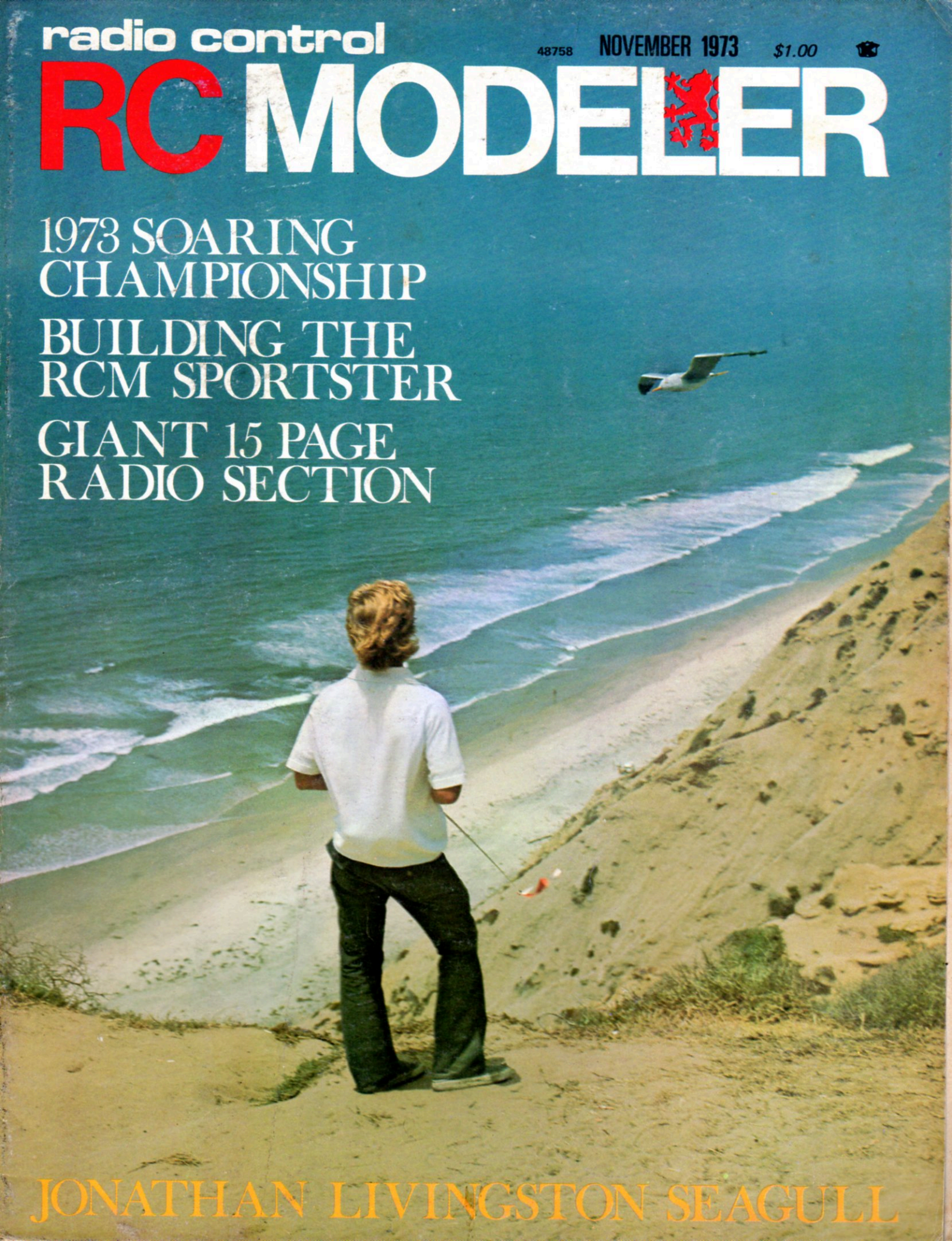
radio control
RC MODELER
48758 NOVEMBER 1973 $1.00

1973 SOARING CHAMPIONSHIP

BUILDING THE RCM SPORTSTER

GIANT 15 PAGE RADIO SECTION



JONATHAN LIVINGSTON SEAGULL

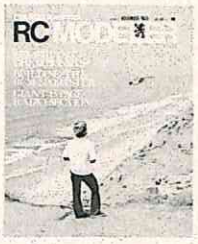
RC MODELER

FEATURES

DEPARTMENTS

VOLUME 10 1973 NUMBER 11

NOVEMBER



THIS MONTHS COVER

Mark Smith flies Jonathan Livingston Seagull for RCM's photographer, Dick Tichenor, at Torrey Pines in Southern California. For details of the part RC played in the movie, see page 33.

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FROM THE SHOP

DON DEWEY

Each year, the November issue of the various model publications carry complete photo coverage of the 1973 National Model Airplane Championships. Since RCM's Reader Interest Survey indicate that virtually all RC enthusiasts buy two or more model aircraft publications we felt that we would depart from our usual procedure of covering the Nationals in order to avoid duplication of the same event by all five magazines. In other words, a lot of space is used by each of the magazines resulting in a multiple duplication of efforts which, in turn, results in the deletion of other good material. For this reason, we decided in advance to cover the 1973 Soaring Nationals in detail and recommend that you obtain the November 1973 issue of Model Airplane News which will provide complete coverage of the 1973 power Nationals. In this fashion, we will not be duplicating each others efforts and both Model Airplane News and RCM will be able to present additional information that we would not otherwise be able to carry in the November issue.

Our congratulations to all of the winners in both the Soaring Championships and the National Model Airplane Championships for 1973.

* * *

In response to our recent Reader Interest Survey for a general question and answer column, the format of From The Shop will be changed, commencing with this issue, to include questions from our readers on almost any subject of RC with the exception of engines and matters pertaining to scale aircraft. The latter two subjects should be addressed to Clarence Lee and Dave Platt, respectively. In this column, Dick Kidd and myself will attempt to answer your questions concerning construction techniques, finishing, radio installation, flying, and just about anything else of general interest concerning RC aviation. Since we currently answer approximately 500 letters per month at the present time, obviously all of these cannot be presented in this column. Those letters selected for publication will be those that would apply to a number of individuals and the answer to which would benefit more than just the author of the question. Be sure to address your queries to the Editors, From The Shop, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024.

The first letter, this month, while not of a technical nature, is one that we thought should be brought to your attention. It is being reprinted in its entirety and was sent to RCM by Walter E. Laich of Houston, Texas, a member of the AMA and LSF:

Dear Don,

I thought I would bring the following incident to your attention.

First, some background: I am a current member of the AMA, #55441, and a member of the Manned Spacecraft Center RCC, an AMA chartered club. On May 13, 1973, the club hosted a sanctioned meet ending with an Open Pylon event. I was the No. 1 pylon judge and had two flagmen with me. Now to the incident.

Because of frequency conflicts we had to have several one plane heats. On one such heat the plane hit the No. 1 pylon and then me. I received extensive injuries to my left hand and face; neither flagman was hurt. Emergency surgery was performed on May 13, and an additional operation on my hand was required on July 9. The C.D. filled out all paperwork at the time of the accident, the pilot did not have homeowners (insurance), and the AMA sent the completed accident form to Hartford on May 31. I was finally contacted by the local agent some two weeks later. This claims agent seemed to think this was some joke – a "toy airplane" was what he called it. Even after I told him of the extent of the injuries he still had a less-than-serious attitude. I called him a week later and he still did not know even the name of the man who had flown the plane. I had written AMA HQ and had obtained a copy of the accident report so I gave him the name and address of the pilot, who was from out of town. He, the agent, then told me he would write his people in that town and they would get in touch with the pilot. The agent would not even call the pilot long distance even after I asked him to and had offered to pay for the call myself. I called the agent a week later and was told he had heard nothing from the out of town agents. I waited another week, called, and again got the same story.

At this time I appealed to my fellow club members for help. Two members picked up the ball for me and called AMA HQ. After three calls AMA HQ finally checked with the insurance company. On the day after the third call the claims agent settled the claim – $1,600.00; this is what my injury had cost in medical bills alone. What really made me mad was this agent telling me, on the day that the claim was settled, that the insurance company could take me to court and would win a decision against me so I had better take the settlement and sign the release form. I did so, but not because of this "threat."

AMA has always used the insurance coverage as a major selling point for membership. After this little encounter many of my club members are taking a long look at it. It will be 6 months to one year 'till I have anywhere near the full use of my hand and, when I start flying RC again, I will have an interesting story to tell. Maybe this kind of claims action is standard but I wanted AMA members to realize what to expect if they need to use this insurance.

Yours truly,
Walter E. Laich
Houston, Texas

Since we have not heard the other side of the story, we cannot render an opinion on this individual case. However, we have received several complaints from AMA members during the past two years concerning their claims on AMA insurance. It is for this reason that RCM has been discussing with several insurance companies, the possibility of offering RCM readers a comprehensive liability group insurance policy as is done by other model magazines in foreign countries. This liability insurance would be offered on a group basis using RCM as the medium and at no profit to the magazine. When this program is firmed up we will let you know about it via the pages of this publication.

Dear Mr. Dewey,

In the RCM Flight Training Course, a most valuable book, I am confused on one point in the chapter on Covering and Finishing. I am completing construction of a RCM Basic Trainer (Bridi Kit) and am ready to finish the wing. I am going to use Microlon and Superpoxy. Can I use Butyrate clear dope as a filler for the Microlon if I break the glaze on the final coat of clear dope via light sanding? Is it necessary to fill the wood under the Microlon with clear dope-talcum mixture? I used to build single channel planes years ago. I covered them with silkspan. The procedure I used then was to apply several coats of clear dope (sanding in-between) with no filler, and I always got reasonable results.

Bill Norton
Rochester, Minn.

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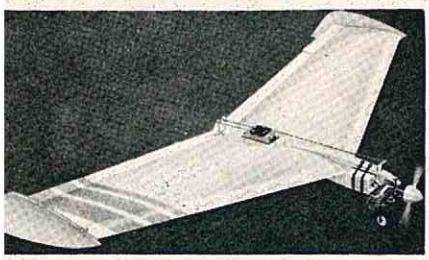
NEW! **Kraft "WINGMASTER" $29.95**
and **"WINGMASTER JR." $27.95**



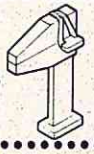
A WINGMASTER builds up in about 5 hours. They are super-simple RC planes for 2 or 3 channels, and use foam wing cores and cardboard covering materials. They'll fly as "hot" or as gently as you want depending upon engine size.

"WINGMASTER"
56" span for .40 - .60 engines. *$29.95*
"WINGMASTER JR."
45" span for .15 - .40 engines *$27.95*

••••••• *Kraft Accessories* •••••••

MODELERS CLAMPS
These handy gizmos are molded of glass-reinforced nylon. Glue won't readily stick to them. Tension provided by rubber bands.

Pair of SMALL Kraft CLAMPS $1.29



LARGE Kraft CLAMP 98¢

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Kraft MANUAL THROTTLE ACTUATOR $2.49

Permits operation of engine throttle without turning on transmitter.

••••••••••••••••••••••••••••••

Kraft ACCESSORY ASSORTMENT $1.95

Contains push rod exits, hatch bracket, flying tab bellcrank, wheel collars, nylon bolts, long and short control horns, bellcranks with bushings.

NEW! Volume II HOBBY LOBBY ILLUSTRATED CATALOG $2.00

Our Volume 2 catalog has more items, more pictures, and better pictures and descriptions of R/C and control-line stuff than we've seen in any other catalog.

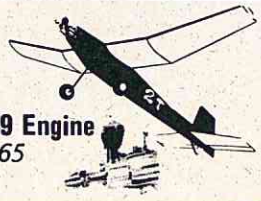
We had a lot of guys tell us that our previous catalog was well worth the two bucks it cost them. Volume 2 is even better.

SAVE $$ ON THESE MATCHED COMBINATIONS

Midwest SWEET STIK
and
Fox 40 RC Engine
Total list value $59.90
SALE **$39.00**

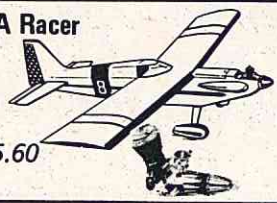
Du Bro "Whirlybird" HELICOPTER
and
K & B 40 RC Engine
Total list value $162.00
SALE **$109.00**

Ace 2T KIT
50" span, stable, 1 or 2 channel
and
Cox Golden Bee .049 Engine
Total list value $22.65
SALE **$17.00**

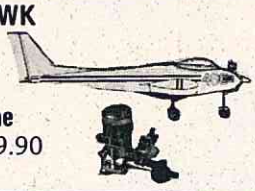


ACE HIGH Glider
70" span, 1 or 2 channels
and
Cox Babe Bee .049 Engine
Total list value $21.20
SALE **$16.00**

Ace UPSTART ½ A Racer
34" span, hot 2 channel and
Cox Tee Dee .049 Engine
Total list value $25.60
SALE **$19.00**



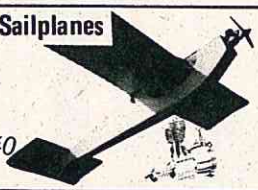
World Engines HAWK 460 Foam A-R-F
52" Span, 4 channels
and
Fox 36 R/C Engine
Total list value $49.90
SALE **$35.00**



Sig PIPER CUB J-3
71" Span,
4 Channels and
McCoy 35 R/C Engine
Total list value $48.90
SALE **$38.00**

Midwest CESSNA CARDINAL A-R-F *All Foam*
and
Cox Medallion .15 R/C Engine
Total list value $40.45
SALE **$28.00**

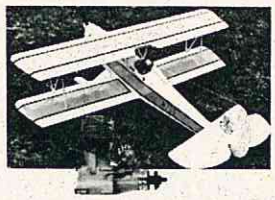
NEW Southwestern Sailplanes "HONKER" *and*
Cox Babe Bee. .049 Engine
Total list price $20.40
SALE **$15.97**



Sterling's Control-Line RINGMASTER *and* **K & B Stallion .35 Engine**
Total list price $23.95
SALE **$17.99**

NEW! ☆☆☆☆ *TWO NOSTALGIC BIPLANES* ☆☆☆☆

Airtronics ☆ACRO-STAR
and
OS 60 RC Engine
Total list price $144.93
SALE **$99.00**



Andrews ☆AEROMASTER II
and
Veco 60 RC Engine
Total list price $119.90
SALE **$79.00**

★★★★★★★★★★★★★★★★★★★★★★★★★

NEW!
Sig "KWIK BILT" RC Super Chipmunk
The new "A-R-F" 4 channel scale plane with unique molded and detailed fuselage halves, foam wings, 64" span for .45 to .61 engine.
Total List Value $39.95

SALE **$35.97**

NEW!
Sig KADET
Attractive 3 channel sport flyer and trainer. 57" span for .19 - .30 engine.
Total list price $23.95

SALE **$21.47**

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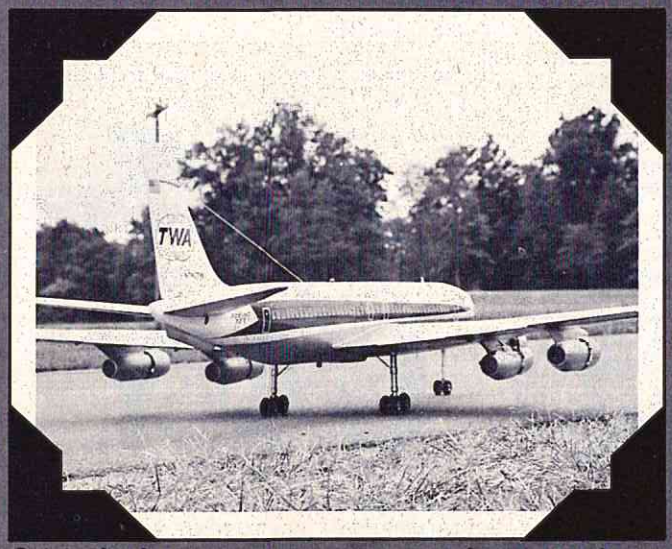
A Page From Dick Tichenor's PHOTO ALBUM

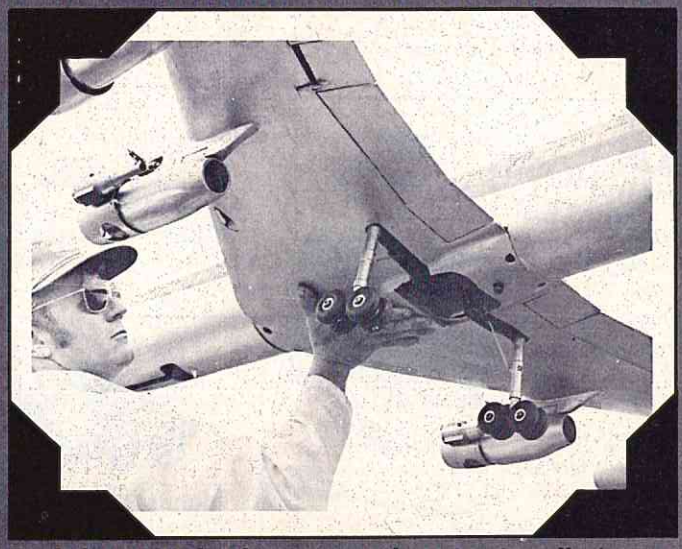
Don't call the F.B.I. to report TWA's missing Boeing 707! This is a beautiful model designed and built by Paul Martin of Springfield, Ohio.

Flying weight is 15 pounds. Martin's 707 has flown several times.

Power is two Super Tigre .60's mounted in inboard pods.



Original design retracts operate from crankcase pressure stored in accumulator.



Paul shows his landing gear and engine installations.

engine clinic

By Clarence Lee

Dear Mr. Lee:

I have been interested in RC hydroplane model building for some time. Last year, I purchased two Rossi, water-cooled engines. I had planned to mount both Rossi .60 engines in one hydroplane. I received one engine that was designed for a tuned-muffler with larger cylinder-liner ports that allowed the engine to discharge the burned fuel more readily than the other engine. There also was a difference in the exhaust port on the crankcase casting in that the port was milled allowing freer discharge of consumed gases from the tuned engine.

Can you please give me information on the differences in the design of these two varieties of the Rossi .60 water-cooled, racing engines. Also, I am finding it very difficult to obtain spare parts for these engines. It is my understanding that there is only one, franchised, wholesale distributor of Rossi engines in this country. I have had no luck in obtaining any spare parts nor are they able to give me any indication as to when I could expect to receive any.

Could you please explain the reasons for this situation and suggest some alternative measure I might take, such as distributors I might contact, etc.

I enjoy your column in R/C Modeler very much!

Thank you.

Sincerely,
Daniel L. Murray
Moberly, Missouri

One thing puzzles me, Dan – if one of the Rossi's was not what you had ordered, why did you keep it? Every month I will get one or two letters from modelers who have purchased an engine – usually from one of the mail order houses – and did not receive the engine they were expecting. The letter I receive is usually one of great disappointment and general unhappiness with the company from whom the merchandise was purchased. And, yet, no mention is ever made of having contacted the company from whom the engine was purchased. So the point I am trying to make here, gang, is simply that if you do order an engine, or any hobby merchandise for that matter, and it is not what you expected, then send it back right away. There are several mail order houses whose business ethics leave a lot to be desired, but you will not see their ads in R/C Modeler. If you ever purchase an engine or product from an advertiser in R/C Modeler and it is not exactly as you expected, then let us know. If your complaint is legitimate and the company will not exchange the merchandise, you will not be seeing their advertisements in RCM. In your case Dan, Bill McGraw of 'Bill's Miniature Engines' is the sole importer of the Rossi line of engines in the U.S. I do not know the circumstances behind the purchasing of your engines, but if one was not the engine you ordered I am sure Bill would have replaced it or refunded your money had it been returned. There is nothing unusual about Bill's Miniature Engines being the only U.S. importer of the Rossi line of engines. World Engines is the only importer of the Super Tigre and O.S. line, MRC of the Webra and

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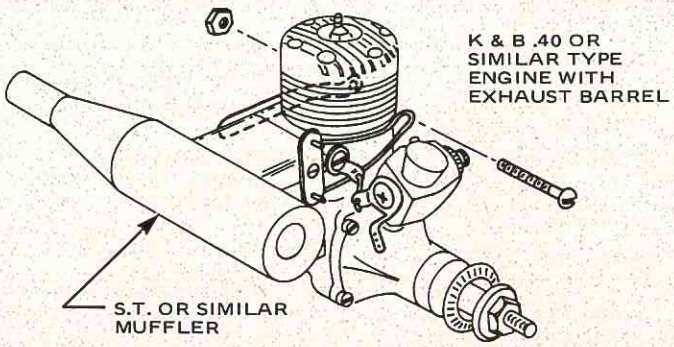

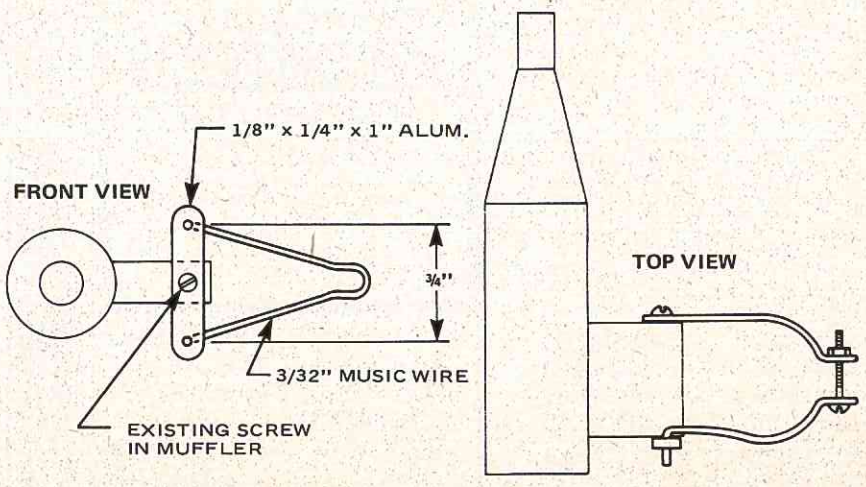

SUNDAY FLIER

KEN WILLARD

This time around I want to turn the column over to a couple of "guest" editors. They will be surprised a bit, since they sent the material to me to use any way I saw fit – but they may not know that I thought the material so interesting that it should be shared with you.

First off, let's hear from the Manned Spacecraft Center Radio Control Club in Houston, Texas. They're kind enough to include me on the mailing list for their newsletter, and the last couple of issues had an article from Bert Striegler's column, FEEDBACK, on how to design a glider. Try it. It works.

You can design your own glider if you follow a few basic principles as illustrated below.

Most dimensions of an airplane depend entirely upon the wing design. All of the guide lines outlined are, therefore, related to the wing. The size of the horizontal stabilizer and the vertical stabilizer are entirely related to the wing.

The following definitions will be helpful. All are in inches unless otherwise noted.

C = wing chord (distance from leading to trailing edge)
S = wing span (tip to tip)
SS = wing semi-span (½S)
AR = aspect ratio (ratio of S divided by C) = 12 typical
CS = cord of stabilizer (both vertical and horizontal)
D = dihedral under each wing tip
NM = nose moment (distance from leading edge of the wing to front of the nose)
M = moment arm (distance from trailing edge of the wing to leading edge of the horizontal stabilizer)
SA = horizontal stabilizer span

Using the above definitions, one can easily calculate "the outline" or "plan form" of an airplane that is guaranteed to fly. Now, let's take them step by step. First decide on the wing span (S) that you want. For the sake of simplicity, take a span of 12'.

1. $C = \frac{S}{AR} = \frac{144''}{12''} = 12''$
2. NM = 1¼C = 15"
3. M = 2.5 – 3.0C = 30" to 36"
4. CS = 2/3C or 8"
5. D = 1¼" for each foot of SS. In this case SS = 6" x 1¼" = 7½"
6. Height of the vertical stabilizer = 1 or 1¼ times C
7. SA = 3C = 36"

The above "plan form" produces a 12' span glider with a fuselage length of NM+C+M+CS or 65". This is really a big one similar to the 12' Gulf Coaster.

THE POINT IS THAT THE GLIDER COULD HAVE BEEN ANY SIZE DEPENDING ON THE CHOICE OF S.

SOME DEFINITIONS:

R = Rudder (moving part of the vertical stabilizer)
E = Elevator (moving part of the horizontal stabilizer)
IW = Incidence of the wing (better call me if you don't know what this one is!)
IS = Horizontal stabilizer incidence.
WO = Washout of the wing under the trailing edge of the tip (negative tip incidence in relation to the rest of the wing)
TP = Tow hook placement
CG = Center of gravity (balance point)

Assuming you have a rough outline all calculated, let's complete your design.

R = ½ CS, or 4" for our hypothetical 12 footer.
E = ¼ CS, or 2".
IW = 6 degrees or about C/9 inches or 1-1/3 inches.
IS = 2 degrees or about CS/24 or 1/3 inch.
WO = 3 degrees or about C/18 or 2/3 inches.
TP = Zero to 1/10 C behind leading edge of the wing.
CG = 30% C behind leading edge of the wing.

Now, you need an airfoil. The good ole 10% Clark Y is an excellent airfoil that offers good performance along with easy handling. Use your favorite as airfoil selection is not nearly as critical as some people think.

You can even design your own glider airfoil. Draw a line with a length of C. Now, mark off 1/3C from the "front." At 1/3C, draw a vertical line equal to C/10. Connect the top of this C/10 line to the rear of the C line with a straight line. Now, draw a gentle curve from the top of the 1/3C vertical line to the "front," or leading edge. If you follow instructions, you just designed a darn good airfoil for your purposes. Round the leading edge slightly and get to work!

The only thing missing is a way to come up with the profile lines of the fuselage – and, to a large extent, that's a matter of individual esthetic desire which you can come up with on your own. Naturally, that assumes it will be within the normal range of glider fuselage cross sections.

★ ★ ★

My other "guest" editor is none other than the world famous Walt Good himself. I recently received my first letter from Walt since he went to Germany – he's not what you would call a prolific correspondent. But, the story of his experiences really fascinated me and, in particular, I was very intrigued with an enclosure Walt sent that outlines the contest rules for a combination duration, distance and speed competition for sailplanes as used by the Italian soaring organization, U.S.A.L.

U.S.A.L. RACING FORMULA FOR RADIO-CONTROLLED GLIDERS AND POWERED GLIDERS

CONTEST RULES

1. Definition:
This contest is a multi-task event for radio controlled gliders and powered gliders, which includes three tasks: A – Duration; B – Distance; C – Speed.
2. Contestant:
Only the operator of the radio gear is considered as contestant.
3. Competing model:
All tasks must be completed by each contestant using the same model, without any replacement of fixed or moving parts.
No spare model is allowed.
All parts of each model will be inspected by the Contest Directors.
Removable ballast is allowed, provided it is completely contained within the model.
4. Model Characteristics:
Maximum projected area (wing and stabilizer): 150 sq. dm.
Maximum flight weight: 5 kilos.
Minimum surface loading: 12 gram/sq. dm.
Maximum engine displacement: 1.8 cubic cm.
Minimum flight weight for powered gliders: 100 grams per cubic centimeter of engine displacement.
All parts of model must be closed.
All fuels allowed, except those containing Hydrazine or any other hazardous ingredients.
5. Radio Gears:
Only radio gear with superhet circuits according to the Italian law must be used.
Only contestants with a valid radio operators license will be admitted.
6. Simultaneous Flights:
More than one model will be allowed to fly at the same time, depending upon frequency of radio gears and number of judges and time keepers available.
7. Flight Order:
The flight order shall be arranged with a draw and in accordance with the frequency of the radio gears, in order to allow simultaneous flights and avoid any interference.
8. Task A – Duration:
This task must be completed within 8 minutes from call by the Contest Director.
Maximum length of tow line is 150 metres.
Maximum engine run is 40 seconds.
Aloft time will be kept after tow release or after end of engine run.
One point per second of flight up to a maximum of 360 seconds will be given.
One point penalty will be given for every second exceeding six minutes (360 seconds).
For models still in the air when the 8 minute time expires, the elapsed time only will be taken into consideration without any additional points for precision landing.
No score is given when model lands at a point located more than 100 metres from the landing spot.
Additional points are given for landing depending upon distance from the landing spot, according to the following tabulation:

Distance from spot (metres)	Points
1	120
2	116
3	112
4	108
5	104
6	100
7	96
8	92
9	88
10	84
over 10	zero

The distance is measured from the nose of the model come to rest within the circle of 10 metre radius.

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CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

The morning flag raising ceremonies at the recent Lone Star Aerobatic Convention.

● The Third Annual Lone Star Aerobatic Convention has come and gone, and I would be very neglectful if I didn't tell you something of this great contest. The important thing about this contest is not who won D Expert, or D Novice, or B, or A, or Stand-Off Scale but, rather, how the contest was run, how the contestants were treated, and how much the several thousand spectators enjoyed the air show held at the end of the competition.

The contest was sponsored by the Fort Worth Thunderbirds and held at T-Bird field on the shores of Lake Benbrook. Contestants came from Arizona, Iowa, Kansas, Oklahoma, Arkansas, Louisiana, and Texas, to compete and to have a good time. No Thunderbird member flew in the competition, thus making available plenty of workers to share in the work load.

The 'scene stealer' had to be the flag raising ceremonies at 8:00 A.M. each morning of the two day event. To the strains of the Star Spangled Banner, the United States Flag, the Texas Flag, and the Thunderbird Flag were hoisted to wave proudly over the airfield. It certainly gave the competition an air of class, and everyone there felt a glow of pride as he watched the flags lifted up the pole. I believe this ceremony should be standard at all sporting events, and our type of events should have this same stature. All of the contestants and their families were given free breakfast and lunch at the field on Saturday, and free soft drinks all day long. Saturday evening they were treated to a free Texas style barbecue. Sunday morning again brought free breakfast, lunch, and drinks. All of this was covered by the entry fee of $10.00. Lake Benbrook being an ideal spot for camping, many entrants brought tents, and quite a few showed up in motor homes, which were stationed all over the parking area. The weather was good, albeit a bit windy, but this is normal at this time of the year in Texas. Three flight lines were used with complete rotation of flight lines judges in order that each flier would be judged by every judge. Flight lines were kept moving and aircraft were in the air flying at all times. Frequency control was tightly maintained and no mishaps happened. Scores were tabulated and posted continuously during the contest. Flying was of the highest order with First Place in D Expert being taken by Steve Helms from Phoenix, Arizona, closely followed (by the width of an eyelash) by Bill Thomas of Bartlesville, Oklahoma. D Novice was beautifully flown by Don Curtis of San Antonio. Bud Atkinson from Kansas took First Place honors in Stand-Off Scale. Trophies were given through Fifth Place in the Pattern events, and through three places in Scale.

The air show was highlighted by a battle between Al Signorino and his Snoopy's Dog House and a dressed up Aeromaster "Red Baron." Naturally, Snoopy won much to the delight of thousands of spectators, but the win was rather hard earned because Snoopy took his share of hard knocks due to the high wind.

Thunderbird President Helmer Johnson, and Contest Director Larry Stanfield, assisted by Past President Monty Moncrief really did a great job of showing how a contest should be run. NMPRA President Ed Rankin handled all of the training and assignments of the flight line judges, and not a gripe was heard from the contestants about judging. It was both accurate and fair. The Thunderbirds normally put on four to six contests a year ranging from Pattern to Fun Fly's to Formula I and 1/4 Midgets, and each contest is well worth attending. Try to make the Lone Star Aerobatic Convention next year – I know you will have a good time.

●

My flying and building has been somewhat restricted for the past several months due to a number of reasons. Foremost among these reasons being that we have recently purchased an old home and are in the midst of an extensive remodel and up-dating job. Sure do wish that I could cover the walls with Solarfilm, and iron it on, rather than clean and paint! What with building an entire new workshop in the super size garage, as well as other additions, it will be several more months before I can really get back to full time building and flying. But, during this time I hope to hear of RCM World War One Scrambles being held around the country. This event should prove to be as popular as Quarter Midgets, and great from the standpoint of spectators. Also, if you missed the Fokker DVII plans in the September issue, then go back and get a copy because, even if you never plan to enter a WW I Scramble, this has to be the most enjoyable airplane to fly that you will ever try. I predict that in the coming year a great many bipe designs for this size aircraft will be cropping up. Now, what we need is a good muffler for the .15 engines. I understand Du-Bro is coming out with one similar to their very simple and popular muffler for

to page 102

RCM-WORLD

SIX CHANNEL DIGITAL PROPORTIONAL SYSTEM

PART II: TRANSMITTER ENCODER AND RF SECTION

BY JOHN MALONEY

R/C Modeler Magazine's new proportional radio is an advanced state-of-the art system that has been designed for you to build - - - and one that provides more precision and reliability than even the most discriminating flyer could demand.

This segment of the RCM-World 6 channel kit article series is devoted to the assembly of the transmitter encoder board and RF section board. Today, in the electronics industry, one is amazed to see the miniaturization and organization made possible by integrated circuits. We introduced one of these integrated circuits in our servo section. We are also using integrated circuits in the decoder.

Our engineering group at World Engines has been working on this new transmitter design for almost a year. This has given us a chance to fly this equipment at approximately 0° Fahrenheit as well as at approximately 100° Fahrenheit. Our chief test pilot is Dave Brown who is making something of a name for himself as a pattern flyer. It is almost mandatory to have a flyer of this quality flying equipment on the test range so that the subtle problems of interaction and minor glitches can be detected. In a high speed Phoenix flying the competition acrobatic pattern, the tiny problems that bug the purest acrobatic flyer are a lot more noticeable than they would be in a .15 powered 3 channel Esquire, particularly if the latter model was being flown by someone who, say, flies only once or twice a month and who has never become really serious about precision flying.

