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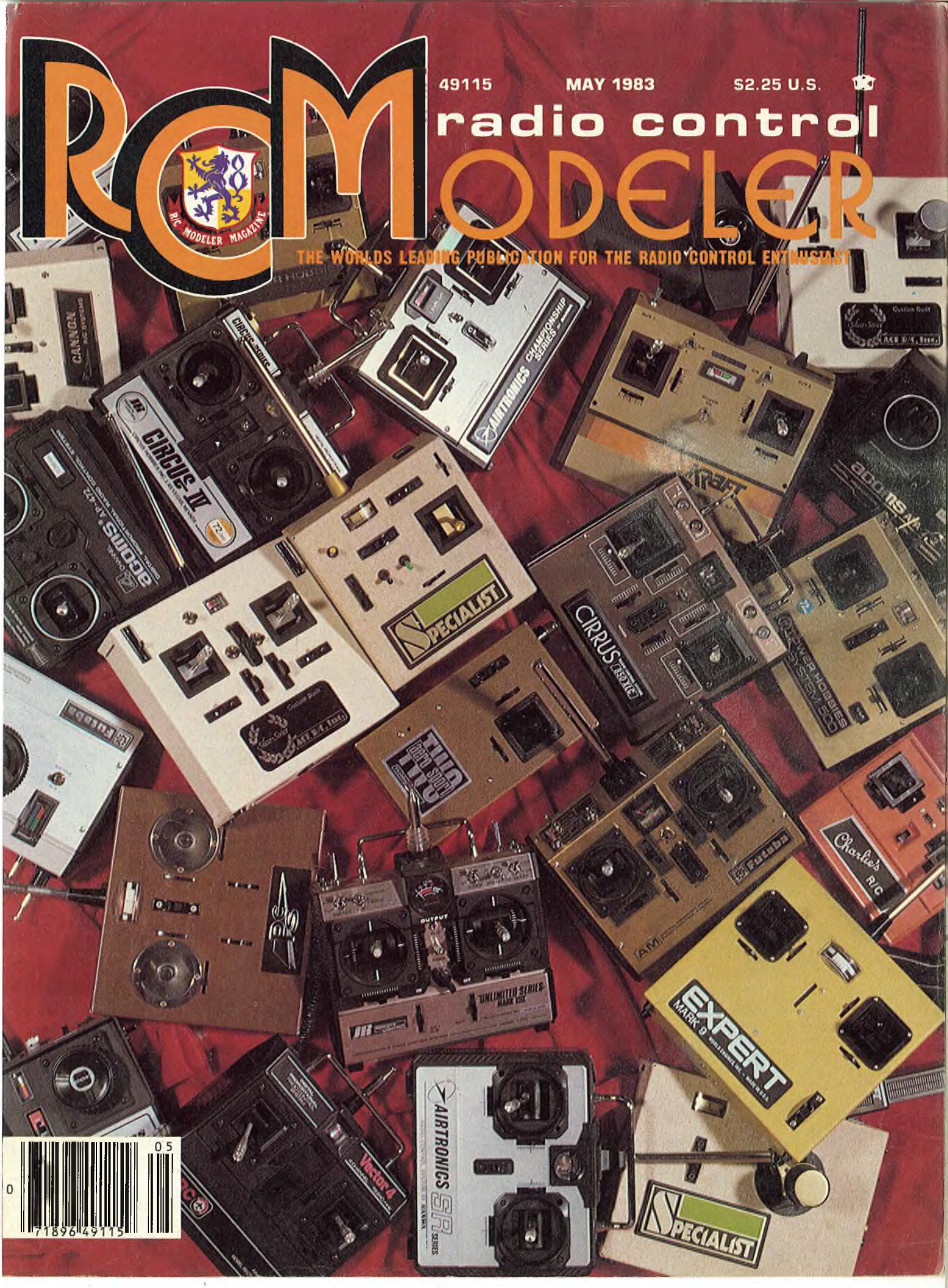
RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



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RCM MODELER

VOLUME 20 NUMBER 5 USPS 509190 ISSN 0033-6866 MAY 1983

THIS MONTHS COVER

features a sampling of R/C transmitters available on the U.S. market today. Additional radio information may be found in RCM Radio Showcase starting on page 40 of this issue. Ektachrome transparency by Dick Tichenor.

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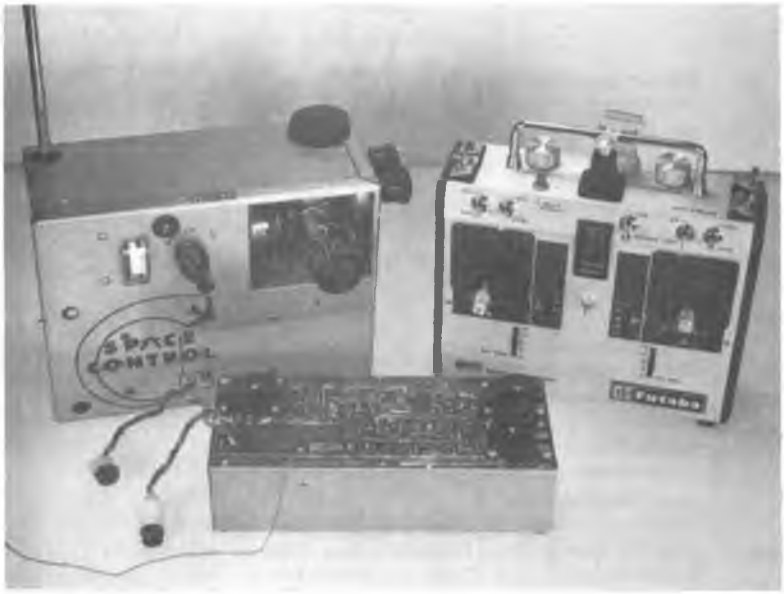
FROM THE SHOP

Don Dewey



Space control, an analog system, was the first commercially available proportional radio for model usage. The famous brick contained receiver and three servos. Futaba's multi-function programmable transmitter is shown for contrast.

How many remember the PCS ads? PCS was an advanced performance radio at a lower price by selling direct from the factory.

Radio Control Modeler. That is what this publication is all about. It is possible only because we have radio control systems available to permit us to participate in one of the world's most enjoyable hobbies. Maybe the foregoing is superfluous but there are a multitude of us who can remember when the capabilities that we take for granted today exceed our wildest fantasies of not too many years ago.

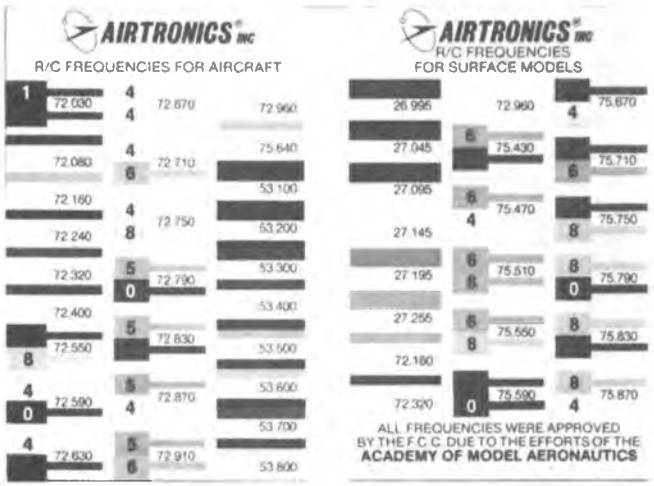
There are several facets of the radio control business that we consider to be remarkable. Most impressive is the price of an R/C system. In spite of the world's economic condition, inflation, and taxation, competition in the U.S. marketplace has led to a continual decrease in the price to the consumer. Coincidentally, improvements in performance and reliability have vastly increased.

Then there are the control functions and features available to us. Fantastic! Servo reversing switches in our transmitters permit us to install servos and related control mechanisms in the most convenient manner with total disregard for direction of servo rotation. A flip of a switch and the control surface correctly follows your command.

Adjustable dual rates, again by flipping a switch, enables you to increase and decrease the travel of control surfaces to pre-set amounts to provide smoother control between low and high air speeds.

We have retract switches, buddy box facilities, roll and spin buttons, exponential displacement, changeable frequency modules, control mixing capabilities --- and the list of options goes on and on. One must remember that nothing is free; depending upon the degree of sophistication, you will pay a modest price for anything beyond the basic functions. Regardless of the bells and whistles (options) that you desire, the radio control systems that we have available today represent the best dollar value in our hobby.

In this issue of RCM we are presenting an abbreviated "Radio Showcase" on radio control systems. All of the importers and manufacturers of R/C systems available in the United States were contacted and requested to loan us their choice of two systems from their line to be photographed and presented with a descriptive list of features. Unfortunately, a few did not wish to participate so we are unable to present a complete representation of all brand names.



The entire R/C frequency control system, old and new, has been reduced to a convenient, wallet-size plastic coated card. Available only through Airtronics, this card lists the seven old frequencies as well as the eleven new ones by frequency number, channel number and color code. Aircraft and surface model frequencies are listed separately for easy reference. Every serious modeler should have one of these cards --- so Airtronics is making them available free of charge. Send a self addressed, stamped envelope to Airtronics, 12160 Woodruff Avenue, Downey, California 90241, or pick one up at your local hobby store.

Since space doesn't allow a complete listing of all the models produced by each manufacturer, and you may not know if your favorite brand has a feature or function that you would like to have, just contact that manufacturer and ask, they will be pleased to advise.

Our resident editorial staff consists of long-time modelers and we are well-aware that this hobby is a most

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SOARING

Al Doig

Although it's the May issue, this piece is being written in the dead of Winter. Life and sailplaning is at a low ebb. It's the time when you sit down at the typewriter with a blank sheet of paper and a mind to match. Our first club contest of the year was postponed a week because it interfered with football on TV. The next week's contest attendance was down because of more football. Now I hear that baseball spring training is starting. Oh well . . .

★

I received a flyer from Davey Systems Corp., One Wood Lane, Malvern, Pennsylvania 19355, announcing an improved winch system. It is called Pow'rtow and replaces their Pow'rwinch. It is designed to provide extra power for the now popular zoom launches. It has a larger motor with one-third the current drain of most starter motors, I'm told. Anyway — it's a kind of neat package and goes well with the Davey Retrieval System. The cost — $300, less battery, plus shipping.

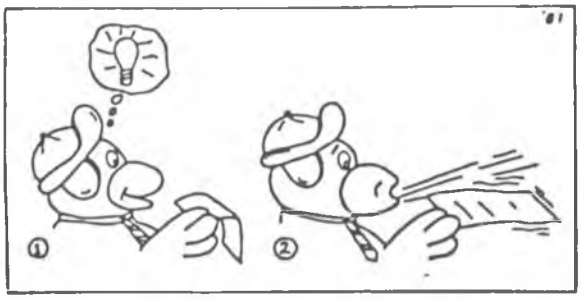
★

The November 1982 issue of "Retracts," newsletter of the Grand Valley Radio Control Club of Nunica, Michigan, carried an interesting article written by Keith Scidmore. The article "Two Meter Sailplane — A Closer Look" generated a storm of response which was printed in subsequent issues of "Retracts." There was no indication whether Mr. Scidmore's article was written specifically for "Retracts" or was reprinted from another publication. While it is dangerous to excerpt from a well thought-out article, this one is a bit long to print in its entirety, so here goes:

Several years ago the 2-Meter (2M) sailplane class began to be widely promoted. Contest rules were often used to encourage the 2M class and sailplane pilots routinely recommended 2M for the beginner. Among other things, it was felt that 2M sailplanes would be less expensive, easier to build and easier to fly, compared to their larger counterparts. Perhaps it is time to take a closer look and to evaluate the extent to which this is true . . .

OZZIE Gene Stattmp

The Bernoulli Effect is why an airplane flies. When you blow over the top of the paper the fast moving air causes a reduction in air pressure on the top surface of the paper. Since the air pressure on the bottom surface of the paper is still at 14.7 lbs./sq. in., it is pushing harder than the top surface, and up the paper goes. Okay kids, now figure out how that works on your gliders.



(1) Cost — 2-Meter wingspans are an awkward size to construct and finish. As a result, construction and kit costs for 2M are higher than one would expect for these smaller sailplanes. Balsa is commonly sold in 36" or 48" lengths (1 meter = 39.37"). Balsa in 48" lengths is considerably more costly and results in a lot of wasted material. Covering the 2M can be costly too. MonoKote and other coverings are typically sold in 72" (6 ft.) rolls. One roll is too little to cover a 2M wing, and two rolls is way too much. The awkward size of the 2-Meter sailplane may explain why kits such as the

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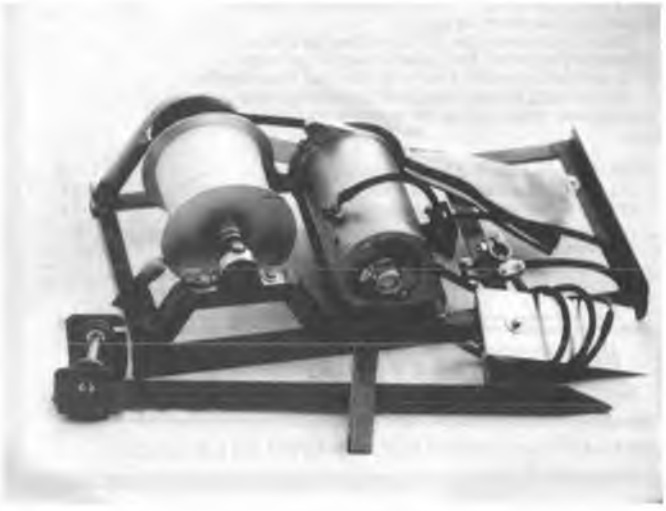


New, more powerful Davey Systems winch, designed for zoom launching.

Adrian Zaltron of Schio, Italy, sent a photo of his latest slope racer. It has a 78" span, fiberglass fuselage with foam wing. After three prototypes and several modifications, it now flies well and is extremely fast.

SUNDAY FLIER

Ken Willard

Creativity --- the quality of being creative: ability to create. So says Webster's dictionary. All you Sunday fliers have a degree of creativity, no matter whether you buy a ready to fly R/C airplane, or build a kit, or design your own plane and build it.

If you buy a ready to fly model, then your creative skill is displayed in the way you make it fly, doing various maneuvers that it would not do except under your control.

If you build a kit, you've gone a bit further. You put the model together, and then fly it. Another dimension has been added. You built the model, as well as making it fly.

If you design your own model, you've gone another step. You created the design, built it, and flew it.

Up until recently, I've always said that the ultimate pleasure is to design, build, and fly your own model. For the most part, that is still true, but a recent letter that I received, in response to my plea for original and unusual designs, proved that there is still one further step that can be taken in creativity as it applies to our sport. You may or may not agree (I understand that some of the judges were a bit negative in their reaction --- at first, anyway) that it is creative --- and imaginative as well --- to design a model, and then present a fascinating --- and amusing --- documentation of the origin and history of the model.

Last month, I showed some of the designs that had been submitted. I have a couple more which were conceived by Joe Shaffer of Ridgecrest, California. One of them is the "Tin Toretto" --- here it is. Joe is my guest columnist for this month. Read on:

Dear Mr. Willard:

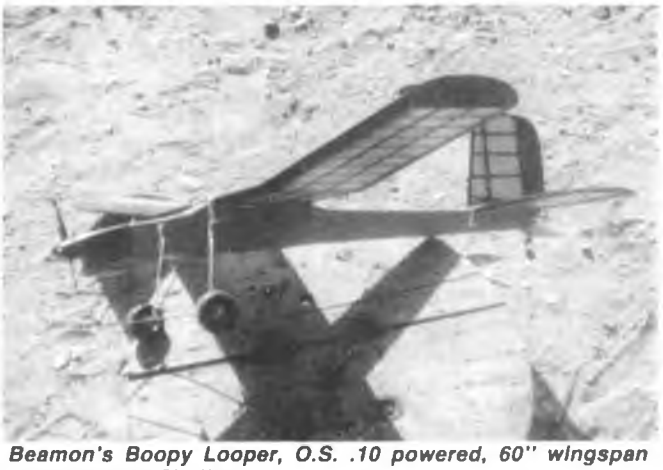
Upon reading the last few paragraphs of your column in the November issue of RCM, I felt prompted to write you this letter. As you requested, enclosed are 5 x 7 photos of my unusual model airplanes. Along with the photos, however, goes the following story — remember, you asked!

I was very active in free-flight modeling in the 40's and early 50's. I worked as a flunkie at the "Garday Model Lab" in Pasadena, making 6 x 3 magnolia wood propellers for Anderson Spitfires (.049's, not the biggies). During the course of one summer, I made 100,000 blue tip props! I believe you and I met at some function or other during this period; I cannot recall exactly, nor do I expect that you would. We used to fly at Puddingstone Dam and occasionally at Rosecrans and Western. I was drafted in 1951 and continued modeling during my stint as a soldier boy. After being discharged, my interest in models waned, and I was completely out of it by 1954.

Joe Shaffer's two Antic Bipes under construction. See text for explanation.

Joe Shaffer's training fleet used for flying experience prior to flying his Antics.

Tin Terato, Shaffer's Saito .40 powered "imaginary scale" bipe.



Beamon's Boopy Looper, O.S. .10 powered, 60" wingspan trainer by Joe Shaffer.

Beamon's Deamon, O.S. .30 Wankel powered 60" wingspan trainer, 60% stab, by Joe Shaffer.

Shaffer's Judy's Joy has 50" span and 80% stab.

The summer of 1981, while visiting my brother in Upland, was the beginning of a renewed interest. He showed me two 7-cylinder radial engines (Technopower) that his son, Johnny, had recently purchased. Johnny deals with used Porsches and has occasions when he is very affluent. He purchased these engines during one of these "good" times merely because they piqued his interest. Last year, at just about this time, he offered to give me one of the engines if I would get back into modeling and build planes for the two radials. With this as an incentive, I agreed to his proposition.

He bought two J series Futabas at the local model shop, simply because they were the most expensive sets they had (I'll bet they loved to see him coming). Then we had to decide on airplanes. I do not know if you have ever built a "Lou Proctor" kit, but wow! One look, and a guy might say, "a man would have to be crazy to build the Antic Bipe." A man would really have to be crazy to build one and put a $1,000 engine in it — would you believe two?

As of yet, the Antic Bipes are not completely finished; the ailerons are not hooked up and the radios have not been installed. At the time the photos were taken of the Antic Bipes, I had the wings built but not covered, and the empennage was in the same situation.

I located a couple of used O.S. .60's and have made two sets of motor mount/cowl assemblies for each plane (four in all), so that either an O.S. or 7-cylinder radial will fit on either Antic Bipe. In this way, some test flights can be conducted without risking the radials.

At any rate, I had told Johnny that I could not just leap back into a discipline that I had been away from for 30 years (yes, it has been that long, dammit). I told Johnny that I would have to spend some time playing "catch up." We agreed that it would take at least a year. I started buying the model magazines, and it was with mixed emotions that I saw some of the same names and faces that I had known in the 40's and 50's. I decided to go over the same evolutionary path that I had taken when I was younger, from free-flight to RK-61 (remember RK-61's?). So I built some 1/2A "Flea Fighters" with used engines purchased at swap meets. By early 1982, I was building models with about 5 feet of wingspan that were basically radio-assisted free-flights. Johnny was learning to fly, and I was getting back into building.

Then a series of events occurred, the timing of which had to be exactly right (or wrong, depending on viewpoint). First, we saw the ad for the First Annual 4-Cycle Contest which was sponsored by Hobby Shack and the Riverside R/C Club. Second, I rejoined the AMA. Then we decided to enter the 4-cycle contest, but we did not have a Stand-Off Scale plane. I could not get a good feel for what "Stand-Off" Scale meant exactly from phone conersations with the folks at Hobby Shack. My AMA number had arrived in the mail, but without my rule book! They probably assumed I had a rule book; it was my fault for not clarifying this. The date of the contest drew nigh and still no rule book! Finally, there was no longer any time to build a plane, but we still wanted to go. Well, we decided to fake it!

*Johnny bought a Saito .40 (it says .30 in the October issue of RCM, page 60, but it was a .40). I stuck this engine on the nose of a big biplane that I had built as a trainer for Johnny. When Johnny first saw it, he said, "Gee, Joe, that's a tintoretto." (**Tintoretto — the popular name of a 16th century artist famous for his red hues; his real name was Giacomo Robusti.**) I asked him to explain what he meant. He then asked me if I had seen the movie "Cat Ballou," to which I replied, "No, but I'm vaguely familiar with it." He told me that during the course of the movie, Jane Fonda goes to see the "bad guy," who shows her a painting. She likes the painting and he tells her it is a "tintoretto." She mistakenly assumes that the term means anything that you think is really neat, so uses the expression eslewhere in the movie. Johnny was using the word tintoretto in this same manner. I said, "Okay, Johnny, the Tintoretto it is then." (Incidentally, the "bad guy" in this movie was played by Reginald Denny --- the fates were closing in on me.)*

Again, the timing is critical. At this point, Johnny was pilot and I was designer/builder. He was doing okay with three channels, and we felt that the time was right for four channel. Rather than try to install ailerons in the wings of an already existing airplane, I got the notion to try a vertical fin above the wing. If this fin were in the outline of a man, it might look cute! In actual practice, the man figure has insufficient lateral area to have much effect, but we were still toying with the idea. At any rate, in keeping with Lee Marvin's nose in the movie, we painted the nose of the Tintoretto silver. I ginned up seven pages of fake documentation, and we were ready to go for it!

The day of the contest found us at the site with everything we needed except for one item, courage. We just did not have the nerve to go through with it. So we got out Johnny's TV camera and his girlfriend's expensive 35mm camera, and fully resigned ourselves to taking pictures of the planes as they arrived.

Once again fortune smiled upon us. The Luppergers who were covering the event for Hobby Shack ran out of film. They asked to borrow some from us, and in the ensuing conversation we "fessed up" to our nefarious intentions and the lack of nerve to carry them through. He thought it was a fun idea and said to go ahead with it — after all, Hobby Shack's motto is "Dedicated to the real champions, those who model for fun." He said we could not win anything, but if all we wanted was to have fun to go ahead!

Well, with this eleventh-hour morale boost, we did go ahead and enter. He was wrong about winning, because everyone who entered got enough prizes through the generosity of Hobby Shack to make it all worthwhile even if you

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POWER BOATING

Howard Power

Steve Muck "Spartan" deep vee.

Picco 45 installation.

The first three photos show the latest version of a series of deep vee hulls manufactured by Steve Muck's R/C Boat Works (6003 Daven Oaks, Dr., Dallas, Texas 75248). As you can see from Photo 1, the boat has the well tested single strake design of the previous Streaker hull but the sides have been cut down in profile and a new top has been added. In my opinion, this new top makes Steve's "Spartan" one of the best looking deep vee boats on the market. The top and hull are pre-joined at the factory and the engine rails and transom are already glassed in. When we first ran the boat it had a nasty habit of leaving the water and making like an airplane. Subsequent tests proved that the 1/4" lip formed by the deck-hull joint was trapping air enough to lift the hull out of the water at speed. By reducing the lip to about 1/16" forward of the cockpit opening and then tapering it to the 1/4" dimension at the transom, this problem was eliminated. Now the hull sets high in the water without any tendency to blow off.

The second photo shows the engine compartment and the Picco 45 installation. Sharp eyed readers will notice an adaptor and Rossi 65 carb mounted on this engine as well as a pipe manifold restraining plate and spring. These items are not stock but have been found to be worth the trouble to fabricate. After running this engine for a time I must say that I am very pleased with it. Its general construction is sound and it is very tough. There are a few things, however, that would make this engine even better. We have been running this engine in the 24,000 to 26,000 rpm range and our tests suggest that the following improvements would be useful. Let's start with the really small but aggravating things. I wish they would machine the top of the engine lugs as well as the bottoms. If you use oversize (translated USA) mounting bolts, you must be very careful not to let the heads bear down on the tapered top surface of the engine lugs. If the heads touch the unmachined part of the lugs, the bolts are twisted and the heads pop off when running. The pipe connector really needs to be water cooled for better coupler life when using high nitro fuel. There should be some sort of restraining system for the pipe adaptor as well. It would also be nice if there was an indexing pin that insures that the liner is in the same position in the case every time the eingine is disassembled. I also found that the aluminum head gaskets supplied deteriorated very quickly. I would suggest the use of brass gaskets to eliminate this problem area.

The biggest problems we have had with this engine are with the large rear bearing and the rod. If you keep the revs below 21,000 these stock parts will live a long time. However, above this speed you can expect premature failures. We found that the new nylon retainer high speed bearing made for the K & B 3.5 engine works great in this engine. These bearings have a good long lifetime even when operated in the 26,000 to 28,000 rpm range! The stock rod doesn't have a bronze bushing in the top. The stock rod elongates very quickly in this area so replacement is necesary. RPM manufactures a replacement rod for this engine which is highly recommended. Another problem area is the water cooled head cap. This cap holds the combustion chamber on the top of the liner. As a result, this cap takes a tremendous beating. I have broken several of the caps trying to keep the head sealed. The cap needs to be strengthened. The engine is really very powerful and, with a few of these changes, could prove to be a world beater.

The third photo shows the hardware set-up of our boat and an OS 46 installed. The hardware is the same as described in my July '81 column in RCM. The strut is set at a 3/4" depth and parallel to the hull bottom. We use

Spartan deep vee hardware set-up and O.S. .46 engine installation.

a JG RH 27 propeller when using 15% nitro fuel. If you use higher nitro the boat runs great using an Octura X447 prop. Our pipe lengths are 9½" for 15% fuel and 8¾" for high nitro fuel. The Mac's 7.5cc pipe seems to be the best pipe when using low nitro fuel and an International Products 50 mono pipe seems to be best when using high nitro fuel. All in all we are very pleased with the boat's running characteristics. The Spartan is a very competitive design and looks like a million bucks.

★

Dear Howard:

I am writing to find a source for obtaining the Anheuser-Busch eagles which are on the Budweiser hydroplanes. I wonder if you could turn me in the right direction to purchase the eagles in the size for 1/8 scale and the sport 40 hydros please? I can paint everything else but those darn eagles. Your help on this problem would be greatly appreciated.

By the way, power boating has caught on like the spread of the swine flu in the Big Sky State (Montana) and it is through advice and information in columns like yours that us backwoods boaters can keep up with the rest of the civilized world in boating competition; without it the rest of us backwooder's would still be just chopping firewood. Your efforts are appreciated.

Yours truly,
Daryl Tulberg
Montana

Thanks for the kind words, but I'm afraid I don't know of any source for the purchase of the eagles in question. I am printing your letter in hopes that someone out there may be of help.

★

Dear Howard:

Once again, a little info, please. I read with interest your January '83 column, particularly about the Rossi carb mod on a 65 OPS. I have installed same and I am curious as to the correct way of setting it up to run.

This winter's project is a Dumas Sorcerer which will see a K & B 7.5 as the main power source, but I am anxious to put the OPS in it for some fast E-Mono straight runs. I have replaced much of the stock Dumas wood with a better grade aircraft ply, replacing the 1/8" engine cockpit sides with 3/16", strengthening the entire hull. The entire drive-line is moved 3/16" to right of centerline, using an Octura S.S. strut. An aluminum (1/4" thick) motor mount will be used on wood bearers, using rubber servo grommets for vibration insulation (top and bottom).

Questions: What can I expect with the OPS? This is a surface drive modified "V" (flat running pad), 37" x 12" boat. What kind of torque problems can I expect? I am going to install 2" wide Steve Muck trim tabs; will this help? Will the stock OPS tuned pipe be okay? Where should I start with a prop? I will be using 25% synthetic lube fuel. The engine is forward of the transom 14" as opposed to stock location of K & B as per Dumas (12"), hopefully to prevent blow-off. I will appreciate any suggestions.

Sincerely yours,
Mike Harrison
Columbiaville, Michigan

P.S. Our club, Oakland R/C, is hosting the '83 IMPBA Nats. Hope to see you and Bev. Thanks, again!

The Rossi carb is very easy to set up to run. It has two needle valves and this can sometimes confuse the novice who has enough trouble with a single needle. The first step is to be sure that both needles are set so that the engine is operated with a rich setting both on idle and on the top end. If you look down the carb throat from the back side of the carb (opposite the airflow) you will see the spray bar square fuel dump hole. The idle needle is on the same side of the carb as the barrel arm. Adjust this needle (usually out) until the blunt end of the needle just shows in the square spray bar hole when the carb is in the high speed open position. As the carb barrel closes, the square hole is blocked more and more to regulate the mixture in the mid range and idle positions. The high speed needle is on the opposite side of the carb. Set this needle at about 4½ turns out. These needle settings should result in very rich running.

The engine is now started. You may have to open the throttle to about half throttle to get the engine running on these rich settings. Once it is running, slowly rotate the idle needle inward and test the throttle response. If the setting is too rich the engine will stumble or stop upon acceleration. Lean the idle needle down until the engine follows the throttle movements at the transmitter. Now rotate the idle needle 1/4 turn rich (counter-clockwise). The boat is now launched and the high speed needle is leaned down as usual to get the best boat running speed. Once you have high speed needle set you can go back to the low speed needle for its final setting. As you try larger props you will find that the low speed needle will have to be richened up to get good throttle response. If you try to use a prop that is too large for your set-up you will find that you will lose the ability to run in the mid range. Your engine will only idle and run good at a fully open throttle setting. In this case you might try to lengthen your pipe

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GIVE IT A WHIRL

John Gorham

I often have to remind myself that this column gets printed nearly two months after I write it. So, although it's raining hard (very) in California right now, I guess by the time you read this column most of the country will be having really good flying weather. So the best of luck in all your flying efforts and, as we now say whenever a flier goes out to do his thing, "break a blade!"

The column this month will consist of a varied number of topics; it just happened to come out that way. First a couple of new people have volunteered to help in their respective areas. They are as follows: Dave Cosby, St. Louis area, phone (314) 438-5683. Bobby M. Everett, Lansing, Michigan, phone (517) 371-4740.

All the information I get tells me that there is starting to be a real boom in helicopter activity in the Lansing area, thanks mainly to some of the stalwarts such as Ray Hanchett. Call (517) 332-6364, during the day, and ask for Ray. Ray now has a group of twenty beginners who meet every week to take instructions from him. We'll see how many get to the hover successfully. Ray, why don't you report on this and we'll publish it. Keep up the good work fellows. 'Gotta show these fixed wing types that our birds fly, too.

★

Now we have a couple of fly-ins to report on. Even though we have just come through winter (when I wrote the column, remember?) it seemed that nothing could stop helicopter fliers from getting together and doing some flying. The Denver R/C Helicopter Club (DHC) has sent me information recently concerning a fly-in held last fall. The club's president is Jeff Sands and the vice president who provided the information is Ken Kershaw. This particular meet was different in that Jeff and Ken arranged for the fly-in to be held at a local airport at which there were many full size helicopters on display, and "were there ever," Ken says. "We had on display a Bell 47G, an AS350 A-Star, a Bell 206 Jet Ranger, A Scorpion home-built helicopter and 'Copter 4,' a Denver TV station Jet Ranger, but the real star of the show was a Cobra from the local National Guard base that flew a demonstration. Imagine the thrill the contestants, spectators and control tower got when the Cobra made a pass at 150 knots at an altitude of 10 feet!" Ken and Jeff also arranged for rides in the Bell 47G or A-Star at $10.00 each. Some of the R/C pilots actually got some hands-on experience this way and talked about it for the rest of the day. Well, although we don't have enough space to publish Ken's report in full, I felt it was worth mentioning because of the full size activity which the Denver R/C Club mixed in with their model flying. Thanks Ken and Jeff for the information. Keep up the good work at the "Mile High" club.

The next meeting to report on is the 1st Annual Westcoast Helicopter Fly-In which was held on January 23, 1983. This was sponsored by the Pioneer's R/C Model Club which is one of the largest R/C clubs in the country and is based at Santa Clara, California. Everything was set for this to be a really large gathering of R/C helicopter pilots and it probably would have been, except for one factor. You may all remember that around that time California was hit with some of the worst storms it has had for many years and it so happened that this meeting was held in the very brief gap between the second and third storms. Actually the organizers were very lucky since the very heavy rain stopped just a few hours before the contest started and resumed again just after it finished. You'll see in the photograph Mike Jones and Ron Bodwell, the two contest organizers watching Leonard Pond perform his anti-rain dance to make sure that the rain stayed away all day. Leonard did his stuff very successfully. Maybe we could rent him out for future events when rain threatens? You can also see a photograph of some of the contestants and if you look carefully, those of you who have seen him fly will spot Curtis Croker who, although only 17 years old, is one of the really veteran fliers in this country. Curtis started when only 11 years old and he and his dad, George, recently moved up to Santa Clara. Finally, a nice surprise, Ken Willard turned up. Ken is still a little skeptical of R/C helicopters and the camera caught him actually laughing at one. However, I think at the end of the day Ken was a little more convinced that these birds could fly just like his seaplanes. We enjoyed having you there, Ken. Why not "give it a whirl"?

One other interesting event happened at this fly-in when Gordon Sheperd, Secretary of the Pioneers Club, turned up with his antique "helicopter." You can see it in the photographs. Gordon built this "chopper" in 1945. It has coaxial contra-rotating dual rotors, an Ohlsson 23 spark ignition engine and was flown on a tether like a U-control plane. It was actually hovered quite successfully in this manner. I notice, though, that the blade tips were dog-eared and chewed up just like ours get sometimes.

There have been many more meetings over the country but it's impossible to report on them all so I try to select a few each month. But keep the reports coming, please. It may be your turn next.

New Radio Frequencies

Well, as everybody now know, the new R/C model frequencies have been approved and, of special interest to the helicopter flier, is the fact that the 72 Mc frequencies can now be FM as well as AM. Now, as many of us have discovered, FM is less susceptible than AM to the type of "noise" we get in helicopters. Well, we managed to get a couple of the first "JR" receivers and transmitters and we have been flying on 72.320 and 72.400 FM for the last week or two. We deliberately put these into helicopters which were "glitching" at times and we found that we obtained a quite dramatic improvement in their performance. In fact, no "glitching" at all! Based only upon these very brief tests it looks like the new 72 FM frequencies will do helicopters a lot of good. We have yet to try the other frequencies so we'll report on these later.

Tail Boom Strikes

Next, we get onto something which "hits" us all from time to time — and that's boom strikes. That is to say, on landing (heavy ones!) the main blades come down and hit the tail boom of our helicopters. This happens mainly to beginners, of course. Well, it was of interest to me to read in the National Capitol Radio Control Helicopter Association's recent newsletter an article by Dwayne Stephens concerning tail boom strikes. Dwayne admits that he stole this article from Helio-Gram, the official newsletter of the Southern Ohio Radio Controlled Helicopter Association. Not having

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A beautifully built Rotorway Executive home-built even got the interest of the Cobra pilots — and yes it was flown in also.

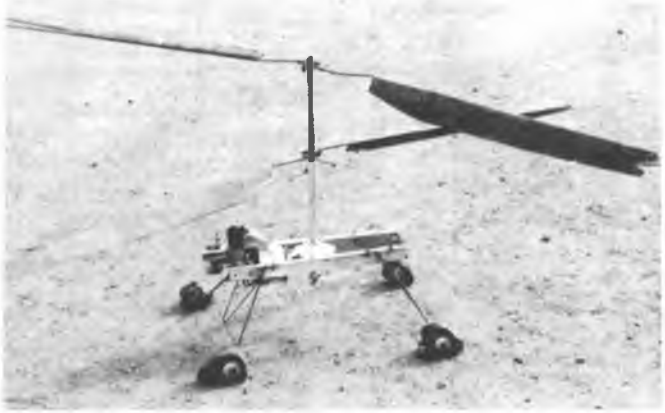
The "big ones" have problems too --- the throttle cable sheared when landing. The crew opened it up for the crowd to look around while they waited for mechanics to fly in to fix it!

