC602 | Caliph Sport-Trainer | 28.96 |
| DSC701 | Heron | 29.96 |
| DSC801 | Fly Baby | 19.96 |
| DSC901 | Citabria | 19.96 |

### DURACRAFT

| | | |
|---|---|---|
| DUR200 | Dura-Plane II | 39.96 |
| DUR300 | Dura Bat | 54.96 |

### DYNAFLITE MODELS

| | | |
|---|---|---|
| DYF2001 | Wanderer 72 | 23.96 |
| DYF2002 | Bird of Time | 56.96 |
| DYF2003 | Mini Bird | 31.96 |
| DYF2008 | Sensor Sailplane | 106.96 |
| DYF2009 | Freedom Slope Sailplane | 52.96 |
| DYF2010 | WindrifterSailplane | 41.96 |
| DYF2012 | Drifter II Sailplane | 22.96 |
| DYF2013 | Apogee 100 In. Sailplane | 35.96 |
| DYF3002 | Fun Scale P-5140-60 | 63.96 |
| DYF3009 | Piece O'Cake MK2 (Gas or Elec.) | 24.96 |
| DYF3010 | Butterfly MK3 (Gas or Electric) | 46.96 |
| DYF3011 | Fun Scale P-5125-40 | 46.96 |
| DYF3012 | Fun Scale Cessna 30-45 | 37.96 |
| DVF3013 | Fun Scale Carsair 40-51 | 59.96 |
| DYF3014 | Spitfire Fun Scale | 59.96 |

### FLITELINE R/C MODELS

| | | |
|---|---|---|
| FLN150 | Scat Cat 500 Racer | 29.96 |
| FLN200 | Fun Fli 40 | 29.96 |

### GOLDBERG MODELS

| | | |
|---|---|---|
| GBG040 | Electra Deluxe | 44.96 |
| GBG041 | Electra Standard | 27.96 |
| GBG042 | Mirage 550 Electric Plane | 49.96 |
| GBG052 | Super Chipmunk | 69.96 |
| GBG053 | Ultimate Bipe | 119.96 |
| GBG054 | Vector 40 Trainer RTC | 99.96 |
| GBG057 | Freedom 20 | 39.96 |
| GBG059 | Sophisticated Lady | 34.96 |
| GBG060 | Gentle Lady | 22.96 |
| GBG061 | Eaglet 50 | 34.96 |
| GBG063 | Anniversary J-3 Piper Cub | 59.96 |
| GBG064 | Sky Tiger | 54.96 |
| GBG065 | Junior Tiger .15-.30 | 44.96 |
| GBG296 | Super Floats | 34.96 |
| GBG678 | Electric Power Pod | 31.96 |

### GM PRECISION MODELS

| | | |
|---|---|---|
| GMI001 | Rainbow Runner 25 | 57.96 |
| GMI002 | Rainbow Runner 45 | 69.96 |
| GMI003 | Sunbird 40 | 57.96 |
| GMI004 | Sunbird Jr. 10 | 42.96 |
| GMI005 | Bumble Vee .049 Electric | 19.96 |
| GMI006 | Kiler Vee | 26.96 |
| GMI008 | Killer Vee 40 | 51.96 |
| GMI009 | Thermal Charger Electric | 46.96 |
| GMI010 | Sunbird 120 | 134.96 |

### GLIDE ONE MODEL

| | | |
|---|---|---|
| GOM100 | Outlaw Slope Sailplane | 29.96 |

### HOBBY DYNAMICS

| | | |
|---|---|---|
| HDDGB20 | Gobee 20 Trainer Kit | 44.96 |
| HDDGB40 | Gobee 40 Trainer Kit | 59.96 |
| HDDSPTE40 | Sportee 40 Trainer Kit | 55.96 |
| HDDULT20 | Ultra 20 Trainer Kit | 44.96 |
| HDDULT40 | Ultra 40 Trainer Kit | 54.96 |
| HDDP51 | Mustang Sport 25-45 | 54.96 |
| HDDMK14 | Spitfire Sport 25-45 | 54.96 |
| HDDP39 | P39 Aircobra Sport 25-45 | 54.96 |
| HDDME109 | ME109 Messerschmitt | 54.96 |
| HDDSCUBE | Cub Electric | 54.96 |

### HOUSE OF BALSA

| | | |
|---|---|---|
| HOB024 | T-6 Texan 15-20 | 29.96 |
| HOB025 | Two-Tee Glider | 22.96 |
| HOB026 | 2 x 4 Glider | 16.96 |
| HOB027 | 2 x 6 Glider | 18.96 |
| HOB040 | P-51 Mustang | 29.96 |

### IMEX PRODUCTS

| | | |
|---|---|---|
| IME9500 | Imex 40T RTF Trainer | 109.96 |

### JACK CALDWELL MODELS

| | | |
|---|---|---|
| JCMSE1 | Swift AT Slope Sailplane | 42.96 |
| JCMSE2 | Swift 46 Slope Sailplane | 42.96 |
| JCMSE3 | Mini X-Cell Slope Glider | 59.96 |

### K & A MODELS UNLIMITED

| | | |
|---|---|---|
| KAM100 | Mini-I Slope Glider | 27.96 |
| KAM150 | Kam-U Slope Glider | 44.96 |

### KALT HELICOPTERS

| | | |
|---|---|---|
| KLT8300 | Enforcer 30 Helicopter RTF | 319.96 |
| KLT8400 | Enforcer 30 Helicopter Kit | 299.96 |

### LONG TAI SHIN MODELS

| | | |
|---|---|---|
| LTSK40 | Das Ugly Stick ARF | 129.96 |
| LTSK60 | Das Ugly Stick 60 ARF | 149.96 |

### BOB MARTIN MODELS

| | | |
|---|---|---|
| MAA024 | ET-25 Trainer | 24.96 |
| MAA029 | Pussycat 78 In. Sailplane | 22.96 |
| MAA031 | Bobcat Sailplane | 26.96 |
| MAA032 | Talon Sailplane | 26.96 |
| MAA044 | ET-40 Trainer | 44.96 |
| MAA100 | Coyote w/Durelene Fuselage | 59.96 |
| MAA110 | SR-7 w/Durelene Fuselage | 79.96 |
| MAA120 | Katie II Sailplane | 54.96 |

### NORTHEAST AERODYNAMICS

| | | |
|---|---|---|
| NEA020 | Train-Air 20 | 47.96 |
| NEA050 | Train-Air 40 | 58.96 |
| NEA075 | Bel=Air 40 Bipe | 78.96 |
| NEA080 | Bel-Air 60 Bipe | 94.96 |
| NEA100 | Sport-Air 40 | 62.96 |
| NEA500 | 40 Hydro Floats | 24.96 |

### PAUL'S FLYING STUFF

| | | |
|---|---|---|
| PFSK01 | Deknight Special F-1 Racer | 124.96 |
| PFSK02 | Thunderquickie II 500 Racer | 47.96 |
| PFSK17 | P51 Fiberglass Kit | 114.96 |
| PFSK19 | F86 Sabre Kit | 159.96 |

### PICA ENTERPRISES

| | | |
|---|---|---|
| PIC01 | Spitfire | 104.96 |
| PIC02 | T28B | 109.96 |
| PIC03 | Focke Wulf 190 D-9 | 109.96 |
| PIC04 | Waco F-3 | 116.96 |
| PIC05 | Duelist Z-40 | 109.96 |
| PIC06 | Cessna 182 | 121.96 |
| PIC07 | Bucker Jungmeister 60 | 112.96 |
| PIC12 | 1/5 Scale Waco .61-1.20 | 169.96 |
| PIC13 | 1/5 Scale Aeronica Sedan | 169.96 |
| PIC14 | 1/5 Scale Cessna | 159.96 |
| PIC15 | 1/5 Scale T-28B | 169.96 |
| PIC16 | 1/5 Scale Spitfire | 179.96 |
| PIC17 | 1/5 Scale P51 Mustang | 209.96 |

### PIERCE AERO MODELS

| | | |
|---|---|---|
| PIE100 | Paragon 118 In. Thermal Glider | 64.96 |
| PIE110 | Ridge Rat 49 In. Slope-Low Wing | 39.96 |
| PIE124 | Gemini M-T-S Sailplane | 79.96 |

### PRATHER PRODUCTS

| | | |
|---|---|---|
| PRA2000 | Little Toni Formula 1 Racer | 119.96 |
| PRA2010 | Wing Kit Toni Formula | 39.96 |

### ROYAL PRODUCTS

| | | |
|---|---|---|
| ROY1003 | Corsair Senior .60-.80 | 164.96 |
| ROY1005 | FW-190 Kit .60-.80 | 159.96 |
| ROY1006 | F8F Bearct .60-.80 | 164.96 |
| ROY1007 | P-51D Mustang .60-.80 | 172.96 |
| ROY1008 | Stuka Kit .60-.80 | 159.96 |
| ROY1009 | ME-109 Kit .60-.80 | 164.96 |
| ROY1017 | P6E Hawk .60-.80 | 219.96 |
| ROY1100 | B-17 Kit | 229.96 |
| ROY1101 | B-25 Kit | 179.96 |
| ROY1102 | P-38 Kit | 244.96 |
| ROY1103 | C-47 Skytrain Kit | 214.96 |
| ROY1200 | 1/4 SC Super Cut | 326.96 |
| ROY1201 | 1/5 SC Corsair/50CC | 489.96 |
| ROY2006 | Easysoar RTF Sailplane | 84.96 |
| ROY2007 | Electrosoar RTF Electric | 97.96 |
| ROY2008 | Powersoar RTF Powered Sailplane | 84.96 |
| ROY2021 | 20S Royal-Air RTF Sport | 79.96 |
| ROY2022 | 20L Royal-Air RTF Sport | 79.96 |
| ROY2023 | 20T Royal-Air RTF Trainer | 82.96 |
| ROY2024 | 40H Royal-Air RTF TRainer | 99.96 |
| ROY2026 | 40L Royal-Air RTF Sport | 99.96 |
| ROY2027 | 40T Royal-Air RTF Trainer | 99.96 |
| ROY2030 | Peashooter | 284.96 |
| ROY2031 | Stearman PT-17 | 284.96 |
| ROY2032 | Reliant | 284.96 |

### SHELDON'S HOBBIES

| | | |
|---|---|---|
| SHS800 | 1 oz. Posi-Cure Cyanoacrylate | 3.29 |
| SHS802 | 1 oz. Posi-Cure + Cyanoacrylate | 3.29 |
| SHS700 | 2 oz. Posi-Cure Cyanoacrylate | 5.49 |
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# BMS ONE BATTERY CYCLER & CHARGER

By George Steiner

Chargers, chargers, chargers --- fast chargers, C 10 chargers, high rate chargers, peak detection chargers, and many others --- sure can be confusing. The modeler would like more information on the capacity of their batteries in their R/C systems. What is wrong with the charger that is supplied with the R/C unit when purchased? Nothing is wrong as it does what it was intended to do, keep batteries well supplied with power if properly used. The care and feeding of NiCds are of interest to some modelers because battery power to our R/C systems becomes the single most important item in reliability and performance. To know more about one's batteries, special after market chargers have been developed with other features. What would these features have to be in order for you to know that the power source to your model is giving everything it can. Let's list some very enticing ideas for an after market charging device that would really keep your batteries disciplined.

**Specifications:** Unit would be AC operated and have a transmitter output that was capable of charging any combination of cells from 1 to 9 (voltage range 1 to 12) at a 50 mA for an overnight charge. It would then automatically switch to a 10 mA trickle charge to maintain a ready-for-use transmitter on an instant notice. It should be able to discharge a transmitter battery, whether 8 or 9 cells, at a 300 mA rate to give an indication of the battery capacity in milliamp minutes with a LED indicating display that can be converted to mAh.

A receiver output should be able to charge 1 to 9 cells (1 to 12 volts) at 1 to 200 mA on an overnight charge with automatic cutback to 10 mA trickle charge for maintaining the receiver battery pack. You want to be able to select a 300 or 500 mA discharge rate on a 4 or 5 cell battery pack to test the batteries' capacity and reduce low power output memory with a LED display to give an indication of the battery capacity; then, when finished in the discharge cycle, automatically switch to the overnight charge rate.




*Photo #1: RK Electronics Battery Management System One after market maintenance battery charger cycler that just about does everything one would need to know and keep R/C system batteries under control.*

It should have an auxiliary charging facility to be able to charge any battery from 1.2 volts to 12 volts at 125 mA on an ovenight charge with automatic switchback to a 25 mA trickle charge for the glow plug start battery or power panel power supply.

On an AC power failure, the unit would always return to the overnight charge rate and has no effect on batteries to discharge them upon total AC power failure and is reverse polarity battery protected.

With these specifications, taking care of R/C NiCds would be a pleasure. Is there such a charger available? Why sure there is! It is built by RK Electronics, 304 Fox Run Hudson, New Hampshire 03051, and is called the Battery Management System One. The above specifications fit this RK Electronics unit because that is what has been outlined for a most agreeable after

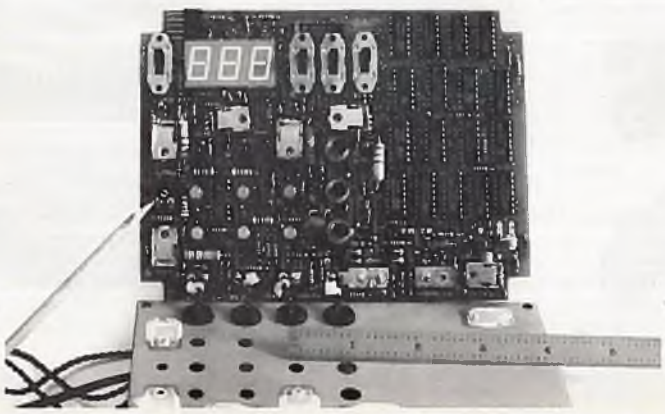


*Photo #2: The inside view of the BMS One charger showing location of the adjustment potentiometer for changing charging current for receiver battery packs from 1 mA to 200 mA. Unit comes factory adjusted for 50 mA.*

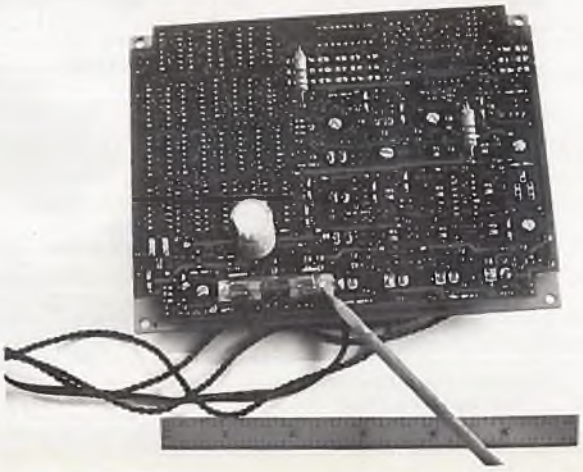


*Photo #3: BMS One charger showing complexity of the unit as also shown in Photo #2, and pointing to the power fuse location. Unit is of very high industrial grade construction.*

market charger. The RK people spent considerable time doing some research in what was desired by the modeler for the basic requirements in the battery department and came up with this BMS One (Battery Management System One). This charger has many more high points that I did not list. It becomes an after market charging device which would take the worry out of battery charging.

Let's take a look at the BMS unit itself and point out a few more details of its operation. Photo #1 shows the front control panel arrangement. Everything is well-placed with pushbuttons, switches, and LED indicators. This layout is so simple it almost becomes self explanatory to operate without having to read the instructions. Everything is so visual for its basic use, one doesn't need a telephone book of instructions to operate it. There are some things that should be clarified over and above the outline of specifications that I have given. The reference to the overnight charge with this unit constitutes a timed interval of 17 hours automatically every time power is interrupted or the overnight pushbutton is depressed. This is fixed and is not a changeable option. Likewise, all batteries connected will automatically go into trickle charge after the timed 17 hours has been reached in the overnight charge mode or when any one of the single trickle pushbuttons are depressed. The adjustment for the receiver overnight charging current has been factory adjusted to 50 mA. However, this can be changed if charging other than a 500 mA battery pack by using the screwdriver adjustment hole on the front face plate. Photo #2 shows the inside of the BMS One and the well-made complexity of PC board components. The pointer is showing what the adjustment looks like under the front panel for the current adjustment. One should be very careful in readjusting this potentiometer randomly without some form of indication to the value of the current being adjusted. A temporary AMP meter, in series with the receiver battery being charged, would be necessary. Photo #3 is the backside of the BMS One PC board showing the placement of the .76 AMP fuse for power protection. This means that if for any reason the unit failed to start operating, one would have to remove the four Allen set screws from the face plate and pull the plastic case to get at this fuse.

To sum up this review, take another look at the photos which will show you the complexity of this unit with its well laid out functional workings. The overall workmanship gives the impression of an industrial grade type of an after market unit that will give many years of trouble free use. The suggested retail price of $189.95 would seem to be a little on the expensive side, but you pay for what you get and that is dependable quality merchandise that gets the job done.

For more detailed information about RK Electronics products and this cycler charger, a phone call at RK to Ralph Keyslay, (606) 882-6022, would be more than welcome. □


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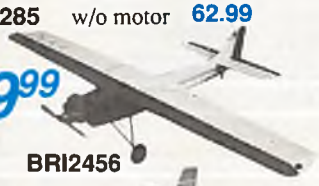
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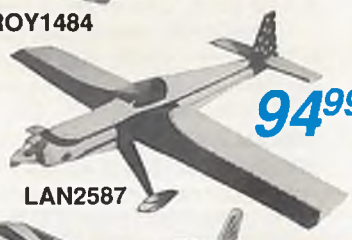


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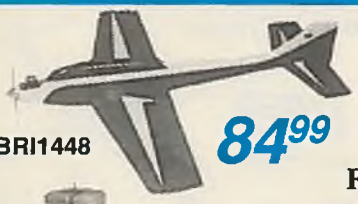
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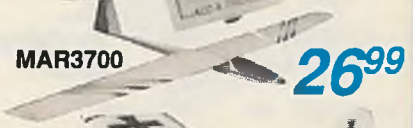


8.99

- Adds trickle charge to any overnight charger.
- Maintains fully charged state at all times.

## Bob Martin Bobcat

MAR3700



26.99

- Aileron control is featured on this 2 meter sailplane for a new dimension in control and performance.

## Long Tai Shin Ugly Stick



| | | |
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| LON1000 | .40 ARF | 99.99 |
| LON4000 | .60 ARF | 129.99 |

- Famous design now pre-built and pre-covered ready for your engine and radio.

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# OmniModels®

## World Engines Expert 7 Channel



209.99
WOR5280**

- 1991 FM receiver for solid control.
- Servo reversing, dual rates and mixing.

## Royal Digital Tach




32.99 ROY7622

- Measures engine speed from 100 to 29,000 rpm.
- Liquid crystal display readable even in direct sunlight.

## Cox E-Z Bee II

62.99



COX1370

- Simple to build, easy to fly.
- 55" span for 2 channel-includes engine.

## Royal Energized Locking Socket

17.99
ROY7512



- Easy to use, portable glow plug ignitor.
- Charger includes.

## Royal Power Panel

19.99
ROY7424




- Powers glow plug, starter fuel pump from 12v source.
- Mounts easily on field box.

## SERVO SALE




**Royal Titan Servos**
12.99
- Standard size servo for general applications
- Weight 1.8 oz., Torque 48.7 oz.-in.

**Royal Micro Titan Servos**
23.99
- Perfect for .049 models and gliders.
- Weight .9 oz, Torque 27 oz.-in.

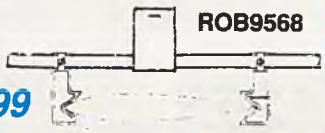
**Royal Maxi Servos**
23.99
- For 1/4 scale applications.
- Weight 2.7 oz., Torque 112 oz.-in.

**Royal Mini Titan Servos**
16.99
- For lightweight small size applications.
- Weight 1.1 oz., Torque 33.5 oz.-in.

**Royal Shorty Titan Servos**
12.99
- A little shorty for tight places.
- Weight 1.4 oz., Torque 44 oz.-in.

All Royal servos are available with JR, Airtronics, World/Aristocraft, Futaba G or J connectors.

ROB9568



## Robart Incidence Meter

- Sets proper thrust, stabilizer and wing incidence.

19.99

GOL1455

## Goldberg Sophisticated Lady



30.99

- Realistic appearance and top performance.
- 2 meter wing span for 2 channel radios.

## Sig Astro Hog

64.99



SIG3793

- The national model aerobatic champion from 1957, the Astro Hog is now the perfect sport flyer for .60 size engines.

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| SMI7000 | Thin 2 oz. | 5.99 |
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## Bob Smith Insta Cure

- Highest quality CA adhesive at the lowest prices.

## Sure Flite P-40 Warhawk ARF



39.99
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- All-foam model of the famous WWII Flying Tigers fighter plane that is designed for the sport flier. 51" span .40 engine.

## Hobby Dynamics Gobee 40



54.99
HYD1500

- Intermediate trainer that builds light and strong.
- 62" span for .40 engines.

## Hobby Dynamics RFB Fan Trainer




- Jet performance the easy way — no ducted fan unit.
- Spans 69" for .40-.50 size ABC engines.

86.99
HDY1600

## Royal Heat Gun & Iron



- High quality tools to take care of all your covering needs.

Combo 26.99

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| ROY9602 | Gun | 15.99 |
| ROY9624 | Iron | 13.99 |

## Thunder Tiger Voltmeter



13.99
THU6500

- Expanded scale voltmeter tests radio under simulated load.

## Lind Magic Magnet Builder



- Metal building board that uses magnets instead of pins.

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| LIN5000 | Magnet Builder | 59.99 |
| LIN5500 | Master Builder | 104.99 |

## Midwest Aero-Stars



- Two of the top rated trainers in R/C.

| | | |
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| MID1000 | Aero-Star 20 | 53.99 |
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## Aristocraft 5 Channel PCM



**139.99**
ARI6124**

- 1991 FM PCM receiver for top interference rejection capability. Fail safe mode gives warning of low receiver battery voltage.

## Goldberg Super Chipmunk



**71.99**
GOL1210

- Replica of famous stunt plane that does every maneuver in the book.

## Goldberg Mirage 550



**49.99**
GOL1315

- Sport-trainer that really performs!
- 54" span, uses standard 6–7 cell battery packs.
- Motor included.

## Royal P-38 Lightning



**244.99**
ROY1462

- An all-time classic with true fighter performance.
- 74" span for .40-.60 engines.

## Dynaflite Cessna Trainer



**36.99**
DYN1500

- Flies like a trainer but looks like a real airplane.
- 62" span for .30-.45 engines.

## Goldberg Cub

- The Cub is one of the most popular airplanes both full size and as a model.
- Goldberg Cub, 76" span for .40-.61 engines.



**55.99**
GOL1175

## Goldberg Electra Deluxe w/Motor

- Fast building glider
- 78-1/4" wingspan
- Comes with 550 motor



GOL1350
**43.99**

## Flite Line Scat Cat 500

- Sport racing plane that flies only one way—fast!
- 51" span for .40 size engines.



**29.99**
FLI4375

## Y.S. 1.2–4 Stroke

- Supercharged and pressurized for power unmatched by other 4-stroke engines.

YSE4855



**369.99**

## Lanier Stinger

- A giant scale kit that flies like a .40 size pattern ship.
- Spans 84" for 1.2-4.2 engines.



LAN0900
**179.99**

## Sig Kadet Sr. & Seniorita



SIG1000 Senior 48.99
SIG1147 Seniorita 35.99

- Gentle stable trainers
- Seniorita spans 63" for .15-.25 engines.
- Senior spans 78" for .35-.45 engines.

## Goldberg Gentle Lady

GOL1490



**21.99**

- Great glider for the beginner.
- Large 78-1/4" wing span and requires a 2 channel radio.

## Royal Staggerwing



ROY1550
**159.99**

- A classic from the WWII era, comes with civilian or military decals.
- For .60-.80 engines.

## Cox Silhouette

**59.99** COX 1504



- A pre-built glider with performance.
- Tight and strong with good wind penetration.
- 55" span.

## Goldberg Eagle II



**49.99**
GOL1105

- New updated Eagle 63 is now an even better trainer!
- 63" span for .29-.45 engines.

## ARISTOCRAFT 457 4 CHANNEL FLITE PACK WITH 2 SERVOS PLUS A FREE TRANSMITTER



**49.99**
ARI5158**

FREE transmitter? What's going on here? Okay, this really is a complete 4 channel radio system. It includes a transmitter, receiver, two standard servos, switch harness, battery box and accessories all for only $49.99. Folks, this is a deal and the supply is limited. In fact we think that this is such a deal that the flite pack alone is worth the price and you can throw the transmitter away! Where else will you find 2 servos, receiver and all the other airborne components for $49.99?

So, if you have always wanted to try R/C combat, practice inverted limbo, or try that slope-soaring Stearman you've always dreamed about, here's your chance. Don't risk that $400 microprocesser equipped, PCM, 8 channel job. Get an Aristocraft 457 and do something a little crazy this time. After all, having fun is what this hobby is all about. (Note that the radio is a dry system which means it does not include batteries. We suggest that you use AA NiCd cells so you will have a rechargable system.)

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## Omni Ultimate Trainer

- Designed by professional flight instructors.
- .60 size spans 94" and comes with video instructions.
- .40 size spans 70".

**OMN1010** .60 w/video 106.99
**OMN2500** .40 56.99



MAR4600

26.99

## Bob Martin Talon

- Small, fast and aerobatic, the Talon will change your ideas about sailplanes.



SIG6160

44.99

## Sig Ninja

- Aerobatic slope soarer with strong ply fuse.
- 58" span for 2 channels.



41.99

SUR5500

## Sure Flite Spitfire ARF

- Molded foam fuse and one piece wing make building this difficult model a breeze.
- 50" span for .40 engines.



44.99

DUM2628

## Dumas Big Swamp Buggy

- Quick building and simple to operate.
- 31" long for .40-.60 engine.

## Astro Flight Challenger & Mini-Challenger



- Past NATS champion with a climb rate you have to see to believe.
- Designed for electric power.

**AST1310** Challenger 34.99
**AST1620** Mini-Challenger 29.99
**AST1775** Mini w/.035 mtr 99.99

## Dynaflite Fun Scale Corsair

- An easy to build and fly model of this favorite WWII fighter.



59.99

DYN2300

## Bob Smith Epoxy

- Super strong, non-brittle epoxy for construction or repair.



**SMI1000** 5 Minute 6.99
**SMI3250** 10 Minute 6.99
**SMI5500** 30 Minute 6.99

## Ace Digipace

- Detects the usable time span of your radio's battery packs.



**ACE8536** 20/50 Cycler 94.99
**ACE8693** 50/120 Cycler 94.99
**ACE8850** 50/120 w/Autotrk 119.99

## GM Thermal Charger

- Unique pusher sailplane design flies great and protects motor in mishaps.
- Includes Leisure 05 motor, switch and prop.

GMP7750



47.99



SIG5116

46.99

## Sig Four-Star 40

- Strong sport model with fun fly performance.
- 59-3/4" wing for .40 motors.



## Ace 4-Cycle Bipes

- Strong good flying sport biplanes designed for 4 cycle power.

**ACE2099** 4-40 56.99
**ACE2256** 4-60/90 79.99
**ACE2413** 4-120 119.99



63.99

ACE3550

## Ace Bingo

- Super sport plane for everyday flying.
- 70" wing span for .40–.61 engines.



219.99

SIG1735

## Sig Spacewalker

- Super realistic, giant scale model that will impress and challenge you.
- 104" span with aerobatic performance.



107.99

DYN5500

## Dynaflite Sensor 117

- Modern sailplane design with a super light fiberglass fuselage.
- A top performer spanning 117".

## Field Equipment Sale




- Special combo including all field equipment listed...

99.99

**ROY7336** Royal heavy duty electric starter 27.99
**ROY7446** Royal 12V fuel pump 13.99
**THU7256** Thunder Tiger sealed 12V battery 26.99
**THU8038** Thunder Tiger 12V batter charger 8.99
**THU6083** Thunder Tiger flight box 17.99
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| ACE2099 Ace 4-40 Biplane | 56.99 |
| ACE2256 Ace 4-60/90 Biplane | 79.99 |
| ACE2413 Ace 4-120 Biplane | 119.99 |
| ACE2570 Ace All Star Bipe | 27.99 |
| ACE2727 Ace Sport T-34 | 48.99 |
| ACE2884 Ace 4-20 | 38.99 |
| ACE3041 Ace 4-40 | 45.99 |
| ACE3198 Ace 4-60 | 59.99 |
| ACE3355 Ace 4-120 | 106.99 |
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| ACE3550 Ace Bingo | 63.99 |
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| ACE4190 Ace Extra 230 33% Scale | 229.99 |
| ACE4200 Ace Clipped Wing Taylorcraft | 209.99 |
| ACE4210 Ace 1/3 Scale Weeks Special | 269.99 |
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| AIR1014 Airtronics Eclipse | 32.99 |
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| AST1620 Astro Flight Mini Challenger | 29.99 |
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| SIG3205 Sig Kwik Bilt P-51 Mustang | 79.99 |
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| SUR3700 Sureflite J-3 Cub ARF | 36.99 |
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| SUR6400 Sureflite P-39 Airacobra ARF | 39.99 |
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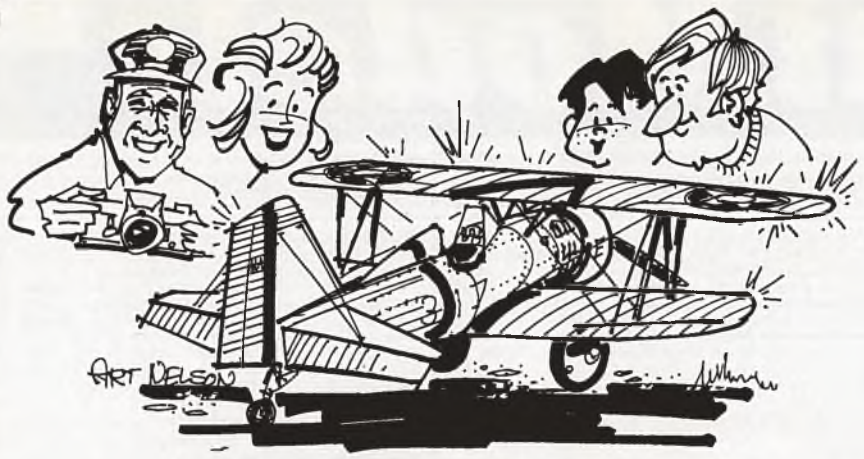
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# SCALE VIEWS

COL. ART JOHNSON

**Gyros In Scale?**

I had a feeling that the use of gyros to help control scale models was going to be a bit controversial after the 1989 Scalemasters contest. Several of the models in the top ten were using them and it certainly did not hurt their performance. How much it helped may be another matter.