In the introduction some things will be said that are concerned with the concepts of the system that we evolved and, possibly, may sound prejudicial against some other systems that are in production by other R/C manufacturers today. The things we say here are our opinion based on the testing and observations of which we are capable. Above all, we do not profess to know everything about the radio control business nor do we profess to be the judges of our competitors who may very well be our peers. We do accept this opportunity to expose all of our 'secrets' in this kit article for the opportunity of being able to tell you, the reader, why we designed our system in the way we did. Our appraisal of you, the RC'er, is that you are very knowledgeable, very capable of examining equipment that is in the marketplace, as well as in deciding what is good and what is bad and, most of all, what is for you. The day may very well come when we are selling absolutely ready-to-fly radio control models ala the Mattel electric airplane to Moms and Dads for birthday presents for their children. At this point in time it will be an entirely new ball game. But, right now, there are experts in almost every metropolitan community who guide the opinion of the newcomers coming into the hobby and there are very knowledgeable hobby dealers who have excellent electronic backgrounds, as well as service experts for every brand of equipment. So, to all of you electronic people, we say that we designed this radio this way because:

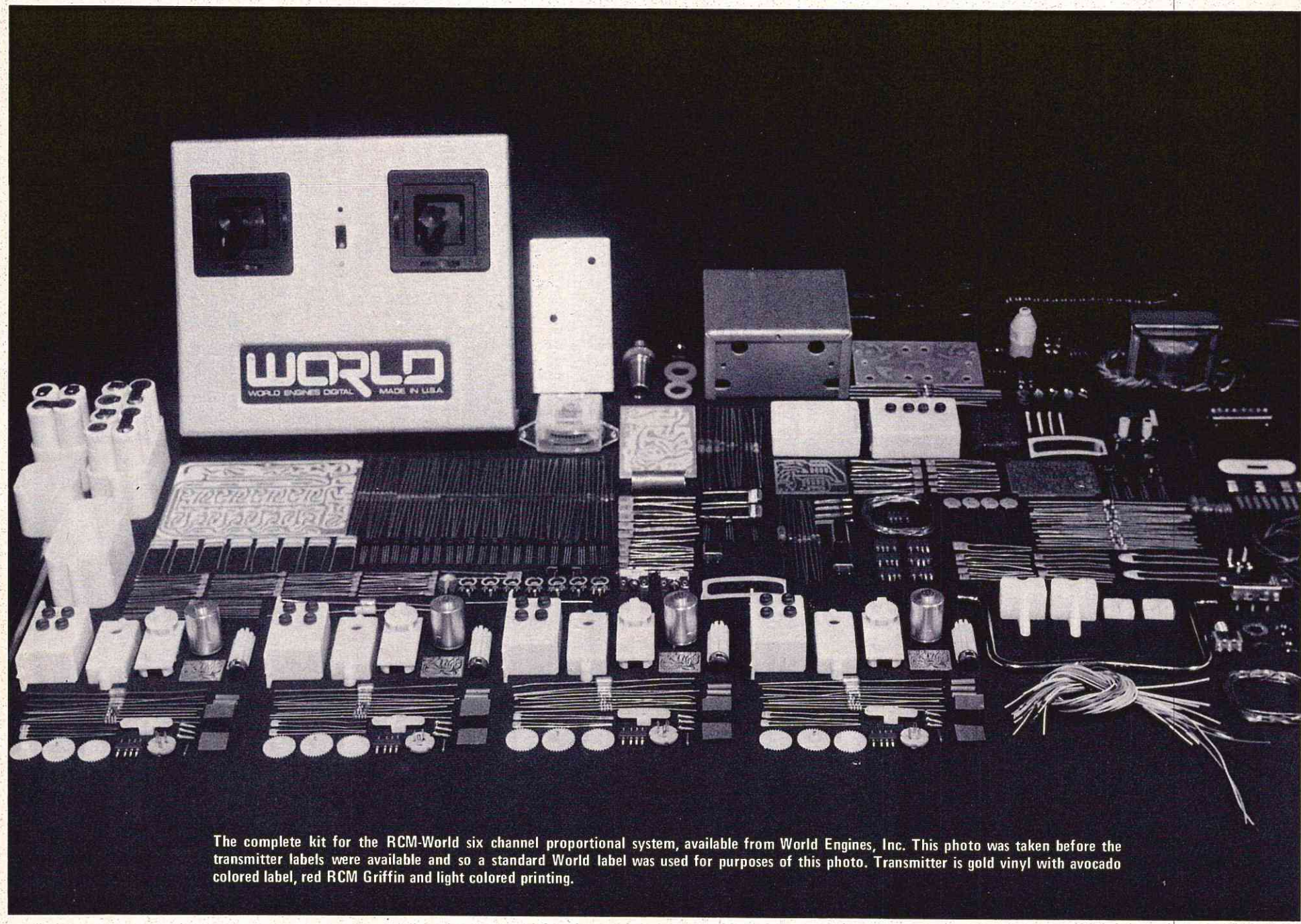
THE RF SECTION

The RF section, presented here, is a very straightforward design of the type that we have been building with success for a long time. We think it is good to offer an RF section which, historically, has not been full of surprises. You will note that we have an aluminum box into which the RF section, and what used to be our filter box, are now integrated. This means we have no transmission line from the RF board to the filter box inasmuch as the RF section is already there. This makes for a more efficient conversion from battery energy to RF out of the antenna. Our appraisal of most systems is that the efficiency factor from input to output is about 50% and our tests indicate that our particular type of mechanical construction is giving an approximate 62% efficiency factor. One of the big things that this does for us is that it permits us to tune the RF board in the transmitter and have the tuning remain intact when the back is put on the transmitter. The relatively large aluminum back exercises the degree of de-tuning on naked circuitry which we are shielding with our little aluminum box.

While we are talking about RF section, let's talk about the antenna for a minute. We have tried a variety of different antenna lengths on this system and feel that the antenna length that we are offering is reasonably close to optimum. While trying variations in antenna length, we also tried some spiral wound antennas and they have been so successful that, at a later date, we plan to market one. The accompanying photo shows a transmitter with one of these antennas. At this time these antennas are not collapsible but they are really short compared to an ordinary antenna.

ENCODER

Much of the research that has been done on this encoder was originally intended for our new coming Expert System and we mention this because we approached the design of an Expert System encoder with the thought that price was no object. We are using this particular encoder with this system basically because this system, like our Expert System, has electronic trim. What you see here, at this time, is not an inexpensive encoder but, rather, a very expensive encoder both from a parts standpoint and from the labor standpoint of joining all parts to the board. At the on-set of our work we eagerly looked forward to being able to use an IC that would condense the encoder to a mere thumbnail full of parts. We tried the Signetics 555 in our timing system and in our circuit and . . . . to page 21



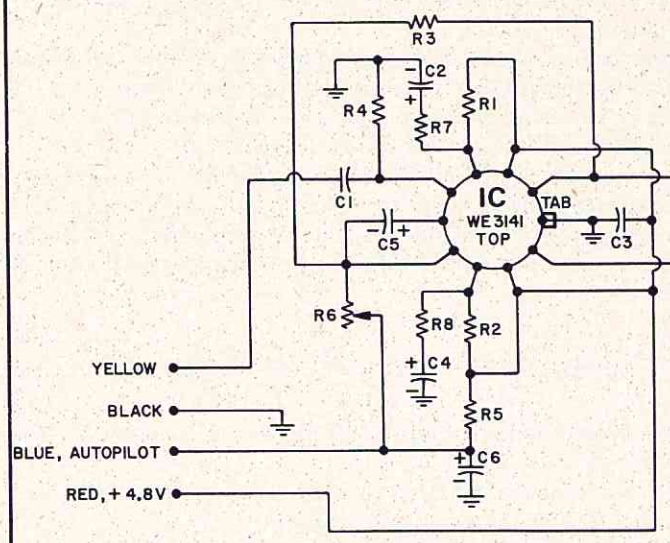
The complete kit for the RCM-World six channel proportional system, available from World Engines, Inc. This photo was taken before the transmitter labels were available and so a standard World label was used for purposes of this photo. Transmitter is gold vinyl with avocado colored label, red RCM Griffin and light colored printing.

found it to be extremely voltage and temperature sensitive. In fact, it just quit altogether at about 35° Fahrenheit, a temperature at which many model builders are still flying. We also tried the Texas Instrument SN74-L-121 and rejected this for its high drain characteristic and its temperature sensitivity which caused a drift in the pulse train pattern. Also, with the above IC's, and with other half-shot systems (half-shot does not mean drunk but, rather, means a variation to the one-shot system) we were plagued with another problem, two more in fact - - - some interaction between channels and non-linear trims. The trim problem is not a factor when using bale sticks with mechanical trim but, in the open gimbal systems with electronic trim, this problem is particularly noticeable, even more so considering that these are the systems used by the contest flyers.

JANUARY '73

At about this date, the writer and our Vice-President and electronic designer, Jim Lanterman (a very discouraged Jim Lanterman), sat down to review our work with the integrated circuits, with the half-shot approach, and with commutated systems in general. The writer represents the management of the company and, as such, wanted to see some progress in the research department. Lanterman, on the other hand, is concerned with the productability of the system and not with the need for a new system in the marketplace. We decided on a bold step. That was to recreate a really precise contest system by using discreet (one component at a time) circuitry for each channel and separate circuitry for each channel. The result of this type of thinking is evidenced on this huge encoder board with so many parts. (The 8 channel version has even more parts!) However, we think that the linearity of the trim, a lack of interaction, and the fact that the trim does not effect the total travel, justify the added expense. For the kit builder we are silk screening in ink a road map of part locations on the non-copper side of the board which should be a big help, particularly with so many parts. These instructions assume both a reasonable degree of intelligence and some familiarity with electronic kits. In other words, this is not a beginner's kit nor is it a kit for someone who is trying to save a lot of money by going the kit route, inasmuch as we put a lot of circuitry into this design in order to obtain contest performance out of it.

The following modifications are to be used only in the rare case of a servo that exhibits a slight jitter or nervous condition. This is a remedial modification only and is not to be used during the construction of your servos. It is for this reason that RCM is presenting this modification after the article on constructing your servos.

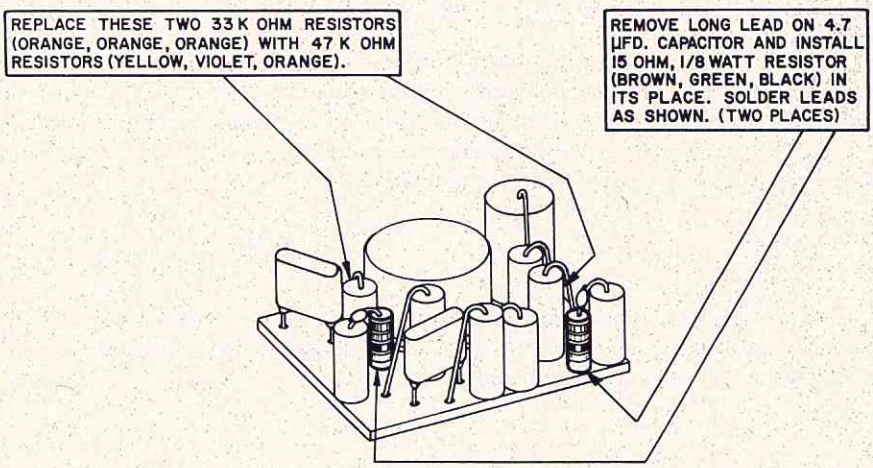


All capacitors in mfd's
All resistors in ohms

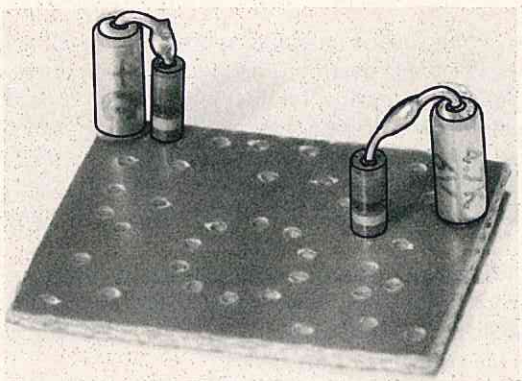
R1	47K	C1	.22
R2	47K	C2	4.7
R3	100K	C3	.22
R4	100K	C4	4.7
R5	4.7K	C5	.56
R6	5K	C6	15
R7	10 OR 15		
R8	10 OR 15		

World Engines S-9 Servo

MODIFIED TO ELIMINATE NERVOUSNESS (8/14/73)



S-9 SERVO MODIFICATION (8/14/73)
FOR ELIMINATING NERVOUSNESS IF PRESENT



P.C. Board showing installation of the 15 ohm, 1/8 watt resistor. (2 places.)

GENERAL INSTRUCTIONS

This section of the instructions explains how to build the encoder and the radio frequency (r.f.) printed circuit boards. Figure T-1 and Figure T-2 illustrate the location of each component as viewed from the component sides. Figure T-3 illustrates the position of the two terminals to be soldered to the foil side of the r.f. board. To identify the components three conventions have been used.

(1) When the component, as drawn, is large enough, its symbol is printed on the outline which represents it. See, for example, the two resistors R1 and R15 in the upper left corner of Figure T-1.

(2) When the identifying symbol of a component will not fit on its outline, the symbol is placed **below** the outline. See, for example, transistor Q1 near the upper left corner of Figure T-1.

(3) When the component cannot be identified by either of the first two conventions, its symbol is printed inside a rectangle. An arrow points from the rectangle to the outline of that component.

The specific mounting instructions list the value of each component according to its symbol. They also show in detail how each component should be mounted on the board. It is suggested that the following sequence of steps be performed for each component installed.

SEVEN STEP PROCEDURE FOR ASSEMBLING A GIVEN COMPONENT

STEP 1. Find the symbol representing the component to be identified from Figure T-1 or Figure T-2; for example, R1 on Figure T-1.

STEP 2. Identify that component from its symbol using the list contained in the specific mounting instructions; for example, R1 is a 10K ohm resistor (brown, black, orange).

STEP 3. Select that component from the supply of parts furnished with the kit.

STEP 4. Refer again to the specific mounting instructions for pictorial directions for mounting the component in the board. The drawings show the component being inserted into holes in the board and do not necessarily indicate its final disposition. The directions require that most components be pushed down into contact with the board. Then go to Step 5.

STEP 5. Turn the board over and bend the leads 45° where they emerge from the foil to provide support for the component.

STEP 6. Solder the component leads to the copper foil. Be sure the tip of the soldering iron contacts and heats both foil and lead. Heat until the solder has liquified and wet the connection. Then remove the iron. Further heating will not serve any useful purpose and may damage the component by raising its temperature too high, or lift the copper from the board.

STEP 7. Wait until the hot solder has solidified. Clip off the excess length of lead where it comes out of the solder. Return to Step 1 and install the next component.

PRECAUTIONARY NOTE

The transistors, diodes, and tantalum capacitors have characteristics which depend on the direction of current through them. Therefore, it is necessary to install these components with proper regard to their polarity. More specific instructions will be given below concerning these components.

SOLDERING COMPONENTS INTO THE ENCODER P.C. BOARD

The encoder circuit board measures approximately 3" x 4" and has one large hole of 3/32" diameter drilled near the middle of one edge. Place this board on the table, foil side down, so that the large hole is located on the left.

When installing a component, follow the seven step procedure explained in the general instructions. Briefly summarized this procedure involves identification, mounting, soldering, and finishing for each component.

Figure T-1 shows the location of the components on this board. Begin by installing resistor R1 in the left rear corner of the board. Next, install one of the components adjacent to R1. Continue adding components, one by one, working outward and away from those already installed. Use the installed components as guides to help locate the correct position of the next component.

Because of the large number of holes in this board, additional care must be taken to make certain that each component is installed in its correct location. Not every hole will be used at this stage of the assembly. To avoid errors in locating the components, it would be helpful to mark each hole to be left vacant with a pencil. Such a mark might be especially helpful for those holes on the right side of the board.

These components are not used in the 6-channel encoder: R7, 9, 28, 30, 31, 40, 41, 49, 51, 58, 61, 62; C7, 8, 17, 18, 25, 26; Q17, 18, 19, 20; D7, 8.

SPECIFIC MOUNTING INSTRUCTIONS

RESISTORS

SYMBOL	DESCRIPTION AND MARKING
R1 – R14	10K ohm (brown, black, orange)
R15	47K ohm (yellow, violet, orange)
R16 – R32	2200 ohm (red, red, red)
R33 – R42	39K ohm (orange, white, orange)
R43	100 ohm (brown, black, brown)
R44	1500 ohm (brown, green, red)
R45	470 ohm (yellow, violet, brown)
R46 – R53	4700 ohm (yellow, violet, red)
R54	R54 has been changed to D10
R55	47K ohm (yellow, violet, orange)
R56	1000 ohm trim pot (value stamped on part)
R57 – R63	100K ohm trim pot (value stamped on part)

HORIZONTAL MOUNTING

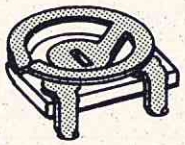
Make a smooth 90° bend in each lead close to the body of the resistor. Insert the leads into the proper holes and push the resistor down against the board.

VERTICAL MOUNTING

Make a smooth bend of about 160° in one lead. Leave the other lead straight. Insert the straight lead into the hole on which the outline of the resistor is drawn and push the resistor down against the board.

TRIM POT MOUNTING

No bending of the leads should be required. The holes have been located in the board to fit the leads properly. Position the trim pot as shown in Figure T-1 and insert the leads into the proper holes.

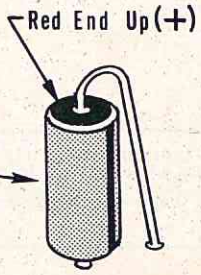


CAPACITORS

SYMBOL	DESCRIPTION AND MARKING
C1 – C8	.001 µfd Disk (102)
C9 – C19	.002 µfd Disk (202)
C20 – C27	.047 µfd Mylar (yellow, violet, orange)
C28	.02 µfd Disk (203 Z)
C29	.01 µfd Disk (103Z)
C30	15 µfd Tantalum (15 µfd)
C31 – C32	.56 µfd Tantalum (.56 M or R56)
C33	.0047 µfd Mylar (4700 or .0047 K100)

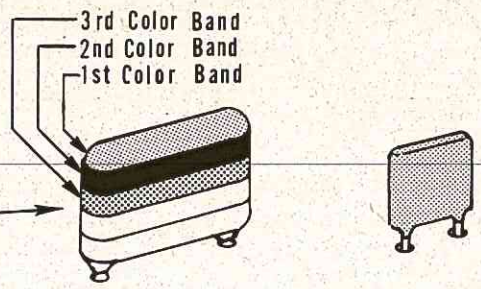
TANTALUM CAPACITOR MOUNTING

Make a smooth bend of about 160° in the lead coming out of the positive (red) end of the capacitor. Do not allow the lead to touch the body of the capacitor. Leave the other lead straight. Insert the straight lead into the hole on which the outline of the capacitor is drawn and push the capacitor down against the board.



DISK OR MYLAR CAPACITOR MOUNTING

Insert the leads into the proper holes and push the capacitor down to within 1/16" of the board.



TRANSISTORS

SYMBOL	DESCRIPTION AND MARKING
Q1 – Q22	n-p-n transistor (MPS2924 or WE2924)

These transistors have a somewhat different mounting from the transistor mounting on the r.f. board. The difference consists in the positioning of the base lead. Bend the two outer leads slightly apart. Bend the center lead slightly towards the flat face. Insert the leads into the proper holes in the board and push the transistor down to within 1/8" of the board. The flat face must be positioned as shown in Figure T-1.

DIODES

SYMBOL	DESCRIPTION AND MARKING
D1 – D10	1N4148 glass diode (black stripe on one end of case)

HORIZONTAL MOUNTING

Make a smooth 90° bend in each lead to fit the holes in the board. Position the diode so that the black stripe has its proper orientation as shown in Figure T-1. Insert the leads into the holes and push the diode down against the board.

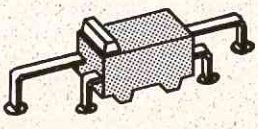
VERTICAL MOUNTING

These diodes have a different mounting from the diode mounting on the r.f. board. Vertically mounted diodes on the encoder board have the stripe down. On the r.f. board they are mounted stripe end up. Make a smooth bend of about 160° in the lead coming out of the **unmarked** end of the diode. Leave the other lead straight. Insert the straight lead into the hole on which the outline of the diode is drawn and push the diode down against the board. The end marked with a black stripe must be down on this encoder board.

VOLTAGE REGULATOR

SYMBOL	DESCRIPTION AND MARKING
VR	MMFC 4060A

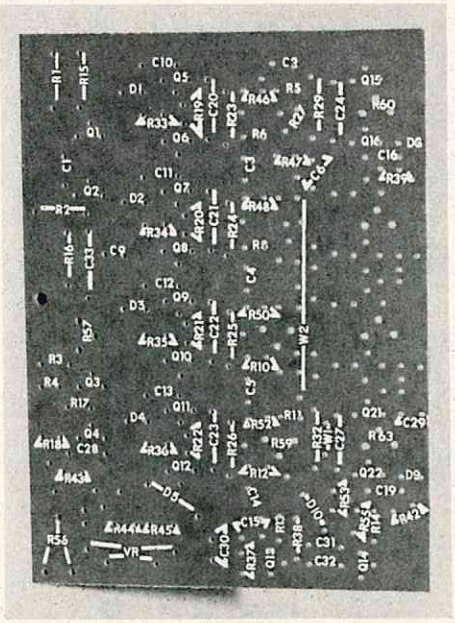
No bending of leads should be required. The holes have been located in the board to fit the leads properly. Position the voltage regulator as shown in Figure T-1. Insert the leads into the proper holes and push the regulator down against the board.



BARE WIRE

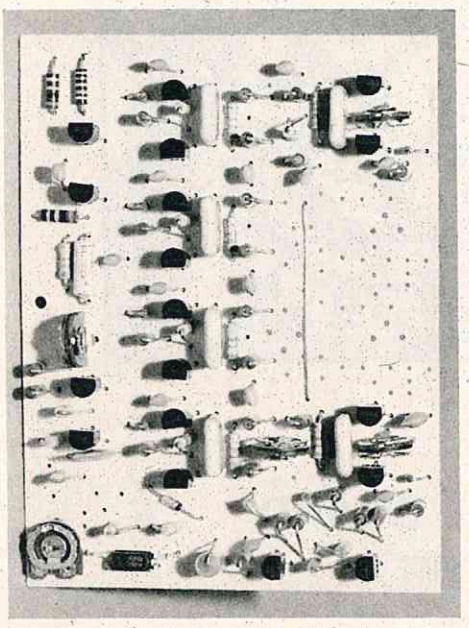
SYMBOL	DESCRIPTION AND MARKING
W1	1" length of bare wire
W2	2" length of bare wire

Insert one end of the wire about ¼" into one of the two holes. Bend it over towards the other hole and insert the other end. Pull the ends from the foil side so that the wire lies flat against the board on the component side.

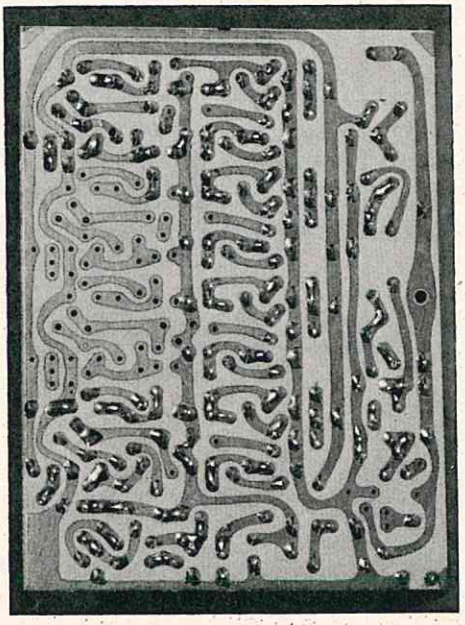


Encoder board – component side showing printed road map of parts.

Encoder board – component side.



Encoder board – copper foil side.



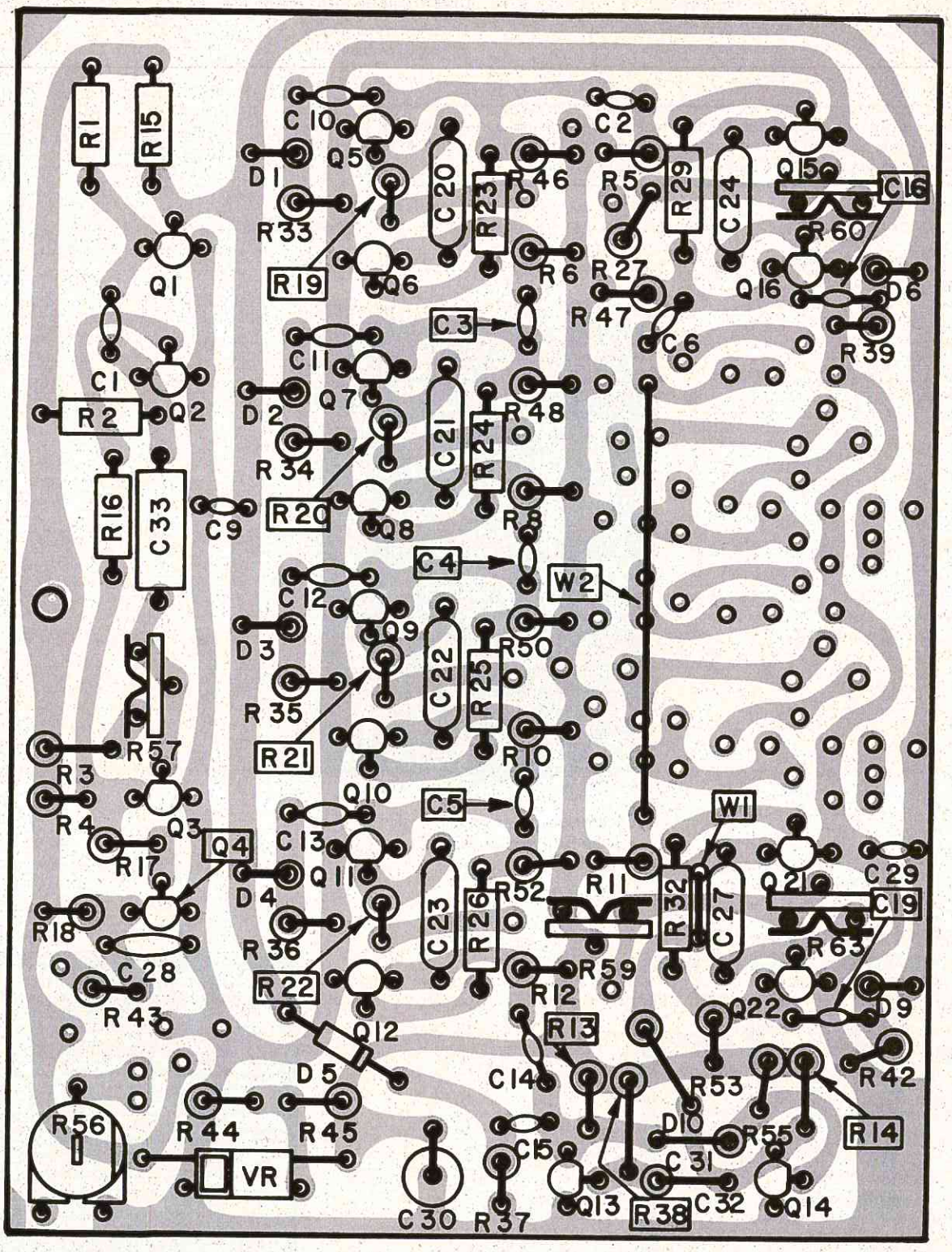


FIGURE T-1
ENCODER PRINTED CIRCUIT BOARD
(VIEWED FROM COMPONENT SIDE)

SOLDERING THE COMPONENTS INTO THE R.F. BOARD

The radio frequency (r.f.) board measures approximately 1-5/8" x 2-3/4" and has two large holes of 3/32" diameter. Place this board on the table, foil side down, so that the large hole nearest a corner is at the left rear.

When installing a component, follow the seven step procedure explained in the general instructions. Briefly summarized, this procedure involves identification, mounting, soldering, and finishing for each component.

Figure T-2 shows the location of the components on this board. Begin by installing capacitor C1 in its place near the left rear corner of the board. Next, install one of the components adjacent to C1. Continue adding components, one by one, working outward and away from those already installed. Use the installed components as guides to help locate the correct position of the next component.

SPECIFIC MOUNTING INSTRUCTIONS

RESISTORS

SYMBOL	DESCRIPTION AND MARKING
R1	100 ohm (brown, black, brown)
R2	1000 ohm (brown, black, red)
R3	33K ohm (orange, orange, orange)
R4	4.7 ohm (yellow, violet, gold)

HORIZONTAL MOUNTING

Make a smooth 90° bend in each lead close to the body of the resistor. Insert the leads into the proper holes and push the resistor down against the board.

VERTICAL MOUNTING

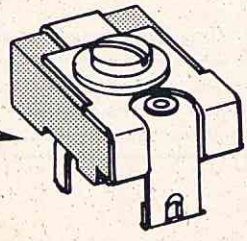
Make a smooth bend of about 160° in one lead. Leave the other end straight. Insert the straight lead into the hole on which the outline of the resistor is drawn and push the resistor down against the board.

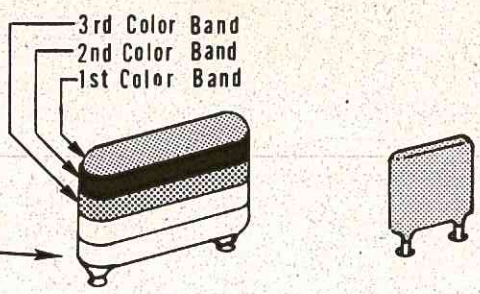
CAPACITORS

SYMBOL	DESCRIPTION AND MARKING
C1, C2	8 - 60 pfd variable trimmer capacitor (404)
C3 – C7	.02 µfd Disk (203Z)
C8, C9	33 pfd Disk (33K)
C10	10 pfd Disk (10)
C11	.01 µfd Disk (103Z)
C12, C13	.15 µfd Mylar (brown, green, yellow)
C14	27 pfd Disk (27K)
C15	.002 µfd. Disk (202)
C16	1 pfd Tubular (brown, black, white)

TRIMMER CAPACITOR MOUNTING

Insert the two flat leads into the slots on the board as shown in Figure T-2 until the two feet under the capacitor body contact the board.





DISK OR MYLAR CAPACITOR

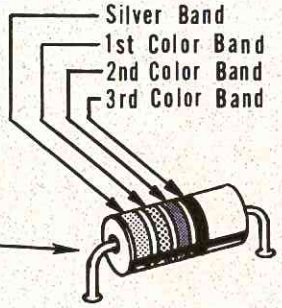
Insert the leads into the proper holes and push the capacitor down to within 1/16" of the board.

TUBULAR CAPACITOR MOUNTING

Make a smooth 90° bend in each lead close to the body of the capacitor. Insert the leads into the proper holes and push the capacitor down against the board.

CHOKES

SYMBOL	DESCRIPTION AND MARKING
L1	1.5 μh Tubular (brown, gold, green)
L2, L3	12 μh Tubular (brown, red, black)
L4	3.9 μh Tubular (orange, gold, white)
L5	5 turns 3/8" Diameter coil, tapped at 2nd turn
L6	2 turns 3/8" Diameter coil
L7	.22 μh Tubular (gold, red, red)



TUBULAR CHOKE MOUNTING (HORIZONTAL)

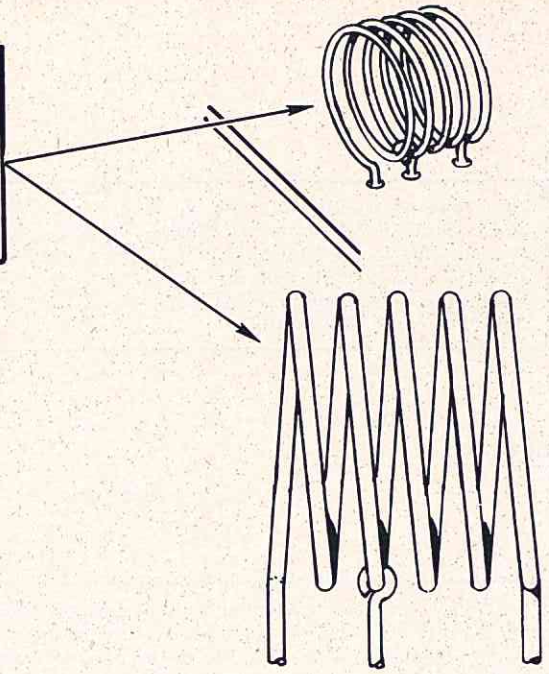
Make a smooth 90° bend in each lead to fit the holes in the board. Insert the leads into the proper holes and push the choke down against the board.

TUBULAR CHOKE MOUNTING (VERTICAL)

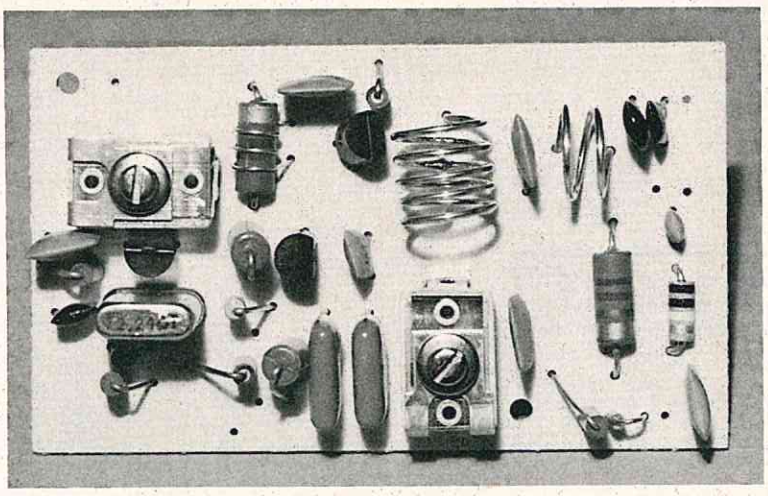
Make a smooth bend of about 160° in one lead. Leave the other lead straight. Insert the straight lead into the hole on which the outline of the choke is drawn and push the choke down against the board.

COIL CHOKE MOUNTING

Coil chokes with the desired number of turns must be made from the large single coil supplied with the kit. To make such a choke, refer to Figure T-2 and count the number of turns required. Clip off one more than this number from the large coil supplied with the kit. Straighten half a turn on each end to form the coil leads. Make a 90° bend in each lead away from the coil. (On coil L5 only, wrap one end of a straight bare wire around the bottom of the second turn and solder the connection.) Insert the leads into the proper holes until the coil is as close to the board as possible (about 1/64" to 1/32").



Also See Photo



R.F. Board – component side.

TRANSFORMER

SYMBOL	DESCRIPTION AND MARKING
T1	.22 μh tubular choke (gold, red, red) and 3" length of bare wire.

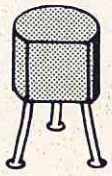
This transformer must be made from a 3" length of bare wire and the .22 μh choke. Wrap 2½ turns of the bare wire around the choke and bend the leads as shown. Insert the leads into the proper holes, and push the assembly down against the board.

Also See Photo

TRANSISTORS

SYMBOL	DESCRIPTION AND MARKING
Q1, Q2	n-p-n transistor (AT2222)
Q3	n-p-n transistor (TIS97)

These transistors have a somewhat different mounting from the transistor mounting on the encoder board. The difference consists in the positioning of the base lead. Bend the two outer leads (the leads closer to the flat face) slightly apart. Bend the center lead (the lead farther from the flat face) slightly away from the flat face. Insert the leads into the holes in the board and push the transistor down to within 1/8" of the board. The flat face must be positioned as shown in Figure T-2.



DIODE

SYMBOL	DESCRIPTION AND MARKING
D1	IN4148 glass diode (black stripe on one end of case)

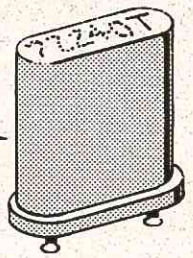
This diode has a different mounting from the diode mountings on the encoder board. (Stripe down on encoder board — up on r.f. board.) Make a smooth bend of about 160° in the lead coming out of the **marked** end of the diode. Leave the other lead straight. Insert the straight lead into the hole on which the outline of the diode is drawn, and push the diode down against the board. The end marked with a black stripe must be up.