Jeff Sands and Ken Kershaw talk to the pilots after their 15 minute demo of "attack flying."

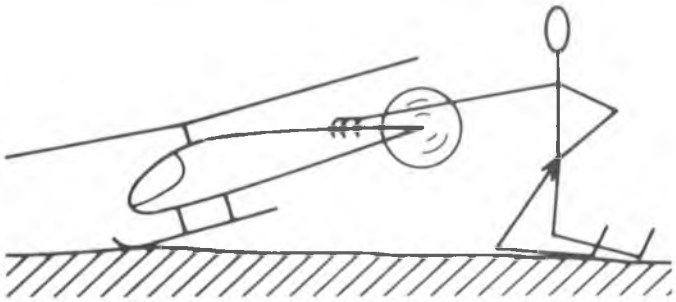
The show organizers — Mike Jones and Ron Bodwell. Leonard Pond is doing his successful anti-rain dance.

Some of the attendees — Curtis Croker and his dad in cowboy hats.

Ken Willard hasn't really figured out these strange machines. Can anyone help him?



Gordon Sheperd's U-control Rotorcraft circa 1945. (We think he is due for some new tires!)



DON'T DO THIS

CUNNINGHAM ON R/C

Chuck Cunningham

Spring is here. Flying time is breaking out all over. Models are being dusted off, radios are being charged, engines are being fired up, and the wild blue isn't so far yonder as it was just a couple of weeks ago. Most of the "Old Hands" aren't doing any of this though. Most of the "Old Hands" don't really need to do this 'cause they have been keeping everything up all winter. It's funny about winter. No grass to mow, no late evening sunshine, TV worse than it was last year, much more building and getting ready time, yet so many of us seem to go into a kind of hibernation. Suddenly spring is on us and, golly, who's ready to go flying? Along about next fall, I'm once again going to talk about putting your goodies away for the winter, but now that it's spring, let's talk a bit about getting those goodies ready for the flying field. If you're a beginner, take a few notes, because this time next year you're going to be a "semi — Old Hand."

Radio — your best friend needs the most loving care of anything in your collection. Some modelers take advantage of the winter time as a chance to send the radio in to a technician to be checked over and cleaned, etc. If you're an average flier you really don't need to do this unless something seems to be a bit strange with your radio. Normal, simple, maintenance will keep that radio working for a long time.

The weakest link in the radio chain is the battery, for both the receiver and the transmitter. Although these are the weakest links they are also the easiest to check and analyze. To do this you need an expanded scale voltmeter, or ESV. You can get into exotic battery servicing units to charge and discharge, but an ESV will do the job with a bit of mental help from you. There are several ESV's on the market — check the ads in this issue. If you're a serious modeler, then you might consider NorCal Avonics Accu-Tach. This keen little machine combines a very accurate tachometer with an ESV operation and a normal voltmeter. But back to batteries. Just what the heck does an ESV do that makes it so good when it comes to testing batteries? Well, it tests them under an imposed load. This is the only way that you can tell if a battery will do the job. Kinda like looking at two cars. Both look the same, but the only way to tell which car will do the job is to drive it. Who knows if both cars have an engine under the hood. It's the same for the battery. You don't know if it will do its job of storing up electrical energy and then releasing it in a small steady stream until you try it. **Charge it up,** then put the ESV to it to see how well it holds up. It should do a great job for a minimum of 1½ hours, and 2 hours would be even better.

At the same time you're checking the receiver pack, turn on the transmitter and let it sit there radiating energy for the same two hours. Note the location of the battery readout dial before turning it on and again at the end of two hours to see what has happened. If either battery fails to give a full discharge time, cycle them again (by that I mean charge them for a minimum of 14 hours and discharge one more time) and see if the period of time that the charge will be maintained will increase. If so, cycle several times to see just how much longer the batteries will keep working. If the time frame moves up, these batteries will continue to work for you. If the time frame moves lower, then toss them in the trash and go buy a new battery pack — a very cheap investment for continued good flying.

Hey, one thought, when you were running your transmitter to test its batteries, you did fully extend the antenna, didn't you? If you didn't, you may have caused yourself some hidden trouble. All transmitters are designed to operate with their antennas fully extended. To operate for any period of time with a collapsed or semi-extended antenna may possibly burn out the output transistor, giving you a hidden problem, one that will be resolved when the model smites the ground. When working the transmitter and receiver up close to each other this generally won't show up, but about the time the aircraft breaks off the end of the runway it suddenly lays over and dies --- very limited transmitter range. This is why it is so important to range check your radio quite often. Read the directions that came with your radio to determine just how much range your style of R/C gear should have.

Getting back to checking over your radio. Take a soft cloth and wipe the extended transmitter antenna clean. The range could be limited by a dirty antenna, with each telescoping section electrically isolated from the next by a layer of dirt and grime. If you fly on a very dusty field, or you're in the habit of leaving the transmitter in direct line with your aircraft's oily exhaust, you may have an oily dirty antenna in short order. Check over the entire transmitter, note the condition of the control sticks and trim levers. Clean all of them with a soft cloth. If you have been careful with your transmitter the chances are that it's in pretty good shape but take the time to look it over carefully.

Now, let's take a look at the rest of the airborne equipment.

Check the receiver over carefully to see that it "looks" okay. You and I can't check the output of the receiver

Jimmy Sikes of Dalton, Georgia, rewarded us with a photo of his first scratch-built model. It is the Wayfarer (RCM plan No. 482, $6.95) powered by an HB .40 PDP engine. Jimmy used a split linkage on the elevators. He states it is a real smooth flier.

Bob Williamson, Inola, Oklahoma, increased the plans 50% and powered his 84" wingspan Magnum with an O.S. Max .90. He says it is the best flying model he has every flown. Magnum plan #745, $6.50.

"Personally, I don't believe all those stories you hear about fanaticism in this hobby!"

easily, but we can take a good close look at it to see if there is any visible damage, such as being crunched in a crash, etc.

Check the receiver antenna. Nope, don't grab on to it and pull to see if it will come loose. Look at the wire, see if it looks like it is frayed or worn, or possibly broken at any point.

Now, check the switch harness for the same broken or frayed wires. Check the switch to see if it is still working properly, visually, that is. If you have any doubt about the switch in your radio set-up, replace it. I've been using the Du-Bro switch holders just about since their inception and find that switch trouble seems to have almost disappeared. The switch is located inside the aircraft, away from oil, dust and dirt, and much less susceptible to damage than simply bolting it to the side of the fuselage.

Next, take a look at each servo. Check each for any visual signs of wear or damage. Don't disassemble your servos unless you are really good at putting this type of thing back together. If you have a friend who has become adept at taking a servo apart, cleaning it and then putting it back together, then learn from him, and check and clean your own servos. If you're kinda fumble-fingered at this, and you quite often find that a few parts are left over, then send the servos in for servicing if they appear to need it. For the average flier, though, a visual check, followed by a good workout with the servos plugged into the receiver and operated by the transmitter will tell if they are ready to do their job. If one servo seems a bit more sluggish than the rest, move it to work the engine throttle, a kinda non critical job. It's really a good idea to rotate the servos from one job to another from time to time, like rotating tires. In normal flying operation the servos that are tagged with the job of moving the elevator and ailerons get most of the work and wear, while those that have to heave the throttle lever and rudder get a free ride on most flights. Rotate them around every so many flights so that they all will get a chance to wear equally. The modern servo will last for a heck of a long time . . . provided that old fumble thumbs on the transmitter doesn't keep bashing the ground with his pride and joy.

Okay, so much for the radio, servos, and battery packs. If you're in doubt, have them checked over by an expert, but you should have done that last October, not now in May.

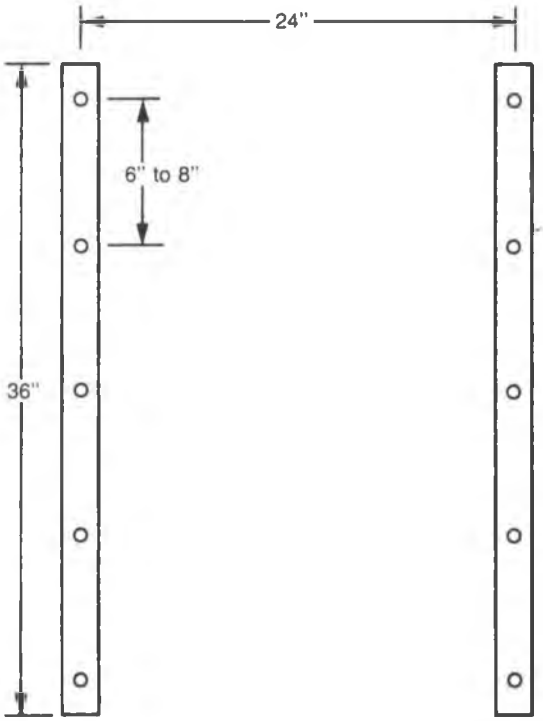
Let's move on and take a good look at your aircraft. Tossed it in the corner last year and just let it set there waiting for spring to roll around, eh? If you've never built a wing storage rack, do it now --- it's darn simple and will store model wings simply and easily, and keep them from warping. You do know that a wing just tossed in the corner can get pretty well warped in six or seven months. Build a rack.

You can use the same type of rack for storage of the fuselage, provided that you use **larger dowels,** than those used in the wing rack, and provided that you aren't storing fuselages for really large models. Give a thought to the wheels, also. Even the standard model will develop flat spots on the tires if allowed to set for a period of time. If you do leave your models setting on the floor or a bench for a time, make a simple jig to lift the wheels up off of the floor, preventing these flat spots. This is really important for those larger models, or ones that use soft tires such as the William's Brothers antique type wheels. These are great wheels, but will acquire flat spots easily, so chock them up, and never have a flat spot again.

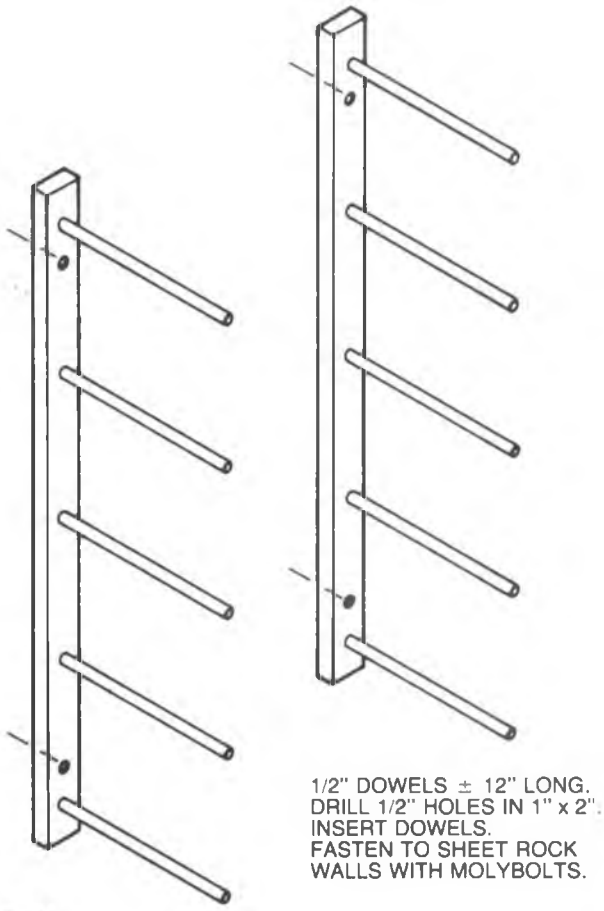
All right, no warps or flat spots, so what next? Let's start with the wing. How about the aileron hinges? Are they all in good shape, or are some of them a bit loose? Do the ailerons need to be rehinged? If you hinged them correctly in the first place, chances are that they are still good today, but if they are worn and sloppy, then take the time to rehinge. While you're at it, take the time to seal the aileron hinge gap. A simple strip of MonoKote ironed over this gap will do wonders for the flying ability of your model; iron a strip over the elevator gap as well.

How about the structure of the wing, is it in good shape, or is it just a bit fractured in spots? How about the covering — does it have a few holes in it that can be patched? Patch 'em. Servo mount — is it secure and stable? Will the servo remain in place, or are the screw holes augered out and sloppy, and does the servo just barely hang onto the wing? You've got time now to correct this.

Aft end — are the tail feathers well-secured to the fuselage, or are they a bit shaky? Reglue them. Again, check the hinges at the elevator and rudder to see if they are correct. If they are not, then rework them. How about the control horns? Are they securely attached? Are they loose and wobbly? How about those Kwik Links that hook the pushrod to the control surface? Are they tight and firm, or are they slightly sprung open, with



1" x 2" x 36" PINE



1/2" DOWELS ± 12" LONG.
DRILL 1/2" HOLES IN 1" x 2".
INSERT DOWELS.
FASTEN TO SHEET ROCK
WALLS WITH MOLYBOLTS.

WING RACK

the possibilty that they could pop loose from the horn when a load is applied? One of the faults that the average newcomer to this hobby makes is to try and economize by using hardware that is past its prime. Hardware really costs pennies compared to the cost of a radio, engine and aircraft, to say nothing of time — so if the hardware on your aircraft is a bit doggy, replace it. Pennies for dollars.

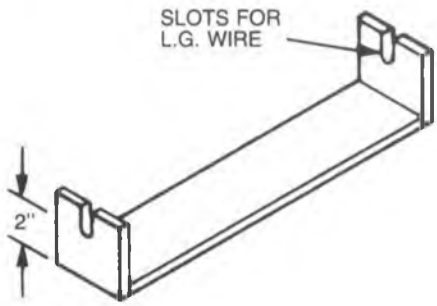
Okay, we've been looking at the aft end of the fuselage — now look it all over. Is the servo mounting secure, or has one corner of the servo board worked loose, and another corner is going to part company at any time? Is the structure firm and in good shape, or is it cracked and damaged? Fix it. Take a good look at the landing gear. Is it well-secured to the fuselage, or is it kinda hanging there by some old rubberbands that will say "bye bye" at the first hard landing, causing you a busted prop?

Now, we come to the nose of the model. Is the firewall still firmly fastened to the aircraft? Is the engine mount firmly fastened to the firewall? Is the engine firmly fastened to the engine mount? Bet that something is loose somewhere. Is the nose gear still firmly fixed to the firewall, and is the screw holding the nose gear steering arm to the wire nose gear good and tight? You did file a flat spot on the wire gear for the screw to grab on, didn't you? If you didn't do this last year, and had rotating nose gears all summer long, then take a little time now to file or grind a flat spot and this summer become one of those guys who can taxi his aircraft without the nose wheel turning sideways and tipping the model over, splitting the prop.

If you find that anything in the front is loose, then it can be fixed easily. Remove the engine and the mount, clean up all of the old fuel and oil soaked wood with an application of K2R, then reglue the firewall back to the fuselage.

While you've got the engine loose from the aircraft, take a good look at it. Tighten all of the bolts holding both the front and rear case covers to the crankcase. Bet a couple of them were loose, weren't they. Next, check the head bolts and tighten them. Tighten up the glo plug. Look over the engine and clean off any dirt that is in it. Squirt a couple of shots of 3-in-1 into the intake and the exhaust, then turn over the prop. Don't turn it over before you give it the benefit of a bit of oil. How about the carburetor? Is it securely bolted to the crankcase? If everything looks to be in mint condition, then reinstall the engine back in the model.

One point — if you properly take care of a model engine it will last for many flights. If you don't take care of it, it can be ruined in just one flight. Keep the engine tight in the aircraft to minimize vibration; keep the prop



LANDING GEAR BLOCK

tight; never, never run the engine lean to milk a few more rpms out of it. Always let it leave a slight smoke trail in the sky. If it isn't smoking a bit, it's running too lean. Never run your engine on too small, or too large a prop. If you fly in dirty conditions, then install some type of air filter. Use good fuel, and filter the fuel before you pump it into the aircraft fuel tank. Oil the engine after each running session. If you do all of these things then your engine investment will be good for a long, long time.

We've checked out just about everything on your aircraft, and if everything is okay, it's just about time to start flying again for this year. How about you, the pilot? Are your eyes as good as last year, or do you need

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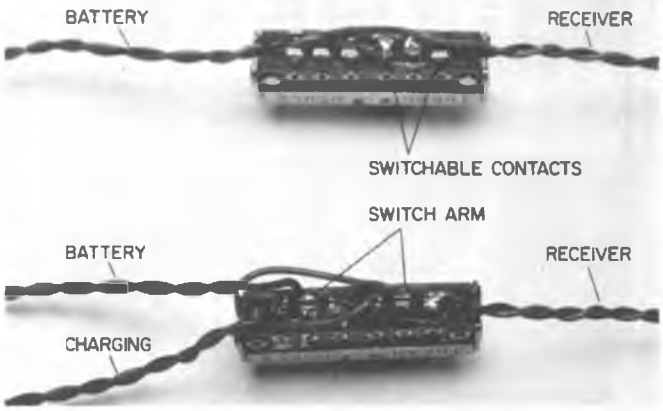
HERE'S HOW

By Jerry Smith

Some of the equipment necessary to build your own switch harness. All hardware can be purchased from Royal Electronics or Ace R/C Inc. See end of article.



Wiring of slide switch can be plainly seen. Upper switch is plain one wire breaker while lower switch includes charging connector wiring. Diagram shows you how. Make sure wire goes through both lugs when soldering.

One of the best connector soldering jigs available. A popsicle stick and two paper clamps. It works simply great! See RCM April 1981 Here's How. Don't forget the shrink tubing before soldering.

Build your own custom switch harness. It's easier than you think. The Du-Bro Kwik-Switch Mount is a great companion.

It takes many talents to keep up with our sport/hobby of RC'ing. Come to think of it, in order to build the average R/C airplane kit it is necessary to have some knowledge of wood working, as it pertains to model building. There is also gluing, sanding, covering, trimming, radio installation, soldering, etc. And, if you don't keep up with these skills, that is to say, deal with them frequently, you simply lose out in developing any technique for them. Sad but true. Then to top it all off you gotta fly it. Another talent.

The other day a friend of mine stopped by, needing some help. He had built a large airplane which required a special radio installation. The batteries had to be located some distance from the receiver for proper C.G. balance. The problem? His switch harness would not accommodate the situation. My friend wanted to build a new one but he couldn't understand the switch wiring. He could have built a cable extension and solved his problem, however, a close look at his switch harness told me he needed a new one. It had been through several crashes.

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DIAGRAM A

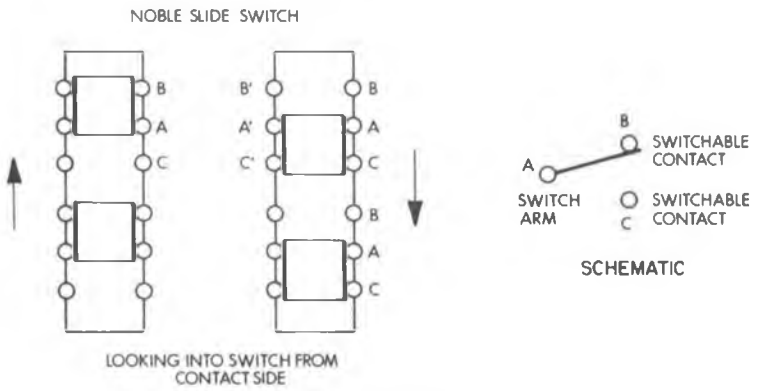
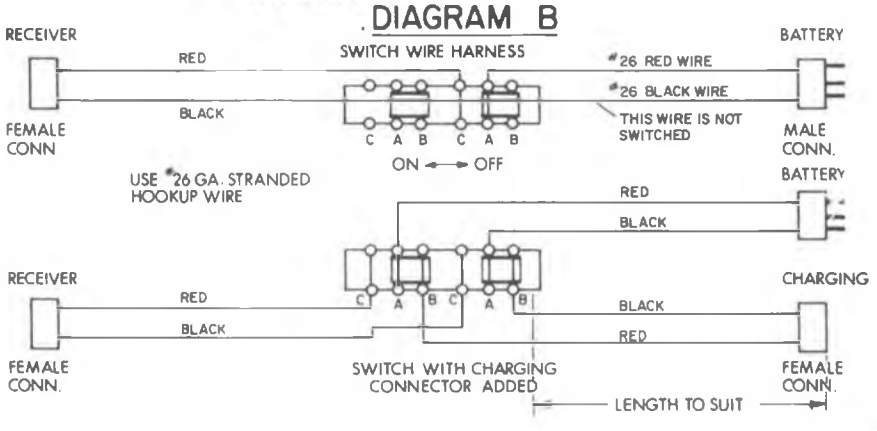


DIAGRAM B



FIREBIRD II
Designed By:
J.M. Mergen
TYPE AIRCRAFT
Big Sport
WINGSPAN
100" to 60"
WING CHORD
15 Inches
TOTAL WING AREA
1448 sq. in. to 848 sq. in.
WING LOCATION
Parasol
AIRFOIL
Clark Y
DIHEDRAL EACH TIP
3½ Degrees
O.A. LENGTH
57 Inches
RADIO & CARGO VOLUME
316 Cu. In.
STABILIZER SPAN
28 Inches
STABILIZER MEAN CHORD (inc. ele.)
8 Inches
STABILIZER AREA (inc. ele.)
220 Sq. In.
VERTICAL FIN HEIGHT
12 Inches
VERTICAL FIN CHORD (inc. rud.)
8 Inches
REC. ENGINE SIZE
40- 60 Cu. In.
FUEL TANK SIZE
16 Ounce
LANDING GEAR
Conventional (5" wheels)
REC. NO. RADIO CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Throt.
BASIC MATERIALS USED

Fuselage	Balsa, Ply & Spruce
Wing	Balsa, Ply & Spruce
Empennage	Balsa & Spruce
Wt. Ready To Fly	**176 Oz. (100")**
	165 Oz. (60")
Wing Loading	**17.5 Oz./Sq. Ft. (100")**
	28.0 (60")

FIREBIRD II

The Firebird II is a two times larger version of the original Firebird (RCM, June 1981). Powered by a good .61 engine, the Firebird II, with two sets of wings, can match whatever type of flying you enjoy.

by Joseph M. Mergen

Firebird II is a big airplane. In fact, it is twice as big as the original Firebird which was the subject of my "design and build" article in the June 1981 issue of R/C Modeler. All dimensions of the original have been substantially doubled giving Firebird II a wingspan of 100" or 60" or anything in-between which the builder chooses.

Like the first Firebird, this airplane is a mixture of the characteristics of the Heath Parasol, the Corbins, the Pietenpol Sky Camper, Sky Scout, etc. Based on those airplanes, the 100" wing is approximately 1/3 scale and a 75" wing is 1/4 scale. The fuselage has been designed to be in-between and if the airplane is built with an 85" wing it will match the fuselage exactly and be a stylized 3.53 scale model of the Heath.

Using the 100" wing, the airplane flies nicely between 20 and 25 mph. remembering that the full scale airplanes cruised at between 60 and 75 mph, Firebird II can be flown at exactly scale speed. Of course this is a slow cruise. With the K & B .61 engine used in the prototype, and the 100" wing, the airplane has been timed at 44 mph at full throttle and will do 58 mph with the 75" wing.

Although it has not been built as yet, a 60" wing would match the clipped wing of the original Firebird and provide a pretty fast airplane.

Using the 100" wing the airplane is slow and docile. With the 75" wing you have a well-balanced sport airplane which seems to do just about everything right.

To try to overcome the transportation problems and tedious assembly at the flying field associated with most 1/4 Scale or larger models, Firebird II has been designed with a quickly demountable wing as in the case of the original. Assembly can be accomplished in less than one minute after arrival at the flying site. Disassembly can be achieved equally fast. The longest job seems to be wiping the castor oil off the stabilizer. Note the easily removed stabilizer and landing gear which make packing for shipping pretty convenient.

Because the airplane is light (160 oz. empty) and the wing loading is relatively low for a large airplane, the .61 C.I.D. engine has more than enough power with the wings tested. It should be entirely adequate even with a 60" wing. Based on flight testing, the writer would not hesitate to use a .40

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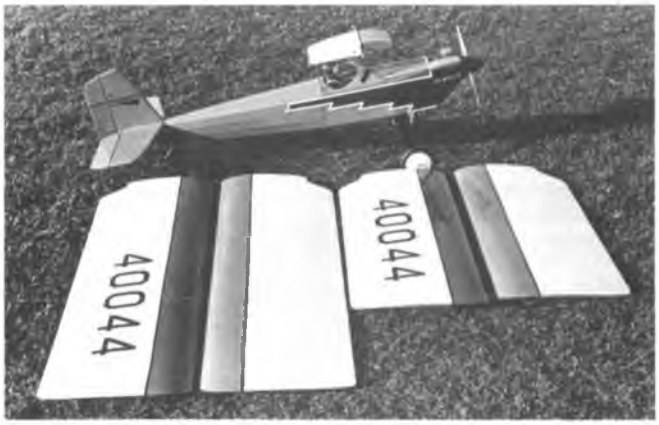
Bill Of Materials

(13) — 1/4" x 1/4" x 36" balsa — fuselage longerons, struts, braces.
(14) — 1/8" x 3" x 36" balsa — cowling, fuselage bottom, ribs, wing plank, trailing edge, cockpit bottom.
(3) — 1/8" x 6" x 36" balsa — wing plank, leading edge (inner).
(1) — 3/16" x 6" x 12" balsa — turtle bulkheads.
(2) — 3/32" x 4" x 36" balsa — spar webs.
(1) — 3/8" x 4" x 36" balsa — cut into strips for fin, rudder, stab, ele., rudder post (lower).
(3) — 3/8" x 3/4" x 36" balsa — leading edge (outer).
(1) — 3/4" x 7/8" x 6" balsa — center section T/E.
(1) — 1/4" x 7/8" x 6" balsa — center section block.
(5) — 1/8" x 5/6" x 36" balsa — rib caps.
(1) — 1/4" x 3/8" x 48" spruce — fin and stab spars.
(2) — 1/8" x 1/4" x 48" spruce — stringers.
(4) — 1/8" x 1/4" x 36" spruce — stringers.
(4) — 3/16" x 3/8" x 48" spruce — spar caps.
(1) — 1/8" x 12" x 28" plywood — hatch fwd., fuse bottom, F1A, F3, F7, NR1, W1, center section doubler.
(1) — 3/32" x 6" x 6" plywood — center spar webs.
(1) — 1/32" x 2" x 1" plywood — doubler at center section clip.
(2) — 1/4" x 6" x 12" plywood — F1, F2, tail skid support, eng. mt. blocks, NR2, servo rails, hatch opening support, C/section blocks.
(1) — 5/16" x 5/16" x 9" hardwood — cowl blocks.
(1) — 1/2" x 1" x 3" hardwood — top cowl block.
(1) — 1/2" x 3/4" x 6" hardwood — center section block.
(1) — 5/32" dia. x 36" music wire — fwd. cabane struts.
(2) — 1/8" dia. x 36" music wire — cross cabane struts, aft cabane struts, tail skid, wing incidence rod, stab carry through rods.
(1) — 1/16" dia. x 16" music wire — aft cross cabane wires.
(1) — 5/16" dia. x 16" 200K T.S. temp — wing carry through bar, steel bar.
(1) — 3/64" dia. x 8" music wire — clips.
(1) — 3/8" O.D. x 11/32" I.D. x 18" brass tube — wing carry through tube.
(1) — 11/32" O.D. x 5/16" I.D. x 18" brass tube — wing carry through tube.
(2) — 5/32" O.D. x 1/8" I.D. x 20" brass tube — wing incidence tube, stab carry through tube.
(1) — 1/8" O.D. x 3/32" I.D. x 1¼" brass tube — fuel filler.
(1) — 17/32" O.D. x 1/2" I.D. x 8" brass tube — muffler extension.
(1) — 16" fuel tubing — fuel line, filler, vent.
(1) — .025" x 1/2" x 2½" brass plate — cross cabane strut clips.
(1) — 1½" x 16" x 2 oz. fiberglass — cabane strut reinforcement cloth.
(1) — .010" dia. x 48" soft wire — cabane bindings.
(1) — #B106-6 Hallco landing gear.
(2) — 5" dia. "Golden Age" wheels
(2) — 3" Sig engine mounts.
(1) — 3" dia. Du-Bro spinner or equivalent.
(1) — .015"-.018" x 9" x 13" alum. — cowling, stab strap.
(1) — 1/32" x 3/4" x 8" alum. — landing gear straps.
(3) — #2 x 3/8" flat head screws — hatch.
(4) — #6 x 3/4" screws — landing gear.
(4) — #4 bolts, washers, nuts — cross cabane struts.
(7) — #1 x 1/4" flat head screws — cowl at NR2.
(10) — #1 x 3/8" flat head screws — cowl at fire wall, stab strap.
(4) — #6 T nuts — engine mount.
(4) — #6 x 1½" bolts & lock washers — engine mount.
(4) — #6 x 3/4" bolts & lock washers — engine.
(2) — #8 x 1" round head screws — wing root.
(2) — #8 x 1" flat head screws — center section block.
(1) — 1/8" x 3/16" x 4" soft rubber — vib. isolator at NR1.
(1) — 1/16" dia. Du-Bro nylon/steel throttle cable assembly.
(3) — #2 x 12" threaded control rods.
(2) — 24" NyRod elevator & rudder pushrods.
(2) — #2 x 1" threaded control rods.
(2) — Large nylon control horns.
(5) — Steel clevises — threaded — elevator & rudder.
(1) — Small nylon clevis — throttle.
(1) — Small steel clevis — soldered — throttle.
(1) — .020" x 6½" x 3½" windshield mat'l.
(1) — 16 oz. Sullivan fuel tank assembly.
(2) — Vent tube clamps.
(4) — #1 x 3/8" screws — vent tube clamps.
30 sq. ft. MonoKote (as desired).
.60 cu. in. engine, propeller & radio equipment of your choice.
Epoxy, cyanoacrylate, aliphatic cements. Sta-Brite solder, Epoxilite, foam wrap for Rx & battery, as required.

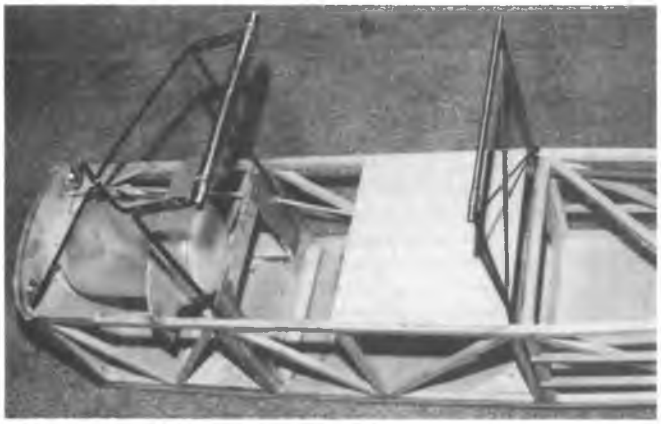
Firebird II with original Firebird (RCM Plan #838) under wing.



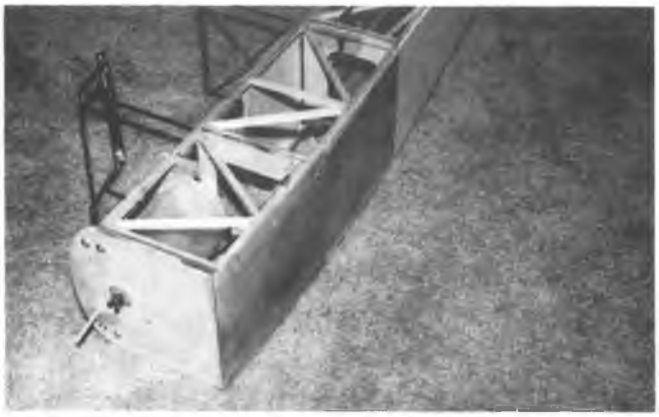
Just pick a wing and fly — 75" and 100" wing panels.

Pretty realistic if it weren't for King Kong.

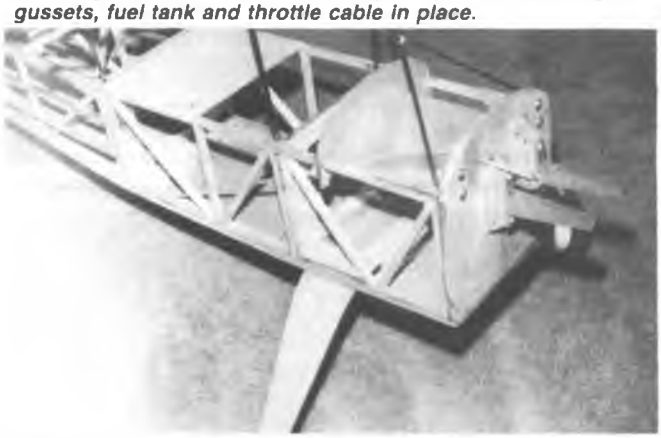
Joe shows what to do for a cold spinner. He failed to tell us if it helped.



View of partially finished fuselage showing forward cabane struts "glassed in," cross brace clips in place, F1 to longeron gussets, fuel tank and throttle cable in place.

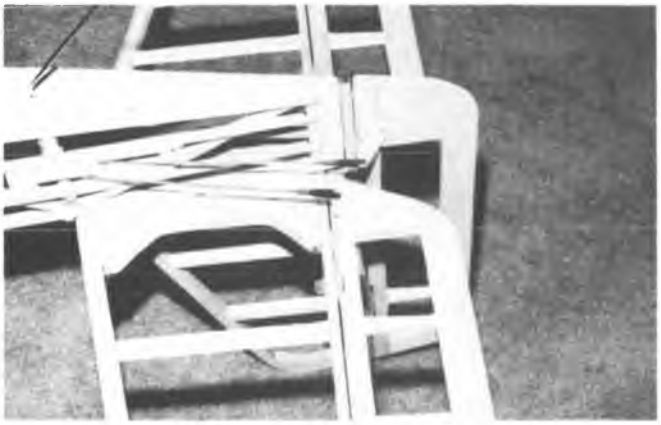


View of fuselage with aft cabane struts "glassed in."

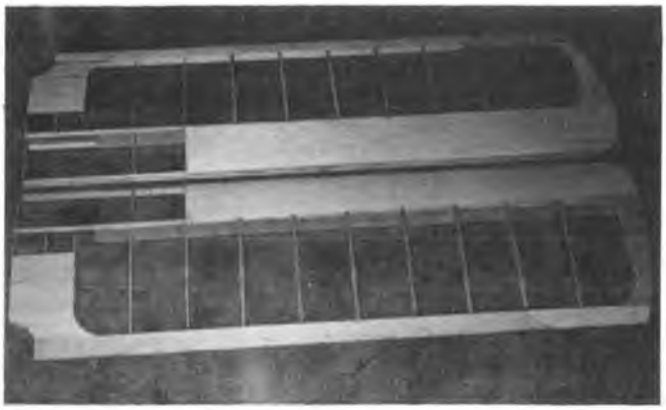


Details of engine mounts and landing gear supports.

Fuselage with side 1/16" ply planking and stringers. Sand everything smooth and flush where stringers meet side planking.