The word gyro immediately brings to mind autopilots, programmed control, and other exotic flight techniques. Maybe some day but I think that we are a long way from that right now. I have read some discussion of gyros in the model press but decided that I better get some firsthand knowledge of their use in models before I went off the deep end. I am rather familiar with the use of gyros in full scale aircraft. For example, no F-100 pilot would ever willingly fly the Hun without the yaw gyro operational. You could work your legs off on the rudder and still do a sloppy job of flying. That particular gyro did not do anything else for you. It just kept the yaw under control that is common to aircraft with highly swept wings. Gyro controlled — all attitude auto pilots were a different story. These could hold any heading, altitude or attitude. A punch of a button could fly the aircraft through a very nice Immelmann without your touching the stick (auto-LABS feature). I don't know of any gyro system that will do this for your scale model. Yet!

I have heard suggestions that gyros on models can drive you straight down the runway for take-off in a cross wind, also a gyro could feed in rudder and prevent problems with an engine out on a twin, or a gyro on ailerons can make you fly like Hanno Prettner. My experience so far is a little different.

**Hands On Tests:**

To get some hands on experience, I bought a Futaba G-154 gyro system and an Airtronics SG-1 system. Both of these are single axis rate gyros used primarily to control pitch changes in the tail rotors of helicopters. Helicopters can rotate in yaw rather rapidly and are naturals for the rate gyro treatment.

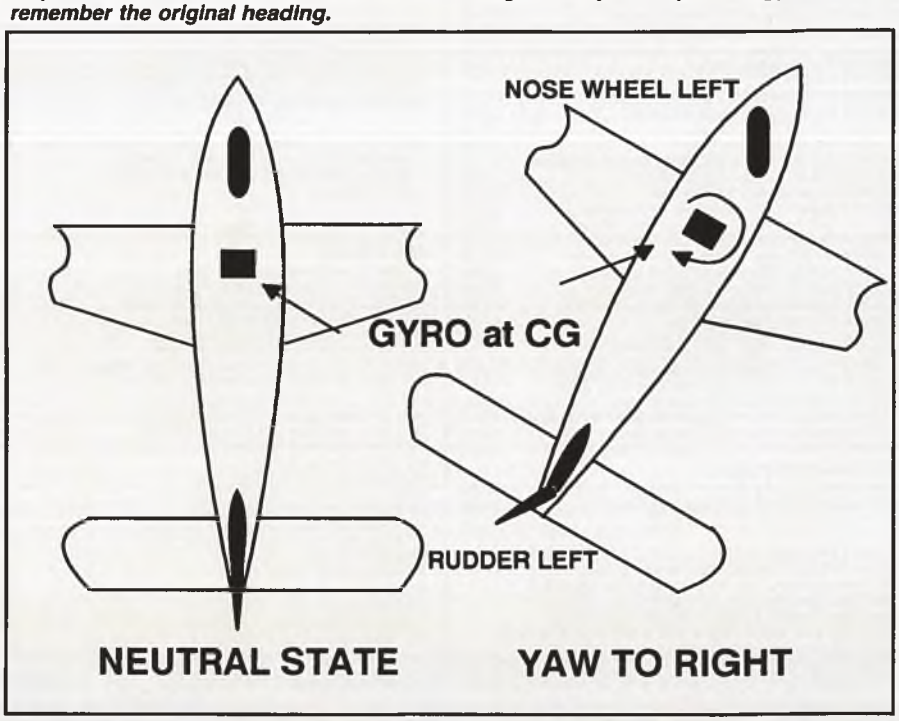
The Futaba gyro was the least complex and least expensive with a single adjustment for sensitivity and a simple mechanical switch to turn on the gyro motor. You might add the cost of a servo if you wish to turn the motor on and off in the air. I installed a micro servo to operate the gyro switch in flight to save battery and aid in tests. The Airtronics gyro had two sensitivity controls and a separate connector to the receiver to turn the gyro on and off in flight from a receiver channel. It also has a mechanical on/off switch for the gyro. I could turn the gyro output on and off with the electronic connection but could not get this separate channel to turn the gyro motor on and off. You could also connect a separate battery to the Airtronics gyro. Something to think about as the Airtronics gyro motor draws 130 mA while the Futaba draws 100 mA.

Now I had to pick a model for the tests. I first became interested in the uses for a gyro when I ran into steering problems on take-off with my model of the Martin B-26. Models of aircraft with canted forward nose gears, Martin B-26, P-39, F-86, and others, tend to get very touchy on steering as speed picks up on the take-off run. I felt that a gyro on rudder and nose gear steering could sense this problem and react faster than I could on the stick. Unfortunately, the B-26 is still in depot maintenance and I had to pick another model. Why not go all out and try a twin tail dragger and check out the other theories on how gyros can help. I just happened to have a natural, the F-82 Twin Mustang.

I had just programmed my nine channel 1024 Futaba transmitter so that I could operate both engines of the F-82 together with the throttle stick in the normal manner or by flipping a toggle switch on top of the transmitter, I could operate either individually — the left engine with the normal stick and the right engine with the channel eight lever on the side of the transmitter. Flipping the toggle switch in flight could cut one engine instantly from full bore to full idle simulating an engine failure in flight.

The available rate gyro systems are very simple to install. They will fit in a small space and you need only to plug them into the receiver and connect to the servo. The gyro is placed close to the C.G. so that the fuselage will rotate around it and not just push it sideways. With the gyro installed to

***Rate gyro puts signal to controls only while yaw is in progress. If gyro sensitivity matches control response, aircraft may return to original heading. If yaw exceeds control response, the controls will neutralize on heading where yaw stops. The gyro will not remember the original heading.***



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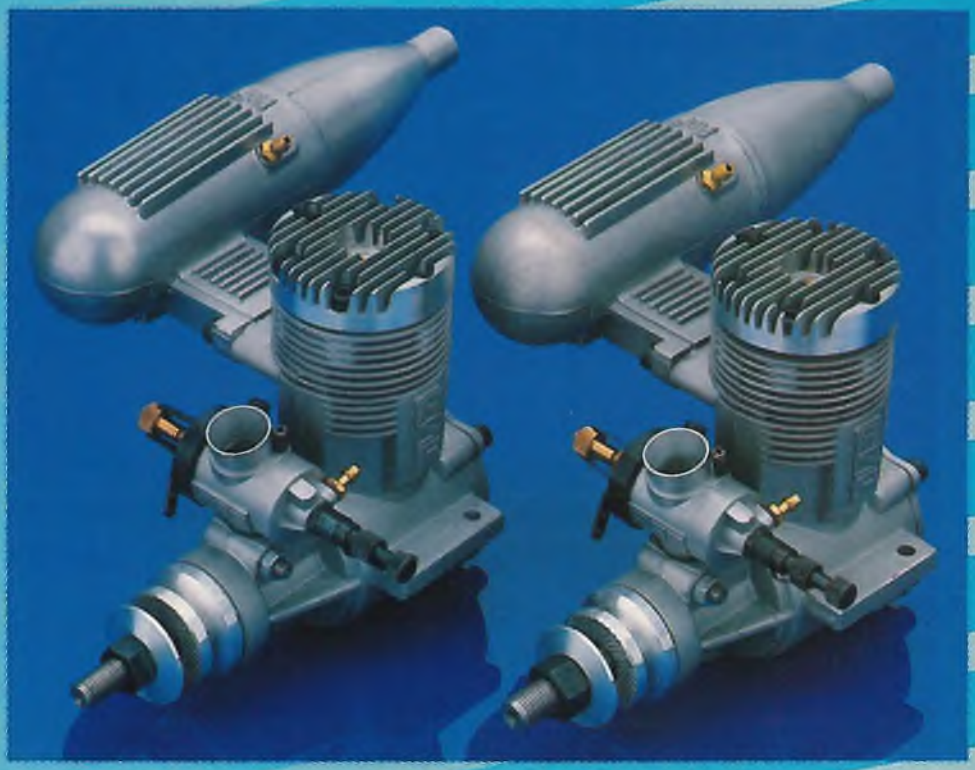
We haven't mentioned it before, as talk is cheap and one might think our price is too low for a performance engine. And well, we are reviewed in magazines as "Sport Engines" that are above average, but are not as good looking as some other brands.



And honestly, we were a little embarrassed to brag too much about performance.

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## ASP 91 FSR ABC

| | |
|---|---|
| Displacement: | 14.97 cc |
| Bore: | 27.30mm |
| Stroke: | 25.5mm |
| Weight: | 810 grams |
| Output: | 2.06/17,000 Kw/RPM |

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| | |
|---|---|
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Above: The New ASP 32 ABC Helicopter w/Cone Starter

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operate both rudders and both tail wheels of the F-82 I was ready for tests. Now I was aware that a rate gyro is not a directional



***Futaba FP-G154 gyro system mounted with servo tape for quick installation. Micro servo added to provide in-flight gyro on-off from separate receiver channel. Gyro system connects between receiver and servo for desired control channel.***

gyro slaved to a magnetic compass and that it does not have any magic heading hold features. All it can do is put out a signal to the servo proportional to the rate at which yaw takes place around the gyro axis. This means that while the fuselage is actually changing direction a signal is put out to the rudder servo. Stop the rotation and the signal stops. The rudder goes to neutral and the gyro waits for another yaw from the new position. At higher speeds the rudder change from the gyro may be enough to keep the fuselage heading fairly straight. At the start of take-off when the model is moving slow in a cross wind this is not so. The F-82 still needed full manual rudder for control in a cross wind and the gyro was of no noticeable help on take-off. Remember, this was a tail dragger, it can be different with nose gear steering.

Okay, so let's try the engine out theory. A pass down the runway, a flip of the lever and the right engine is out (almost). The model twitches to the right slightly, returns and continues straight down the runway with full bore on the left engine. Boy! It looks like this gyro is really the answer. To confirm we will shut off the gyro and make another pass. Same engine shut down and the model does exactly the same thing. It was not any different without the gyro. I had

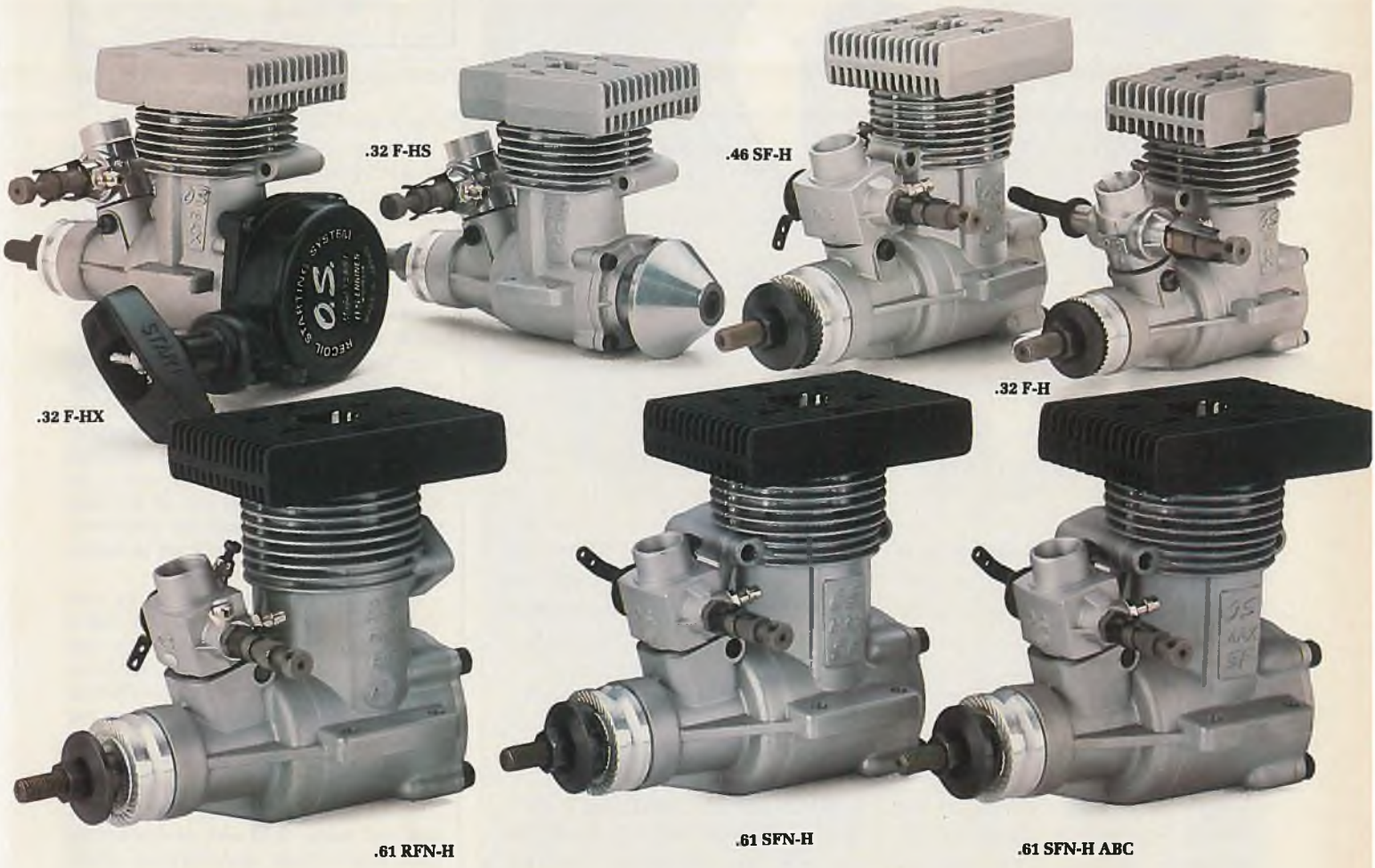


***This shows an Airtronics' gyro system fitted into small space between receiver and servos. Gyro is on left, gyro mixer control in center (foam protection removed for clarity), and switch box with dual sensitivity pots in upper right. Gyro should be near C.G.***

forgotten that the F-82 is a very stable airplane on one engine.

Actually, you cannot expect a rate gyro to do much for an engine out situation. It will not hold the rudder for you — it will not put rudder trim in — all it will do is kick the rudder for a second when the initial yaw occurs. If the yaw continues slowly towards

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| .61 SFN-H<br>.61 SFN-H ABC | 19.9 oz. | 2,000-17,000 | 1.8 bhp/17,000 RPM | Available in ringed piston and ABC models with a 6B carburetor providing the correct fuel-air mixture throughout the RPM range. |
| .61 RFN-H<br>.61 RFN-H ABC | 20.5 oz. | 2,000-16,000 | 1.7 bhp/16,000 RPM | Consistent power and torque allows tight loops and rolls without hesitation. Both ringed piston and ABC versions are equipped with the 6B carburetor. |

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the dead engine, the gyro will do nothing useful. Very little signal is put out in a slow rotation. The gyro will resist the turning motion of a spin but only after the spin has started. It will not stop you from getting into one that starts from a stall.

Well maybe the F-82 Twin Mustang flies too well to make a good test bed. Let's put the gyro on the rudder control in the Republic P-43 Lancer. This is a short coupled aircraft with a very small fin that was squirrely on rudder in the original. If a gyro will help any tail dragger, this is the one. Again, the wind is 45 degrees to the runway (does it ever blow down it?) A slow start is made and as soon as the tail comes up the model swerves into the wind. Full manual rudder for the rest of the take-off roll. No noticeable help from the gyro.

In the air the P-43 normally had a slight tendency for rudder walk. The gyro seemed to eliminate this. At least until the model entered a dive and picked up speed. The model then started a rudder oscillation that continued until speed was reduced. It was apparent that the gyro sensitivity was set too high. Reducing it stopped this problem. Directional control was good on landing and after touch down the model rolled very straight. The gyro seemed to help with the higher speed on landing.

With the gyro only so-so on rudder, I thought I better try it on ailerons. The rate gyros will operate any control so long as you mount it so that the rotation of the fuselage is around the axis you want to control. Servo tape holds the gyro so that it is easy to change position. The gyro does a nice job holding the wings level so long as you leave the stick alone. It will hold a bank after you enter it but look out for the rolls. Contrary to my original thoughts, moving the stick does not cut out the gyro signal. The signal comes through to the servo adding to or subtracting from the stick movement. This becomes very apparent on ailerons when you try to roll. The gyro fights the roll all the way around. Nice for slow rolls but you better have plenty of aileron throw set in before you experiment with this one.

I did not have a model with a touchy nose wheel ready for tests but I am sure that a gyro would help in this situation and perhaps make take-offs safer (it worked fine on the nose gear of a Sig King Kobra but the Kobra tracks pretty straight without the gyro).

It is understandable that gyros were banned from pattern competition some years ago. This type of flying is a pure test of stick and rudder skills with models having very similar flight characteristics. Scale competition is a test of a modelers ability to create an illusion of realism in the flight of his model. The scale models themselves can have wildly different flight characteristics. So did the originals. Rate gyros were used on some aircraft to control adverse flight problems. If a gyro can help make a difficult scale model fly more like the original, then it might be the way to go. After all, most of our scale models are not being judged for their ability to do pattern type maneuvers.

With my experiments to date, I would not bother adding gyro to a model of a J3 Cub or a good many other planes for that manner (F-82 for example). It would be a waste of time and money. I might want to add one to a scale model that has designed in control problems. It could be safer and make the difference between being able to compete with it or hang it on the shelf. With what this modeler knows to date, I think the jury is still out when it comes to gyros for scale flying. □

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**ENGINE: .45-.60 2 CYCLE, .60-.90 4 CYCLE**

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# RCM PRODUCT REVIEW

## Great Planes Model Dist.
# STURDY BIRDY





## SPECIFICATIONS

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| Name | STURDY BIRDY |
| Aircraft Type | 3 Channel Trainer |
| Manufactured By | Great Planes Model Dist. Co.<br>1608 Interstate Dr.<br>Champaign, Illinois 61820 |
| Mfg. Suggested Retail Price | $69.95 |
| Available From | Retail Outlets |
| Wingspan | 53 Inches |
| Wing Chord | 9½ Inches |
| Total Wing Area | 504 Sq. In. |
| Fuselage Length | 43 Inches |
| Stabilizer Span | 19½ Inches |
| Total Stab Area | 87¾ Sq. Inches |
| Mfg. Rec. Engine Range | .20-.30 2-stroke |
| Recommended Fuel Tank Size | 6 Oz. |
| Recommended No. of Channels | 3 |
| Rec. Cont. Funct. | Rud., Elev., Throt. |
| Basic Materials Used In Construction: | |
| Fuselage | PVC Aluminum |
| Wing | Foam |
| Tail Surfaces | Balsa |
| Building Instructions on Plan Sheets | No (not req'd) |
| Instruction Manual | Yes (20 pages) |
| Construction Photos | Yes |

## RCM PROTOTYPE

| | |
|---|---|
| Radio Used | Airtronics SR-6 channel (w/1991 dual conversion) |
| Engine Make & Disp. | .28 Royal/.25 O.S. |
| Tank Size Used | 6 Oz,. |
| Wt. Ready to Fly | 72 Oz. (4.5 Lbs.) |
| Wing Loading | 20.57 Oz./Sq. Ft. |

## SUMMARY

**WE LIKED THE:**
Quick and easy to build, smooth flight characteristics.
**WE DIDN'T LIKE THE:**
Motor mount screws were short (see text for additional info).

Hobbico's Sturdy Birdy is designed to let the beginner concentrate on flying with assembly time reduced to the bare minimum. This birdy sports a PVC fuselage, an aluminum boom, and a molded foam wing. The tail feathers are 1/4" balsa and of good quality. Stability is built into this plane with a wingspan of 53" and an overall length of 43".

Our Sturdy Birdy came well boxed with a shopping list of required additional equipment printed on the front. We found the list to be accurate and short (wheels, covering, fuel tank, fuel line, engine, and radio). Two bags contain the small wood pieces and the supplied miscellaneous hardware. The foam wing sections are neatly protected in their own compartment and were in excellent condition. The rest of the parts were laid out nicely in the box.

The fuselage is pre-drilled for the wing dowels, engine mount, landing gear, and the boom. The stabilizer is bolted to the bottom of the boom and the fin seats nicely in the center. The true beginner may not appreciate this benefit but, their first plane will be straight and true.

Hobbico did an excellent job of documenting all aspects of construction for beginners including, additional items needed, balancing, getting ready to fly, flying, and even repairing. We appreciated the "why" pointers given as well as the "how to"!

**Construction:** Quick, easy, and straight! There are no plans needed and the construction is broken down into 76 detailed steps along with good quality photos accompanying over 50 of the steps. The instruction book is 20 pages long and very well done.

The tail feathers are constructed first. They are pre-cut so all that is necessary is some CA glue, a little sanding, and covering. We used #100 sand paper to round the edges and #220 to put the final touches on before covering. The tail feathers were then bolted onto the aluminum rail (boom). We used Satellite City "UFO" Thick, Thin, and Hot Shot Accelerator to get the job done on all gluing except to join the wing together.

The wing construction is done next. This is quick, simple, and will give you a very strong unit. A very light touch of #240 sand paper was all that was necessary to clean up the mold marks and #320 was used to finish up for covering. Use 30 minute epoxy to join the wings so the heat from the curing does not damage the foam. We taped the bottom and top of the wing as directed for more strength with aerobatics. UFO Thick was used to attach the plastic center section as it does not attack foam.

The engine mount is a "break-away" type that only requires mounting the engine to a firewall that has a doubler which fits into the fuselage. This whole assembly is then held to the fuselage with rubber bands; Quick, simple, and effective! The instructions called for and we were supplied with 4-40 x 3/4" screws to attach the motor mount to the firewall. The screws need to be 1" long.

Your radio is then installed "on the aluminum rail" by pressing the servos into the channel and taping them down. Standard servos fit tight on the rail. The receiver was padded and taped behind the servos. We then taped the on-off switch to the side of the receiver. The switch is easily reached from the back of the fuselage, which is open.

The last step is the easiest. No construction is required on the fuselage. Just slide the channel into the fuselage with the tail feathers and radio attached, add the landing gear, bolt it all down, attach on the engine, and there you go!

**continued on page 185**

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Wing Span 63" | Wing Area 715 s.i.

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### Midwest Aero Star 40
Kit Price $63.99



Wing Span 62" | Wing Area 675 s.i.

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### Almost Ready to Fly Royal 40H
Kit Price $99.99



Wing Span 57" | Wing Area 572 s.i.

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### Duracraft Duraplane II
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Wing Span 45" | Wing Area 495 s.i.

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### Sig Kadet
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Wing Span 78" | Wing Area 1150 s.i.

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**Includes: Kadet Kit**
Futaba 4NBL 4 channel radio w/3 servos
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Kit Price $99.99



Wing Span 68½" | Wing Area 736 s.i.

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and .40 ABC Engine

### Deluxe Field Package



**138.99**

**Includes:** Hobbico Ultra Tote **Field Box,** Royal Hot Head **Locking Socket, 12 Volt 5.5 amp. Battery,** Royal **Battery Charger,** Royal **Power Panel,** Varicom **Heavy Duty Starter, Fuel Pump, Metal Fuel Can,** Dubro **Fuel Can Fitting, and 4-way wrench.**

### Sig Senorita
Kit Price $38.99



Wing Span 63" | Wing Area 746 s.i.

**254.99**

**Includes: Senorita Kit**
Futaba 4NBL 4 channel radio w/3 servos
.28 ABC Engine, 2 Rolls of MonoKote (specify colors)
Wheels, Fuel Tank, Spinner and MORE!!

### Hobby Lobby Telemaster 40
Kit Price $76.99



Wing Span 73" | Wing Area 848 s.i.

**304.99**

**Includes: Telemaster 40 Kit**
Futaba 4NBL 4 channel radio w/4 servos
.40 ABC Engine, 2 Rolls of MonoKote (specify colors)
Wheels, Fuel Tank, Spinner, and MORE!!

### Almost Ready To Fly Hobby Lobby Telemaster 70
Kit Price $170.99



Wing Span 70" | Wing Area 695 s.i.

**330.99**

**Includes: Telemaster 70(ARF)**
Futaba 4NBL 4 channel radio w/4 servos
and .40 ABC engine

### Royal Titan II Servos



For Futaba, Airtronics, JR, Aristo, and Expert (Specify Connector)

| | | | |
|---|---|---|---|
| Standard | 13.99 | Mini | 16.99 |
| Shorty | 14.99 | Micro | 23.99 |

### Great Planes PT-40
Kit Price $55.99



Wing Span 60" | Wing Area 675 s.i.

**285.99**

**Includes: PT-40 Kit**
Futaba 4NBL 4 channel radio w/4 servos
.40 ABC Engine, 2 Rolls of MonoKote (specify colors)
Wheels, Fuel Tank, Spinner and MORE!!

### Great Planes Electric Cub
Kit Price $60.99



Wing Span 59¼" | Wing Area 480 s.i.

**227.99**

**Includes: Electric Cub Kit**
Futaba 4NBL 4 channel radio w/3 servos
7.2V Battery Pack, and Battery Charger

### Great Planes Super Decathlon 40
Kit Price $78.99



Wing Span 64" | Wing Area 694 s.i.

**305.99**

**Includes: Decathlon 40 Kit**
Futaba 4NBL 4 channel radio w/4 servos
.45 ABC engine, 2 rolls of MonoKote (specify color)
Wheels, Fuel Tank, Spinner and MORE!!

### GLUES
#### CYANOACRYLATE

| | |
|---|---|
| CDH Thin 1 oz. | 2.99 |
| CDH Thin 2 oz. | 5.59 |
| CDH Gap 1 oz. Filling | 2.99 |
| CDH Gap 2 oz. Filling | 5.59 |
| CDH Gap 8 oz. Refill | 17.99 |
| CDH Super Thick 1 oz. | 2.99 |
| CDH Super Thick 2 oz. | 5.59 |
| CDH Odorless Thin 2 oz. | 12.99 |
| CDH Odorless Thick 2 oz. | 12.99 |
| CDH CA Debonder | 2.99 |
| CDH Accelerator 2 oz. | 2.99 |
| CDH Accelerator Refill 10 oz. | 6.99 |

#### EPOXY

| | |
|---|---|
| CDH 5 min. Epoxy 4½ oz. | 3.99 |
| CDH 5 min. Epoxy 9 oz. | 5.99 |
| CDH 15 min Epoxy 4½ oz. | 3.99 |
| CDH 15 min Epoxy 9 oz. | 5.99 |
| CDH Finishing Epoxy 4.5 oz. | 4.99 |
| CDH Finishing Epoxy 13 oz. | 7.99 |

### Almost Ready to Fly Royal 20T
Kit Price $73.99



Wing Span 50½" | Wing Area 437.5 s.i.

**265.99**

**Includes: 20T Trainer (ARF)**
Futaba 4NBL 4 channel radio w/4 servos
.28 ABC Engine

### Dynaflite Butterfly
Kit Price $46.99



Wing Span 99" | Wing Area 916 s.i.

**189.99**

**Includes: Butterfly Kit**
Futaba 4NBL 4 channel radio, and
Cox .09 Engine

### Goldberg Freedom 20
Kit Price $34.99



Wing Span 55½" | Wing Area 440 s.i.

**253.99**

**Includes: Freedom 20 Kit**
Futaba 4NBL 4 channel radio w/4 servos
.28 ABC Engine, 2 rolls of MonoKote (specify colors)
Wheels, Fuel Tank, spinner and MORE!!

### Royal Heat Gun, Iron and 2 Rolls of Opaque MonoKote
(Specify Colors)



**Metallic Colors** add $1.50 per roll additional.
**Frosted Colors** add $2.00 per roll additional.

**44.99**

# Glider Packages

### Airtronics Olympic II



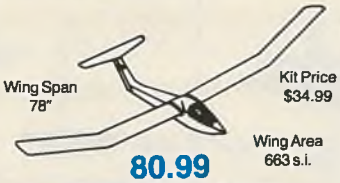
Kit Price $56.99

Wing Span 99" — Wing Area 928 s.i.

**105.99**

**includes: Olympic II Kit**
and Futaba 2 channel radio

### Goldberg Sophisticated Lady



Wing Span 78" — Kit Price $34.99 — Wing Area 663 s.i.

**80.99**

**includes: Sophisticated Lady Kit**
and Futaba 2 channel radio

### Great Planes Electrostreak



Kit Price $56.99

Wing Span 44" — Wing Area 340 s.i.

**195.99**

**includes: Electrostreak Kit**
Futaba 4NBL 4 channel radio
7.2V Battery Pack, and Battery Charger

### Goldberg Gentle Lady



Kit Price $23.99

Wing Span 78" — Wing Area 663 s.i.

**97.99**

**includes: Gentle Lady Kit**
Futaba 2 channel radio, and High Start

### Almost Ready To Fly Royal Powersoar



Kit Price $86.99

Wing Span 66" — Wing Area 495 s.i.

**156.99**

**includes: Powersoar (ARF)**
Cox Tee Dee .049, and Futaba 2 channel radio

### DCU Stryker Super Slope Soarer



Kit Price $80.99

Wing Span 50" — Wing Area 400 s.i.

**132.99**

**includes: Stryker Kit**
and Futaba 2 channel radio

### Sig Ninja



Kit Price $43.99

Wing Span 58" — Wing Area 500 s.i.

**88.99**

**includes: Ninja Kit**
and Futaba 2 channel radio

### Hobby Lobby High Sierra



Kit Price $115.99

Wing Span 79" — Wing Area 490 s.i.

**155.99**

**includes: High Sierra Kit**
and Cox 2 channel radio w micro servos

### Goldberg Electra Deluxe



Kit Price $49.99

Wing Span 78" — Wing Area 663 s.i.

**185.99**

**includes: Electra Deluxe Kit**
Futaba 4NBL 4 channel radio,
7.2V Battery Pack, and Battery Charger

### Graupner Electro-Uhu



Kit Price $90.99

Wing Span 67" — Wing Area 449 s.i.

**257.99**

**includes: Uhu Kit**
Futaba 4NBL 4 channel radio, Graupner Drive System
7.2V Battery Pack, and Battery Charger

### Aeronaut Aerofly



Kit Price $141.99

Wing Span 100" — Wing Area 691 s.i.

**275.99**

**includes: Aerofly Kit**
Futaba 4NBL 4 Channel Radio,
7.2V Battery Pack, and Battery Charger

### Great Planes Spectra



Kit Price $59.99

Wing Span 78½" — Wing Area 676 s.i.

**200.99**

**includes: Spectra Kit**
Futaba 4NBL 4 channel radio
7.2V Battery Pack, and Battery Charger

### Almost Ready To Fly Royal Easysoar



Kit Price $86.99

Wing Span 66" — Wing Area 495 s.i.

**138.99**

**includes: Easysoar (ARF)**
and Futaba 2 channel radio

### Sig Riser 100



Kit Price $50.99

Wing Span 100" — Wing Area 1000 s.i.

**106.99**

**includes: Riser 100 Kit**
and Futaba 2 channel radio

### Robbe Kormoran Electric Canard Glider



Kit Price $148.99

Wing Span 68" — Wing Area 465 s.i.

**279.99**

**includes: Kormoran Kit**
Futaba 4NBL 4 channel radio
8.4V Battery Pack, and Battery Charger

### Airtronics Eclipse Deluxe



Kit Price $70.99

Wing Span 78" — Wing Area 660 s.i.