CRYSTAL

SYMBOL	DESCRIPTION AND MARKING
X	Frequency printed on case

CAUTION: Use the transmitter crystal which is identified by the letter "T" printed behind the frequency number on top of the case. For example, a crystal might be designated 72.240T. The corresponding crystal, 72.240R, is used in the receiver.

Insert the two leads into the holes in the board as shown in Figure T-2 and push the crystal down against the board.

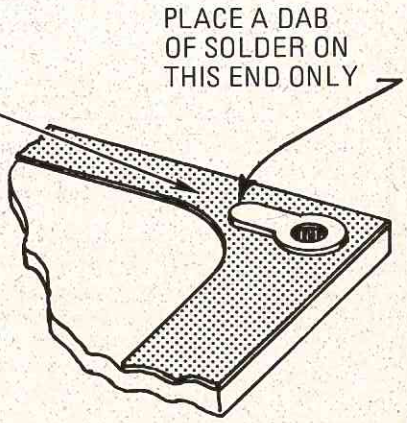


SOLDER TERMINALS

SYMBOL	DESCRIPTION AND MARKING
ST1, ST2	#2 hole, 5/16" long

These terminals must be soldered to the foil side of the board. Turn the board over so that the foil side is up. The large (3/32" diameter) hole in the corner of the board should be at the right rear.

Position the two terminals on the board as shown in Figure T-3 so that the larger hole in the solder terminal is directly above the hole in the board. Insert a #2-56 machine screw in the opening to hold the terminal in place while it is being soldered.



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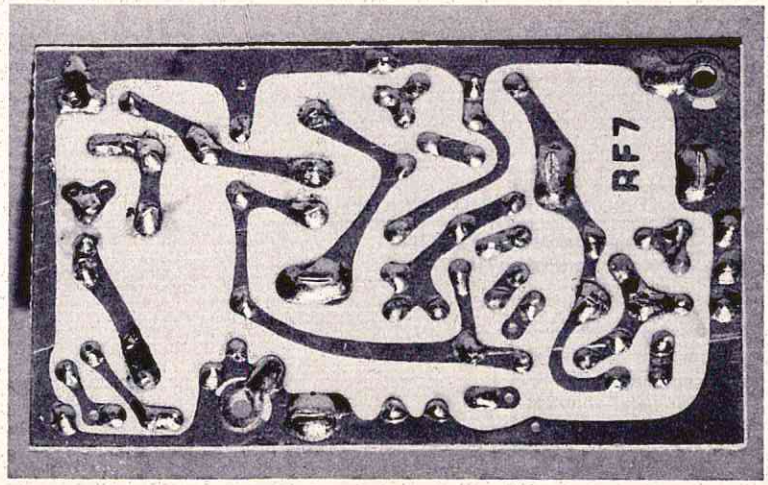


R.F. Board — copper foil side.

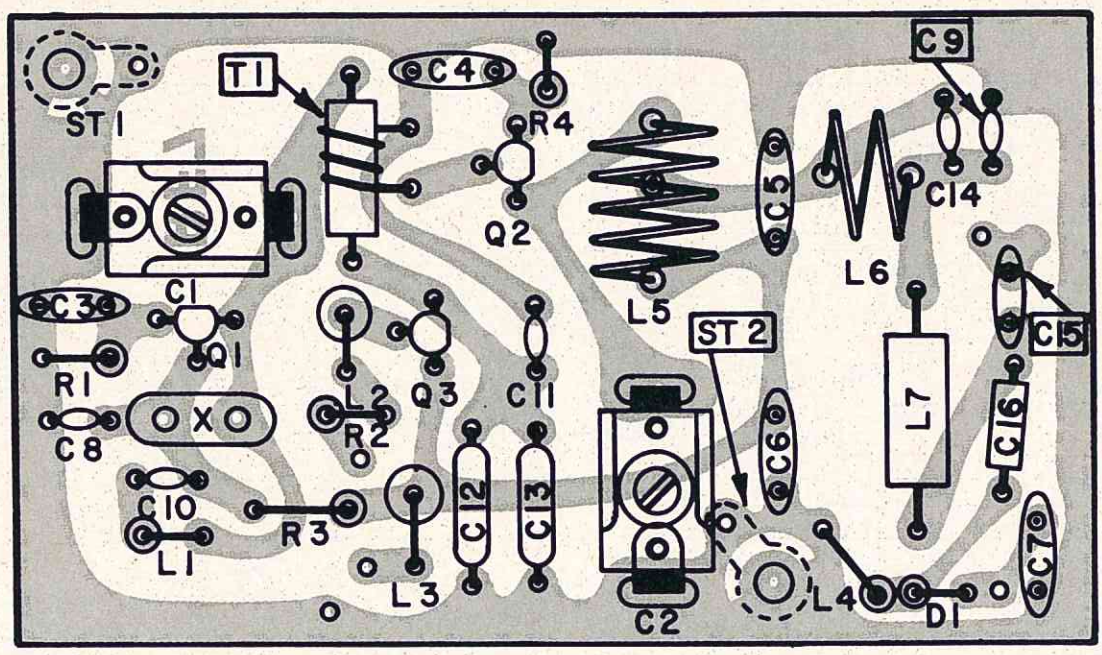


FIGURE T-2
R.F. PRINTED CIRCUIT BOARD
(VIEWED FROM COMPONENT SIDE)

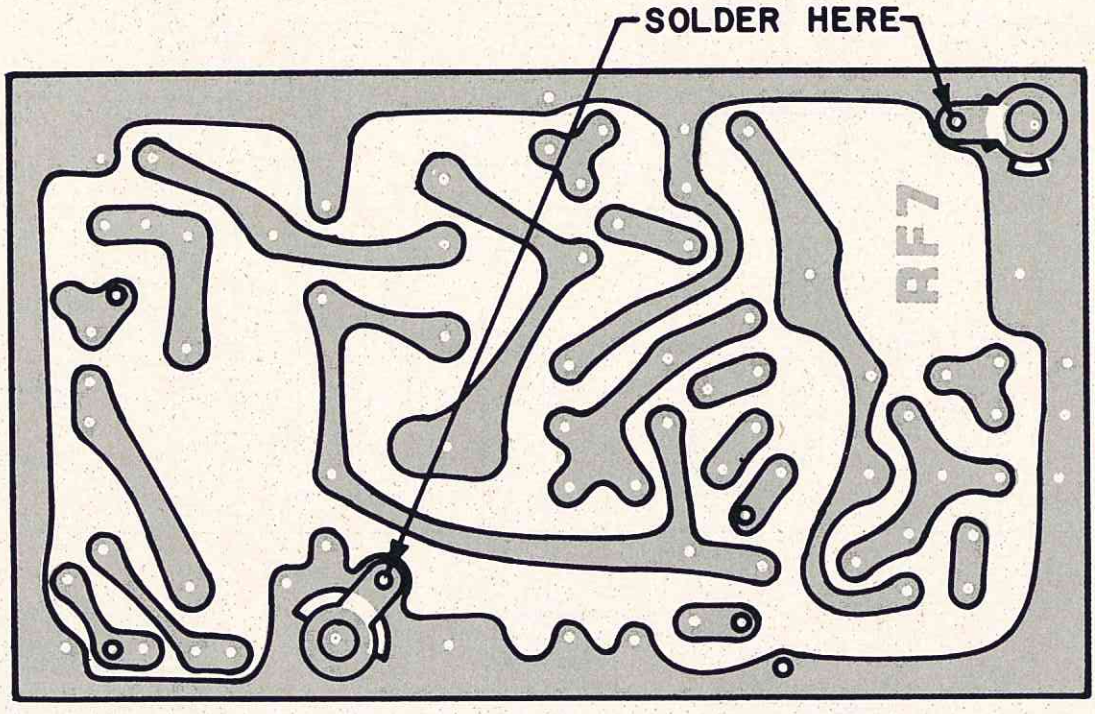
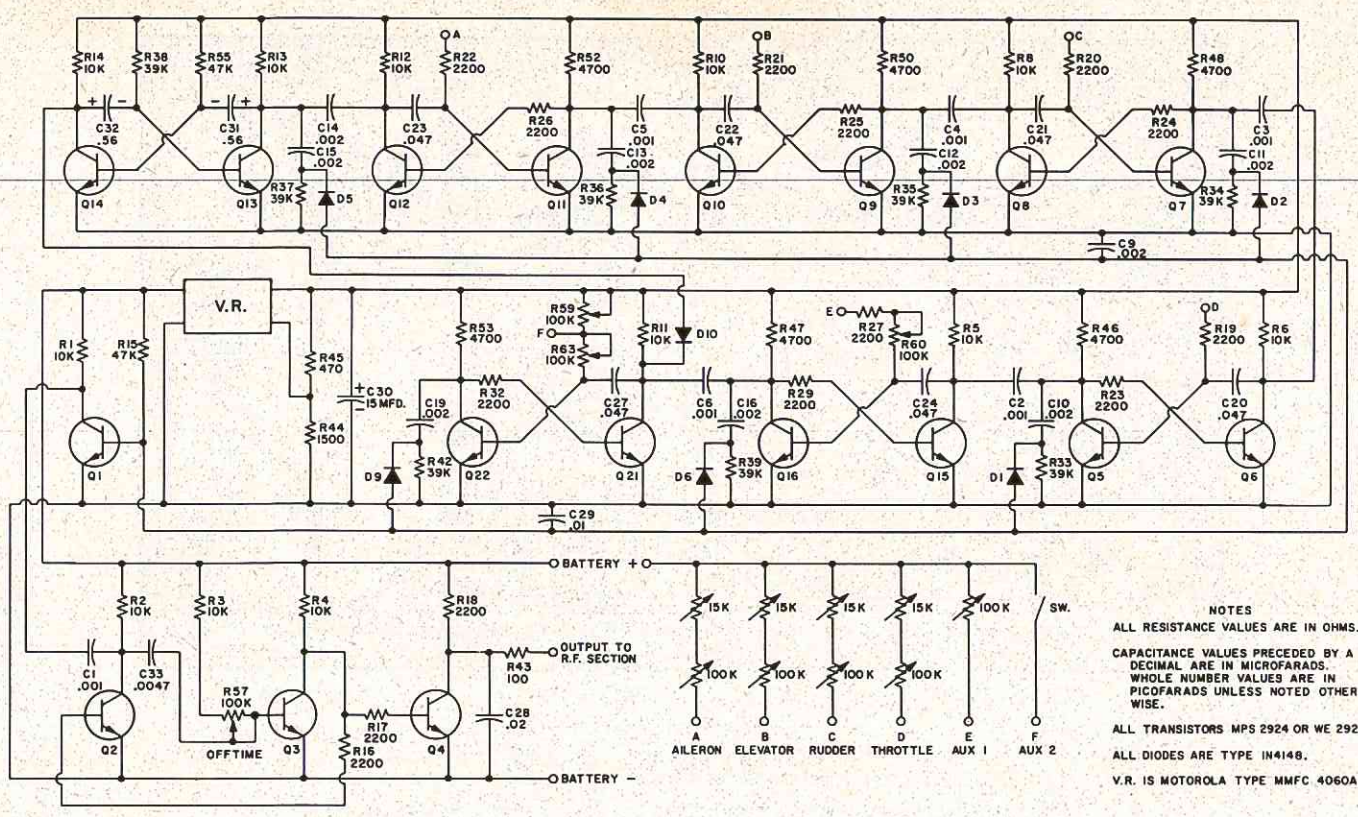


FIGURE T-3
R.F. PRINTED CIRCUIT BOARD
(VIEWED FROM FOIL SIDE)



NOTES

ALL RESISTANCE VALUES ARE IN OHMS.

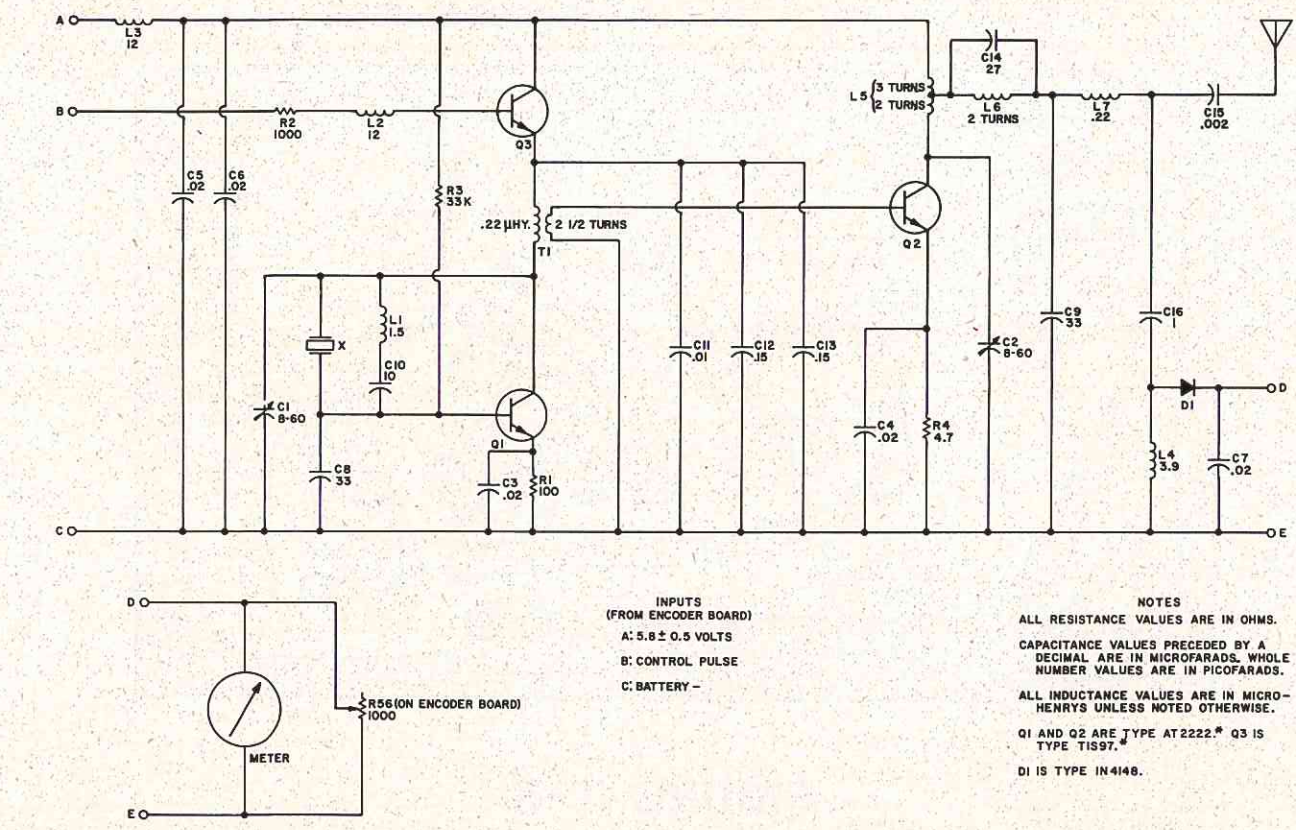
CAPACITANCE VALUES PRECEDED BY A DECIMAL ARE IN MICROFARADS. WHOLE NUMBER VALUES ARE IN PICOFARADS UNLESS NOTED OTHERWISE.

ALL TRANSISTORS MPS 2924 OR WE 2924.

ALL DIODES ARE TYPE IN4148.

V.R. IS MOTOROLA TYPE MMFC 4060A.

SIX-CHANNEL ENCODER SCHEMATIC



INPUTS (FROM ENCODER BOARD)

A: 5.8 ± 0.5 VOLTS

B: CONTROL PULSE

C: BATTERY –

NOTES

ALL RESISTANCE VALUES ARE IN OHMS.

CAPACITANCE VALUES PRECEDED BY A DECIMAL ARE IN MICROFARADS. WHOLE NUMBER VALUES ARE IN PICOFARADS.

ALL INDUCTANCE VALUES ARE IN MICROHENRYS UNLESS NOTED OTHERWISE.

Q1 AND Q2 ARE TYPE AT2222.* Q3 IS TYPE TIS97.*

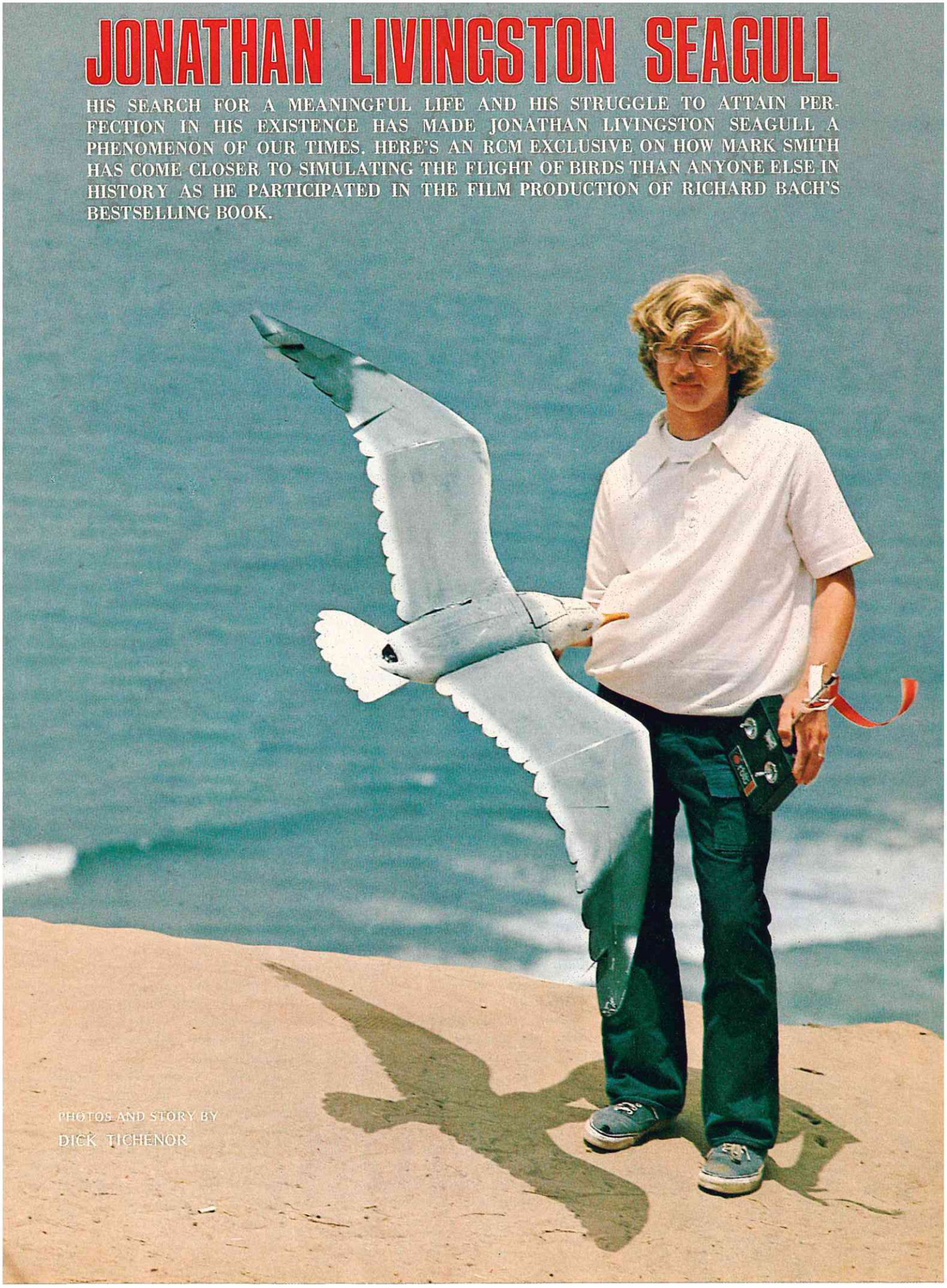
D1 IS TYPE IN4148.

*AVAILABLE: WORLD ENGINES.

TRANSMITTER – R.F. SECTION SCHEMATIC

JONATHAN LIVINGSTON SEAGULL

HIS SEARCH FOR A MEANINGFUL LIFE AND HIS STRUGGLE TO ATTAIN PERFECTION IN HIS EXISTENCE HAS MADE JONATHAN LIVINGSTON SEAGULL A PHENOMENON OF OUR TIMES. HERE'S AN RCM EXCLUSIVE ON HOW MARK SMITH HAS COME CLOSER TO SIMULATING THE FLIGHT OF BIRDS THAN ANYONE ELSE IN HISTORY AS HE PARTICIPATED IN THE FILM PRODUCTION OF RICHARD BACH'S BESTSELLING BOOK.



PHOTOS AND STORY BY
DICK TICHENOR

MUCH ADO ABOUT SOMETHING

By Phil Mayer

Reprinted from the Honolulu Star-Bulletin Thursday, July 26, 1973

"JONATHAN LIVINGSTON SEAGULL" was on Maui last month.

That is spooky enough.

Because there are no seagulls in Hawaii.

But things are spookier than that.

Certainly as spooky as Richard Bach's best-seller about good gulls who go to heaven.

Bach is one of America's best, least-known writers. Don't let "Jonathan" keep you from reading "Stranger to the Ground," "Biplane" and "Nothing by Chance."

Bach is the Melville and Mark Twain of flying.

And isn't there something of both in Bach's investing most of his "Jonathan" loot in a two engined Grumman flying boat – and a uniform for himself – in which he booms around the country calling himself "Trans-Creature Airlines?"

Anyhow . . . .

Early this year Hall-Bartlett Productions announced a full-length, no-people movie of "Jonathan" to be released in November.

They said Jonathan and the book's other gulls would be played by trained seagulls.

And you will see some fluttering and free flying now and then.

But secretly the studio hired one of the West Coast's best-known designers, builders and fliers of radio-controlled model gliders to build several Jonathans.

Also:

Fletchers, Henry Calvins, Maynard Kirks, Lowells, Judy Lees (girl gulls), Sullivans (instructor gulls) and Chiangs (super, spectral gulls).

Mark Smith of Escondido, Calif., made 20 such gulls.

Each is of styrofoam and has a wingspan of five feet.

Ten are black.

The plastic gulls aren't easy to fly.

They are so heavy with the batteries in them that none can be kept in the air unless Smith or his father works constantly at the controls.

Remember that.

And the only way to get them into the air at all is throw them off a cliff.

For about two weeks the gulls performed perfectly above a beach in Southern California.

But the cameraman began grumbling.

"No clouds . . . "

So Smith, his father, five black gulls and four white ones and the camera crew came to Maui to work from a cliff overlooking isolated Mokolea Point.

The site is reachable only by an unimproved road that links the ends of the paved roads from Lahaina on the west and Wailuku to the east.

Smith and the cameraman were delighted.

Their Hawaiian guide was not.

He said there was a heiau below the cliff they must not even approach.

From June 11 through June 18 everything went well.

And here it should be explained that the black gulls won't seem black in the movie.

A special film was used to photograph them which will make the black gulls seem to be ghosts.

On June 19, about 10 a.m., while filming two black gulls being flown side by side, something happened.

The power failed in one and somehow the other was pulled to the ground with it.

But only one gull was found – near the heiau.

Then filming – but no flying – went on until 4 p.m.

And while the cameraman was packing up he tripped and almost fell to his death.

At the same instant, the horrified Smith looked up and out to sea.

The missing black gull was headed straight at the cliff and coming so fast it would have broken windows in their van.

At the last moment, Smith reached and picked the gull out of the air. It dragged him to the ground.

He later discovered that its batteries were dead and its switch was on so that the batteries could not have recharged themselves.

And neither Smith nor his father had been anywhere near any of the controls for three hours.

Smith ordered each gull nailed into its packing crate before leaving the flying site.

They are still in their boxes in California. □

Mark and Jonathan Livingston Seagull, kindred spirits.

His search for a meaningful life and his struggle to attain perfection in his existence has made Jonathan Livingston Seagull a phenomenon of our times.

The fascinating book by Richard Bach has been a thought provoking best seller since Jonathan Livingston Seagull's tribulations are problems to which people can relate. As is the case with so many best selling books, plans were formulated to produce a motion picture version of this book. The heart of the story is Jonathan's determination to learn about aerodynamics and to perfect his flying techniques. Just how do you persuade a seagull to do all the things necessary to pictorially convey Jonathan's frustrating struggle? In reality, there is no way since all those birds want to do is to eat and they only fly in search of food.

The producers of the movie contacted about a dozen of the leading R/C model airplane fliers in Southern California and arranged for each of them to independently develop a radio controlled flying model seagull. This was no small chore - - - after all, man has been trying to simulate the flight of birds for centuries (remember Icarus?). Each modeler had his own concept that resulted in varying degrees of success. Mark Smith from San Marcus, California, conceived the only practical design, a glider version.

Mark has been, several times, National Radio Controlled Sailplane Champion, a qualification with the expertise in air currents and soaring flight that gave him a distinct advantage over the other modelers who were using model airplane engines to power their birds.

The first requirement for a model of Jonathan was a true-to-life appearance so that the film sequences would not reveal that he was anything other than a real, live seagull. Secondly, and every bit as important, was the flight capability. A bird's natural instinct will influence his movements required to sustain flight. A man-made machine must have inherent aerodynamic stability with movable control surfaces in order to fly. A jet airliner or Cessna 150 has very little resemblance to a bird. Each of Mark's first three models proved the feasibility of his approach but they were lacking in directional stability. Airplanes have rather large vertical stabilizers and rudders for that purpose, while seagulls achieve directional control by flexing their wing and tail feathers. A mechanism to operate those same flexing motions in a model are prohibited by their weight. After due consideration to this problem, Mark drew upon a device that was used back in the 1930's during the development of tail-less flying wing aircraft. These are small vertical discs mounted on the wings near the tips at an appropriate angle to provide automatic return to a straight forward flight path following any directional disturbance. They were made of thin transparent plastic and are undistinguishable from a distance of only a few feet. This simple effective solution was installed on model number four, the configuration that was used in the movie.

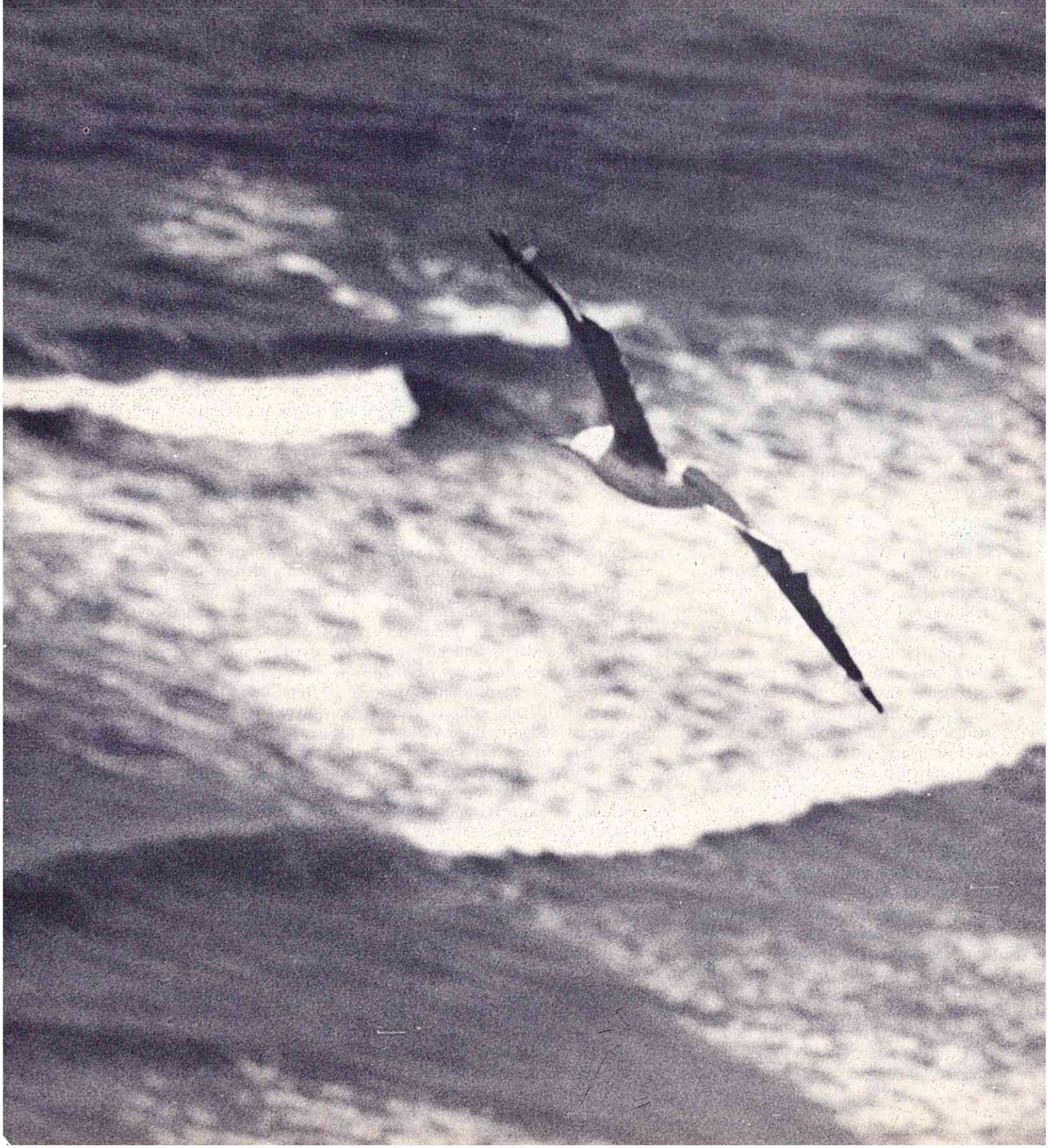
Having a controllable flying model of a seagull was a real accomplishment but it flew like an airplane and seagulls just don't fly exactly like an airplane! The executives of Orbit Electronics, Inc., were intrigued by Mark's project and were happy to modify their control system to his specifications. The habits of piloting model airplanes and gliders over the years had to be forgotten and new skills developed to simulate the flight of a seagull with the new control arrangement. Many hours of flying and several crashes that destroyed the models were involved in the learning process.

During the time that Mark was developing his new piloting techniques, he was also busy building birds numbers 5 through 15. Naturally, the filming schedules were tight and the Smith household didn't get their quota of sleep for awhile. Fortunately Mark's father, Rod, is also an accomplished model sailplane pilot and builder and, without whose participation the schedules would not have been met.

The filming started at Torrey Pines, California, and the film crews were delighted as the performance of the models exceeded the original requirements. After a flight sequence was filmed, Mark was usually asked if he could do it again or if he could fly it in closer to the camera or to perform a more difficult maneuver. Some of the

scenes called for two gulls to be flown simultaneously, keeping them both in camera range. This was quite a challenge that drew heavily on the depth perception and coordination of Mark and Rod. A few of the birds had mid-air collisions and crashed beyond repair. The realism of flight increased as the flying hours mounted, far beyond the expectations of everyone involved. Have you ever seen a seagull fly inverted? Mark Smith can do it!

Other filming locations were in Hawaii and at Carmel, California. The selection of locations was influenced by their having sheer bluffs against which the prevailing ocean winds blow and form strong up-currents that sustain the gliders' flight. With his understanding of air currents and aerodynamics, Mark Smith has probably come closer to simulating the flight of birds than anyone else in history. In achieving this remarkable accomplishment in a time period of less than a year, one might easily relate Mark's untiring desire to do something that no one else has done, and to do it perfectly, to that of the symbolic Jonathan Livingston Seagull. □



Close fly-by's required extreme skill for this precision maneuver.
RIGHT: Hatch removed for access to the radio compartment.
BELOW, RIGHT: Jonathan is lucky - - - he gets to ride to the cliffs!

MORE ABOUT BALSA

..... AND HOW TO WORK WITH IT!

BY JIM NEWMAN

Designer and Promotions, Midwest Products Company

● With the current shortage of wide balsa sheet, the use of glued up balsa sheet is becoming common. R/C flyers have been doing it for years in an effort to obtain sheets of sufficient width to skin wings. But, how often has an otherwise well finished model been marred by ugly seams showing on the wing skins? The simplest job in modeling is viewed with horror, yet it only requires a good metal straight-edge and a sharp, stiff blade. A very good straight-edge is the 48" 'Exact,' distributed by Midwest Model Supplies of Chicago and obtainable through your hobby store.

Before commencing, one must, of course, see that the balsa sheets are matched as closely as possible. The straight-edge and balsa are taped firmly to the cutting board to prevent either one slipping (Figure 1.) Then,

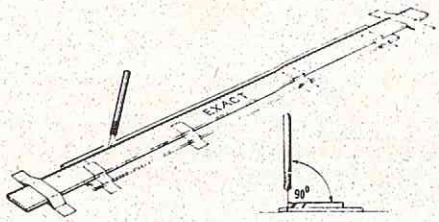


FIGURE 1

with the blade upright and held firmly in contact with the straight-edge, slice off the edge of the sheet. I do this as a matter of course, even if the sheet looks straight, because I am then certain that I have a good square and straight gluing edge. This should be done to as many sheets as are required.

Now lay two trimmed sheets tightly edge to edge (Figure 2) while a second pair of hands runs a strip of masking tape along the joint. Press the tape

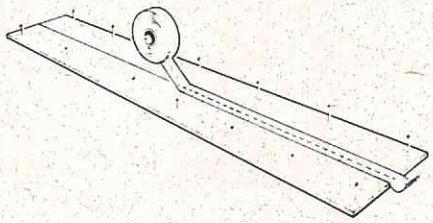


FIGURE 2

down firmly before turning the sheets over and hinging them open like a book. Stand the sheets up on the bench (Figure 3) and run a thin bead of glue down the vee of the joint.

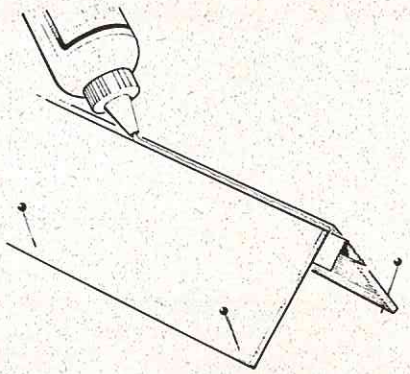


FIGURE 3

Make sure that the bead is continuous before closing the joint up by collapsing the sheets flat on the bench with the tape downwards. Glue will ooze out of the seam and this must be removed immediately because it can be very difficult to sand off without damaging the sheets. The easiest way to remove it is by scraping it off with a razor blade. Leave the sheets weighted down, preferably overnight, to be certain that they remain flat and well bonded.

Sanding the joint is advisably carried out with the sheets flat on the bench so that only light finish sanding is required on the model. (This eliminates the distinct possibility of sanding through the planking on high points formed by ribs and formers.)