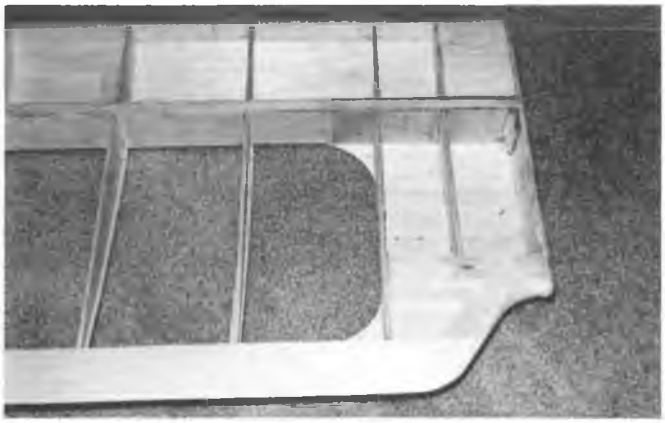


Plates with slots for pushrods to facilitate covering and support rod eyelets.



Build wing panels to this point — then assemble on center section. Note that spar web is left off first bay so that carry-over tube can be fitted.

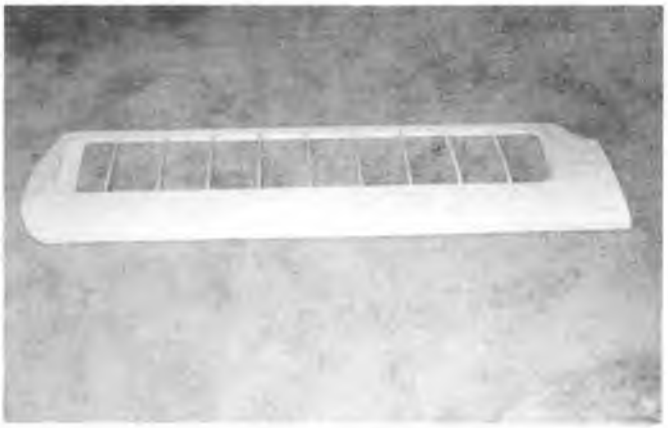
View showing wing panels mounted and carry-over tubes tack cemented to spar web. Dihedral and alignment is established here. That's a K & B .61 up front.



Bottom view of inboard end of finished wing panel.

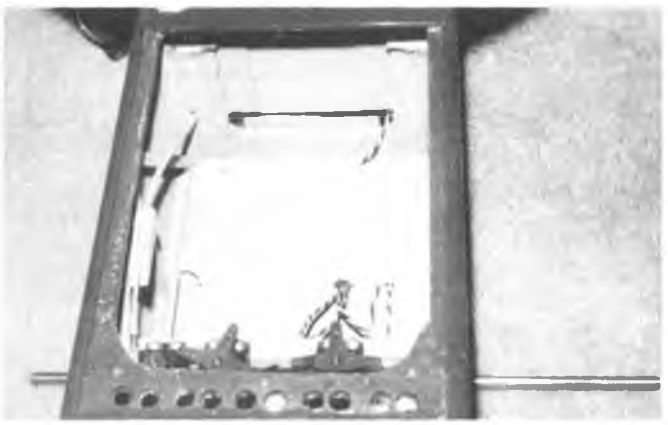
Top view of inboard end of finished wing panel. Retaining screw not shown.

Bottom view of wing tip.

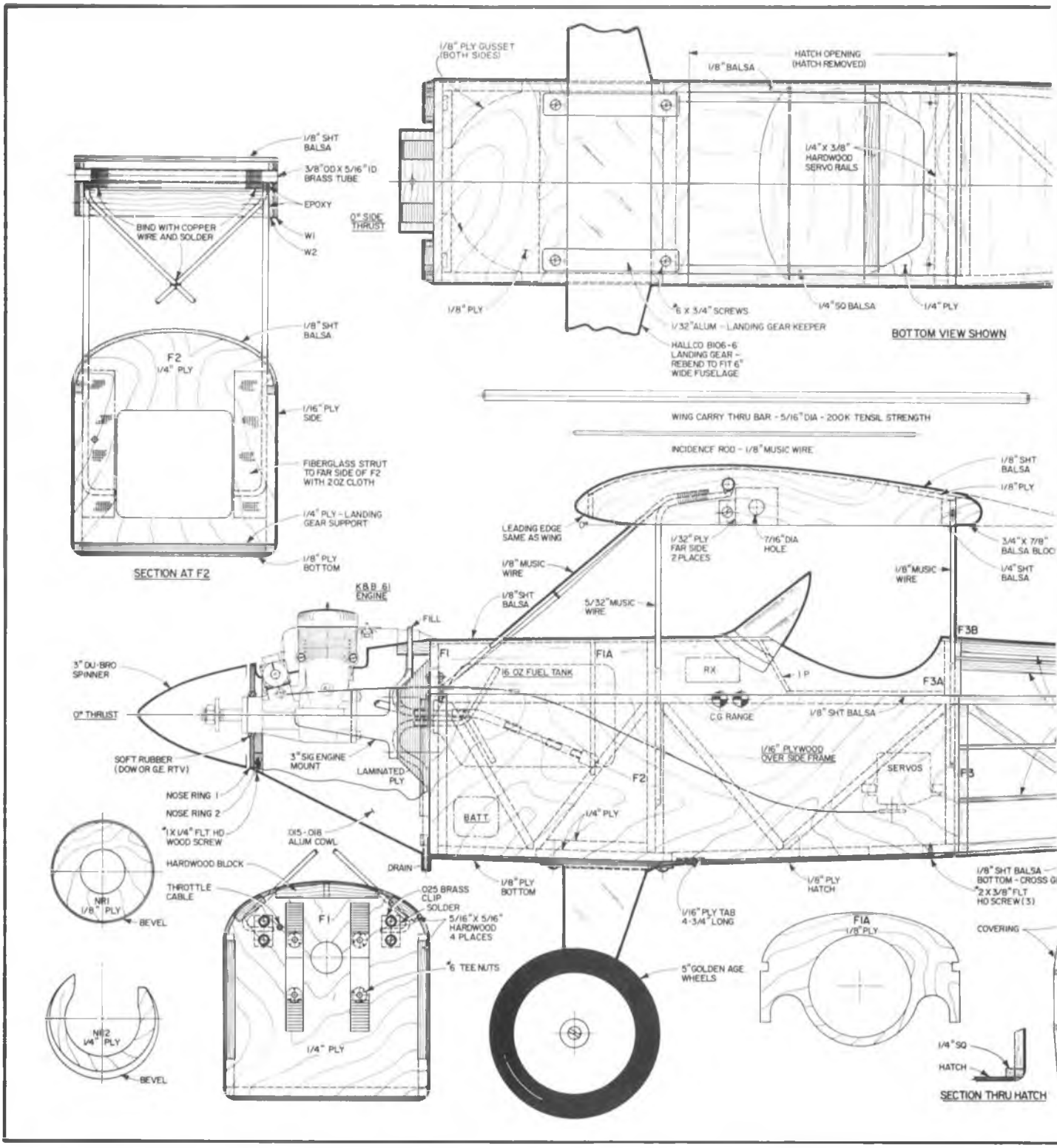


Finished wing panel ready for covering.

Bottom view of fuselage with hatch removed to show RX location, antenna tube, throttle cable, servos and fuel tank. RX is above top longerons in forward cowling.

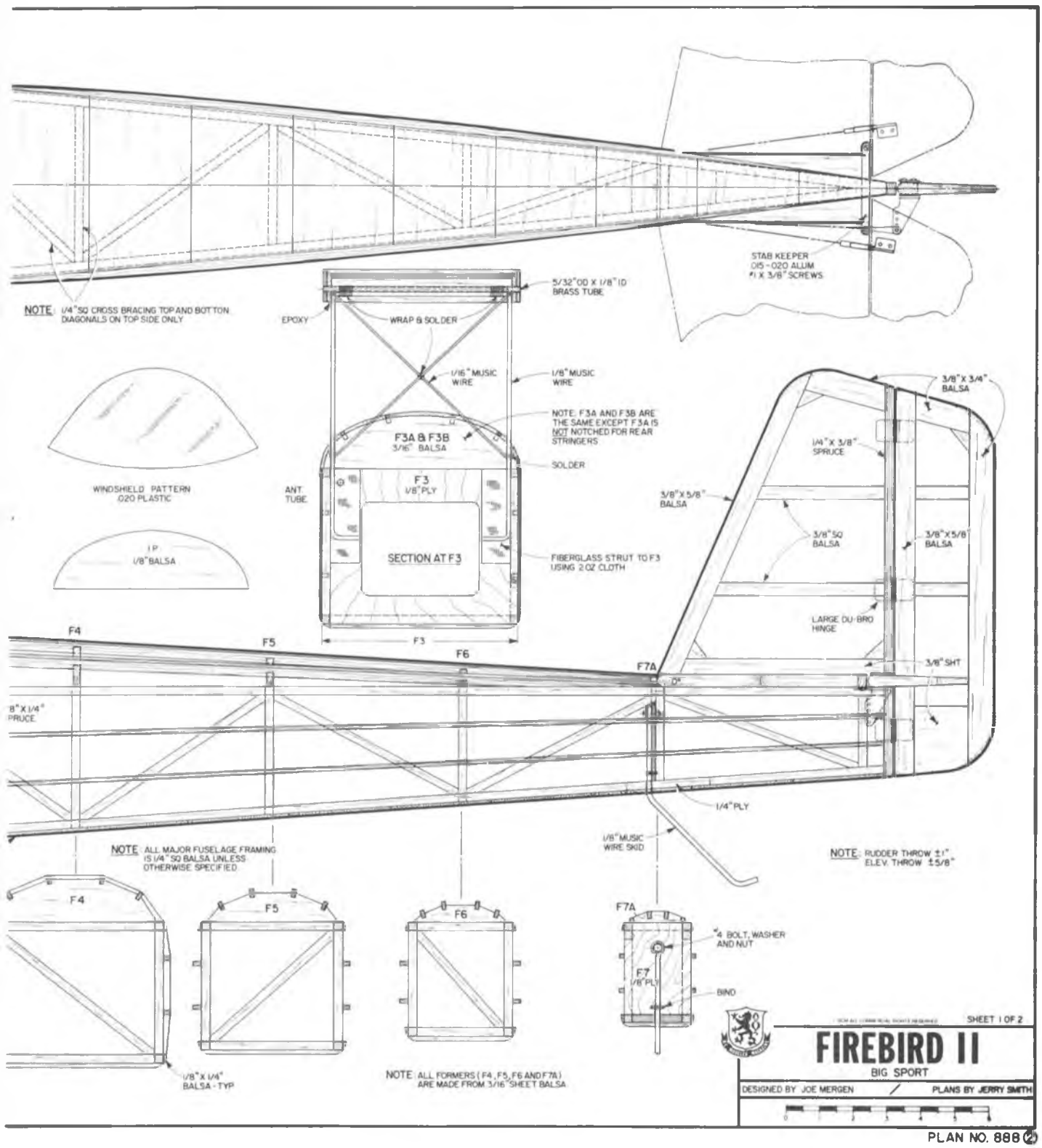


Simple snap in hatches to keep things in place can provide substantial clear cargo space. Room for two more servos to drop cargo or perform other tasks is provided.


1/8" PLY GUSSET (BOTH SIDES)
1/8" BALSA
HATCH OPENING (HATCH REMOVED)
1/4" X 3/8" HARDWOOD SERVO RAILS
1/8" SHT BALSA
3/8" OD X 5/16" ID BRASS TUBE
EPOXY
0° SIDE THRUST
BIND WITH COPPER WIRE AND SOLDER
W1
W2
1/8" PLY
6 X 3/4" SCREWS
1/4" SQ BALSA
1/4" PLY
1/32" ALUM - LANDING GEAR KEEPER
HALLCO BI06-6 LANDING GEAR - REBEND TO FIT 6" WIDE FUSELAGE
BOTTOM VIEW SHOWN
1/8" SHT BALSA
F2
1/4" PLY
1/16" PLY SIDE
FIBERGLASS STRUT TO FAR SIDE OF F2 WITH 2OZ CLOTH
1/4" PLY - LANDING GEAR SUPPORT
1/8" PLY BOTTOM
SECTION AT F2
WING CARRY THRU BAR - 5/16" DIA - 200K TENSIL STRENGTH
INCIDENCE ROD - 1/8" MUSIC WIRE
LEADING EDGE SAME AS WING
1/32" PLY FAR SIDE 2 PLACES
7/16" DIA HOLE
1/8" MUSIC WIRE
1/8" SHT BALSA
5/32" MUSIC WIRE
1/8" SHT BALSA
1/8" PLY
3/4" X 7/8" BALSA BLOCK
1/4" SHT BALSA
K&B 61 ENGINE
FILL
3" DU-BRO SPINNER
0° THRUST
F1
F1A
16 OZ FUEL TANK
RX
I P
F3B
F3A
CG RANGE
1/8" SHT BALSA
SOFT RUBBER (DOW OR GE RTV)
3" SIG ENGINE MOUNT
LAMINATED PLY
1/16" PLYWOOD OVER SIDE FRAME
SERVOS
F3
F2
NOSE RING 1
NOSE RING 2
BATT
1/4" PLY
1 X 1/4" FLT HD WOOD SCREW
.015 - .018 ALUM COWL
HARDWOOD BLOCK
THROTTLE CABLE
DRAIN
1/8" PLY BOTTOM
1/8" PLY HATCH
1/8" SHT BALSA BOTTOM - CROSS G
2 X 3/8" FLT HD SCREW (3)
NR1 1/8" PLY
BEVEL
.025 BRASS CLIP
SOLDER
5/16" X 5/16" HARDWOOD 4 PLACES
1/16" PLY TAB 4-3/4" LONG
F1A 1/8" PLY
COVERING
6 TEE NUTS
5" GOLDEN AGE WHEELS
NR2 1/4" PLY
BEVEL
1/4" PLY
1/4" SQ
HATCH
SECTION THRU HATCH


40044

FULL SIZE PLANS AVAILABLE — SEE PAGE 219



in all but the shortest wing versions.

So, if you would like a versatile, low cost, easy to build, easy to transport, big airplane --- why not build Firebird II.

CONSTRUCTION

The construction of Firebird II is conventional and relatively simple throughout. All materials and parts can be bought at the local hobby shop or hardware store with the exception of the wing carry-through bar which will have to be procurred from a specialty steel warehouse or industrial supplier.

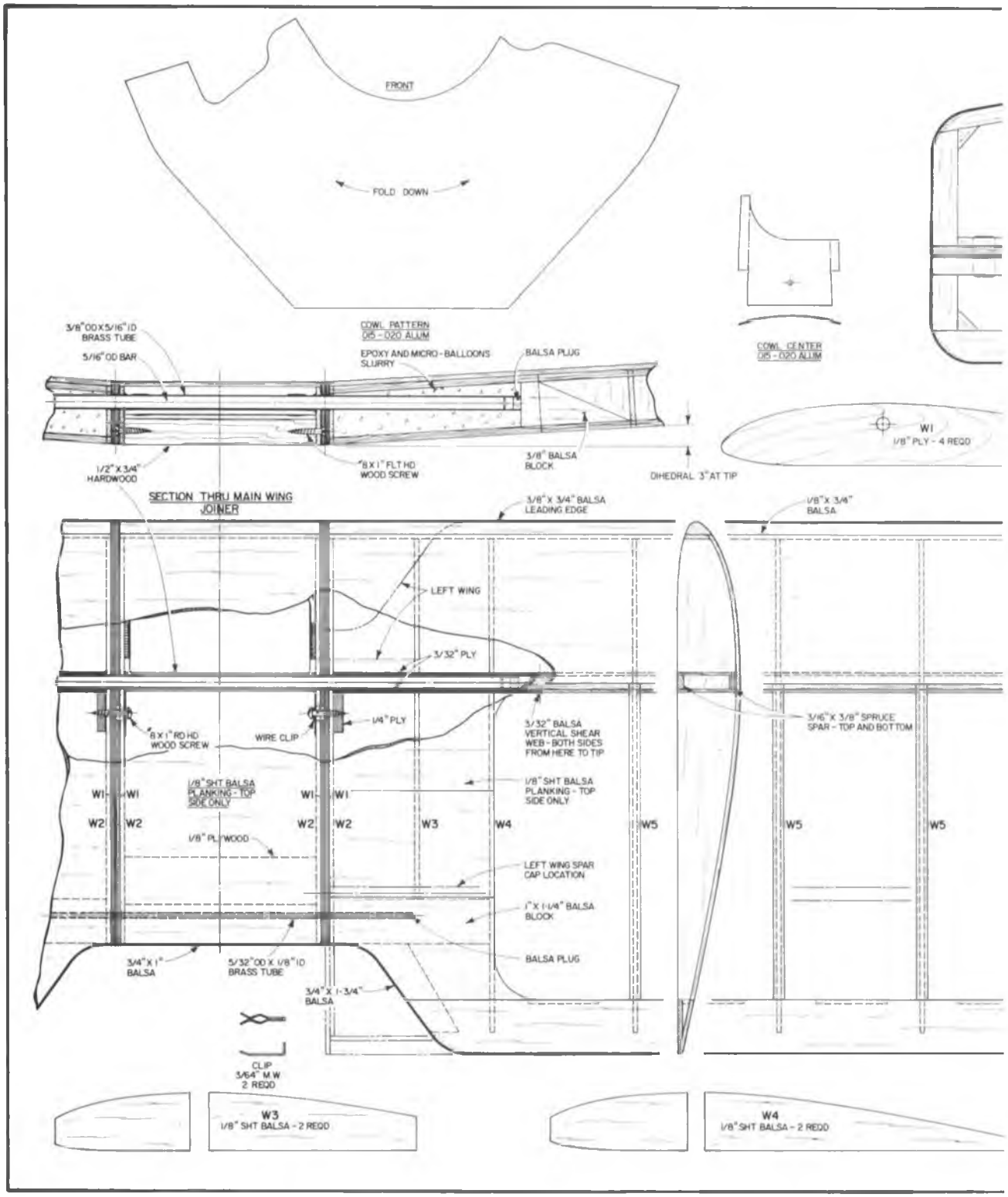
The finished empty weight with the 100" wing should be no more than 160 oz. using a .60 C.I.D. engine and standard radio gear.

Almost any size fuel tank can be used. The writer chose the 16 oz. tank to provide almost a half hour of flying between fueling sessions.

Since the construction is conventional, and the usual builder will have no need of step by step details, the discussion will cover the sequence of operations with an occasional explanation of a convenient way to accomplish a particular phase.

Fuselage:

Start the fuselage by building two identical sides using 1/4" square balsa



for longerons, struts, and braces. Next, cut out F1, F1A, F2, F3, F3A, F3B and the turtleback formers at F4, F5, F6, F7 and the bulkhead at F7 which supports the tail skid.

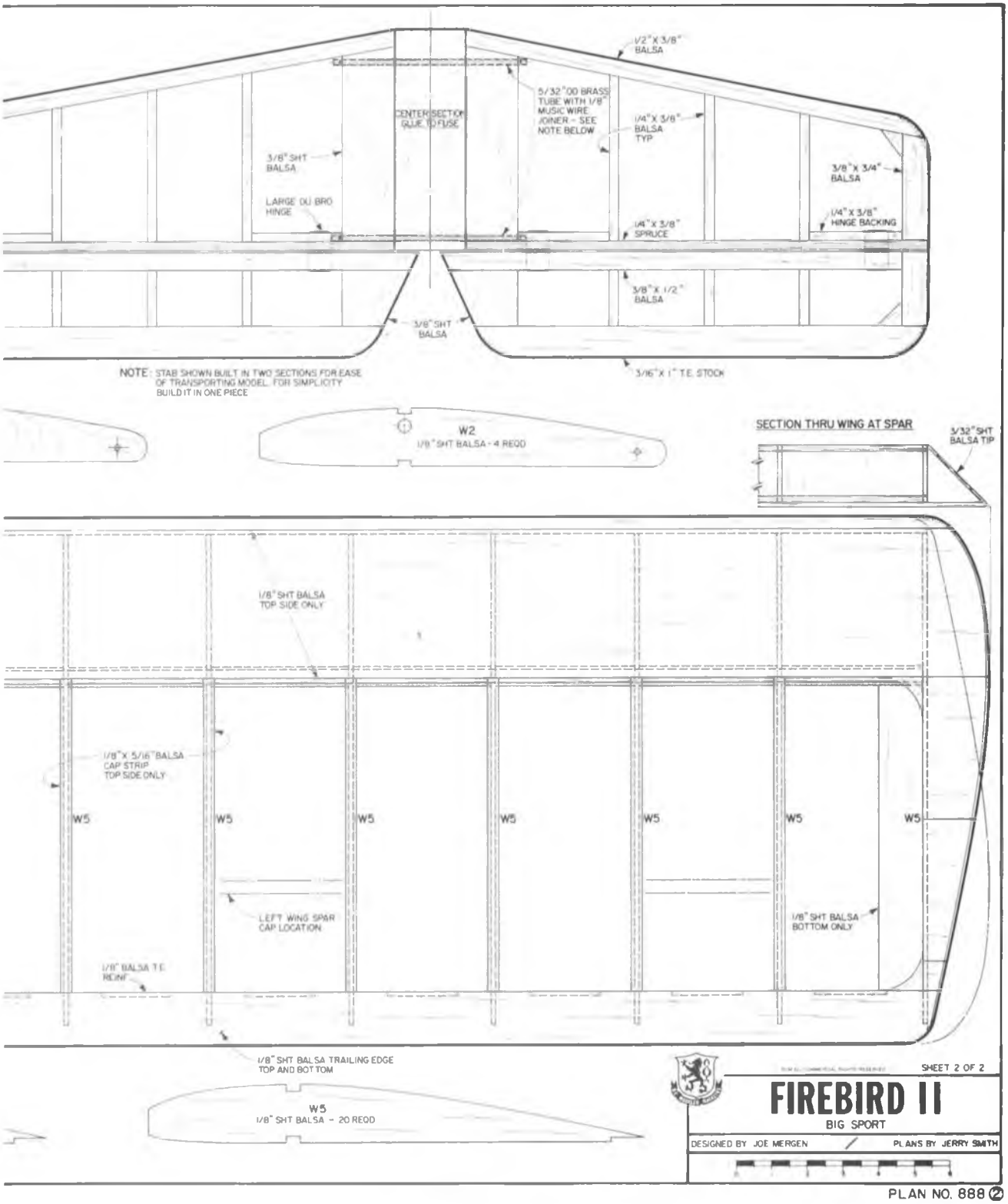
Start assembling by attaching the sides to F2 and F3. Then square up the forward end of the fuselage frames with the top longerons and install F1. The 1/4" plywood landing gear supports can be put in next.

The bottom plywood planking from F1 to just beyond F2 can now be added. Note that it extends beyond F2 to take the aft landing gear screws and provide a lip for the hatch tab. Install the shaped 1/4" plywood stiffener between the longerons near F3. This contains the servo screw access holes. This planking includes the 1/8" and 1/4" square balsa strips which frame the hatch shown in section A-A. Also add the cockpit bottom on the upper longerons.

Now draw the fuselage together, sand to fit and install the balsa tail post and cross struts. Diagonal braces are added next to the top longerons and across F4, F5 and F6. Stiffness of the bottom is supplied by the 1/8" planking which can be installed now, stopping short of F7.

Bend the 5/32" music wire forward

FULL SIZE PLANS AVAILABLE — SEE PAGE 219



cabane struts using the drawing as a pattern. The 3/8" O.D. brass tubing can be added next by wrapping with fine wire and silver soldering to the music wire. Since 3/8" O.D. x 5/16" I.D. tubing is hard to obtain and every hobby shop has 1/64" thick brass tubing, the writer used an 11/32" O.D. by 5/16" I.D. tube inside a 3/8" O.D. by 11/32" I.D. tube sweat soldered

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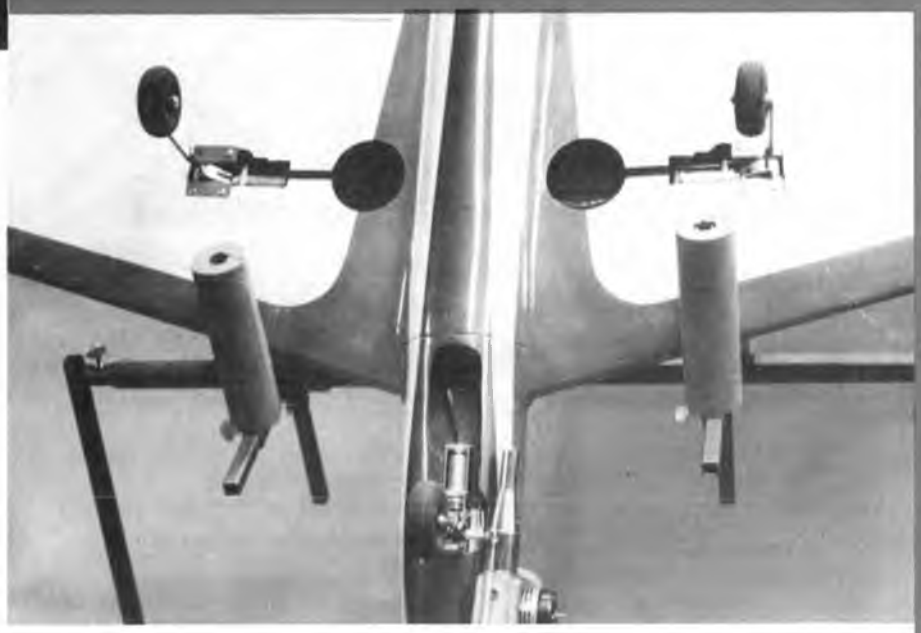
RCM PRODUCT TEST

SPRING AIR PNEUMATIC RETRACT SYSTEM



By Bob Wallace

The Spring Air retract system is a pneumatically operated retractable landing gear system that is available in a variety of configurations. In addition to the three gear systems that are available with either a flat or firewall mounted nose unit, the conventional two gear systems are offered with either 90° or 85° (to compensate for wing dihedral) gear leg arcs. The three gear system is also available with three nose gear units for use on multi-engine type aircraft. The list price for the three gear system ranges from $134.95 for a conventional tricycle set-up, to $144.95 for the multi-engine (three nose gear) system. The two gear (tail dragger) system price range is from $93.95 to $98.95 list, with the 85° arc system being the most expensive. The various Spring Air system list prices are competitive with the other pneumatic retract systems that are currently available.

If a single word were to be used to best describe the Spring Air systems, that word would be **quality!** The gear units are very well-made, with the main frame being fabricated out of .060 gold anodized aluminum. The pneumatic cylinders are aluminum with machined aluminum end caps. The pivot blocks are neatly machined from 7075 hardened and tempered aluminum, and are made to accept the 5/32" diameter gear legs that are also included. The nose gear is available with either single or double arm steering. Each system comes complete with an airborne pressure tank, a servo actuated control valve, a filler check valve, tee connector, and an ample supply of vinyl hook-up tubing.

The control valve is machined from solid aluminum with a barrel type valve sleeve that is equipped with two lubricated "O" rings. The servo control rod (1/16" music wire) simply rides through the barrel and uses push-pull type stops (brass tubing sleeves soldered onto the music wire) to operate the retract units. Included with each system are full size multi-view drawings of each gear unit. These will be of great value to the scratch-type builder. A parts list and isometric drawing of the main gear unit is also provided, along with typical installation drawings.

The size and weight of the Spring Air units is comparable with most other makes of retracts, both pneumatic and mechanically operated. We decided to use an existing Circus Circus Acro Knight (our favorite) pattern aircraft for our test purposes. The Acro Knight was equipped with mechanically operated retracts, which were removed. The Spring Air units were installed with very little in the way of modifications being required. In fact, the Spring Air units fit the existing mounting blocks perfectly. All that was required for mounting was the drilling of new holes in the blocks. The Acro Knight fuselage, which is of average size, easily accommodated the pressure tank, control valve, and filler check valve.

We slipped 1/8" diameter wheel collars over each unit's pressure line in order to restrict the air pressure for a more realistic system operating speed. These restrictor valve collars were a personal preference. (The modeler who doesn't mind the rapid operating speed associated with pneumatic retract systems could certainly eliminate these restrictors.)

Initial operating tests indicated that the Spring Air retract systems function as well as they look. Airborne testing revealed the Spring Air retracts to be a completely reliable system.

The reliability factor associated with the Spring Air retracts is perhaps less important than it normally would be with other pneumatic systems, due to Spring Air's best feature of all. If system pressure is lost for any reason, the landing gear system returns to the locked down position via special built-in return springs within the unit air cylinders! Each unit also has a positive lock in the up (or retracted) position, which prevents "wheel sag" during high-G maneuvers. This reviewer is firm in the belief that the "fail-safe" down gear feature of the Spring Air system is what sets it apart from other pneumatic systems.

Any RC'er who has suffered the misfortune and anguish of a malfuntioning retract system (mechanical or pneumatic), and as a result, has had to land gear-up (or partially collapsed) on any field other than soft grass, will well appreciate this feature. The vision of a beautiful pattern or scale aircraft "sanding its belly or nose off" on a hard surface runway, is reason enough to favor the Spring Air retract system with its fail-safe gear down and locked feature.

We used an inexpensive hand held plastic bicycle pump to pressurize our retract system. This type of pump is readily available in bike shops and discount department stores; ours cost $2.99. Five or six easy strokes with this pump produces sufficient airborne tank pressure for five or six retraction cycles with our three gear installation.

In summary, the Spring Air retract system is truly excellent. It is competitively priced with other pneumatic systems, well-engineered, and obviously manufactured by people who care about their product quality. The "fail-safe" down gear feature enhances its appeal even further. Any modeler who is contemplating the purchase of a retract system, would be well-advised to seriously consider the Spring Air system before making a final decision. For more information contact Spring Air Incorporated, P.O. Box 853, Orange Park, Florida 32073. Phone (904) 269-3488. □

KONVERTIBLE KADET

By George N. Evans, Jr.

Anyone who knows me knows I like to build — with innovation. As you may expect, the degree increases with each model built. I have added style to an Aamco Trainermaster through the use of plastic landing gear strut covers, plastic pilots, and plastic radial engine cylinders. To top it off, that model had an authentic pre-1940 U.S. Navy color scheme. You know, lots of bright yellow, red, and navy blue! I have added scale to an Aeromaster by using a fat radial cowl and shortened landing gear with an Al Williams orange and white Gulfhawk

STANDARD TRAINER

SKIPLANE

or classic paint jobs. Then comes changes to kit configurations. Ultimately, you can proceed to real scale with weathered paint and "working" instruments! That takes more patience and dedication than most of us "sport types" are willing to invest. Second, I believe most of us prefer to start with something familiar and work our way up from there, as opposed to starting with a photograph and a blank piece of paper.

The best learning experience I have had in R/C was a Sig Kadet and a couple of very competent instructors in our club. My Kadet survived a good many hazardous experiences until one day, all by myself, I made a mistake and really did it in! My intentions to rebuild were honest enough, but time and other things intervened. The other things were a Kommander and a Sweetstick. A little later I took about two years off from the hobby. When I got back into it, I carefully considered my flying skill (somewhere between none and poor) and (wisely) decided to paint job. This time I took a different route — no plastic and a paint job right off the box.

The Konvertible Kadet is suitable for single "land, water, snow," twin flying, and all that with one fuselage and two wings; a set of floats; and a pair of skis.

To begin with, I suspect the most of us like to innovate starting with something simple, e.g., plastic engines, pilots, and strut covers. This is likely to be followed by recognizable

SEAPLANE

TWIN

build another Kadet.

As it progressed, my imagination took over and I found myself making modifications here and there based on my past experience and with future possibilities in mind. Primarily, the modifications were of a beef-up variety; reinforcing for a dural landing gear, 1/16" ply doubling the fuselage from the firewall aft to the wing bulkhead. The price of all this was weight, of which more later! For the future, there were provisions for a float strut attachment at the firewall and a tailskid which could double as a sub-rudder.

The Kadet was completed with silkspan and brushed epoxy paint, using the black and red color scheme right off the box. It was set up with a K & B .40 and a standard Slimline muffler.

Right here I began to get off on a tangent. Adding the Sureflite floats with dural struts wasn't too bad. Even the skis made sense considering that up our way the moisture becomes solid and white at certain parts of the year. The skis were made from 1/16" ply using plans by a fellow Cape Ann R/C club member, Stan Orlowski.

Now the real fun began. The next step obvious to me was a multi-engine Kadet, so with pencil and paper I started the sketches for a twin Kadet. I selected K & B .19 engines and a layout showed that the Kadet cowls — inverted — resulted in nice lines. Nacelle location and clearances dictated a standard Slimline muffler. The overall appearance was good, the engine would have adequate cooling yet not protrude too far out of the cowl and the nacelle proportions allowed plenty of room for fuel tanks. The firewall shape was the same as the standard Kadet with 3° outboard angle of the thrust line.

Starting with a Sig Kadet wing kit and two cowls, the project was begun. The balsa sheeting on the lower surface was replaced by 1/16" ply and extended one bay outboard of the nacelle. The ribs adjacent to the nacelles were doubled with 1/16" ply. The upper wing skin was extended the same as the lower skin and shear webbing added to the front spars. This all may be overkill, but better safe than sorry, I always say. Other structural additions included hard balsa plates between the firewall and spar. The wing halves were joined with epoxy and 4" fiberglass cloth using the method shown in the December 1975 issue of RCM. Firewalls were epoxied in place with gussets extending aft to the rear spar. (I mentioned the weight cost earlier. All of this reinforcement and added structure increased that cost more

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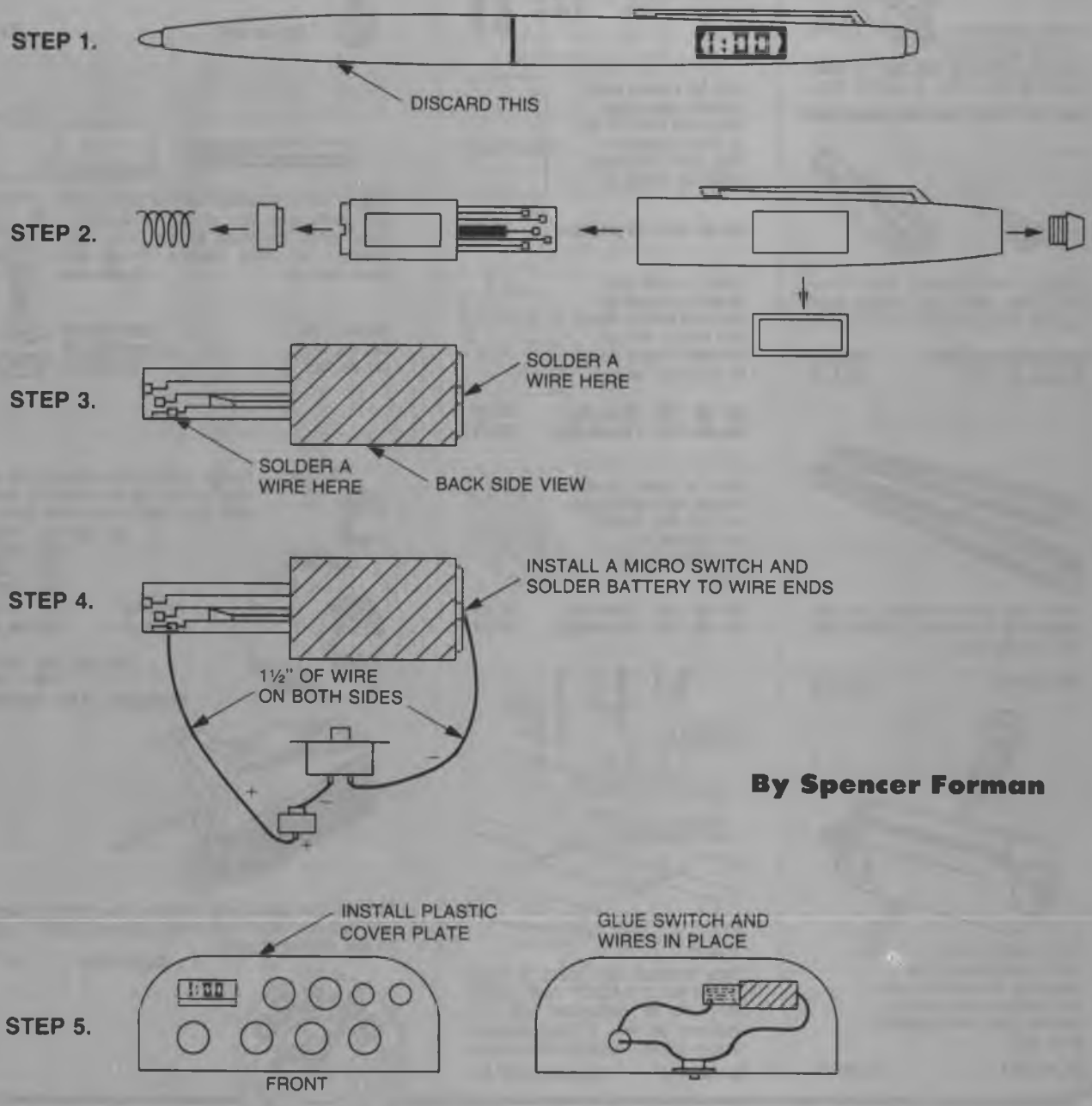
WORKING DIGITAL CLOCK FOR SCALE PLANES

The following instructions detail the assembly and installation of a working digital clock for scale R/C aircraft utilizing a digital clock pen.