**210.99**

**includes: Eclipse Deluxe Kit**
Futaba 4NBL 4 channel radio
7.2V Battery Pack, and Battery Charger

# Speed Boat Packages

### MRP Outrageous Deluxe

Kit Price $123.99



Length 26½" — Beam 10"

**189.99**

**includes: Outrageous Deluxe Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### MRP Fast Cat Deluxe

Kit Price $130.99



Length 26" — Beam 10"

**170.99**

**includes: Fast Cat Deluxe Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### MRP Miss Bud Deluxe

Kit Price $151.99



Length 26" — Beam 13"

**218.99**

**includes: Miss Budweiser Deluxe Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### MRP Fountain Superboat

Kit Price $89.99



Length 41½" — Beam 9½"

**151.99**

**includes: Fountain Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### MRP Skater Deluxe

Kit Price $180.99



Length 35¾" — Beam 10"

**250.99**

**includes: Skater Deluxe Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### MRP Mach I Mirage Deluxe

Kit Price $118.99



Length 28½" — Beam 13"

**260.99**

**includes: Mach I Deluxe Kit**
Futaba 2 channel radio,
and K&B 3.5cc Outboard

### MRP Bud Light Deluxe

Kit Price $143.99




Length 26" — Beam 10"

**200.99**

**includes: Bud Light Deluxe Kit**
Futaba 2 channel radio, Electric Outboard
7.2V Battery Pack, and Battery Charger

### Traxxas Villian IV

Kit Price $131.99



Length 31" — Beam 8¼"

**192.99**

**includes: Villian IV Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### Dumas Big Swamp Buggy

Kit Price $49.99



Length 31" — Beam 17"

**152.99**

**includes: Big Swamp Buggy Kit**
Futaba 2 channel radio
and .40 ABC Engine

### MRP Mach II Deluxe

Kit Price $128.99



Length 30" — Beam 14"

**300.99**

**includes: Mach II Deluxe Kit**
Futaba 2 channel radio
and K&B 7.5cc Outboard

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# BOAT PACKAGES

### Lindberg Constellation

Kit Price $89.99



Length 30" **155.99** Beam 7½"

**includes: Constellation Kit**
Futaba 2 channel radio and 540 Electric Motor

### Victor Soling 1 Meter

Kit Price $89.99



Length 39" **166.99** Beam 9¼"

**includes: Soling Kit**
Airtronics 2 channel radio
Sail Winch, and Rudder Servo

### Lindberg PT 109

Kit Price $53.99



Length 30" **91.99** Beam 6"

**includes: PT 109 Kit**
Futaba 2 channel radio and 540 Electric Motor

### Victor 600 Class Australia II or Stars and Stripes

Kit Price $94.99

**199.99**



Length 39" Beam 8"

**includes: Either Kit**
Airtronics 2 channel radio
Sail Winch, and Rudder Servo

### Midwest Boothbay Lobster Boat

Kit Price $99.99



Length 30" **172.99** Beam 10"

**includes: Lobster Boat Kit**
Futaba 2 channel radio and 540 Electric Motor

### Dumas PT 109

Kit Price $47.99



Length 33" **92.99** Beam 9"

**includes: PT 109 Kit**
Futaba 2 channel radio and 540 Electric Motor

### Midwest Sequin Package

Kit Price $108.99



Length 39" **153.99** Beam 7¾"

**includes: Sequin Kit**
Futaba 2 channel radio and 540 Electric Motor

### Sterling Sea Maid

Kit Price $61.99



Length 27" **100.99** Beam 9"

**includes: Sea Maid Kit**
Futaba 2 channel radio and 540 Electric Motor

### Sterling Missouri

Kit Price $81.99



Length 55" **129.99** Beam 6"

**includes: Missouri Kit**
Futaba 2 channel radio and 540 Electric Motor

### Robbe Sea Wolf

Kit Price $210.99



Length 35" **250.99** Beam 4"

**includes: Sea Wolf Kit**
Aristo Craft 4 channel radio

### Sterling Chris Craft 63' Yacht

Kit Price $90.99



Length 40" **146.99** Beam 10"

**includes: Chris Craft Kit**
Futaba 2 channel radio and 540 Electric Motor

### Dumas Crockett

Kit Price $76.99



Length 51" **110.99** Beam 7½"

**includes: Crockett Kit**
Futaba 2 channel radio and 540 Electric Motor

### MRP Gentry Eagle Deluxe

Kit Price $145.99



Length 43" **201.99** Beam 9"

**includes: Gentry Eagle Kit**
Futaba 2 channel radio
7.2V Battery Pack and Battery Charger

### MRP Italia Deluxe

Kit Price $97.99



Length 25" **148.99** Beam 7"

**includes: Italia Deluxe Kit**
Futaba 2 channel radio
7.2V Battery Pack, and Battery Charger

### Sterling America Scout

Kit Price $95.99



Length 50" **143.99** Beam 7"

**includes: America Scout Kit**
Futaba 2 channel radio and 540 Electric Motor

# Monster Truck and Car Packages

### MRC Lunch Box

Kit Price $109.99



**179.99**

**includes: Lunch Box Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### Kyosho Big Boss

Kit Price $132.99



**187.99**

**includes: Big Boss Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### Kyosho Big Brute

Kit Price $110.99



**177.99**

**includes: Big Brute Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### MRC Blackfoot

Kit Price $117.99



**189.99**

**includes: Blackfoot Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### Royal Crusher

Kit Price $79.99



**154.99**

**includes: Crusher Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### Futaba FX-10

Kit Price $62.99



**136.99**

**includes: FX-10 Kit**
Futaba 2 channel radio,
Battery Charger, and 7.2V Battery

### W.E. Rockbuster

Kit Price $41.99



**113.99**

**includes: Rockbuster Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### MRC Midnight Pumpkin

Kit Price $129.99



**194.99**

**includes: Midnight Pumpkin Kit**
Futaba 2 channel radio,
Battery Charger, and 7.2V Battery

### Associated R/C 10 With Bearings

Kit Price $175.99



**250.99**

**includes: R/C 10 Kit**
Futaba 2 channel radio
Battery Charger, and 7.2V Battery

### Ready to Run Royal Honda

Kit Price $105.99



**125.99**

**includes: Honda (RTR)**
Royal 2 channel radio
Battery Charger, and 7.2V Battery

## AIRPLANES

**DYNAFLITE**

| | |
|---|---|
| Wanderer 72 | $25.99 |
| Piece O'Cake Mark II | 27.99 |

**GOLDBERG**

| | |
|---|---|
| Junior Sky Tiger | 39.99 |
| Sky Tiger | 58.99 |
| Super Chipmunk | 82.99 |
| Ultimate 10-300 | 108.99 |

**GREAT PLANES**

| | |
|---|---|
| PT-20 Trainer | 44.99 |
| Trainer 20 | 44.99 |
| Trainer 40 | 59.99 |
| Trainer 60 | 76.99 |
| Big Stik 40 | 60.99 |
| Big Stik 60 | 70.99 |

**HOBBY LOBBY**

| | |
|---|---|
| Telemaster 66 | $67.99 |
| Senior Telemaster | 128.99 |
| Funster | 73.99 |

**MIDWEST**

| | |
|---|---|
| The Hot 2 | 65.99 |
| Super Hots | 78.99 |

**NE AERODYNAMICS**

| | |
|---|---|
| Sport Air 40 | $67.99 |
| Bel-Air 40 | 83.99 |
| Bel-Air 60 | 99.99 |

## COVERINGS

| | |
|---|---|
| Oracover | 7.99 |
| Coverite | 7.29 |
| Solartex 2 Meter | 7.99 |
| Solartex 5 meter | 19.59 |

## GLIDERS

**AIRTRONICS**

| | |
|---|---|
| Olympic 650 | $39.99 |
| Sagita 900 | 88.99 |

**BOB MARTIN**

| | |
|---|---|
| Bobcat | 29.99 |
| Coyote | 78.99 |
| Talon | 24.99 |

**OFF THE GROUND**

| | |
|---|---|
| Prodigy | 65.99 |
| Quasoar | 128.99 |

**BK PRODUCTS**

| | |
|---|---|
| Std. Start 3/16" Tubing x 25' | 45.99 |
| High Start 3/16" x 100' | 65.99 |

## SAIL BOATS

**VICTOR**

| | |
|---|---|
| Valkrie "M" 50-800 Class | $200.99 |
| Tahoe | 75.99 |
| Mini Soling | 50.99 |
| Soling 1 Meter | 89.99 |
| Mast Boom Upgrade | 37.99 |

## BATTERIES

| | |
|---|---|
| 7.2V Flat or Hump | 20.99 |
| 8.4V Hump or Flat Pack | 25.99 |

**SANYO**

| | |
|---|---|
| 1.2V 550 MA W/Tab | 2.99 |
| 1.2V 1200 MA W/Tab | 3.99 |

## CHARGERS

**PRO-TECH**

| | |
|---|---|
| Current Adj. #701 | $51.99 |
| AC/DC #702 | 42.99 |
| DC #703 | 29.99 |
| Peak Detector #706 | 80.99 |
| Peak Detector #707 | 60.99 |

## ACCESSORIES

| | |
|---|---|
| Dave Brown Fuel Pump | 7.99 |
| Fuel Wizard Pump | 6.99 |
| Robart Super Stand | 5.39 |
| Metal Gas Can | 2.99 |
| Fuel Can Fittings | 2.59 |
| #11 Blades 5 pack | .79 |
| #11 Blades 100 pack | 8.59 |

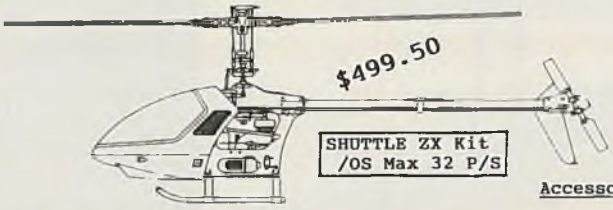
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Skyward ARF Planes

| | | |
|---|---|---|
| 25 ARF Plane | 53" wing | $ 99.50 |
| 40 ARF Plane | 63" wing | 119.50 |
| 60 ARF Plane | 72" wing | 159.50 |
| 120 ARF Plane | 108" wing | 459.50 |

40Fsr AIRPLANE ENGINE
Cycle 2, Net wt. 420 gr., HP .97 @ 15000 RPM, Disp 6.4 cc, Type Ignition glow. Hand casted and machined ball bearing engine for superior performance. Black anodized



Skyward Engines

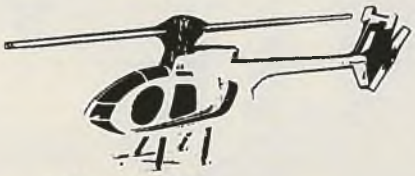
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|---|---|---|
| 21 | Engine/Car | $149.50 |
| 40 | Engine/Plane Muff. | 119.50 |
| 45 | Engine/Plane Muff. | 198.50 |
| 40 | Engine/Heli | Phone |
| 46 | Engine/Heli | Phone |
| 60 | Engine/Plane Muff. | 174.50 |
| 60 | Engine/Plane Pipe | 198.50 |
| 60 | Engine/Heli ABC | 214.50 |
| 80 | Engine/Plane | Phone |

Just in: OS FP-40 Needle Valve Assembly $8.25

HIROBO

| | |
|---|---|
| Shuttle ZX unbuilt kit | $324.50 |
| Shuttle ZX built no eng | 374.50 |
| Condor EX .60 SSZ head | 749.50 |
| Condor EX .60 no eng | 599.50 |
| SST Eagle .60 DDF head | 799.50 |
| SST Eagle .60 SSRII | 1099.50 |
| Boeing Vertol Tandom | 1099.50 |

*Limited supply on Shuttle kit/ OS Max 32 Pull Start!!*



Hirobo Bodies

| | | |
|---|---|---|
| Shuttle | | |
| Hughes 500 | Painted | $274.40 |
| Nova | Painted | 274.50 |
| Jet Ranger | Painted | 274.50 |

*All prices subject to change without notice!!*

Accessories "GOLD" metal parts

| | | |
|---|---|---|
| 402-247 | Cone start set | $ 89.50 |
| 402-231 | Auto tail drive | 12.99 |
| 402-234 | Symmetrical blades | 39.50 |
| 402-233 | Wash out/w type | 59.50 |
| 402-245 | Main frame metal | 114.50 |
| 402-246 | Servo tray metal | 54.50 |

*(Phone for complete Shuttle Metal price list).

All new "GOLD" metal parts for Shuttles. (Phone)

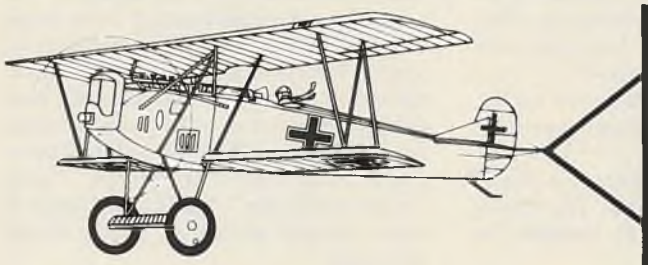
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**continued from page 181**

Once we completed our bird, the center of balance came out right on the money without requiring any adjustments.

**Covering:** Minimal. Low heat only on the wing. We used Black Baron for the wing and the tail feathers. We achieved a good covering with no "melt down" even on the sharp trailing edge of the wing. We added Black Baron press-on accents to complete the job. The fuselage does not require any covering. Total covering used was less than 1/2 roll.

**Engine:** .20-.30. Hobbico did their homework here. A .20 engine is a good trainer size which will also keep the cost down. A .25 to .30 will give snappier performance. Anything bigger will fit but then you sacrifice control of the airplane at low speeds . . . good point. We ran our tests with an O.S. .25 and a Royal .28 with a Du-Bro S-6(oz) square tank. Both engines were well fitted to this birdy. The fuel tank fit snugly in the fuselage and we had run times between 10 and 13 minutes.

**Radio:** 3 Channel required. We installed an Airtronics Vanguard which had recently been upgraded to 1991 specifications. The Vanguard was equipped with dual rates which is a good idea for the beginner who is tempted to "bang the sticks" (aren't we all from time to time!). Once installed and eyeballed for alignment, we found that only minor adjustments were required to trim the plane in flight.

**Flying:** Fun and predictable. We test flew our Sturdy Birdy over two weekends with identical weather. We had 70° with a 5 to 10 mile per hour breeze.

We let a novice try a take-off with the tail skid provided and decided that a steerable rear wheel is a necessity, especially if the runway is cement. We installed a steerable tail wheel (Du-Bro cat. no. 375) and the frustration turned to all smiles.

Once we corrected the ground action we were in for a treat. Our Sturdy Birdy took off almost hands free, as a good trainer should. By feeding in throttle, the plane took off in about 30 feet. Once airborne and trimmed, our Sturdy Birdy flew straight and steady. The response to elevator and rudder inputs were smooth and predictable. This model can be controlled very easily by a novice when the control action is reduced on the transmitter. If your transmitter is not equipped with dual rates, start out with the connectors moved all the way in on the servos. Very little up elevator is required to keep this birdy level in turns. Once the trim is adjusted the plane does self-correct in flight as advertised. We were able to make long runs hands free with the birdy showing no signs of "losing it." With the transmitter set at full rates, our birdy became very



Nieuport 28 C-1

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maneuverable without any tendency to go squirrely on us. The Sturdy Birdy has a very low stall speed and a very long glide ratio which a beginner will appreciate.

We found a couple of items that we felt needed some attention. The landing gear did not hold up very well to 20+ semi-hard landings. The gear consists of a thick, constant width aluminum bar. This should be wider to provide more strength for beginners.

We also found that the main channel was a little wobbly from the fuselage back to the tail feathers. We installed two additional metal screws and this significantly stiffened up the "bird."

The Sturdy Birdy is able to fly inverted with some throw left in the controls. We were able to maintain inverted flight for as long as we wanted without losing altitude or control. It takes quite a while to perform a roll but our bird went around smoothly. Not bad considering it is a three channel with lots of dihedral in the wing. This bird has a good blend of "stability" and "maneuverability" that should keep a novice amused and out of trouble at the same time.

Landing approachs are as they should be, very controllable at low speeds. Once the approach is set up, all that is required is to throttle back, and Sturdy Birdy lands smoothly. We attempted many dead stick landings and were pleased with the smoothness of the descent.

Our novice had to work at it (full throttle, half attention), but he did mange to spiral our birdy into the ground (mostly rocks). The consensus of those watching was that it should have been totalled. Our Sturdy Birdy suffered only a broken motor mount and throttle control horn! Truly amazing!

**Conclusion:** Good trainer! The Sturdy Birdy is making the list of good trainers longer. Ease of construction and good flying habits are the hallmarks of this bird. We experienced smooth flight characteristics and good maneuverability. Our recommendation is to install a steerable rear wheel and to start a novice out on the reduced transmitter mode, if available. If you are looking for a 3 channel trainer with no bad habits, try a Sturdy Birdy! □


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## IN REMEMBRANCE
### Duke Fox

Duke Fox, pioneer model airplane engine designer and manufacturer, succumbed to a stroke February 15, 1991.

Duke had several bouts with heart problems the past several years, leading to his departure. At age 71, he led a full life as a modeler who loved model airplane engines.

In California, back in the "30's", he saw the need for a light, powerful, reliable model engine design, and developed the **original** Fox 35. This engine was the forerunner of the basic design that followed, and was used by other manufacturers throughout the world. Duke's "Fox 35" won, and is still winning, model contests. He built his first factory in California, and later moved to Fort Smith, Arkansas, where a better business climate existed. Besides the Fox 35, he manufactured several sizes of model engines. Through the years, several hundred thousand Fox engines were sold.

Perhaps the item that Duke is recognized most for is the Fox Glow Plug, which is the **standard** of its field. Through the years, Duke developed several different styles of glow plugs that filled the exacting needs of the modeling public. Millions were made through the years.

Duke Fox was honored by the Academy of Model Aeronautics in 1978, and was inducted into the Model Aviation Hall of Fame for the many contributions he made during the past 50 years.

Fox Manufacturing Company has been a major force in the hobby for over 43 years, and will continue to carry on in the fine tradition of producing quality products at reasonable prices. Duke always promoted "Made In America" even before it was fashionable, and now, more than ever, we at Fox Manufacturing Company will continue to maintain those ideals that have been established by Duke.

Duke's contributions and presence in the model aviation scene will be missed by all. We at Fox Manufacturing will see to it that the name **Fox** will be around for many years to come. □


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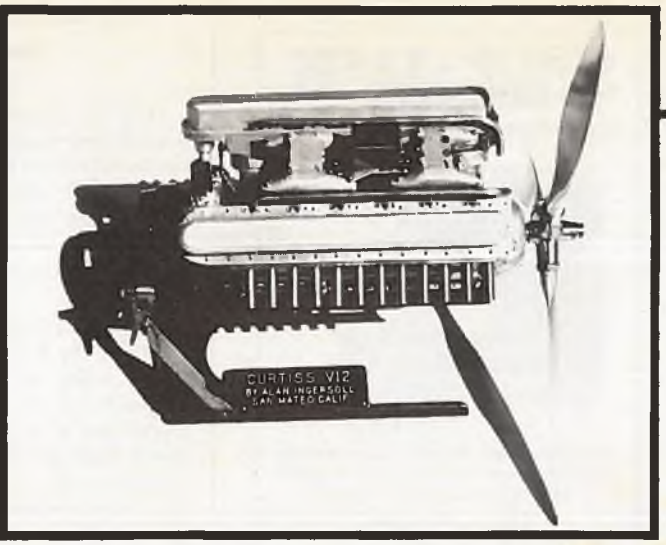


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# CURTISS V-12 ENGINE

**By Bob Banka**
Scale Model Research




***Beautiful 1/6 scale Curtiss V-12 engine. Top view shows cam covers, up-draft carburetors, and exhaust stacks (2 per cyl.).***

While attending the IMAA West Coast Festival at Crows Landing this past summer, I had my camera ready and had the opportunity to shoot pictures of a most intriguing, and exquisite piece of mechanized art in the form of a V-12 Curtiss engine in 1/6 scale.

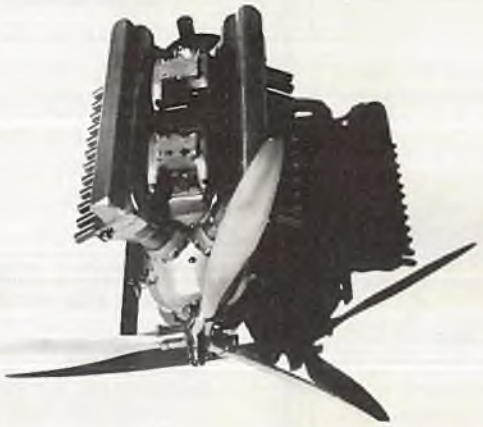
Weighing approximately 6 pounds, the engine construction began in 1980 and is just about completed. There are no castings, all parts were machined from bar or stock material.

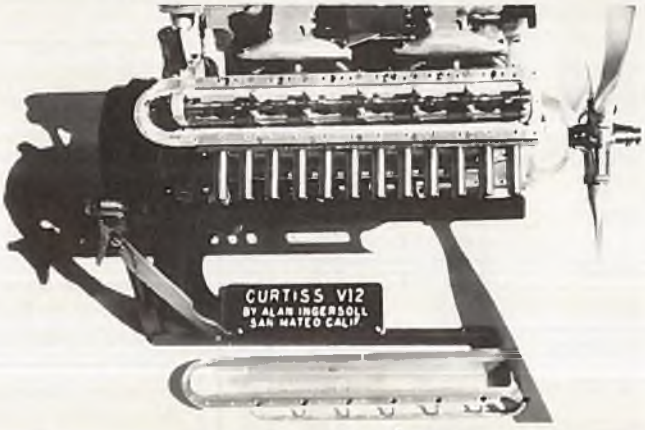
The machinist, Alan Ingersoll (P.O. Box 6401, San Mateo, California 94403, 415-341-1129), created the engine to fly his 1/6 Curtiss P6E Hawk, which has a 64'' wingspan with a total weight of approximately 11 pounds. Specifications on the engine are: Bore .800"; stroke 1.00"; crankshaft, one piece 3140 steel; seven main bearings; pistons are fully machined with pin bosses; rods are stainless steel.

There are two geared oil pumps, a double outlet coolant pump, two home-built distributors, and two home-built updraft carburetors. The valves are ground from concrete nails, and the propeller blades, are machined and hand finished with indexing for pitch change. A 2.75:1 gear reduction is used to drive the propeller.

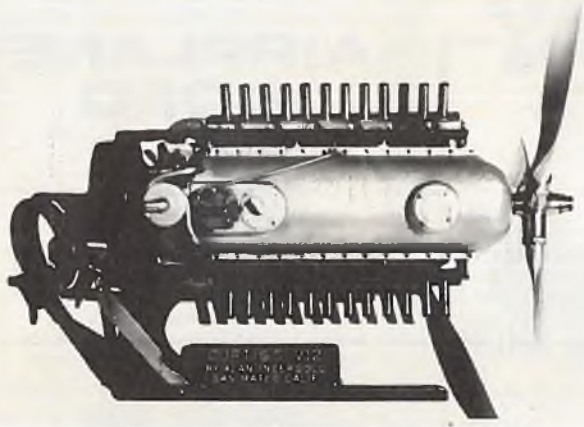
The engine is designed to run on car gas or propane, it uses 12 V-3 Champion plugs donated to Alan when the quality of work was observed by a collector of old model engines and parts. It will use Marvel Mystery Oil for lubrication.

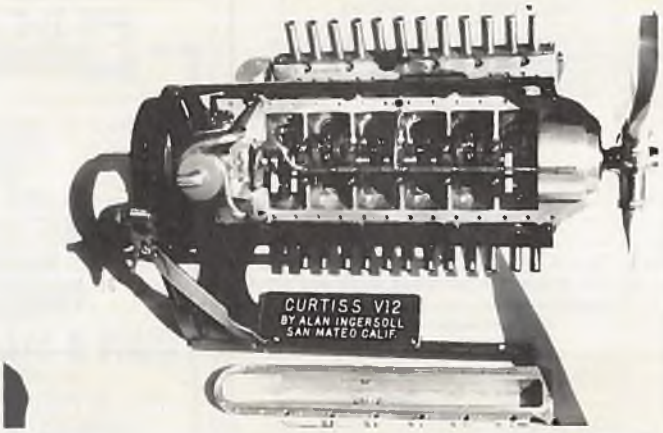
Alan hopes to have the engine and aircraft ready for operation by the next flying season. □






***LEFT: 2.75:1 gear reduction case on front of engine for prop drive. RIGHT: A single gear driven camshaft is located in each head assembly. Note oil pipe to provide top end lubrication.***






***LEFT: Bottom view of engine showing oil sump and oil pump locations. RIGHT: Oil pan removed exposing crankshaft, oil lines. etc. (Cam cover is lying below engine.)***

**Photos continued on page 190**

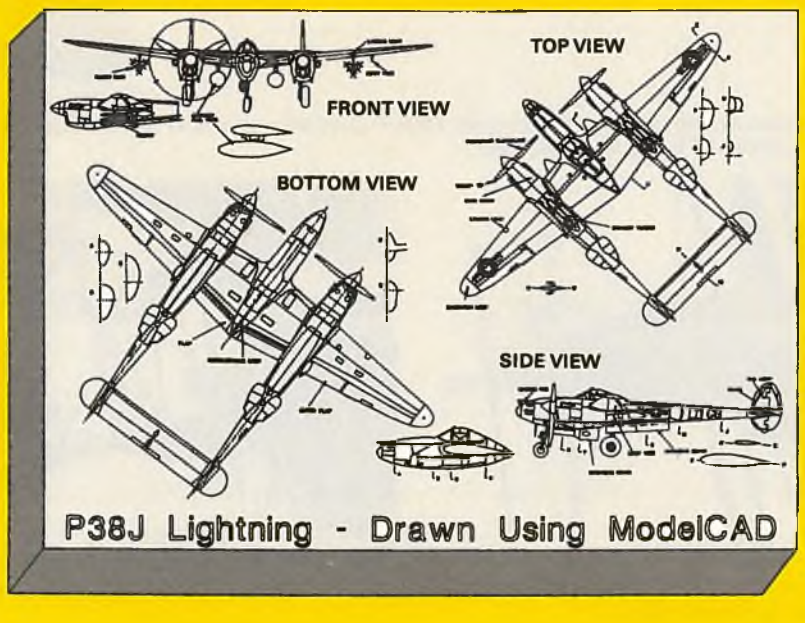
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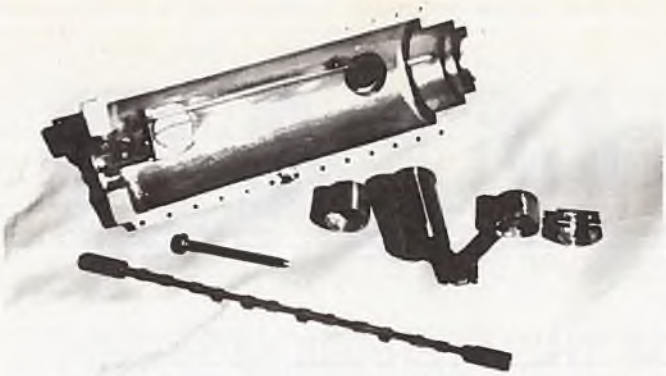
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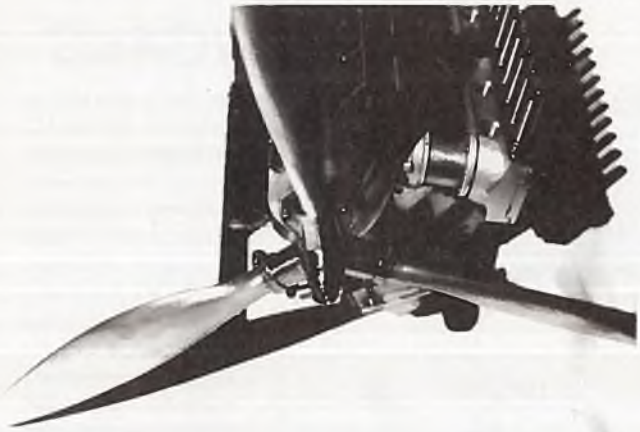
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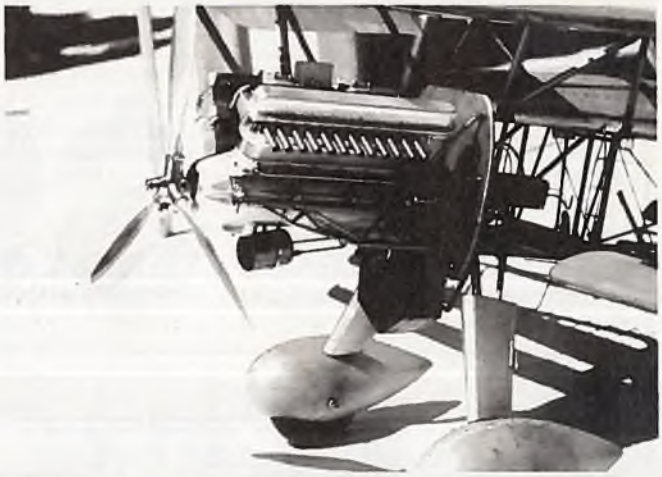
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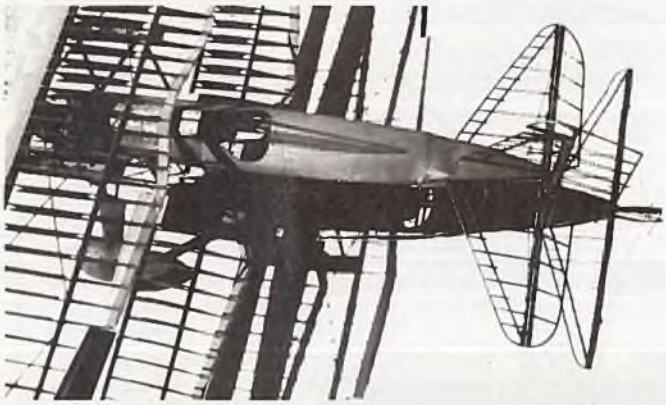


*LEFT: Inside of oil pan showing oil sump pickup and oil line. Pistons, inter-connected connecting rod assembly, and cylinder sleeve are above the camshaft. Concrete nails like the one shown were machined to make the valves. RIGHT: The oil pan was machined from aluminum stock and contains the hand built oil pump.*





*LEFT: Propeller blades are indexed so that pitch can be changed. RIGHT: Dual exhaust stacks for each cylinder. Cooling system and oil cooler radiators are shown in place. All function as intended.*





*LEFT: Like the engine, the air frame is a work of art; scale placement of ribs, built-up tail structure, etc. RIGHT: Metal seat, cowlings, turtle deck, and head rest. Functioning control stick.*





*LEFT: Tailwheel assembly mounted in the tubular construction fuselage. RIGHT: Curtiss P-6E Hawk, 1/6 scale.*

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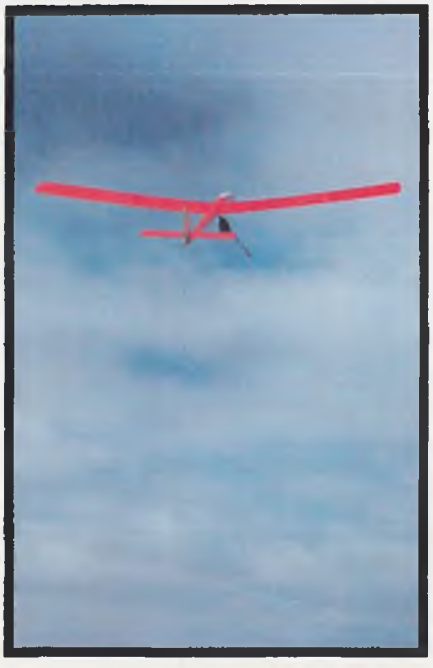
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# SWINGER

**By Mike Hollison**



Swinger is an experimental 100" thermal ship that uses the proven wingeron control system. Basically, this provides lateral control of the sailplane by twisting the entire wing instead of moving just a part of it, the aileron.