There are so many little dodges which, once learned, makes model building easier and much more pleasurable. For instance, you will frequently find 'doublers' called for in models and this is merely an extra layer of skin inside the fuselage. Often it is cut from 1/32" or 1/16" thick plywood but sometimes it is balsa. Whichever it is, if white glue is used to laminate the two, you can bet your last dollar that the doubler will curl up like a last week's sandwich (Figure 4). This is

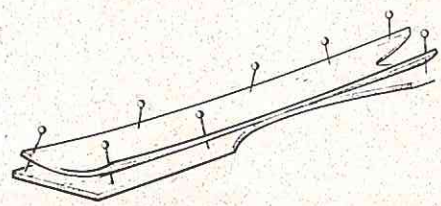


FIGURE 4

because the water in the white glue causes the wood fibres to swell on the glued side and curl away. The trick is to dampen the opposite side (Figure 5)

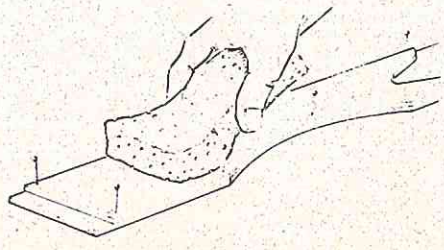


FIGURE 5

so that expansion takes place on both sides and cancels each other out. It is still a good idea to weight the assembly overnight to make certain that it remains flat. To kill the problem once and for all, many modelers are swinging over to contact cement for applying doublers and my colleagues and I find Weldwood's Contact Cement (the kind marked 'Inflammable', not the 'super' variety) to be absolutely first class for this purpose. Be very careful though - - - let the coated components touch before everything is lined up and it is usually, "Hello trash can!" Better to use pins as stops along two sides and a separating sheet of paper, sliding the paper out when the two pieces are in alignment (Figure 6).

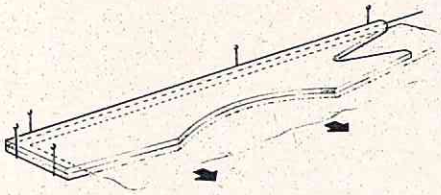


FIGURE 6

Getting back to the subject of joining balsa sheet – not wide enough is one thing, but, not **long** enough is a whole new ball game! It is perfectly acceptable to join sheets end to end by splicing, or scarfing, as it is sometimes called, provided the splice is 1) at a decent angle and 2) the splice is located at a point where it carries little load.

To my way of thinking, a decent angle means 30 degrees or less and, over the years I cannot recall having a single splice failure, but, I do take a lot of care when making that joint, as before, one only needs a metal straight-edge, a keen blade and tape. Simply mark a line across the end of a sheet at 30 degrees or less to one edge, lay the sheet on the second with the appropriate overlap and, using the straight-edge for alignment, tape the whole mess down (Figure 7) before

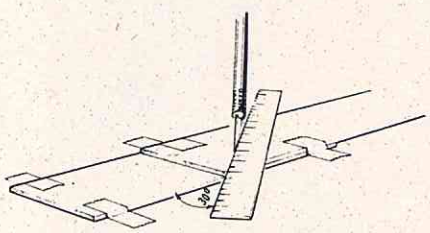


FIGURE 7

cutting firmly through both sheets keeping the blade vertical. Drag out the scrap pieces, apply your favorite adhesive to both joint faces before 'taping and weighting.'

A quick word on gluing end grain will not be out of place here. Using regular balsa cement in particular, the pre-gluing of such joints is a 'must' and all it involves is rubbing a thin coat of glue into the end grain, allowing it to dry somewhat before applying a second coat and making the joint. This ensures that the adhesive has penetrated the joint and not soaked away from the faces leaving you with a dry glue line.

Returning to the actual planning and making of joints, one should be sensible in the locating of splices. There are two schools of thought, one is to stagger the joints in fuselage or wing skins (Figure 8); the other school

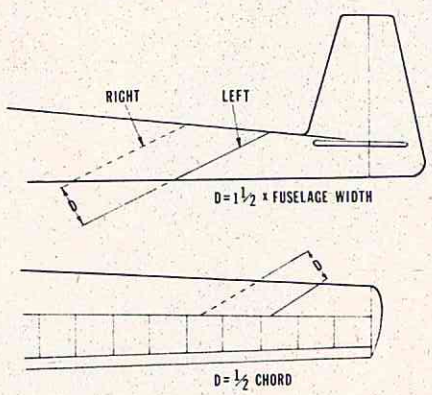


FIGURE 8

being followers of the crossed splice doctrine (Figure 9). The stagger theory

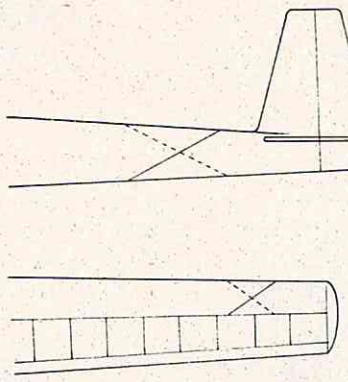


FIGURE 9

is good, provided that the offset is 1½ times the distance between the skins as a general rule of thumb and, where possible, it is helpful to back up the joint with a butt strap (Figure 10) a practice often used in full-size aircraft.

For the modeler who really likes to play here is another way of scarf jointing - - - not by angling across the width of the sheet but by making an angle through the thickness! This is actually the stronger joint because of

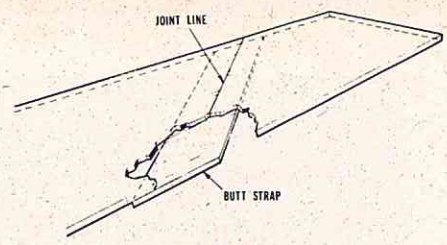


FIGURE 10

the tremendous gluing area available and is certainly the joint to be recommended for wing skins, where the joint must follow the leading edge camber. This practice, again, originated on full-size airplanes and was taught to me while repairing full-scale sailplane wings, where I was instructed to make '15 to 1 scarf' (Figure 11). So if your

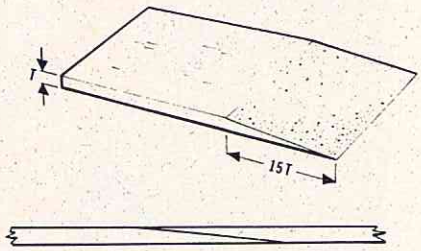


FIGURE 11

leading edge skin is 1/16" balsa, the bevel on the end of the sheet should be at least 15/16" long. If the modeler anticipates doing much of this it is worth making up a simple sanding jig. One technique I witnessed was to clamp a sanding drum equipped drill in a simple ply jig, set at the correct angle, and pass the sheets under the drum (Figure 12).

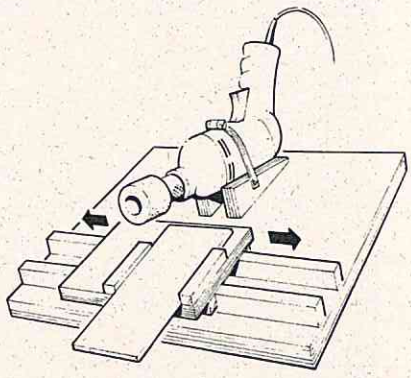
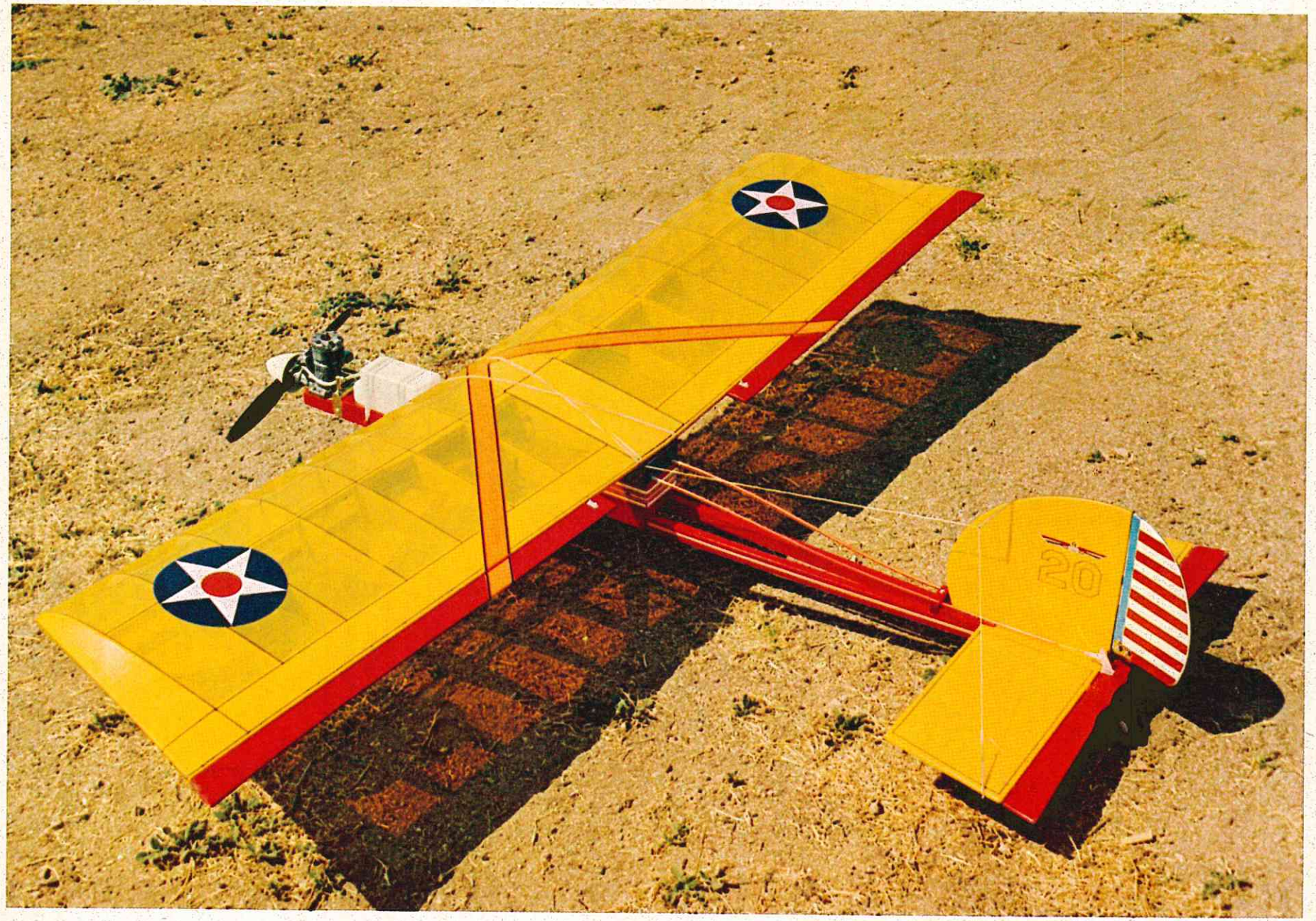


FIGURE 12

It is obviously good practice to avoid locating splices or scarf joints at areas of high stress, unless the joint is suitably re-inforced. Bad places are immediately at the wing trailing edge and just forward of the tail group. How many fuselages have you seen break at those points after quite mild

to page 101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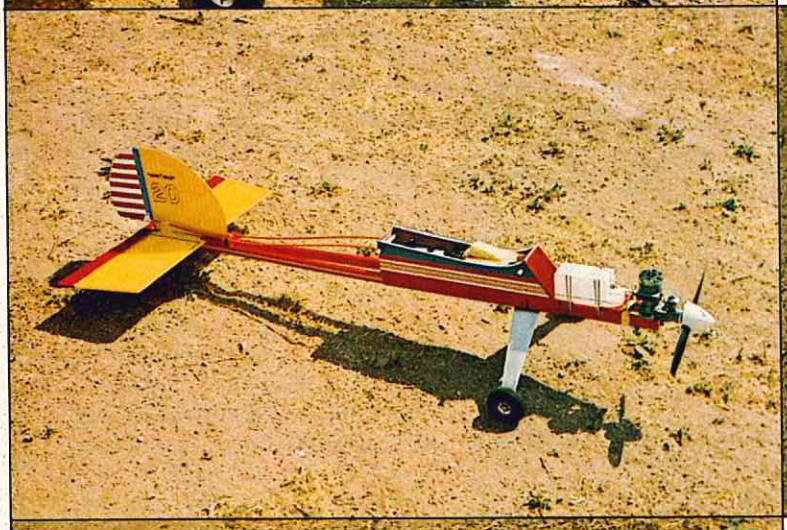
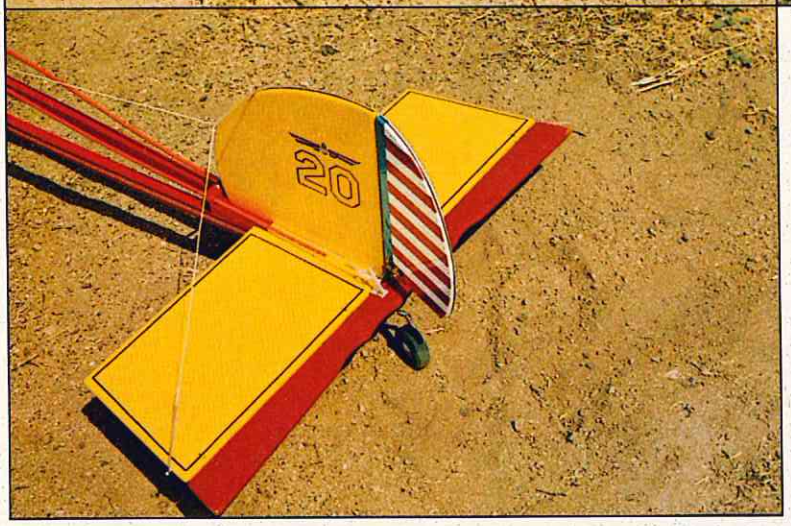




Obviously, R/C Modeler Magazine cannot build and test fly every aircraft we present as a construction article. As a matter of fact, we actually build approximately one out of every five that we present and spot check for accuracy on the others. In the case of the Kwik-Stick, we were so intrigued by the simplicity of the design that we actually built three of them – one .15 powered version with a Junior Box Fly wing and two .60 powered versions using Ugly-Stik wings. The total length of time that it took to cut out the fuselage and tail parts and to assemble each aircraft was one hour!

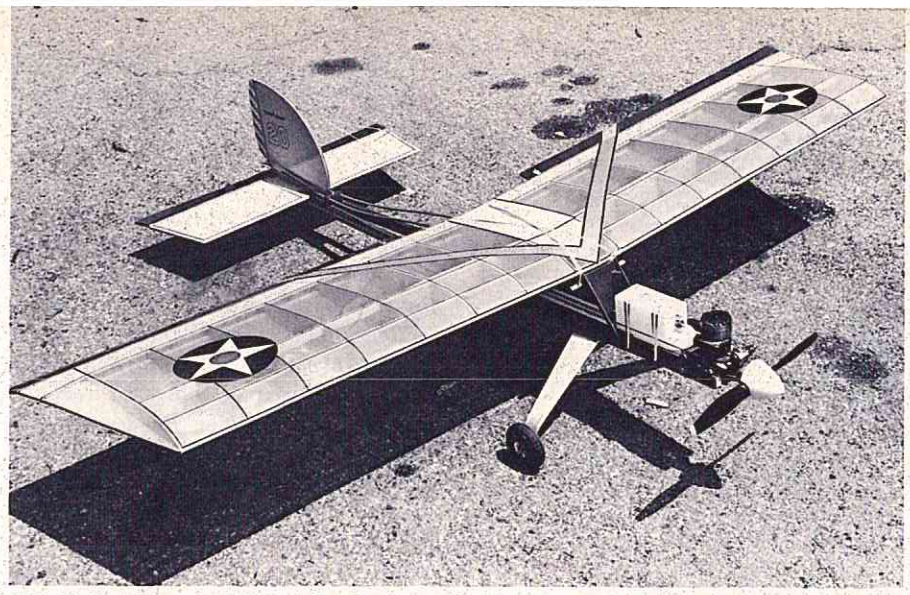
Thus, for an hours worth of work, about two or three dollars worth of material from the local building supply or lumber yard, you can build up several fuselages to fit those spare wings you have left over from deceased aircraft. And, you're going to be extremely surprised by how well the Kwik-Stick flies! The .15 powered version spins like a top, either upright or inverted, snap rolls instantly simply by pulling the stick down in the corner, and will recover from any attitude you put it in by simply taking your hands off the transmitter. While the smaller version is not a pure basic trainer, it is an excellent sport ship that is relatively easy to fly. Take-offs and landings are virtually hands off.

The larger Kwik-Stick with an

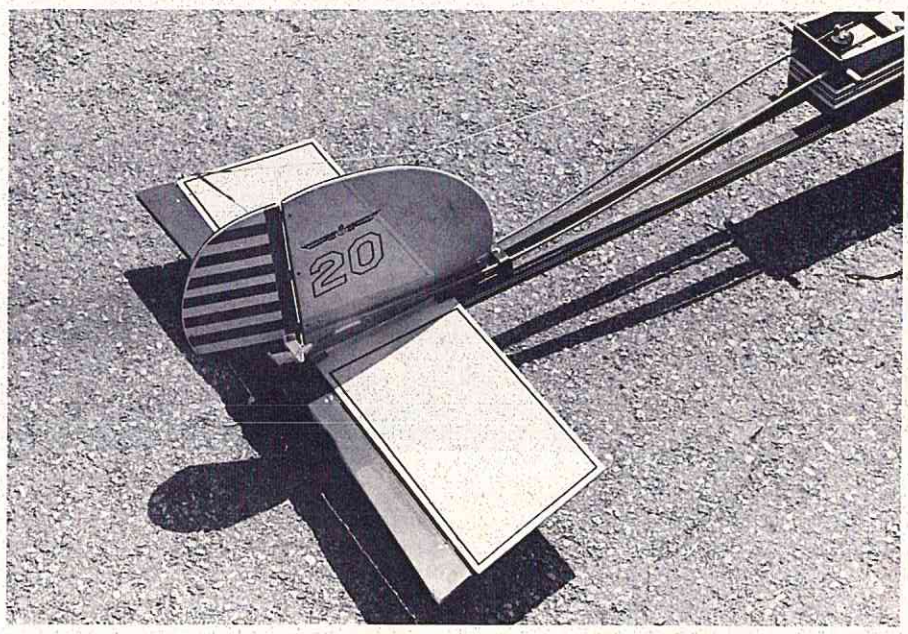
BY GEORGE CHABOT

RCM PHOTOS BY RITA LORD

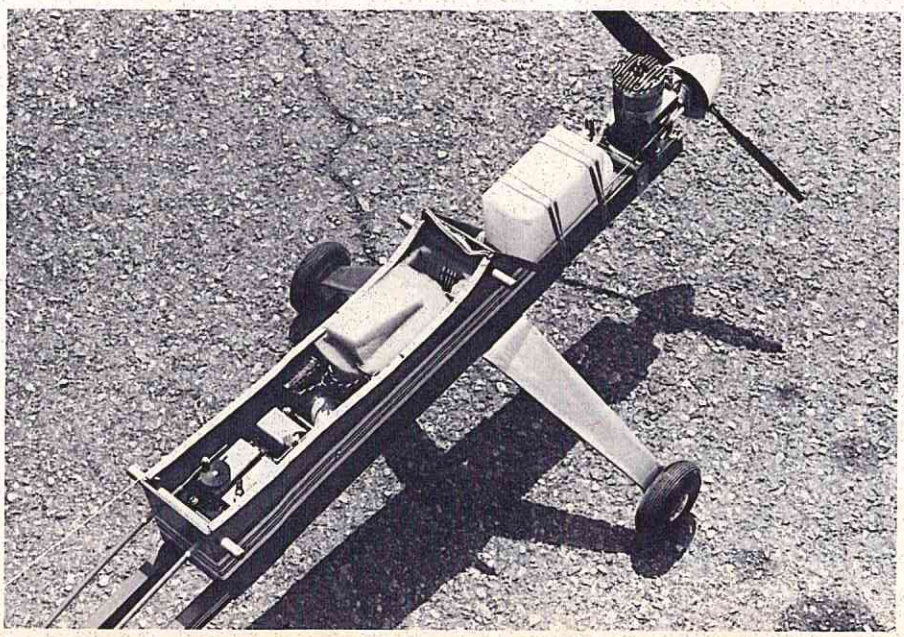
KWIK-STICK



This Kwik-Stick uses an Ugly-Stik wing covered with Super MonoKote and trimmed with DJ's Multi-Stripe, 3/16" sheet tail surfaces, .60 engine, Kraft-Hayes tank, and large dural gear. Quick and easy to build, and a ball to fly.



All sheet tail surfaces are held in place with two screws and a plywood clamp-alignment guide. BELOW: View of the radio installation.



Ugly-Stik wing is pure joy to fly. With everything out in the open where you can get at it, there is no wasted time taking your aircraft apart in order to get at the fuel tank or engine. Clean up and repair is a breeze. And, the flying characteristics are truly outstanding, retaining all of the flight characteristics of the original Ugly-Stik. Using a Lanier, Johnny Casburn 'Big Tex,' or other foam wing, the wing loading is slightly increased and the landing speed goes up ever so slightly.

You'll enjoy the Kwik-Stick – one of the fastest aircraft you can build and one that will give you many months of flying pleasure.

. . . . Don Dewey

I would like to say that the Kwik-Stick is the final result of thousands of hours of testing in the lab and wind tunnel and then numerous actual research test flights, culminating in many first place contest wins throughout the nation.

I would like to – but I can't – it just didn't happen that way.

The Kwik-Stick came into being due to the constant nagging and complaining by my modeling pal, Jim Barnes. Every time he had a bad crash with an airplane that represented more than two weeks building time, I noticed some suicidal tendencies, preceded by threats to sell all his modeling gear and take up golf. He kept saying, while picking servos out of smashed balsa and good old Mother Earth, quote: "There has got to be a quicker way, George." Unquote. So thinking back to 'U-Control' days, remembering Dennymites and Orwicks on ignition, gasoline and S.A.E. 70 oil, I vaguely remembered the stick type of trainer we used to build when we wanted to get in the air in a hurry, and thought that this concept might be applied to RC models.

The Kwik-Stick can be built in what I think is the least amount of time, compared to anything else available at the present time. It uses inexpensive materials available at most building supply stores or lumber yards, e.g., white pine, 1/8" shop grade plywood, a few sheet metal screws, plus a small amount of sheet balsa for the tail surface, an Ugly-Stick wing, or any other suitable wing of approximately 600 square inches in area. (We have found the Lanier wing to be very good, and they are readily available.) The fuel tank, being out in the open, eliminates the need for hooking up vents and fillers in impossible-to-reach

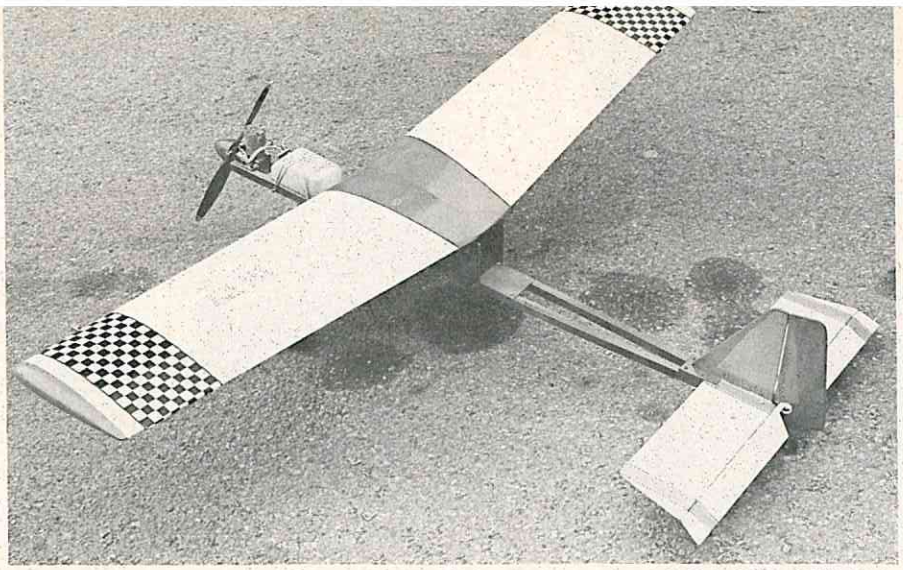
areas. In addition, there is no motor mount to buy or mount, as the main longerons serve as the motor mount. The complete tail assembly is removable as a unit for repair, or replacement, by simply removing two screws. The wing is held on with rubber bands for simplicity.

I used an Ugly-Stik landing gear with 3" Du-Bro wheels, simply bolting the unit on to the bottom of the longerons with four 6/32 bolts. NyRods were used for the elevator and rudder pushrods mainly because they are quick and simple. The throttle rod is just 1/16" music wire in a straight run to the carburetor arm, with no support or guide needed. The fuel tank is held on with two No. 64 rubber bands with the throttle wire between them and the tank. Painting the fuselage was super simple - - - just hang it up in a handy location, shoot a couple of coats of clear dope on it, then a couple of coats of your favorite color or colors and let it dry. (Cover the tail with Mono-Kote or Solarfilm, or whatever), install your radio, screw on the tail, bolt down the engine, rubber band the wing on and go fly it. (P.S. Charge the batteries first!)

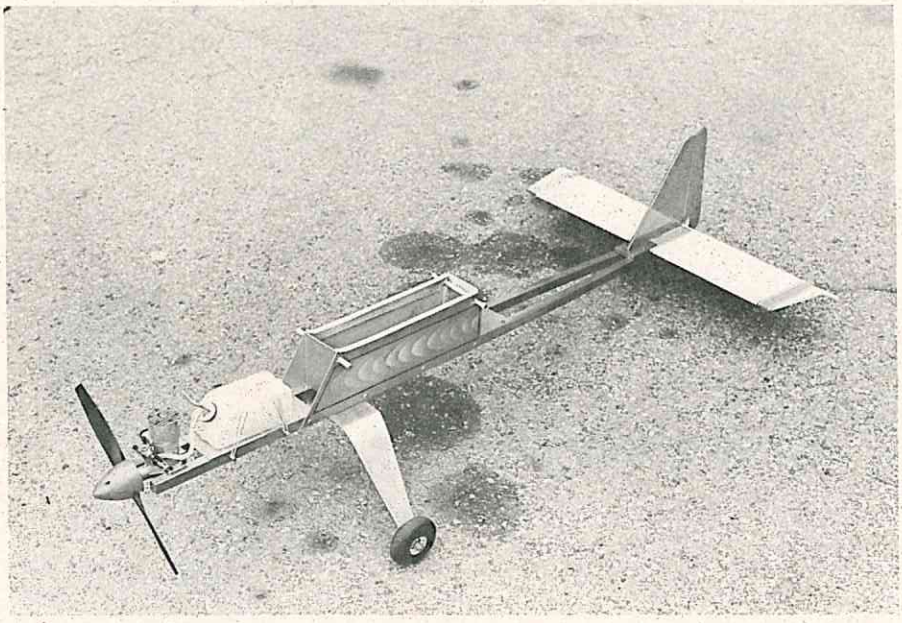
I hope this airplane will fill a gap that befalls all of us, mainly right after a crash, since you can build one of these in the time it normally takes to decide what to build next. Flying the Kwik-Stick is great, several proficient pilots have flown it, among them Dick Sonheim, Don Dewey, Dick Kidd, Jim Barnes, and Baron Von Thumbs, and all are in agreement that it just has no bad habits. In fact, it tracks straight down the runway on take-off, will not drop a wing in a stall, recovers from bad attitudes hands off, and it lands at about five mph with absolutely no snap-roll on final no matter how much you slow it down. It is an excellent small field airplane, as it will clear tall obstacles in a single bound. However, fortunately, it is not as fast as a speeding bullet.

If you follow the plans, this fuselage will come out perfectly straight without the use of a jig of any kind, and will fly right off the board, so to speak. On the very first flight the only trim change made whatsoever was just about 1/16" of up on the transmitter elevator trim lever.

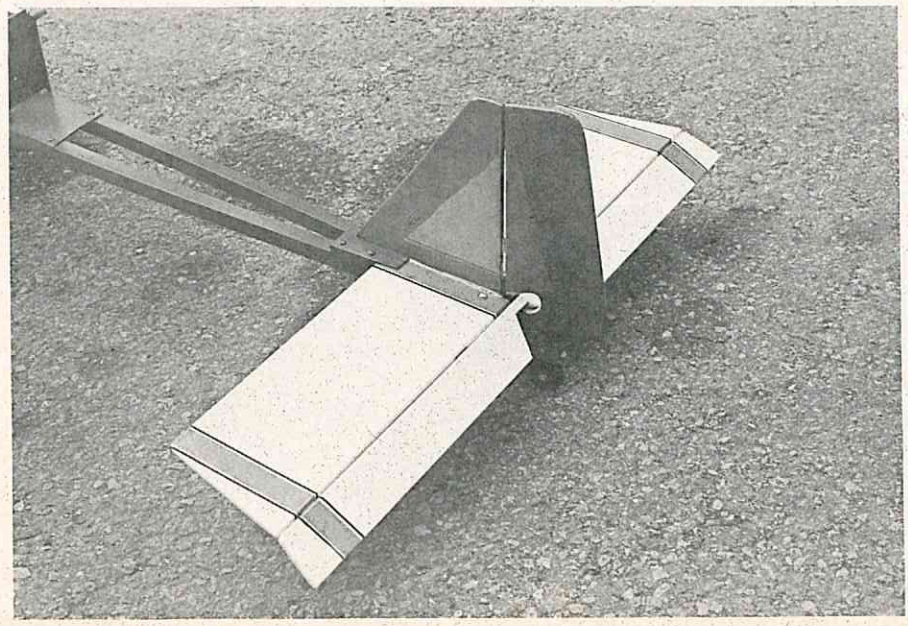
This article concerns itself only with the largest Kwik-Stick built, however, three smaller ones have been built; Number II used an OS Max .35 and a Sr. Box Fly wing; Number III used an OS Max .15 and Jr. Box Fly

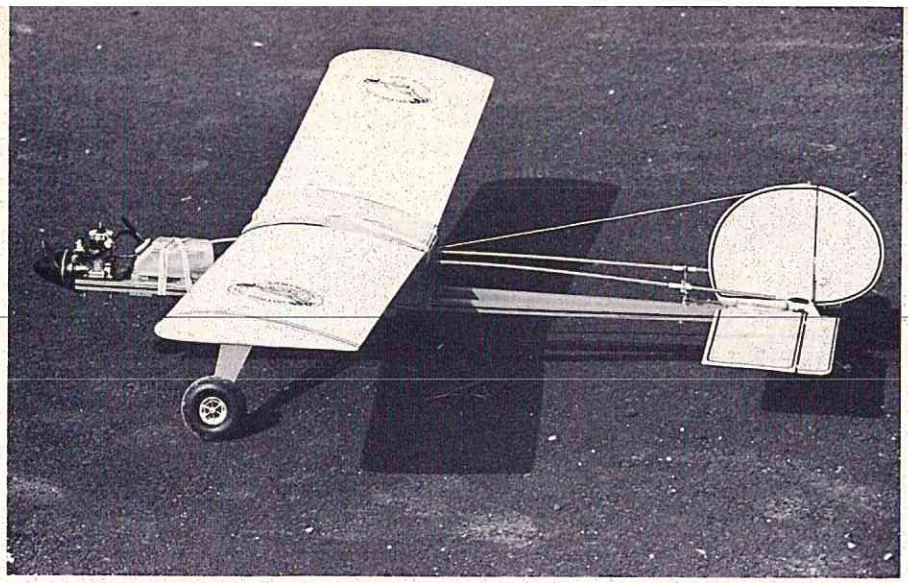


The Kwik-Stick II uses a Senior Box Fly plastic covered foam wing and O.S. .35 Gold 'N Rods not installed in this view.

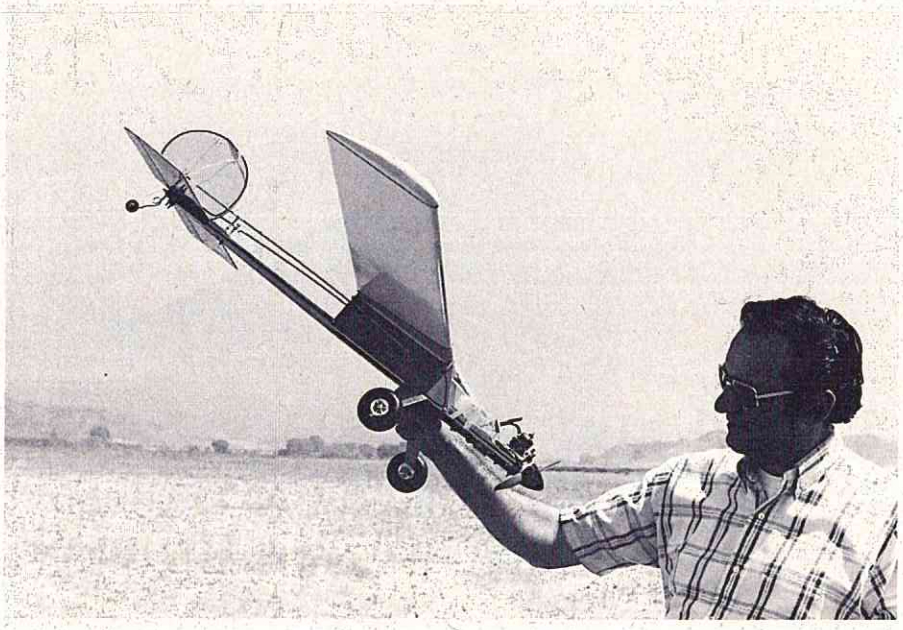


The basic Kwik-Stick fuselage can be used on any sized aircraft. BELOW: Close-up view of the Kwik Stick II empennage.

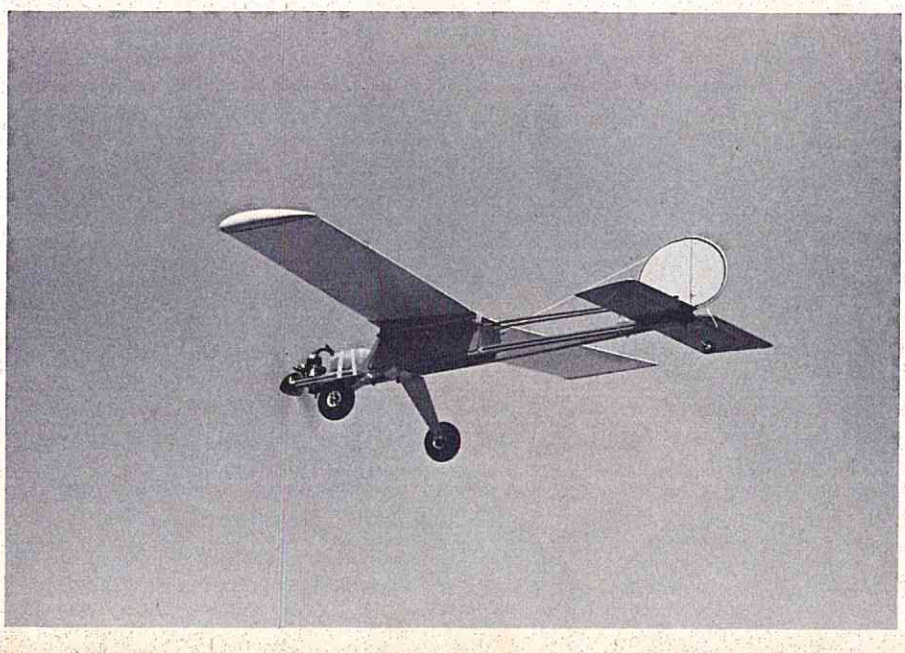




The Kwik-Stick III used a Jr. Box fly wing and O.S. .15 or .19. All-up weight, 3 pounds. Use innermost holes on short control horns for some real fun!