First you need to purchase a digital clock pen at a drug store or similar place. Remove the casing (this can be saved or discarded). Take out the plastic cover plate, clock, spring, and battery. Take two pieces of 26 gauge wire and solder the ends to the points indicated in the sketch. Splice a micro-switch to the negative wire of the clock, soldering where indicated. Solder the ends of the wire to the indicated spots on the battery. Install the plastic cover plate into an appropriate size hole that you have cut into your instrument panel. Glue this and the clock in place with CA glue. Batteries can be replaced by simply unsoldering wires if you make an access hatch.

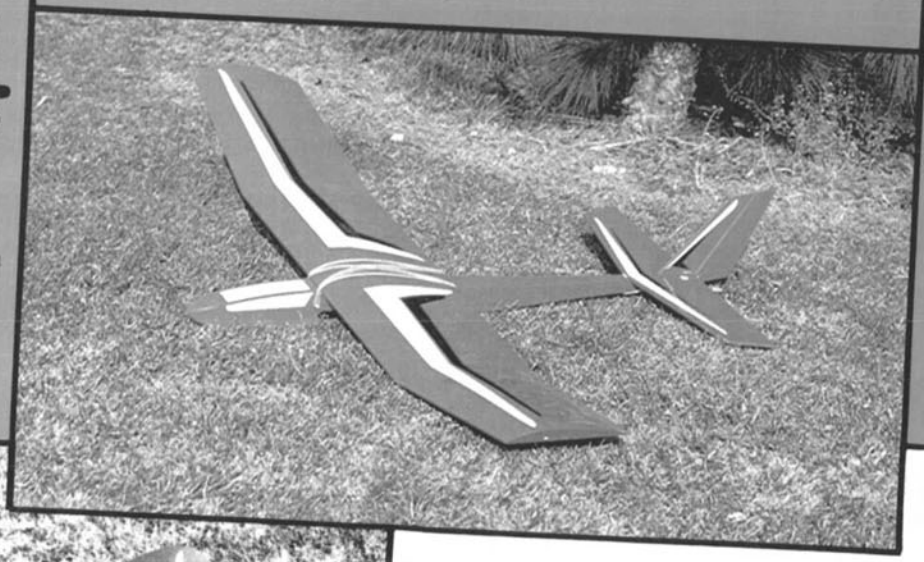
This clock is not only good in precision scale models, but can also be used as an "at the field" flight timer. Mine is installed in a Sig Smith Miniplane and works just great. When switch is turned off, clock resets to 1:00. □

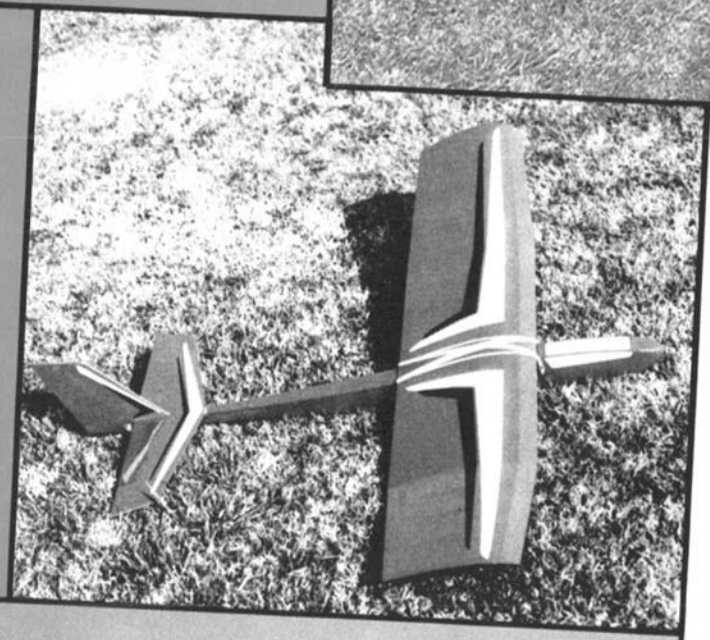


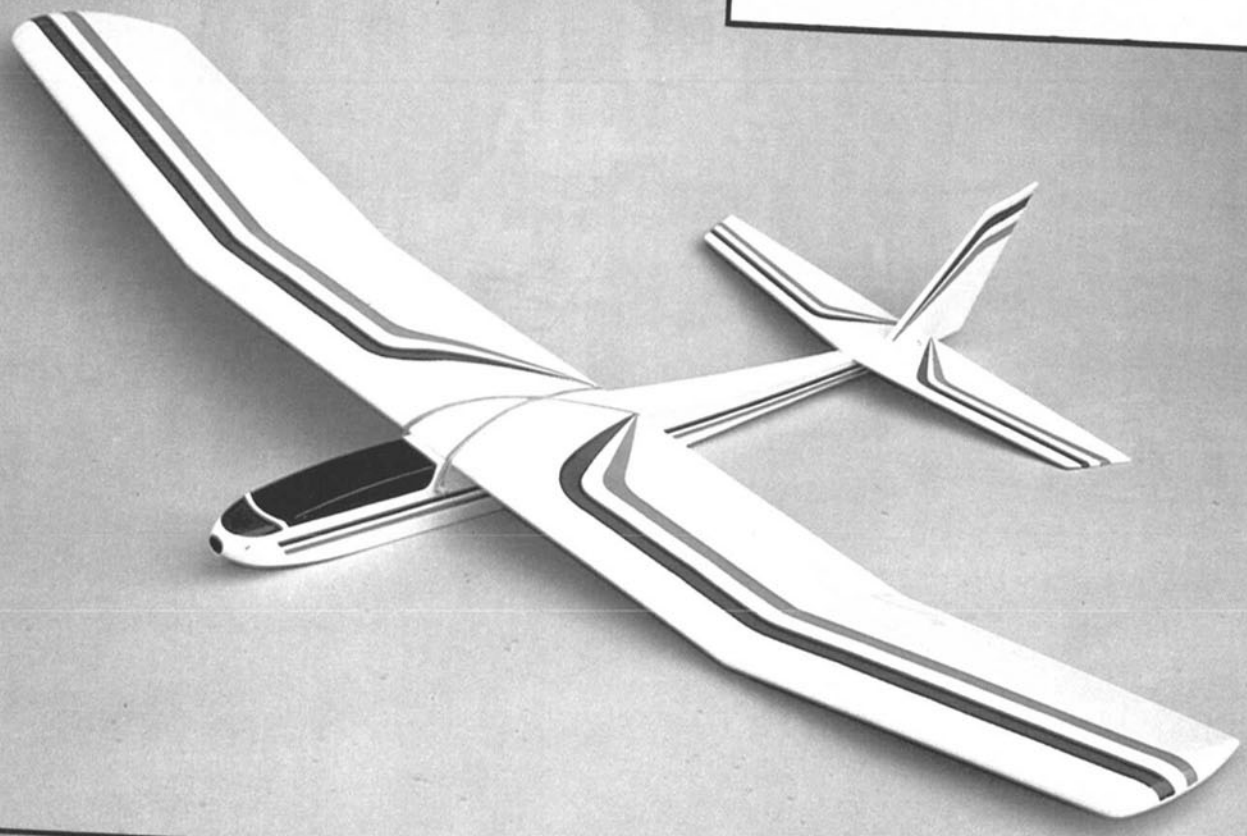
By Spencer Forman

2 X 4

This superb little sailplane was designed for the newcomer into R/C. Built around a standard radio with standard servos, this 2 channel, 49½" span sailplane will amaze you at its flying ability.







By Gene Wallock

I spend a lot of time observing beginners at R/C glider flying, helping them where possible and listening to problems they have. Allow me to list a few:

A. "The radio I bought won't fit in the model I bought. I spent $70.00 for the radio and $105.00 for the mini-servo and small battery pack."

B. "My model is too weak for the Hi-Start that the guys are using and no one wants to even try it on the winch."

C. "My model doesn't respond to commands for 3-4 seconds and I'm always over controlling."

D. "I can't fly if the wind is blowing."

E. "The MonoKote costs more than the model kit."

F. "Every time I land, something breaks."

To my way of thinking, the problems are driving people away from the hobby so it's time to do something about it. Let's call it a primary trainer, a basic element in building --- a "2 x 4."

The 2 stands for 2 channel standard airborne package (my Futaba weighs 10 ounces). The 4 represents the span — about 4 feet (49½"). The area is 409 in^2 and the prototype weighs 28 ounces. This combination gives a wing loading of 9.8 $oz./ft.^2$ The moments and aspect ratios were set up along proven free flight criteria for stability and quick response to slight trim changes (minimum throws).

The low aspect ratio wing lends itself to simple but very strong structure, so I used standard parts out of a House of Balsa Two-Tee wing. Spruce spars and cedar arrow shafts are the basic elements of a very strong wing center section. Balsa spars are used in the tips because of the low loads but the arrow shaft is retained for abuse strength.

The single elevator should not raise eyebrows. It's been around since the 1938 Blohm Und Voss BV 141 full size aircraft. Blaine Rawdon used it on his "Mirage" design in current times. Basically, it simplifies elevator construction, allows flexibility in tail group layout and helps to dampen the galloping effect novice fliers seem to produce. With the short moments and low flying speed it doesn't produce a roll.

Fuselage cross-section was dictated by radio component sizes. The battery is the biggest item no matter which way you turn it, so width was established. Standard servos and receiver width established depth. It's interesting to note that the on-off switch is longer than the battery is wide, so side mounted space had to be provided in the receiver compartment so that all standard leads would reach their proper destination without extensions.

Fuselage construction is standard lite-ply with balsa aft planking. A balsa crutch is used to eliminate the uneven bowing of sides when they're pulled together. It also provides additional stabilizer gluing area.

"2 X 4"
Designed By: Gene Wallock

TYPE AIRCRAFT
2 Channel Glider
WINGSPAN
49½ Inches
WING CHORD
9 Inches
TOTAL WING AREA
409 Sq. In.
WING LOCATION
Shoulder Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord Center
Tapered Tips
DIHEDRAL EACH TIP
3 Inches
O.A. FUSELAGE LENGTH
38½" (inc. rud.)
RADIO COMPARTMENT SIZE
(L) 15" X (W) 1⅜" X (H) 2¼"
STABILIZER SPAN
20 Inches
STABILIZER CHORD (incl. elev.)
4" (Avg.)
STABILIZER AREA
79 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6½ Inches
VERT. FIN WIDTH (incl. rud)
4¼" (Avg.)
REC. ENGINE SIZE
Cox .049
FUEL TANK SIZE
NA
LANDING GEAR
NA
REC. NO. OF CHANNELS
2
CONTROL FUNCTIONS
Rudder and Elevator
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Lite Ply & Balsa
Wing	Balsa & Spruce
Empennage	Balsa
Wt. Ready To Fly	**28 Oz.**
Wing Loading	**9.8 Oz./Sq. Ft**

The construction photos and captions cover the construction steps so there is no need to duplicate verbage. Lets discuss some very important items that are usually overlooked by both beginners and experts:

(1) Glue:

I do not use epoxy for construction. The weight penalty to strength attained is poor at best. The entire model was built with Zap. All joints were double glued with Zap-A-Gap. The weight added was negligible and the strength astounding. Total framing time was 6 hours.

(2) Sanding:

Sanding is minimal because the L.E. is pre-formed, the fuselage is a box and the tail surfaces are flat. The ribs and turbulator spars usually cause a problem because normal tendency is to maintain the rib contour. Stop and think about what the MonoKote is doing 1/4" either side of the rib. You're right --- it's flat between the spars. I sanded the ribs flat between the L.E. turbulators and main spar. In effect, the top wing contour from the main spar forward has three facets or flat surfaces. This technique comes from early multi-spar rubber model designs. Dick Korda didn't do bad in 1939.

(3) Covering:

If any uncovered structure you've built can't be twisted, ignore this section. If you can twist it, then do the following: Attach the MonoKote to every piece of structure it touches in its entirety. That means the whole T.E., all ribs, all spars, and all planking. If you don't, you haven't covered it; you've sacked it and haven't made use of the skin strength that's there for you to use. Before covering, vent the wing by cutting 3/16" holes in the ribs and tips so that air won't be trapped, causing your wing to bulge on hot days. Vent the tail feathers with a pin hole through the MonoKote in each bay.

(4) Balance:

Balance the model where shown on the plans. If it takes nose weight, add it. A natural tendency is to add down trim or remove wing incidence because of an old wive's tale that anything above 4 oz. wing loading will kill performance. Remember, you are flying the model, it's not parachuting down like a free flight model. You must be able to penetrate upwind to get back to the field on windy days and maintain speed so you can make a down wind turn.

(5) Launching:

I believe in the "shoot them in the air for max altitude" theory of launching. "Finesse" is a slick move in bridge but not applicable to maximum flying time. I used a standard 5/16" diameter Hi-Start for initial flights. I did make sure the surfaces were warp free and that the wing tips were both

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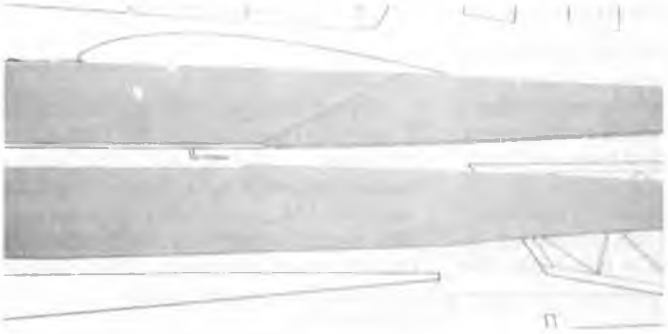
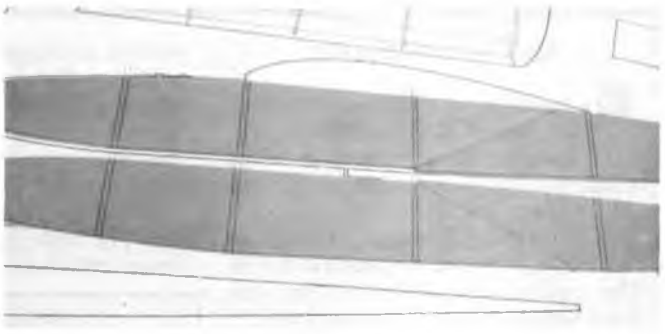
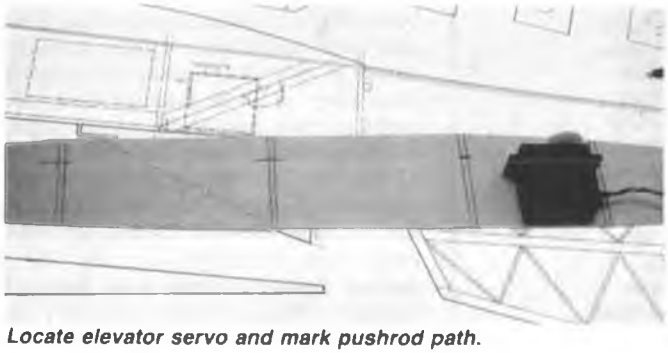


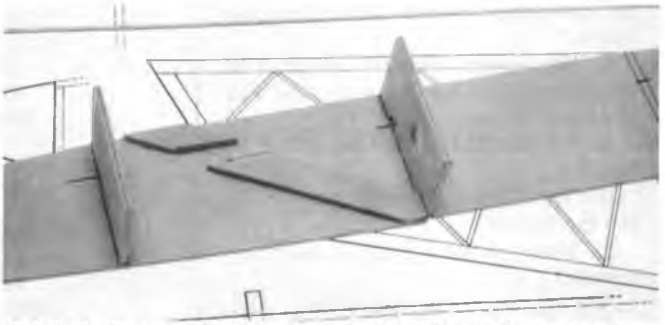
Fabricate side pieces and join over plan.



Mark former locations.

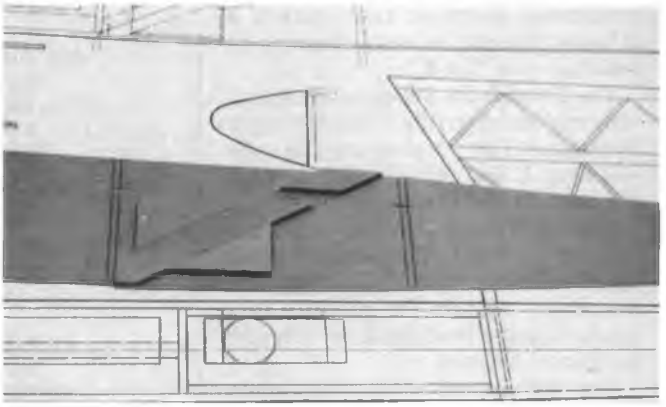


Locate elevator servo and mark pushrod path.



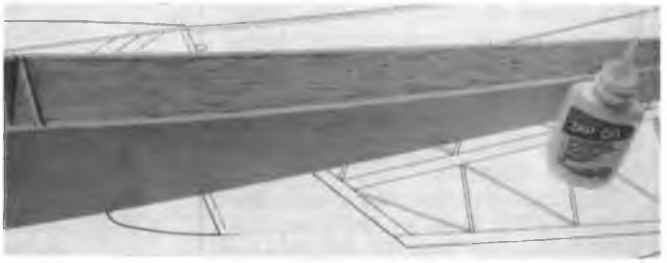
Fabricate formers and joiners — make cut-outs for pushrods.

Zap and Kick formers and joiner to left side.



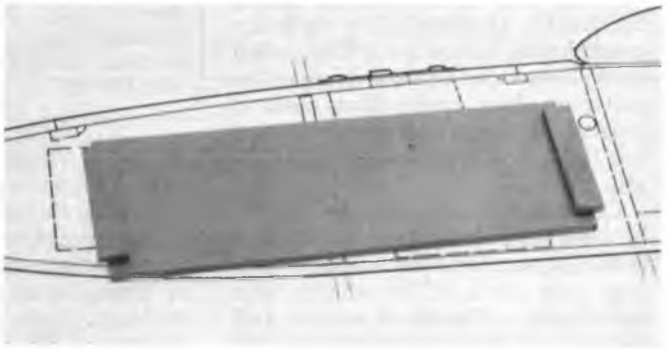
Fabricate rudder servo mounting pads. Locate rudder pushrod path. Notch joiner and former; Zap and Kick.

Join right hand side to formers.



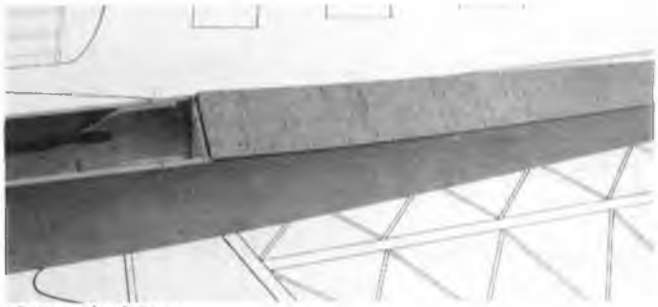
Fabricate aft crutch and Zap in flush with top side edges.

Zap in hatch hold-down plates.



Fabricate hatch (cross grain) and Zap on cleats.

Zap in forward bottom (cross grain).

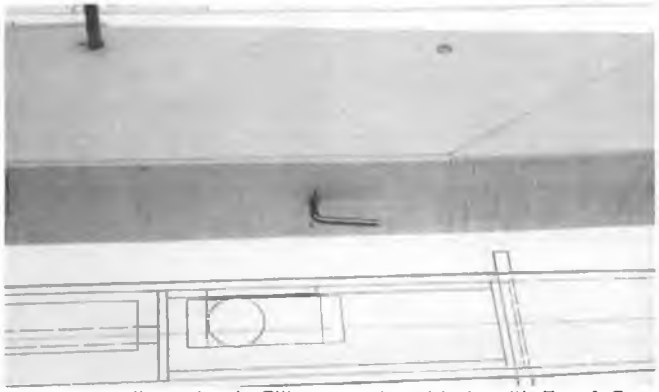


Cross plank top.

Zap in tow bar and guides.

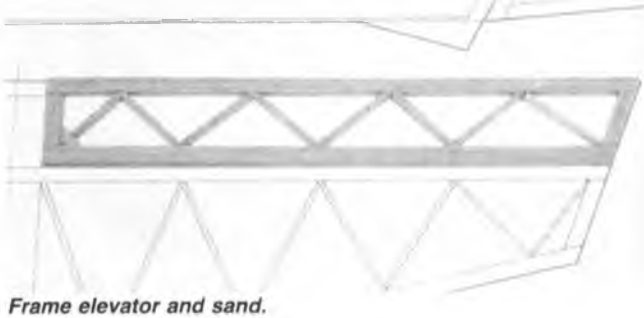
Drill dowel holes. Double check locations — you may have the wrong bay.

Zap on nose and shape.

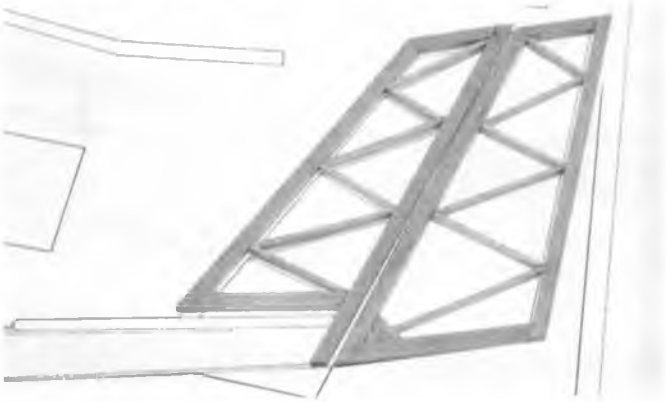


Check install tow hook. Fill wrong dowel hole with Zap-A-Gap using tape backing inside. Study plans carefully from now on.

Frame stabilizer and sand.

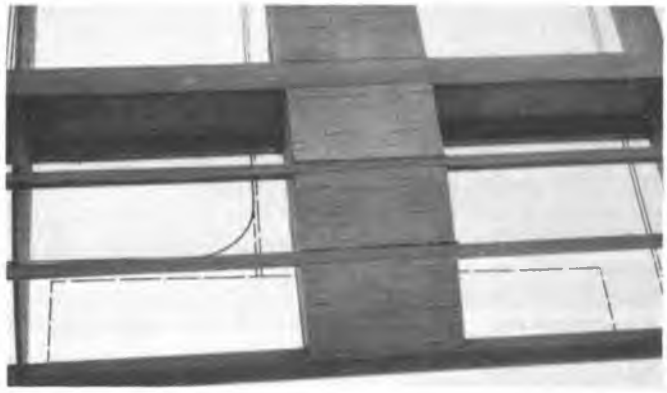


Frame elevator and sand.

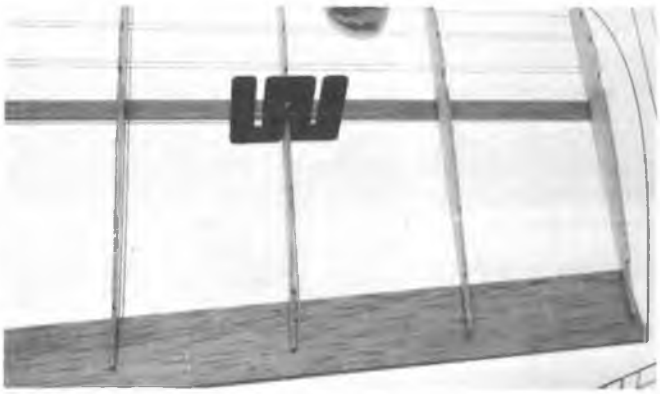


Frame fin and rudder and sand.

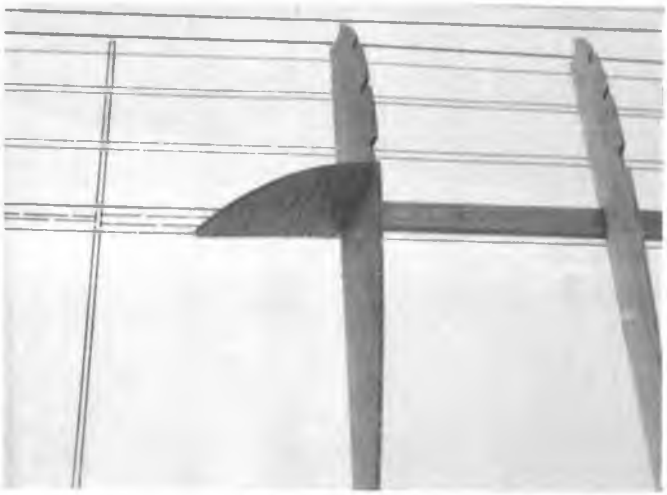
Fabricate wing parts. Zap center section together. Note vertical shear web grain.



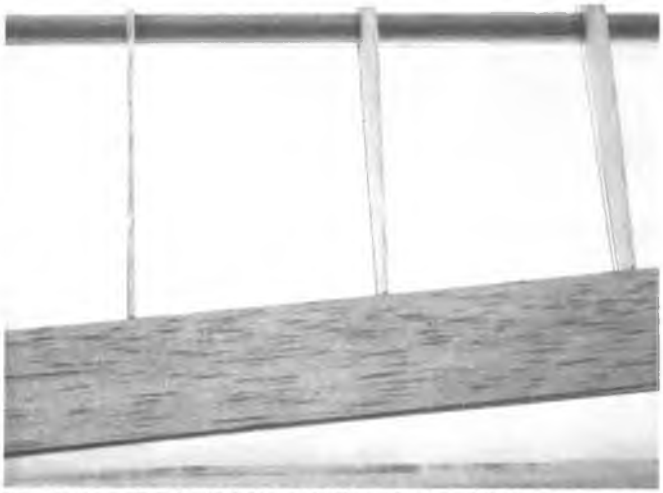
Plank center section. Please sand!



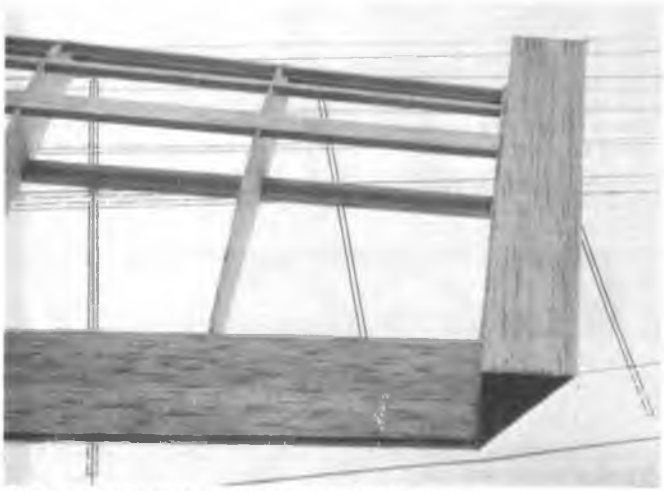
Build tips. Use up-right for plumb ribs.



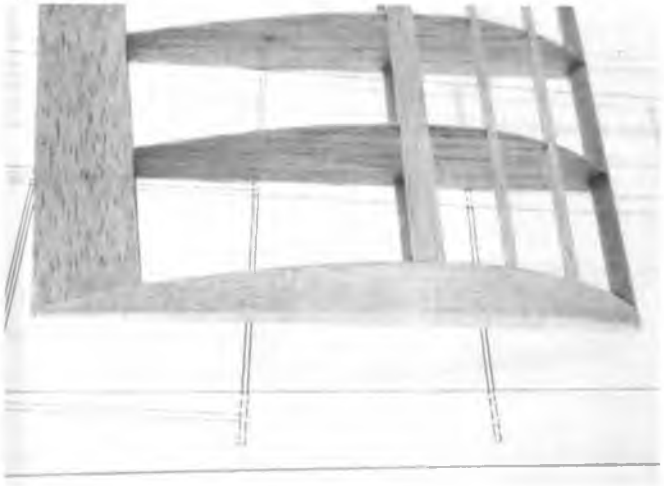
Install dihedral rib at 15° angle. Make guide as shown on plan.



Typical top T.E. installation. Hold in place — let Zap propagate down ribs.



Zap on tip triangle stock. Contour to rib.

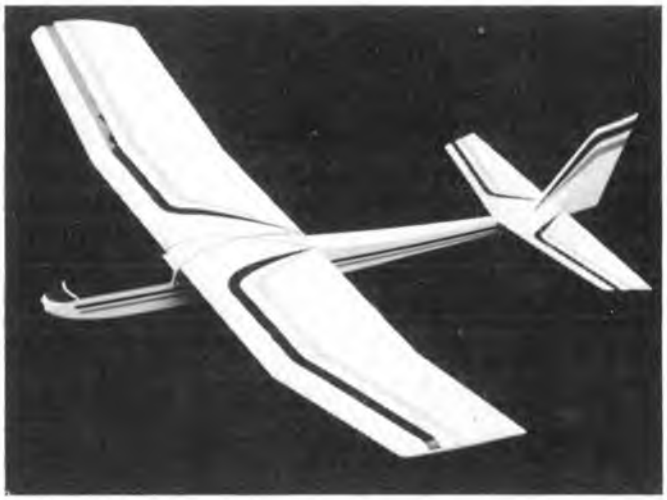


Finished wing tip contoured to shape.

Notch center and tip dihedral break ribs. Zap braces in center section.

Slide tips on — Zap in place.

Pushrod hook-up. Clean and simple.



Trimming does wonders.

Simple machine ready for blast-off.

Author demonstrates proper launch angle. Note wide open spaces.

Bob Brown making a realistic landing. Did you ever see a full size glider spear a runway?

Author and Bob Brown going back for the 20 pound launch. It's important to dress casual and maintain composure during test flights!

washed out 1/8". I used a fish scale to determine line tension. The first flight was at 10 pounds, the second at 15 pounds, and the third at 20 pounds. You know you're at 20 pounds because your knuckles are white and your feet are slipping. The "2 x 4" shoots up the line and, if you're fairly proficient, you can get a zoom out of it. Six foot diameter circles are no problem and it's quite happy in a fair to middlin' breeze.

(6) Performance:

My good friend, Ed Slobod, stated that performance is hard to measure when tree stumps are going up in the same thermal you're in. I prefer to measure performance by the degree of satisfaction of the pilot. At the last flying session at a high school football field, I asked three flying buddies to take it up and see what they could do. The flight lasted 20 minutes and 49 seconds. The pilot skills ranged from intermediate to expert. All three were pleased with the performance.

(7) Conclusion

(1) The design accepts standard airborne radio configurations.

(2) The model may be launched on standard Hi-Starts.

(3) The model responds quickly to command with minimal throws.

(4) Wind is an advantage for high launch altitude and wave soaring.