While the wingeron will never replace conventional aileron control, it does have the advantage of simplicity to recommend it. Each wing panel can be built as a single unit; there is no aileron gap to worry about, no extra servos to buy, no complicated linkages to install and no expensive extension wiring for wing-mounted servos. In fact, Swinger goes one better and gives the modeler full house control on just two servos — truly the "poor man's multi."

So, for those of you who have always wanted to try precision flying but were afraid to build an aileron ship, read on . . . Swinger may be just for you!

## CONSTRUCTION

Start with the fuselage; it's the most difficult part, and even it is easy!

(1) Cut two fuselage sides from Sig 1/8" lite ply and contact cement 1/16" ply doublers inside between formers F1 and F2.

(2) Drill and slot the fuselage sides for the wing rod tube, wingeron bellcranks, wing drive pins, and wing retaining hooks.

(3) Cut the 1/4" triangular balsa longerons to length and glue to the inside of each fuselage panel as shown on the plan, sawing the kerfs into the forward bottom strips so that they follow the curve of the fuselage.

(4) Cut formers F1, F2, and F3, slot and drill as per plan and epoxy in place to one fuselage side. Add the 1/4" triangular stock supports around the formers as shown, drilling where necessary for rudder and stabilator NyRod tubes.

(5) Epoxy the second fuselage side to the formers and, when dry, pull together the

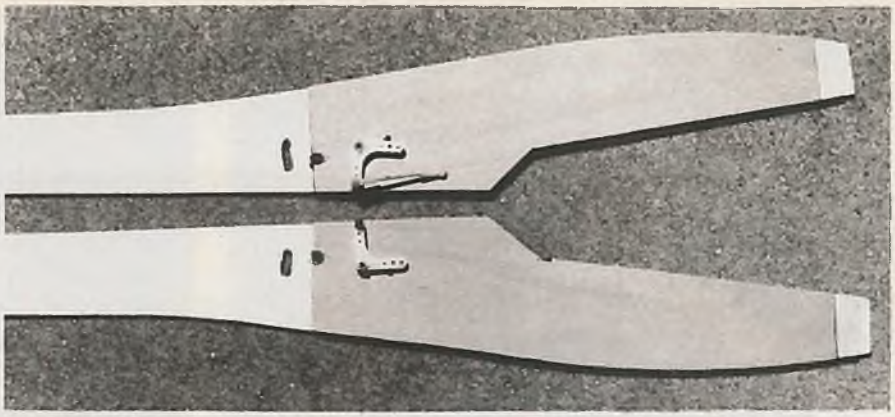
rear of the fuselage and cement a 1/4'' sq. balsa scrap spacer in place (to be removed later).

(6) Next, cut the forward fuselage bottom panel from 1/8'' ply; drill for the cut-down Airtronics adjustable tow hook mount, and epoxy the bottom panel in place between F1 and to just beyond F2.

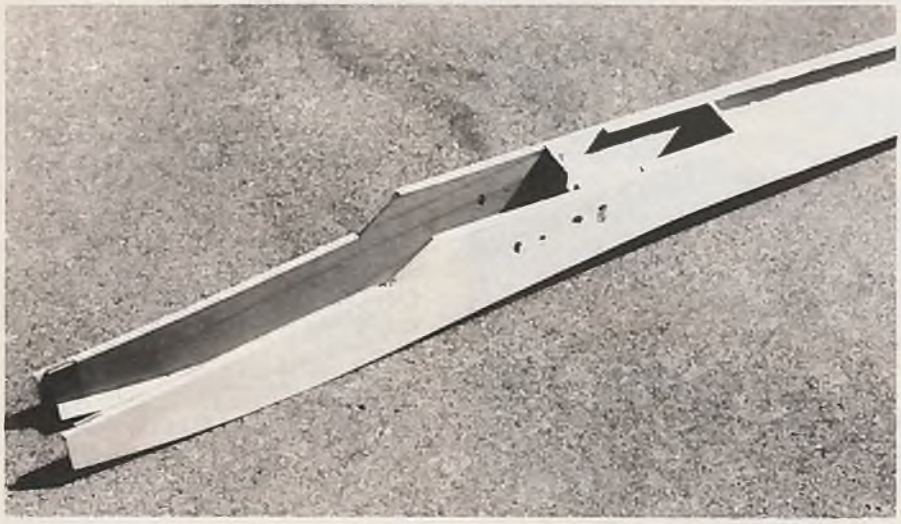
(7) Carve the nose block from a suitable piece of hardwood, using the nose template provided to shape the top of the block, and epoxy to F1 and the bottom panel.

(8) Install the rudder, stabilator, and antenna lead-out NyRod tubes, then add the 1/4'' balsa sheeting to the top of the fuselage, slotting the rear section for the fin.

(9) Carve the canopy from soft balsa block, epoxy the 1/4''sheet balsa hatch cover to the rear of the canopy, then glue the 1/16'' x 1'' x 1¾'' long ply alignment tongue to the bottom of the hatch cover as shown.



***Fuselage sides with 1/16 plywood doublers shown. Wingeron linkage, slots for wing rod tube, and retaining hooks are also visible.***



***Fuselage in mid construction. Note the knerfs sawn into the bottom of 1/4" triangular longerons.***

(10) Countersink and epoxy the female part of a dress snap fastener to the 1/4'' x 1/2'' x 1⅝'' long balsa strip and epoxy it between the fuselage sides at F1. Countersink and epoxy the male part of the fastener to the bottom of the canopy and ensure that the canopy snaps shut flush with fuselage. Now add 1/8'' sheet balsa bottom (cross grain).

(11) Sand the completed fuselage smooth, rounding off the top balsa sheeting and fuselage edges to your satisfaction. Put aside and start on the fin and rudder.

**Fin and Rudder**

(1) First, cut two fin panels from 1/16'' ply and drill a 1/8'' diameter hole for the stabilator horn pivot. Cut a slot for the rear stabilator horn pivot. Cut a slot for the rear stabilator pin, then cement the 1/4'' sq. and 1/4'' x 1/8'' balsa strips to one of the panels.

(2) Epoxy a 3/8'' length of 1/8'' o.d. brass tubing through the hole of one panel, slide the Airtronics control horn over the tubing, and epoxy the remaining fin panel to the balsa frame.

(3) Lay the completed stabilator control box over the plan and build the rest of the fin around it. Cut the 1/4'' x 3/8'' balsa trailing edge strip to length, epoxy the Du-Bro nylon hinges in place, then cement to the rear of the stabilator box.

(4) Glue the 1/4'' x 3/8'' balsa leading edge in place, add the 3/8'' balsa top piece, and cement the 3/8'' x 1/16'' balsa fin braces as shown on the plan. Sand the fin to shape.

(5) (Remove scrap balsa spacer from fuselage now.) Next, slide the stabilator pushrod into the NyRod tube already installed in the fuselage. Add the clevis and threaded rod and connect to the stabilator horn; then epoxy the completed fin into the slot cut from the rear fuselage top decking. Make sure the fin is square to the fuselage.

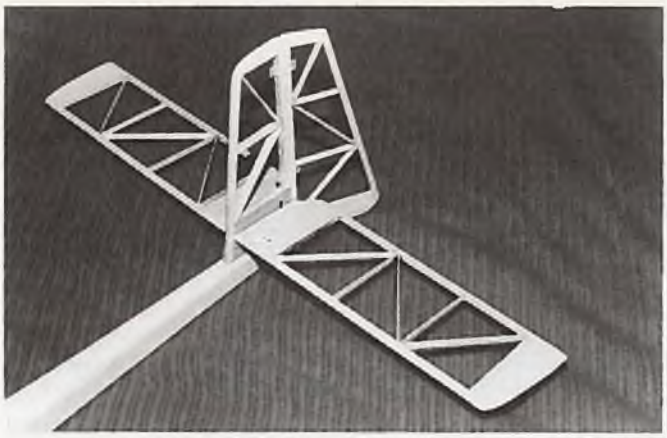
(6) The rudder can now be built directly over the plan. Cut the 1/4'' sq. balsa leading edge to the correct length and slot for the rudder hinges. Cement the 1/4'' balsa top and bottom pieces in place; then the 1/4'' sq. balsa trailing edge. Glue the 1/16'' x 1/4'' balsa rudder braces in place, sand the whole unit and put aside for installation and covering.

**Stabilator**

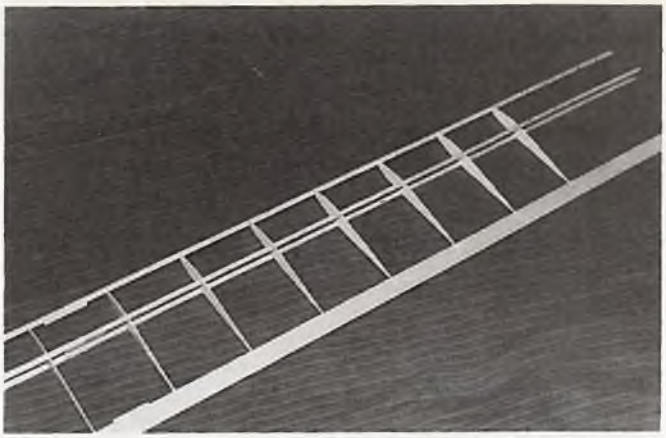
(1) Cut the 1/4'' sq. balsa leading and trailing edges to length and lay over the plan. Cement the shaped 1/4'' sheet tip panel in place and the 1/16'' sheet bottom center section panel.

## SWINGER

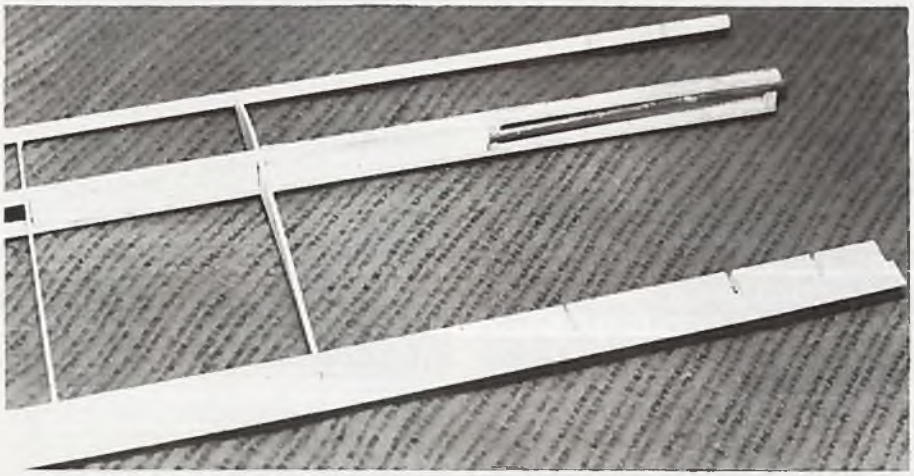
**Designed By:**
Mike Hollison
**TYPE AIRCRAFT**
Sport Sailplane
**WINGSPAN**
100 Inches
**WING CHORD**
7¾ Inches
**TOTAL WING AREA**
775 Sq. In.
**WING LOCATION**
Shoulder Wing
**AIRFOIL**
Semi-Symmetrical
**WING PLANFORM**
Constant Chord
**DIHEDRAL EACH TIP**
1 Inch
**OVERALL FUSELAGE LENGTH**
49¼ Inches
**RADIO COMPARTMENT SIZE**
(L) 10'' x (W) 1½'' x (H) 2¼''
**STABILATOR SPAN**
24 Inches
**STABILATOR CHORD (incl. elev.)**
4 Inches
**STABILATOR AREA**
96 Sq. In.
**STAB AIRFOIL SECTION**
Flat
**STABILATOR LOCATION**
Mid-Fin
**VERTICAL FIN HEIGHT**
10 Inches
**VERTICAL FIN WIDTH**
6 Inches
**REC. ENGINE RANGE**
NA
**FUEL TANK SIZE**
NA
**LANDING GEAR**
NA
**REC. NO. OF CHANNELS**
2
**CONTROL FUNCTIONS**
Rudder, Elevator, Wingeron
**BASIC MATERIALS USED IN CONSTRUCTION**
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Spruce
Empennage ..... Balsa
**Wt. Ready To Fly** ..... 47 Oz. (2.9 Lbs.)
**Wing Loading** ..... 8.73 Oz./Sq. Ft.



*Empennage assembly before covering. Wingeron and rudder are coupled together. Stabilator linkage is hidden inside the fin.*



*Skeleton of wing shows splicing of spars, leading edge, and trailing edge to achieve the 45¾" length.*



*Wing rod box is shown with balsa spacers before microballoon epoxy mixture and 1/16" plywood spar brace are applied.*

(2) Mark the position of the 1/8" o.d. brass tubing, then cement the 1/8" balsa sheet core around the outlines.

(3) Cut two 1/8" o.d. x 2" long brass tubes to length, crimping them at one end and epoxying them between the core sheets. Now glue the top 1/16" balsa sheet in place, add the 1/16" x 1/4" balsa braces and then set aside the completed stabilator panel for covering.

Repeat steps 1-3 for the second stabilator panel.

**Wing**

This is the easy part, thanks to the wingeron control.

(1) Unless you are lucky enough to have a supply of spruce strips and trailing edge stock about 48" in length, you will have to splice some standard size strips to the correct length. Using 1/8" x 1/4" x 2" long spruce joiner strips, make one 1/4" sq. spruce leading edge, two 1/8" x 1/4" spruce spars and one 1/4" x 1" tapered balsa trailing edge.

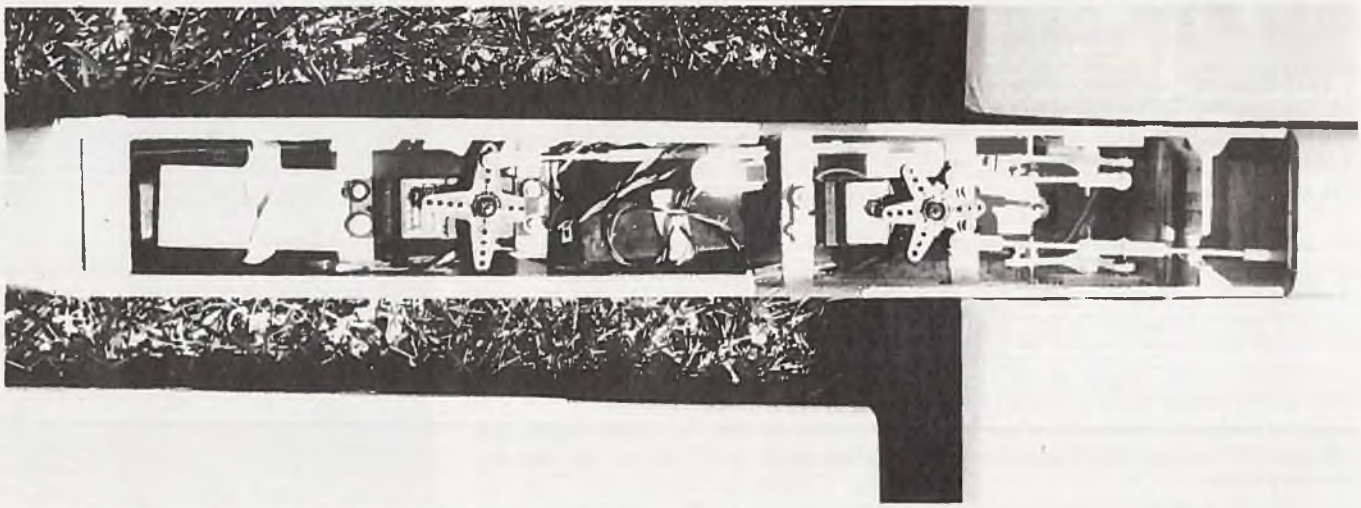
(2) Notch the trailing edge stock for the wing ribs, and lay over the plan along with the leading edge and the bottom wing spar, ensuring that the spar splice is face up on the plan.

(3) Cut ribs W2 as shown and glue in place. Cement the top wing spar in position, ensuring that the splice is facing downwards. Slide a scrap of 1/4" balsa under the trailing edge tip to build in the wing tip washout.

(4) Add lengths of 1/4" sheet balsa filler between the spars and between the first four ribs marked W2 closest to the wing center section (see plan).

(5) Now cut two panels W3 from 1/16" ply and epoxy the front one in place as shown. Cut the 1/4" o.d. x 5 3/16" wing rod tubing to length, and using scrap balsa supports as shown, epoxy it at the correct dihedral angle to the inside of W3 between the spars. Fill the gap between the tubing and the spars with a mixture of epoxy and micro-balloons and epoxy the rear W3 panel in position.

(6) Cut ribs W1 from 3/32" sheet balsa. Slice them in half and epoxy in place as shown. Next, add a piece of scrap balsa block to the inside of root rib W1 between the leading edge and W3. This will serve as a base for the drive pin when it is epoxied



*Radio installation is very simple. Note rudder coupling linkage to the wingeron servo.*



*Designer, Mike Hollison, and the Swinger.*



*Swinger being launched with the hi-start.*

into the wing.

(7) Cement the 1/16'' sheet balsa shear webbing between the wing ribs as shown on the plan with the grain running vertically for maximum strength.

(8) Sheet the top of the wing between the leading edge and the spar with medium weight 1/16'' balsa, then add the rest of the 1/16'' balsa center section sheeting top and bottom as shown.

(9) Now add the 1/4'' x 1/16'' balsa capping strips top and bottom; then carve the tip from soft balsa, cement to the wing and sand to a shape similar to that indicated by the template.

(10) Finally, cut the wing root rib from 1/8'' ply and drill a 1/4'' diameter hole for the wing rod tube plus a 1/16'' diameter hole for the wing drive pin. Epoxy to root rib W1. Sand the whole wing panel smooth, rounding off the spruce leading edge, and put aside for covering.

Repeat steps 1 - 10 for the second wing panel.

**Covering and Radio Installation**

(1) Cover your Swinger with your favorite brand of heat shrink covering. The fin and rudder may be covered separately before being connected.

(2) Bolt a pair of Du-Bro 90° aileron bellcranks to the inside of the fuselage as shown on the plan, countersinking the screw heads so that they lie flush with the fuselage sides.

(3) Cut the 13½'' long wing rod from a piece of 7/32'' diameter steel and slide into the fuselage.

(4) Install the wingeron/rudder servo as shown on the plan, positioning it so that the rear servo ply mount acts as a fuselage anti-crush brace at the wing root leading edge. If this isn't possible, glue a separate 1/8'' ply brace between the fuselage sides at this position; it will help protect the fuselage from any backlash of the wing panel in the event of a hard landing!

(5) Drill through the ply root ribs into the drive pin balsa mount and slide each wing panel onto the wing rod, making sure that the wing roots are parallel to the fuselage sides. There should be no gap between wing root and fuselage.

(6) Install the Du-Bro ball links and threaded coupling rods as shown, ensuring that differential throw (more up-wing trailing edge than down) is incorporated as per plan.

(For those readers who wish to install a separate rudder servo and mix their wingeron/rudder controls electronically, simply replace the double take-off ball link with a single ball link.)

At this point I'm sure the reader will ask, ''But if I incorporate differential throw in the wings and operate the rudder off the same control, won't I get differential throw on the rudder?'' The answer, of course, is yes, you will, but don't worry about it — it makes no difference to the turning ability of the model. Swinger turns equally both left and right! The differential **is** necessary, however, to prevent reverse wingeron drag, and must be incorporated in the radio installation.

(7) Set the leading edge of each wing panel at about 3° positive incidence, and slide the 1/16'' diameter x 2¼'' long drive pins through the second hole of the wingeron control horn, then through the fuselage wingeron slot and epoxy them **firmly** into the wing roots. Eyeball the model from the nose and make sure that each wing half has the same angle of incidence.

(8) Install the rest of the radio as shown on the plan and then add sundry items such as tow hook block, nose skid and tail skid, rudder control horn, and balance the sailplane as indicated. Epoxy the 1/2'' screw eyes into each wing root for the wing retaining bands and Swinger is ready for the flying field.

**Flying**

Now comes the moment of truth. Slide the wings onto the wing rod, engage the drive pins into the wingeron bellcrank holes, and bolt a wheel collar to the end of each drive pin.

Eyeball the model from the nose and make sure the leading edges are level and at the correct incidence angle with the aileron function at neutral. The coupled rudder should also be at neutral.

Loop a couple of small rubber bands between the wing retaining screw eyes, using just enough tension to hold the wings against the fuselage, but not too much that it binds the controls. Do **not** omit the wing retaining bands. Check the wingeron movement at this point; each wing should rotate freely around the wing rod pivot.

Now make sure the wings are moving in the right direction. For a right-hand turn, the **right** wing trailing edge must go **up**, the left **down**, and the rudder should turn to the **right**! There should also be more up than down on the wing movements, owing to the differential set-up at the servo. Now, test for proper Center of Gravity.

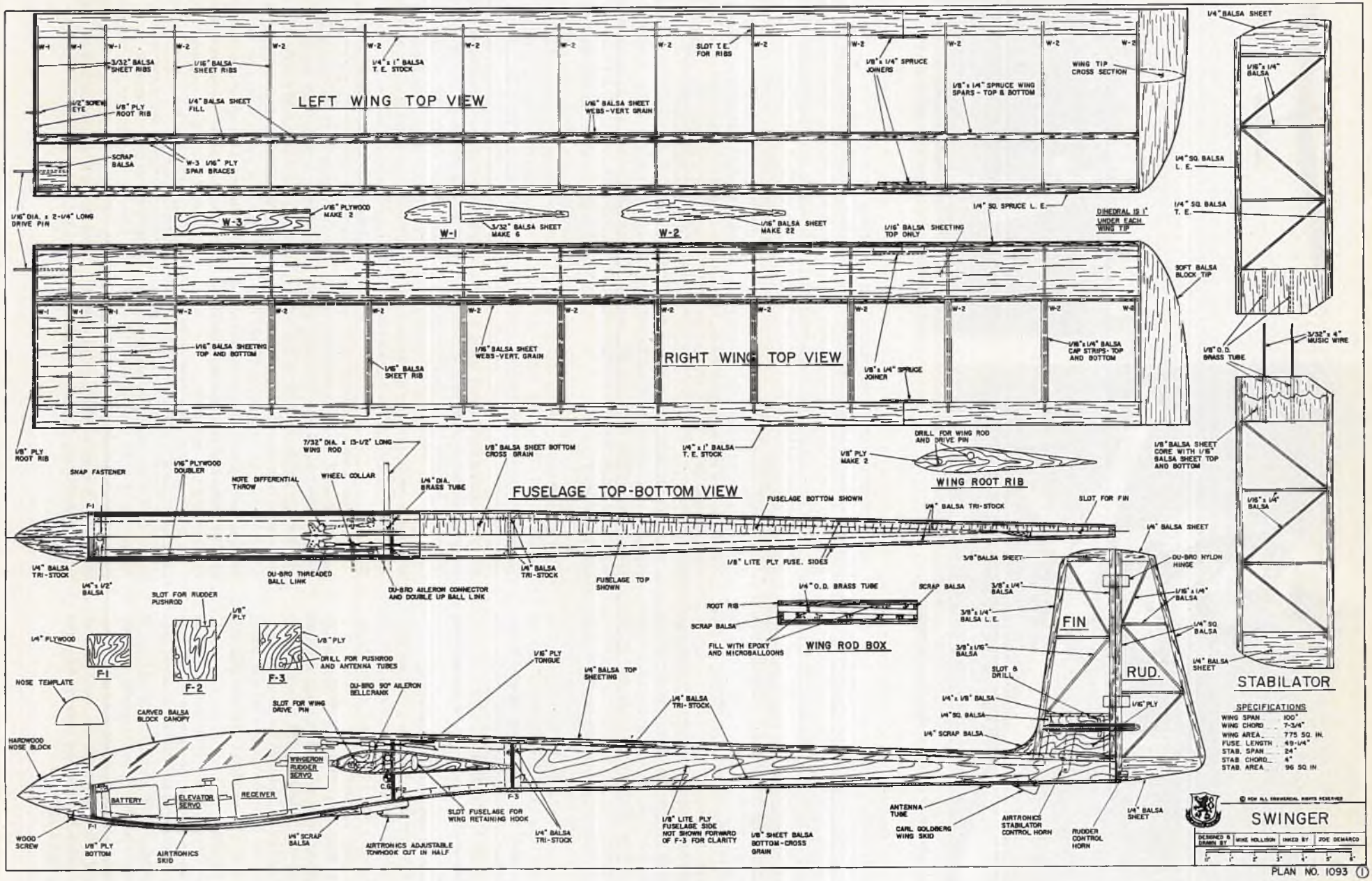
Launch Swinger on either a hi-start or a winch; the sailplane should climb straight up and release itself smoothly at the top of the launch. A little stick movement to the left and she'll turn gently to the left; a little more stick and the turn will steepen; a touch of right stick will straighten her up. A tad of down increases her speed and she begins to cruise across the sky at just the right speed.

Swinger flies like a beginner's aileron sailplane should; it has a slow to medium airspeed, executes gentle turns, but is fully responsive to your commands.

All in all, a fine flier on just two channels; now, if some enterprising modeler could only devise a simple method of installing spoilers on an all-moving wing.

□

FULL SIZE PLANS AVAILABLE SEE PAGE 248



# RCM BOOK & VIDEO SHELF




**TU-16 BADGER IN ACTION**
**By Robert Block**
**Color By Don Greer and Perry Manley**
**Illustrated By Joe Sewell**

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**Windsock Datafile #23**
**By P.M. Grosz**

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**P-38 LIGHTNING IN ACTION**
**By Larry Davis, Color By**
**Don Greer & Perry Manley**
**Illustrated by Joe Sewell**

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**WINDSOCK DATAFILE 24**
**By J.M. Bruce**

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Bert Kinzey and Ray Leader

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**Vol. 18**
**By: Bert Kinzey and Ray Leader**

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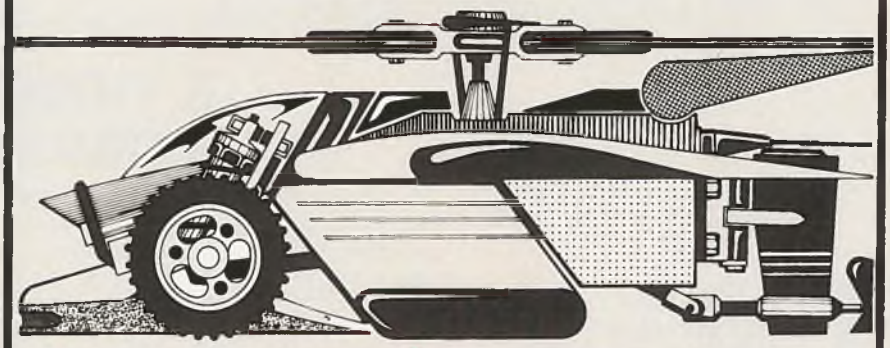



**WINDSOCK INTERNATIONAL**
**Vol. 6, No. 6, Nov., Dec. 1990**

Another fine issue of the "International" series, this special edition concentrates on the Italian war planes. It features the Macchi M.5, Ansaldo A.1, and Capproni Ca.3 tri-motor bomber. The reader is provided with hard to obtain photos and excellent line drawings for full 3-view representation.

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# A TIGER SHOWS ITS STRIPES

**By Art Harrison**

*(Editor's Note: RCM received a letter from Art Harrison, and we were so impressed with this paint scheme and model we wanted to show our readers. We have reprinted Art's letter, since it tells the complete story.)*

The photos shown here are of a Tiger Moth that my uncle, Dr. Pat Harrison, and I have just completed. I thought it had an interesting paint scheme and thought you might be interested in publishing it in your magazine.



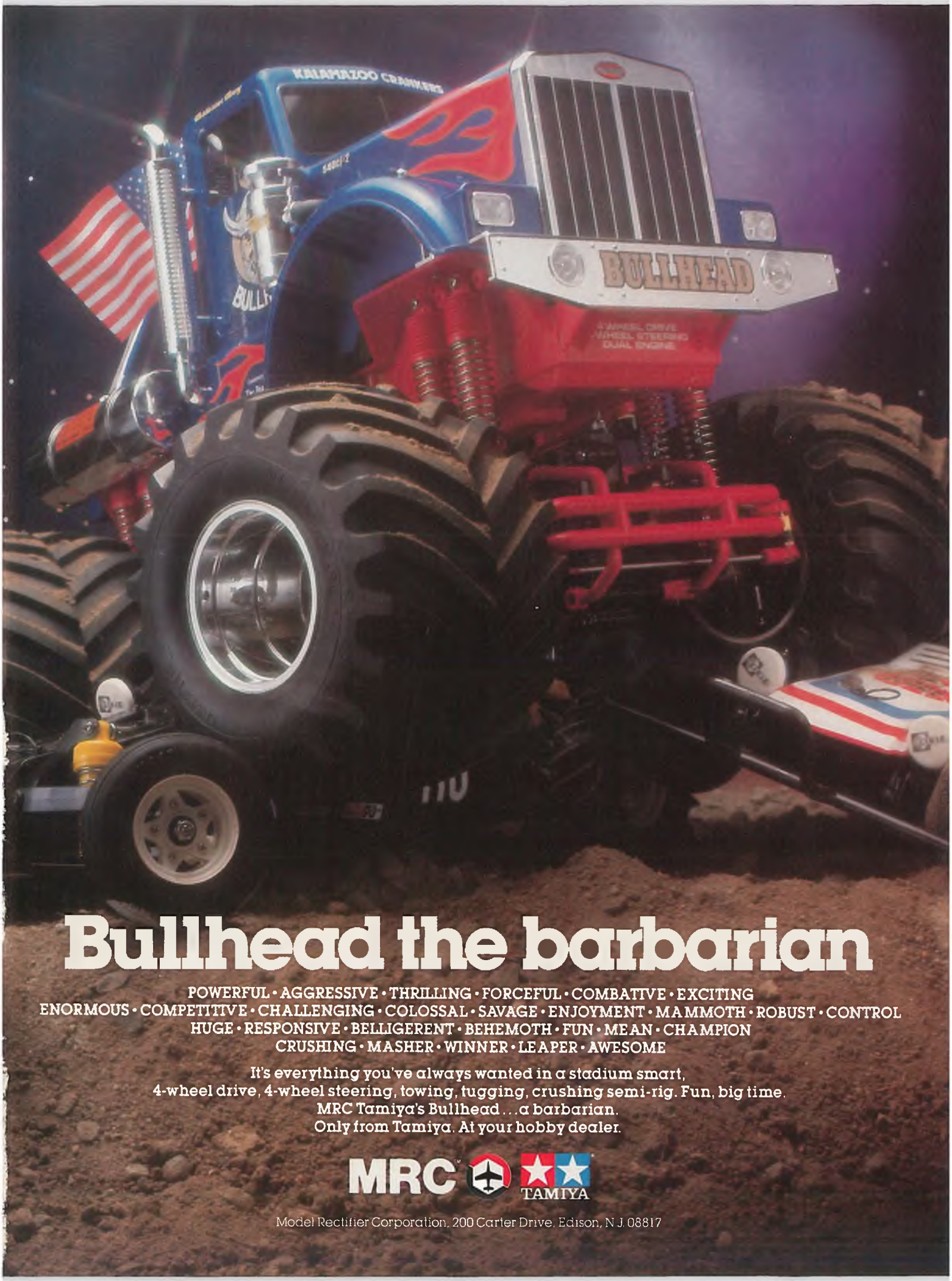


This is the first R/C airplane I have had a hand in building. I became interested when my wife and I visited my uncle two years ago. My uncle gave me the kit, engine, and radio and told me to get started. I enlisted the help of Tom Waite, the crew chief of my/our F-16 (I'm an F-16 instructor with the Kansas Air National Guard). Tom helped a lot in the early stages of model building and is helping me learn to fly it when my uncle isn't in town. I don't want to mislead anyone --- my Uncle Pat did all of the hard stuff and I was the errand boy trying to learn as much as possible. It was a lot of fun. My uncle would come visit and we would work on the model together and usually go to an airshow somewhere as well, since we both love flying.