The author and Kwik-Stick III. BELOW: The .15 version in the air. Flat spins, tight axial spins, snap rolls a breeze. Photos on this page by Dick Sonheim.



wing; and Number IV, the Mini-Stik, used a Cox Golden Bee and an Ace foam wing, as used in the Upstart kit. Numbers II and III used rudder, elevator and throttle while the .049 ship used rudder and elevator only. The latter, with two servos and four channel receiver, 500 MAH battery pack, only weighed 18¼ ounces, ready to fly! The largest and smallest ships use no down or side engine thrust, however, the .15 and .35 size ships required about 3/16" of washers under the rear engine mounting bolts to provide some down thrust. I think this is due to the use of the Box Fly wings, being flat bottom they evidently provide more lift, thus the need for some down thrust.

CONSTRUCTION

(1) Cut out all plywood parts, i.e., F-1, F-2, make two sides, one bottom, B-1, and one tail hold-down. The shape of the wing saddle will depend on the wing you choose so cut it to shape accordingly. Obtain two pieces of white pine or other suitable hardwood ½" x ¾" x 44½" long. These will be the main longerons, around which the fuselge will be constructed.

(2) Lay the two longerons on the bench with the ends, front and rear, flush. This is important in order to insure a straight fuselage later on. Glue and screw the bottom B-1, down to the longerons in the position shown on the plan. Glue and screw the sides to the sides of the longerons placing the rear of the sides even with the rear of the bottom. Now, using 5 minute epoxy, install bulkheads F-1 and F-2 at the front and rear of the radio box.

(3) Now pull the rear of the longerons together, drill a 1/8" hole 1-1/8" in from the rear, centered up and down on the longerons; put a dash of glue in-between, and bolt together with a 6/32 bolt. Now turn the fuselage upside down and drill four holes through the longerons and bolt the landing gear in place. Make sure the center of the axle is in line with the leading edge of the wing since, with the gear at this location, the ground handling is excellent. The tail wheel bracket is just brass tubing epoxied in a hole drilled at the rear of the fuselage, with 3/32" music wire running up to the rudder. A 1¼" diameter wheel is used for a tail wheel. I have found, on large airplanes, that a 3/32" tail wheel wire is less prone to breakage than 1/16" wire. Do not mount the engine yet. I mount it after the

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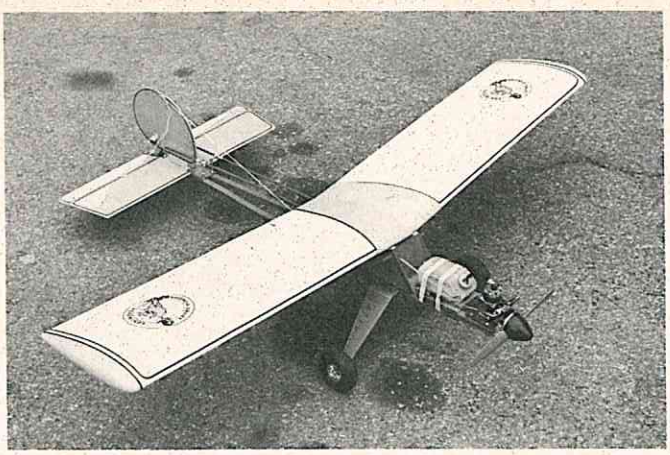
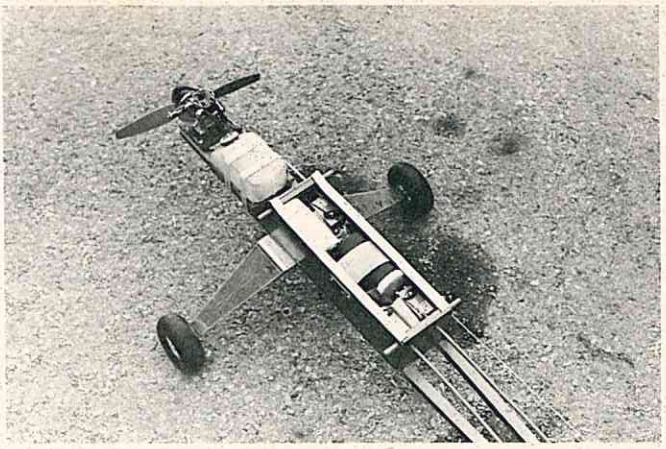
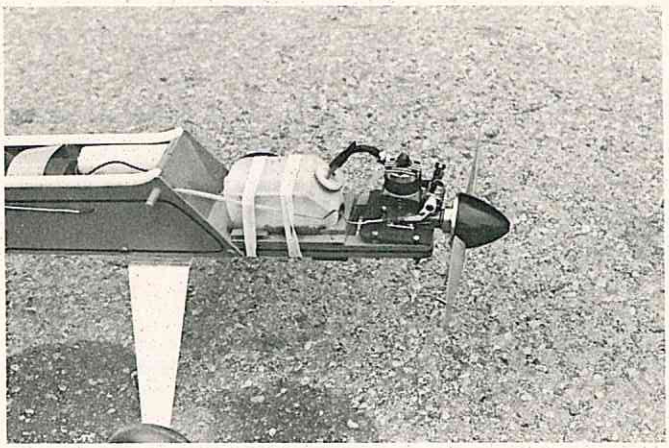
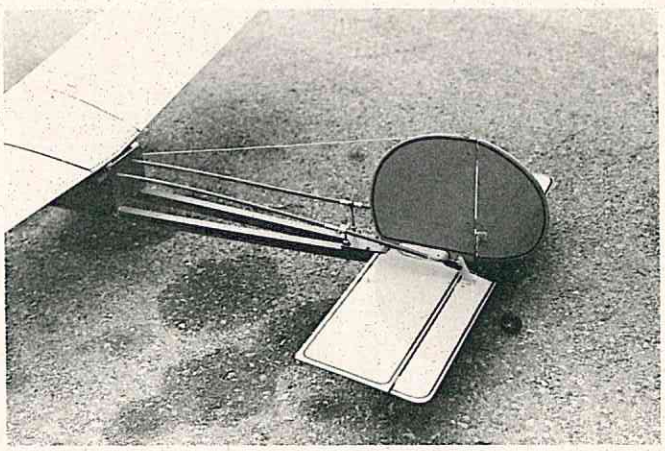
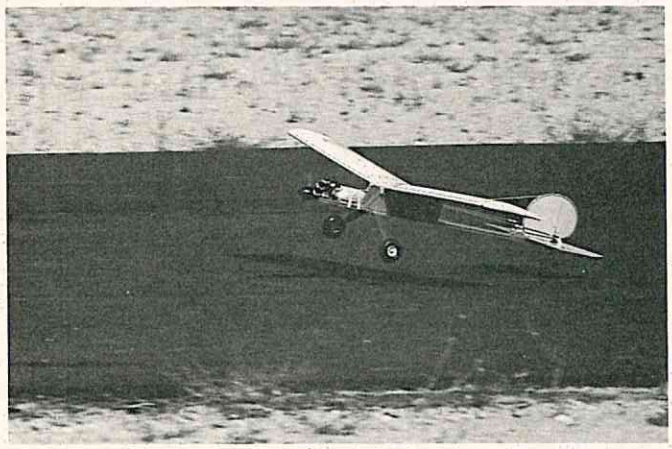
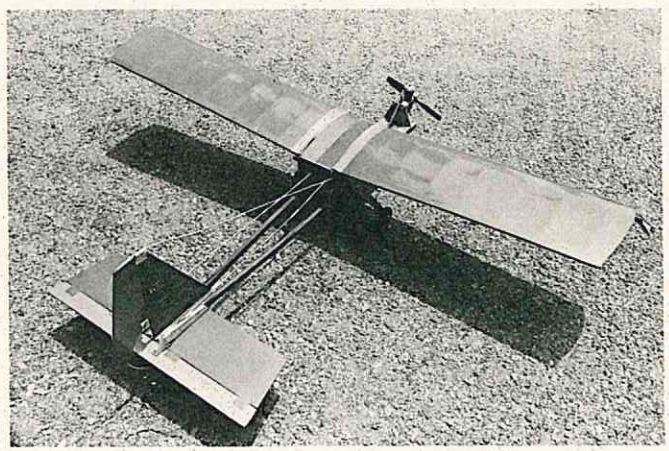


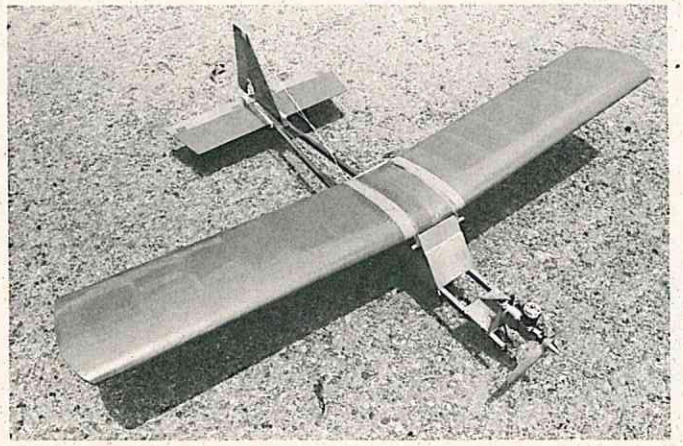




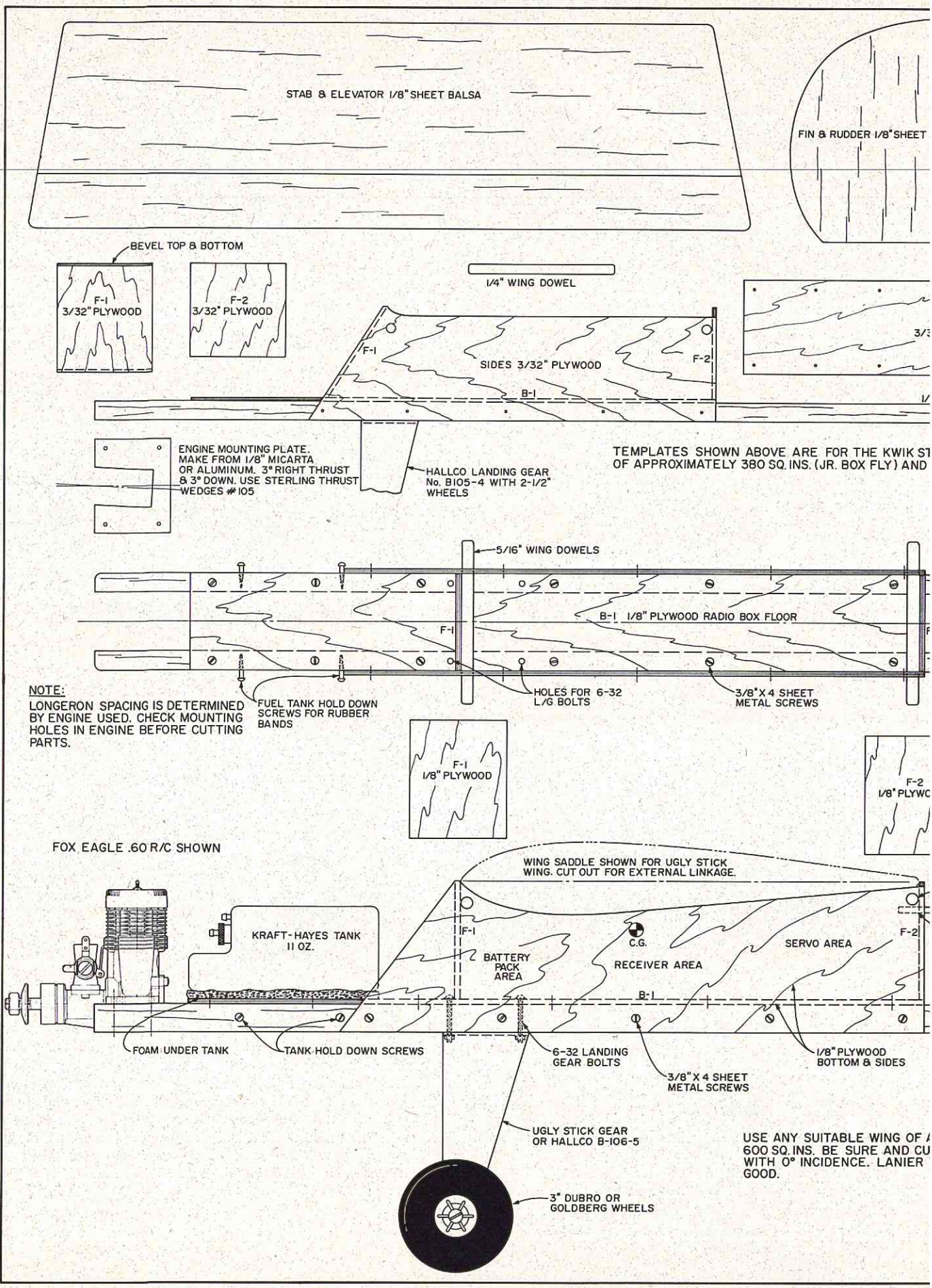


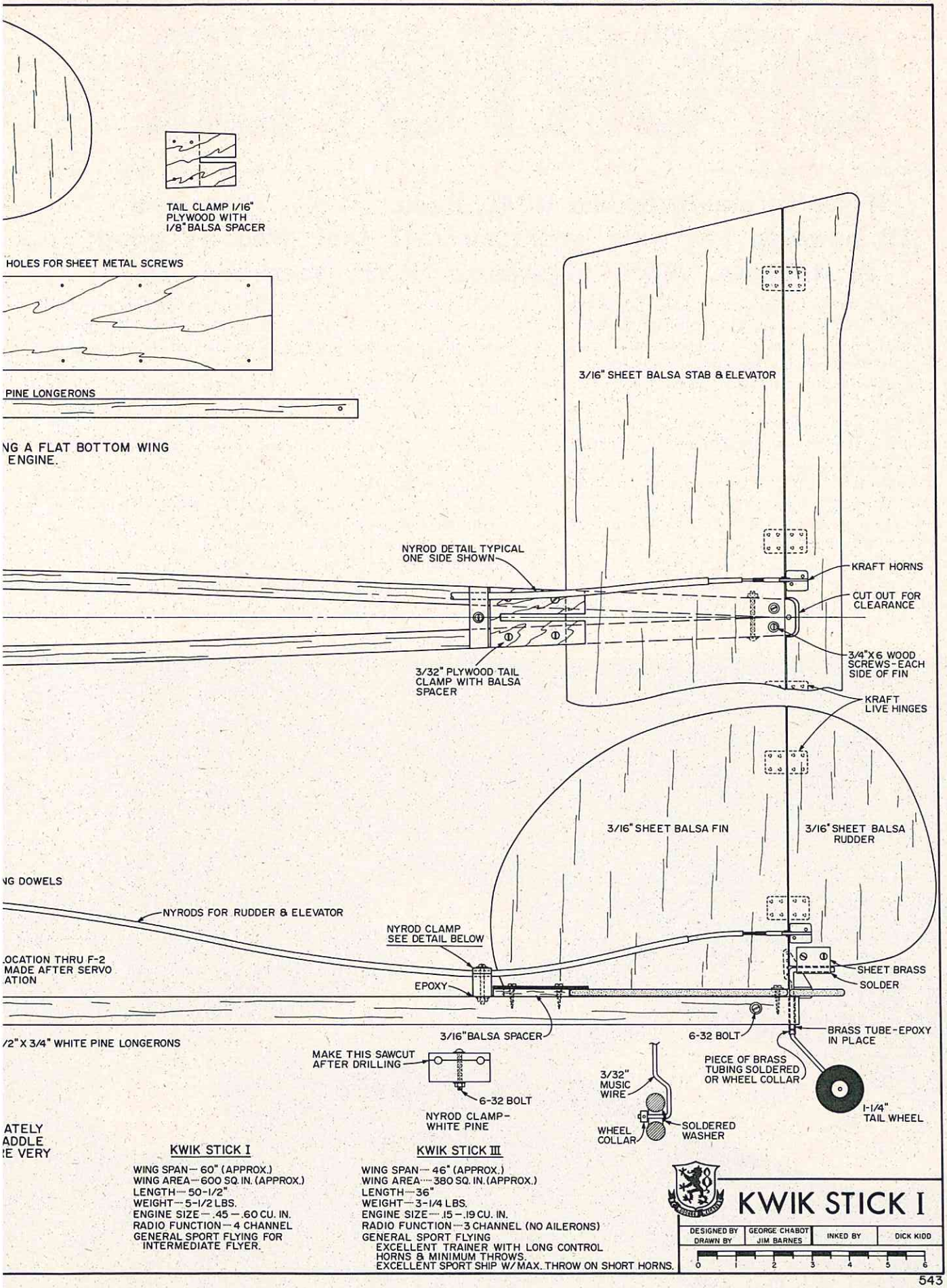






TOP ROW: The O.S. .15 powered Kwik-Stick III. Note radio installation with battery pack and throttle servo in front of compartment. If tail heavy, build ply battery box under fuel tank. SECOND ROW: Close-up of fuel tank and O.S. .15 installation. Note down thrust due to high lift flat bottomed wing. Tail surfaces are of simple sheet balsa construction. ABOVE: The Kwik-Sticks are virtually STOL aircraft, can also be hovered in 10 mph head wind. ABOVE, RIGHT: Kwik-Stick IV uses Ace foam wing with foam cut out to make "foam ribs." Golden Bee .049 used. LEFT: Engine installation in Kwik-Stick IV.


STAB & ELEVATOR 1/8" SHEET BALSA
FIN & RUDDER 1/8" SHEET
BEVEL TOP & BOTTOM
F-1
3/32" PLYWOOD
F-2
3/32" PLYWOOD
1/4" WING DOWEL
F-1
SIDES 3/32" PLYWOOD
F-2
B-1
ENGINE MOUNTING PLATE.
MAKE FROM 1/8" MICARTA
OR ALUMINUM. 3° RIGHT THRUST
& 3° DOWN. USE STERLING THRUST
WEDGES #105
HALLCO LANDING GEAR
No. B105-4 WITH 2-1/2"
WHEELS
TEMPLATES SHOWN ABOVE ARE FOR THE KWIK ST
OF APPROXIMATELY 380 SQ. INS. (JR. BOX FLY) AND
5/16" WING DOWELS
B-1 1/8" PLYWOOD RADIO BOX FLOOR
F-1
FUEL TANK HOLD DOWN
SCREWS FOR RUBBER
BANDS
HOLES FOR 6-32
L/G BOLTS
3/8"X4 SHEET
METAL SCREWS
NOTE:
LONGERON SPACING IS DETERMINED
BY ENGINE USED. CHECK MOUNTING
HOLES IN ENGINE BEFORE CUTTING
PARTS.
F-1
1/8" PLYWOOD
F-2
1/8" PLYWO
FOX EAGLE .60 R/C SHOWN
WING SADDLE SHOWN FOR UGLY STICK
WING. CUT OUT FOR EXTERNAL LINKAGE.
KRAFT-HAYES TANK
11 OZ.
F-1
C.G.
F-2
SERVO AREA
BATTERY
PACK
AREA
RECEIVER AREA
B-1
FOAM UNDER TANK
TANK HOLD DOWN SCREWS
6-32 LANDING
GEAR BOLTS
1/8" PLYWOOD
BOTTOM & SIDES
3/8"X4 SHEET
METAL SCREWS
UGLY STICK GEAR
OR HALLCO B-106-5
3" DUBRO OR
GOLDBERG WHEELS
USE ANY SUITABLE WING OF A
600 SQ. INS. BE SURE AND CU
WITH 0° INCIDENCE. LANIER
GOOD.



KWIK STICK I

WING SPAN— 60" (APPROX.)
WING AREA—600 SQ. IN. (APPROX.)
LENGTH— 50-1/2"
WEIGHT— 5-1/2 LBS.
ENGINE SIZE— .45 — .60 CU. IN.
RADIO FUNCTION— 4 CHANNEL
GENERAL SPORT FLYING FOR INTERMEDIATE FLYER.

KWIK STICK III

WING SPAN— 46" (APPROX.)
WING AREA— 380 SQ. IN. (APPROX.)
LENGTH— 36"
WEIGHT— 3-1/4 LBS.
ENGINE SIZE— .15 — .19 CU. IN.
RADIO FUNCTION— 3 CHANNEL (NO AILERONS)
GENERAL SPORT FLYING
EXCELLENT TRAINER WITH LONG CONTROL HORNS & MINIMUM THROWS.
EXCELLENT SPORT SHIP W/ MAX. THROW ON SHORT HORNS.

KWIK STICK I

DESIGNED BY / DRAWN BY	GEORGE CHABOT / JIM BARNES	INKED BY	DICK KIDD

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THE RCM SPORTSTER

BY JOE BRIDI

RCM PHOTOS BY DICK TICHENOR

EKTACHROME BY RITA LORD

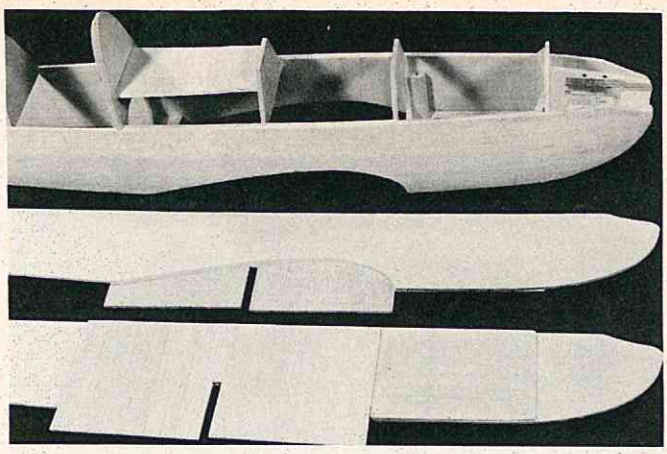
If you've mastered the RCM Basic Trainer, here's a .19 powered low wing sport aircraft that flies as good as it looks. K&B Superpoxy finish, Veco-Lee .19.

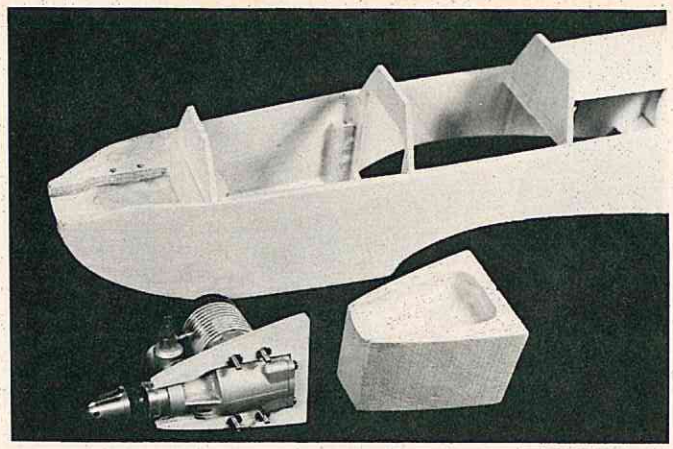
One nice sunny, smogless day in California we were out at the local flying site doing our thing with the RCM Basic Trainer when all of a sudden we said to no one in particular, "If we took the same wing, rear rudder and elevator and put the wing on the bottom we would have a dandy, fun to fly model."

This is how it all began, so we proceeded to make these changes and now we have the RCM Sportster. The wing is the same as the RCM Basic Trainer except the aileron horns come through the top instead of the bottom. The rudder and elevator haven't any changes whatsoever. The motor mounts are the same but the fuselage sides are different. We also added a canopy and turtledeck.

Several months later we finally got the prototype assembled and ready to fly. Once again, we were back at our local flying site testing out our idea. We fueled up, flipped over the prop and we were ready to fly. All controls were checked so we proceeded to taxi out on the runway. Everything was working well so we gave her the gun and off it went.

I was amazed - - - it lifted its tail, and then broke ground just as gentle as you would want it to do. No elevator was needed, but a little rudder was applied. The only trim changes it needed was a couple of turns of down elevator. Other than that it was virtually trimmed out. We had a ball flying the Sportster that day and for quite a few more days since. We also tried some crosswind landings and take-offs with huge success. A little rudder has to be applied to compensate for the wind, but crosswind take-off and landing are possible with little effort. Now we'll get into the construction of the model. We hope we have made the construction easy to follow and the model easy to build.

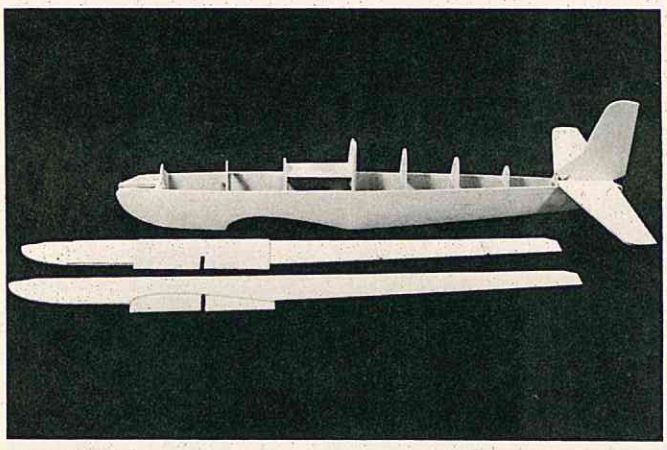




CONSTRUCTION

Start by building the fuselage sides – one left and one right. Draw a line on the inside of each fuselage side from the leading edge of the wing saddle to the top of the fuselage side at right angles to the top of the sides. This is the position of bulkhead No. 2. Cut the 3/32" x 4" x 13" fuselage doublers in four equal pieces, cross grain (see parts list). Next, cut 2 pieces of the wing capstrips to 2-1/8" long, then cut the rear fuselage vertical bracing from 1/8" x 3/16" stock.

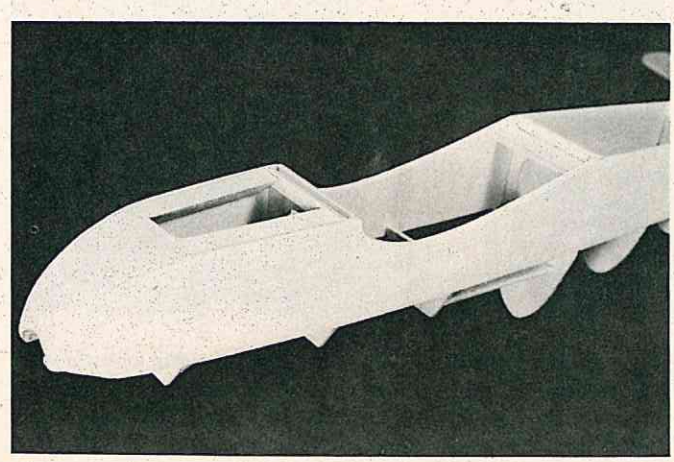
Using epoxy, glue the 1/16" ply fuselage tank doubler to the sides; they go in front of the line drawn from the wing saddle to the top of the sides. Next, glue one piece of the 3/32" fuselage doubler you just cut behind the 1/16" ply doubler, then the 2-1/8" piece of capstrip. Next, add the other 3/32" fuselage doubler. The last pieces to go into place are the vertical fuselage rear braces.



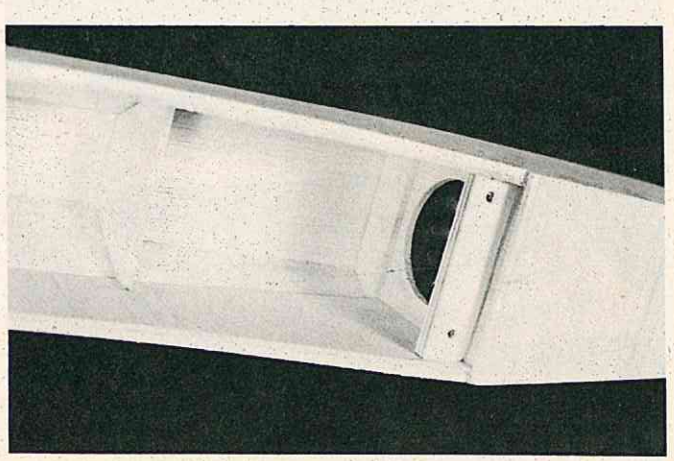
Join the two fuselage sides at the rear and install bulkhead No. 5, making sure the tops of the fuselage sides are parallel. Bulkhead No. 5 goes behind the last 3/32" doubler. Next, install bulkhead No. 2; it goes on the front of the first 3/32" doubler. Do not put bulkhead No. 2 on the 1/16" ply doubler. Now install bulkhead No. 3 and the cockpit floor; this will help keep the fuselage square and rigid. Install the rest of the bulkheads except No. 1 which is the 1/8" ply firewall.

The engine mount must be made to fit your choice of engines and blind nuts installed prior to assembling to nose block and firewall. The fuel and vent line holes in the firewall must match your choice of fuel tanks. Remember to align the landing gear retainer slots properly on bulkhead No. 2 (one slot forward and one aft). Drill a 1/8" diameter hole in each end of bottom landing gear support to accept strut.

Epoxy the engine blind nuts and hollow out the nose blocks to fit your engine. Epoxy the motor mount to the nose blocks. Epoxy the firewall (did you drill all holes?) into the fuselage. Butt the firewall against the 1/16" ply doubler, not on top of it. Now epoxy the nose block, motor mount assembly against the firewall.

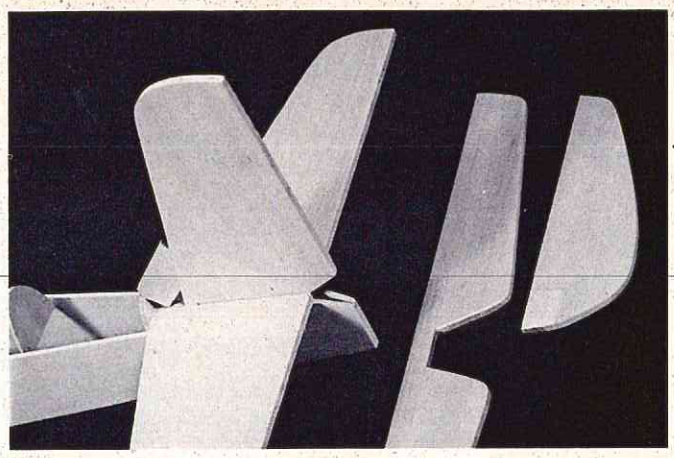


Add the 5/8" triangle stock to the bottom of the tank compartment, then the 1/16" ply tank compartment bottom. It butts up to the landing gear cross bracket, not on top of it.

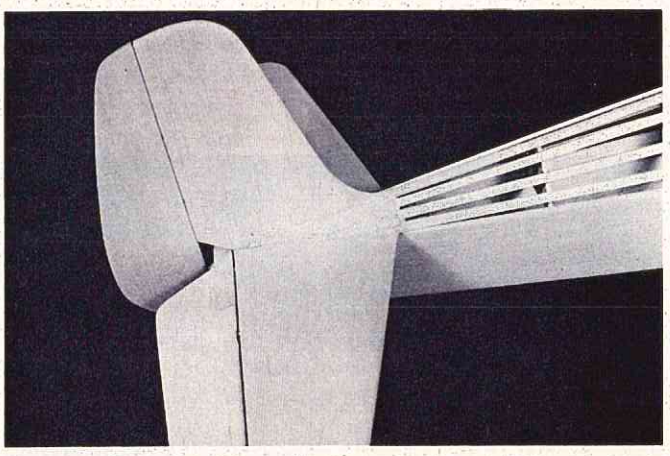


Add the 1/4" ply rear wing hold-down, do not drill until the wing is complete. Add all 1/4" triangle bracing as shown on plans.

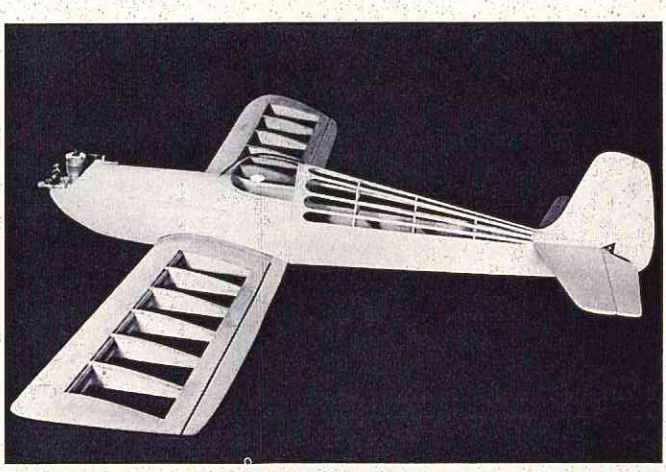
The tail surfaces are 3/16" thick balsa sheet. Pine inserts are cemented in place with epoxy or white glue. The



surfaces are sanded to shape after hinges are installed.

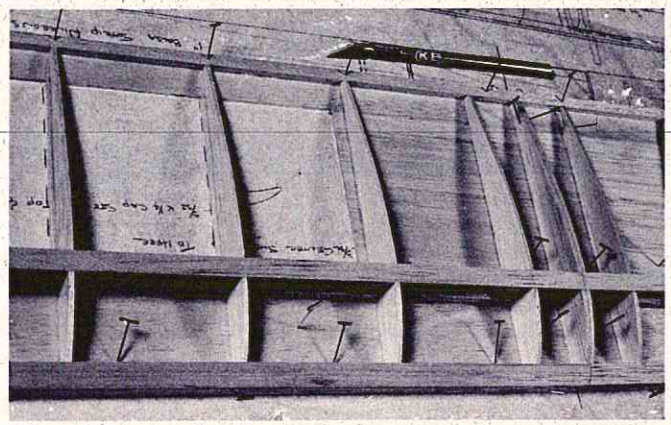


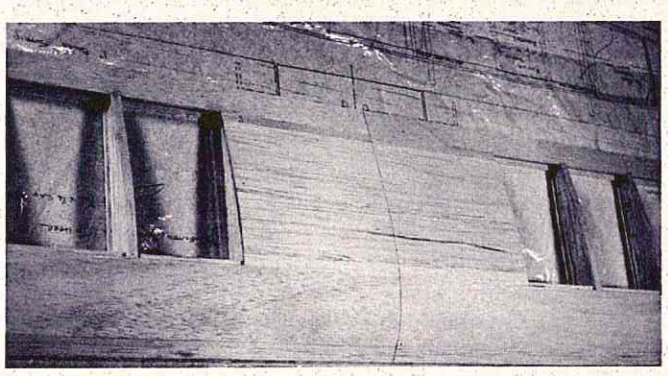
Glue on the rudder and stabilizer, making sure they are at right angles to each other and the stabilizer is at a right angle to the fuselage sides. Then cut a slit in the rear where the two fuselage sides join. Fill the slot with epoxy and insert the tail wheel bracket. Add the small rudder front filler piece but do not shape until the rear stringers are in place.