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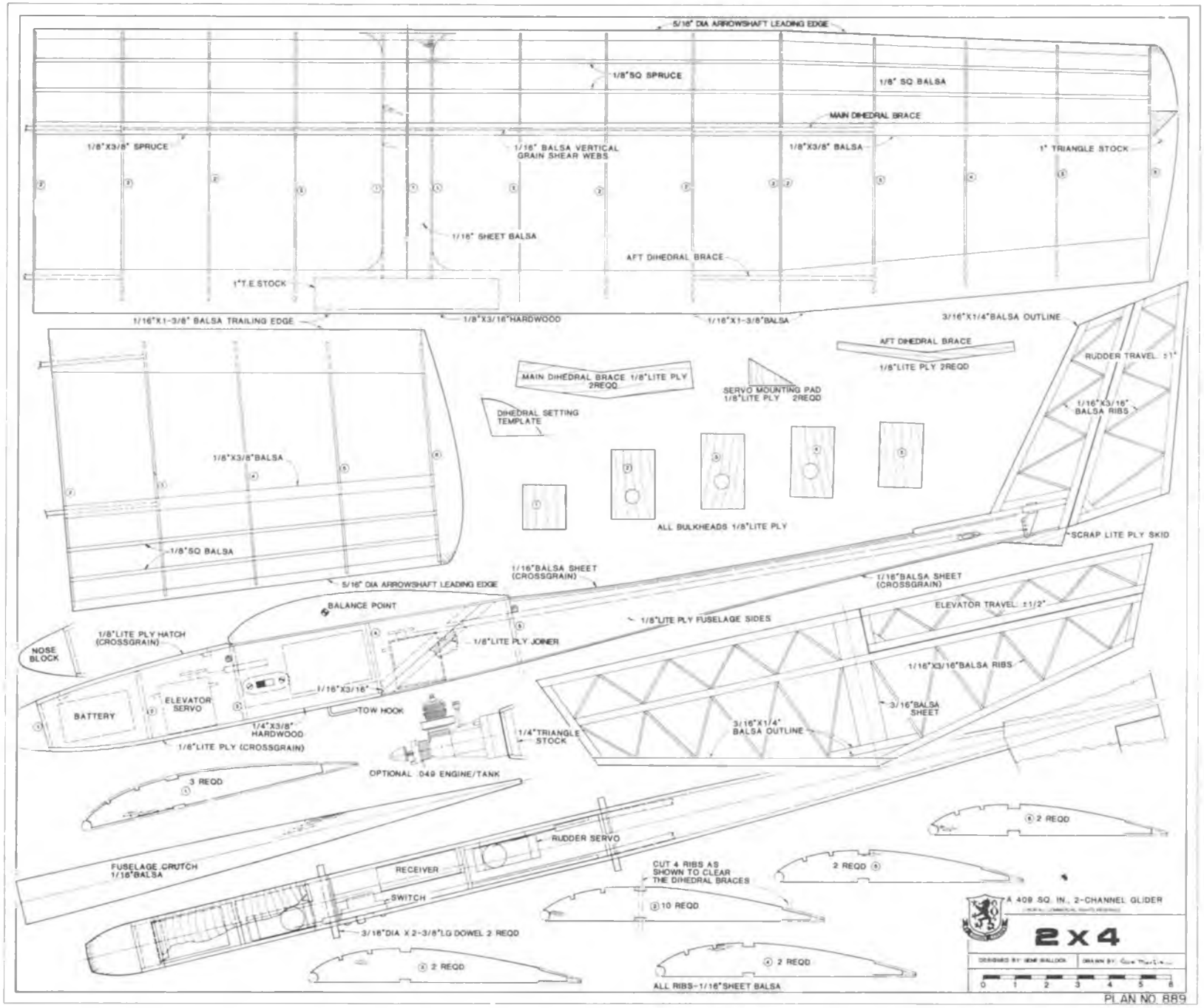
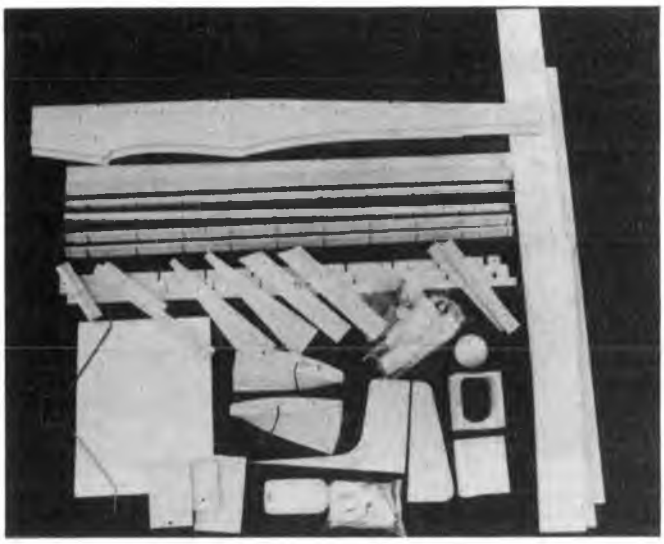
FULL SIZE PLANS AVAILABLE — SEE PAGE 219



RCM PRODUCT REVIEW

Wolff-Pak SHRIKE



SPECIFICATIONS

Name	SHRIKE
Aircraft Type	Sport
Manufactured By	Wolff-Pak 4517 Morning Wind Place Ft. Wayne, Indiana 46804
Mfg. Suggested Retail Price	$59.95
Available From	Both Mfg. & Retail
Wingspan	60 Inches
Wing Chord	9 Inches
Total Wing Area	540 Sq. In.
Fuselage Length	43 Inches
Stabilizer Span:	18 Inches
Total Stab Area:	103.5 Sq. In.
Recommended Engine Range	.25-.45
Recommend Fuel Tank Size	6 Ounce
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No Plans
Instruction Manual	Yes (20 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba FP6FN
Engine Make & Displacement	O.S. Max .45FSR
Tank Size Used	6 oz. Sullivan
Weight, Ready to Fly:	56 Oz.
Wing Loading:	14.9 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Instructions; hardware; machined parts; overall quality; flight performance.

WE DIDN'T LIKE THE:

Lack of plans (very minor).

The Shrike was designed by the folks at Wolff-Pak to be an easy to build and fun to fly sport aircraft. The kit is well-packed in a box that measures 37½" x 6½" x 2¾" and is illustrated with a color label of the finished aircraft, along with all the specs. The overall quality of this kit was impressive as well as the complete hardware package which included a spinner, fuel tank, nuts, bolts, blind nuts, tail wheel, and more.

Construction:

The first thing we usually do before we begin construction is to match all the parts to the plan, and review the instructions. This kit is so well-designed that plans are not required or provided. The instruction book is filled with many drawings showing the complete assembly process. This procedure is further enhanced by the fit of the machined and pre-shaped parts. The fuselage is very easy to build because all bulkheads fit in pre-machined slots in the fuselage sides. Once the alignment was checked, it was a simple matter of running Goldberg Super Jet along each bulkhead. The nose blocks were already hollowed to accept the engine, and were easy to shape due to Wolff-Pak's selection of soft balsa for this area. The top and bottom of the fuselage is sheeted with 1/8" balsa, and the tank compartment has a removable ply hatch.

The wing is built using a full depth balsa spar, machined ribs with the center section ribs already cut to the correct dihedral angle, leading edge sheeting, and capstrips. This wing is very easy to build due to all parts being pre-cut, pre-shaped or pre-notched. Even the wing sheeting was cut to the correct width and the capstrips to the right length.

Goldberg Super Jet will ensure a light and strong wing that will take a minimum of time to build. One modification that we would recommend if you plan to use a .40 or larger engine, is to add 1/32" ply reinforcement plates on the aileron stock above and below the aileron torque rod locations.

Both rear stabs are pre-cut from balsa sheet requiring a minimum amount of time to glue, sand, and then shape the leading edges. The vertical fin is already glued and sanded at the factory. Even the leading edges of the elevators are pre-machined to accept the hardwood dowel that joins them. We attached the stab and fin to the fuselage, using Goldberg Super Jet, cut and fit the hinges, and sanded the fuselage to shape in preparation for covering.

Covering:

In the interest of speed, weight, cost, and appearance, we decided to cover the Shrike with Top Flite Super MonoKote. We used red and white MonoKote with black automotive striping tape for trim. The checkerboard pattern under the wing was cut from Contact Brand contact paper. At this time all flight controls were hinged and the engine and fuel tank compartments got a coat of K & B resin, for fuel proofing.

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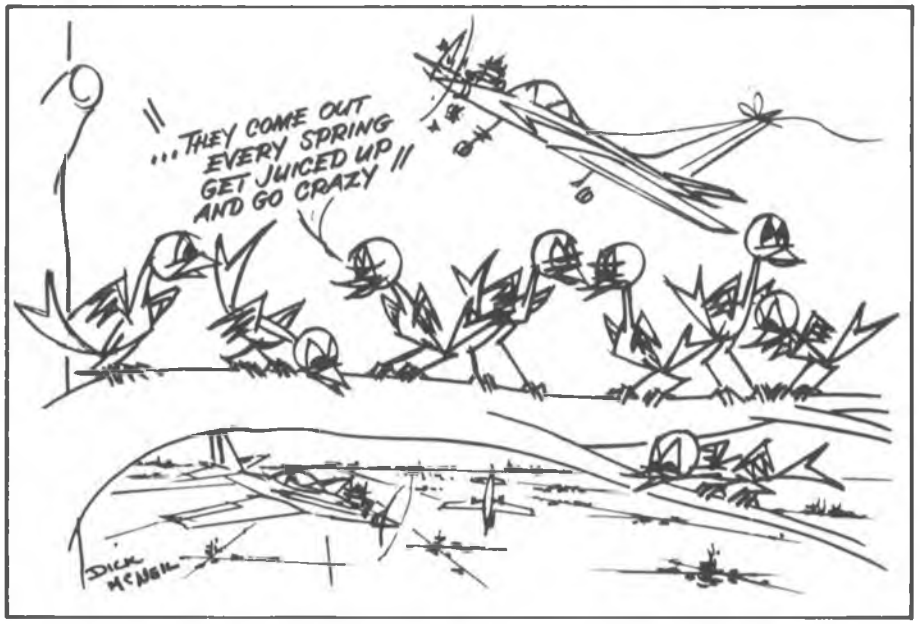
ENGINE CLINIC

Clarence Lee

In the fourteen years that I have been writing the Engine Clinic column I have often made statements or comments that I was sure would bring in a barrage of letters with differing opinions. Strangely enough the things I expected comment on seldom bring a reply. However, small things that you do not give a second thought to will often bring in a surprising number of letters. As regular readers of this column will know I have always tried to do the column in a straightforward manner and "tell it like it is." If a particular make of engine has had a problem, I have said so. If some product has appeared on the market that was nothing more than a rip-off, I have said so. This is one of the few magazines in the hobby field where the columnists are not censored by the editor for which Don Dewey and staff are to be commended. This "tell it like it is" approach has often ruffled a few feathers and, as mentioned previously, usually from sources completely unexpected.

In the November issue I did a review on the newly imported CMB .60 and .90. I felt a little background on the fellow importing the CMB engines — Ted Dodd — would be of interest to the readers. A few statements of common knowledge did cause some unhappiness among the tethered car enthusuasts --- at least to the president of the organization. Needless to say any comments I made were never intended to be detrimental in any way. I raced the tethered cars myself prior to WW II and again after getting out of the Air Corps in 1946. For that matter I still have a Dooling Arrow and two McCoy cars. I certainly have nothing against tethered car racing although I do feel that many of the fellows previously involved in tethered car racing have more recently become involved in R/C car racing that certainly has a wider scope. Dick McCoy certainly is an outstanding example here. At any rate, for any of you readers who might be contemplating taking up the hobby of tethered car racing, the President of the American Miniature Racing Car Association (AMRCA), Mr. Roger A. Phillips, offers the following:



Dear Mr. Lee,

I have long been a devoted reader of your Engine Clinic column in R/C Modeler. Over the years you have gained the respect of many thousands of modelers all over the United States. It is due to this devotion that the readers have for your column that necessitates this letter.

In the November issue, you mention Tether Car Racing. As the current President of the AMRCA (American Miniature Racing Car Association), the governing body of Tether Car Racing in the U.S., I am thankful for the publicity that we can gain from an article that is published in a magazine as notable as R/C Modeler. In your article, though, such phrases as "one of the few fellows still actively participating in the tethered car racing which is fast fading from the modeling scene due to lack of tethered car racing tracks" and "Ted's U.S. record was set on the deteriorating track at Whittier Narrows recreation area here in Southern California — one of the few remaining tracks in the U.S," although bearing some truth, would certainly have a tendency to discourage a modeler from even considering an involvement with our fine hobby.

There isn't any question that Tether Racing will never again influence the modeling industry as it did in the late 1940's and early 1950's. We are not, however, a dying sport as an uninformed reader might conclude having read your article.

As points of information, I would like to offer the following:

(1) The AMRCA membership has been reasonably stable over the last few years, with the Midwest and East showing increases in members.

(2) The 1982 Nationals, held at Anderson, Indiana, in August, was the best attended, and had the most entries of any race that has been held there since the 1974 World Meet.

(3) Formed only last year, the Eastern Miniature Racing Car Association is actively seeking a location to build a modern Tether Racing facility capable of World standards competition.

(4) A new "beginners" Tether Car is presently being designed, and is expected to be available by mid-1983. The car is planned to be used with the K & B 3.5cc engine, and is aimed at giving the newcomer an affordable means of experiencing the excitement of Tether Car Racing.

(5) At last year's WRAM show, held in Westchester, New York, more than 200 interested modelers visited our booth and wanted to learn about Tether Car Racing. We have concluded that our new Eastern club will gain in membership rapidly as soon as their track is completed.

We admit that we have a large task ahead of us in the effort to grow once again to being an organization of sufficient size to entice the manufacturers to produce equipment for our sport. The only way for us to accomplish this is through new membership. It is critically important to our efforts in gaining new members

that notable people such as yourself are properly informed about our hobby.

Understanding our situation, I sincerely hope that your readers will be given the opportunity to form a positive opinion about becoming involved in Tether Car Racing.

Very truly yours,
AMRCA
Roger A. Phillips
President

In the January Engine Clinic, Bob Stover of Colgate, Wisconsin, sent in a letter in regards to problems he was having with crankshaft breakage in his Super Tigre .15 diesel. Since his fuel was composed of 1/3 castor oil, I suggested he try reducing this to 25%. My thinking being that the high oil content was causing a hydraulic lock condition with the engine running rich. Bob wrote to say that lowering the oil content did indeed seem to solve the problem as the engine was now operating fine with no further crankshaft breakage.

I received several letters from other fellows who had used the S.T. .15 diesel in U-Control team racing and experienced the same problem. It seems this problem is also caused by the hollow crank pin having a small drive pin pressed into it to drive the rear rotor. The tight press fit of the drive pin into the crank pin imposes a stress that can result in breakage, especially if the engine is operated under high stress conditions such as FAI Team Racing. The cure is to replace the crankshaft with a crankshaft from the S.T. X-15 speed motor which uses a solid crankpin with the rotor drive machined in the end rather than a pressed in drive pin. So, if any of you other fellows have experienced crankshaft breakage with your S.T. .15 diesel and you are not running an excessive amount of lubricating oil, this is the solution.

In the December Engine Clinic, Tony Ferrelli of Staten Island, New York, sent in a letter inquiring about a source of parts for his Merco 61. Royal Products in Denver had previously been the U.S. importer of the Merco line of engines but no longer do so. The following letter from Rupert Butler of Model Express Ltd., in England, will be good news for owners of older Merco engines. I wonder why we did not hear from Mr. Gus Pandajis of Panco Hobbies here in the U.S., the U.S. importer? If you read this Gus you might consider taking an ad occasionally and letting fellows know that there is a source of parts for the Merco engines here in the U.S.

Dear Mr. Lee:

I am writing to you about the letter in your "Engine Clinic" of December 1982 from Mr. Tony Ferrelli of Staten Island, New York, about his old Merco .61 engine.

We have been for many years and remain the sole export distributor for the Merco range of engines. Please could you let Mr. Ferrelli know that there is a full range of spares for his engine and that to obtain them he should either contact us or contact Mr. Gus Pandajis of Panco Hobbies at the following address: Panco Hobbies, 2676 Ridge Road East, Rochester, New York 14622 USA.

Because this engine has been superseded, the company has chosen not to make the cylinder head. If this part ever needed replacing he would be offered the single plug head of the later mark.

Royal Products of Denver did an excellent job as importer until our manufacturer was unable for awhile to keep up the supply of spare parts. The current range is available through dealers in the United States. The engines have been improved and do not run quite so hot as they used to; they remain very reliable and have unusually high torque.

May I take this opportunity to repeat the message of the little advertisements that we insert in R/C Modeler, "If you have seen it in a British magazine we will get it for you."

Again, I want to thank you for the way in which you provide so much information so clearly and concisely.

Yours sincerely,
Model Express Limited/Model Exports
Rupert Butler
Managing Director
331 Old Street
London EC1V 9LE
Great Britain

Dear Mr. Lee,

At the beginning of the last flying season I purchased a new O.S. Max .61 FSR engine. I broke it in according to the manufacturer's instructions and flew it all season in a pattern ship using Blast Contest 1000 (12% nitro, 22% castor oil), a Fox glow plug, a Top Flite 11/7½ power prop, and stock silencer.

The engine has had one persistent problem that prompts me to write you. Immediately after starting at full throttle a tachometer shows 12,500 rpm. After about 10-15 seconds running the rpm drops to 11,600. No possible combination of carburetor adjustments will recover this lost rpm. What should I be looking for while trying to solve this problem? Other fliers in the area use this engine — without this problem. A check of my fuel system has not turned up any leaks or other problems.

Your kind advice would be greatly appreciated.

Sincerely,
Bruce Jennings
Lake Ronkonkoma, New York

Any number of things could be causing your O.S. Max .61 to lose rpm after running for 10-15 seconds. This is common with a new engine that is not broken in. However, with a season's flying on the engine, yours should certainly be broken in by now. My first guess is that something is hanging up and binding such as the crankshaft or a tight piston. When the engine gets hot, the bind gets worse. Make sure the engine is absolutely free. If it seems tight, then the cause will have to be determined. Any shiny spots or rings around the crankshaft will indicate it is binding in the crankcase and should be loosened up. A dowel with some #360 grit emory paper and oil will loosen the fit in the crankcase — but be careful. If too much material is removed, the engine can start leaking fuel out the front bearing. You may find that the crankshaft has been seizing right behind the front bearing. If this is not the case, check the piston for a shiny ring directly below the ring (if this is the ringed engine and not the ABC). Many times the piston will be a little tight and, upon expansion, will bind as indicated by a shiny ring around the piston (this pertains to any ringed engine). Again, a little work with #360 emory paper to loosen the piston should be applied.

You did not say what type of model you are using the engine in. If the engine is cowled-in it could be overheating which, in turn, would cause the loss of power. If none of these things apply then it is a matter of the ring not sealing properly as the engine warms up. Cold, it has a good seal; hot, it does not. This could, in turn, be caused by the sleeve distorting, the ring sticking, or not seating on the piston ring land, too much or not enough ring end gap, etc. If the ring gap is excessive it would allow excessive blow-by as the engine gets hot and the oil thins. If the ring gap is too little the ends of the ring would butt together as the engine gets hot causing a bind. Correct ring end gap for a .60 displacement engine is .006"-.008". There are so many possibilities that it is really hard for me to say what the exact problem may be without seeing the engine. Does the engine have good hot compression? If not, this is the answer and related to a problem with the "piston ring sleeve" fit.

Dear Mr. Lee,

I am building a 1/4 Scale J-3 Cub from a Balsa USA kit — powered by an inverted OS .90 engine. I am concerned about adequate cooling because of the

design of the cowl. I am thinking of liquid cooling via a radiator — cool clamp and Robart pump. I have constructed a radiator which will be mounted just ahead of the cylinder (I have enclosed a sketch). I have several questions I hope you can help me with.

(1) Can a system such as this provide adequate cooling?

(2) Because of the small cowl of the J-3, the available area for exhaust cooling air is minimal — about 2.5" x 2.5" on the cowl bottom (your opinion please). Which type of Robart pump do you recommend for pumping coolant (Ethlene glycol)? The one for glo-fuel or gas?

(4) If neoprene tubing is used between radiator — pump and head — will coolant expansion be a problem? Is an expansion tank necessary?

With the radiator mounted up in front I don't anticipate any problem with getting enough cool air to the radiator.

I'd certainly appreciate any help you can give me.

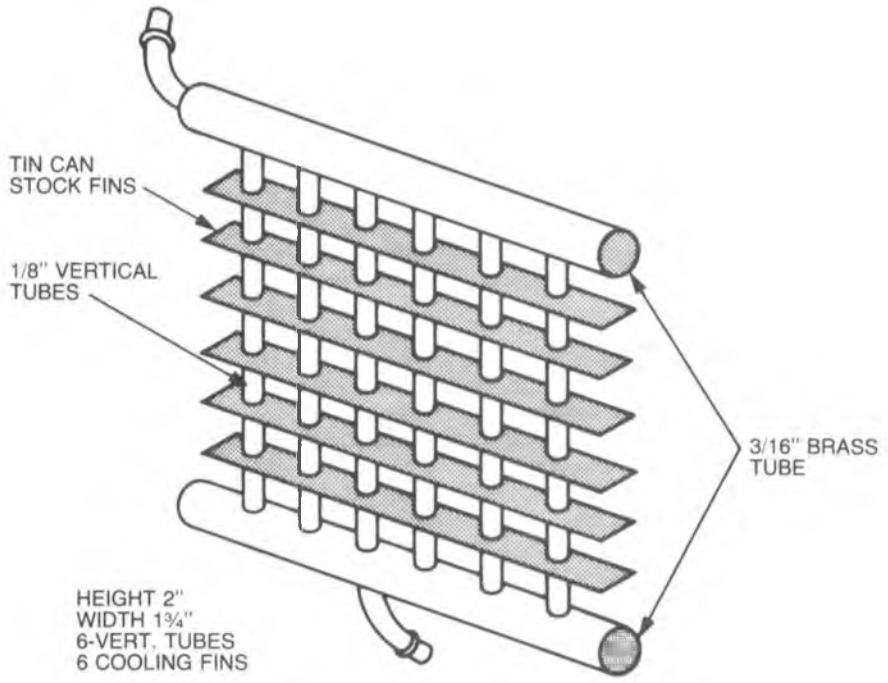
Many thanks,
David D. Anderson
Waupaca, Wisconsin

I do not see any reason why your water cooling system should not work. It is a lot of extra gagetry, however, and should not really be necessary. A lot of fellows are flying J-3 Cubs and do not have to resort to a water cooling system. Is there some reason that you cannot cut an air exit through the firewall and duct the exhaust air out the bottom? A couple of baffles that force the air through the fins before exiting would also be required but it is sure a lot simpler.

If you do choose to go with the Ethylene glycol cooling system you are going to have to have a bottle with the cooling liquid which, in turn, would serve as an expansion tank. Just the fluid in the radiator would not be enough. I would also suggest using brass shim stock rather than tin can stock for the radiator fins.

I do not know if Ethylene glycol is compatible with silicon rubber or not. It is easy enough to find out. Just soak a piece overnight and see. If no swelling occurs then the regular Robart pump would be okay (it uses silicon tubing as a diaphragm).

One other thing I would like to point out. Even with water or Ethylene glycol cooling, you cannot bury the engine and expect the liquid cooling to handle the cooling. Quite often the head will get so hot that the cooling liquid will turn to steam upon entering the head --- so it is very important that the head and cylinder fins receive some air cooling as well.



RADIATOR FOR O.S. .90

Dear Clarence,

I have an OS .60 four cycle, also a Gemini. The instructions say to use commercial fuel 5-10% nitro. Someone has told me they run better if you use less oil (10%, I believe); if so, would it be satisfactory to add methanol to my "Cool Power." (50-50 castor and synthetic)?

I'd certainly appreciate your advice.

Cordially,
Bud Caddell
Birmingham, Alabama

Most all of the four stroke engines seem to run better with less oil. I have found 15% to be about right although many fellows are running less without problems. A lot depends on the individual. Some fellows can always set the mixture properly and get away with less oil. Others seem to have a "tin ear" when it comes to setting the mixture and, if setting the engine too lean, could ruin it with too little oil. I would start with 15% oil until you are familiar with the operation of the engine and it is broken in. Then reduce to 12%. Eventually 10% if no problems are experienced.

Adding methanol to your fuel will cut the oil content but will also cut the nitro content as well — so this must be taken into consideration. Start with 10% or 15% Cool Power to begin with so that, after cutting, you will still have at least 5% nitro. The four strokes like a little nitro in the fuel.

Incidentally, Cool Power is straight synthetic lubricant — not 50-50 castor and synthetic. Omega, also made by Jim Morgan, is 5% castor and balance synthetic. The total oil content of both fuels is 22%.

Dear Mr. Lee:

I have an unimportant question to ask you but it is something that has puzzled me for some time. Would you take a minute to satisfy my curiosity?

I have two O.S. Max engines, a .20 and a .25. Both have the factory supplied mufflers. Both engines have performed without fault for several years and I am well-satisfied with them. My question concerns the brass fitting on both mufflers located just below the centerline and opposite the exhaust port of the engine. This fitting has a small open hole through it and the nose of the fitting extends about 1/4" inside the muffler towards the exhaust port. My question is — what is this fitting for? Both mufflers came with fittings near the rear for pressurizing the fuel tank but the function of the other fitting puzzles me. I can't imagine anyone going to the trouble and expense of this added part without a good reason but I haven't been able to guess what its function is.

Thank you for the very useful information in your RCM column. I realize my question is a trivial one, but if you would answer it I will stop wondering every time I look at that mysterious little fitting. Thank you.

Yours truly,
Harland H. Hofmeister
Ann Arbor, Michigan

The extra fitting is for priming the engine through the exhaust. You attach your fuel bulb to the fitting and, with the piston at the bottom of its stroke, give the fuel bulb a squeeze.

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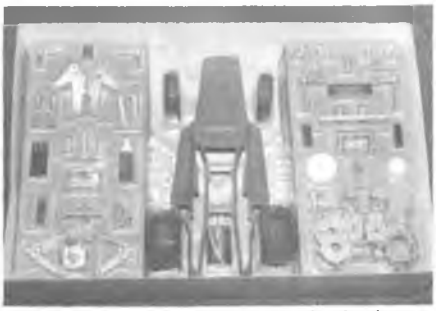
OFF-ROAD RACING

Bill and Linda Pihl



Super Champ kit as it comes in the box.

New Mono-Shock mounted on the 'A' arms.

Oil reservoir for the Mono-Shock, no air bubbles in the shock.

There is so much going on in the off-road world that it is hard to keep up. However, one thing we have been wanting to do is Figure 8 racing but we haven't been able to get anybody to race with us. Maybe we will get a challanger soon.

We have two new cars to describe from Model Rectifier Corporation (MRC) the importers of the Tamiya car line. First is the Super Champ which has been redesigned to incorporate all of the performance items that we have been using here in the U.S. The car now comes with a single rear shock known as a mono-shock. The mounting arms and shaft for the shock are mounted directly to the A arms. An oil reservoir mounted on the rear case feeds the shock oil continuously to eliminate air bubbles for smoother shock operation. The mounting is well-designed and will really make the car smooth out those rough tracks. Another improvement is that all the set screws come with double face locks. For any of you who have had problems with the brass U-joints wearing out, the Super Champ now comes with steel U-joints. In the gear case, the idler gear now comes in brass instead of nylon.

The new servo-saver is very well-designed and will keep breakage of the servo-saver and servo gears to a bare minimum.

The speed control unit is now so beefy that you would be hard pressed to burn one out. It is a 3-speed with the first and second speeds adjustable. A brake is incorporated just before reverse and is very effective; reverse is a single speed, not two speed, as in the earlier speed control.

The addition of steel hime joints for the steering is great. Previously, the steering links were balls mounted to the steering arm and a black plastic snap link popped on to the balls. We doubt if the new hime joints would

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Super Champ assembled, beautiful detailing.

Wild Willy in kit form, more fun assembled.

Wild Willy with all detailing done, photos don't do justice.

Wheel stands easy, just punch the throttle.

Wild Willy and Super Champ ready for fun or serious racing.

If you can see the expression on the driver's face you will know why he is called Wild Willy.

BIG IS BEAUTIFUL

Dick Phillips

I don't know if it is common to all of us who write columns for magazines or not, but I tend to assume too much knowledge on the part of my readers at times. This was pointed out to me at Las Vegas by a modeler who had wanted to use the "envelope" method of covering I have talked about here in the past.

His contention was that the description of the method and the various steps necessary to properly cover a large model using Dacron and the envelope method were a bit superficial and hard to follow. I'm going to go through it all again in some detail for two reasons. One, to make sure you can follow along and do it yourself, and, two, it's probably about time to review it anyway for the benefit of those who have come along in the meantime.

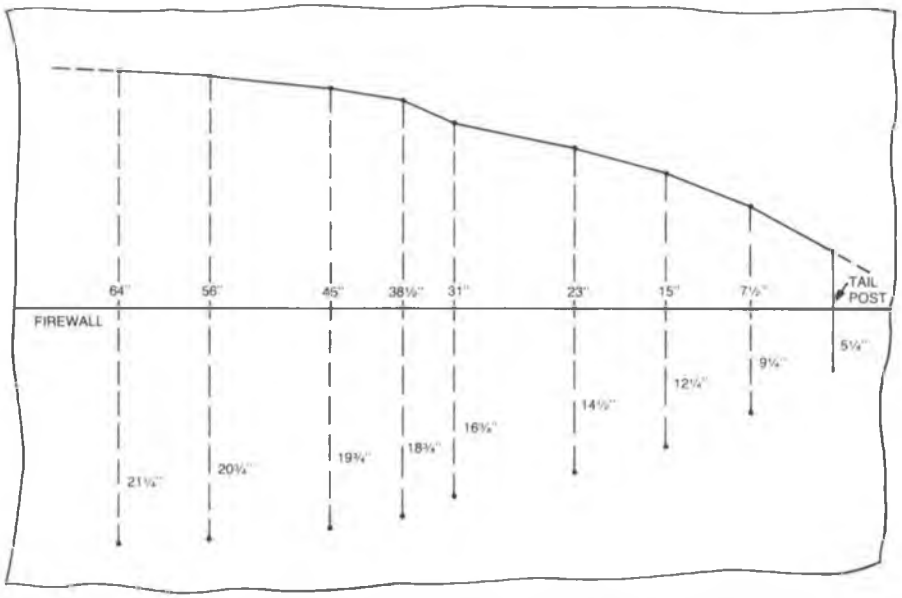
Initially, I wanted to try to develop a method of covering which would utilize Dacron in a convenient way without a lot of hassle and time being involved. The feedback I have had has indicated that others have found the method to be as great as I originally thought it was and it makes it possible for anyone with even minimal skills to do a really fine covering job. In addition, the method cuts the cost of covering a large model down to a very manageable amount.

The reason for the Dacron is that it is readily available at low cost, has high strength, a good shrink factor and shrinks the same amount in both directions which is not available from some of the polyester materials.

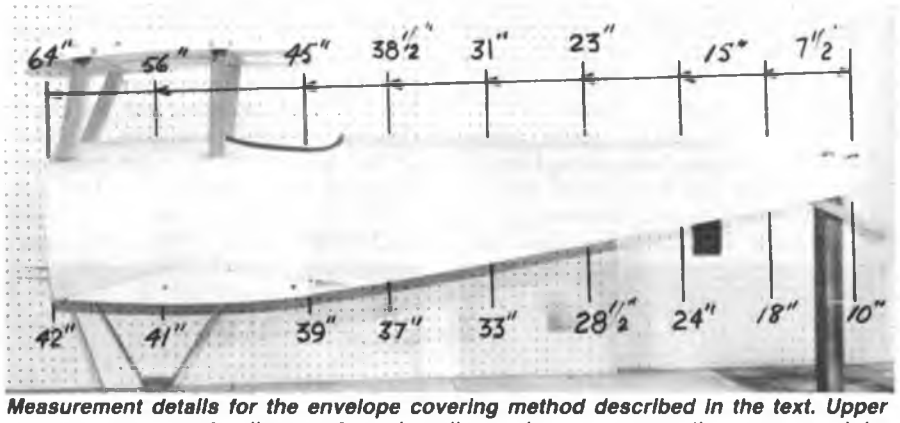
I get mine from Aircraft Spruce and Specialty Inc., Box 424, Fullerton, California, and it is under $3.00 per yard in a 60" width. They have a modeler's catalog which details many other fine items for our use as modelers and they give good service even on small orders.

For the covering job we are going to do, you'll need enough material to cover all of the assemblies to be done, a good sharp pair of scissors, some Balsarite or other liquid adhesive which is heat sensitive (Aircraft Spruce and Specialty have Poly-Tac which is a good substitute for Balsarite), a rule, a felt pen and a straightedge about the same length as the part being covered.

The first order of business is to measure the fuselage from the tail post to each bulkhead or fuselage



LAYOUT FOR ENVELOPE TO COVER SOPWITH PUP FROM THE BALSA USA KIT. UPPER POINTS HAVE BEEN JOINED BY STRAIGHT LINES. LOWER POINTS YET TO BE DONE. WHEN LINES ARE COMPLETE, MATERIAL IS FOLDED ALONG CENTER LINE AND THE TWO LINES ARE THEN SEWN TOGETHER. DACRON PIECE REQUIRED FOR THIS MODEL IS 48" x 72" (GLIDER GRADE CECONITE)



Measurement details for the envelope covering method described in the text. Upper measurements are the distance from the tail post, lower ones are distance around the fuselage at the points measured. Any convenient reference can be used (fuselage uprights used here) and the measurements are not critical.

upright and lay these dimensions out on a piece of paper along a straight line. Refer to the photograph of my Sopwith Pup fuselage to see how this is done. (Don't mark up the airplane as I have the photo, it isn't necessary.)

Once these measurements have been made and laid out roughly on the scratchpad, we now measure the distance around the fuselage at each of the stations we have already identified. This is most easily done with a cloth measuring tape, but a steel tape can be used. It might be as well to point out that none of these measurements are critical so you needn't be too precise with them.

As each measurement around the fuselage is made, it's noted beside the appropriate bulkhead mark on our sketch. Once this measurement has been completed, we are ready to lay out the envelope on the material to be used in covering.

First, lay the material on a convenient (large!) working surface and draw your centerline right on the material. A felt pen works best here. Be sure to make the line longer than the fuselage. Once this line is laid out, mark any convenient point a few inches in from the edge of the material as the tail post reference. From this mark, referring to the sketch, lay out the points of measurement taken from the fuselage as station points. Keep in mind that both the tail post and the firewall locations should be a few

inches inside the edges of the material. You'll see why later.

Once all the points have been laid out, we then go back to the tail post mark and, using the circumference measurement, we lay out the distance from the centerline to the edge we will eventually sew. This is done by halving the circumference measurement and adding 1/4" to it and laying this distance out at right angles to the centerline and on both sides. Just mark a point at this time.

Repeat this procedure until all the stations have been marked on the material which will produce a series of marks giving the edges of the material. It will look very large to you at this point, but fear not and press on!

At this point, simply join all the marks you have just made on each side of the centerline. These may be straight lines, it's not necessary to loft a neat curve. Once this has been done, you have all but finished the envelope for the fuselage. It's just a matter now of folding the material so the lines you have lofted match one another and sew it up. Sewing should be done by machine, using the smallest available stitch. If you can do this yourself, well and good; if not, ask your lady if she'll do it for you. (She'll prbably do a better job than you could anyway!)

Once the envelope has been sewn, trim off the excess material outside the sewn edge and discard. You can cut up to about 1/8" to 3/16" from the sewn line. Any closer than this and the seam may pull out when you shrink the material. When trimmed, turn the envelope inside out, putting the seam on the inside. This will hide the extra material you have left outside the seam.

Now the envelope is ready, it can be set aside while the fuselage is prepared. Naturally the assembly must be properly sanded and prepared just as if we were going to cover using any other method. Any flaws in the surfaces to be covered will show through so sanding the framework prior to covering has not changed.

Once properly sanded, we must coat the fuselage with whatever heat sensitive adhesive we plan to use. Balsarite works fine as does the previously mentioned Poly-Tac. It is very important to coat any part of the framework which will touch the inside of the envelope in order to prevent the primer or paint from soaking into the wood and requiring multiple coats to seal it after covering. I normally use two coats of adhesive which ensures the framework is properly covered and sealed against any paint getting through and soaking into the wood afterwards. It's not a bad idea, if covering an undercambred wing, to add one more coat to the lower edges of the wing ribs to assure good adhesion when we come to seal the fabric down later. Coat the firewall about one inch in from its edge, all the way around before putting the Balsarite away. Again, two coats.

Once the second coat of adhesive had dried, it's a good idea to let it cure for about one hour. This is recommended with Balsarite and is not a bad idea with the other heat sensitive adhesives as well.

The next step is easy; slide the envelope onto the fuselage with the seam on the bottom of the fuselage until it is as far forward (and as tight) as you can get it. You can see now why we wanted the envelope to be longer than the fuselage as this permits us to get it quite snug throughout its entire length. Don't worry if it seems to be a rather loose fit, it won't be for long!

Next, seal the envelope around the tail post so it is adhering to the structure all the way around. (A standard heat sealing iron turned to high level works fine.) Same thing around the front end and seal the material down onto the glued area on the firewall as well. This will give it a good hold and will also get away from any cut edge right at the firewall and eliminate any stray fibers showing.