It's taken over two years to build the model, and it wasn't until I took an F-16 to the show at Oshkosh that I found a book on the Tiger Moth with an actual airplane like the one painted as I've sent to you. I got the help of another guy at work, Bob Johnston, to learn how to airbrush, and we did all of the airbrushing. The cowling took from 10 a.m. to 5 p.m. one day. We've only flown the airplane once so far, and it flies fine on a Super Tigre .60. The first flight was before it was painted. My Uncle Pat says you can save yourself a lot of time by flying it before you paint it to see if it's going to work.

We plan to fly the plane at least once more so we can get some good video of it before retiring it --- I would like to say that I've still got the first one I ever built. Uncle Pat and I are going to start on an F-9F Cougar with a ducted fan next, and I'm going to try to learn how to fly on a trainer in the meantime. □






# Bullhead the barbarian

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# CEILING SHELVES FOR MODELS

**By George Kyer**

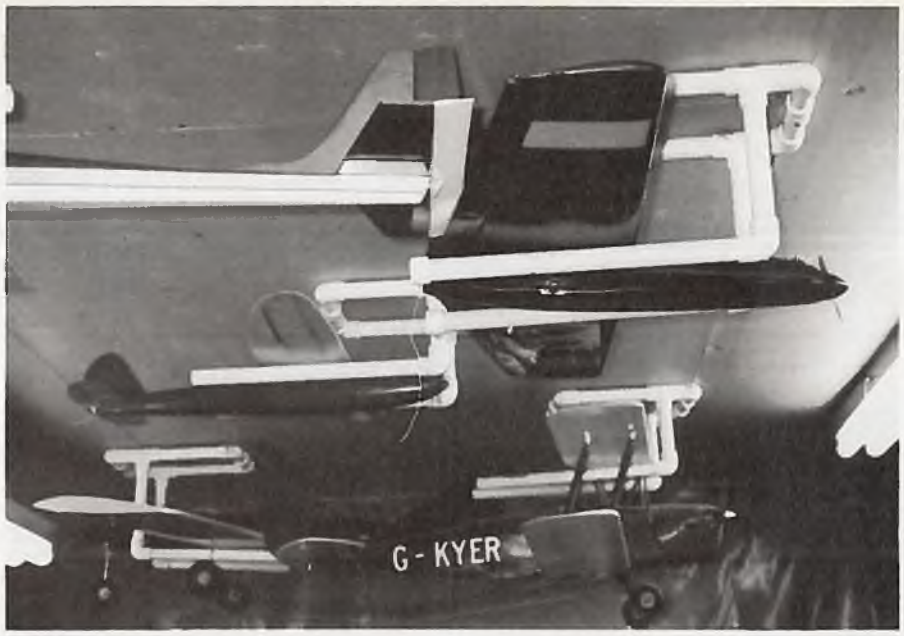



**Photo #1**



**Photo #2**

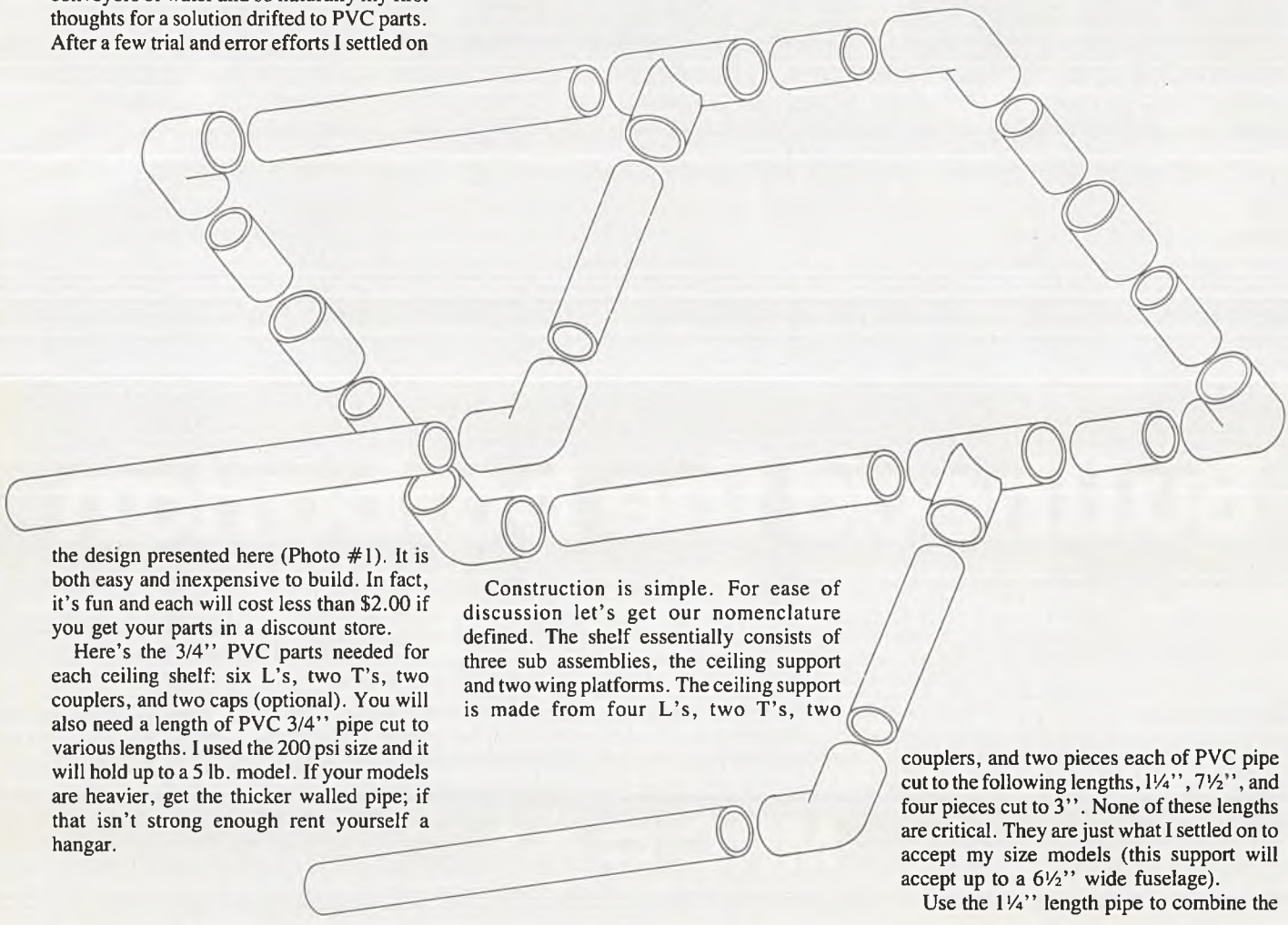


**Photo #3**

Being retired I have a lot of time to build and fly models. My workshop had all the spare corners and unclaimed wall space covered with them. They are mostly of the small variety since that is where my interest lies. I also had them dangling from the ceiling suspended on strings like flies in a spider web. I found myself avoiding the ones on the ceiling because they were a pain to get down and rehang after flying. I thought that there must be a better way so I devoted a little grey matter looking for a solution.

I've always thought of PVC pipe couplings as "Tinker Toys" rather than conveyors of water and so naturally my first thoughts for a solution drifted to PVC parts. After a few trial and error efforts I settled on the design presented here (Photo #1). It is both easy and inexpensive to build. In fact, it's fun and each will cost less than $2.00 if you get your parts in a discount store.

Here's the 3/4" PVC parts needed for each ceiling shelf: six L's, two T's, two couplers, and two caps (optional). You will also need a length of PVC 3/4" pipe cut to various lengths. I used the 200 psi size and it will hold up to a 5 lb. model. If your models are heavier, get the thicker walled pipe; if that isn't strong enough rent yourself a hangar.



Construction is simple. For ease of discussion let's get our nomenclature defined. The shelf essentially consists of three sub assemblies, the ceiling support and two wing platforms. The ceiling support is made from four L's, two T's, two couplers, and two pieces each of PVC pipe cut to the following lengths, 1¼", 7½", and four pieces cut to 3". None of these lengths are critical. They are just what I settled on to accept my size models (this support will accept up to a 6½" wide fuselage).

Use the 1¼" length pipe to combine the

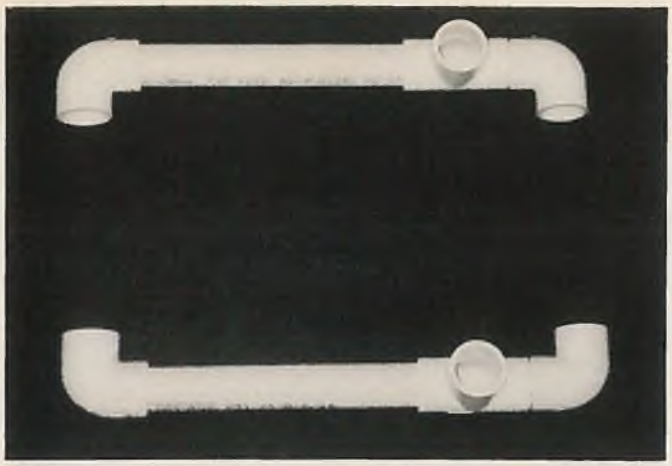


Photo #4

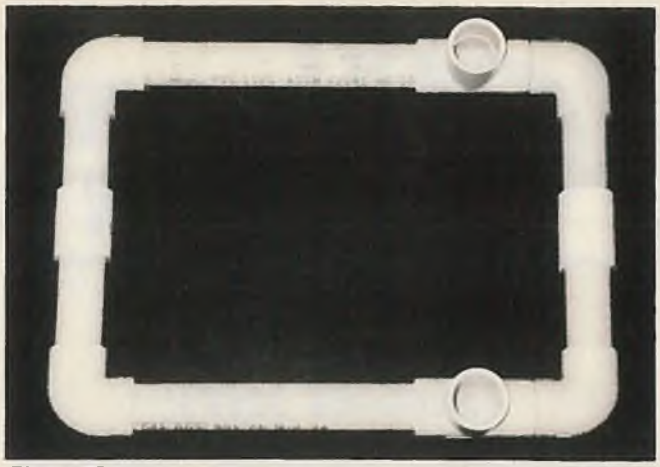


Photo #5

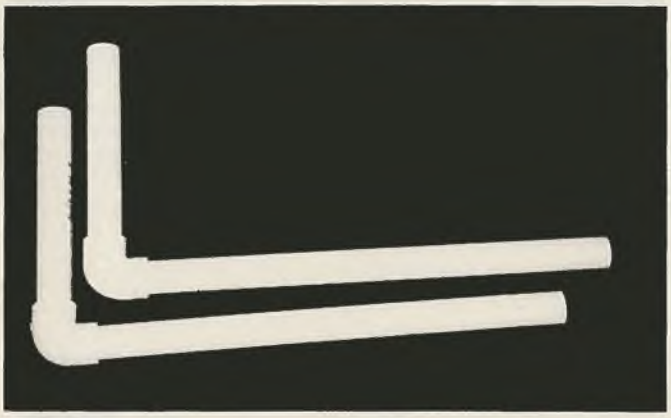


Photo #6

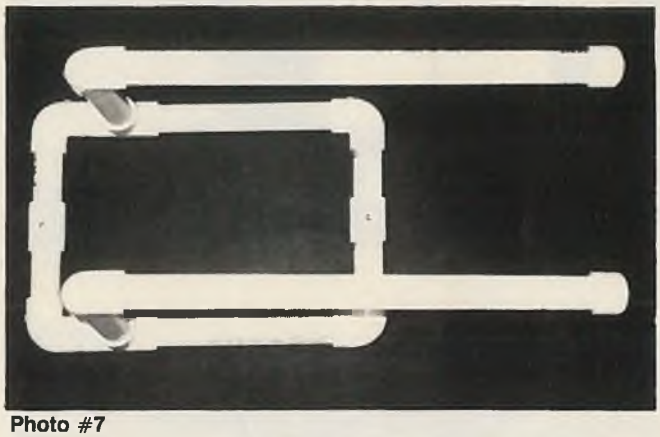


Photo #7

L's with the T's in the front corner where the wing support leg will extend down (Photos #2 & 3). Add the 7½'' pipe from the T's to the L's in the other corner (Photo #4). Complete the ceiling support by joining the four corner L's to the couplers. The couplers may even be omitted and two 7'' pieces of pipe substituted but I put the couplers in to provide more ''meat'' for the screws holding the assembly to the ceiling. Photo #5 shows the completed ceiling support.

Each wing support is made by combining a 7'' pipe wing support leg with an L and the 15'' pipe wing platform to the same L (Photo #6). The length of the wing support leg pipes depend on the vertical height of your model and how far from the ceiling you want your model suspended. I like mine as close to the ceiling as possible.

Complete the whole structure by inserting the wing platforms in the ceiling support. Adjust any twisted or misaligned joints so that everything is square and glue the joints with thin CA glue. Add the optional caps to the end of the wing platform to finish off the ends, if you like (Photo #7). You could also add round foam pipe insulation around the wing platform pipe for cushioning, if desired. I don't think it's needed. Drill 1/4'' holes in both couplers of the ceiling support to accommodate the mounting screws.

By the way, this contraption can also be used on the wall with the wing supports pointing up.

Hope you find this a convenient way to store your models. □


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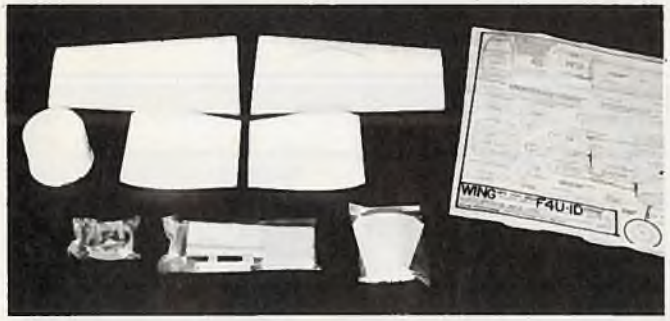
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# RCM PRODUCT REVIEW

## Wing Mfg.
# F4U CORSAIR (SHORT KIT)






## SPECIFICATIONS

| | |
|---|---|
| Name | F4U CORSAIR |
| Aircraft Type | Sport Scale |
| Manufactured By | Wing Manufacturing<br>306 E. Simmons<br>Galesburg, Illinois 61401 |
| Mfg. Sug. Retail Price | $44.95 |
| Available From | Both Mfg. & Retail |
| Wingspan | 56 Inches |
| Wing Chord | 10 Inches (Avg.) |
| Total Wing Area | 560 Sq. In. |
| Fuselage Length | 41½ Inches |
| Stabilizer Span | 21 Inches |
| Total Stab Area | 105 Sq. In. |
| Mfg. Rec. Engine Range | .40-.60 |
| Rec. Fuel Tank Size | 8-10 Oz. |
| Recommended No. of Channels | 5 |
| Rec. Cont. Func. | Rud., Elev., Throt., Ail., Flaps |
| Basic Materials Used In Construction: | |
| Fuselage | Balsa & Ply |
| Wing | Balsa Sheeted Foam Cores |
| Tail Surfaces | Balsa Sheet |
| Building Instructions on Plan Sheets | Yes |
| Instruction Manual | No |
| Construction Photos | No |

## RCM PROTOTYPE

| | |
|---|---|
| Radio Used | Futaba 9VAP 1024 PCM |
| Engine Make & Displacement | Magnum .45 Pro FSR ABC |
| Tank Size Used | 8 Oz. |
| Weight, Ready to Fly | 96 Oz. (6 Lbs.) |
| Wing Loading | 24.68 Oz./Sq. Ft. |

## SUMMARY

**WE LIKED THE:**
**Plans and construction methods, fit of wing cores and parts templates, scale appearance, and good flying qualities.**

**WE DIDN'T LIKE THE:**
**Plastic molded cooler, intakes, and gun ports.**

Wing Manufacturing has a line of short kits that build into very authentic looking replicas of the great warplanes of WW II. The kits include foam wing cores, sturdy plastic engine cowls, plus other formed plastic parts, formed canopies, and a unique formed steel engine mount. Also included is a bill of materials for the balsa wood and hardware that you will need to complete the model.

The F4U kit comes in a well-made carton featuring a large attractive label depicting three of those magnificent Corsairs flying in formation. The kit contents are listed on the label. On opening the box we see the contents dominated by the foam wing cores with two plastic parts bags tucked in with the tissue wrapped canopy, motor mount, and molded parts. There is a very detailed specification sheet of the model that also provides excellent three-views of the full scale F4U.

**Construction**

Two 24'' x 48'' plan sheets provide all the necessary instructions and details an experienced builder will need to successfully complete the model. Though not recommended for an inexperienced builder, this would be a good way for a modeler to get started in scratch building. Highly accurate templates for all wood parts are presented near the drawings of the related structures. The isometric drawings of the wing detail are most helpful as the construction steps for the wing must be followed carefully. The wing wedges supplied to form the dihedral angle of the outer wing panels are ingenious in the way they make this difficult task relatively simple. Great care must be taken in sawing or sanding the required dihedral break angles in the sheeted foam wing sections. Sig Core Bond was used to bond the 1/16'' balsa wing sheeting to the foam cores. Sig's instructions were followed closely and the results were good.

The fuselage and tail surfaces for the Corsair are surprisingly simple to construct considering this is a sport scale model. Satellite City Hot Stuff glue along with Super ''T'' and Special ''T'' were used selectively in constructing these components. The differing viscosity and bonding times of these wonder glues along with the Hot Shot and Kick It accelerators make it possible to tailor each gluing operation to the exact need. Use of these glues reduce building times from days or weeks to hours when compared with other bonding agents.

**Covering**

Although it would have been easy to cover the many compound curves of this model with an iron-on plastic, we chose instead to cover it first with .75 oz. Sig glass cloth and then finish it with K&B Superpoxy paint. K&B Superpoxy white paint with satin catalyst was used as an adhesive to stick the cloth to the structure and then primed and filled with three coats of the same. The Superpoxy paint and satin catalyst mix sands easily after it hardens. The color finish was two coats of blue Superpoxy mixed with 1/3 paint, 1/3 gloss catalyst and 1/3 thinner. The optional Wing Mfg. decals were applied after painting.

**Engine**

A new Magnum 45/PRO FSR-ABC was used for power. The engine was broken-in following the manufacturer's

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recommendations before installing in the airplane. An O.S. muffler extension was used to extend the muffler completely out of the cowling. A Pitts type muffler could be used to contain the muffler inside the cowling and maintain a greater degree of scale appearance. The unique steel engine mount supplied with the short kit was used and found to be designed well and easy to use. An 8 oz. Sullivan tank was installed exactly where the plans showed.

**Radio**

A Futaba 9VAP 1024 PCM radio using 9101 servos was used. A total of five servos were used with one each being installed into the bottom side of the outer wing panels for each aileron. One each went in the fuselage for the engine, elevator and rudder. With the exception of the two servo aileron set-up, the installation was just like the plans. Plenty of space was found for everything with the battery placed under the tank and the receiver positioned between the servo tray and the battery.

**Flying**

The Center of Gravity came out an inch behind the point shown on the plans so a Harry Higley heavy hub was used to properly place the C.G. Even with the nose weight the total weight came well within our expectations. The plans show flaps but we chose not to use them and instead used ailerons that extend the full length of the outer wing panels. Initially we used far too much aileron travel and adjusted this down to 3/8" both up and down. One half inch up and down on the elevator worked out well with 1" each way on the rudder. Without going into details on how we arrived at those control throw values we can say without reservation the airplane performed beautifully after the right adjustments were determined. The only word of caution concerns the airplane's tendency to groundloop in th early part of the take-off roll and the last part of the landing roll — so stay on the sticks. The Magnum 45 is more than enough power for this airplane and after some initial surging and idle adjustment problems (that Randy Wrisley at the Magnum service department helped us with), we were more than happy with the airplane engine combo. It looks like a Black Sheep Squadron warplane and performs like a trained tiger.

**Conclusion**

Wing Mfg. recommends this model be built and flown by an experienced modeler. We agree. I would rate the flying qualities of the model in the same category as a good sport pattern plane powered with a hot 60 engine. Nice but not for the beginner. Short kits can be helpful to the kit builder transitioning to scratch building. The Wing Mfg. Corsair is a high quality and very well thought out kit that will fulfill the reasonable expectations of the most discriminating modeler. □

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# A LOOK INTO THE T.O.C.

## Interviews with participants

**By Pat Godfrey**



**Bill Thomas**

Bill Thomas; author, full scale aerobatic competitor, full scale judge, international flight instructor, R/C competitor, and R/C judge. He and his wife Joye spend the summer months in Cuba, New York, and the balance of the year in Venice, Florida. I know from our phone conversations that he is as enthusiastic about R/C as he is full scale. He has been organzing and participating in the IMAC contests on the East Coast (they use scale R/C planes, do Aresti maneuvers, in front of full scale judges). Also he was a judge at the 1988 Tangerine R/C Contest.

Bill was on the United States Aerobatic Team from 1971 through 1977, and won a silver medal at Salon De Provance, France. From 1984, he has served as an international full scale judge, most recently at Fon du Lac, Wisconsin, in 1988. He owns and operates "Fly For Fun" Aerobatic Flight School and wrote a book on Aerobatics, "Fly for Fun with Bill Thomas." The other answers to my questions are as follows:

**PG:** How long have you been flying full scale and what plane do you prefer?
**BT:** I have been flying full scale for 46 years and I prefer a Pitts.
**PG:** The same questions pertaining to R/C.
**BT:** I flew R/C from 1958 to 1968 and then started again in 1985. I prefer the Laser.
**PG:** What are you looking for as a T.O.C. judge?
**BT:** A thousand and one things — including straight lines, round circles, smoothness, positioning, and rolls properly placed.
**PG:** When a flier has won a competition several times do you feel you are as impartial judging him as the others?
**BT:** I hope so.
**PG:** If all the planes were identical and the judges could not see the fliers do you think it would be more impartial?
**BT:** I judged this way in the Masters. I could sometimes determine who the pilot was after the first maneuver.
**PG:** All of the interviewed fliers to date agree that the judging at T.O.C. is superior to any other R/C event. What is being done differently here?
**BT:** Using both R/C and full scale judging makes for a better mix.
**PG:** Do you feel it is more difficult to fly full scale or R/C?
**BT:** R/C.
**PG:** Would you like to participate in more T.O.C.'s?
**BT:** Yes.

Bill includes a copy of the biographical information that he had sent to the Contest Management so I would understand his judging credentials and why he was selected. It is evident that he will enjoy judging at the T.O.C. and will do a good job.



**Don Weitz**

When we first met Don Weitz, he was competing in the 1982 Tournament of Champions. (He was also in the '78 and '80.) Bob had built a 1/3 scale Laser for Don Lowe, so we went to Las Vegas with Don and Clara to see the event and keep the airplane in good shape. Don Weitz was one of the competitors that year and we saw quite a bit of him at the practice field. When we went to the next two T.O.C.'s we found him working at Circus Hobbies, and since the Circus employees were all greeting and helping the invited contestants, he was working not participating.

Don is a very good flier, and has been interested in aviation all of his life. He started in free flight and U-Control. His father was a modeler and he learned early. He built his first plane when he was 10, and won the A.M.A. Air Youth State




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Championship in Nevada, when he was 13 years old. From 14 to 21 he found other ways to spend his extra time, but in 1972, he started flying radio control. In 1974, he began competing and flew in every Nats from 1975 to 1983. Also, he participated in the 1987, 1988, and 1989 Nats.

He was born and raised in Henderson, Nevada. Two years in the Navy took him to Viet Nam, where he served aboard the flagship of the 7th fleet. After he returned to the Las Vegas area he worked for Circus Hobbies, and is now sponsored by the Circus Circus Hotel. He is one of the lucky ones who has his hobby as his profession.

Don started out flying R/C with a Lanier Citron, graduated into an Ugly Stick, and then a Kaos. He likes F.A.I. pattern where he competes with a Conquest. His past T.O.C. planes were a 98" Chipmunk and 1/3 scale Laser and this November he will fly a Precision Built Ultimate powered by a 4.2 Sachs that is cushioned with a soft mount that was designed by Chip Hyde's dad, Merle. He has chosen a JR PCM 10 radio.

On one of our trips to Las Vegas, we were at the field with Don and some other employees of Circus Hobbies. He was checking a radio, and had the receiver installed in a plane that they used for this purpose. With the plane at high altitude, flying straight and level, we watched him take the back from the radio and make adjustments while continuing to fly the plane. He finished, replaced the back, flew for awhile testing other things, and landed. I was impressed.

Practice is as important when you are competing with a miniature airplane as it is for a pro bowler or golfer. Actually it takes more time, and probably more money, keeping the equipment for our sport in good condition than many other sports. Don likes to practice four to five days a week (two or three flights per day), when he is preparing for the Nats or Masters. Preparation for the T.O.C. will consist of four to seven days a week (four to eight flights per day). This rigorous schedule will start four months prior to the competition. When the contest schedule is lighter, he concentrates on building. During a T.O.C. year, he tries to attend six to eight contests but might participate in 15 in a regular year.

Don believes the Tournament has a very positive effect on the industry and hopes there will be many more. He concurs that judging is the best he has seen in any competition he flies in. Also, he feels that the prize money gives the event and the hobby more prestige and helps offset the price of the planes (more than $3,000.00 each), plus the time and many other expenses involved.

Don was an invitational contestant as are half of the contestants. The others have qualified by their high standings in the Nats, Masters, International competitions, and for the first time I.M.A.C. (Also, this year the alternates are going to compete, but if someone can't or doesn't participate there will be no substitute.)

I asked Don if there were any changes he would like to see in this competition and he replied: *There is only one thing that I can think of and it would have affected me this year. Everyone I know of in the competition world would like to compete in the T.O.C. This is many competitors' dream. Many fliers work very hard for the Nats and Masters trying to qualify for the T.O.C. and some don't make it because of the qualifying system presently used. I would like to see the top ten at the Nats and Masters used to qualify all America's and the International contestants in the order of placement at the Internats. I feel that this would give the T.O.C. even more prestige with the contestants and the spectators. As I said earlier, if this was the case I would not be a contestant this year, so I guess I would have to say that I'm glad they didn't do it that way this time. Hopefully, I can qualify next time.*

Not only would such a change affect Don, but also half of the scheduled contestants. This is indicative of Don Weitz's character as I know it. Very friendly to everyone, concerned, and compassionate of his fellow man. We root for all of the competitors, but if I am permitted to have favorites just Don's personality makes him special.

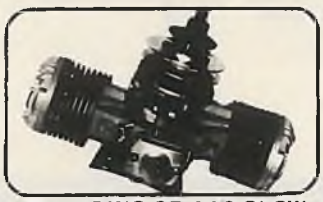
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**Dave von Linsowe**

Dave is another young man who started out in this hobby as a member of an R/C flying family. He was allowed to cut out balsa parts at age three with a double edge razor (without cutting himself). He first flew free flight then became interested in control line and then R/C. His radio control beginnings were with an Ambroid Charger equipped with escapements.

He and wife Janell live in Mt. Morris, Michigan, and he is an experimental model maker. What a perfect career for a gentleman interested in designing airplanes. It makes you wonder if the hobby influenced the vocation or if the vocation just assisted the hobby. He has been a private pilot for 11 years. Dave says, "I am checked out in complex high performance aircraft, and I do enjoy aerobatics. R/C allows me to try many things with airplanes that would otherwise be too costly, time consuming, and in some cases too dangerous."

Dave has always been drawing and designing planes, and his latest pattern design is the Mistress, kitted by Phillips Aircraft. He won an award with this plane at the 1990 Toldeo show. At the T.O.C. he had a Precision Built Ultimate and also a plane that he calls the Cortesan. The latter is a 35% scale verison of Henry Haig's new bi-plane with retracts. Dave first saw the welded fuselage frame of this plane in a hanger in Michigan 10 years ago. At that time he was researching the Super Star for Dennis Donahue. He decided to take a

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version of this to T.O.C. and approached Henry Haig about information on the plane. There are no drawings but they measured the plane that Henry was building and went from there. It was a good decision and a fine flying plane. He actually finished the model before Henry completed the full size plane (although it may have been flown by now). The full size biplane will have approximately 17 foot wings and a 16 foot fuse, and is equipped with a six cylinder engine.

Dave's model has a built up balsa fuse, one piece wings of foam sheeted with balsa, with the cabanes holding the top wing above the fuse. Dave had planned on flying a Precision Built Ultimate and finished that plane in his hotel room after he arrived at Las Vegas. He lost the Ultimate on his first flight in the contest due to radio interference. He had the Cortesan with him also, but was not satisfied with the engine he had installed. It just did not have enough power. Chip Hyde loaned him the twin 3-W he had had in one of his Ultimates that had crashed. So back to the hotel room to get the Cortesan ready. He had put five flights on the plane before the competition. Luckily the radio was on a different frequency.

Anyone who was there will tell you that Dave von Linsowe put in some terrific flights. He wants another chance without all the stress to show exactly how well he can compete and how much higher he can place. I particularly like his freestyle performances during which his brother announced his maneuvers just like they do at a full scale aerobatic show. This was the first time music, smoke, and other embellishments were allowed. The other competitors had music and Dave's choice of an announcer was unique. He placed 3rd in that part of the Tournament.

I am not sure how superstitious Dave is but he pointed out that: His Ultimate crashed on the 13th flight, the last flight he put on the Cortesan at Vegas was the 13th, the 13th servo he installed in the plane was numbered 13, he finished in 13th place, and he and Janell flew home on November 13th.