Cut the fuselage rudder filler block in half. Shape these parts before gluing into position. Add the seven 1/8" x 3/16" stringers to rear deck. The stringers butt against bulkhead No. 4 and rest on bulkhead No. 5.

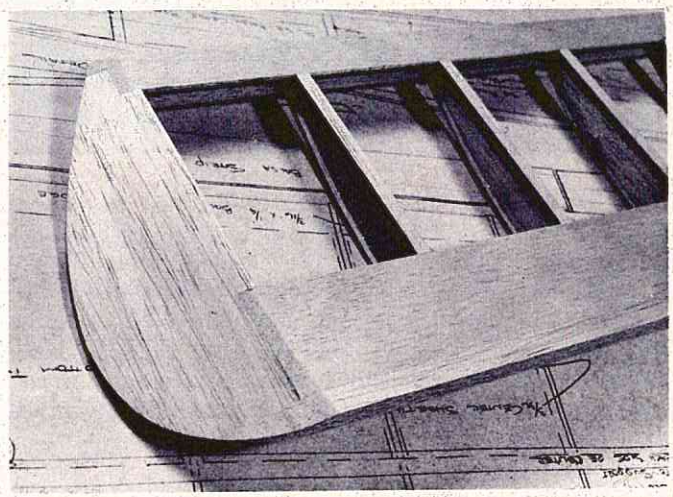
Cut the 1/8" fuselage stringer filler pieces and glue between each stringer as shown. Glue the ¼" fuselage front deck sides in place, and be sure to angle the bottom where it meets the fuselage so a good strong glue joint will be made. Sand the fuselage front deck sides flat on top, then glue on the fuselage front deck ¼" top. Sand the front deck to shape; the front deck is not half round at the cockpit area, it is flat across the front of the canopy and half round at the firewall. A Du-Bro No. 4 canopy can be used.





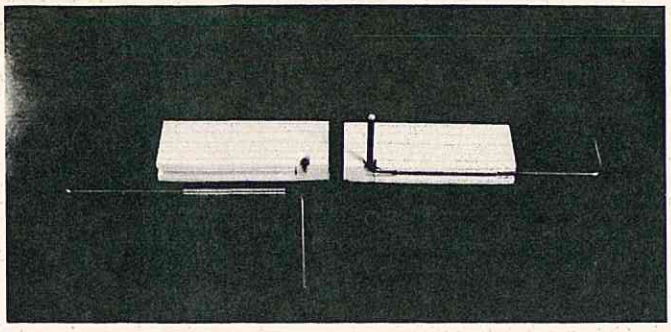
The wing is constructed right on the plans. Note the plastic food wrap to prevent gluing the wood to the plans. The first step is to assemble the bottom leading and trailing edge sheeting, center sheeting, and bottom capstrips. Next, assemble leading edge, trailing edge, bottom spar and ribs. Then install the top spar. A **flat** building surface is required to build a straight wing.

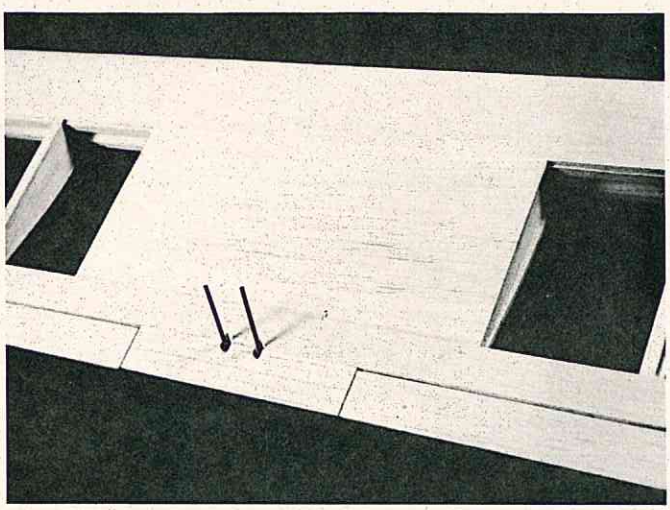
The top sheeting and cap strips are assembled after the bottom assembly is thoroughly dry.



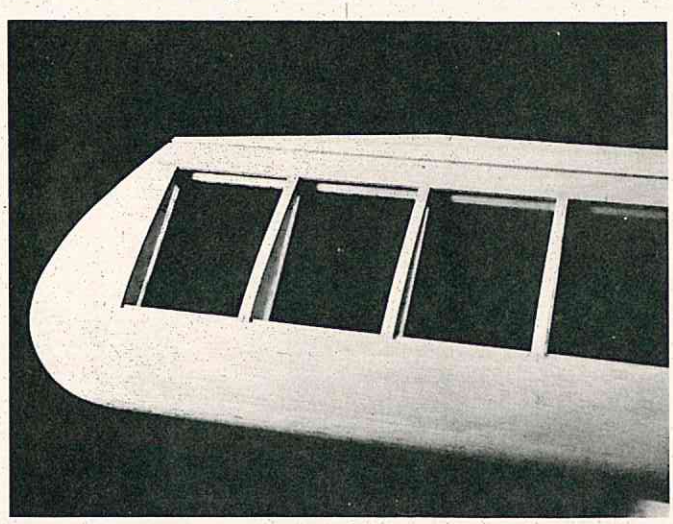
Trim ends of the wing assembly and sand smooth.

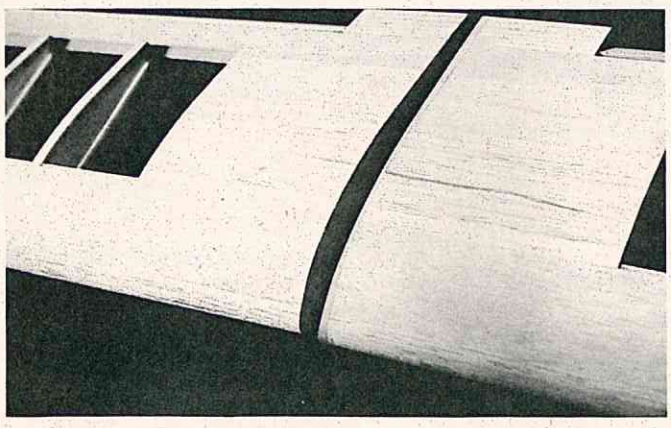
Notches are trimmed in the top side of the center section trailing edge blocks and wing for control arm clearance. The controls are inserted (be sure to assemble a





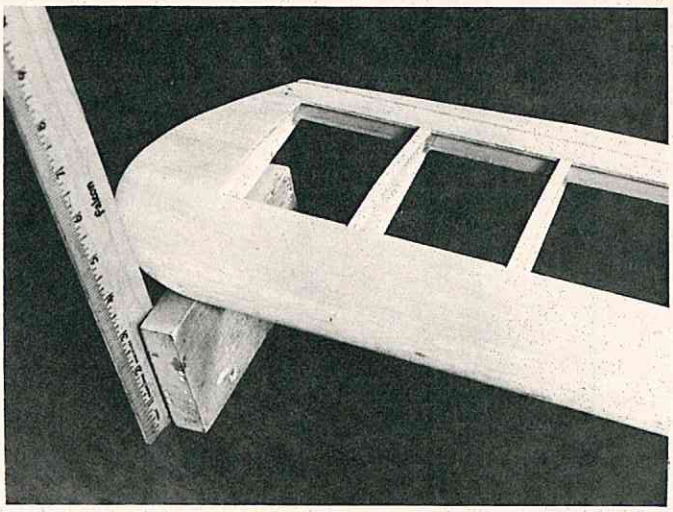
left hand and right hand pair). Cut a groove in the inboard end of the ailerons and drill holes for the control arm. Install the ailerons with hinges.



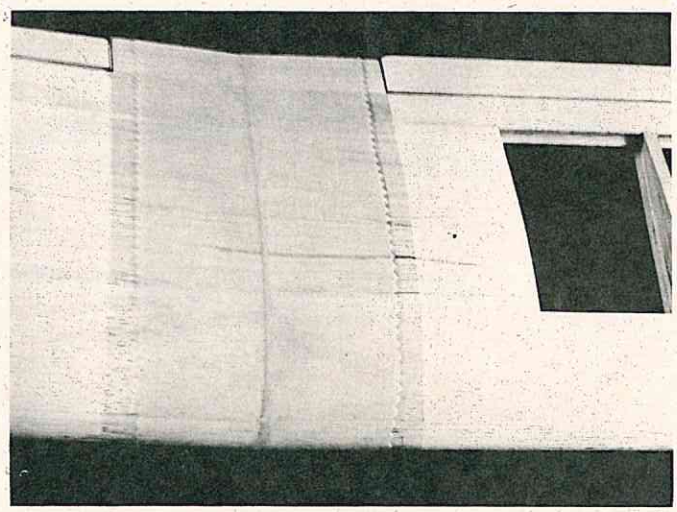


View showing wing tip and aileron tip shape.

The center section wedge shaped rib is glued to one inboard rib.



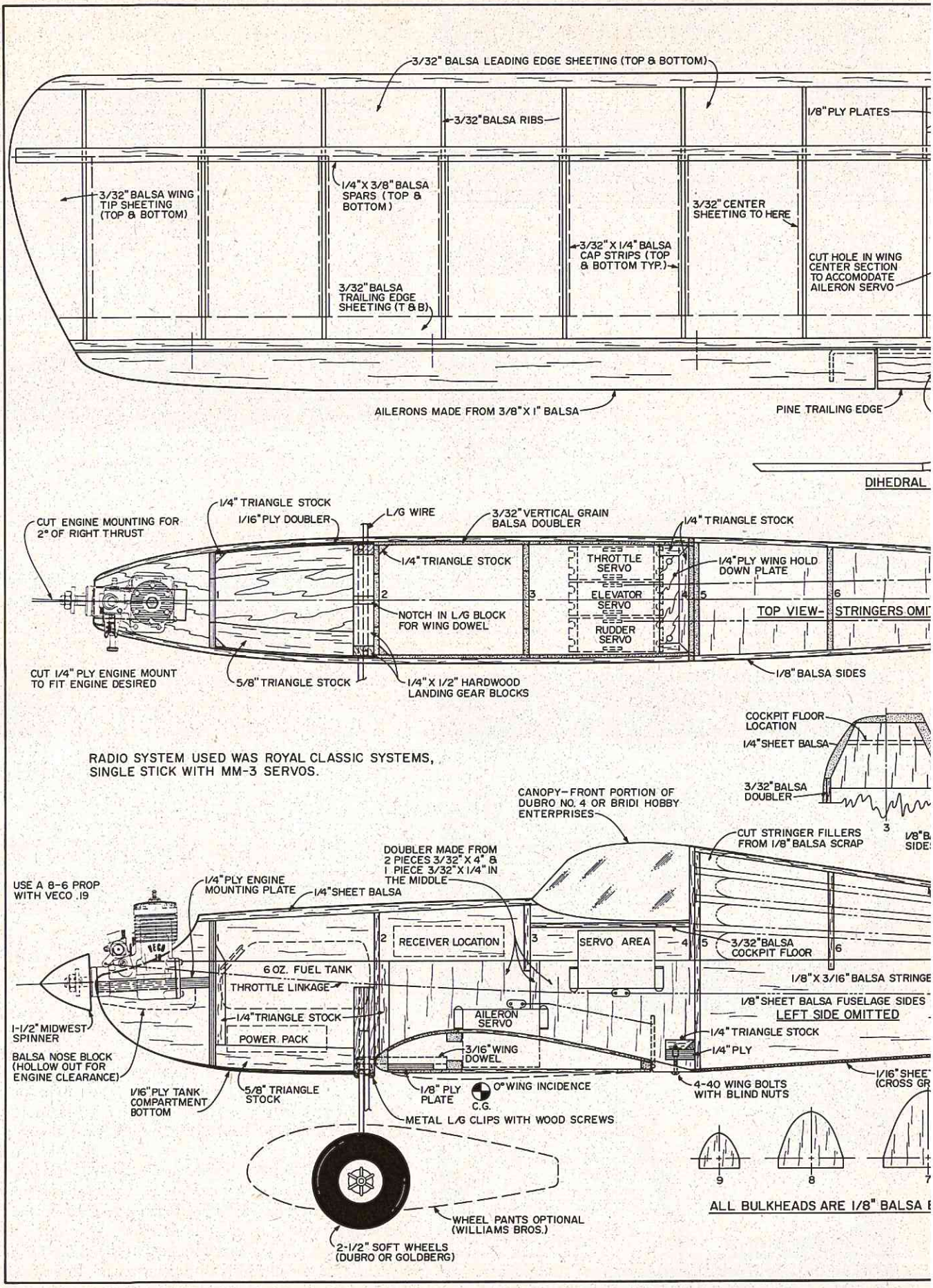
Wing panels are glued together at the center with the wedge shaped rib in place. One panel is held flat and the other panel is blocked up 3 inches to obtain the proper dihedral. Check alignment for a straight wing. A ¼" dowel is inserted and epoxied into the center dihedral rib.

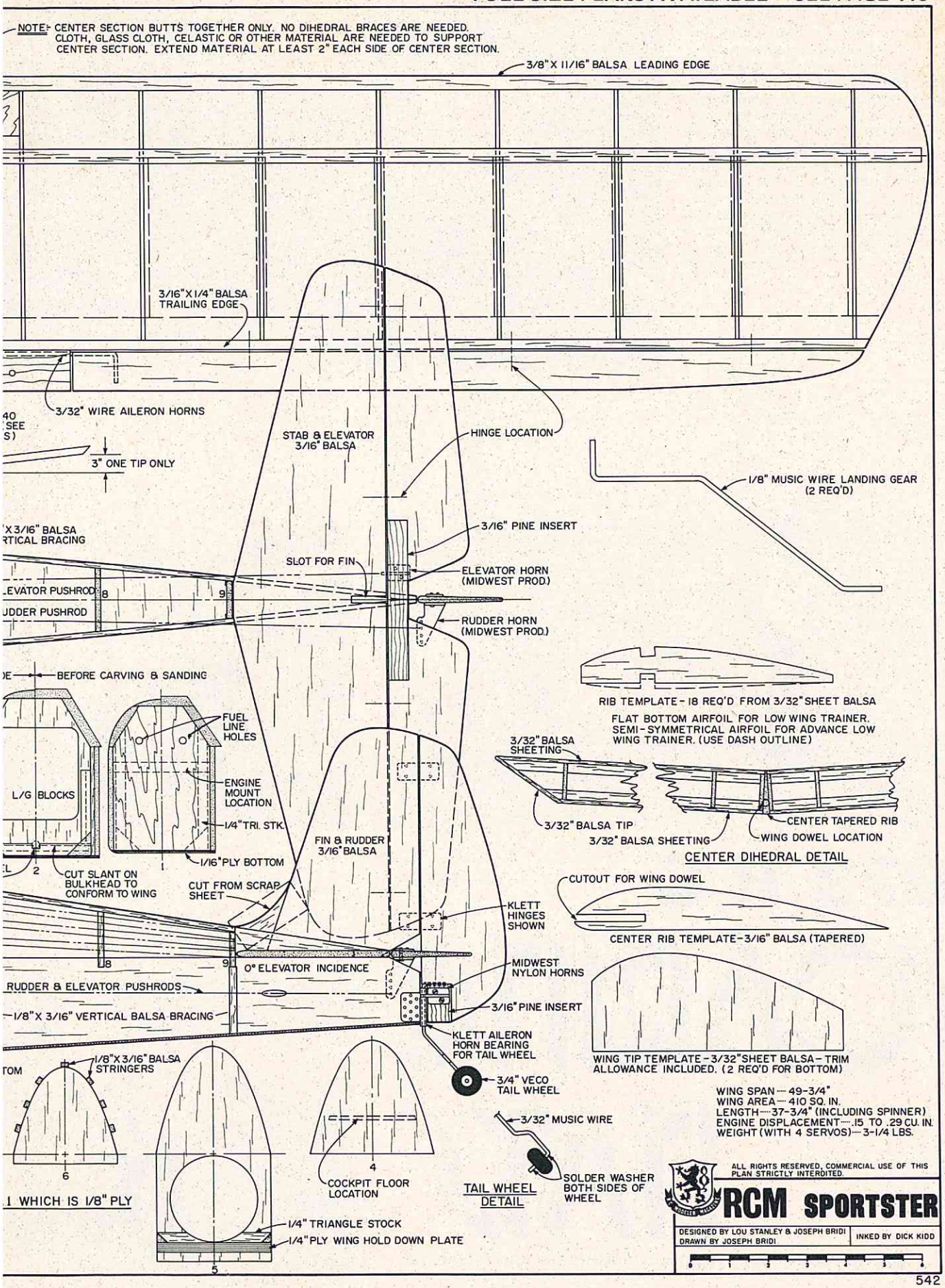


The center section is reinforced with cloth, Celastic, or fiberglass.

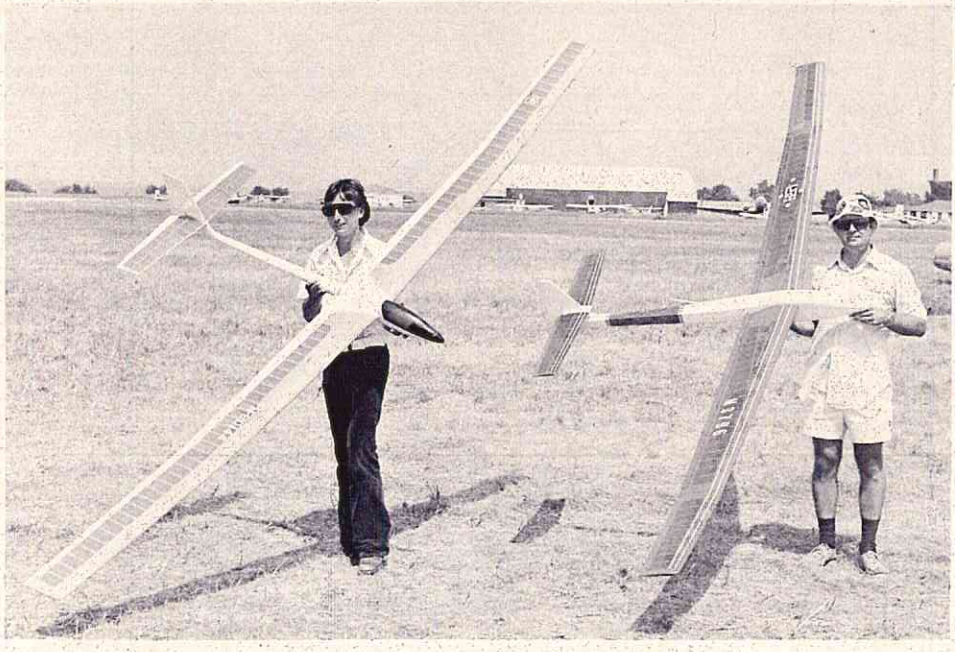
With the fuselage upside down, place the wing into position in the saddle. Make sure the wing is square to the fuselage. Then drill the two rear wing hold-down holes through the wing and ¼" ply fuselage wing hold-down brackets at the same time. Epoxy in the two 4-40 blind nuts. Check all alignment – see the RCM Flight Training Course book for alignment suggestion or call Don Dewey on the phone!

The selection of finishing materials and techniques are left to the option of the builder as there are numerous excellent materials available. Regardless of finish used, keep the weight as light as possible. We have found that the K & B Superpoxy primers and paints give us the desirable combination of a beautiful finish with light weight. Any of the .15 to .30 engines will provide more than ample power for the ship. We have used a Veco .19 with a 9-4 or 8-6 prop. □


3/32" BALSA LEADING EDGE SHEETING (TOP & BOTTOM)
3/32" BALSA RIBS
1/8" PLY PLATES
3/32" BALSA WING TIP SHEETING (TOP & BOTTOM)
1/4" X 3/8" BALSA SPARS (TOP & BOTTOM)
3/32" CENTER SHEETING TO HERE
3/32" X 1/4" BALSA CAP STRIPS (TOP & BOTTOM TYP.)
CUT HOLE IN WING CENTER SECTION TO ACCOMODATE AILERON SERVO
3/32" BALSA TRAILING EDGE SHEETING (T & B)
AILERONS MADE FROM 3/8" X 1" BALSA
PINE TRAILING EDGE
DIHEDRAL
CUT ENGINE MOUNTING FOR 2° OF RIGHT THRUST
1/4" TRIANGLE STOCK
1/16" PLY DOUBLER
L/G WIRE
3/32" VERTICAL GRAIN BALSA DOUBLER
1/4" TRIANGLE STOCK
1/4" TRIANGLE STOCK
THROTTLE SERVO
1/4" PLY WING HOLD DOWN PLATE
ELEVATOR SERVO
NOTCH IN L/G BLOCK FOR WING DOWEL
RUDDER SERVO
TOP VIEW- STRINGERS OMI
CUT 1/4" PLY ENGINE MOUNT TO FIT ENGINE DESIRED
5/8" TRIANGLE STOCK
1/4" X 1/2" HARDWOOD LANDING GEAR BLOCKS
1/8" BALSA SIDES
COCKPIT FLOOR LOCATION
1/4" SHEET BALSA
3/32" BALSA DOUBLER
RADIO SYSTEM USED WAS ROYAL CLASSIC SYSTEMS, SINGLE STICK WITH MM-3 SERVOS.
CANOPY- FRONT PORTION OF DUBRO NO. 4 OR BRIDI HOBBY ENTERPRISES
CUT STRINGER FILLERS FROM 1/8" BALSA SCRAP
DOUBLER MADE FROM 2 PIECES 3/32" X 4" & 1 PIECE 3/32" X 1/4" IN THE MIDDLE
USE A 8-6 PROP WITH VECO .19
1/4" PLY ENGINE MOUNTING PLATE
1/4" SHEET BALSA
RECEIVER LOCATION
SERVO AREA
3/32" BALSA COCKPIT FLOOR
6 OZ. FUEL TANK
THROTTLE LINKAGE
1/8" X 3/16" BALSA STRINGE
1/8" SHEET BALSA FUSELAGE SIDES
LEFT SIDE OMITTED
AILERON SERVO
1/4" TRIANGLE STOCK
1-1/2" MIDWEST SPINNER
POWER PACK
1/4" TRIANGLE STOCK
3/16" WING DOWEL
1/4" PLY
BALSA NOSE BLOCK (HOLLOW OUT FOR ENGINE CLEARANCE)
1/16" PLY TANK COMPARTMENT BOTTOM
5/8" TRIANGLE STOCK
1/8" PLY PLATE
0° WING INCIDENCE
C.G.
4-40 WING BOLTS WITH BLIND NUTS
1/16" SHEE (CROSS GR
METAL L/G CLIPS WITH WOOD SCREWS
9
8
7
ALL BULKHEADS ARE 1/8" BALSA
WHEEL PANTS OPTIONAL (WILLIAMS BROS.)
2-1/2" SOFT WHEELS (DUBRO OR GOLDBERG)


NOTE: CENTER SECTION BUTTS TOGETHER ONLY. NO DIHEDRAL BRACES ARE NEEDED. CLOTH, GLASS CLOTH, CELASTIC OR OTHER MATERIAL ARE NEEDED TO SUPPORT CENTER SECTION. EXTEND MATERIAL AT LEAST 2" EACH SIDE OF CENTER SECTION.
3/8"X 11/16" BALSA LEADING EDGE
3/16"X1/4" BALSA TRAILING EDGE
3/32" WIRE AILERON HORNS
3" ONE TIP ONLY
STAB & ELEVATOR 3/16" BALSA
HINGE LOCATION
1/8" MUSIC WIRE LANDING GEAR (2 REQ'D)
3/16" PINE INSERT
SLOT FOR FIN
ELEVATOR HORN (MIDWEST PROD.)
RUDDER HORN (MIDWEST PROD.)
BEFORE CARVING & SANDING
FUEL LINE HOLES
ENGINE MOUNT LOCATION
L/G BLOCKS
1/4" TRI. STK.
1/16" PLY BOTTOM
FIN & RUDDER 3/16" BALSA
CUT SLANT ON BULKHEAD TO CONFORM TO WING
CUT FROM SCRAP SHEET
KLETT HINGES SHOWN
0° ELEVATOR INCIDENCE
MIDWEST NYLON HORNS
RUDDER & ELEVATOR PUSHRODS
1/8"X 3/16" VERTICAL BALSA BRACING
3/16" PINE INSERT
KLETT AILERON HORN BEARING FOR TAIL WHEEL
3/4" VECO TAIL WHEEL
1/8"X 3/16" BALSA STRINGERS
COCKPIT FLOOR LOCATION
3/32" MUSIC WIRE
SOLDER WASHER BOTH SIDES OF WHEEL
TAIL WHEEL DETAIL
1/4" TRIANGLE STOCK
1/4" PLY WING HOLD DOWN PLATE
RIB TEMPLATE - 18 REQ'D FROM 3/32" SHEET BALSA
FLAT BOTTOM AIRFOIL FOR LOW WING TRAINER. SEMI-SYMMETRICAL AIRFOIL FOR ADVANCE LOW WING TRAINER. (USE DASH OUTLINE)
3/32" BALSA SHEETING
3/32" BALSA TIP
3/32" BALSA SHEETING
CENTER TAPERED RIB
WING DOWEL LOCATION
CENTER DIHEDRAL DETAIL
CUTOUT FOR WING DOWEL
CENTER RIB TEMPLATE-3/16" BALSA (TAPERED)
WING TIP TEMPLATE-3/32" SHEET BALSA-TRIM ALLOWANCE INCLUDED. (2 REQ'D FOR BOTTOM)
WING SPAN — 49-3/4"
WING AREA — 410 SQ. IN.
LENGTH — 37-3/4" (INCLUDING SPINNER)
ENGINE DISPLACEMENT — .15 TO .29 CU. IN.
WEIGHT (WITH 4 SERVOS) — 3-1/4 LBS.
ALL RIGHTS RESERVED, COMMERCIAL USE OF THIS PLAN STRICTLY INTERDITED.
RCM SPORTSTER
DESIGNED BY LOU STANLEY & JOSEPH BRIDI
DRAWN BY JOSEPH BRIDI
INKED BY DICK KIDD
542

RIGHT: 12-year old Jeff Mrlik with Astro-Jeff, Dad's original design, immediately after flight that garnered Jeff a sensational Grand Champion win over nations top soaring pilots. BELOW, LEFT: Otto Heithecker and Ray Vanderdonck just before fly-off in 15 minute Precision. BELOW, RIGHT: Hugh Stock with Glasflugel 604 and Tony Estep with Kestrel 19, 1st and 2nd in scale. RCM team of Stock, Estep, and Jim Simpson captured first three slots in Scale category. BOTTOM: Mark Smith and Windfree just after winning fly-off in Precision/Duration. Timer is Dick Schilling.

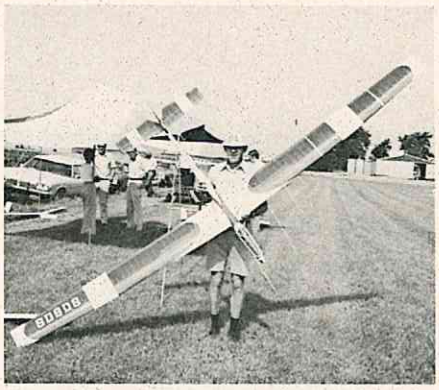


1973 R/C SOARING NATS

BY TONY ESTEP

RCM PHOTOS BY HUGH STOCK, JACK HUMPHREYS, AND TONY ESTEP

Jeff Mrlik being presented with Grand Champion trophy. 4th Annual Soaring Nat's represented the best traditions of modeling and sportsmanship.

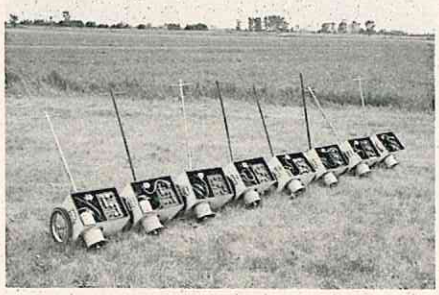


Proud father, Jerry Mrlik, with Astro-Jeff which not only won championships for son, but also Best Original Design Award.

Lovely Patricia Martin holds the Soarcraft Glasflugel 604 which won 1st in Scale for RCM Nationals photographer, Hugh Stock.

Jerry Nelson and beautiful Graupner Cumulus. Jerry has always been a top competitor in every facet of radio control from Formula I to sailplanes. A well-liked gentleman and sportsman.

East versus West - - - Mark Smith, center, and Otto Heithecker, left center. Two of the nation's top sailplane pilots watch the competition perform.



ABOVE: The line-up of winches which ran like clockwork throughout entire meet and, below, the line retrieving vehicle provided by S.O.A.R.

1973 R/C SOARING NATIONALS AWARD STANDINGS

TOTAL % POINTS – GRAND CHAMPION COMBINED CLASSES

1	Jeff Mrlik, Michigan	6342
2	Mark A. Smith, California	6267
3	Otto Heithecker, Michigan	6103
4	Rick Lederman, Ohio	5465
5	Tom Kelly, Michigan	5411
6	Bob Thacker, California	5354
7	Milt Woodham, Jr., Alabama	5211
8	Jack Josaitis, Michigan	5132
9	Ken Bates, Michigan	5130
10	Don Clark, Maryland	5105

TASK % POINTS – 10 MINUTE DURATION

STANDARD CLASS

1	Mark A. Smith, California	2383
2	Rod Smith, California	2173
3	Rich Lederman, Ohio	2076
4	Warren Tiahart, Michigan	1717
5	Dave Shadel, California	1682

OPEN CLASS

1	Otto Heithecker, Michigan	2953
2	Max Geier, Illinois	2719
3	Jeff Mrlik, Michigan	2649
4	Joe Mavaro, Connecticut	2522
5	Neil Nolte, Missouri	2323

TASK % POINTS – 2 MINUTE PRECISION

STANDARD CLASS

1	Gary Joseph, Illinois	2920
2	Mark A. Smith, California	2885
3	Rodman Smith, California	2845
4	Dave Shadel, California	2480
5	B. Zabransky, Illinois	2475

OPEN CLASS

1	Bob Gill, Illinois	2960
2	Dale Nutter, Oklahoma	2925
3	Milt Woodham, Jr., Alabama	2835
4	Don Clark, Maryland	2750
5	Jeff Mrlik, Michigan	2735

TASK % POINTS – PRECISION/DURATION

STANDARD CLASS

1	Mark A. Smith, California	999
2	Rod Smith, California	999
3	Byron Grover, California	933
4	Rick Lederman, Ohio	914
5	Bob Steele, Indiana	870

OPEN CLASS

1	Otto Heithecker, Michigan	1000
2	Ray Vandierdonck, Michigan	1000
3	Rick Walters, California	995
4	Denny Darnell, Oklahoma	994
5	Fred Steffen, Ohio	992

SCALE

1	Hugh Stock, California	6383
2	Preston Estep, Jr., Missouri	5999
3	Jim Simpson, Nebraska	5076

BEST JUNIOR TEAM

1	Rocket City Radio Controllers	14,297

BEST SENIOR TEAM

1	Torrey Pine Gulls	17,638

BEST ORIGINAL DESIGN

Jerry Mrlik's Astro-Jeff

BEST TECHNICAL ACHIEVEMENT

Otto Heithecker's Linkage Design

BEST JUNIOR

Jeff Mrlik, Michigan 6342

AMA PRESIDENT'S SPORTSMANSHIP AWARD

Greater Detroit Soaring and Hiking Society

● The 1973 Soaring Nationals were, in every way, a tribute to the sport of R/C soaring, the fine people who enjoy our hobby, and the organizational skills and energy of the

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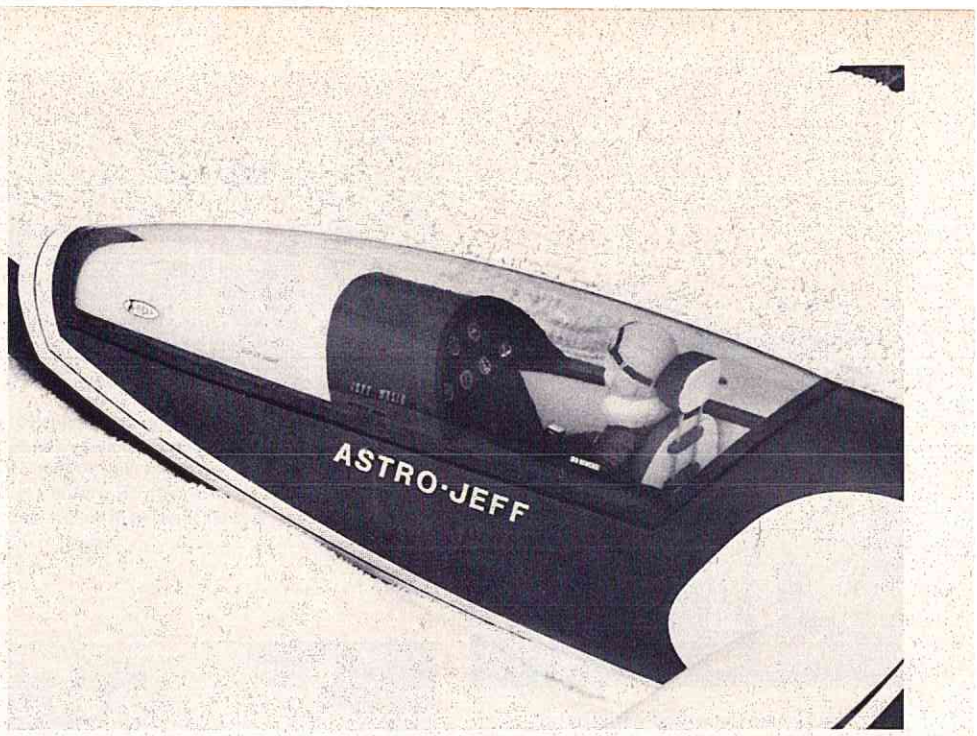
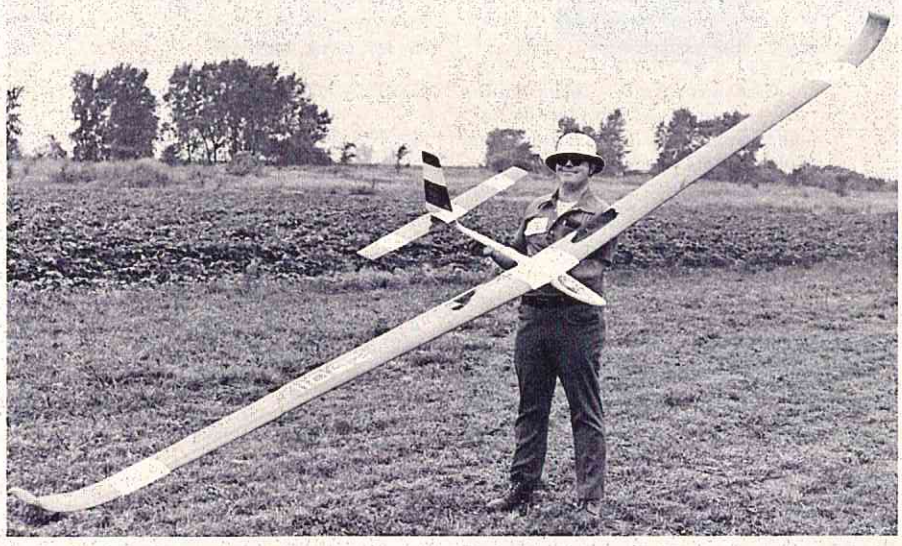
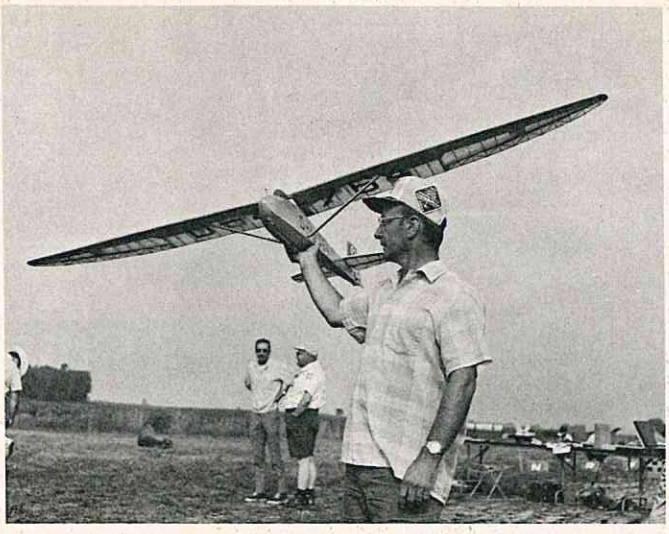


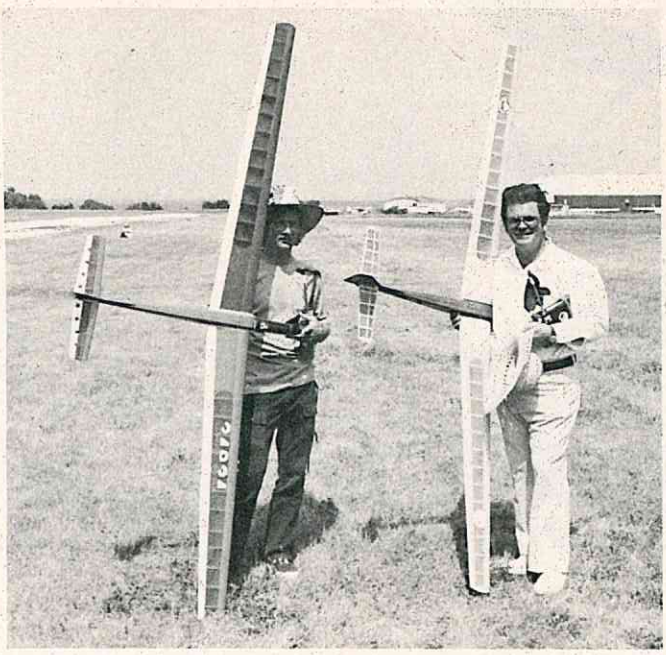
Jeff Mrlik's winning sailplane featured a fibreglass fuselage, modified Cirrus airfoil. Wingspan is 151" with a total area of 1370 square inches. Weight is 5 pounds. Astro-Jeff, designed by father, Jerry, has all-flying stab and rudder plus spoilers.