Once sealed around the front and rear of the fuselage, you can now start to shrink the material tight to the fuselage. Dacron will shrink about 25% so be careful. Try to avoid sticking it down to any of the structure until it's fully shrunk as this will permit maximum shrinkage and will aid in eliminating any baggy area which could cause wrinkles in the finished product. Once the Dacron has been shrunk tightly onto the structure, seal around any openings such as cockpit, wing opening, etc. Make sure you get good solid sealing around these openings; if not, they will separate when you cut the fabric away. Then go over all of the structure that is being touched by the fabric and seal it down properly. You can see the sealing taking effect inside the Dacron as you run the iron over the wood. When the material is sealed down completely, cut out the necessary openings and you are finished. The Sopwith Pup shown in the photos was done as above in about four and a half hours one Sunday and used about a yard and a half of Dacron and about half a can of Balsarite. The cost of the Dacron was under five bucks and the covering job is without a flaw. True, there is a seam down the belly of the airplane but this can be concealed with primer and will be on the bottom and out of sight almost all of the time anyway. Besides, in the covering of a full sized airplane using an envelope, there is also a seam and where do you

Here is an epoxy that will adhere to epoxy, epoxy/glass, and fiberglass (cowlings, fuselage, etc.). It is called Epoxy Epoxy and is available from Hobby Lobby, 1 Franklin Pike Circle, P.O. Box 285, Brentwood, TN 37027. See Hobby Lobby ad for details.

suppose they put it?

The above system works really great and will do a superb covering job every time. It works, however, **only** if the fuselage increases in size throughout the length from tail to firewall. What about a fuselage which tapers both ways from a wide area at about the the cockpit? No problem, although we have to make some slight changes to do this shape. All that is required is to sew the envelope **only** as far as the widest section and then stop. If the sewing machine being used is capable of a reverse stitch, reverse back over the last half inch or so in order to make a seam that will not pull away as the Dacron is shrunk. However, after sealing the rear end of the envelope in place, if we then take one edge of the un-sewn part and seal it down about an inch over the centerline, recoat over the sealed area with Balsarite, and then seal the other edge down over top of it, then seal down around the firewall as before, we'll still end up with a one piece covering job that will still pass pretty close inspection. There will be a slight lap on the bottom forward of the wide spot, but this will be even less obvious after painting than the sewn seam.

Wings and other parts of models can

Scotch Brand Hair Set Tape (available at drug stores and supermarkets) is ideal stuff for rib taping large models. The material is adhesive backed and quite inexpensive.

also be covered with the Dacron. Wings may be done using the envelope method with the ailerons off the wing and the envelope sewn to just outboard of the aileron cut-out. The remainder, outboard, is then sealed down to the aileron spar and to the inboard face of the inboard rib making a one piece, one seam job here as well. I usually turn the sleeve slightly so the seam is under the trailing edge and is much less visible there.

The easiest way to do this is to lay the material on the floor, place the wing (top upward) on the material and trace around the wing with the felt pen. Then turn the wing over and match the leading edge to the previously drawn leading edge and trace again. Now, in order to get the wing into the envelope, we must allow additional material at the trailing edge. This will depend on the thickness of the chord so I usually make a guess at how much will be required and pin the two thicknesses of material together and "try-fit" it on the wing. If it will go on and be a little baggy, then it's big enough. Remember, this Dacron stuff shrinks about 25% so it will take up a lot of "bag" as you shrink it.

If there are aileron pushrods involved, I'll slide the bag around far enough to allow the end of the rod through the Dacron and then slide it back in place which requires only a small slit. The aileron exit is normally sheeted and the sheeting will provide an area around which to seal the Dacron. Also, if there are interplane strut mounts, as on the Pup, I will add a little sheeting around them for the same purpose. Makes for a much neater job than just cutting a slit and leaving an opening which will enlarge when the material is shrunk later.

This method will leave a seam visible at the wing tip, but so does it in full scale practice where the envelope is used and that's what the pinked tape is for — to cover up the seams.

Sealing down to an undercambered win is easy and there are a couple of methods which work quite well. One is to place a finger on either side of the rib, seal down a short stretch of fabric, remove the heat and wait till things cool down and the adhesive will hold and then do the next section and so on until you have the material sealed down over the undercamber. The second method uses a wet sponge, which is quite cool and which is applied to the material right after you have passed the hot iron over the rib edge. The cooling action of the water soon cools the adhesive, it takes hold and the job is done.

Covering the tail surfaces is done using the Dacron but done in much the same way as would be the case with any of the iron-ons. The Dacron's shrink factor is so great that it is easier to do a neat job than with the ordinary iron-ons as they won't shrink as much as Dacron. I have done a few tail sections using one piece of material and, while it's a bit finicky, it can be done. The high shrinkage of the Dacron in comparison to most covering materials is an advantage as you can shrink your mistakes right out of sight unless they are particularly glaring. Be careful on light structures though since that high shrink factor can warp a light structure badly out of shape if you aren't careful. If you are in doubt, shrink gradually from **both** sides in order to prevent warping a light structure out of shape. A little on the top, then a little on the bottom and so on until the fabric is tight.

Another method of sealing down the material to the structure while avoiding shrinking the material during application, is to use acetone applied to the surface of the material. The acetone will soak through the material, re-activate the adhesive and seal the material to the structure. This has the advantage of sealing without heat and the attendant shrinkage which can result in gathers and puckers in the material. Judicious use of a little heat while doing this will assure just enough shrink to make things fit. After the material has been properly sealed down around the edges of the structure, heat shrinking can then be done just as before. It's a real treat to take what looks like a pretty baggy piece of covering, apply the heat and watch a perfect covering job materialize out of what looked quite poor prior to applying the heat.

Acetone can also be used to seal down to under-cambered wings as well. It dries faster than a heated area will cool, and it does a good job of sealing the material to the wood quite well. As with any volatile and potentially hazardous material, be careful about open flame, smoking, and work in a well-ventilated area.

Don't try to make the envelope you are going to use for covering a perfect fit. First, it isn't necessary to be perfectly accurate and it takes time to maintain perfect accuracy, and, secondly, the Dacron shrinks so well, you may warp even a well-built structure if you permit too much shrinking. You'll hear the structure you are covering creaking and groaning as you complete the shrinking process, it's that powerful.

I can't prove it, having made no serious tests, but I am convinced this method of covering adds significant strength to a structure just by being as tight as it is. The Dacron itself has a puncture strength of 60 pounds and, if obtained from the source mentioned above, is aircraft grade and so without flaws of any kind.

As with most things we do, our methods change as we continue in this hobby and the above method has undergone some change over the years I have been using it along with some changes in the method of doing a paint job on the completed structure. I've described and altered the details from time to time and will now update it as to how I am using it at the present time. First, I mix up a batch of Knox Gelatine with water and brush on. One packet was sufficient to do the entire Sopwith Pup and that includes 28 square feet of wing (top and bottom of all four wings) The gelatine seals the material with one coat and adds a totally insignificant amount of weight. For the Pup it's particularly effective, as the original was not painted on the bottom surface so I'll finish that with clear dope which goes on over the Knox Gelatine quite evenly and does not seep through the material.

Then on those areas which will be painted, I add a very highly thinned coat of Latex primer. This I water down to the consistency of table cream and apply it with a foam rubber brush, brushing carefully to minimize the brush marks.

A very light sanding with a very fine paper (400-600 wet or dry) used dry, prepares the surface for paint. Be really careful doing this minimal amount of sanding, an even slightly heavy hand will cut through the Dacron without warning. It doesn't "feather" as most materials will, just zip — and you've cut right through it. A light touch is what's wanted here and it doesn't take much to get the very thin coat of latex smooth enough to take paint well.

Once sanded, touched up with your tack rag and you're ready to spray the color. I use Acrylic Lacquers and like them for their excellent covering properties and because they dry very quickly. The painted surface can be handled quite safely soon after spraying. As always, wear a good mask and work in a well-ventilated area, especially if you are using any of the more dangerous materials. I use a charcoal filtered mask and it is not even possible to smell the paint while spraying. The slight additional cost involved in using a good quality charcoal mask is well-worth it in the long run.

The Acrylic Lacquers do not give a high gloss finish and for a fabric covered model, you don't want such a shine on it. The fabric covering, painted with Acrylic, looks very much as does fabric on a full scale aircraft

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TOYS FOR TOTS, 1982

By John Elliot

California R/C'ers Help Santa

Participating in activities for the betterment of one's community is not new as may be evidenced by such organizations as the Kiwanis, Exchange Club, Rotary International, Shriners, etc. R/C modelers in Southern California participated in a most worthwhile project in 1982 that might be used as an example for other R/C'ers to follow:

Presenting --- The 4th Annual "Toys for Tots Airshow," produced and directed by the "Sky-Nauts" of Saddleback Valley, in close collaboration with the United States Marine Corps Reserves, and a special guest appearance by Santa Claus, his substitute transportation furnished courtesy of the Goodyear Airship Columbia!

Or --- Jerry Lewis has his kids, we have ours . . .

Other attractions included a 6K and 10K run for the athletic types earlier in the morning, a huge display of restored Golden Age and customized cars in one of the famed blimp hangars, and Christmas music provided by the Capistrano Valley High School Band of Mission Viejo during the noon break.

After promptly discharging Santa at 1:30 p.m., the crew of the blimp treated one and all to a high speed (?) low level pass and an abrupt pull-up and climb out! No victory roll, however. . .

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Capistrano Valley High School Band marches out to Jingle Bells. Super noon break entertainment!

Steve Spears launches his Barbarian, a highly aerobatic electric powered model.

Larry Wolfe and Bert Ayers light off .65 powered Mirage IIIR. Action being taped for 1983 show advance publicity.

Restored and customized cars and trucks almost filled one side of famed Blimp Hangars.

Dave Shadel, left, and Gary Hover go forth for mock Form. I race. The crowd loved it!

The Special, one of several models built and flown by John Simone for Blue Thunder eases into the air, Dave Herbert assisting.

Johnson/Bloom B-17 pitches out into landing pattern as Spitfire of Garland Hamilton flies close support.

The Man deplanes (deblimps!) courtesy of Goodyear's sign in the skys.

Small portion of models on display with Marine Corp aircraft serving as back drop.

Mel Santmyer's Quadra powered Tomahawk on take-off run. Mel performs spectacular aerobatics.

Larry Wolfe's ducted fan Mirage IIIR at lift-off. Awesome performance with Rossi .65 power.

The Meyer brothers Spruce Goose was on static display.

SCALE VIEWS

Col. Art Johnson

Realism In Flight

How fast should a model of a Tiger Moth fly? A T-6? A P-47? Questions that might get you as many answers as the pilots you ask. Several years ago a line was added to the scale flight judges form which has produced more controversy and misunderstanding than almost any other aspect of scale competition. The "Realism in Flight" block was added to give judges a chance for an overall evaluation of a flight where they have already judged each separate maneuver for its realistic simulation of those performed by the full scale prototype. Judges and competitors alike do not have much problem agreeing on smoothness of flight, reasonable "G" forces and realism of mechanical options, but when it comes to scale speed and use of throttle the fur begins to fly.

The subject of realistic flight is not really as difficult as it has been made out to be and, reduced to basics, the information you need is available to anyone. For starters, you can forget about Reynolds numbers, dynamic scaling, or any of the other explanations of why it is hard to make a model fly like the original. The flight judges are not interested in excuses. They just want to sit there and see your model fly by and perform looking just as it would if it were blown up by whatever scale you choose. It should not be hard for you to figure out how fast a one to one scale model should fly to look right. At one half to one, the model will look just like the original when flying at one half speed. In fact, if the speed is varied with the scale, the judges will have a tough time deciding whether they are looking at a model or not unless there is some other object in view that will give them a clue to the actual model dimensions.

In the past several years, scale flight judges have become more knowledgeable and sophisticated. They are more likely to penalize non-scale-like flying than they were in years past. This change is partially due to the fact that judges are seeing more and more models actually capable of flying at scale speed. I can remember not many years ago when it was considered a compliment if someone mentioned that your P-51 model flew like a pattern model. In today's world such a comment might get you a dirty look if not worse. Even pattern fans have recognized that their fast guided semi-missiles do not duplicate the flight of any known man carrying prop aircraft and they have taken steps that should change pattern model design trends.

So, for realistic flight, you do need to know something about how the original flew and then how to figure the approximate speed of your own model so that you can make it look right. Any flight judge worth his salt will also spend some time boning up on this type of data. The figures should be easy to come by for civilian aircraft flying from the local airports. If you cannot find a flight planning manual, ask a pilot who flys the type aircraft you modeled. Do not just ask him how fast his prize airplane flys. That is like asking him how big was the last prize fish he caught. Ask him what true airspeed he used to plan his last low altitude cross-country. That speed will be close to the level flight speed you will want to imitate in your Figure Eight maneuver. Naturally you will divide that speed by the scale of your model to see how fast it should fly.

Right now I better mention something about airspeed and altitude. We are used to watching the performance of real aircraft when they are close enough to the ground to see them. Unless you live in Peru or Ecuador, you are probably flying your model from altitudes of sea level to around 6,000 feet. You want to imitate the speeds the real aircraft would fly down where it could be seen from the ground. How fast the aircraft might go at high altitude is not of much importance to a modeler. You are not ever going to see an SR 71 flying at Mach 3 down at sea level. The SR 71 does this with ease at 100,000 feet but looking from the ground, you will never know.

MODEL (S)
P-47B, P-47C (EST.)
P-47D (EST.) AND P-47G

CONDITION	R.P.M.	M.P. (IN. HG.)	BLOWER POSITION	MIXTURE POSITION	DURATION (M. MIN.)	U.S. G.P.H.	IMP. G.P.H.
TAKE-OFF	2700	52		A.R.	5		
MILITARY POWER	2700	52		A.R.	5		

ENGINE ID: R-2800-21 (WITH TURBO)

ZERO WIND

I (MAX. CONT. POWER)

R.P.M.	T.A.S. M.P.H.	T.A.S. KNOTS	M.P. (IN. Hg)	U.S. G.P.H.	IMP. G.P.H.	DENSITY ALT. IN FEET
2550	370	322	36	205	171	30000
2500	360	314	38	190	158	25000
2450	330	287	37	175	146	20000
2450	310	270	36	165	138	15000
2400	300	261	35	160	133	12000
2400	285	248	34	150	125	9000
2350	275	239	34	145	121	6000
2350	265	231	35	140	117	3000
2350	255	222	36	135	112	S.L.

Extracts from P-47 "Flight Information Chart" show time limits for full power operation and true airspeeds for altitudes from sea level to 30,000 feet.

Unfortunately, when it comes to WW II military aircraft, about the only speed figures listed with aircraft specs in most books is the maximum speed obtained without military load, at full throttle, at optimum altitude, usually 15,000 to 30,000 feet. These figures were no more useful to the combat pilot of the original than they are now to a modeler of one of these aircraft.

Thanks to publishers catering to model aviation enthusiasts, we now have the performance information we need readily at hand, at least for most U.S. WW II tactical aircraft, and the figures would not be much different for aircraft of other nations for the same time periods. I am talking about the Pilot's Handbooks or Flight Manuals that have been reproduced from the originals. Check one of these manuals and you will find that the publishers have included examples of the "Flight Operating Instruction Charts" used to plan flights and combat missions in these aircraft. At first glance, these charts may look like a lot of Greek to the uninitiated but for our purpose there are only a couple of important blocks.

At the top of a typical WW II flighter "Flight Operation Chart," you will find the Model of the aircraft identified, gross weights listed, and data on external loads for the chart. Right under this will be the rpm and manifold pressure for take-off and military power (the same on most fighters). You will also note that this full bore power is limited to five minutes of use on almost all of the WW II birds. Already we have something useful for the scale judge. Any modeler who takes off and never throttles back for the rest of the flight

Flight Manuals for the Russian Lavochkin La-5 might be hard to find but performance not much different from other WW II fighters of same time period. This model — Webra 91 powered by Bob Taylor of Ft. Lauderdale, Florida.

Easy to find out how fast this one should fly. Dick Trueshel copied a Globe Swift that flys from an airport close to his home in Sarasota.

This Gee Bee looks speedy but the original was not all that fast and neither is Nick Zelinka's Webra 91 powered copy. Photo taken at the Spaceport RC'ers annual scale contest, Cocoa Beach, Florida.

Wayne Rippel's Nieuport 28 from the Proctor kit flys at a good scale speed of about 30 mph. Max 90 powered.

F-86D from the Byron kit on its first flight, 5 p.m. Christmas Eve, 1982. It sure would have spoiled builder, Bob Temple's Christmas if it had not flown right. OPS 65, Spring Air retracts and that is a radome on the front, not a prop spinner.

Stinson Tri-motor is stately fly-by at West Palm Beach, Florida, just moments before Jacksonville co-builder and pilot of the model was stricken by a cerebral stroke. The model was safely landed by a standby pilot but we were saddened to hear later that Arle Kline did not survive.

is not flying his model the way pilots flew the original.

The left hand column of the Flight Operation Chart usually contains the data of most interest to a scale modeler. This column includes the airspeed that the aircraft would fly at "maximum continuous power" for altitudes from sea level to the top operating altitude of the plane. These were the max practical level flight speeds for each aircraft. Divided by your scale, these would be the max speeds for your model in level flight maneuvers. The altitudes we are interested in are from sea level to 6,000 feet. Looking at the manual for the P-47, the chart shows that the old "Jug" without any external load (bombs or tanks) would hit a max T.A.S. (True Air Speed) of 275 at 6,000 feet. The chart knocks 20 mph off of this speed down at sea level. Not exactly a 400 plus mph barnburner down at altitudes where you can see it from the ground.

Other WW II fighters had similar max cruise speeds at altitudes of interest to us. The chart shows the P-40D going 263 I.A.S. or a true airspeed of 286 mph at 6,000 feet. The max continuous power chart for the postwar Allison equipped F-82E (which was a bit faster than the P-51) shows a respectable speed at 5,000 feet of 330 mph T.A.S. Using these figures, the flier who builds a model of one of these fighters should, with a 1/6 scale model, fly level at no more than 46 mph with the P-47 to 55 mph with the F-82E.

Add drop tanks or GP bombs to your model and you will have to fly slower to look right. When the full size fighters were going for a max range mission at low altitudes they really crawled along — 190 mph to 235 mph according to the charts for the examples given.

None of the above is to imply that WW II fighters could not move right along up at altitude. Take a P-47 over five miles straight up and the chart shows it going at 370 mph at 30,000 feet. The F-82E would hit 390 at the same altitude with a sustained power setting. Of course, you cannot see what the planes are doing up there, and if you could a judge would be disappointed. The pilot's indicated airspeed would be lower than at sea level and he is not about to try any loops or Immelmans in spite of his high true airspeed.

The Pilot Manuals also give other information that is of interest to a modeler. Prohibited maneuvers are listed and you would want to leave these out of your optional flight maneuvers. You will find the redline airspeeds (max dive speed) and other speed restrictions listed, i.e., gear down, flaps down, rolling maneuvers, snaps, etc. Knowledge of these limitations will help you fly your model in a more realistic manner.

While I am writing this, I have a nagging feeling that I am going to hear someone say, "the performance figures in these old Pilot Manuals

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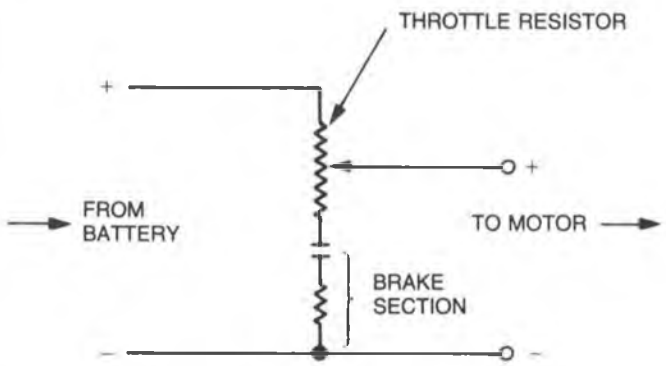
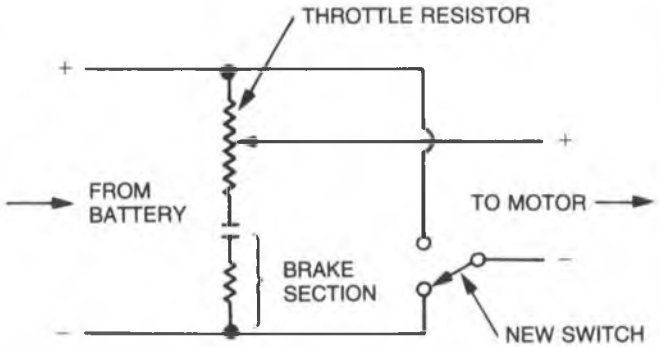
A PAINLESS WAY TO ADD REVERSE TO YOUR 1/12 SCALE ELECTRIC CAR

BEFORE

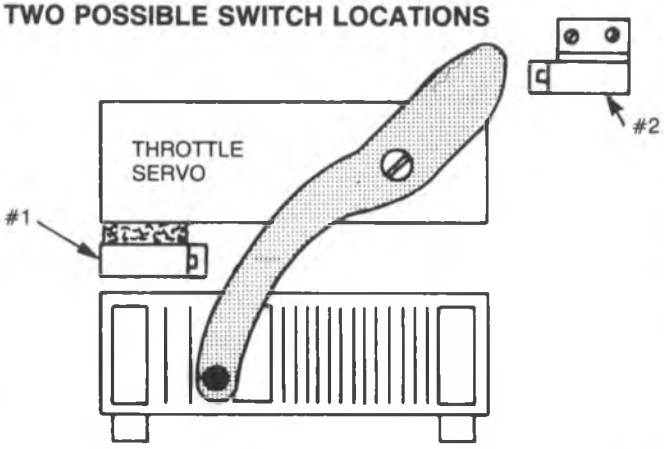


AFTER



(SHOWN IN "NORMAL")

TWO POSSIBLE SWITCH LOCATIONS



SWITCH MAY BE MOUNTED USING SERVO TAPE, BY GLUE. OR BY FABRICATING A SMALL "L" BRACKET FROM SCRAP METAL.

Running around chasing electric cars might be okay if your name is Fido, but not if you're a corpulent adult human. If you agree and like to race 1/12 Scale electric cars, then you'll love my reverse system. As an avid 1/12 Scale racer, career electronics technician, and corpulent adult human, I have developed a method of reversing the direction of the car so that when it gets stuck you can get it going again without the help of a spotter. The principal advantages are:

(1). Your lap times will improve considerably.

(2). The number of spotters required per race is cut in half if most of the cars are using a reverse system.

The additional weight is negligible and the cost is reasonable. Time required to make the conversion is less than 1/2 hour. Cost is $1.39 plus tax. How can you go wrong?

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Shows microswitch mounted on "L" bracket as indicated in drawing as #2.

Shows microswitch mounted on servo with servo tape.

MATERIALS NEEDED

1 EA. — 275-016 MICROSWITCH (RADIO SHACK)
12" — 18 GAUGE WIRE
1 — SMALL "L" BRACKET (OPTIONAL)
1 — SOLDER IRON & SOLDER

By John F. Damiano

STEPS

1. MOUNT SWITCH SO ITS PUSHED ON BY ARM AT "FULL BRAKE" POSITION — DISCONNECT BATTERY.
2. CUT BLACK WIRE FROM MOTOR 1" FROM WHERE IT ATTACHES TO RESISTOR — CONNECT THE PIECE STILL ATTACHED TO RESISTOR TO "NC" ON SWITCH (SPLICE ADDITIONAL WIRE IF NECESSARY) — SOLDER.
3. RUN END OF WIRE THAT IS GOING TO MOTOR TO "C" ON SWITCH — SOLDER.
4. RUN A NEW WIRE FROM HOT END OF RESISTOR (RED WIRE) TO "N.O." ON SWITCH — SOLDER BOTH ENDS.
5. CHECK ALL CONNECTIONS AND SUPPORT CAR SO ITS REAR WHEELS ARE OFF THE GROUND — PLUG BATTERY BACK IN AND TEST THE THROTTLE OPERATION.

FLYING LOWE

Don Lowe

The 15th Annual Tangerine Internats

For the past 15 years, my wife Clara and I have attended the Tangerine Internats held in Orlando, Florida. The first thirteen contests drew us from Dayton, Ohio, to escape the wintry blasts of the Midwest and enjoy the (sometimes) balmy breezes in Central Florida. The contest is always scheduled between Christmas and New Years. This year it lasted until the second of January.

Since we have lived in the Orlando area for the past two years, we have had to drive only across town to enjoy all the festivities and to renew acquaintances with friends from near and far.

The contest has always been a multi-event radio control contest, encompassing pattern, scale, pylon racing, and helicopters. This year it attracted over 175 entries in the four basic events, plus a special Vegas style "turnaround" pattern competition. There were over 55 awards made in 18 categories of competition.

We had a special treat this year in that the competition site was at R/C World. The "World" is to be the first residential community for modelers. When development is completed, it will include single family homes, condominiums, a swimming pool, tennis courts, and one of the world's best model flying and boating facilities. R/C World accelerated its developmental pace so the Tangerine Contest could be held there this year. A runway was installed with pit facilities and an access road was prepared in time for the contestants use. I'm sure that all who attended were impressed with the facility and with its potential for the future. Those of you who may be interested in learning more about this very unique undertaking may contact R/C World of Florida, Inc., 216 E. Jackson Street, Orlando, Florida 32801.

The Radio Control Association of Central Florida (RCACF) is very appreciative of the generosity of R/C World, and the other sponsors: R/C Modeler Magazine, Kraft Systems, Miniature Aircraft Supply, Sig Mfg., Satellite City, K & B Manufacturing, and Central Florida Hobbies. Without their support, the contest would have been impossible.

Competition got underway with a one day event dreamed up by yours truly, patterned after the Las Vegas Tournament of Champions and the International Miniature Aerobatic Club (IMAC) events. We called it "Tanger Vegas" and flew one category, using the IMAC unlimited "turnaround" pattern. It was great fun --- especially since I won it with my Vegas "Laser." We were hard pressed, however, by Dean Pappas, flying a **standard pattern ship** called "Hippo Tippo." Dean placed **second**, ahead of other Lasers. Spectators as well as the fliers really enjoyed this unique pattern variation. We hope to make this a regular part of the Tangerine format from now on. We added a full scale flair to the event by using judges from the International Aerobatic Club (IAC).

The next three days were filled with four categories of pattern and **seven categories** of helicopter competition held at separate sites. The pattern competition attracted 55 competitors, and the helicopter competition, 29 competitors. Pattern entries came from all over the U.S., with Dave Wilson making it all the way from California. Dave edged out Dan Kowallek and Ron Chidgey in the Masters to make it all worthwhile. The event took on an international flavor with an entry by Milton "Billy" Girod from Garches, France. Yours truly was felled by a virus and didn't compete. Dave Brown couldn't make it due to a death in the family. Tony Frackowiak was here but spent all of his time at the helicopter contest. All classes were hotly contested with the following first place winners emerging: Jeff Hannon, Sportsman; Juan Romero, Advanced; Orlando Ruiz, Expert; and Dave Wilson, Masters. Our local Patty Violet gave the guys a tough time in Sportsman and finished second. (She finished first in the Florida Pattern Association's Sportsman Division.) You guys better watch out, for Patty is for real --- and she loves flying model airplanes.

Pattern events attracted the usual variety of aircraft with the Phoenix being the most popular (ahem!), plus Arrows, Curares, Tipos, Deceptions, etc. With the variety of good designs around, the big difference is, and always has been, pilot proficiency. There was lots of discussion about the "turnaround" pattern. I still feel that standard pattern designs will be

R/C World Florida host of the 15th Annual Tangerine.

competitive in the event, especially if built light. Additional proof of this was provided by Dean Pappas' fine finish in our "Tanger Vegas" event.

The helicopter competition featured seven competition categories. In addition to the normal novice, intermediate, expert, and scale categories, three "Schluter Cup" categories were added. The "Schluter Cup" events are promoted and sponsored by Miniature Aircraft Supply of Orlando, the sole importers of Schluter helicopters. The company sponsors a series of events held around the U.S. during the year. Of course, any helicopter may be entered in these events. Last year ten such contests across the country were sponsored and attracted an average of thirty or more contestants. The competitions featured hovering maneuvers which are easily judged on a Yes, No, timed basis.

The most interesting result in the helicopter competition at the Tangerine was the win by Tony Frackowiak in the Expert category. Tony is a superb pattern pilot and placed fourth at the Las Vegas TOC this last November, and has become an accomplished helicopter pilot; just ask anyone who competes against him. Steve Helms, a member of our

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Jean Mersch from Luxumbourg — now in the U.S. Navy. Placed fifth in Masters.

Cliff Atkins' second place Advanced and Modified Deception called "Inception" glass skin.

Tom Kirk made it from Baltimore with friend "Tippo."

Orlando Ruiz first place Expert and fiance caller Lourdes Alvarez. Name of the Ship? Oh, it's a P-8.

Ron Chidgey and third place "Tigre Tail."

On the left is genial Jim "Doc" Edwards and a face out of the past Rhett Miller. Rhett is now a banker in Tampa and says he is getting back into the swim — Rhett is five time Nationals Pattern winner.

Juan Romero and daughter with Phoenix 8 — Super Tigre X-60. Juan won Advanced Pattern.

David Wilson came all the way from California to win Masters with some very nice flying. Dave was also a T.O.C. competitor this year.

The Pattern winners! Look out for that cute gal guys — that's Patty Violett and she's for real!

Bob and Patty Violett tune up.

General view showing runway and taxi ways.

Quarter Midget pylon action.

Leonard McCoy tunes up his second place winner, Dornier DO-23-G.

Bill McCally attaches drop tanks to his F-8-F Bearcat. Bill finished first in Stand-off Expert Scale.

Ramon Torres and beautiful second place (Giant) T-34-C1.

Art Johnson, first place Giant Scale P-43, a very nice flying ship.

All the way from Paris, France, Milton "Billy" Girod and Phoenix 8.

Danny Kowallek and friend. Dan placed second in Masters.

Don Lowe cranks up Laser for "TangerVegas" event.

Bill Williamson lands his Mallory Laser in "TangerVegas" event.

Helicopter winners except for Schluter cup winners.

Converted pattern flier Cliff Hyatt in action. He's now looping and rolling and flying inverted with the best chopper fliers.

Tony Frackowiak in "inverted hover" first in Expert. See how warm it is in Florida in December.

Stacked judges used in "TangerVegas" competition. I.A.C. judges used; Dr. Bloodwell, Carlos Casterelo and Floyd Lawrence. Note grids used to assist judging lines. Similar larger grids were used at the Homestead I.A.C. competition.

RCM PRODUCT REVIEW

Orline VICTORY STICK

SPECIFICATIONS

Name	VICTORY STICK
Aircraft Type	Sport
Manufactured By	Orline Radio Controlled Aircraft Mfgs. P.O. Box 12501 Salem, Oregon 97309
Mfg. Suggested Retail Price	$39.50
Available From	Direct Only
Wingspan	56 Inches
Wing Chord	12 Inches
Total Wing Area	672 Square Inches
Fuselage Length	37 Inches
Stabilizer Span	20 Inches
Total Stab Area	87.5 Sq. In.
Mfg. Rec. Engine Range	.25-.40
Recommended Fuel Tank Size	8 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (7 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba
Engine Make & Displacement	O.S. Max .40
Tank Size Used	8 Oz.
Weight, Ready to Fly:	78 Oz.
Wing Loading:	16.7 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:
Fuselage design; ease of building; excellent instructions; performance.

WE DIDN'T LIKE THE:
Soft fin material; die-cutting of fin.

OrLine R/C Aircraft's answer to the group of "stick" type sport aircraft is the Victory Stick, intended for .25 to .40 size engines. This kit is aimed at satisfying the novice type flier as well as give the more experienced pilot something to utilize on a day of fun flying.

The rather small box (40" x 4" x 5½") is loaded with die-cut parts and a complete hardware package. Everything is numbered or labeled to make identification easy. All contents were in an undamaged state as the box is packed tightly and nothing had a chance to rattle around.

Construction:

The well-done plan measured 57" by 36" and, in conjunction with the seven page instruction booklet, provided excellent guidance on building the model.

The die-cutting was generally good with the exception of the vertical fin parts, which were too soft. Since undergoing a change of ownership in November of 1981, OrLine has continually upgraded the wood and die-cutting qualities. Any parts not up to expectation will be replaced if the modeler calls OrLine.

The fuselage is the box type with a plywood bottom extending from the firewall to the rear of the landing gear attachment point. The plywood is then covered with 1/8" balsa sheeting. This feature really adds strength to the front half of the fuselage. The rest of the fuselage is standard with the exception of the shaped hardwood block which acts as the anchor for the dowels in the wing. This block also is used as the rear base for the front hatch. This piece creates a clean wing-fuselage joint as the leading edge fit perfectly in the grooved block.

The wing panels are built separately and then attached to the wing center section. The joint at the front and rear — where the leading edge of each panel joins the center section — should be reinforced with scrap material as well as fiberglassed. The review model was pulled out of high speed vertical dives and the wing withstood every challenge. There is no wing sheeting but 16 ribs and 10 additional half ribs combined with hardwood spars provided adequate strength.

An excellent hardware package is included. We particularly liked the two-piece hinges of thicker than usual material. The builder provides the hinge pins by using ordinary straight pins.

Covering:

Super MonoKote was used on the entire airframe. The markings shown are included in the kit and dress the model attractively. The markings are of the "cut out and peel off the backing" type. Their quality was good.

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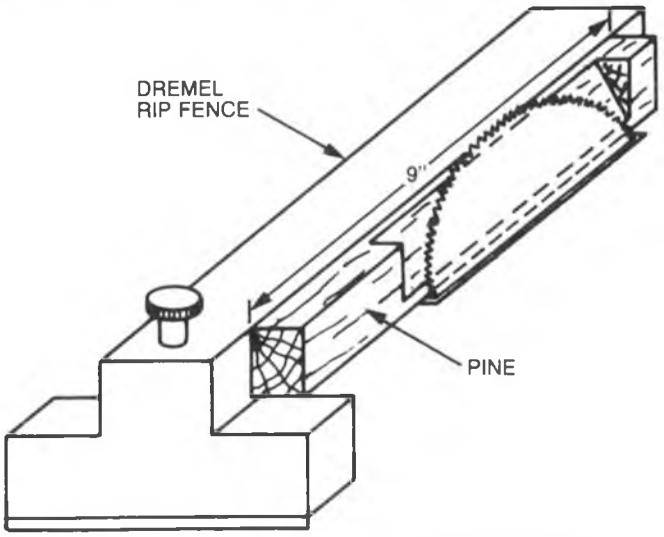
FOR WHAT IT'S WORTH

Albert Scott of Powell, Wyoming, tells how he has made his Dremel table saw more versatile. Al has developed a method to allow his table saw to safely cut triangle strips of balsa. As shown in the sketch, epoxy a 1/2" x 3/8" x 9" piece of pine to the side of the rip fence of the Dremel saw. Put the remodeled rip fence on the table. Start up the saw and let it come carefully in contact with the pipe. Bevel the pine out until the blade is at a 45° angle. Put the size of balsa that you want cut on the table. Carefully line it up with the blade and saw away.

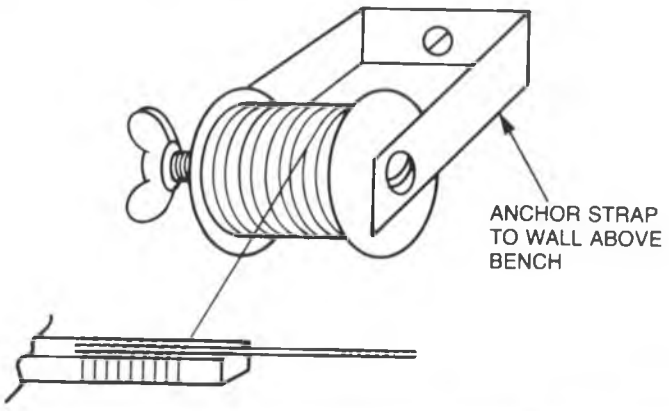


Peter Xtian of Windermere, Florida, has discovered a material to get extra bite for 1/12 Scale electric car tires. He rubs two teaspoons of waterless hand cleaner into each of the front and rear tires. This greatly improves the traction so he can go faster.