Dave has a busy life flying competition, running Performance Products (he manufactures soft mounts for smaller engines), is on the AMA contest board and FAI team selection. You are certainly going to hear a lot about him in the future.

**QuiQue Somenzini**

It is always good to see new talent come to the Tournament of Champions. In 1990 there was an entrant from Argentina who was interesting to watch. Actually we were watching another father and son team. QuiQue is 23 years old and has been flying since he was eleven. His father was the Argentine champion in Pattern, and QuiQue helped him with his plane. Three months after he started flying, he was flying the F.A.I. pattern. He placed third in the Argentine Nationals and the following year he won their Nationals and his father was second.

He is very well known in Argentina, and



the Argentina Air Force helps him find materials to work with and a place to practice. Model supplies are extremely expensive there. He and his father manufacture a lot of the parts he uses in his models. He was in the U.S. for the World Championships in 1989 and he and his family came by our shop to get parts for an Ultimate. They took a set of plans and only the things they were sure they could not duplicate. The duty to take goods into Argentina is very high and they could hold their purchases in their two hands. QuiQue will be flying an Ultimate (designed by Bob and modified by Mr. Somenzini), powered by an A&M Sachs, also extensively modified by his father, who is a former race car champion. This model uses a tuned exhaust system and this plus other engine secrets give this Ultimate superb vertical performance.

QuiQue is studying Mechanical Engineering and is in his third year of college. He attends ten to twelve shows and demonstrations a year. In the past two years he has attended two international events each year. The Argentine Championships is the only F3A event held there yearly. He has won each year since 1979. His father was the winner in 1978. He also has a brother and sister who are pilots. Last year he won an international contest in Australia.

QuiQue wants his T.O.C. plane to have plenty of power and good trimming. It should have a long tail moment, short wings, be very stable, and do predictable snap rolls. Don Lowe was recently at the Argentine Nationals and he predicts QuiQue will be a potent competitor.

**Betty Stream**

I am pleased to include Betty Stream in this series of Tournament of Champions articles. She is a wife, a mother, and an Executive Secretary for Southern California Center of Sports Medicine. I'm sure that this is enough to keep her pretty busy. Daughter Susi has grown up and is responsible for herself now, so what's the big deal?

When she married Joe Stream, she also married his hobby and over the years the hobby may have won. Seriously, there are a lot of readers out there who wish their wives were half as interested or at least more tolerant of their Radio Control hobby. Betty flies gliders, is a C.D., has edited

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newsletters, and has done the score tabulation at local contests. When she accompanied Joe to the 1967 Nationals, she offered to help out. She worked in Pattern Tabulation that year and since has performed most of the tasks that must be fulfilled to have a successful Nats. Presently she is Event Director and Category Manager of all the events held at the Nats.

She and Susi were so good to work the California Pattern Competitions as score tabulators that the Pattern Club gave them their first computer six years or so ago. It has since been updated and carried to the Nats, the T.O.C. or where ever they are needed.

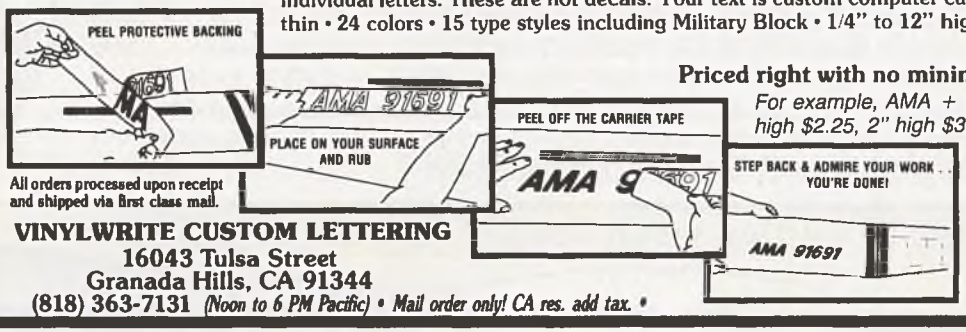
She and Susi were asked to tabulate at the 3rd T.O.C. and have been there each year since. They work with Jackie Edwards, Mike Lauman, and this year, Mike's wife Vicki will process the scores. Each year they find ways to make this task more efficient. I worked with Betty two different years at T.O.C. and was very impressed at the professional manner in which she does her job. The first year I helped with scores at T.O.C. there could be half an hour to an hour wait from the time a contestant's scores were brought to us and the time they were recorded on the public scoreboard. The next year Betty, Susi, computer, and the gentlemen with the computer program arrived and things began to speed up. This year the time between getting the scores and recording them for the crowd to see is only a few minutes. I am very impressed at the professional manner in which these ladies do their work.

Betty wears many hats: Assoc. V.P. of District 10; Editor of K Factor, the publication for the National Society of Radio Control Aerobatics, with 999 members worldwide; and a member of the A.M.A. Scholarship Fund. Participation in the latter and pride in what they are accomplishing is very evident when Betty tells you that the A.M.A. Council took their suggestions and added more money to the


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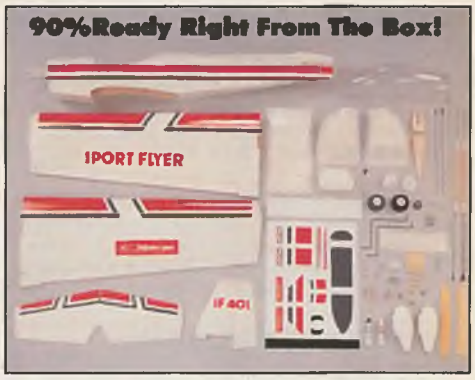
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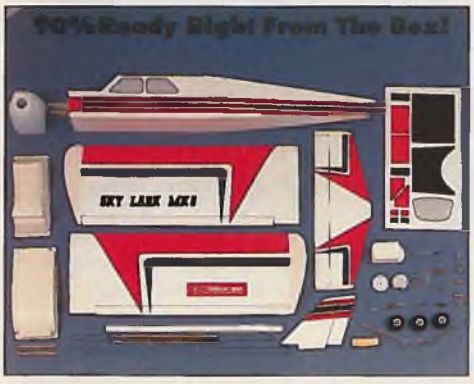
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Fund so that they are giving seven this year. I have a lot of admiration for this lady who has wholeheartedly accepted her husband's interests and found a place all her own.



**Ken Binks**

Bob and I have never had the pleasure of meeting Mr. Binks or his wife Susanne, "Susie." He is the Tournament of Champions entry from England, but I am sure that you will be as eager to make their acquaintance as I am, just to hear how he flies model planes for movie companies.

Ken is forty two and began flying free flight at seven years of age. He started in Radio Control using rubber driven escapements at 12, and later developed aerobatic slope soaring gliders which were very successful in England.

Looking for a new challenge, he found F3A Aerobatics and the opportunity to compete on an International level. He has been overall English National Champion eight times since 1976. This allowed him to compete in the European Championships where his top placement is 7th, and in the World Championships where he started in 1979, representing England and has appeared in every one since. He designed the "Stylist," an F3A plane for a YS 60cc longstroke.

He is an Industrial Process Engineer and he and Susie live in Sussex. His preference is a "scale aerobatic aircraft with correct (1:1) power weight ratio." She also enjoys the hobby, the travel, and the friends they have made.

In the pictures that accompany the interview you see a handsome man who might be in the cast of the film rather than flying one of the models. "Empire of the Sun" is a Warner Brothers film directed by Stephen Spielberg. Ken flies both a B-29 and a Mustang. The B-29 is of balsa and ply with a 29' wingspan. It weighed 120 lbs. and was equipped with: two Futaba Radios, 16 servos (one radio was an auxiliary), two King 70cc engines, two freewheeling props, and a Mick Reeves Screw Jack u/c. The Mustang weighed 80 lbs. and had a span of 12'. It had a glass fuse, built up wings, a 200cc engine, and a 34 x 14 prop.

There were 17 planes in all built for the movie by Model Effects of Watford, England, used in the film. More recently he

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worked again for Warner Brothers on the film "The Recruit," which was done in Yugloslavia. The script called for a mid air collision and the aircraft blowing up on impact. Ken said, "After some 28 passes which were unbelievably close we finally achieved a superb mid-air."

Being a participant in the T.O.C. has been a goal of Ken's for years. He is proud of his hobby and feels that "the technology developed for this type of an event is of benefit to all R/C modelers, Aerobactic and Scale. It takes the 'boys with the toys,' image away and firmly establishes it as a sport with Olympic potential. If you can have archery, shooting, and sychronized swimming, etc., why not aeromodeling?" He and Susie send a "Hallo" to all of their friends and look forward to renewing acquaintances at the T.O.C.

**Steve Morris**

At the 1988 Tournament of Champions, I sat in on a very interesting class conducted by Mr. Steve Morris. It was a training and review class for the judges and it lasted all day. Steve had the responsibility of preparing six full scale judges to utilize their I.A.C. skills while judging models, and six model judges who were being asked to judge the competitors using the





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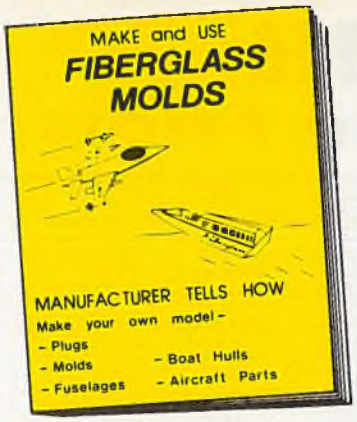
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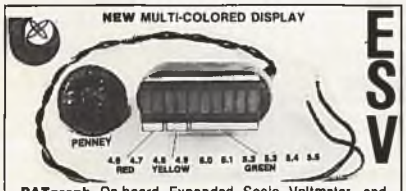
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I.A.C. judges are tougher than their model counterparts. Also, full scale planes and models do not necessarily do maneuvers in exactly the same way. Standing on the ground with a radio transmitter is not the same as being physically in the aircraft. There are judges who do not fly, fliers who have never judged and some who do both. With all of these dissimilarities, twelve judges listened to Steve's instructions and then did the professional job they had assembled to do.

Steve Morris is a 737 pilot for United Air Lines. Currently he holds an ATP certificate, Flight Instructor, Airplane, Instrument, Multi-Engine, Helicopter, Advanced and Instrument Ground Instructor ratings. He is married, they have a son and live in Colorado. In 1974 he seriously began aerobatic flying, and also, was President of I.A.C. Chapter #36. From 1976 to 1984, he was the Editor of Sport Aerobatics and held several positions including Director in I.A.C. He has been involved with nearly every program in this organization and promotes safety in aviation as he speaks at Aerobatic Seminars around the country. He is now seeking the office of President of the International Aerobatic Club.

He has been flying since he was 16 years old and flew a Citabria 361AC, while competing in Sportsman and Intermediate categories. Steve presently is flying a family-built Pitts.

He was Chairman of the I.A.C. Judges school program for four years and is at T.O.C. as the Judges school Instructor and Line Judge. He is watching for symmetry, lines, and angles, round loops or portions of the same, and constant roll rates. He belives that R/C is more difficult to fly than full scale and that T.O.C. is a superior competition because they have a full scale judges school prior to the contest and treat the flying as though it is full scale. He enjoys T.O.C. and wants to participate as often as possible.

### George Manning

George spends his working hours constructing elevators at Grand Terrace, California, where he lives with his wife and son. His spare time has been devoted to Radio Control Modeling with the proud support of his family. When possible he puts in two or more flights, three to four times each week. He also is obligated to participate in the Masters, Nationals, U.S. Team selection, etc., or he may not get





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another T.O.C. bid in the near future.

After being invited to participate he had to decide on a plane or planes. I know he has two Ultimates, but like some of the others he may have decided to try one or two others to see which he felt the most comfortable with. Each of these planes must have an engine, which hopefully will have the power you are seeking, a good quiet muffler, and more than likely a soft mount. Carbon fiber landing gears and propellers are another not so small extra, and the box to ship all of this in to Las Vegas might be a concern. The honor of winning an invitation to try for the "big one" can get pretty salty. Of course the odds are a lot better than winning the Florida Lottery.

George says, "If the desire to be a top competitor is deep inside a person they stand a good chance." □

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# THE CONDORS 1ST ANNUAL JET RALLY

**By Douglas Cerrito**



*Bob Violett, Dave Ribbe, and Frank Tiano pose with the "Air Force" Bob brought to the event, including (in front of Bob) the F-16 selected as the Critic's Choice winner and (at the end of the line) the F-86 selected as the Best Scale Jet.*



*Meet Coordinator, Charlie Chambers, with his beautifully detailed Violett Viper for which he won the Craftsmanship Award.*



*Ray Kleber of Boca Raton, Florida, a member of the Condors, with his gorgeous P-80 Shooting Star, from a Sterner kit, powered by an O.S. 77 turning a Byron's Fan. This plane was flown several times both days, but unfortunately crashed on Sunday due to radio failure. Ray won the Condors Jet Rally Award for the show he put on with his P-80 and his Byron's F-16.*

With the membership approaching 400 active enthusiasts, the Coral Springs, Florida Condors certainly qualifies as one of the country's largest R/C model airplane clubs. Despite the club's size, organization skills, a 500' by 50' paved runway and long-standing reputation, everyone involved in planning the First Annual Jet Rally was more than a little nervous as October 27th, the first day of this two day event, approached.

No newcomer to planning major events (the Condors hosted the 1989 Top Gun Invitational Scale Tournament), the Jet Rally staff still managed to conjure up a great deal of stage fright, which soon spread through the rank and file as the event grew closer. "What happens if no contestants show up?" was the primary question everyone was asking, and not without just cause. Unfortunately, the planning committee had overlooked the fact that the entry forms did not require preregistration. Wild speculation filled the last meeting on the Sunday before the event. It was estimated that anywhere between six and twenty-six jet pilots would come with an unknown number of jets in tow. Six would be a disaster, as this few jets and pilots would have a hard time sustaining the interest of more than 2000 spectators expected to attend the two-day event; twenty-six would be heaven.

The last week was a fervor of activity as follow-up calls were made to jet pilots throughout the country in an attempt to get firm commitments. The chairman of the planning committee, Charlie Chambers, one of the best known and most successful R/C pilots in the country, used his considerable charm and influence to obtain commitments from Bob Violett and Bob Fiorenze, perhaps the premier jet pilots in the hobby. Still, as the weekend approached, no concrete number of participants had been obtained. Everybody wondered if there would ever be a Condors Second Annual Jet Rally.

The early morning hours of October 27th proved to be very tense. The contest



*Craig Wilson of Deland, Florida, with his Violett Viper and F-86 that earned him the Condors Special Award.*




*Bob Fiorenze with the prototype F-4 Phantom voted the Pilot's Choice Award. Bob also brought the prototype F-16 and his scratch-built F-5E shown in the photo.*

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*Ron Schaefer with a Violett Aggressor 2 finished in desert camouflage. He was ready to join forces in Operation Desert Shield.*




*Frank Tiano with a nicely finished Violett Viper. Violett kits were much in evidence, accounting for about half the jets at the meet.*


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pump. The crankshaft is equipped with an anti-corrosion disc-plate and is also plated. The engine is ball-bearing equipped, front and rear, with the rear bearings being stainless steel to prevent corrosion. Also included as standard equipment is the new longer exhaust header. All that's required is your tuned pipe to extract every bit of horsepower that the Hanno Special is capable of. The cylinder head is machined from bar-stock and is distinctively anodized red.

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planners began to assemble at the flying field at about 6:00 a.m. It was an unseasonably cold morning, especially by South Florida standards, with temperatures lingering in the high 40's before the sun began showing its face. Apparently the cold front that persisted the week before hadn't moved as forecasted. To make matters worse, the southeast oriented runway was being hit by a steady 20-knot, 90° cross wind, with occasional gusts up to 30-knots. It definitely seemed colder than it was. It was easy to see why the free hot coffee and doughnuts that the Condors had thoughtfully brought for the pilots and their helpers proved to be extremely popular with this pre-sunrise group.

It wasn't until around 7:45 a.m. (temperature now in the mid 50's) that the first jet pilot drove through the gate. "I hope he brought plenty of fuel," joked Paul Woodard, the Contest Director. And then miraculously, other pilots and their entourages began to file in. By 8:45 a.m. we counted 27 pilots and 34 aircraft on the flight line, all of whom were pleased to find that there was no registration fee.

The tension began to ease as the temperature slowly inched up. But then a new chill filled the air, with everyone wondering whether the unusually cold weather would keep the spectators away.

Fortunately it didn't. By 9:30 a.m. the main bleachers were full to capacity. Soon, all the seating was taken and there were people lined up three deep at the fence; all the way down the length of the field.

Craig Wilson of Deland, Florida, was the first jet pilot in the air. He put on a spectacular show with his Bob Violett Viper, despite the menacing cross winds. By 11:00 a.m. things were rolling along smoothly thanks to the exhibitions put on by Bob Fiorenze, Bob Violett, Frank Tiano, and a very brave and talented group of jet pilots.

The spectators also enjoyed a breathtaking model helicopter show put on


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Specifications

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| Wing Span | 60 inches |
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Bob Boucher




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***LEFT: Wayne Knight, a member of the Condors and the nearby Gold Coast R/C Club of Delray Beach, with his Mirage 2000 built from a Jet Hangar kit. The Rossi 65 and Dynamax fan moved this 10 year old Mirage at a nice "scale" clip. RIGHT: Craig Wilson's nicely finished Violett F-86 Sabre.***






***LEFT: Ray Kleber's Byron F-16. RIGHT: Ray Kleber's P-80 Shooting Star, built from a Sterner kit, and powered by an O.S. 77 turning a Byron's fan.***

by two champion heli pilots, Mike Maas and Danny Melnick. Mike demonstrated a new electric powered heli he was testing for the manufacturer.

At noon, the audience was treated to the ever popular Art Johnson and his Florida Air Show Team, as they demonstrated their piloting skills flying such novelty items as race cars, a full-size lawn mower, Snoopy and his Dog House in pursuit of the Red Baron and, just in time for Halloween, a pair of witches complete with their flying brooms. The crowd, kids, and parents alike, loved it.

By 1:00 p.m. the jets were back in the air competing for over a thousand dollars worth of prizes and trophies that were part of the booty for this first time event, including an F-20 Tigershark kit donated by Knights of the Air, a Futaba 7-channel radio, courtesy of R/C Hobbies of Tamarac, Florida, a cash award and two trophies donated by Frank Tiano Enterprises, a 50% discount on a JR X-347 radio from Hobby Dynamics, and four cash awards and a trophy provided by the Condors.

In the meantime, all the Jet Rally participants and their helpers were enjoying a free BBQ sponsored by the Condors, which went on for the balance of the afternoon.

Sunday brought a new element to the event --- intermittent showers to go along with the still-present hefty cross winds. But despite these minor interruptions, the crowd was enjoying the show so much, that they waited them out. The gatekeepers were actually continuing to sell tickets in the rain.

As the last flight was coming to an end at around 3:00 p.m. on Sunday, the Condors First Annual Jet Rally committee was finalizing the details for the award presentations scheduled for 3:30. The Fastest Jet Award went to Bob Violett (192 mph); Special Contest Award to Craig Wilson; Best Scale Award to Bob Violett's perfectly detailed F-86; Pilot's Choice Award to Bob Fiorenze for his F-4 Phantom; Critic's Choice Award to Bob Violett for his beautiful and excellent performing F-16; Special Craftsmanship Award to the 1990 Scale Master's Champion Charlie Chambers' flawless Violett Viper; and the Condors Jet Rally Award to Ray Kleber of Boca Raton, Florida, who brought several jets to the event and flew them spectacularly and tirelessly throughout both days.

It is now definite that there will be a Second Annual Jet Rally sponsored by the Coral Springs, Florida Condors R/C Flying Club in October of 1991. We are all starting to rest up for it now. □


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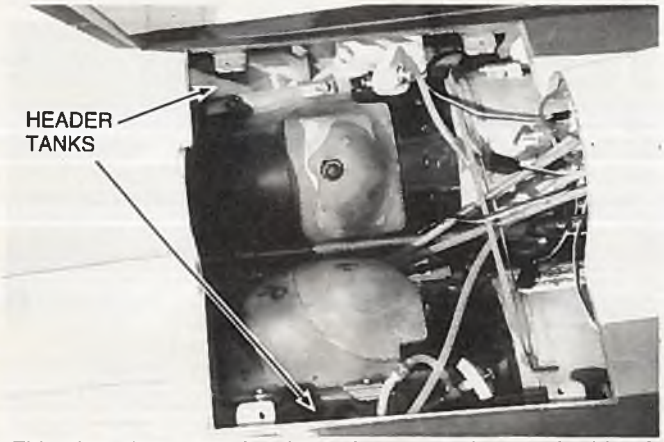



*Main fuel tank.*

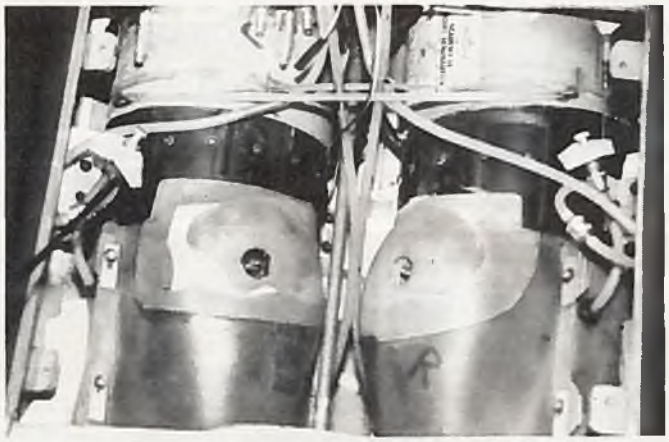
# JET MODEL FUEL SYSTEM HOOK-UPS

## (2 Tank Series System and the 3 Tank Parallel System)

**By Wally Zober**

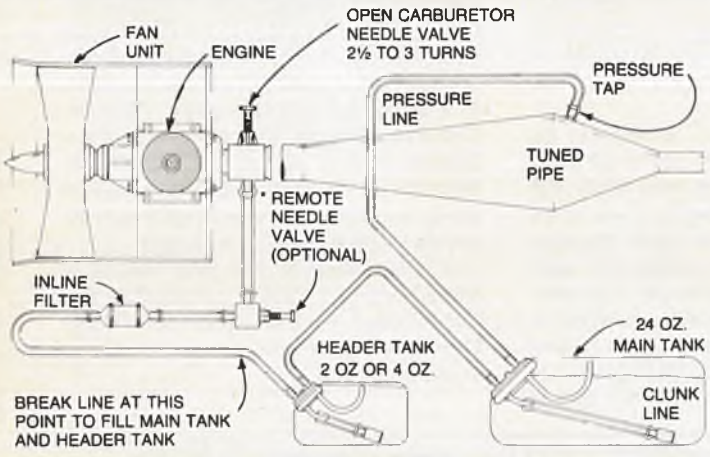



***This view shows two header tanks mounted on each side of ducted fans.***



***Fuel lines from main tanks to header tanks on twin fan system. Note inline filters and remote needle valves.***

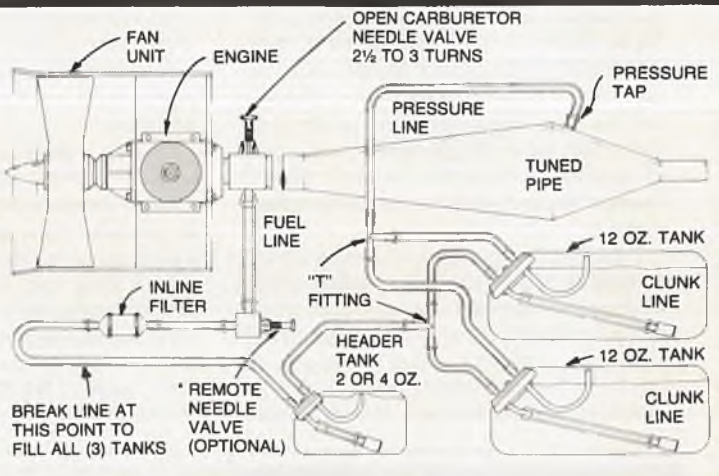
Those of you who are getting into jet model flying and are a little concerned about fuel system hook-ups can lay your fears aside and put your doubts to rest. There is no secret or magic to a good fuel system hook-up; just good common sense. That means using the tried and true techniques used by the more experienced jet modelers, sometimes referred to as the pros. Speaking of pros, that's how this article came about. A good friend of mine let me fly his Regal Eagle and




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**SCHEMATIC DIAGRAM PART #1**




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**SCHEMATIC DIAGRAM PART #2**

# THE BLACK BARON TIPLIST

PUBLISHED EVERY NOW & THEN BY COVERITE, 420 BABYLON RD., HORSHAM, PA 19044

## Subject: The truth about ALL film coverings

Manufacturers all claim their film goes on easy, stays drum tight, never gets hanger rash, middle age sag, or wrinkles. Have they ever gone to a flying field in July? What causes all those models to look like Del Monte prunes?

### The bugaboo is heat.

The simple truth is that the more heat you apply to **any** plastic film, the less chance it has to succeed. This fact is obvious after a few months go by. The film might look great while going on, but after a while, the heat-stressed film begins to poop out. Hello bubbles, hello sags! If you've really cooked your film, it gets so brittle, it can shatter like glass on impact!

### The solution.

Of the 3 most popular films, only one goes on with low-heat. That's Black Baron Film. Originally, Black Baron required the same high heat as the others - close to 300°! But new Black Baron goes on at 230°! It not only sticks at this temp, it shrinks fully, as well. Less heat, less stress, much better long term stability.

### Beware the sneaky iron.

Ordinary irons have a heat control mechanism that encourages the temp to continuously swing up to 20° above and 20° below the desired setting. Not so with our Black Baron Iron. It's high-tech thermostat reduces the variation to a mere 5°.

### The iron dial means zip.

Lots of guys think the dial numbers mean something. Like number 1 = 100°. Forget it. They have no meaning. In fact, every iron has different temps at these numbers.

### Get a thermometer.

Without one, you're playing Russian Roulette. Our Pocket Thermometer is remarkably accurate, yet costs only $7.50. It comes in a handy carrying case and includes a chart showing the correct temps for most coverings (film & fabric).




### Here's what the experts say about Black Baron Film

"It's not usual for this newsletter to endorse products, but this is special. You have heard the claims from all and usually take it with a grain of salt, but Nelson Holden used Black Baron Film to cover a cub. He said it's hard to describe, but it covers like (Super) Coverite and looks like Monokote. Compound curves are not a problem, like wing tips, etc. **Seams disappear** and its colors match Black Baron paints."

*- Editor, Sparks R/C Club*

"I've used a lot of this stuff this year, and I wouldn't have continued using it if I didn't like it...It goes on very easily, suffers very little from trapping air bubbles and getting creases. BBF was very **easy to apply around corners**, compound curves, and just about anywhere."

*- Gordon Banks, R/C Report*

"I returned all the test pieces (covered in Black Baron Film) to their nest in the rafters of my workshop and didn't check on them until some 5 weeks later. Guess what? The test structures were as good as new with **no evidence of lifting or bubbling.** Troops, the good just got better!"

*- Frank Healey, IMAA Newsletter*

"The first thing we noticed was the ease with which the film ironed down, and the total lack of bubbles. Also, the grain pattern of the **balsa was hidden** and did not become visible once the film had cooled. In fact, at one place on the tail feathers where we had to make a seam with the Cub yellow over the Flag blue, the seam was only a slightly darker yellow..."

*- Bill Kaufman, R/C Modeler*

"Good shrinkability. I put it in loose just to see what would happen. It shrank up perfect without warping! It works curves well and created no problems. **Stuck to itself very good** with minimal show of ironing lines."

*- Bob Banka, Scale Model Research*

"I covered the model (Davey Systems Miss La.) with Coverite's Black Baron Film which really did a great job. Heating really **shrinks out wrinkles,** and somehow did not warp the very light frame, in fact, it seemed to add a great deal of stiffness to this bird."

*- Stephen Scott, Model Airplane News*

"Black Baron Film is the best film covering I have used so far, and I have tried them all. I particularly like the temp range allowing one **to cover foam,** wood frame or sheeted surfaces...I was very pleased with my testing results...A comprehensive demo, involving many club members, convinced many to give BBF a try. I know it made believers out of many."

*- Jerry Smith, R/C Modeler*

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We've been in the covering business since 1968. We're committed to helping you succeed. So, we've written a booklet on the subject: "Tips On Covering". It contains techniques, do's & don'ts, trouble-shooter solutions, and secrets gathered from the best "finishers" in the world. **To get your copy, free,** just send us a self-addressed, stamped business-size envelope plus the circle in the upper left hand corner of the instruction sheet that comes with our new LOW-TEMP Black Baron film. Here's what the circle looks like:

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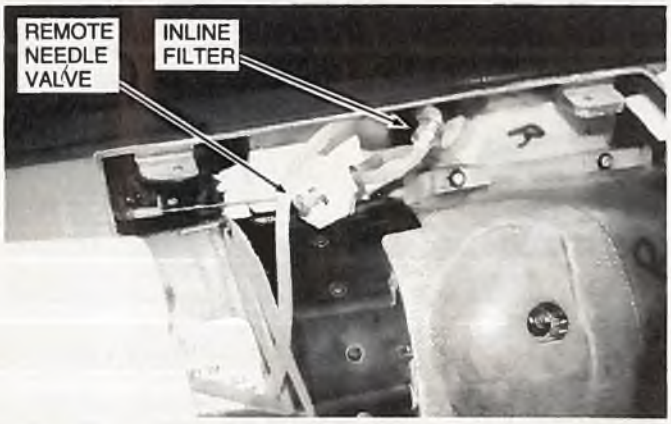
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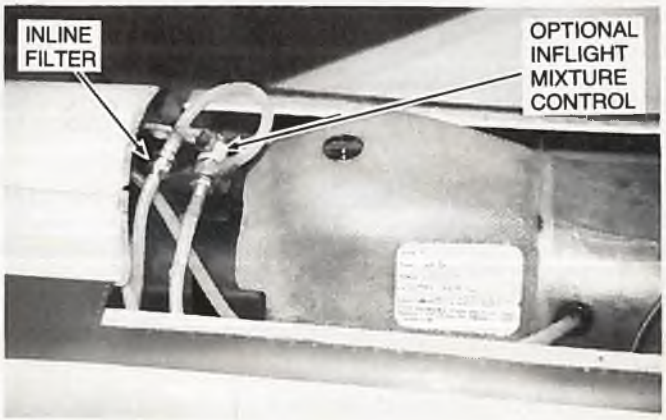
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*Twin tank system showing right side fan, header tank, remote needle valve, and inline fuel filter.*




*Single fan system showing optional in-flight mixture control and inline fuel filter.*

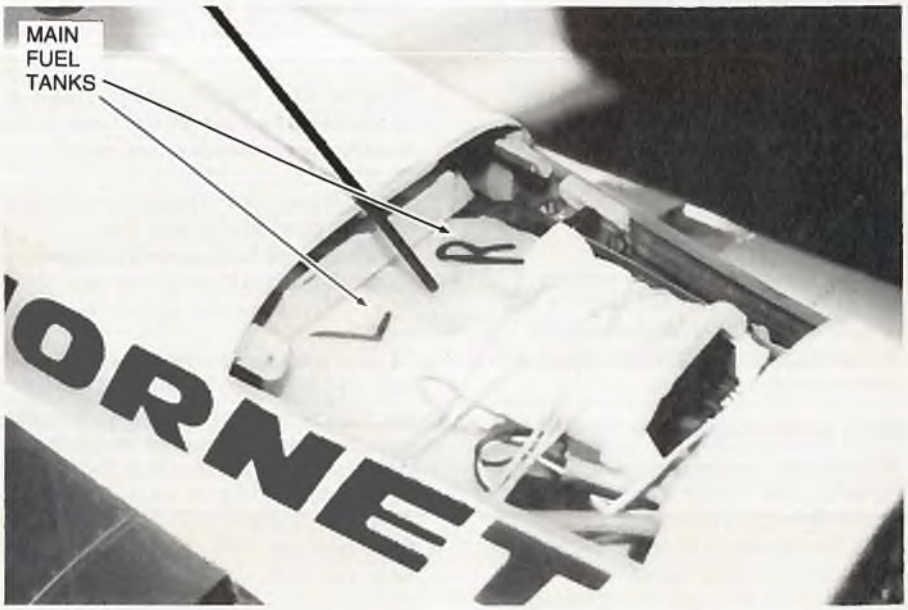
that first flight turned me on to jet models. I now have a Yellow Aircraft A-4 Skyhawk which is nearing completion. I am at the point of installing the engine, the fan, and fuel system. I've heard a few horror stories about how you can fry a ducted fan engine if the fuel system is not set up properly; or how you can have a flameout on takeoff or on a final landing approach. As we all know, jet modeling doesn't come cheap. I, for one, don't want to lose a beautiful and expensive jet model to a poorly designed fuel system hook-up. That's why I decided to seek out a pro or a more experienced jet modeler. In the Orlando area, we have several jet model experts, i.e., Bob Fiorenze, Gregg Wilson, and Bob Violett, just to name a few.