ABOVE, LEFT: Long wings – 195" original design by Jim Porter of Bonita, Iowa. Shrike-W weighs 5 lbs., has all-flying surfaces. ABOVE, RIGHT: Bob Gill (r), winner of Precision, adjusts servos in Airtronics Olympic as Tom McCarthy assists. RIGHT: Gordon Pearson, Ann Arbor Michigan with beautifully finished Airtronics Grand Esprit.



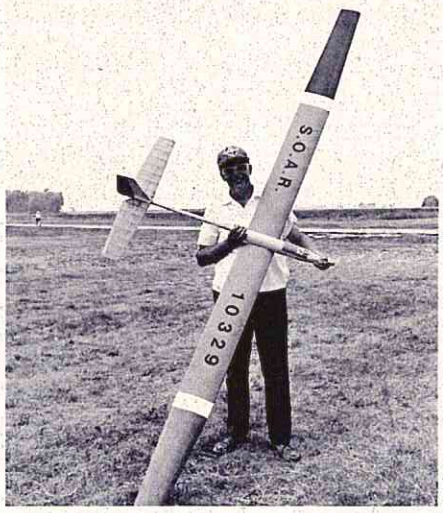
ABOVE: Grunau Baby by Max Geier, S.O.A.R. Chicago. Unstable on tow, this magnificent scale machine crashed during '73 Nat's.
RIGHT: Father and son team of Mark and Rod Smith mopped up in Standard Class with Mark's Model's Windfree. Mark, 3rd overall.



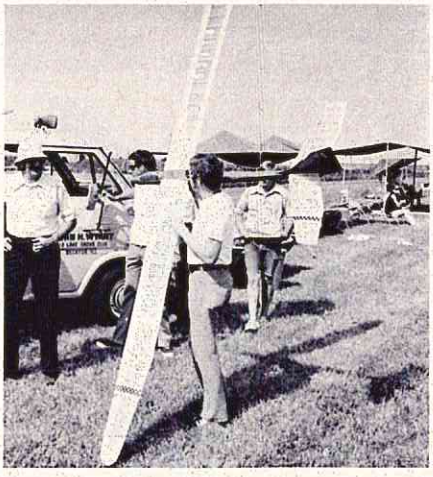
LEFT: Their third year as Scale judges at the Soaring Nat's, the fabulous Scalemasters judge the Grunau Baby. ABOVE: The Rocket City Radio Controllers, winning Junior Team. And . . . can they fly!

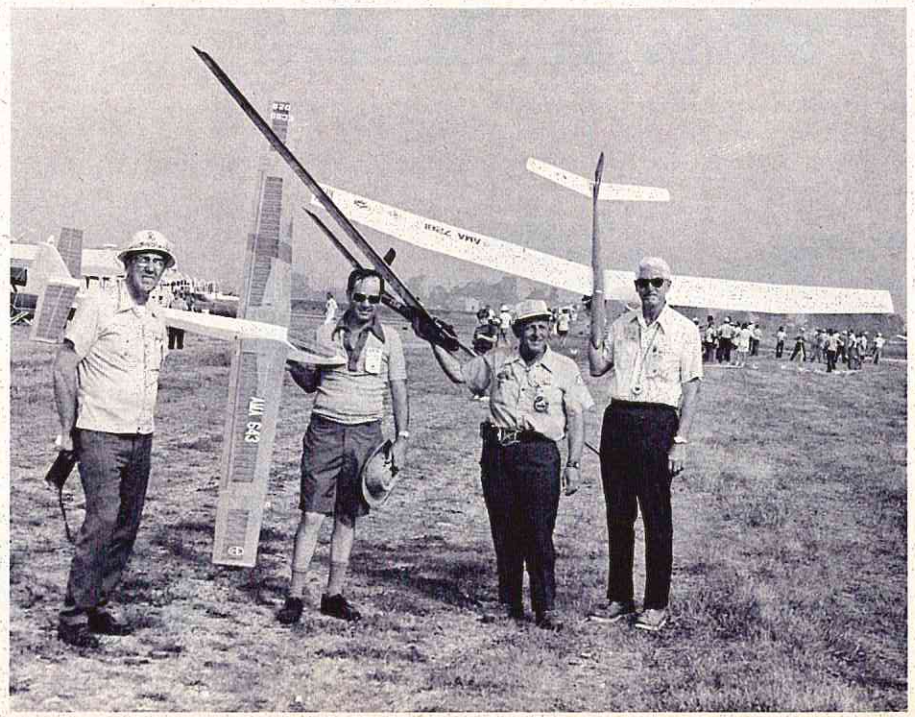
ABOVE: Organization excellent. Contestants line up in front of letter for timer. Contestants in foreground are Juniors from Canada. RIGHT: Well-known modeler, Chet Lanzo, with original pod and boom design, featuring string actuated T-tail.

LEFT: 12-year old Doug Durney flies dad's O.D. Ellipsoar. ABOVE: Aerial view of Lewis University, Lockport, Illinois, magnificent hosts for '73 Soaring Nat's.



LEFT: Pat Martin with Scale winning Glasflugel 604. ABOVE: John Nielson, S.O.A.R. Chicago, with O.D. Right-On, 130" span, 9% section.

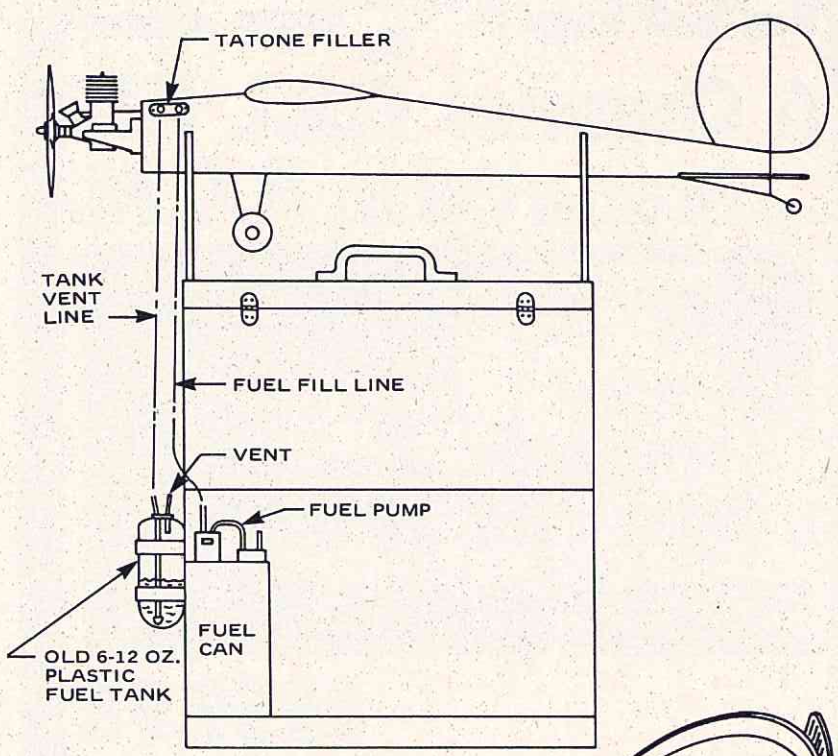




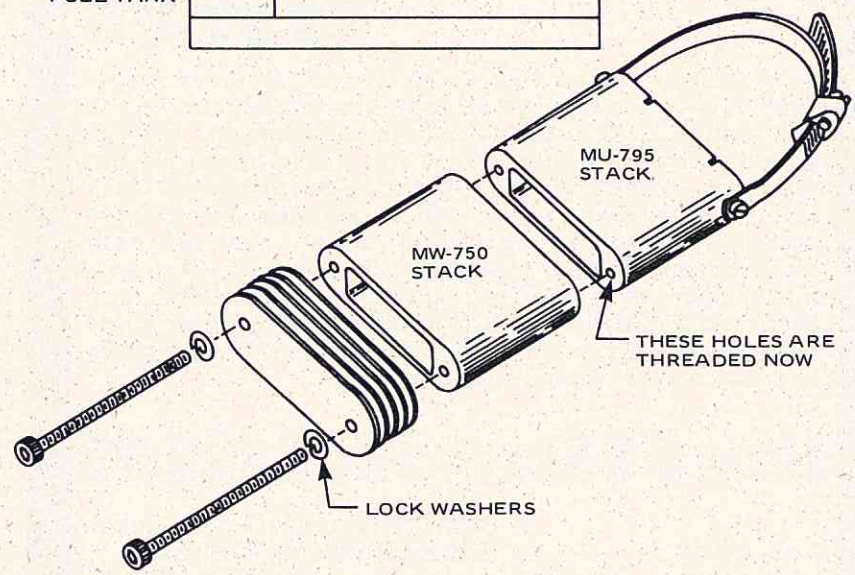
ABOVE: Gary Lachman with Zehr Gut, best thermal climbing ship at Nat's. RIGHT: D^2T Soaring Team of Don Gouchner, Tom Kelley, Don Clark.

FOR WHAT IT'S WORTH

George Chabot of Saugus, California, submitted this neat method of refueling without getting fuel all over the plane and the runway. Use a Tatone type of fuel filler on the plane, and mount an old or new plastic fuel tank on the front of your flight box with two tubes coming out of the rubber stopper. One tube uses a fuel line and clunk and runs to the bottom of the tank while the other tube is a vent. When filling the plane, hook up the fuel line from the fuel pump to the fill side of the Tatone filler, hook up a long piece of fuel line from the vent side of the Tatone filler to the clunk tube on the tank mounted on the flight box. When your plane tank is full, the excess fuel goes into the tank on the flight box. As an extra fringe benefit, you have a handy place to fill your fuel primer bulb and, at the end of a days flying, you will have saved almost a whole tank of fuel. Don't forget to plug the carburetor feed line if you have trouble flooding the engine.



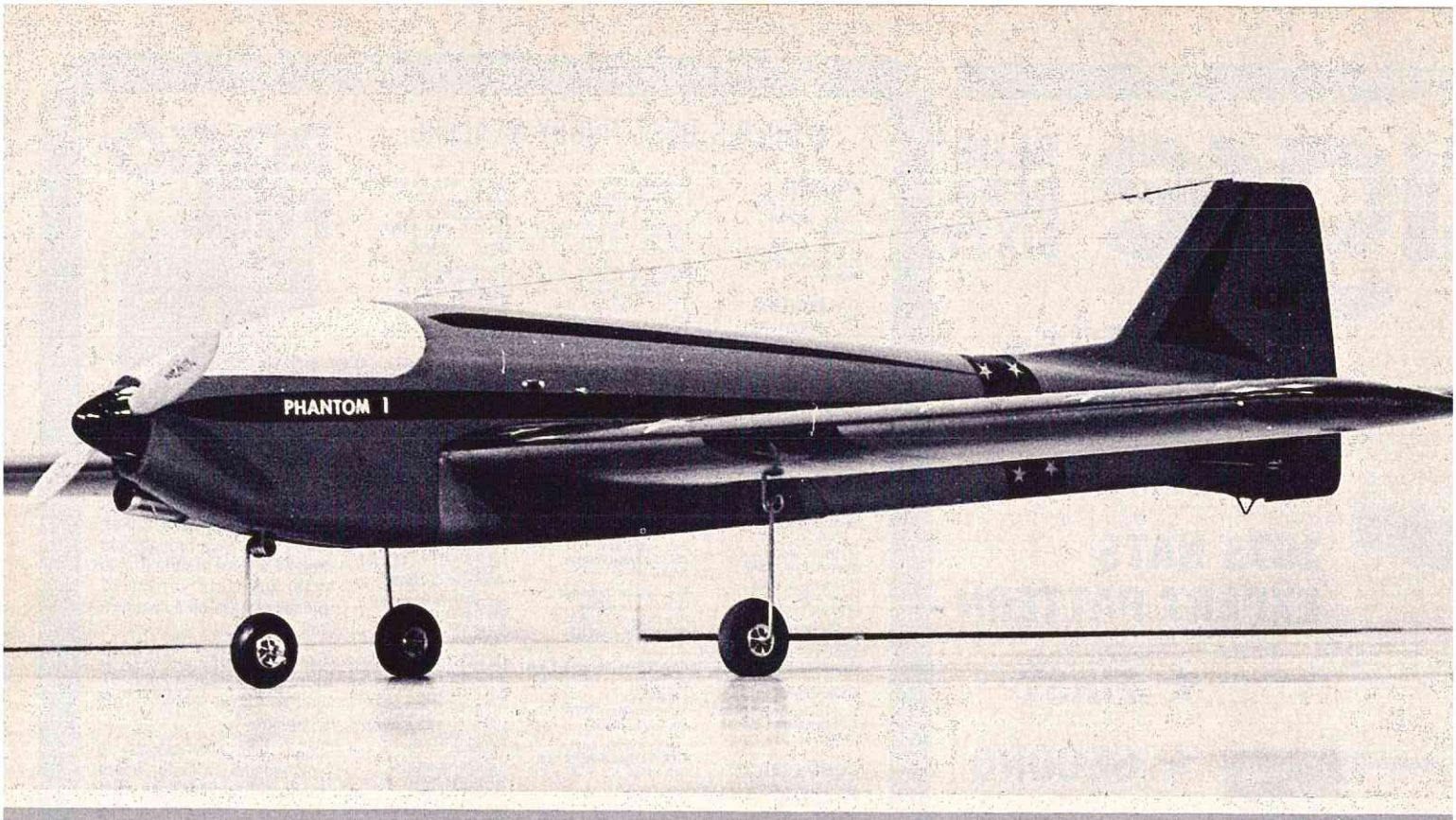
Bob Steckroth of Niles, Illinois, suggested a method for extending the regular Mu-795 Du-Bro muffler. Simply obtain a MW-750 (Webra) muffler (blue box) and save the plates for spares. Drill holes clear through the 750 stack to take a 4-40 bolt. The holes are almost through when you purchase the muffler. It is suggested to use 4-40 socket head bolts although regular heads will suffice. The bolts should be 1¾" long and be sure to re-tighten all screws after engine gets hot.



One of the best materials available for pin-striping tape is Solarfilm or MonoKote, cut into strips of any size you desire as well as any color. It goes on easily with a small iron, stretches beautifully around compound curves, and is so thin that it can hardly be felt. However, cutting those nice, thin, even strips can be worse than getting a worm to lie perfectly straight! Lee Taylor of Roseville, California, has a method which consists of peeling back the backing from a short section of the MonoKote or Solarfilm and sticking the exposed adhesive side to a clean piece of glass. Lee uses the front window in the house. This holds the material snugly in place and a straight-edge and sharp razor blade will give you a years supply of trim tape in just about 20 minutes. It's a lot less expensive that the store bought stuff, as well. When the tape is applied, the iron will invariably force out some of the adhesive, making an ugly smear along the edge of the tape. Don't worry about it, just finish the entire job making sure that the tape is tightly adhered along its entire length. Then, with a rag lightly soaked in lacquer or dope thinner, clean off all of the smears. A coat of clear epoxy paint over the tape will insure that it stays on until eternity.

James Shnowske of Mosinee, Wisconsin, has found that a battery charger for a car battery can be used as a transformer when cutting out foam wings. Just connect the leads from the battery charger to the opposite ends of the cutting wire. Since most people already own a charger for their car, they can save even more on the already low price of foam wings. If you own a charger that can charge either 6 or 12 volt batteries, Jim suggests using 6 volts for the leading and trailing edges and 12 volts for the balance of the wing. Using 6 volts for the leading and trailing edges lets you cut slower and more accurately.

●



PHANTOM I

Bob Klineyoung's high performance pattern ship is for the flier looking for that extra margin in competition. Photos by Rick Friend.

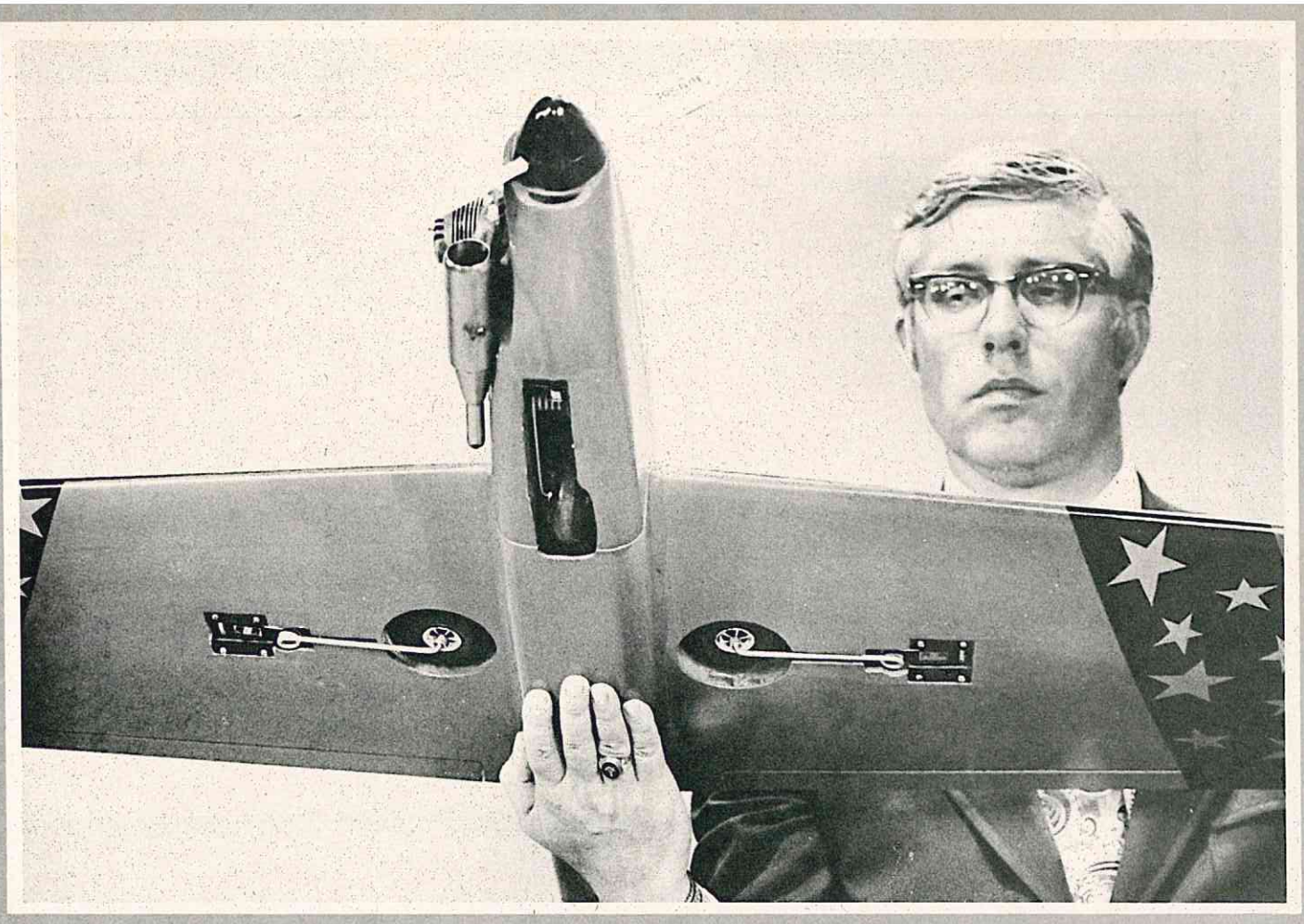
Pattern flying today has developed into a kind of "Poetry in the Sky" with the advent of today's competent radios, retract gears, powerful engines such as the Webra .61, Lee Veco .61, S.T. Bluehead, etc. Also, pattern flying is fast developing into a more competitive, polished, and refined "State of the Art."

Since I started serious competition flying some three years ago, and enjoyed some reasonable success in the winner's circle flying various Kwik Fli's, New Orleanian, etc., I started looking for something different. The Phantom I is the result of many hours of "Hangar Flying" discussions over pattern aircraft design. With my good friend and fellow R/C club member, Dubby McGuire, I started to form a mental picture of the plane I wanted to design. After transferring those ideas to lines on paper, I became even more enthused about building it. The wing templates were computer-plotted by another fellow club member, Gary Martin, who has access to one of these electronic wonders.

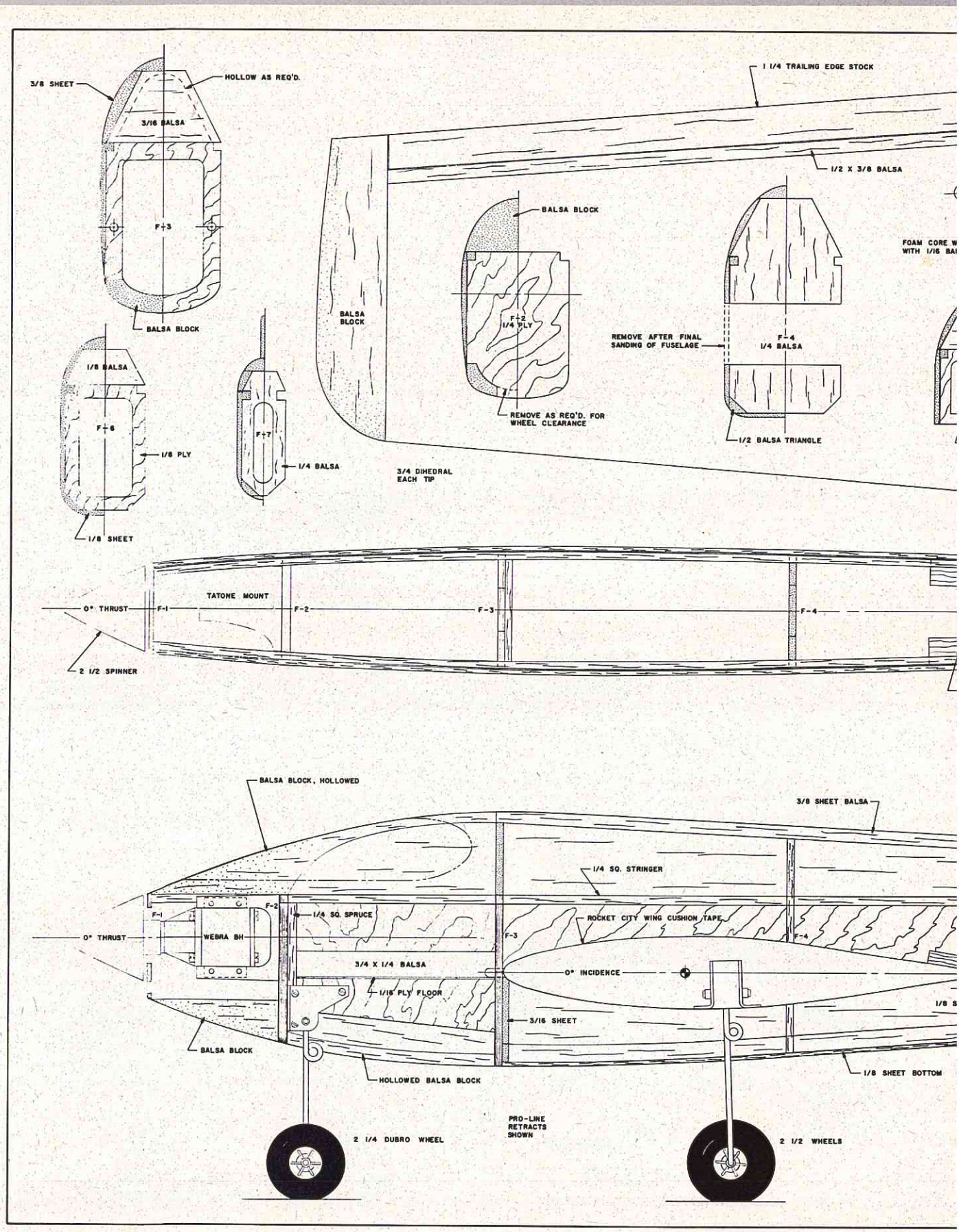
The prototype flew "right off the board," so to speak, with only minor trim adjustments. The first flight was made under fairly heavy wind conditions, but the Phantom I grooved through the FAI Pattern like a bullet. With its Webra .61, and Silence-Aire muffler, Pro-line radio and retracts, it is extremely fast and clean. Landing characteristics were even better than I hoped for, as you can literally "walk it" right to the inner circle.

CONSTRUCTION

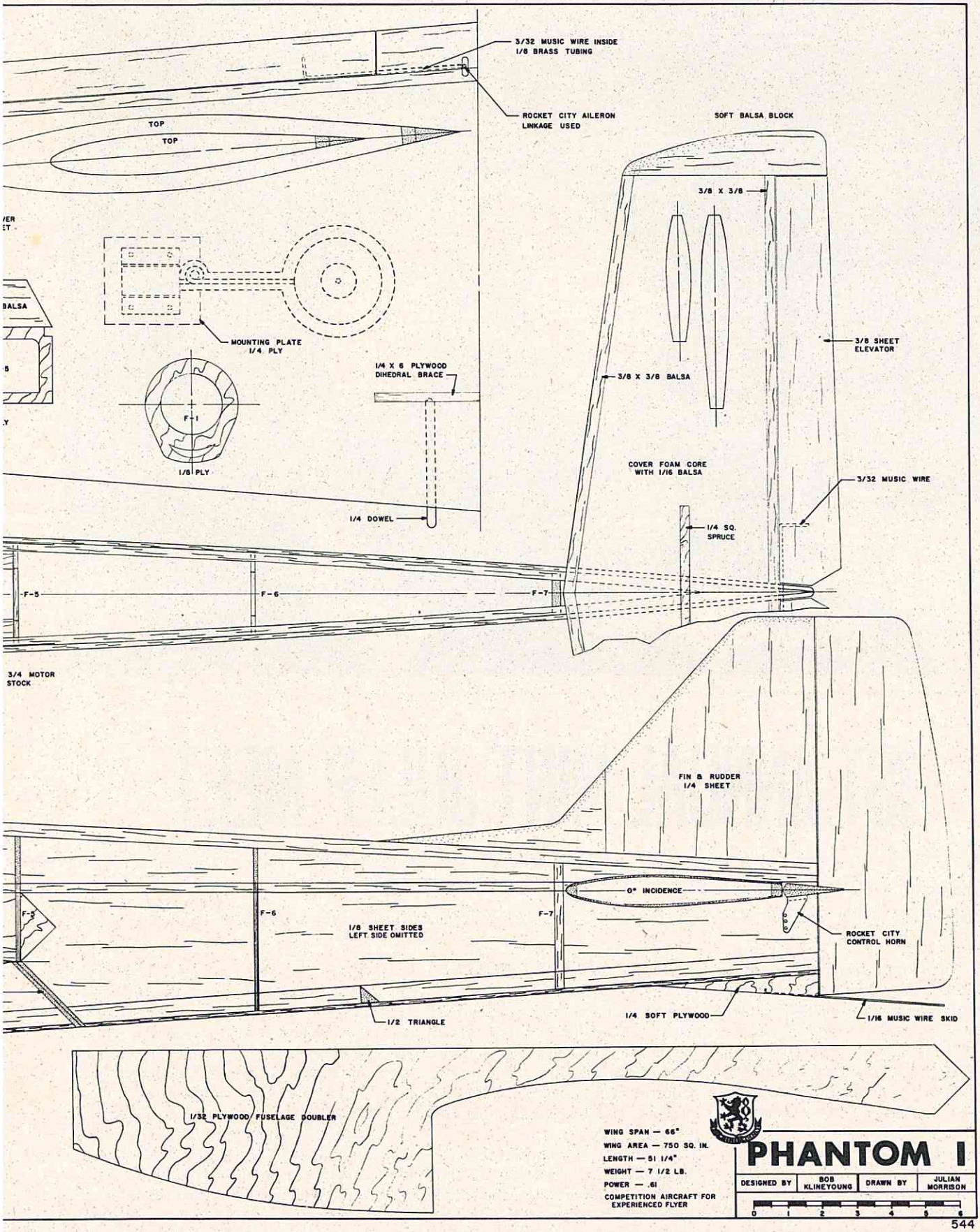
Fuselage: Cut the sides from medium 1/8" x 5" x 48" sheet balsa and then add the 1/32" plywood doubler. I use epoxy to laminate the doublers and sides to insure maximum fuselage strength. Add the ¼" square fuselage stringers and ½" triangular soft balsa stock to the fuselage sides. At this point, use the sheeted stab outline from the plans, and proceed to cut the stab openings from both fuselage sides. Now proceed to lay the plans on a flat and level table, and cover them with wax paper in order . . . **continued on page 91**




PHANTOM 1
PRO LINE
Competition


3/8 SHEET
HOLLOW AS REQ'D.
3/16 BALSA
F-3
BALSA BLOCK
1/8 BALSA
F-6
1/8 PLY
1/8 SHEET
F-7
1/4 BALSA
1 1/4 TRAILING EDGE STOCK
1/2 X 3/8 BALSA
BALSA BLOCK
BALSA BLOCK
F-2
1/4 PLY
REMOVE AS REQ'D. FOR WHEEL CLEARANCE
REMOVE AFTER FINAL SANDING OF FUSELAGE
F-4
1/4 BALSA
1/2 BALSA TRIANGLE
FOAM CORE W
WITH 1/16 BA
3/4 DIHEDRAL EACH TIP
TATONE MOUNT
0° THRUST
F-1
F-2
F-3
F-4
2 1/2 SPINNER
BALSA BLOCK, HOLLOWED
3/8 SHEET BALSA
1/4 SQ. STRINGER
F-1
F-2
1/4 SQ. SPRUCE
ROCKET CITY WING CUSHION TAPE
0° THRUST
WEBRA BH
F-3
F-4
3/4 X 1/4 BALSA
0° INCIDENCE
1/16 PLY FLOOR
3/16 SHEET
1/8 S
BALSA BLOCK
HOLLOWED BALSA BLOCK
1/8 SHEET BOTTOM
PRO-LINE RETRACTS SHOWN
2 1/4 DUBRO WHEEL
2 1/2 WHEELS

FULL SIZE PLANS AVAILABLE – SEE PAGE 118



WING SPAN — 66"
WING AREA — 750 SQ. IN.
LENGTH — 51 1/4"
WEIGHT — 7 1/2 LB.
POWER — .61
COMPETITION AIRCRAFT FOR EXPERIENCED FLYER

PHANTOM I

DESIGNED BY	BOB KLINEYOUNG	DRAWN BY	JULIAN MORRISON

0 1 2 3 4 5 6

544

Just a small part of the sterling silver trophies presented by the Commonwealth of Kentucky at the 1st Annual Mint Julep Meet.

1ST ANNUAL MINT JULEP MEET

HOSTED BY THE KENTUCKY STATE DEPARTMENT OF PARKS AND SPONSORED BY THE KENTUCKY-INDIANA R/C ASSOCIATION, THIS FIRST ANNUAL EVENT SHOWS HOW MODELERS AND THEIR STATES CAN WORK TOGETHER FOR THE COMMON GOOD.

BY DICK TICHENOR

● One of RC's most significant events has occurred in Kentucky. The occasion was the First Annual Mint Julep Meet held May 19 and 20, 1973, at the Rough River Dam State Resort Park in central Kentucky. Recognition of R/C modeling and sponsorship of a major meet by an agency of the State of Kentucky is indeed significant.