Walter VanDer Meulen of Walden, New York, sent in a nice shop aid as shown in the sketch.

Start with the spool of heavy thread that you use for pushrod wrapping. Get a 1/4" diameter bolt long enough to go through the spool and through a wing nut.

Bend up a U-shape bracket from sheet metal with 1/4" holes for the bolt and a smaller hole in the middle for a mounting screw. Mount in a convenient place on your workbench and install spool. Now you have a holding fixture with adjustable tension. By rolling the pushrod wire between your fingers, you can make neat wrappings. Apply some CA or your favorite glue and you have got it made.



Gus Kaser of Farmington Hills, Michigan, has a neat, simple method of handling the fuel filler installation. Drill a hole through the fuselage slightly larger than the fuel tubing to be used. Then attach the tubing to the filler port of the tank and pass the other end through the hole. Allow enough slack so that the line will extend at least an inch outside the fuselage. In this position, the fueler can be attached. After fueling is completed, a sheet metal screw is threaded into the tubing and is pushed through the hole in the fuselage. The expansion of the tubing caused by the screw will give a secure snug fit. All that is left visible is the screw head.

This handy shop hint was submitted by Jack Voegler from Modesto, California. Have you ever tried to cut brass fuel tubing with a hack saw or tube cutter? The ends mash down and you never get a good cut. By accident, Jack discovered that if a 3/32" wire is slid into the 1/8" O.D. tube, you can cut right through the tubing very neatly with a tube cutter. Then take a large drill and twist it by hand into the cut end to ream out and smooth the cut end. You can also use 1/8" wire inside 5/32" O.D. tubing.

We received the following engine care handy hint from Brian Kretchmar of St. Louis, Missouri. After repeatedly installing glow plugs in one of his engines, Brian noticed that the threads in the head started to gall. To prevent further damage, he has found that using Champion spark plug thread lubricant and anti-seize compound does the trick. It is a high temperature graphited lubricant for application to spark plug installation threads to prevent galling and seizing. Make certain that the compound is applied only to the 2nd and 3rd thread and does not make contact with the nichrome as the compound is conductive and will short out the plug.

Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free book from RCM's Anthology Library Series if your idea is used.

VICTORY STICK

from page 86

Engine:

A standard O.S. .40 was used with accompanying muffler. Engine mounting is easy as it hangs out in the breeze. An 8 ounce tank fit easily in the fuselage.

Radio:

A Futaba FP-7GE radio was installed with no problems as the room in the fuselage allows use of standard servos in a three abreast set-up.

Flying:

No matter how well-produced a kit is, the bottom line is how well does it fly? The Victory Stick flew beautifully and can be used for practicing almost any maneuver. Since it is light, even a standard .40 provides lots of reserve power and the best adjective to describe its flight is that it really "grooves." It will almost hang in the air when the engine is at idle.

Conclusion:

The Victory Stick builds easily enough that it could be successfully finished by a first time builder. Flying skills required basically are determined by the amount of surface travel used. By varying the deflection you can have a pussycat or a tiger. If you are looking for an aileron trainer or a Sunday fun flier, the OrLine Victory Stick represents a good choice. □

FLYING LOWE

from page 82

last International Pattern Team is also a very good helicopter pilot. I've caught the fever again and am flying a Kalt Baron 50. If you want to try something with a unique kick all its own, get a chopper. It will be a humbling experience for you hot shots who think you can fly anything! Flying a helicopter makes you a better pattern flier.

The pylon competition featured both Formula I and Quarter Midget. Formula I seems to have peaked in fast time with the current rules. Brian Richmond had a good 1:13 fast time and, also, won Formula I. Quarter Midget times keep coming down with changed engine rules. Buddy Roos had best time: 1:25.2. It is hard to believe these are the same ships that used to struggle around the sky on the edge of a stall. Fast time didn't win Quarter Midget, however, as consistency again paid off for Jimmy Bartels who won the event. Years ago, when I participated in pylon racing, fast time for Formula I was in the high 1:30's to 1:40's, and I thought that was fast! Guess I'm showing my age! The Formula I's are moving so fast now that you really don't need to level the ship between pylons --- in fact, Brian Richmond flies the course in a continuous knife-edge!

After the hectic pace of the pylon racers, things settled down to a little more sedate two day scale contest. With thirty-five entries in four scale categories, much fine scale flying was seen. There were a few unfortunate crashes, but there is no question but what scale fliers are a much improved group of fliers. The advent of Stand-Off Scale with much better flying ships has made a big difference; it has also greatly improved the popularity of scale competition. Scale rules which now give equal weight to scale judging and flying still demands a well-built and detailed aircraft, but certainly far from the requirements of museum scale. Personally, I would like to see more weighing of the flying points --- something like a 40-60 split.

Scale always attracts the largest crowds and we experienced that again at the Tangerine Scale event, and they were not disappointed.

This year, for the second time, a

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FLYING LOWE

from page 92/82

special category was added (sponsored by Mike Haddox) for the best scale jet aircraft. The award of $500 went to Art Arro. Art did a fine job of keeping the temperamental beast going; all other competitors (4) had various equipment problems. You jet fans should plan on competing next year since the $500 will again be awarded.

Giant scale was taken by Art Johnson, flying his beautiful original Republic P-43. (Art flew the full scale P-43 many years ago.) The military scale ship seems to be a good subject for winning with retracts, flaps, and drop tanks for scale functions. Second place Giant scale was also a military design T-34 C-1 by Ramon Torres. Pete Mas' well-detailed Laser 200, equipped with smoke for maneuver realism, took third place.

Stand-Off expert category was won by Bill McCally and his beautiful F-8F Bearcat, followed by Leonard McCoy's very unusual Dornier DO 23G and Bob Hanft's F-6-F Hellcat. (Note that they are all military designs.)

Sportsman was won by Tom Veloskey with a very nice Christian Eagle, followed by Mike Barber's clipped wing Cub and Bill Schneider's Cosmic Wind.

All of these winners were extremely well done models, with many other fine ships not making it. I must say that this scale contest attracted some very outstanding modelers and their models. The Giant Scale event is the most appealing to me since these ships fly better and more realistically. This category also benefits from the considerable current interest in large size aircraft.

The 15th Annual Tangerine was a truly outstanding happening. Why don't you modelers take a vacation to sunny vacationland in Orlando, Florida, next year and enjoy the 16th Annual Tangerine; you will be very glad that you did. There is also Disney World, Epcot Center, and many other attractions for the family. See **you** next time! □

A PAINLESS WAY TO ADD REVERSE

from page 80

What the system does, in essence, is use a microswitch to reverse polarity to the motor and apply full power for a short period in "full brake." This quickly scoots the car backwards. For complete instructions, please refer to the schematic and drawing.

Over twenty cars in this area have been converted to incorporate this reverse system. No failures of the microswitch have occurred in six months of racing. The person who will probably benefit the most from this conversion, aside from the spotters, is the novice/intermediate racer.

When I first used this reverse system I was the only one with any type of reverse in the races. The astonished look on the spotters' faces as they ran towards my rapidly reversing car was ample reward for the time spent in this modification.

NOTE: This reverse could be applied to electric boats, any type of electric car or off-road vehicle. Think of the possibilities of a thrust reverser in your electric airplane for short field landings. □

SCALE VIEWS

from page 79/78

must be all wrong, I have seen WW II fighters of the CAF and the Reno races flying faster than the figures show." Well, what you have seen for the most part are Sunday fly sport versions of the original military combat aircraft. When you take 25% to 50% of the weight out of one of your models you know what happens to the performance. Same thing for the big ones. Self sealing tanks, armor plate, tube radios, guns, bombs and ammunition, did nothing to improve the performance of an airframe-engine combination. Strip the airframe, modify it and install a blown, race tuned engine and you will have a fun bird to fly at the races but it would not remind a WW II fighter pilot of the same plane he jumped into forty years ago loaded with the military equipment needed for a combat mission. If you are going to build a model of one of these civilian sport planes, paint it to match and forget dropping GP bombs, external tanks, etc. You will have a model of a plane that will go a little faster and maneuver a little easier but it will not be a model of a WW II combat aircraft.

So far the publishers have favored reproductions of the Pilot Handbooks for the popular WW II fighter subjects. They left the performance charts out of the B-26 manual I picked up recently. If the data is not readily available, there are other ways to get a handle on relative speeds. One way is to group aircraft with similar performance together. For example, the T-6 advanced trainer, the C-47 Gooney Bird, and the B-17 Flying Fortress all took off, landed and

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SCALE VIEWS

from page 95/78

cruised down low at about the same airspeed. These were 150 mph cruise planes at altitudes where you could see them. Flat out, pilots were going to see something less than 200 mph on the clock. Primary trainers, Tiger Moth, PT-17, PT-19, etc., grouped in the 75 to 95 mph cruise range. Similar groupings can be made for old time civilian aircraft.

So you have divided by the scale and you know how fast your model should fly. How do you know how fast it is really going? Not many of us have access to a friendly cop with a hand-held radar gun (it works if you do) so we have to find another way. If the diameter and blade area of your prop is matched to the horsepower of your engine and the drag of your model, the pitch of the prop will give you an approximation of the speed you can expect. For instance, in theory, a seven inch pitch prop moves forward seven inches each time it goes around. If it is going around at 10,000 rpm, it should go forward 70,000 inches every minute. Divide this by 1056 and you will find it moving at a hair over 66 miles per hour which is a more useful figure. The 1056 is just a number changing inches per minute to miles an hour. If you want the answer in knots divide by 1200.

The formula seems to work reasonably well for normal "prop engine aircraft" combinations. It will not work if your prop is spinning its wheels on an inadequate engine. No matter what prop you put on a Cox .049 engine, it will not get your 12 pound P-51 off the ground even if the formula says it should fly at 100 mph.

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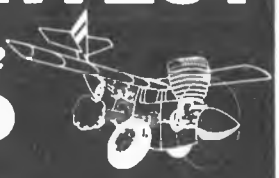
RCM'S 1983 MONTHLY CONTEST

DO YOUR THING *with the* REAL THING MOCK TWO



This contest is for the most original/unusual modifications to the Real Thing Mock Two. Use your wildest imagination . . . and anything goes! ★ *YOU CAN WIN* ★

★ FIRST PRIZE ★

From Dremel, Division of Emerson Electric Co., 4915 Twenty First St., Racine, Wisconsin 53406:

A Dremel Delux Model 3801 Ball Bearing, Variable Speed Moto-Kit.

★ SECOND thru FIFTH PLACE ★

From House of Balsa, 20134 State Rd., Cerritos, California 90701:

A ZAP Package consisting of 6 different items (ZAP-A-GAP CA+, ZAP/CA, ZAP LOCK, ZIP KICKER, Z-7 DEBONDER, and Z-ENDS).

Entries to consist of color photo print (do not send slides) and written description detailing equipment used and modifications that were made.

Winners will be chosen each month for 12 months from entries postmarked between first day and last day of each month in 1983.

See R/C Modeler, November 1982, Plan #877, available from RCM Plans Service for $5.75.

RULES

Persons not eligible:

1. Members and employees of RCM or any other model airplane publication.
2. Members and direct or indirect employees of Dremel Manufacturing Co.
3. Members and employees of any manufacturer of hobby kits, hardware or supplies.
4. Anyone engaged in the wholesale or retail distribution of hobby kits, hardware or supplies as a major source of income.

General:

1. All contest entries must be addressed to RCM REAL THING CONTEST, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024
2. All photographs and materials submitted by the contestant will become the property of R/C Modeler Magazine and none will be acknowledged or returned.
3. This contest will be null and void in any state or locality where specifically prohibited by law.

FEBRUARY WINNERS

Fuselage/hull made from corrugated fiberboard. Weight: 39 oz., (2) Cox .049 Golden Bees. Wing loading 14.94 oz./sq. ft.

1ST PLACE
Elmer A. Gross
Cheektowaga, New York

2ND PLACE
Calvin Stone
Cool Ridge, W. Virginia

3RD PLACE
Ray Shields
La Cygne, Kansas

4TH PLACE
Harry Wallace
Gaffney, S. Carolina

5TH PLACE
Donald Petersen
Bridgewater, New Jersey

SCALE VIEWS

from page 98/78

Don Lowe recently published figures for one of the USAF RPVs (210 pound radio controlled drone). The 13" pitch prop turned 7,000 rpm static and Don says it flys about 85 knots. The speed formula shows about 76 knots for this prop rpm combination. The difference is probably due to the engine unloading in flight.

The formula also works backward, which is the way you want to use it to figure what pitch prop you need for a given airspeed. When applied to a full scale aircraft it comes up with some interesting figures. The prop on a P-51 going 375 mph at high altitude is still only turning about 1500 rpm. 375 mph x 1056 divided by 1500 rpm gives you a prop pitch of 264"! A little different from your average model prop.

After you figure out how fast your model should be going, don't get too worried if you still cannot tell exactly how fast it is going. The judge who can tell you your model speed within 10% should have his radar-eyes hired out to the local police to spot traffic. The judge should be able to recognize the 30 to over 200% deviations from scale speed that are not uncommon with some scale models. Scale speed is not the only factor in scale realism but it is the most important and the most often abused.

If you fly your model so that it looks like the real thing, chances are that you will automatically use the throttle right. There are not many aircraft that can fly at full throttle from take-off until ready to land. Time restrictions for full throttle were mentioned. Flying at max continuous power is okay but the P-47 will fly four times further at low altitude at max range throttle settings. Pretty good reason to fly slower. Exceeding the

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SCALE VIEWS

from page 102/78

redline airspeed or rpm limits is a mandatory reason to throttle back.

You have to pick up some airspeed in a dive to be able to ease a Tiger Moth over the top of a loop without stalling. On the down side you will have to ease off on the throttle to keep from going over either the airspeed redline or the rpm limit for the engine with a fixed pitch prop. Most of the old light planes and trainers had fairly low max airspeed limits and it was easy to overspeed engines with fixed pitch props.

On the other hand, you had to dive with a lot of power on to get anywhere near the 450 to 500 mph I.A.S. limits for most U.S. WW II fighters. There would be nothing wrong with a maneuver where your model rolled over, pulled through in a power on Split-S, and came screaming across the ground close to the redline speed of the original. However, the final reason for retarding the throttle is to keep from making a large hole in the ground. Once you got a P-47 going down at the 500 mph IAS limit, you needed 12,000 feet to pull it out, after the throttle was pulled back! With a 1/6 scale model, better start the Split-S above 2,000 feet and hold the speed build-up until it is almost level. If you do it right, your 1/6th model could hit 83 mph before passing the scale redline speed of the P-47.

If you are into ducted fan models of jet fighters, forget all of the above except for the scale speed factors. Jet engine and aircraft operation is a whole different subject and we will talk about it some other time. At the moment, I just want to mention that I enjoyed putting the first couple of flights on a F-86D model on Christmas Eve. The model belonged to Bob Temple and was built from the Byron kit with an OPS .65 for power. It came out at 11 pounds with Spring-Air retracts complete with gear door sequencing valve. With the help of a 20 mph headwind, the model took off and landed without problem from a 250 foot runway. It performed well in the air through loops, rolls and Split-S maneuvers. How fast did it fly? I don't know, I was having too much fun! □

TOYS FOR TOTS

from page 77

Also on display were Marine Corp fixed and rotary wing aircraft with

personnel to describe their mission and operation. All of this activity was woven around two, two-hour R/C airshows.

What makes this airshow special is its growth and refinement since its inception four years ago by Sky-Naut member Dave Herbert, an RC'er and Marine Corps Reservist. His superiors approved the idea and the cooperation between the U.S.M.C. Reserves and the Sky-Nauts has been fantastic.

Wherever possible, flying talent from within the club is utilized, but to round out the airshow program, other local fliers are invited to participate. Planning for the 1983 show, including a thorough debriefing of the '82, show will be underway by the time this is being read. It is interesting and satisfying to note that several other R/C clubs in the Southern California area have adopted the idea and are also working closely with the U.S.M.C. Reserves to support Toys for Tots at their respective flying fields. Promotional packages describing the event (photos, text, etc.) were provided to the local newspapers and were run during the week prior to the event. This advised the public and influenced the spectators to turn out bearing Toys for Tots.

The exposure of our hobby/sport is great, the public relations are excellent and the best part of all is that a lot of needy kids receive that special toy for Christmas that probably would not have been there.

If the weather & conditions in your part of the country permit it, how about getting together with a Marine Corps Reserve unit and help create some Christmas cheer for underprivileged kids.

Fliers for the airshow included 15½ year old Adam Wickert flying a 9 foot Aeronca Champ, Mel Santmyers with his big Tomahawk performing aerobatics, Shane Cramer's Quadra powered P-47 Jug on a combat mission and the Forest Edwards' Jr. and Sr. team sharing the spotlight with their Quarter Scale Fleet biplane. Next was Garland Hamilton with a high powered routine with his contest winning Spitfire followed by young John Bashore and his down on the deck performance with a giant scale Super Chipmunk. Next up was Steve Spears performing an electric powered aerobatic routine with his Barbarian followed by Larry Wolfe with his Rossi .65 powered Mirage. Spectacular vertical performance here!

John Simone, Jr. flew The Special, a helicopter to be seen in a forthcoming movie called "Blue Thunder." To get everyone's adrenalin moving, Dave Shadel and Gary Hover staged a mock Formula I race that had the crowd cheering. Ron Karwacky then cranked up his 4 stroke powered Jenny, The Great Waldo Pepper, for a real contrast in R/C flight.

The Johnson/Bloom B-17 flown by John Elliot went on a bombing mission planting four 500 pounders on the runway. Then it was joined by Hamilton's Spitfire as an escort for some low altitude formation fly-bys. Brian Curry's 1/3 Scale Sopwith's flight terminated with a one wheel touchdown as one tyre had separated from its rim on take-off. Dave Herbert experienced some engine problems

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TOYS FOR TOTS

from page 108/77

during the first show, but he got his act together and thrilled the crowd with a Pitts Special for the second show.

The 4th Annual Toys for Tots Airshow was an unqualified success. Attendance by the general public numbered in the thousands and a mountain of toys was collected. To use the Marine Corps expression, "Teamwork made it happen." Everyone benefitted from the show and the real winners were the underpriviledged children. □

BIG IS BEAUTIFUL

from page 76/74

and adds to the effect rather than detracting from it. Where a high gloss finish is desired, such as on a "show" airplane, a coat of clear gloss may be sprayed over the paint for the desired effect.

I find that the use of a "plasticizer" in the Acrylic paint will prevent surface crazing or cracking of the paint and it's highly recommended where the painted surface can flex as in a fabric covered model. The cost is moderate and it doesn't take very much so it's a good idea to add the recommended quantity.

The covering qualities of the paint make more than one coat quite unnecessary so minimal weight is added to the model with the paint job. While weight is less of a consideration with the larger model, there is no need to add large amounts of unnecessary weight. The finish can be masked and painted over for trim lines and the like and, once set, masking tape will not lift it from the surface.

If you prefer to trim with the adhesive tapes in common use today, then a coat of clear, either matte or gloss, should be applied over the trim material to seal it in place. Also, if you are using paint materials not from the same manufacturer, it's a really good idea to test them for compatibility before putting them on the model. This usually doesn't take very long and is worth the time to prevent a disappointment later.

If you haven't yet tried these methods of covering and finishing, do so, I can all but guarantee you won't be disappointed and will be able to turn out jobs which are all but flawless. Besides that, you'll cut your covering and finishing costs by really significant amounts.

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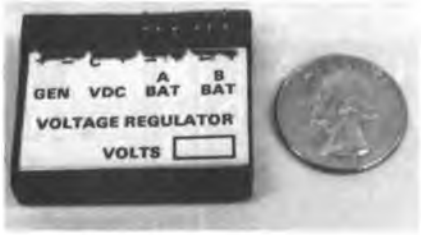
BIG IS BEAUTIFUL

from page 110/74



This on-board charging system is offered by Don Harris for 35cc and 50cc Quadra motors and is to be used with 450-550 milliamp battery packs. It is a redundant charging system — charges two battery packs at the same time thus eliminating the need for large, heavy packs for Quarter Scale aircraft. The unit can also be adapted to most chain saw motors with a rear shaft.

The system consists of a generator, voltage regulator, brackets, pulley, plugs, and wire to assemble. A small meter which is mounted in the aircraft indicates whether or not the unit is charging. The complete system weighs approximately 5 oz. The generator contains a fan for cooling and a solid state device across the brushes to eliminate arcing.

Available April 1983 — $49.95 plus $3.00 shipping and handling from Don Harris, 23668 Shadow Dr., Auburn, CA 95603, (916) 269-1164. Cash only, COD's acceptable.

Back next month with more good stuff for your big birds! □

OFF-ROAD RACING

from page 73

break unless you hit them with a hammer.

All the steering rods are hardened steel and are very strong. The radio box has been replaced by a shaker plate, anyone who has been running 1/12th Scale knows what a plus the shaker plate is. The shaker plate is mounted above the chassis, on mounting pins; the radio is mounted to the plate and the batteries are mounted under the plate, allowing air flow to the batteries for better cooling.

The new body is made of soft, flexible plastic to resist breakage, and is very detailed.

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from page 120/73

The knobby tires, that are included in the kit are going to bring about some changes in racing tires. These tires have a very good bite surface and are a harder rubber compound that will not wear out fast.

We have been using Holiday Buggy rear tires on Sand Scorcher rims.

The suggested retail price for the Super Champ is $159.95. The Super Champ is available through your local hobby shop; if not, ask your dealer to order it. The stock number is RA5834.

The second import is a fun vehicle called the Wild Willy — and is it wild! The kit has the same quality parts and instruction manual as all the other Tamiya car kits. The body is a scale C5 Jeep with every detail in its exact place. When you get to the suspension, it is a different story. The rear end is a closed differential case with a differential built into it. There are long swing arms for lots of suspension travel, and steel axles that are very strong. The front end is an A arm suspension with coil springs to smooth out the front end. The vehicle is well-balanced to do wheel stands, spins, rolls and lands upright.

The tires are the same paddle tread that come with the Blazer 4 x 4 with foam inners to make the tires soft yet grip well. There is steel hime joint steering and rear swing arm stabilization with hardened steering rods to add strength.

Detailing is superb and it will get a lot of attention at any off-road race.

We believe, with rebalancing, the Wild Willy could be raced in a special Jeep class. It is hard to describe the quality of the kit so head down to your local hobby dealer and pick one up for yourself. The stock number is RA5835; the suggested retail price is $120.00.

★

Now on to the mail bag. The first letter comes from Chris Girand, Dallas, Texas:

Dear Bill & Linda:

I've been having lots of trouble with the four front end pins. Toward the ends of them, where the arms are joined, they have begun to bend. I bent them back but they bent again. It has been going on like that for the past four weeks. Could you tell me where I could get something stronger?

Sincerely,
Chris Girand

The stock pins are of a soft material. Replacements are manufactured by R.C.H. Products, Costa Mesa, California. Check with your local

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OFF-ROAD RACING

from page 122/73

hobby shop dealer for R.C.H. Products stock number 1501. If he doesn't carry them, you can order direct by calling (714) 642-7475.

The other heavy duty front end pins will be available from Tamiya but we don't know the stock number.

Hi Bill & Linda:

In regards to your column in the January issue about the fellow who wanted a speed control for his Tamiya Rough Rider, I have used the Tamiya variable speed control (part no. SP-1054) in my Sand Scorcher and find it works well in normal use. I don't know how well it would work in all-out racing. You have to modify the radio box to make it work.

What charger do you recommend for fast charging (110V-12V)? Can I charge slow charge batteries on a fast charger? Also, which motor is a good one to use for normal racing?

Thank you,
Dick Bookner

The Tamiya variable speed control is very good, when used with a stock motor but we wouldn't recommend using it with a high performance motor. Open class motors will draw up to 40 amps and the variable speed control is not designed for that heavy of a load. AC/DC chargers that are available and that we know about are the Leisure #107 and the Astro Flight 4005-B.

We have heard that Leisure is coming out with an AC/DC version of the digital 109 charger. When it is available we will let you know more about it.

The best answer we can give you about Nicad Sub C cells is that they were never designed to be fast charged at the rate that we charge them at now (4 to 5 amps). The battery manufacturers are amazed at what we do to batteries and still have them perform as well as they do.

As for motors, the stock motors that come in the kits perform very well. In stock and modified class, under ORRCA Rules, the Mabuchi 0540 (which comes in just about all the car kits) is the only motor that is legal. In open class the motors are rewound for more torque and rpm. Some racers are rewinding their own motors or you can buy motors already built such as the Reedy Modified, Checkpoint, Trinity, Leisure, Bolink, or MRP. All of these motors are excellent for open class.

MRP has a new body out called the Funco Shorty. If you have been running after market rear cages and have had the problem of the body not fitting over the cage, instead of cutting off the rear section, try this body that has already been cut for you. The body

is molded of 50 mil Lexan and is very strong.

Other new bodies available in the same quality Lexan are the A.S.A. Camaro, which is very aerodynamic for oval racing, the Ford F-150 truck body and the Scorpion single seat body with wing molded on top.

Another new product is the Sprint Car for dirt oval. The car is 1/12th Scale and very complete. The one we received came ready to go, with the exception of the radio. The first time we ran this car, we found it to be very fast and it drew lots of attention from the other racers. The body is very well-done in the outlaw style with a small wing in the front and a very large wing on the top. Any of you who enjoy oval racing will enjoy this scale Sprint Car.

For those of you who want to put a wing on your car, MRP has a wing set complete with mounting brackets. If you haven't tried a wing on your car yet, try one, you will be surprised at how much better your car will handle at high speeds.

Also available is a new skid plate front bumper for the Tamiya car, made of Kidex, which is almost indestructible. If you have had trouble breaking stock bumpers, try one of these new bumpers.

★

We will close this column by saying that it never rains in Southern California! It's only liquid sunshine! Rain has been a big factor resulting in no race reports. All of the scheduled races have been rained out in January.

Until next time --- keep the dirt out of your eyes. □

ENGINE CLINIC

from page 72/70

This shoots fuel into the engine. Be careful though as it is easy to inject too much fuel and flood the engine. This feature is a nice cold weather starting aid.

That does it for another month. Keep the letters and suggestions coming in. Don't leave it up to the other guy. If you want a personal reply be sure to include a S.A.S.E. and keep the letter as short as possible. □

SHRIKE

from page 69

Engine:

An O.S. Max .45 FSR was installed on a Kraft mount, using the cap screws and blind nuts provided in the hardware package. A Sullivan 6 ounce tank and Goldberg spinner, included in the kit, completed the business end

of the Shrike. We set up the Shrike so that we could use either the stock O.S. Max muffler or a tuned pipe, from Mac's Products.

Radio:

We installed a Futaba FP6FN with a combination of Futaba and World Engine servos. Because of the weight of the .45 engine, we had to mount the battery pack well aft in the fuselage. The servo tray was mounted using the pine mount rails provided. The radio compartment is large for a model of this size, and almost any radio with standard servos would fit. We made the pushrods for the rudder and elevator out of 1/4" square balsa, and used Sullivan flex rod for the throttle. The final hook-up was completed using a combination of Goldberg and Du-Bro hardware.

Flying:

With the C.G. and control travels set as recommended in the instructions, the overall flight performance can only be classified as exceptional. Our first flights, however, were interrupted by aileron flutter following a full throttle dive. The addition of ply reinforcements, and sealing the aileron gap with MonoKote, cured the problem that was caused primarily by excessive airspeed. All following flights were completed while enjoying the outstanding qualities of the Shrike. Because of the light wing loading, and the power output of the O.S. Max .45 FSR, take-offs and vertical climb-outs can be completed with one half throttle. Aileron rolls are smooth in either direction and snap rolls are crisp. Once the test pilot (known locally as fast Ed) discovered that the Shrike will do an inverted flat spin, he developed an ear to ear grin and the Shrike spent the rest of the day climbing straight up and spinning inverted back down. We feel that the Shrike is over powered with the .45 and any good .25 with a tuned pipe should provide enough power for even the local hot-rodder. To check our theory, we limited the thottle travel to 50% and still had enough power for a full range of maneuvers. The only difference was that we didn't have to call NASA for clearance.

Conclusion:

The Shrike is very easy to build because of the quality of the machined parts and instructions. A new or experienced builder will appreciate the engineering that went into this design. The Sunday flier will be the one who will have the most fun with the Shrike. The overall quality of the kit, coupled with the flight performance, will ensure many fun filled weekends. We have enjoyed our outings with the Shrike and look forward to many more. □

When writing to an advertiser, be sure to let them know that you saw their ad in RCM.

2 x 4

from page 67/63

(5) The entire model can be covered with one roll of MonoKote.

(6) The only thing that almost broke was my thumb when I tried to catch it on a down wind landing.

(7) The model is suited to small obstructed fields. You'll spoil it on a wide open plain.

If slope soaring is your mode of pleasure --- enjoy. Remember, you must have wind to slope soar. Flying buddy, Paul Strona will have a ball with this in his Hawaii hurricanes.

My sincere thanks to Bob Brown, Keith Kindrick, Bob Goldie, and Les Wilfong for taking the time to fly the model and evaluate performance objectively. □

KONVERTIBLE KADET

from page 56/55

than I had thought, the total will be noted a little further on.) The wing was finished with silkspan and brushed Hobbypoxy, the same colors as the standard.

For appearances, I made a nose cover to use with the K & B .40 removed. For safety, the nylon wing bolts were backed up with dowels for the standard #64 rubber bands.

Radio set-up is not unusual. The twin wing has an aileron servo and

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KONVERTIBLE KADET

from page 138/55

the plane settled quite rapidly. Given that judgment, I decided I would fly the single engine Kadet for a while longer before I tried the twin myself.

On the last twin flight, one engine lost power. That rudder change really came in handy. Bill brought the ship in downwind, but under control with full rudder displacement. At the last minute he had to put it in the high grass. Damage was very minimal. I was flying the next day in the standard Kadet configuration.

The Konvertible Kadet was fun to build. Next time I would cut down on some of the beef-up to hold the weight down.

That twin sound is great; passing overhead, the plane sounds like a P-51 on final. You know what? I have this Kommander in the box. Maybe a little beef-up, a couple of .40's and . . . here I go again! □

FIREBIRD II

from page 39/32

together at one end to prevent slipping out when installing the carry-through bar.

Next, bend the 1/8" music wire aft cabane struts as shown and wrap and solder the 5/32" O.D. by 1/8" I.D. tubing to the music wire. Add the 1/16" cross braces and solder as shown, making sure of a good fit inside the longerons.

Tack cement the two cabane strut assemblies to the fuselage at F2 and F3 so that the flat bottom of the wing center section is exactly parallel with the two upper longerons. Make sure that the sides of the struts are parallel with the centerline of the fuselage and the tubes perpendicular since the whole positioning of the wing depends on the squareness and accuracy of the center section.

Bend the crossed 1/8" forward cabane braces as shown and fit to the brass clips which are bolted to F1. Before assembling, tin the clips and wire ends with Sta-Brite or equivalent low melting joint solder. When assembling to the firewall, slip a piece of 1/16" scrap plywood between the clip and the firewall to protect F1 while soldering. Solder the clip to the wire. Remove the 1/16" plywood and secure both clip and wires in place with the #4 bolts. Carefully fit the tops of the braces by bending so that they lie against the 5/32" cabane strut wires. Wrap and solder. This

completes the cabane strut assemblies except for "glassing in" with fiberglass and epoxy cement as shown. Recheck all alignment dimensions before "glassing in."

F1A and the fuel tank can now be installed as well as the throttle cable. Fit and epoxy two 1/8" plywood gussets between the top longerons and F1 as shown on the photos.

Larger engine mounts could be used but the writer was successful using 3" Sig mounts on plywood spacers to obtain the desired engine position.

Using 1/8" music wire, form the tail skid and attach to F7 with a #4 bolt and wire wrap. Install the bulkhead in the fuselage and add the 1/4" plywood stiffener between the longerons as shown. Finish the 1/8" balsa planking.

Fairing strips and planking for the fuselage are added next along with the instrument panel. The 1/8" x 1/4" strips along the longerons are very important to stop the covering material from tucking in and spoiling the appearance.

Fit the 1/8" plywood hatch as shown, cement the tab in place and secure with three #2 screws.

Shape four W1 and four W2 ribs together drilling the 3/8" and 5/32" holes for the cabane tubes at the same time using the flat bottom of the ribs for incidence reference. Use two W1 and two W2 ribs to form the center section. The hardwood center brace, the 1/32" plywood wear plates, the leading and trailing edges, and the planking complete the center section. Make sure that the flat bottoms of the ribs are parallel to and equidistant from the tops of the longerons and the faces of the ribs parallel to the fuselage centerline.

Rework a Hallco B106-6 landing gear by flattening and rebending to fit the 6" wide fuselage. The landing gear is attached by 1/32" soft aluminum clips and #6 screws. The aluminum clips are meant to shear in a hard landing to protect the screw threads in the fuselage. This will eliminate the need to remove a broken nylon screw which happened to break just below the surface in the conventional screwed-on landing gear. Install 5" Golden Age wheels.

The aluminum engine cowl is begun by adding the hardwood blocks to F1. NR1 and NR2 are next roughly formed making the hole in NR1 a tight fit on the engine nose. Laminate the two and, after installing the engine, push the assembled nose rings on the engine nose. By laying a straightedge between the blocks on F1 and the nose ring assembly, the variable angles required at the nose ring are fairly easily determined and can be sanded to conform with the cowl angles.

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Trace the cowl pattern on the drawing on vellum, or other stiff paper, approximately 1/8" oversize. Cut out and tape on to the blocks at F1 and nose ring. Establish a bottom centerline and adjust and trim until satisfied with the fit. Then use the pattern to cut out the aluminum cowl. Starting at the bottom centerline, shape the cowling up to the top longerons and the centerline of the nose ring. Install two screws on each side at F1 and one at the bottom, one part way up and one at the centerline of both sides of the nose ring. Remove the cowl and engine. Reinstall the cowl and finish forming and fastening as shown with a screw at each end in the top wood block at F1 and screws equally spaced to the top edges at the nose ring. Trim at F1 and the nose ring. Reinstall the engine and cowl and mark the clearance you like around the engine and muffler boss. Remove and trim. Sand the aluminum and NR1 flush. Open the hole at the engine nose to accommodate a 1/8" rubber ring as shown. A 2¾" Goldberg or 3" C.B. Associates spinner can be fitted with slight changes in NR1 and NR2. The cowl pattern will fit with trimming changes.

Seal the exposed wood and fuelproof the inside of the nose ring parts. Lightly sand and spray paint with polyurethane.

The small piece of cowl behind the cylinder is cut to size, joggled to match the edges of the main cowl, and finished in the same manner. It is retained by two screws in the upper hardwood block on F1.

Set the fuselage aside. Controls and covering will be added after the empennage is fitted.

Empennage:

3/8" sheet balsa is used for the empennage since the widths vary considerably and stripping your own pieces seems much more economical. All stabilizer, elevator, fin, and rudder balsa stock is 3/8" thick. Note that stab and fin spars are 3/8" x 1/4" spruce. Build the center blocks of the stab in one piece by slotting for the tubes and tack cementing. The writer used Klett aileron bearings for hinges but any large size hinge will do. MonoKote hinges would be very satisfactory and provide a sealed gap. Don't forget the aluminum keeper strap on the stabilizer.