Bob Fiorenze is a close friend of mine. As we all know, he is one of the top jet model builders and fliers in the U.S.A. Bob was the first Top Gun invitational winner of 1989, the winner of the 1988 Scalemasters, and also winner of the 1985 NATS. I called Bob and asked him if he would help me with the fuel system hook-up in my Yellow Aircraft A-4 Skyhawk and he agreed to help me.

While Bob was explaining to me how his system works, I realized that surely there must be other new jet modelers, like me,



*Main fuel tank in single fan unit.*




*Main fuel tanks under receiver.*

# Whisper

## ELECTRIC HELICOPTER

KALT

NEW!



*Main rotor diameter – 3' 2 5/8"*
*Length – 2' 11 5/8"*
*Weight – 2 lbs. 2 oz.*
*Battery – 9.6v/1,100 mA or 9.6v/1,700 mA*

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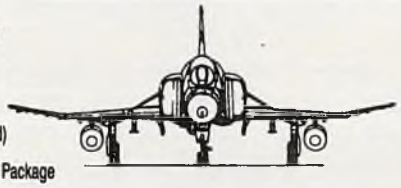
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who could use this information. I asked Bob if he would mind if I did an article on this subject with the information he was giving me. Bob said, "Heck, no — go for it. If I can help someone out who is new to this phase of R/C flying, I'm more than happy to contribute whatever knowledge I have to offer."

There are several methods used in jet model fuel systems and basically they are all somewhat similar. The systems described here are rather simple: one system is a two tank series hook-up and the other is a three tank parallel hook-up.

I am not going to give you a point by point or fitting by fitting description in this text. The schematic diagrams and photographs should be easy enough to follow. The following items will be required:

For the two tank series hook-up, you will need the following items: one ducted fan engine, one tuned pipe with pressure fitting, one remote needle valve, one inline filter, one 2 oz. or 4 oz. header tank, one 24 oz. main tank and enough fuel-line tubing to tie all the components together.

For the three tank parallel system, you will need the following items: one ducted fan engine with tuned pipe and pressure fitting, one pair of "T" fittings, one remote needle valve, one inline filter, one 2 oz. or 4 oz. header tank, two 12 oz. main tanks and enough fuel tubing to tie everything together.

On the schematic diagram you will note that the remote needle valve or inflight mixture control is listed as optional; however, I feel it is a must. Trying to get at the needle valve or trying to adapt some sort of device to adjust the carburetor can be cumbersome.

Some important things to remember: When using the remote needle valve, adjust the needle valve on the carburetor so that it is opened 2½ to 3 turns. No other adjustments will be made with this needle valve.

**Point of Interest** — Some fan jet engine manufacturers are supplying a threaded plug which replaces the carburetor needle valve. If you have this accessory item for your engine, I recommend that you use it.

Some additional points to remember — Keep the header tank close to the engine, keep your main tank or tanks as close to the C.G. (Center of Gravity) as possible. The large amount of fuel carried in a jet model will move the C.G. radically as it is depleted.

That's it folks! Try model jet flying — you'll like it. □

**Aero-Guidance Soc., Inc., "1st Annual Electric Fly"**
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*For further info, contact: AGS Inc., 101 Smithfield Dr., Endicott, New York 13760.*

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(Exception: 4 cycle Castor-synthetic blend)

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FAI
5%
10%
4 cycle
Helicopter

Omega
Competition Fuels

15%
25%
40%
¼ scale
Large Super "T"

Castor-synthetic blend

For general use in all conventional Glo engines. Works extremely well in A.B.C. or A.B.N. engines in hot instillations such as cars, boats and cowled in instillations.

Fun Power
Sport Fuels

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10%
15%

Castor-synthetic blend

For general use in all conventional Glo engines. Highly recommended for sport use where high performance is not needed or wanted. Idles great and has about 80% to 90% of the top end power of Cool Power or Omega.

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25%
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[1] Length: 25" (610mm), Wheelbase: 12" (305mm); recommended for 2 channel operation

[2] Model 8902 HF with SKYWARD 21 FSR engine; Model 8902 H without engine




## SKYWARD 21 FSR



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|---|
| Engine size: 21<br>Displacement: 3.44 cc<br>Net Weight: 420 gr |
| Two stroke/ Glow plug<br>1.1 HP @ 25,000 RPM |
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# SHOWCASE 91

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### INDEX-ON-A-DISK COMPUTERIZED MAGAZINE INDEXES

Periodical Index Enterprises announces the development of their 1990 magazine index for RCM. This new release adds to the list of computer indexes already available on diskette for RCM, covering the years 1985 through 1989. Unlike paper indexes, the diskette indexes go beyond referencing articles, and features simply by name or title only. Each issue of RCM has been thoroughly indexed for all essential information contained in each article and feature --- as well as the continuing monthly columns. Information such as Showcase items, For What It's Worth tips, Book/Video reviews, and much more are referenced in detail in a complete and concise, yet simple fashion. A separate disk/directory is also available containing data on construction plans, R/C organizations, and other R/C related information. The diskettes are not copy protected, and are available for both Apple and IBM computers.

The time to scan an entire year of information takes less than a minute for most searches. If you are tired of the endless searching through magazine issues that takes many hours, days, or even weeks to locate the desired information, then these indexes are a must. For complete free information, send a large SASE to: Periodical Index Enterprises, P.O. Box 9065, Brea, California 92622.



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### CALIBER 3P

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### P-40E WARHAWK

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| 1/16 x 3/32 | .07 | |
| 1/16 x 1/8 | .09 | .12 |
| 1/16 x 3/16 | .10 | .14 |
| 1/16 x 1/4 | .11 | .16 |
| 1/16 x 3/8 | .14 | .18 |
| 1/16 x 1/2 | .17 | .21 |
| 1/16 x 3/4 | .22 | .30 |
| **3/32-INCH** | **36"** | **48"** |
| 3/32 x 3/32 | .09 | .12 |
| 3/32 x 1/8 | .10 | .14 |
| 3/32 x 3/16 | .11 | .16 |
| 3/32 x 1/4 | .14 | .17 |
| 3/32 x 3/8 | .15 | .20 |
| 3/32 x 1/2 | .17 | .22 |
| 3/32 x 3/4 | .25 | .33 |

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| 1/8-INCH | 36" | 48" |
|---|---|---|
| 1/8 x 1/8 | .09 | .12 |
| 1/8 x 3/16 | .12 | .16 |
| 1/8 x 1/4 | .14 | .18 |
| 1/8 x 3/8 | .17 | .22 |
| 1/8 x 1/2 | .18 | .26 |
| 1/8 x 3/4 | .26 | .35 |
| **3/16-INCH** | **36** | **48"** |
| 3/16 x 3/16 | .14 | .18 |
| 3/16 x 1/4 | .15 | .20 |
| 3/16 x 3/8 | .17 | .22 |
| 3/16 x 1/2 | .21 | .27 |
| 3/16 x 3/4 | .30 | .41 |
| **1/4-INCH** | **36"** | **48"** |
| 1/4 x 1/4 | .17 | .22 |
| 1/4 x 3/8 | .19 | .27 |
| 1/4 x 1/2 | .22 | .31 |
| 1/4 x 3/4 | .34 | .45 |
| **5/16-INCH** | **36"** | **48"** |
| 5/16 x 5/16 | .23 | .29 |
| 5/16 x 3/8 | .25 | .32 |
| 5/16 x 1/2 | .30 | .39 |
| 5/16 x 3/4 | .42 | .56 |

| 3/8-INCH | 36" | 48" |
|---|---|---|
| 3/8 x 3/8 | .29 | .40 |
| 3/8 x 1/2 | .33 | .44 |
| 3/8 x 3/4 | .47 | .64 |
| **1/2-INCH** | **36"** | **48"** |
| 1/2 x 1/2 | .40 | .52 |
| 1/2 x 3/4 | .56 | .75 |

**TRIANGULAR CUT BALSA**

| | |
|---|---|
| 1/4 x 1/4 x 36 | .27 |
| 3/8 x 3/8 x 36 | .31 |
| 1/2 x 1/2 x 36 | .40 |
| 3/4 x 3/4 x 36 | .50 |
| 1 x 1 x 36 | .65 |

**BALSA PLANKS**

| | |
|---|---|
| 3/4 x 3 x 36 | 1.90 |
| 1 x 2 x 36 | 1.75 |
| 1 x 3 x 36 | 2.46 |
| 1 x 4 x 36 | 3.24 |
| 2 x 2 x 36 | 2.46 |
| 2 x 3 x 36 | 3.52 |
| 2 x 4 x 36 | 4.96 |
| 3 x 3 x 36 | 5.24 |
| 3 x 4 x 36 | 7.28 |

**BALSA SHEETS**

| 1-INCH | 36" | 48" |
|---|---|---|
| 1/16 x 1 | .29 | .39 |
| 3/32 x 1 | .32 | .43 |
| 1/8 x 1 | .35 | .47 |
| 3/16 x 1 | .39 | .52 |
| 1/4 x 1 | .44 | .61 |
| 3/8 x 1 | .57 | .77 |
| 1/2 x 1 | .70 | .94 |
| **2-INCH** | **36"** | **48"** |
| 1/32 x 2 | .32 | .43 |
| 1/16 x 2 | .39 | .51 |
| 3/32 x 2 | .44 | .58 |
| 1/8 x 2 | .49 | .64 |
| 3/16 x 2 | .58 | .77 |
| 1/4 x 2 | .67 | .90 |
| 3/8 x 2 | .82 | 1.10 |
| 1/2 x 2 | 1.21 | 1.61 |

| 3-INCH | 36" | 48" |
|---|---|---|
| 1/32 x 3 | .43 | .57 |
| 1/16 x 3 | .46 | .62 |
| 3/32 x 3 | .56 | .75 |
| 1/8 x 3 | .64 | .86 |
| 3/16 x 3 | .77 | 1.02 |
| 1/4 x 3 | .90 | 1.20 |
| 5/16 x 3 | 1.10 | 1.43 |
| 3/8 x 3 | 1.28 | 1.71 |
| 1/2 x 3 | 1.61 | 2.14 |
| **4-INCH** | **36"** | **48"** |
| 1/32 x 4 | .70 | .93 |
| 1/16 x 4 | .78 | 1.08 |
| 3/32 x 4 | .88 | 1.17 |
| 1/8 x 4 | 1.02 | 1.35 |
| 3/16 x 4 | 1.22 | 1.62 |
| 1/4 x 4 | 1.40 | 2.07 |
| 3/8 x 4 | 1.95 | 2.90 |
| 1/2 x 4 | 2.34 | 3.48 |

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| 1/64 x 12 x 48 | 8.01 |
| 1/64 x 48 x 48 | 32.04 |
| 1/32 x 6 x 12 | .64 |
| 1/32 x 12 x 12 | 1.27 |
| 1/32 x 12 x 24 | 2.57 |
| 1/32 x 12 x 48 | 5.06 |
| 1/16 x 6 x 12 | .63 |
| 1/16 x 12 x 12 | 1.25 |
| 1/16 x 12 x 24 | 2.50 |
| 1/16 x 12 x 48 | 5.00 |
| 3/32 x 6 x 12 | .97 |
| 3/32 x 12 x 12 | 1.94 |
| 3/32 x 12 x 24 | 3.87 |
| 3/32 x 12 x 48 | 7.74 |
| 1/8 x 6 x 12 | 1.07 |
| 1/8 x 12 x 12 | 2.13 |
| 1/8 x 12 x 24 | 4.25 |
| 1/8 x 12 x 48 | 8.50 |
| 3/16 x 6 x 12 | .79 |
| 3/16 x 12 x 12 | 1.56 |
| 3/16 x 12 x 24 | 3.14 |
| 3/16 x 12 x 48 | 6.26 |

| | |
|---|---|
| 1/4 x 6 x 12 | .77 |
| 1/4 x 12 x 12 | 1.56 |
| 1/4 x 12 x 24 | 3.14 |
| 1/4 x 12 x 48 | 6.26 |
| 3/8 x 12 x 12 | 1.93 |
| 3/8 x 12 x 24 | 3.85 |
| 3/8 x 12 x 48 | 7.70 |
| 1/2 x 12 x 12 | 2.16 |
| 1/2 x 12 x 24 | 4.33 |
| 1/2 x 12 x 48 | 8.65 |

**LITE PLYWOOD**

| | |
|---|---|
| 1/8 x 12 x 12 | .82 |
| 1/8 x 12 x 24 | 1.64 |
| 1/8 x 12 x 48 | 3.28 |

**TAPERED TRAILING EDGE**

| | 36" | 48" |
|---|---|---|
| 1/8 x 1/2 | .24 | .32 |
| 3/16 x 3/4 | .31 | .43 |
| 1/4 x 1 | .42 | .58 |
| 5/16 x 1-1/4 | .47 | .65 |
| 3/8 x 1-1/2 | .56 | .77 |

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Best of all is Baby Birdie's price! You can pick up this model for as little as $21.99 at hobby shops everywhere! The kit includes: engine mount, wing mount, all hinges, all horns, canopy, and step-by-step instruction manual.

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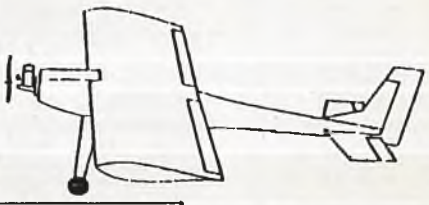
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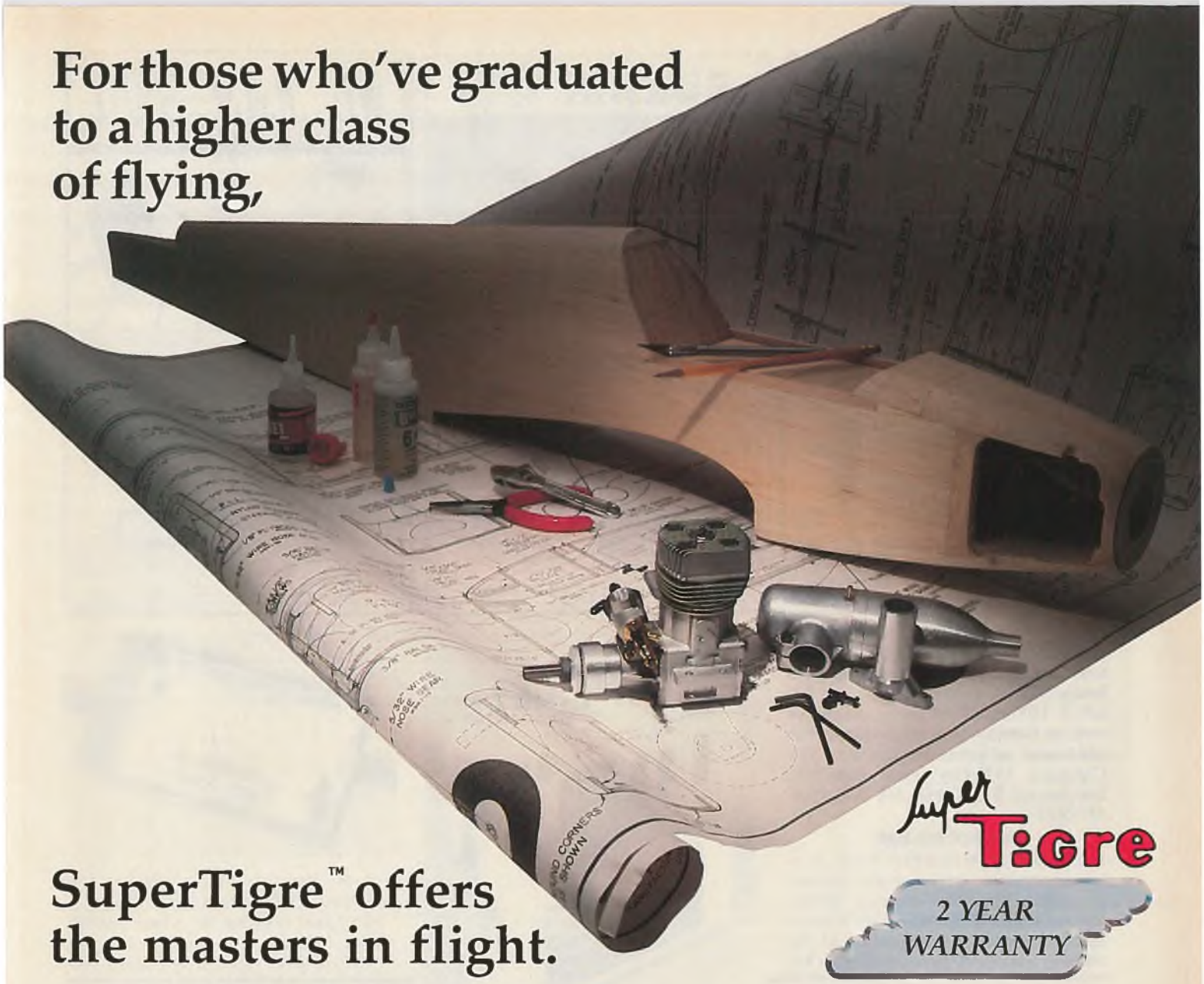
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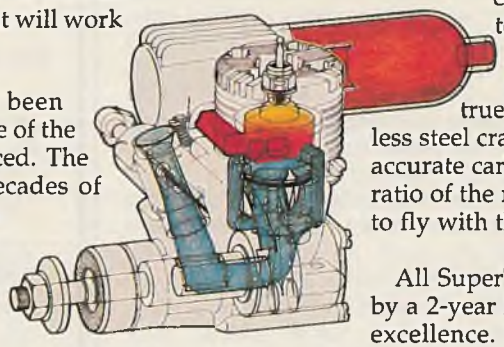


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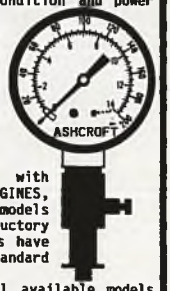
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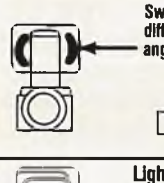
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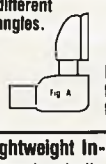


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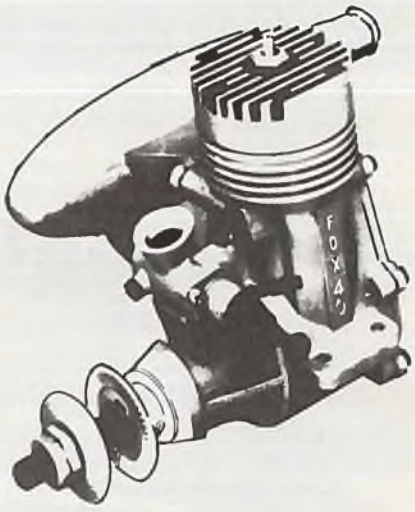
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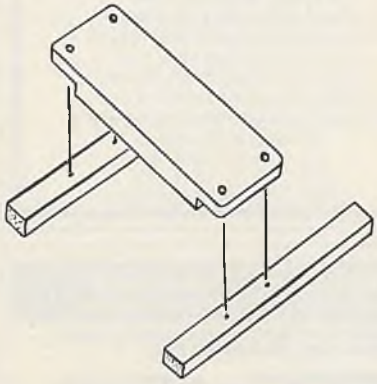
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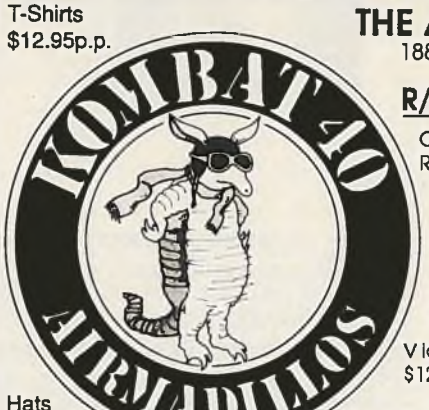
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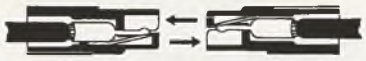
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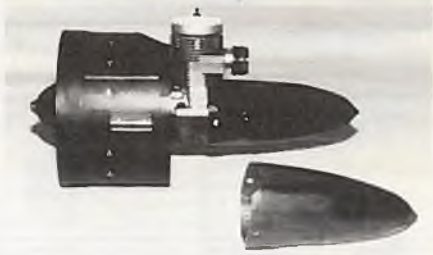
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| RCM | CLASSIFIED | ADVERTISERS: | Send | your | Classified | ad | to: | RCM | Readers | Exchange, | P.O. | Box |
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| 487, | Sierra | Madre, | CA | 91024; | any | questions, | please | call | (818) | 355-1476. |
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# HELICOPTERS *LEARN TO FLY without CRASHING*



★ *ACCEPTS ALL POPULAR MODELS .28-.61*

★ *LEARN NOSE-IN AND NOT CRASH*

★ *FLY'S TO A HEIGHT OF 4 ft., AND IN A 7 ft. DIAMETER CIRCLE.*

★ *42" LONG, PORTABLE, EASILY DISASSEMBLES.*

★ *SPRING LOADED CASTER*

★ *J-BOLTS CLAMP HELICOPTER SKIDS TO STAND.*

★ *ALL ALUMINUM CONSTRUCTIONS, SEVEN BALL BEARINGS.*

The Whiteman Flying stand is constructed entirely of aluminum, and uses seven ball bearings at strategic locations, allowing very smooth and easy movements.

"J" bolts attached to your helicopter skids, hold it firmly, in a hanging-pivoting-cradle (PAT. PEND.), that allows your helicopter to actually roll, bank and pivot in all directions. It will also rotate around it's axis (spins around like a top), so you can learn tail rotor control.

A gas strut, located at the base of the stand, acts as a counter balance, eliminating the weight of the cradle and parallel arms. Your helicopter does not lift extra weight.

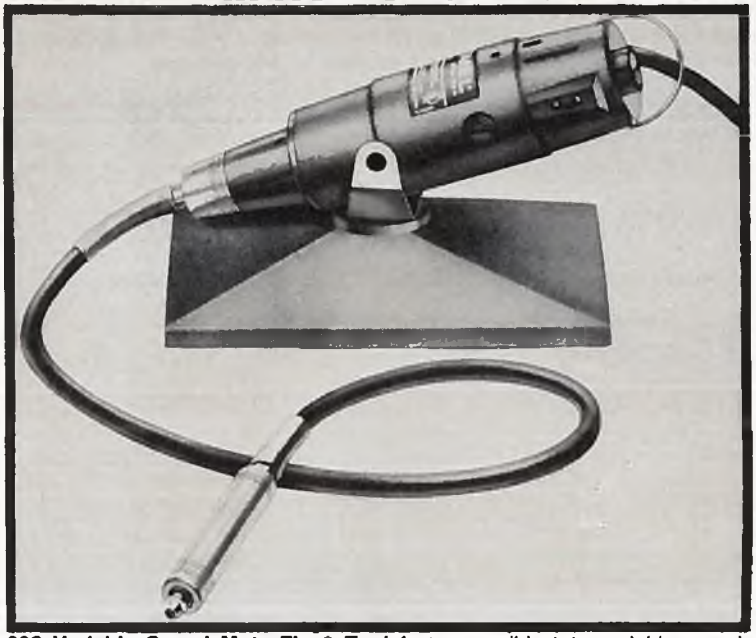
These unique design features of the Flying Stand, allow more free and normal movements of your helicopter, so you can develop your flying skills, and avoid costly repairs and frustrations. You will also learn to fly sooner, because you are getting hours of continuous flying time, uninterrupted by down time (due to repairs). When you can control and hover your helicopter on the Flying Stand, you will be able to when you take it off!

***"SEE A VIDEO DEMONSTRATION AT YOUR LOCAL HOBBY STORE"***

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# WIN A DREMEL MOTO-FLEX® TOOL

## in RCM's new For What It's Worth Contest



**332 Variable Speed Moto-Flex® Tool** features solid state variable speed control (7,500-25,000 rpm) and 3-position selector switch with variable speed override. 34" thermo-plastic rubber covered flex-shaft has spring-type strain reliefs on both ends. Lightweight, aluminum, ball bearing, 3/4" diameter hand piece. Detachable 360° swivel base and wallhanger device adds versatility. Also includes 1 open end wrench; 1 right angle wrench; 1 No. 480 collet in tool. Motor 0.95 Amp., 115V, 50-60 Hz., AC only.

**Every modeler has a trick or two up his sleeve that comes in handy when solving a particular modeling problem. We would like you to share your "shop secrets" with us and our readers and, in so doing, be eligible to win a Dremel Moto-Flex® Tool for your shop, furnished by Dremel.**

**Each month we will draw a name at random from all "For What It's Worth" ideas submitted that month to determine the winner.**

***Send your ideas to:***
**R/C Modeler Magazine**
**"For What It's Worth Contest"**
**P.O. Box 487**
**Sierra Madre, CA 91024**

**FEBRUARY '91 WINNER**
Ron Jaap
Alberta, Canada

*Contest void where prohibited*

# HOBBY SHOP BULLETIN . . .

RCM has long maintained that the local hobby shop is one of your best sources of information regarding the R/C hobby. It also provides the opportunity and forum for the exchange of ideas and experiences. To reinforce this belief, RCM will be featuring each month different sections of the U.S. with the names and addresses of hobby shops where you can see and purchase "what's new" in modeling, share local hobby news, as well as pick-up the latest R/C Modeler. If your local shop does not carry RCM, please call, we will do our best to locate the hobby shop with RCM in your area.

Outside California call (800) 523-1736 ----- In California call (800) 624-7354

RCM would like to express its appreciation to Kalmbach, distributor of hobby related books to shops, for their assistance.

*This month we are featuring some shops in Pennsylvania, Rhode Island, and South Carolina.*

**ADAM & EVE'S PET & HOBBY**
Latrobe 30 Shop. Plaza
Latrobe, PA 15650

**BUCK'S**
232 Levergood St.
Johnstown, PA 15901

**R/C PREFLIGHT SHOP**
1622 No. Main St.
Butler, PA 16001

**CRANBERRY HOBBY DEPOT**
20327 Perry Hwy.
Evans City, PA 16033

**WILDWOOD HOBBIES CORP.**
178 Mars-Valencia Rd.
Mars, PA 16046

**GEHRLEIN PRODUCTS**
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Waterford, PA 16441

**DAVID T. EAGLETON & ASSOC.**
901 W. 5th
Erie, PA 16507

**MAXWELL'S HOBBY SHOP**
5014 Station Rd.
Erie, PA 16510

**THE HIDDEN HANGAR**
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Hummelstown, PA 17036

**R&D HOBBIES**
11 S. Hanover St.
Hummelstown, PA 17036

**GARY L. MCNEAL HOB. SHOP**
28 W. Third St.
Lewistown, PA 17044

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Rt. 22 & Colonial Rd.
Harrisburg, PA 17109

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16 York St.
Hanover, PA 17331

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Mill Hall, PA 17751

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**APPONAUG COLOR SHOP**
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Apponaug, RI 02886

**JIM'S ANTENNA SERVICE**
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**REMOTE HOBBY INC.**
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Columbia, SC 29223

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515 Coleman Blvd.
Mt. Pleasant, SC 29464

**ED'S HOBBY SHOP**
702 Main
Myrtle Beach, SC 29577

**THE GREAT ESCAPE INC.**
1426 Laurens Rd.
Greenville, SC 29607

**HOBBY TOWN USA**
3122 N. Main St.
Anderson, SC 29621

**THE HOBBY SHA'K**
Rt. 1, Box 263 Harper Rd.
Pentleton, SC 29670

**GOLDEN STRIP HOBBIES**
551 Fairview Rd. #111
Simpsonville, SC 29681

**CAMPS HOBBY SHOP**
Rt. 3, 670C
Blacksburg, SC 29702

**COUNTRYSIDE HOBBIES**
312 W. Richland Ave.
Aiken, SC 29801

# WIN




**Length: 40"**
**Wingspan: 75.6"**
**Weight: 44 oz.**
**Motor: LeMans AP36L**

## February 1991 Winners

The following two people won a prize from RCM and Kyosho.

Thomas E. Brinkman
Cincinnati, OH

Jim Douglas
Almira, WA

**Congratulations!**

*Offer void where prohibited. Substitutions may be required due to availability of item.*

# A Stratus 2000 ARF Electric Sailplane from RCM and Kyosho.

- *Exceptional low-drag design inspired by top European models*
- *90% pre-assembled*
- *Enter the RCM giveaway, and it could be yours — FREE!*

Both new and experienced pilots have placed Kyosho's Stratus 2000 ARF among the hottest electric sailplanes available. You can also enjoy its powerful climbs and smooth transitions into soaring...FREE...just by ordering your next set of plans from the RCM Plan Service.

Kyosho's high-performance model includes the best design features found in the most successful European sailplanes. Together, its Schumann-type wing, computer-optimized Selig 3021 airfoil, 540 motor powered direct drive system, and scimitar-shaped folding prop add up to endless exciting flights...

Flights you'll begin to experience almost immediately with the Stratus 2000's easy ARF construction. The durable, lightweight, blow-molded polypropylene fuselage and prebuilt, precovered balsa/spruce wing and tail reduce assembly time to a few hours. Out of the box, the Stratus 2000 is 90% finished.