Large nylon horns are used and the prototype was rigged with steel clevises and threaded steel pushrods.

In the case of the elevator, the two rods were joined in a "Y" with a short length of threaded rod soldered on. This was threaded into a NyRod to connect in the conventional way to the servo. The single rudder rod was treated in the same manner.

Clamp the empennage on the fuselage for control rigging and then remove for covering. After both the fuselage and empennage parts are covered, the stab center section and fin can be cemented in place. If you want an internal antenna, run a 3/16" NyRod tube from F3 and bring it out ahead of the tail skid.

Wing:

The toughest part of building the wing is to pick the span. As discussed earlier, a very docile, slow floater is obtained with the full 100" wing. An 85" wing will be substantially true scale with the fuselage and will turn out to be a lady-like sport and trainer airplane. Experience with the 75" wing has shown it to provide an all-around well-tempered machine with good maneuvering capability and excellent handling qualities. Try the 60" wing if you want speed and quick response. Having more than one size on hand seems desirable. Any size is a very simple structure to build. With its flat bottom Clark Y section, no jig is necessary so just clear the table, tape the drawing down, cover with waxpaper, and go ahead.

A word about mounting is about all the help that can be given or needed. Before planking the inboard ends, and before adding the webbing to the forward side of the spar at the inner bay, slip in the carry-through tubes and, after clamping roughly in place, assemble the panels on the center section with the carry-through rod. When satisfied with the dihedral and alignment, tack cement the tubes in place with epoxy. When cured, remove one panel and set the incidence of the other by aligning the flat bottom surfaces of the inboard rib and the center section rib. With a long 1/8" drill or sharpened 1/8" wire, bore the incidence rod hole in the wing block using the aft center section tube as a drill guide. Remove the panel and enlarge the hole to 5/32". Epoxy in the brass tube. Repeat this process on the other panel and the wing is mounted. All that remains is finishing the webbing and planking, covering, and installing the retaining screw. Of course, both panels must be sanded with the center section for a good match.

Flying:

There is nothing unusual or different about flying Firebird II. With the 100" wing it will take off smoothly at less than half throttle and climb beautifully. Taxiing is what you

would expect with a tail skid only. Steering must be done with rudder and throttle. In this maneuver Firebird II handles just like its full scale ancestors and is, in the writer's opinion, great fun. However, if you don't want this challenge, a tail wheel can be added.

The airplane has been designed with a slightly forward C.G. location so that construction of the rear of the fuselage and empennage will not require extreme weight consciousness to prevent that old "tail heavy," lots of "ballast in the nose," airplane. However, keep the C.G. pretty much as shown — 28% with full fuel and 32% empty — to achieve a super handling machine. As in most models, and full scale airplanes as well, a C.G. too far aft will make the controls over-sensitive and variable; too far forward will make this parasol type power pitch trim sensitive. In any event, you should have many happy flying hours ahead if you build Firebird II.

HERE'S HOW

from page 30

The switch used throughout the R/C industry is the Noble slide switch. It has been used for many years and is considered the number 1 standard. Of course there are others in use, but the good old Noble slider is still very much in evidence. Why? Simply because it's the most reliable switch we have today. When viewing this switch from the contact side it looks very formidable and complicated. Actually it is quite simple when you understand its workings. The many contacts make it look complicated. Let's get friendly with it.

Looking at Diagram A, we see that the switch is actually two switches in one. Viewing the upper six contacts, note that A is always connected to the slider. This is known as the switch arm. Contacts B and C are switchable as shown graphically in the schematic. Note that the slider also connects the three adjacent contacts in the same manner as shown for A, B, and C. Now contacts A and A', B and B', and C and C' are connected by the slider.

The redundancy of A and A', etc., is the reliability built into this switch. If A contact fails, A' will carry on. So, each of the six contacts on one side has a partner doing the same thing on the adjacent side. Not too complicated now that you know. Another benefit of this switch is that it's self cleaning. Due to

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CONTEST ANNOUNCEMENTS

MIDDLE TENNESSEE R/C SOCIETY
PYLON RACE
April 30, May 1, 1983. Smyrna Airport, Smyrna, Tennessee.
For further info, contact: Greg Doe, C D., Rt. 4, 166 Pony Dr., Smyrna, Tennessee 37167. Ph (615) 459-6845.

NAVAL AIR STATION
AIR FAIR/OPEN HOUSE
May 1, 1983. Naval Air Station. Lemoore, Calif.
For further info, contact: Public Affairs Office, Naval Air Station, Lemoore, California 93245. Ph. (209) 998-3140.

SAN JOSE WAVEMASTERS
IMAC CONTEST
May 15, 1983. San Jose Wavemaster Field.
For further info, contact: Jim Coburn, 3309 Pearltone Dr., San Jose, California 95117. Ph. (408) 243-3739.

SUMTER MODEL AIRPLANE CLUB
ANNUAL IRIS FESTIVAL PATTERN-SCALE CONTEST
May 21, 22, 1983.
For further info, contact: Bill Patterson, Secretary-Treasurer, 2282 Primrose Court, Sumter, South Carolina 29150.

THE THOUSAND ISLANDS INT.
R/C MODEL BOAT SHOW
May 28, 29, 1983. Recreation Park Arena, Clayton, New York.
For further info, contact: Dennis Honeywell, Director, Town of Clayton, Clayton, New York 13624 — 686-4310.

TERRE HAUTE R/C CLUB
4-CYCLE ONLY SPORT SCALE CONTEST
May 29, 1983. Club field.
For further info, contact: Dr. Charles Gray, 201 Hulman-Salem Rd., Terre Haute, Indiana 47803. Ph. (812) 877-9215.

WOLVERINE MINIATURE RACE BOAT ASSOC.
R/C HYDROPLANE RACES
June 25, 1983. Belle Isle, Detroit.
For further info, contact: Jo Ellen Gault, Secretary, 5444 Kreger, Sterling Heights, MI 48077. Ph. (313) 268-1297.

BORGER MODEL AIRPLANE CLUB
7TH ANNUAL FUN FLY
June 4, 5, 1983. BOMAC Field, Lake Meredith, Borger, Texas.
For further info, contact: Joe Petz, 1006 Illinois, Borger, Texas 79007
Ph. (806) 274-5124.

VACA VALLEY R/C CLUB
4TH ANNUAL HOBBY SHOW
June 4, 1983. Geri Towne Mall, 3085 Travis Blvd., Fairfield, California.
For further info, contact: Don at Don's Hobbies (707) 429-2232; or Monty Welch, President VVR/C (707) 425-3033.

HERE'S HOW

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the action of the slider knifing through the contacts, a wearing or cleaning action takes place. Indeed, if it gets dirty enough, operation will be hindered to the point of malfunction. A ball detent keeps the switch in one position, either on or off.

In Diagram B, I have shown two switch harness wiring diagrams. The first is a simple on/off two wire connection breaking only the plus (+) red wire. The minus (–) black wire is not broken, however, it could have been switched through the unused contacts on the other half of the switch. For the sake of reliability, it is best to keep the number of solder joints at a minimum.

The second diagram shows a connector added to the harness. Note that in this case I have used both sections of the switch. One section switches the black wires while the other section switches the red ones. Also note that the red and black wire from the battery go to the switch arm in each section of the switch. The switchable contacts, depending on the position of the slider, will direct battery current to either the receiver or the charging connector. The latter allows you to charge the battery without disconnecting.

Building your own custom switch harness is not all that difficult now that you know how the switch functions and how to wire it. All the hardware can be purchased from Royal Electronics Corp., 3535 South Irving Street, Englewood, Colorado 80110; or Ace R/C Inc., Box 511B, Higginsville, Missouri 64037. I use Deans three pin connectors on all my equipment. They have gold plated pins and are completely reliable. Some of you use Kraft, Futaba, etc. These connectors are also available from Royal and Ace. In fact, it is a good idea to have extra connectors on hand in case one gives up. Replacing a connector is an easy task especially if you use the connector soldering jig I presented in the April 1981 RCM. It's simple to construct and you will find it mighty handy in your workshop.

When the switch harness is completely wired it is a good idea to provide some protection and strain relief for the wires around the switch terminals. I use Dow Corning (Midland, Michigan 48640) silicone rubber sealant for this purpose. Coat the solder lugs and wire over the switch with this material. Do **not** let it get into the contacts. This type of rubber sealant releases acetic acid,

during cure only, which is corrosive to metal. I have used it for many years this way and have had no trouble with corrosion problems. Normally the sealant "skins" in 5 minutes, dries to touch in 1 hour, and fully cures and bonds in 24 hours. Optimum strength is achieved in 7 days.

When mounting your switch harness there is no easier way than using the Du-Bro Kwik-Switch Mount (Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, Illinois 60084). This is one of the best switch mounts you can possibly buy. A simple 3/16" dia. hole and you are in business. So there you have it all. Build your own switch harness. It ain't that hard! □

CUNNINGHAM ON R/C

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glasses, or a new prescription? Have you got yourself in shape for this year's flying by mentally going through a flight, rekindling your reflexes and responses. If you're new to the sport, and last fall you just managed to get in several solo flights, then this year, get some help for a few flights until your automatic reflexes really do become automatic.

As in so many other things in life, successful RC'ing is a matter of exercising good common sense. You can develop the habit of using common sense. Let your mind, not your emotion or your pocketbook work for you to really achieve the real fun and enjoyment of this hobby/sport. Few things equal the pure joy of making a successful flight, no matter if you've done it one time or one thousand times --- the enjoyment is there, so grab it.

Time, gang, to remind you again of the upcoming Sixth Annual Jumbo Fly-In, which will be held at Thunderbird Field on the west shore of Benbrook Lake. Benbrook Lake, as most of you know by now, is located just west of Fort Worth, Texas. The Fly-In will be held July 16 and 17 this year and is open to modelers flying any type of large aircraft. Minimum wingspan of 60" for a biplane and 84" for a monoplane. It's going to be another great time for all of us, so plan to be there. For further information you can write to me at: 2440 Colonial Pky., Fort Worth, Texas 76109. There never is any pre-registration. Just show up. We've got room for you.

This summer will see a continuing gain in the Fly-In type of get-together with the emphasis by the IMAA to have a Fly-In sponsored by each active chapter. It's a lot of fun, so if you're getting into the world of the larger models, then plan on attending a

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CUNNINGHAM ON R/C

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Fly-In in your area. Friend Marvin Reese is throwing his second Fly-In May 7 and 8 in Wichita, Kansas, and is inviting everyone in that area to come on in for two great days of flying and funning. Give Marvin a call at (316) 721-1861 for more information. Whatever you do this year in R/C, do it carefully. Good Luck and Good Flying. □

GIVE IT A WHIRL

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seen this particular issue I'm not sure where **they** got it from but here it is, printed just as it was published in the NCRCHA December 1982 newsletter.

What is the most often heard statement after a model helicopter crash? Quote, "I don't know what happened." Recently I read an article on full scale helicopters regarding tail boom strikes. The author wrote that when a pilot makes a hard landing with the nose up, the rear of the skids will touch down first, then the nose will suddenly pitch forward and down. At this time the pilot will instinctively pull full rear cyclic. At this point the tail boom is going up because of the nose going down, the blades are deflecting rearward and suddenly you have a tail boom strike.

I then realized we can have a similar situation occur in the models. Of course we don't feel the sudden lurch forward and down of the nose but everything else is the same.

If you are making a rapid descent and pull a lot of rear cyclic to stop the forward motion then you only have to wait a little too long to add power to stop the descent and you will have the same situation as in a full scale.

The rear part of the skids will touch down causing the nose to pitch forward and down, the tail boom will then rise and if you are holding rear cyclic you can then say, "I know what happened." So the next time you realize you are descending too fast, try to level off and let the entire length of the skids hit hard. Until next month, keep the skids level on landing.

Hope the foregoing helps some of you understand why these things are happening.

On the subject of incidents and safety, another piece of information caught my eye in the AMA recent newsletter. This was concerning a report by Jerry Sprinkle of District VIII when he was watching a

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helicopter pilot checking his blades for trim at the local flying field. Here's the report just as Jerry gave it.

As the pilot was running up the engine and eyeballing the blades to check for trim, or whatever it is that they check for, he was holding the helicopter by the rear assembly (tail boom — JG) near the tail rotor, and the main rotor blades were turning full bore, eyeball level. I was sitting about 10-12 feet away when all of a sudden there was a loud "pop" and I was hit across the right arm, left chest, and left arm. I hurt so bad that all I could do was curl up into a big ball and just lay there until some of the pain subsided and I could get some help to get up and check for damage.

Now, as to what hit me — the blades of the helicopter apparently came loose from their mounting plates and, since I was in their line of fire, I caught the full force of the blade as it was slung through the air. In retrospect I shudder to think of what would have happened to the pilot if the blade had made a

quarter of a turn more. It very easily could have hit the pilot between the eyes and I doubt that he could have survived the impact.

I think that after this incident that anyone flying helicopters should resist the temptation of eyeballing the blades while the enigne is running — for whatever reason. I know that in this case — as safety conscious as this pilot is — he could not foresee the blades coming loose. I have seen many of the helicopter pilots crank up their engines and eyeball those blades, but I sure hope that I don't ever see it again.

I completely agree with Jerry. One of the most difficult things for us to do with an adequate safety margin is to "track" the main rotor blades. In order to do this you have to position your eyes on a level with the blades. Holding the tail boom is obviously a very chancy thing to do and I've always very much discouraged this practice. I certainly don't do it myself. Of course when you cannot even hover yet, it's very difficult to track those blades. Many times it's possible to get somebody who can fly to put your helicopter into a hover for you and then both of you can squat down and look. But keep it brief. So long as you

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are at least 25-30 feet away the chances of a blade really hurting you are very much less. So let's be careful with our 'choppers and not get into an incident which could discredit our part of the hobby or even get us removed altogether. Rotor blades, when they hit you, can do a lot of damage, even at 20 to 30 feet but closer than that — UGH!

Fuel and Lube

A couple of items in the NCRCHA also caught my eye concerning the type of fuel which helicopter fliers use and also a new idea for lubrication of the ball and other rotary bearings of a helicopter. In California we went through the usual variations of fuel in the early days and finally settled on a fuel which is now made up by a local hobby store for us. It is 12% nitro, about 22% of a good quality Klotz oil. The rest is methanol. In some versions we would add an "easy start" element which was 2% propylene oxide. This fuel has served us well over the years and, although we have tried others from time to time, we always return to our old favorite. I notice in the NCRCHA newsletter an article by Stan Blum where he arrives at a similar conclusion except that he likes to see about 5% castor oil. I won't disagree with the advantage of castor, however, as Stan says, it should be kept to a minimum since it can make a really sticky mess of your helicopter and be difficult to clean off all the parts. By the way, the above hints on fuel doesn't mean that there are not plenty of other fuels around which work well. Fuel is kinda' like politics — **you** decide.

The other item about lubrication happens to also be in the NCRCHA newsletter and this is a tip by Albert G. Seidowski that he has discovered a bearing grease sold by Slick which is 50% Teflon and Lithium. This grease costs $6.50 for a grease gun tube full. Al says the stuff won't melt, it's waterproof, it stays put, treats metal with Teflon and one tube will last five guys forever. Sounds great, Albert, I've not had a chance to try it but I'm sure as heck going to.

Well, that's about all we have for this month. I hope you will give me your views on the table top trainer and especially if there are other ideas out there for helping us to learn to fly without breaking blades. Meanwhile, 'till next month, "break a blade." □

from page 14/13

1/2" and try again.

I have no experience with the Dumas Sorcerer. Your set-up seems logical to me, but running the boat is the only way to work out any problems. Any time you place the drive line close to the surface you will have to trim out the side force developed by the surfacing propeller. The prop side force produces a right turning tendency which must be balanced before the hull will track straight. Most people find that offsetting the strut position and angle are beneficial in this respect. I would try an angle to the left, when looking from the top rear of the boat, of about 2 to 5 degrees. The angle required will vary with the size and pitch of the prop. Usually the higher the pitch the greater the angle required to keep the boat going straight. During these adjustments the rudder should be positioned at zero angle of attack. In this way the boat will have the least drag and, therefore, the best speed. Trim tabs will be essential to control riding attitude and to help control torque.

The stock OPS 65 should be capable of propelling a boat of this type in the 60 mph region without too much trouble. Moving the engine forward to increase stability was probably a good move. The stock OPS pipe is okay but we on the West Coast have found that other pipes can (when using high nitro) substantially increase power output over the stock nitro or muffled pipe. I would recommend either the International Products 65 sized mono pipe or a Mac's 11cc Marine pipe for maximum performance. Most fellows find that a pipe length (measured from exhaust port to maximum diameter section of the pipe) of about 11" is a good place to start. If you are using high nitro fuel (40% or more) try an Octura X455 or X460 propeller. If you use lower nitro fuel, try the Octura X452 or X455 propellers. These props have very low lift and are excellent for use on monos with surface drives.

I'm a little afraid of your engine mounting set-up. I would guess that servo grommets are too soft to live very long when used to mount that 60! Most people have their best luck when the engine is rigidly mounted in the hull. If you wish to reduce noise you should investigate some commercial European style flexible engine

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POWER BOATING

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mounts. The ones I have seen are much stiffer than the one you propose to use.

★

Mr. Power,

I would like to open up the intake port in the crank of my K & B 3.5 Marine. How far can I open it up and do I take metal off both sides of the opening or off of only one side? Also, is there anything else I can do to make it run faster? Any help would be greatly appreciated.

Thank you,
Harold Epting

As it comes from the factory the K & B 3.5 has an intake opening timing of 40 degrees ABDC (after bottom dead center) and a closing timing of 60 degrees ATDC (after top dead center) for a total crankshaft duration of 200 degrees. These intake timings are very typical of modern racing engine intake specifications. The engine, in its stock condition, puts out its maximum horsepower on high nitro fuel in the 22,000 to 23,000 rpm region. If you delay the closing timing you will tend to move the max power rpm higher but you will also reduce the low speed power of the engine. You almost never get something for nothing.

How far you can increase the closing angle depends on your boat and propeller combination. You will find that as you open up the intake timing you will have to go to a smaller load (prop pitch or diameter) on the engine so that you can get to the higher rpm the engine wants to run at. If your speed goes up as a result of the higher rpm then you have done a good thing. If you have to use a prop with reduced pitch you may find that the higher revs do not make up for the decrease in

prop pitch. As a result, you go slower. In this case you have gone too far and have done a bad thing. Only experimenting will tell you what is best for your combination.

If you are circle racing, acceleration is usually more important than top speed. In this case a more conservative (stock) intake timing is used. If you are interested only in straightaway speed the intake timing can be increased with good results. In any case, go slowly with your cutting. Cut the closing side of the crank so that you increase the timing about two to three degrees at a time. The engine will lose its torque if you go too far, and you will then have to buy another crank. I personally have never found that a closing timing of later than about 70 degrees has been beneficial. Remember also that all the timing in the engine (bypass, boost, exhaust and intake) are interrelated and that just changing one will not optimize the production of power. All the timings should be moved (more or less together) to achieve your specific optimum match of engine, boat and prop.

I suggest that you read Gordon Jennings' book "Two-Stroke Tuner's Handbook" to get further details about engine timings and their relationship to the operating rpm of any engine. This book is available from Shamrock Imports (P.O. Box 26247, New Orleans, Louisiana 70186) and is a must for the serious engine hacker. The opening intake timing is relatively insensitive and is fine as it comes from the factory. I would not recommend changing this side of the crankshaft opening.

★

Howard Power:

Short and sweet. Here goes! First model, like 7.5 K & B outboard. Will this work okay on a Dumas Scarab 60 Deep Vee? What should I look for as

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best D.V. for this motor? Thanks a bucketfull. Like your column!

Michael Zandee
Grand Rapids, Michigan

The selection of a K & B 7.5 outboard engine is a good one for the boating novice. It is a very nice package since you won't have to worry about the usual inboard drive line and rudder set-up. The engine, however, cannot be expected to produce as much power as a 7.5 inboard racing engine set-up with its tuned pipe. It certainly won't produce enough power to move the Dumas 60 Scarab Deep Vee hull to anything close to satisfactory racing speed. Even twin 7.5 outboards would be marginal power for this large boat that is designed for much larger and powerful engines. Twin engines are not usually recommended for the novice. My advice is to select a different hull for your first project.

I have not run a 7.5 outboard deep vee but there are some existing hulls that probably would work satisfactorily. If you want your boat to go fast I would suggest that you pick a hull that is somewhat smaller than those currently being used for 7.5 inboard set-ups. I would pick one of the larger 3.5 size inboard deep vee hulls. Something with a length of 30 to 35 inches would fit the power output of the 7.5 outboard. The boats that come to mind are the Dumas Deep Vee 40, the Muck Lil Streaker, Wardcraft 33 Offshore Deep Vee, or the Norco Super V. There are probably others I have forgotten. The larger 7.5 inboard hulls are about 40" in length and would be good for beginners because of their stability. I would try to make these larger boats as light as possible for best performance. The Pinckert Chaparel Deep Vee, the Muck Spartan and the Prather 40 Offshore hulls would probably work out fine for your purposes. The radio box should probably be mounted forward of its usual inboard set-up position. I would make the box removable and experiment with its position to find the best Center of Gravity location. I would try the radio box located about where the inboard engine would be normally located for a first try. I would consider using two servos to turn the engine, especially if you intend to use large props close to the surface. This may not be needed if you run a small prop submerged. I hope this helps you out somewhat. Be sure to give us a report on how your project works out.

★

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POWER BOATING

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Well, that about does it for another month. Send your questions, comments, race results, etc., to the address at the end of this column. If you desire an answer before magazine publication enclose a self addressed, stamped envelope so I may answer your letter by return mail.

Howard Power, Hobbies Unlimited, 766 Broadway, Seaside, California 93955. (408) 394-1200. □

SUNDAY FLIER

from page 12/11

did not count the fun aspect of it. Needless to say, the entry prizes were all we came home with. Johnny got a bad case of contest nerves, and the ground came right up and smacked the Tintoretto hard enough to break the crankcase of the Saito .40! We packed up our troubles in our old kit bag and slunk silently away into the afternoon sun. Hobby Shack was good enough to print a picture of the Tintoretto in their flyer; RCM printed one also.

Well, that's the story of the Tintoretto or "Tin Terato," as I called it in the documentation. You more or less asked for unusual planes in your last column, and if this is not an unusual plane, I'll throw in with you.

I have also included pictures of some of the other planes that I have built in the last year. As you can see, I like large stabilizers. The Tintoretto is fairly small, but the others range from 40%-80%.

Since the contest, Johnny has lost interest (hopefully temporarily), so I have started over with the trainers and am presently teaching myself how to fly R/C. I still have trouble with the ground coming up and smacking my planes once in awhile, but I have several of them with which to experiment. I cannot get into the plastic

films (MonoKote, etc.), so all of these are covered with silk and colored with dyed dope.

This letter has turned out to be lengthier than I intended, but I felt the whole story had to be told in order to convey the proper picture.

*I have enclosed a copy of the "documentation" (**see Editor's Note below**) that I sprang on the judges at the 4-cycle contest. Do not try to read it in a hurry or you will lose the thrust of it. All of the names used are either double entendre or are taken from famous fiction (Sherlock Holmes, etc.). At first, the judges did not quite know how to react; one of them said incredulously, "what **is** this?" But as soon as they realized it was a leg-puller, they joined right in and even gave me one point for Sir Beamon's crutch.*

We totaled some 24 points out of a possible 200, which we claim is the lowest score ever awarded in an AMA sanctioned Stand-Off Scale contest, but we sure had fun. Hoping you too will have fun reading the "documentation," I remain,

Yours truly,
J.J. Shaffer
(alias Sir Beamon Leverscale)

P.S. Upon looking back over this whole thing, I believe I should be qualified to receive the "First Annual, Ken Willard, Golden Pitchfork Award."

(Editor's Note: Due to the length of the "documentation" package, it was impossible to include it. It was written up very cleverly and with much thought put into it. Our congratulations to Joe Shaffer.)

In closing, let me say, Joe, that you may have the germ of an idea with that "Golden Pitchfork Award." There is no question about it, you can throw a meadow muffin as well, if not better, than any Sunday flier I know of. However, it's still early in the year. Who knows? Someone may want to challenge you. How about it, Sunday fliers? Any takers? □

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Drifter II come with supplies for a 72" wing and list additional parts that may be purchased and used to modify the wing for a 2-Meter span. It may also explain why actual 2-Meter kits such as the Metric and the Sagitta 600 cost as much or more than many standard class sailplanes.

(2) Ease In Building — While a 2-Meter sailplane, due to its size, has fewer parts than a comparable Standard Class sailplane, this is where its advantages seem to end. Most 2M sailplanes designed for the beginner are of exceedingly light (weak) construction. As a consequence, severe warping, constant stab and fin repairs, folded wings, and fluttering surfaces are a very common problem. This writer has seen as many as a half dozen beginners' 2M sailplanes bite the dust in one day due to folding wings. There is less space inside a 2M sailplane to install the necessary batteries, receiver, servos, etc. This becomes a serious problem with some of the newer designs, such as the Sagitta 600, which may force the builder to buy new (smaller) equipment. The problem worsens when using spoilers, a captured towhook, and/or ailerons.

(3) Easier To Fly — Most 2M sailplanes designed for the beginner fly more slowly than a comparable Standard Class design. It is very common to see a beginner (with a Drifter II, Gentle Lady, 2X2, etc.) have a problem flying in even moderate (10 mph+) winds. The inability to penetrate upwind gets the beginner into trouble, greatly reduces the number of flyable days, and puts him at a competitive disadvantage on windy days due to his lack of ballasting know-how.

(4) Transportation — Many 2M sailplanes are harder to transport than even many Unlimited ships due to one piece wings and permanently attached horizontal stabs. The longer wings and attached stabs of the 2M ships seem to have a propensity for self-destructing on the way out of the house. Contest goers become particularly aware of the problem of transporting their 2M if they carpool to contests.

(5) Usefulness and Versatility—For more advanced soaring, 2M sailplanes suffer by comparison to larger sailplanes. Larger sailplanes are preferred by most pilots for FAI record attempts, cross country, LSF duration,

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goal and return tasks, and F3B competition. This is because of their better visibility at altitude, higher L/D ratios, lower sink rates, and availability of space for a high capacity battery or a thermal sniffer.

(6) Contest Problems — The running of three-class contests very often results in class participation levels which are too low to satisfy some LSF and NSS requirements (the minimum number of entrants). Also, in order to recruit participation in the 2M class, some contest officials have restricted participation to Standard ***or*** *Unlimited* ***and*** *2M (pick two). This means that the pilot must fly in 2M if he wishes to fly in two classes. There are some pilots who, in such cases, remain at home rather than come to fly in one class. They either don't have a 2M sailplane or don't wish to fly in 2M.*

The purpose of this article is not to argue for the elimination of the 2M class, nor is it intended to breed active opposition to 2M. It is the intent of this writer to point out that perhaps it is time for us to re-evaluate our approach to the 2M class and see if our earlier beliefs about 2M have been borne out in actual practice. The time has probably come to let the 2M class fly or die on its own merits without the special rules and active promotion, etc., which may be largely responsible for its popularity in the first place. Many people have assumed that 2M is a better bet for the beginner because it seemed like common sense. Often, things that seem like common sense don't hold up under a closer analysis. The recommending of 2M to beginners should not be done automatically nor simply because of a somewhat lower purchase price on the 2M kit. When it comes to actual practice, the 2M sailplane may in fact be harder to fly, require more repairs, and be more costly than a Standard Class sailplane of comparable design.

Well, you can imagine that quite a few rose in defense of the 2M sailplane. No one really disagreed that 2M was an awkward size.

Jim Benson observed: "Anyway, why are they 2-Meter designs and not 2-yard designs? Whoever boosted 2-Meter appears to be the culprit here. On another tack, isn't it time we had balsa in 1-meter lengths and covering in 2-meter rolls? If you can't solve the problem, change the problem."

Cal Posthuma observes that the folding of wings is more of a lack of

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experience by the beginner in construction and launching technique than the fault of the plane. He also notes that relative to ease of flying: "The 2-Meter airplane is responsive, but not to the point of being dangerously so."

Mr. Benson also says: "One-piece wings and attached stabs have one big advantage: lack of complexity. We easily forget the beginner's bewilderment when he opens a box containing over twenty pieces of wood, none of which resemble the picture on the box . . . Transportation difficulties are shared by Unlimited ships with **two** six foot wings **and** a six foot fuselage. . . . I must agree that wind is the nemesis of the inexperienced flier, but putting a larger airplane in his hands only means it will take slightly longer to lose sight of it downwind."

The discussion of contest problems seemed to focus more on traveling hours to a contest for just three flights, rather than problems generated by a 2-Meter class. Where multiple entries are permitted, many fliers enter two just to get twice as many flights. Whether it makes sense to permit 2-Meter and Standard or Unlimited, or any two, is a matter of personal preference. Many larger contests have 2-Meter **or** Open as entry choices because of the time limit due to a large number of contestants. Here, the 2-Meter class seems to be able to stand on its own by preference of quite a number of sailplane pilots. I suppose they feel their chances are enhanced because the hot shots will fly in Open, but this is not always true.

One very notable response came from a very distinguished sailplane designer and kit manufacturer, Ed Slobod. Mr. Slobod is President of the Pierce Aero Co. and has designed such well-known sailplanes as the Pierce Arrow, Paragon, and Gemini MTS. Some of Ed's comments should be passed on:

"About 10 years ago I designed and kitted a sailplane called the Pierce Arrow, and called it a 2-Meter sailplane, under the mistaken impression that such a class existed in Europe. It was not my intention to start a 2-Meter class here in the U.S., but rather to kit a simple, easy to build and fly sailplane primarily for the newer builder/flier. Since the Southern California area has never flown contests with separated classes, it would make no sense to fly a 2-Meter

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Especially ludicrous is the AMA Standard and Modified Standard.

One thing a lot of people miss is the potential of a 2-Meter sailplane as a contest machine, even in thermal competition against Standard and Open size ships. Except in those instances where you must out-L/D a bigger, efficient sailplane, the 2-Meter job can be more than competitive. It has low roll inertia and is very responsive in working thermals, especially small ones, near the ground. Its responsiveness gives it better landing potential than the larger ones.

Fliers just don't practice with and develop skills to use the 2-Meter machine. Those who do, have achieved notable success. Dave Johnson of Portland, Oregon, regularly blew away competition in Open contests last year with his 2-Meter K-Minnow. John Brown of Anaheim, California, has, for the last two years, been the NATS Standard Class National Champ flying his 2-Meter Icarus. Erik Eiche of Vancouver, B.C. Canada, won the prestigious Northwest Soaring Society Annual Championship, flying a Gentle Lady. Erik beat out a whole herd of big, efficient aileron machines, including Dodgson's 134" Windsong. While all the top finishers maxed every flight, Erik snuggled his Gentle Lady right up to the spot every time, and zipped the bacon right from under the noses of the best fliers in the Northwest.

Anyway — I'm out of paper and you're probably bored with the whole thing by now. Next month we'll give 'em heck Harry! Catch you next month, all being well.

Howzat! □

FROM THE SHOP

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personal and highly emotional activity. In the course of our work we handle a large number of radios. We find it very interesting that each transmitter not only has its own "feel" and balance but that "feel" varies with individuals. Sometimes the stick length is too long or too short to be comfortable but with only a 1/8" adjustment it fits perfectly. Did you know that most transmitters have a

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stick length adjustment capability? So what? We would like to make a suggestion. The next time you have the opportunity at a hobby shop, or trade show, or at the flying field, to see a new or different transmitter, ask if you may handle it. Don't look at the transmitter, gaze off into space and pretend you are flying your latest pride and joy. You just might find something more comfortable that will allow you to relax and increase your flying pleasure. Try it, it certainly won't hurt.

★

As a 1983 New Year's gift to the radio control modelers, the Federal Communications Commission allocated a new group of frequencies for model usage. This concession from the FCC is the culmination of several years of effort by members of the AMA Frequency Committee. Incidentally, there were quite a number of dedicated individuals who served on the committee over the years who voluntarily gave of their time, expertise, and money to obtain the additional frequency franchise. To these unsung heroes, we offer our sincere thanks. A special thank you to the quarterback who, in the last quarter, carried the ball over the goal line, Mr. Bob Aberle.

We of the proletariat find the legal mumbo jumbo of governmental decrees to be quite confusing. From several sources we have gathered interpretations of the new frequency rules that are in a language understandable to us. Highlights are as follows:

All existing equipment is usable through December 31, 1987. On January 1, 1988, the FCC rules us off the existing seven frequencies

permanently.

All existing equipment is usable from January 1, 1988 through December 31, 1990 with a change of crystals and re-tuning to one of the new "channel" frequencies. On January 1, 1991, all receivers that exist now will be made obsolete. Transmitters, as they exist now operate on a narrow enough bandwidth to be usable forever with crystal and tuning changes.

The following manufacturers have invested in spectrum analyzers and can convert and tune your existing equipment for use on the new channels: Airtronics, Circus Hobbies, Futaba, and World Engines will exchange crystals and re-tune for $10.00. Kraft will exchange Tx and Rx modules and re-tune for $25.00-$30.00 --- depending on series. Note: Most radio repair shops do not have the equipment necessary to tune to the narrow limits.

It is strongly recommended that anyone on Green/White, (75.640) get off it as soon as possible as the FCC has authorized special industrial, manufacturers, and railroad radio services as well as eleven "guard band" channels to use frequencies that have a high harmonic interference potential with 75.640. Of course the seriousness of this situation will vary with the area where you live or fly.

One important caution: The new FCC rules imply that frequency changing by modelers is possible. That's not quite so. The new FCC rules permit "removing and inserting a plug-in module that is part of a type-accepted R/C transmitter," but it does not refer to crystal changing.

The AMA legal counsel's interpretation is that transmitter frequency changing by crystal swapping alone is only permissible if it involves a unique crystal configuration which is not

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interchangeable between manufacturers because it is common only to the specific transmitter design which a manufacturer has gotten type-accepted by the FCC. Otherwise, the crystal and other accompanying frequency determining components must be exchanged in a module form. Regardless, most manufacturers have come up with economical plans to convert existing equipment to the new frequencies, for those who don't want to wait five years until that becomes necessary. The old and new can operate compatibly, provided we use common sense.

Note: The new frequencies can use either AM or FM. This should not cause problems since, on any one frequency, at any given time, the operation will be either, not both. Thus, compatibility is a matter of frequency (channel) numbers rather than whether AM or FM is in use.

The AMA HQ staff is distributing a new Frequency Identification and Control System plan which will help you understand the exact nature of the new channels. Along with that, a four color pair of summary charts has been released containing all the basic information on both the aircraft (72 MHz) and the non-aircraft (75 MHz) channels suitable as an easy reference document.

Our readers may obtain this material by sending a written request and enclosing a legal size self addressed stamped envelope (SASE) to Academy of Model Aeronautics, 1810 Samuel Morse Drive, Reston, Virginia 22090. (703) 435-0750.

Suggestions: Study the new channel numbers and color codes on the chart. Learn how the new 72 MHz frequencies relate to the old. Get together with other RC'ers, particularly in club meetings, and develop new frequency controls (clothespin or other type) for your flying site. Think seriously about frequency monitoring as a means of **knowing** who is on what frequency.

For the first time we have more legal frequencies than the number of models we can fly safely at a typical club field. Think about that and the need for keeping track of all the possibilities. Adapt to the new situation in your area carefully. Remember that channel numbers refer to new frequencies only.

We hope that our words on the radio scene have been beneficial. See you next month. □