Order your plans from the RCM Plan Service and you could win your Kyosho Stratus 2000 free! Two names will be drawn at random each month. Winners receive a new Stratus 2000 from RCM and Kyosho. Order now — you could fly away a winner!

To enter, send your name and address on a postcard to: RCM, P.O. Box 487, Sierra Madre, CA, 91024. No purchase necessary. Void where prohibited by law.

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# RCM PLANS SERVICE



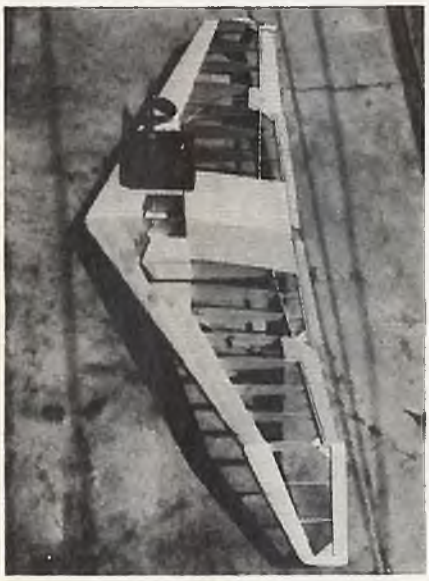
**KARI-KEEN SIOUX COUPE**
**#1092** **MAY 1991** **$31.00**

Designed by Dennis Tapsfield to 1/4 scale, the Kari-Keen Sioux Coupe is a Sport Scale model of a beautiful classic design of the early 30's. Having a span of 90", and approximately 11 sq. ft. (1584 sq. in.) of wing area, gives this large model a very light wing loading for its size, approximately 16 oz./sq. ft. The construction is conventional built-up balsa, ply, and hardwood. Power is by a .65 2-stroke or .90 4-stroke engine, and a 4 channel radio system provides the control. Four sheets: 34½" x 91"; 34½" x 80"; 34½" x 80¼"; 34½" x 66¾".



**SWINGER**
**#1093** **MAY 1991** **$5.50**

This experimental sailplane by Mike Hollison, brings a new "twist" to thermal flying. Easy to build and fly, it is considered an aileron trainer capable of soaring to great heights. The wingeron and elevator controlled sailplane is of balsa/plywood construction with all control linkage concealed inside the fuselage. Span is 100" with 775 sq. in. area. One sheet: 35¼" x 56½".



**N1-M**
**#655** **AUG. 1976** **$6.00**

Unique slope soaring version of the famous Northrop N1-M flying wing. Span 72¼", area 942½ sq. in. By Gus Morfis. One sheet: 52½" x 35".



**CASSUTT**
**#657** **SEPT. 1976** **$3.50**

A .20 powered racer for the new Club 20 sport racing event. 30½" span, 313 sq. in. area. One sheet: 41½" x 30". By Gordon Whitehead.



**500 ML**
**#658** **SEPT. 1976** **$6.75**

57½" span, 560 sq. in. area, 15 powered, twin rudder Old-Timer for all around flying fun. By Paul Denson. One sheet: 58" x 32¼".



**GUPPY**
**#661** **OCT. 1976** **$6.75**

A Sport STOL aircraft for .30 engines and four channels. Span 52 in., area 572 sq. in. By Bob Thompson. One sheet: 58" x 38½".



**FIREBALL**
**#666** **NOV. 1976** **$2.75**

Half-A sport and pattern version of Jim Walker's famous Fireball Ukie. For two channel operation. Span 40", area 418 sq. in. By Floyd E. Carter. One sheet: 33⅜" x 24⅜".



**SON OF QUAKER**
**#670** **DEC. 1976** **$3.50**

Scale model of the famous Quaker free flight design. An old timer for relaxed flying with an .020 and pulse rudder only. 38½" span, 190 sq. in. area. by Loren Dietrich. One sheet: 26" x 36".



**CHEETAH**
**#662** **OCT. 1976** **$2.75**

Extremely hi-performance mini-pattern ship for Tee Dee .051 engines. Fast and spectacular. 36" span, 216 sq. in. area. By Ken Eubanks. One sheet: 35" x 24½".



**PEPPE LA' PEUW**
**#663** **OCT. 1976** **$2.75**

An .020 powered semi-scale Nieuport for pulse rudder only. Easy to build and fun to fly. Span 22⅞ (top), 20" (bottom), with 140 sq. in. area. By Dick Erickson. One sheet: 30" x 21".



**ZOEGLING PRIMARY GLIDER**
**#668** **DEC. 1976** **$11.25**

Six foot span semi-scale model of the famous German Primary Glider of the 1930's. For thermal or slope flying. 73" span, 876 sq. in. area. By Dr. Gerry Casey. Two sheets: 50" x 35".



**DICKIE BUG**
**#664** **NOV. 1976** **$3.50**

One of the most unusual R/C aircraft ever designed, resembling a dragonfly. For .049-.09 engines and 2 channels. Span 32", area 300 sq. in. (appx.). By Dick Tichenor. One sheet: 36" x 25¼".

**For Ordering Info, see page 251**

# WIN






## Feb. 1991 Winners

The following two people won a prize from RCM and Great Planes.

Donald R. Kudla
Hamtramck, MI

Maj. Warren Drew
APO, NY

# A Master Caddy With A.P.S. Field Box From RCM and Great Planes.

- *Made of beautiful Philippine mahogany plywood*
- *Detachable power station for unique field box convenience*
- *Enter the RCM Giveaway and win yours — FREE!*

Just by ordering an RCM Anthology Book, you could win the best designed field box available — the Great Planes Master Caddy with A.P.S. — absolutely free!

The Master Caddy's key feature is the Auxiliary Power Station (A.P.S.), which lets you start your engine away from the pit area or flight line...without taking along your entire field box. The A.P.S. neatly stores your 12V battery, power panel, starter, glow plug clip, and vital tools — everything you need for fast engine starts.

The Master Caddy provides additional storage area in the main unit: three top compartments, two large drawers with dividers, and a fuel compartment. The complete field box measures 25" x 15-3/4" x 8-1/4", and includes instructions for easy assembly.

Order your book from the RCM Anthology Book Service and you could win a free Master Caddy field box. Two names will be drawn at random each month. The winners will receive a free Master Caddy with A.P.S. from RCM and Great Planes Manufacturing. Order now — you could be a winner!

To enter, send your name and address on a post card to: RCM, P.O. Box 487, Sierra Madre, CA, 91024. No purchase necessary. Void where prohibited by law.

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# RCM ANTHOLOGY BOOKS




The 200 page **Flight Training Course, Volume I ($11.95)** covers everything you need to know, from kit to first flights. Included are topics such as building, hinging, engine, pushrod, and radio installation, covering and finishing techniques. Our 173 page **Flight Training Course, Volume II ($11.95)** teaches you how to flight trim your plane, then step-by-step through 22 different maneuvers.

**Sailplane And Soaring Manual ($10.00),** 138 pages in length, covers special sailplane building ideas, launching methods, and flying techniques. A must for every sailplane enthusiast.

**Foam Wings ($4.95)** is a step-by-step instruction manual which outlines techniques from cutting to covering and includes special topics such as constructing a permanent shop hot wire cutter, landing gear blocks, control systems, and more.

**R/C Engine** anthology series provides reprints of Clarence Lee's popular Engine Clinic Feature from the R/C Modeler Magazine. Based on letters from readers, topics include fuels, fuel tanks and fuel lines, carburetors, engine installation, glow plugs, props, mufflers, engine repair, engine mods and maintenance. First in the series, **Volume I ($4.95)** is 62 pages of reprints from the early issues of the R/C Modeler Magazine. **Volume II ($7.95)** continues with subsequent issues through August 1974 and is 140 pages. This volume also includes selected article reprints by other RCM authors. **Volume III ($9.95)** consists only of Clarence Lee's reprints. Covers issues from September 1974 to September 1980, is 232 pages thick and includes his reviews of antique engines.

**The R/C 4-Stroke Engine ($7.95)** by Clarence Lee is limited to the R/C 4-stroke engine. This 144 page book includes reprints from his column plus engine reviews. Highly illustrated with numerous photos of engine details and models powered by 4-stroke engines.

**From the Firewall Forward, the Quadra Bible ($12.95).** Dario Brisighella, "Mr. Quadra," has put together the definitive book on the Quadra engines. It covers all you need to know about the Quadra with photos, charts and graphs.

**For What It's Worth** anthology series features reader-contributed handy hints and edited reprints of articles by RCM's associate and contributing editors organized into chapters ranging from construction techniques to R/C related electronic projects for both powered plane and sailplane modelers. A comprehensive index is also included. Our 58 page **Volume I ($4.95)** was first in the series from the early issues of R/C Modeler Magazine. **Volume II ($5.50)** has 77 pages of unpublished material. In addition, some "how-to" ideas submitted but never published are included. **Volume III ($9.95)** has 152 pages of ideas and includes reprints of other related articles. **Volume IV ($9.95)** has 264 pages and includes reprints from For What It's Worth. **Volume V ($13.95)** is the largest volume to date with 328 pages of over 800 ideas and helpful hints. **Volume VI ($13.95)** has 301 pages of ideas & helpful hints.

**Scale In Hand ($4.95)** has 62 pages of reprints of Dave Platt's Scale In Hand feature in RCM. The articles are organized and indexed by subject such as color selection and mixing, cockpit detail, applying markings and so on.

**Scale Reference Guide ($5.50)** has 110 pages listing scale plans or 3-view drawings that have been published over the past years. Also includes selected reprints from Dave Platt's Scale In Hand feature in RCM.

**Basics Of R/C Scale ($8.95)** by Patrick H. Potega, will save the beginner time and money with special chapters on selecting that first Scale model. The scale pros and contest fliers will also find it helpful. Chapters include documentation, paints and painting techniques.

**RCM Illustrated Plans Guide ($11.95** includes plans catalog) is a 288 page indexed and illustrated catalogue of plans printed in RCM from October 1963 through October 1979. **Supplement #1 ($4.50)** contains plans from November 1979 through June 1981. **Supplement #2 ($4.50)** from July 1981 through January 1984. **Supplement #3 ($4.50)** from February 1984 through June 1986. **Supplement #4 ($4.50)** from July 1986 through March 1989. **Cover and Comb Binder ($2.95)** for Supplements. **Supplement Package ($19.45)** includes Supplements 1-4 plus Cover and Comb Binder. **Complete Package ($30.50).**

**Mission To Gibralter ($4.50)** is a fascinating, recently declassified true story of Ken Willard's top secret WWII assignment as a weather officer assigned to General Eisenhower on Gibralter.

**Radio Control, From The Ground Up (25¢)** was written to acquaint the general public with R/C. Sold at cost, this booklette is recommended as a give-away at shows or contests by clubs, distributors, or manufacturers.

**Harry's Handbook ($12.95)** for miniature engines by Harry Higley. 90 pages written for the sport flier or even a young beginner. **There Are No Secrets ($12.95)** by Harry Higley. Deals with preparation, covering, and finishing your model to make it look outstanding. 84 pages dealing with adhesives, planking, sheeting, fillets, canopies, sealers, fillers, primers, and much more. **Master Modeling ($12.95)** by Harry Higley. 86 pages full of "how to do it" information from designing your own model, through the uses of the various techniques and building materials. Shows how to do fiberglass lay-ups, plugs and mold.

**Tom Techniques ($12.95)** written by Tom Ingram and Harry Higley. 56 pages of techniques for applying plastic film covering, including the most difficult areas, multicolor schemes, and intricate graphics — filled with step by step photos.

**Completely Cars ($12.95)** covers all aspects of model cars from driving in the street to off road competition. 80 pages with 345 large detailed photographs and easy to understand text describe building, radio installation, and painting bodies. **The R/C Car Body Book ($12.95)** explains all aspects of trimming, mounting, masking, painting, and detailing Lexan bodies found on R/C cars. Step by step instructions show how an award winning finish with the snap of an expert modeler are possible. **Car Crushing and Mud ($9.95)** has over 200 photos and easy to read text that can be understood by all ages. It covers essentials of getting started in R/C cars by using monster trucks, car crushers, and mud racers as subjects. **Getting Airborne Vol. I ($12.95)** has over 400 photos, topics on selecting radio, learning to fly, all about ARFs, and much more. **Getting Airborne Vol. II ($12.95)** also has over 400 photos, how to film cover, NiCd explanation, rebuild a servo --- an engine, and much more. **Entering Electrics ($13.95)** covers all aspects of building and flying electric powered model aircraft --- over 100 pages and 850 photos.

**Ray's Complete Helicopter Manual 2nd Edition ($14.95)** is the authoritative book for any present or prospective R/C helicopter pilot. Features theory, building, set-up details, and much more.

**VIP Directory of Giant Scale Plans ($11.95)** covers 50 Giant Scale plans in all categories and gives details on each.

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OHLSSON RACE CARS WANTED — top dollar for "new in box" example. Also antique Ohlsson 60 F.R.V. "Purple Head," 33 Red Head, early Gold Seal and Custom engines any vintage engines. Woody Bartelt, 1301 W. Lafayette St., Sturgis, Michigan 49091, (616) 651-5431.

WANTED — Berkeley and Cleveland kits or related items; parts, plans, boxes, brochures, books, ads, radio equipment, accessories, etc. Gordon Blume, 4649 191st Ave. S.E., Issaquah, WA 98027.

OVER 1000 BACK ISSUES of model airplane magazines. Most under $3.00, List $1.00 (stamps okay). R.C. Piccola, Rt. 6, Box 73, Scottsboro, AL 35768.

WANTED: YOUR OLD PROPORTIONAL R/C SETS, partial or complete, any condition, cash paid. Ron Gwara, 21 Circle Dr., Waverly, NY 14892, (607) 565-7486.

WANTED: MODEL AIRPLANE engines and model race cars with engines made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063, (918) 245-3649.

WANTED: Used or new in box R/C Tamiya or Kyosho kits (Euclid, Hanomag, tanks, trucks & cars). Ken (201) 295-0002.

CANADIAN MODELERS new and old can benefit from membership in Model Aeronautics Association of Canada and/or one of Canada's 300 plus clubs. You can benefit from the know-how of experienced modelers for building and flying. M.A.A.C membership includes $2,000,000 modeling liability insurance and more. Call or write: Model Aeronautics Association of Canada, P.O. Box 9, Oakville, Ont. L6J 4Z5, (416) 844-8764.

MICRO-AVIONICS: Would like to form a hobbyist newsletter for R/C-RPV electronics, navigation, telemetry, and control systems. Write: Dave Ewen, P.O. Box 16629, Wichita, KS 67216, CCINK bbs: (203) 871-1988.

WANTED: Dynaflite Master scale SBD Dauntless kit. John Sannino, 62 Holly Hills Dr., Somers Point, NJ 08244, (609) 926-0444.

WANTED: MK Akromaster 120 in kit form. Used to be Circus kit. Jim Corry, 470 Harrison Ave., Panama City, FL 32401, (904) 769-1686.

WANTED KITS: Aristocraft: Sopwith Camel; Sureflight: L-19 Birdog (an ARF); Capitol Models: J-3 Cub; Peerless: J-3 Cub. Monty Baker, 5045 Heather Dr., Cross Lanes, WV 25313 (304) 776-4047 est after 6:00 p.m.

MAGAZINES — R/C Modeler, Flying Models, MAN, others $3.00 and under — huge list $1.00, stamps okay. Dan Boardman, 316 Creek Bend Dr., Woodstock, GA 30188.

WANTED: Kraft radios from 1964-1975, only excellent condition. Karlheinz Schmid, Akeleistr. Fa, 89 Augsburg 21, West Germany.

FOR SALE: Futaba G-Series transmitter only (no receiver) with special Mixmaster analog mixer for Synergy gliders. Performs all the functions of a Vision at a fraction of the price. Works with any Futaba or compatible FM receiver. $150.00 transmitter only (no module), $250.00 transmitter and two Ham modules (53.4 & 00 — hams only). Don (714) 552-1812.

WANTED: Fox .15's with single arm carb. Webra T4/40, 60, 80. Midwest Astro Cat Class 2. Mid. 60's plans, kit. Saito 2-cycle ignition .60 class, sold by Hobby Shack mid 70's. H. Wilson, 619 W. 19th, Houston, TX 77008.

FOR SALE: Byron Corsair F4U-1 NIB, 90° Robart retracts NIB both $450.00. David Simpson, 4152 Allen Rd., Tecumseh, MI 49286, (517) 423-4970.

HELICOPTER KALT BARON gas 50 complete less engine and radio $125.00. Larry Kosta (619) 586-6223.

WANTED: Midwest A-4 any condition, even wrecked. Also, any other ducted fan planes, kits, plans, accessories, or wrecks. Please call with details. Chris (918) 663-7847, or 743-0637, or write 4547 S. Gary, Tulsa, OK 74105.

WANTED: Futaba "J" Series FM transmit module, any frequency. Need not work, state price. Wm. H. Craig, c/o WGOH Radio, P.O. Box 311, Grayson, KY 41143, (606) 474-5144.

FOR SALE: Byron F-18 Hornet ducted fan kit with engine, fan, and radio. Also EZ P-51 Mustang complete and ready to fly. No reasonable offer refused. Call (601) 864-4360 after 6 p.m. C.S.T.

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LITTLE TONI — finished with two wings, canted landing gear, bar stock engine mount, tank, etc., $350.00 firm. Marty (203) 644-6701.

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WANTED: Large scale World War One model aircraft to hang in museum. Call Frank at (205) 586-1580, weekdays.

WANTED: Discontinued kits and RTF, RTR models or related items; brochures, ads, boxes, plans, radio equipment or accessories from Cleveland, Comet, Goldberg, Berkeley, Monogram, etc. Prices with first letter please. John Wells, Rt. 1 Box 41A, Geuda Springs, KS 67051, (316) 447-3248.

AERO CLUB OF ISRAEL needs your support for student modelers. SASE for information newsletter. Friends of the Aero Club of Israel, 79-02 212 Street, Bayside, NY 11364.

FOR SALE: Unassembled Jet Stream GP-10, RC 10L, Yokomo Y2-10 and Enforcer 30. Will sell 10% below any advertised price. Postage paid. Michael Impey, Chesterfield, MO (314) 256-0229.

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FOR SALE: Rampage with two O.S. engines, Futaba radio, $250.00. Dumas fiberglass DV10 with motor, $60.00. Futaba 4 channel, $60.00. Kraft 5 channel, old, $40.00. James Valdon, 796 Kitt Narcisse Rd., Colville, WA 99114, (509) 684-3683.

FOR SALE — Over 80 NIB kits from the 50s-80s, send $2.32 (stamps ok) for 8-page list. Dave Melcher, 7236-118 Terr. No., Largo, FL 34643.

HELICOPTER: Hobby Lobby MFA 500 with Futaba FPG 154 gyro, both like new. New undrilled motor mount, new main and tail blades. J. Craig, RD. #4, Box 313, Washington, PA 15301, (412) 223-8151.

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WANTED: Model engines and race cars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105, (806) 622-1657.

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WANTED: Toyota Bruiser by Tamiya. NIB or built. Shawn Kelley, 6 Chester St., Andover, MA 01810, (508) 475-4921.

WANTED: Air Flair Mfg. Co., Messerschmitt ME-262 kit. Dick, (716) 592-3934.

WANTED: DC-6 Kyosho kit, partially built, or completely built okay. Ken Leith, 9045 Gotham St., Downey, CA 90241, (213) 869-0117.

WANTED — PEN FRIEND: Hi, I am a Finnish boy, 16. I am interested in snowboarding, cycling, and R/C models. Write to: Samu Ilonen, Tohtorinkatu 25, 33720 Tampere, Finland.

BYRON MIG 15, NIB with tuned exhaust $350.00 ppd. Edward P. Graveline, 1104 E. Vassar, Fresno, CA 93704, (209) 226-3936.

WANTED: Sick, dying or dead 4-stroke engines, preferably exposed racker arm models, but others are welcome. I'm retired and love to tinker. R. Komin, 6238 8th Ave. S., Gulfport, FL 33707.

WANTED: Saito FA-30, Mills .75cc diesel, original or replica, Elfin diesel, original or replica. Any other diesel .099 or smaller in displacement. R. Komin, 6238 8th Ave, S., Gulfport, FL 33707.

MAGAZINES: 1000 MAN '56 to '90, RCM '74 to '90, MA '77 to '90, others. SASE for list. William H. Craven, 18550 SW 88 Road, Miami, FL 33157, (305) 235-1950.

FOR SALE: R/C helicopter Morley Bell 47, brand new, still in box. Must sell $250.00. Paul (813) 536-1574, 1979 Dodge Cir., Clearwater, FL 39620.

FOR SALE: Innovative Models' Hurricane kit $100.00. GMP Cobra kit, auto $150.00, others. Wilson, Box 232, Centennial, WY 82055, (307) 742-6765.

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MAGAZINES FOR SALE: R/C Modeler, 1964-1989; American Aircraft Modeler 1968-1974. Ralph Furness, 108 Nadon Place, Tonawanda, NY 14150, (716) 693-6794.

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WANTED: Plans for Aerotech Model Engineering Albatross D/V, D/VA 2" scale. David Baccus, 17449 Alsea Hwy., Alsea, OR 97324.

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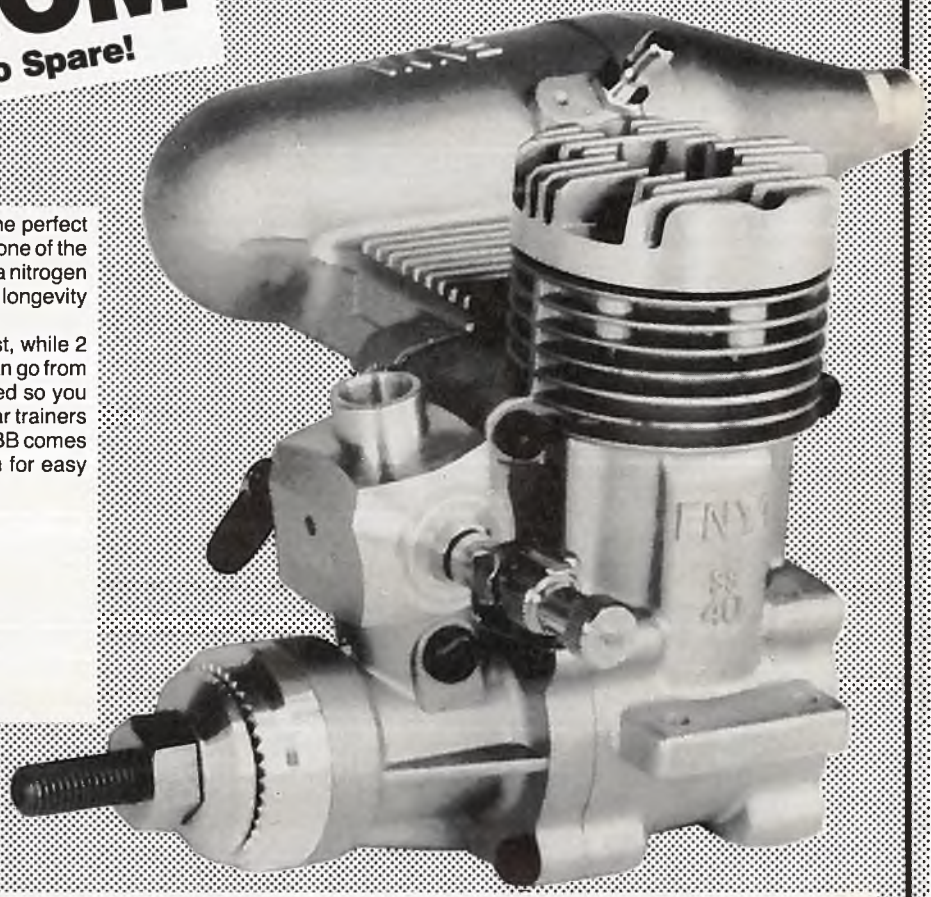
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# ADVERTISERS INDEX


A & A Industries ..... 25
AAA Model Supply ..... 238
Ace R/C Inc. ..... 7
Advanced Model Products ..... 240
Aero Innovations ..... 135
Aerodrome Models Ltd. ..... 232
Aerospace Composite Products ..... 64
Air Flair ..... 118
Airplane Factory ..... 243
Airplane Video ..... 187
Airtronics ..... 23
A-Justo-Jig ..... 76
Altech/Enya ..... 4th Cover
American Small Business ..... 189
America's Hobby Center ..... 237
Associated Electrics ..... 45, 208-209
Astrodata ..... 220
Astro Flight ..... 226
B & D Enterprises ..... 4
Balsa U.S.A. ..... 70 thru 73, 119
Balsadust Enterprises ..... 227
Bill Evans Air Craft ..... 137
BK Products ..... 44
Blue Ridge Machinery ..... 136
Bob Dively Models ..... 219
Bob Smith Industries ..... 10
Boca Bearing ..... 87
Booth Hobbies ..... 185
Bridi Aircraft Designs, Inc. ..... 242
Byron Originals ..... 35, 215
Campbell Tools Co. ..... 178
Carden Corp. ..... 135
Carl Goldberg Models ..... 31, 42, 223
Carlson Engine Imports ..... 136
Central Model Marketing ..... 124-125
Cermark Model Supply ..... 21
Cleveland Model Supply ..... 88
Colorado Discount Hobbies ..... 182 thru 184
Coverite ..... 65, 92, 229
Crown Models Inc. ..... 136
Custom R/C ..... 123
Custom Woodcraft ..... 87
Danielle's R/C ..... 187
Davey Systems ..... 60
Davis Diesel ..... 64
Dougs Hobby Shop ..... 109
Du-Bro Products ..... 2, 111, 191
Eastern Tool & Supply Co. ..... 89
Edson Ent. ..... 221
Ernst Mfg. Inc. ..... 243
FHS Supply ..... 68
Fiberglass Master ..... 136
Fiberglass Specialties T&D ..... 206
Fiorenze Hobby ..... 232
1st U.S. R/C Flight School ..... 244
Flitecraft ..... 121
Fox Mfg. Co. ..... 212
Franklin Woodcraft ..... 88
Futaba Industries ..... 2nd Cover, 26, 94-95
G & P Sales ..... 242
Global Hobby Dist. ..... 17, 113, 217
GM Precision Products ..... 19
Great Circle Hobbies ..... 240
Great Northern Hob. ..... 106-107
Great Planes Model Mfg. ..... 131
H. Douper Electronics ..... 240
Hansen Scale Video ..... 89
Harry E. Higley & Sons, Inc. ..... 88, 137
Helicopter World ..... 56-57
Helicopters Unlimited ..... 205
Hel-X Corporation ..... 128
Hidalgo Inc. ..... 198
HiTec ..... 32 thru 34
Hobbico ..... 256, 3rd Cover
Hobbies & Heli's ..... 218
Hobby Barn ..... 114 thru 117
Hobby Centro ..... 199
Hobby Craft Instruments ..... 199
Hobby Hardware ..... 240
Hobby Lobby Int'l. ..... 46 thru 53
Hobby Shack ..... 78 thru 85
Hobby Wholesale Club ..... 137
Horizon Models ..... 236
Hybrid Hobby ..... 87
Idealair ..... 221
Indy R/C ..... 36 thru 39
Irvine ..... 159
ISC International ..... 175, 179
J'TEC ..... 11
Jim Waterman ..... 199
Joe Pinkston Mfg. ..... 243
John Sullivan Products ..... 221
Jomar Products ..... 14, 128, 186
JR Remote Control ..... 157
K & B Mfg., Inc. ..... 13
Kalt ..... 231
K-Bees's Modeling ..... 203
Kemp Aviation ..... 8
Kraft Midwest ..... 206
Kuhlmann R/C Ent. ..... 221
Kyosho ..... 9
Landing Products ..... 220
Lanier R/C ..... 219
Litco Systems ..... 76
Lone Star Models ..... 20
LWK Enterprises ..... 221
M.T.A. Hobbies ..... 176
Mach-7 ..... 25
McDaniel R/C Service ..... 242
MGA Pilots ..... 92
Micro Mark ..... 28-29
Midwest Products ..... 77
Mini Craft ..... 62
Miniature Aircraft ..... 75
Model Rectifier Corp. ..... 201
Model/Tronics ..... 186
Morgan Fuels ..... 233
Mutchlers ..... 118
Neiderhiser Graphics ..... 92
Nor-Ray Products, Inc. ..... 133
O.S Engines ..... 18, 177, 224-225
Omnimodels ..... 166 thru 173
Pacer ..... 122
Peck Polymer ..... 88
Performance Specialties ..... 199
Perry/Varsane Products ..... 178
PICA Products ..... 41
Plane Video ..... 88
Prather Products ..... 126
Proctor Enterprises ..... 186
R C Systems ..... 216
R.C. Heli Innovations ..... 136
R/C For Your Information ..... 230
R/C Ready Models ..... 165
Radio South ..... 14
RAM R/C Models ..... 130
Rave's Mfg. USA ..... 212
Ray's Heli Manual ..... 8
RC Hobbies ..... 92
RC Video Magazine ..... 232, 199
RCD Inc. ..... 5, 126-127
RCM Anthology Library ..... 134, 250-251, 198
RCM Plans Service ..... 248
RCM Subscription Service ..... 255
Revmor Model Products ..... 199
Rivergate Hobby Center ..... 211
Robbe Modelsport Inc. ..... 24
Robin's Hobby ..... 89
Robson House ..... 220
Royal Products ..... 15, 66-67, 207
S & S Enterprises ..... 88
S.A.C. ..... 19
San Antonio Hobby Shop ..... 238
Satellite City ..... 180
Sermos R/C Snap Connectors ..... 244
Sheldon's Hobby Shop ..... 160 thru 163
Shop Task ..... 187
Sig Manufacturing Co. ..... 43, 129, 165
Skymaster Industries ..... 224
Skyward Research & Dev. ..... 234
Slimline Mfg. ..... 244
Smithy Co. ..... 187
Southside Hobbys Inc. ..... 213
Southwest R/C Flying ..... 227
SR Batteries, Inc. ..... 155
Stream Inc, ..... 130
Sullivan Products ..... 61, 63
Suncraft ..... 240
Super Circuits ..... 14, 123, 178, 227
Super Tigre ..... 239
Superior Aircraft ..... 236
Sure Flite Ent. ..... 89
Tammie's Hobbies ..... 90-91
Technopower II Inc. ..... 214
Teleflite Corp. ..... 137
The Country Cloth Shop ..... 225
Tidewater Engineering ..... 134
Top Flite Models ..... 241
Tower Hobbies ..... 142 thru 153
Transmotions, Inc. ..... 187
U.S. Aircore ..... 132
U.S. Quadra ..... 123
United Model Dist., Inc. ..... 141
Vantec ..... 210
Victor Model Products ..... 92
Video Specialties ..... 89
Vinylwrite Custom Lettering ..... 216
VIP Publishers ..... 88
Vortac Mfg. Co. Inc. ..... 89
Walt's Hobby ..... 155
Wells Cargo ..... 42
Whiteman Industries ..... 245
Windsor Propeller Co. ..... 158
Wing Mfg. ..... 136
Winning Model ..... 211
Z & Z Hobbies & Crafts ..... 178
Zenith Aviation Books ..... 59



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