The Mint Julep Meet was co-sponsored and hosted by the Kentucky-Indiana Radio Control Association (KIRCA) with the same degree of eagerness and enthusiasm that favorably impressed the Kentucky Park Department officials and thereby obtained their sponsorship. The KIRCA is an association of clubs which include the following: Central Kentucky Radio Control Club, Lexington Radio Control Club, River City Radio Controllers, and Southern Indiana Radio Control Modelers.

Their live wire contest director was Doug Early, a gentleman of untiring energy who was also the chief coordinator between the KIRCA, the park officials, the hobby industry (for prize donations), and the press.

The Kentucky State Park officials were contacted for possible sponsorship and their first reaction was roughly the same as many modelers have experienced all across the U.S.A. Because the park people were not at all familiar with R/C, they were something less than enthusiastic. They were, however, receptive to a group of modelers bringing out their models and showing them what it was all about. The modelers did their homework and went out with appropriate information and flew demonstrations. The guys from KIRCA did a first class selling job which resulted in the Park

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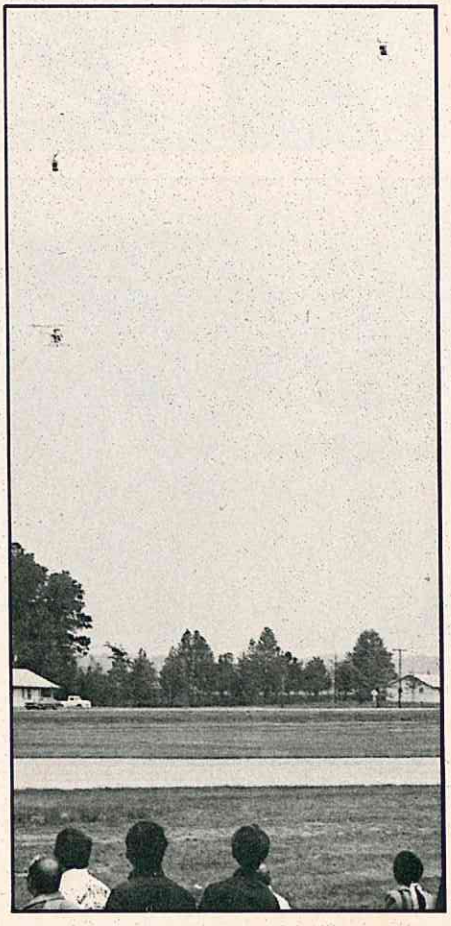
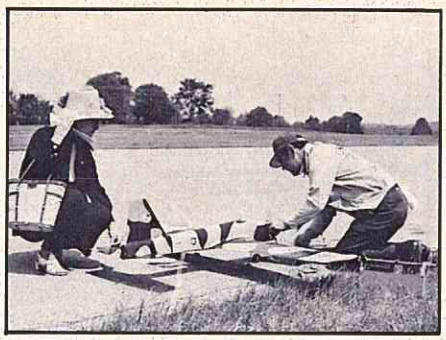
ABOVE: Jim Whitley's Daddy Rabbit, held here by Ramona Schultz of Columbus, Ohio, won the big Pattern spot. Ramona won Best MonoKote Finish Award for her Fokker D-7.

ABOVE, RIGHT: Doug Early, the energetic organizer and CD who put it all together and did a bang-up job of it.

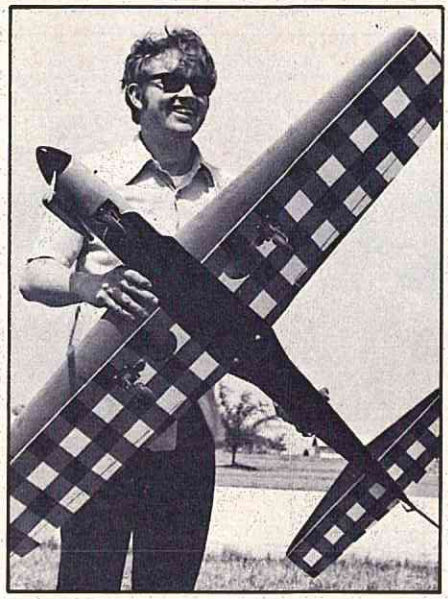
RIGHT: Dottie Duff steps on a pretty little Pitts, one of the fly-in's to Mint Julep.

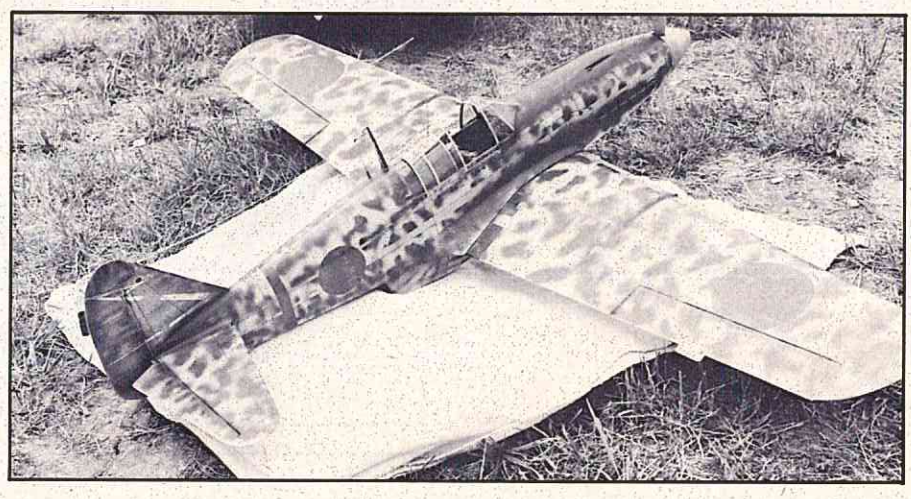


One of the most necessary aspects of our hobby-sport is public information — the only way to combat the 'toy airplane' image and to gain public support. One sure fire way is by television coverage. In the photo above, WAVE-TV, Channel 5 from Louisville, covered both days events. At right, three Du-Bro helicopters during a helicopter pylon race!

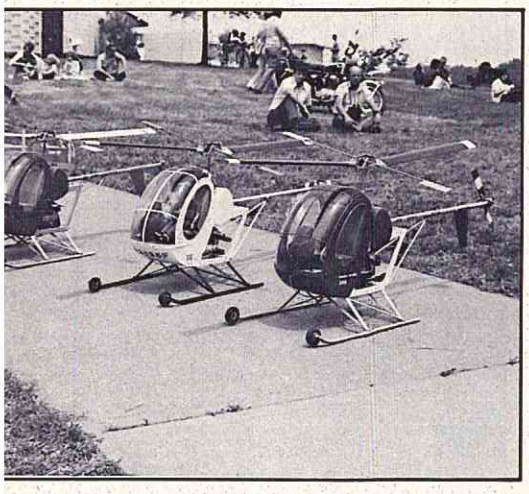


FAR LEFT: Lew Penrod took 2nd in D Expert with his Cajun Queen. LEFT: Super nice PT-17 by Paul Clements. ABOVE: A family affair, Alice Hutchinson helped hubby, Bud, with his Pattern entry at Mint Julep Meet.





ABOVE: First Place in the Scale event went to a scratch-built Kawasaki-Hein 'Tony,' built by Gerald Dauet. LEFT: Jerry Nelson showed off his Super Kaos with colorful scotch plaid paint job.



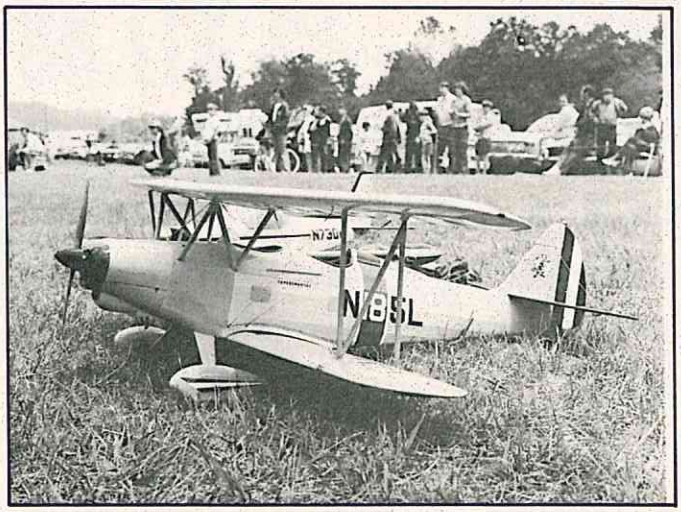
Du-Bro Hughes helicopters were everywhere - - - racing on the pylon course, flying off water - - - demonstrating the versatility of the best flying chopper of them all.

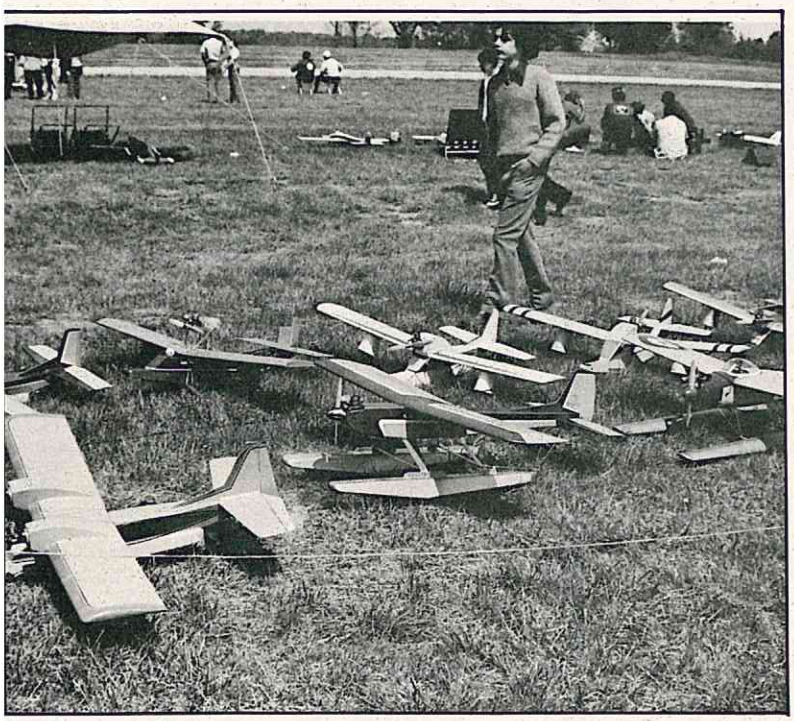
Bill McCalla and his beautiful Sea Fury Quarter Midget Racer.

The genial Reuther Team placed third in the Quarter Midget Races.

Bud Atkinson took second in Scale with this Ryan Fireball.

Third in Scale was this Liberty Sport by Dick Graham.



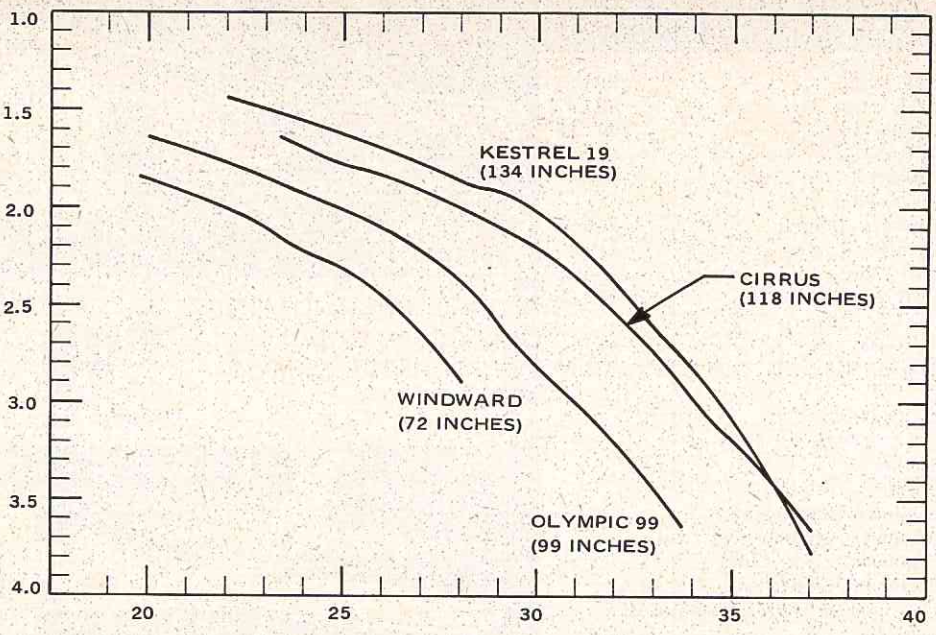


ABOVE: These seaplanes came from all over the country to demonstrate the joy of flying off water.
RIGHT: Bryce Petersen's Tipsy Nipper will be featured in RCM.

BASIC SAILPLANE DESIGN

BY PRESTON ESTEP JR.

PART IX



The absolutely fabulous job done at the 1973 Soaring Nationals by Dan Pruss and the hard-working S.O.A.R. club of Chicago was matched by super flying and super machines. In my opinion, the best overall performance by a single design was turned in by the Windfree, which swept all the top places in Standard Class. I have expressed reservations about the narrow tip chord of this design, but careful

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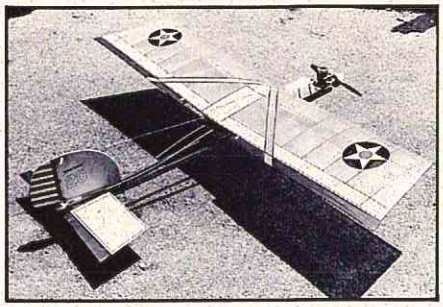
SPAN 130.50 AREA 852 WEIGHT 55.00 Est. Cdp = .017 AR 19.99 OZ./SQ. FT. 9.30

1.00	.030	.018	.065	15.359	23.166	1.508	3:18
.90	.027	.014	.058	15.341	24.419	1.591	3: 8
.80	.024	.011	.052	15.212	25.900	1.702	2:56
.70	.021	.008	.046	14.934	27.689	1.854	2:41
.60	.018	.006	.041	14.451	29.907	2.069	2:24
.50	.018	.004	.039	12.649	32.762	2.589	1:55
.40	.018	.002	.037	10.554	36.629	3.470	1:26
.39	.018	.002	.037	10.330	37.095	3.591	1:23
.38	.018	.002	.037	10.102	37.580	3.719	1:20

DATA FOR POLAR

showcase'73



KWIK-STICK FUSELAGE KIT

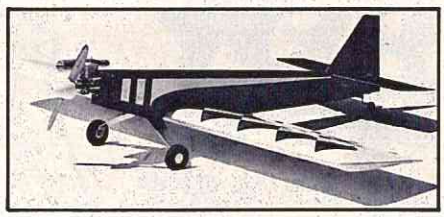
GMC Models, 28062 Glasser, Saugus, California 91350, is producing fuselage and tail group kits for the Kwik-Stick featured in this months issue of RCM. Designed to use your own wing, the Kwik-Stick fuselage is for use with a .60 and is priced at $14.95. The Kwik-Stick II is designed for .29 to .35 engines and is priced at $13.95. The Kwik-Stick III is for use with .15 to .19 engines and is priced at $12.95. Order direct from the manufacturer. The Kwik-Stick is featured in this issue of R/C Modeler Magazine.

FLITE-KOTE

Flite-Kote is the newest of the adhesive backed plastic covering materials to be introduced in this country. Available from Hobby Shack, 6475 Knott Avenue, Buena Park, California 90620. Flite-Kote requires very little heat during application and is as flexible as any material currently on the market today. It is extremely easy to work with in that it tacks down easily, heat shirnks beautifully and, best of all, goes around curves with a minimum of effort. To do this, Flite-Kote has had to use a semi-dry adhesive that, to the touch, feels dry but, like a contact cement, once the two sides come together, they will stick. This material has been Tested and is Approved and Recommended by RCM.

WORLD WAR I PHOTOS

Interplanetary Aero Graphics, P.O. Box 1338, Sausalito, California 94965, is producing 48" x 34" super size full color prints of WW I aircraft by nationally recognized artist, Alfred Owles. These amazing reproductions are printed on heavy stock and in a size that will command attention in any room. Each painting represents a dramatic moment in the air-to-air combat of WW I, providing a focal point of excitement wherever they are displayed. Price is $5.00 each direct from Interplanetary. These prints are also available in a packet of all six Aero Graphics in Mini Print size, 11¼" x 8", for only $5.00.



THE TOAD

The Toad is a quick building medium size radio controlled aircraft for "one-design" novice pylon racing

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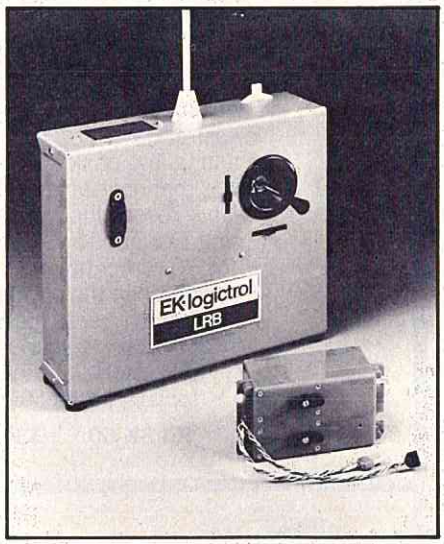
SHOWCASE '73

from page 78

plus aerobatic training and sport flying. Available from Wolff-Pak, P.O. Box 589, San Jose, California 95150, the kit features all parts machined to exact tolerances for fast and accurate assembly; finest quality balsa and hardwood graded to each specific use; a complete package of quality basic hardware; and custom formed aluminum landing gear, including wheel axles. The Toad has a wing span of 50 inches with a wing area of 530 square inches. The flying weight is from 3.5 to 4.5 pounds and designed for use with a .35 to .49 engines, stock front intake. A front rotor .40 is used for sport pylon racing. If not available at your local dealer, contact the manufacturer direct for further information.



EK-LOGICTROL FOR 1973

The EK-logictrol LRB for 1973 has a new and improved transmitter design, featuring the use of the 9v dry cell battery. Three-control capability is standard on all LRB units, as are precision control sticks with adjustable tension. The LRB, a low-priced unit designed especially for beginners, still offers its famous "brick" servo-receiver package. It's available with either single or dual stick control and is priced at $119.95 for three controls with two servos, $159.95 for three controls with three servos. For details, write: EK-logictrol, 3233 West Euless Blvd., Hurst, Texas 76053.

FIELD PACK

Maintenance Engineering, 41 Norwood Terrace, Trumbull, Conn.

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SHOWCASE '73

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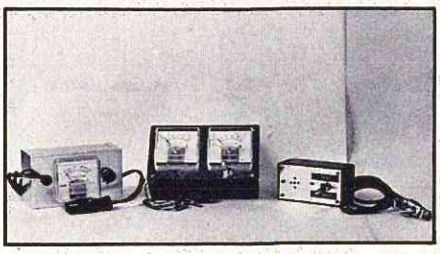

06611, has introduced a plug tester, field charger, and nickel cadmium battery analyzer. The plug tester features all solid state circuitry. With the switch in the test position and the clip on the glow plug, a tone from the unit tells you, not only that the plug is good, but that all the associated wiring is working properly. With the switch in the start position you have ignition. The nickel cadmium pack and cell analyzer features precision metering of current and voltage simultaneously. The current drain is varied by means of a heavy duty potentiometer, enabling the user to put a load on a pack or cell and watch the voltage variation. This tells you without a doubt if the pack is up to standard. This may also be used on dry batteries and a chart is supplied with the unit so anyone can safely test their batteries. The nickel cadmium field charger features metered current variable output. A fast or slow charge is available by the rotation of the output control. Now you can charge your flight pack on the field. The unit is supplied with cigarette lighter plug or clips for charging from your 12 volt engine starter battery.

BASIC SAILPLANE DESIGN

from page 72

attention to design detail has optimized the flight characteristics of the plane. Light moments and careful experimentation in the angle and position of wing-to-fuselage mounting are the keys to the success of this ship, according to Rod Smith. Of course, Mark and Rod could do the job with a dead-stick Tri-Squire!

The Outstanding Original Design Award was gobbled up by a fantastic machine from Michigan. About a month before the Nats I called up the publisher of this rag and raved wildly to him about a plane I had seen at a contest hosted by the Decatur Blunder-Birds. This beauty spans fourteen feet, and has a lovely handmade fiberglass fuselage, a Snoopy-like tail, with all-flying surfaces, spoilers, and a 12% flat-bottom wing with very slight polyhedral and slightly swept tip leading edge. The superb craftsmanship in this design will be detailed in picures in RCM. The designer's name: Jerry Mrlik, of the Greater Detroit Soaring and Hiking Society. And now the payoff – the Grand National Champion flew this plane, but it wasn't Jerry Mrlik. It was his 12-year old son, Jeff Mrlik!

Another beauty was authored by Jim Porter of Iowa, whose fourteen foot Nordic-like jewel sported not only outstanding workmanship and engineering, but also curved dihedral in the tips which was built-in via a jig.

Finally, the Technical Achievement Award was won by Otto Heithecker for what must surely be one of the cleverest uses ever devised for a three inch piece of string! (Incidentally, Otto Heithecker and Mark Smith were runners-up in the race for Grand Champ) A diagram of Otto's string masterpiece is shown below.

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ENGINE CLINIC

from page 10

Enya, Nelson Model Products, the H.P., etc. As for the parts situation, I cannot give you an answer on this. The Rossi brothers evidently have a hard time keeping up with the demand for their product, due to the high quality and performance. When a manufacturer makes a run of engines, a certain percentage of the run is set aside for replacement parts, i.e., out of a run of 1250 parts, 1000 engines might be assembled and the balance held for replacement. When the replacement parts are gone there will not be more until another run of engines is made. A manufacturer cannot profitably make up a few hundred sleeves, pistons, etc., alone.

Now as for the difference between your two engines. An engine intended for 'pipe' use cannot be run at its optimum without a pipe. In fact, many engines intended for use with a tuned pipe will run very poorly without the pipe. The same thing pertains to an engine not intended for pipe use. Unless modifications for the use of a pipe are made to the engine it will show little or no benefit with the use of a pipe. As you have noted, the exhaust port in your piped engine is considerably higher than in the unpiped engine. Although you could not convert the engine intended for pipe use to conventional use without replacing the sleeve, you could raise the exhaust port in the unpiped engine and then use it with a pipe. The reason for the higher exhaust being that, under combustion, as the exhaust port starts to open, a positive wave is sent down the pipe. This wave draws the spent exhaust gasses from the engine and also part of the new fuel charge through the engine and into the manifold portion of the pipe. As the positive wave reaches the converging cone of the pipe, a negative wave is sent back up the pipe to the exhaust port. If this wave reaches the exhaust port while it is still open, but the bypass port closed, the fresh fuel charge in the manifold will be rammed back into the engine, creating a supercharging affect. So, on engines intended for use with a pipe, the exhaust port is raised considerably to allow more of a differential between the opening of the exhaust port and bypass port than that used with an unpiped engine. Timing the pressure

wave to reach the exhaust port while it is still open and the bypass port just closed is the real trick with pipe tuning, and the reason tuned pipes are usually critical to a very narrow rpm range.

Dear Clarence:

While stationed on Okinawa I started flying R/C and purchased a Futaba radio set. As you know Futaba is imported and sold in this country by MRC. Recently I had trouble with my 5 channel receiver and sent it to MRC for repair. They sent it back with a note stating that no service had been performed since it was not imported or distributed by MRC.

Can you provide me with the name of a company or person that will provide reliable repair service on this equipment. I find it hard to believe that MRC will not, in the name of goodwill and the betterment of R/C flying, provide service on this equipment.

Sincerely,
William B. Leist, Capt., USAF
Newport News, Virginia

As long as the column is running in the vein of customer complaints I thought I would run the preceding letter and try to explain why situations such as the one Capt. Leist has run into do occur. Like the first letter this month, and where I receive several each month from fellows unhappy with merchandise received, I also receive several from fellows unhappy because they have purchased foreign engines or equipment that the U.S. importers will not service. Fellows like Capt. Leist purchase foreign equipment while in the service and then, upon returning to the U.S., find that their engines or radios will not be serviced by the U.S. importer. Surprisingly enough, the fellows who purchase the equiment while in the service send in very few complaints. This is probably due to the fact that they figured that it served its purpose while in the service and they will use American equipment now that they are back. Capt. Leist is an exception in this instance. Usually the RC'ers that write the strongest letters and cry the loudest are those who have friends, such as airline pilots, who travel to Japan, Germany, etc., and have them pick up Webras, Enyas, O.S.'s, etc., with the big idea of saving a few bucks. Okay, fine, but when they stick the engine two feet into the concrete and MRC or World Engines will not repair the engine they get very upset. Most of our U.S. manufacturers and importers will only service the product that they sell. The main reason for this being that the repair business is more often than not a losing proposition. It is quite easy to tie up a lot of labor

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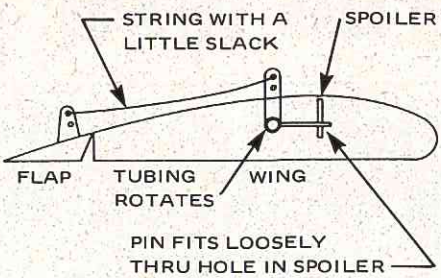
BASIC SAILPLANE DESIGN

from page 82



When the flap is dropped 30°, the string becomes taut; as the flap drops farther to its ultimate 45° position, the tubing rotates inside the wing and the little pin soldered to the tube lifts the spoiler up through a slot in the top surface of the wing. The result is a smooth, non-ballooning control of descent and speed. I beleive that this arrangement gives the best control of any I saw.

Subsequent issues will have detailed coverage, photos and, hopefully, construction articles on some of the super-ships at this year's Super-Nats.

■ ■ ■

Flying under real-life conditions requires a wide range of capabilities from your soaring machine. In this installment we will, at last, examine the "Polar Diagram" of a glider, and talk about what it means. The polar is the most revealing (and most abused) measure of glider performance. Knowledgeable free-flighters have occasionally published excellent analyses of Nordic and other designs based on accurately calculated, or measured polars, but the ones I have seen for R/C ships were largely the product of a fertile imagination and a strong wish for the best.

The polar is nothing more than a graph of forward speed vs. sinking speed, showing how both increase as down-trim is fed in. A sample table of data for a Kestrel 19 is shown in Table I, which calculates V and V_V for various C_L ranging from 1.1, which we assume to be the maximum sustainable C_L, down to .38, the point at which the L/D drops below 10.

From studying the polars and the data behind them, several extremely important principles can be derived. First, the airfoil has very little to do with the high-speed characteristics of the plane. These are determined mainly by wing loading and parasitic drag. I have already mentioned this several times, but I want to keep hammering on it; high C_L airfoils (i.e. undercambered) will produce a low minimum speed, but are not harmful to high speed. The reason an Olympic will not "go fast" is that it is a light, high-drag machine. Bob Gill had a flying-stab, streamlined, heavy American Eagle that would fly quite respectably in strong winds or speed events, and still had the desirable thermalling qualities of the 6409 section.

Next, size and more size will be the determining factors in producing a really wide-range airplane. The heavy, high-AR, slick monster can still maintain a useful L/D ratio and reasonable sink rate when it is down-trimmed to fly in 20 mph winds, something which the smaller craft won't do. Notice how the Kestrel and the Cirrus are still sinking less than 2 ft./sec. at forward speeds up around 30 ft./sec. (21 mph) while the Olympic is coming down at 3 ft./sec., and the Windward can't even go 30 ft./sec. except in a rather steep dive. This has nothing to do with design flaws in the smaller craft; it is just a fact of life. Small planes need light loadings to get good still-air times, and their higher parasitic drag

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BASIC SAILPLANE DESIGN

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and light loadings mean that lots of down trim are needed for high speeds. Thus, the well-known complaint, "It won't penetrate!" What this really means is that it won't go fast enough at a reasonable L/D or won't have a decent L/D if speeded up to penetrate.

The sad answer is to build a bigger plane. I am the lucky possessor of a Kestrel 19, a lovely piece of design craftsmanship by Hugh Stock, and I must say that the advantages offered by a design like this for all-around flying are many, especially in the multi-task contest. However, my point is not to extol the virtues of the giant machine but, rather, to sound the alarms about the potential dangers to our sport if the big, expensive, complex machines begin to frighten away the weekend flyer who has no interest in an airplane bigger than 100 inches. There is more design challenge in the smaller craft, a more general appeal and, certainly, a very adequate range of performance. Aerodynamically, there is not really much point in attempting to improve on a Grand Esprit or a Kestrel 19. But in the 100 inch and under class, there may be many untapped possibilities. The ultimate 100 inch machine is not with us yet; the Windfree needs some competition, but the incentive to design 100-inchers will die if Standard Class dies. The Nationals and other contests in this area (Midwest) still preserve the Standard/Open differential, as they should. Years ago, the first serious effort at starting interest in RC sailplanes was made via the 12 foot scale KA-6E, but it was not until the introduction of smaller machines, ala Windward, that the average flyer got interested. Today, all the 11 foot gliders in America put together probably are less than the number of Lil T's. We should not let competition drift off toward just the minority, lest soaring contests end up like pylon racing, with no interest outside a small circle of cognoscenti. This circle should have their right to compete as should the small-plane fan who wants a hi-startable, portable, two-channel sport/

contest ship.

Returning to our point (sorry for the digression), we see that the sinking speed of all our planes increases whenever you have to down-trim for wind; much more so for the lighter and smaller ships. Thus, even though it seems like the wrong thing to do always use ballast at the C.G. rather than down-trim to compensate for wind effects. We also can see that there is no tendency for the curve to flatten out at the left end as C_L increases, which would imply that we are definitely not approaching the maximum usable C_L with our present airfoils. If there is a major design breakthrough out there lurking somewhere, it might be found if somebody could figure out a way to build a wing of 18:1 aspect ratio using a 6% Nordic airfoil which would withstand typical Hi-Start winch launches. It seems to me that a jig-built all-sheet structure with full depth spruce spars, covered with silk or impregnated with Francis Resin, might do it. Weight doesn't matter.

If anybody does it, let me know. □

1ST ANNUAL MINT JULEP MEET

from page 66

Department's full support of the Mint Julep Meet.

Rough River Park is about a hundred miles southwest of Louisville and has, along with the exceptionally nice recreation facilities, an airstrip upon which the meet was held. This is the first time we have seen an entertainment program organized for the wives and children of the contestants. Besides horseback riding, bicycling, golf, tennis, swimming, and fishing, there was a ping pong tournament, a miniature golf tournament, bingo games (they even gave away Churchill Downs as a prize), and a Great Kentucky Critter race. The kids searched the lake shore and shrubbery for insects, frogs, lizards, and any other critters they could find. Races were run between these critters with famous winning names such as Jiminy Cricket, Rickey Roach, Amy Ant, Black Beauty Ant; Leaping Lizard was scratched.

The banquet in the lodge on Saturday night featured what had to be a 30

foot long buffet with so much delicious food that it was difficult to make a choice. Three beautiful ice sculptures by the park staff decorated the buffet (would you believe over 400 lbs. of ice). Then there were the trophies; the array of sterling silver platters and mint julep cups looked like a display from Tiffanys. When we said full support, there is no way we can give the entire Park Department enough credit for all the good things that they took care of – especially Bill Marshal and Woody Woodcock.

Oh yes, there was an R/C meet too! They planned a rather ambitious schedule with Pattern, Quarter Midgets and Stand-Off Scale. Entries in Pattern were A Jr./Sr. 2, A open 34, B 17, D Novice 14, and D Expert 15. Quarter Midget had 44 and Scale 24 entries. Contestants came from 12 states, the extremes were Massachusetts, Michigan, Florida and Iowa. The most impressive aspect of the meet was the general atmosphere and attitude of both the contestants and the officials; it was a happy week-end with everyone enjoying the whole affair. There aren't too many areas where you find the control line modelers lending their assistance to help run a R/C meet; it happened in Kentucky.

There were flight demonstrations each day during the lunch break. Seaplanes were flown from the lake; Don McGovern, Don Foster, Bob Amy, Harold Hackett, and R.C. Harley put on a crowd pleasing show. The Du-Bro helicopter team did good things with three of their new Hughes 300 choppers on Saturday. On Sunday they were accompanied by Don Lowe with his Kalt Huey and another first was scored at the Mint Julep Meet – four helicopters ran a race around the Quarter Midget course! They didn't set any world speed records but it sure was fun, especially for the pilots. Al Signorino showed off his famous Snoopy's Doghouse in a dog fight with Tom Gettelfinger's Snoopy's Doghouse – pretty wild!

The members of KIRCA are to be congratulated for not only conducting an exceptionally good R/C meet but for gaining the support of the Kentucky State Park Department as well. Our sincere thanks to the Kentucky park officials for their recognition of the value of R/C modeling and for their sponsorship of the Mint Julep Meet. Plans are underway for the 1974 Mint Julep Meet and if you would like a great week-end for the entire family, try Kentucky! □

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that your adhesives will not stick to the plans. Next, cut out fuselage formers 1 through 7. Now plot the wing centerline directly on both the fuselage sides, using a red fine tip, Magic Marker type pen and, using the wing root template, draw this on both fuselage sides in its respective location. Now, draw the belly pan separation lines, both front and rear on the fuselage sides. The fuselage and belly pan are built as an integral unit and, after the fuselage is sanded to its final configuration, cut the belly pan from the fuselage on the scribed separation lines using a sharp X-Acto knife. Add Rocket City wing seating tape to the fuselage wing saddle and, after the wing has been joined, sheeted, and the center section covered with Celastic, bolt the wing in its proper location, then epoxy and fillet the belly pan in place. You should have perfect alignment.

Now, back to the fuselage construction. Invert the fuselage sides and place them over the top view of the fuselage plans to insure proper alignment. Epoxy formers F2, F3 and F5 in place. After they are completely dry, Titebond the remaining formers in place - - - except F1 - - - and glue the rear fuselage ends together. Now, to epoxy F1 in place, I use two 1" x 1" x 12" pine blocks to bracket the front sides of the fuselage then, wrapping each end with heavy nylon string, and inserting a screwdriver through the string at each end, simply twist the screwdriver until the fuselage sides are pulled together at the end. Finally, epoxy former F1 in place.

After F1 has dried, glue the bulkhead reinforcements in place, along with the tank floor and belly pan front former. The latter is a repetition of the bottom half of former F3 which is made out of 3/16" balsa and not hollowed out as you did with F3. Now, locate your particular engine on the Tatone mount and locate the mount position on former F2. Drill F2 and install 6-32 blind nuts, setting your engine and mount for 0-0 thrust. I cut a ½" diameter hole on the tank center line, through former F2 and the Tatone mount to exit the fuel lines. Now, proceed with the 1/8" bottom sheeting, bottom blocks, and all necessary front engine compartment fill blocks. Add the top fuselage formers,

3/8" top sheeting, and front dummy canopy block, hollowed as shown on plans to receive the battery pack. Sand the entire fuselage to shape. Add the ¼" balsa vertical fin. After silking, or using the finishing technique that you prefer, complete and finish the fuselage.

Wing: Cut foam cores from 1 pound density foam. The wings are symmetrical. Add the ½" x 3/8" balsa edge stock to the cores, then the short piece of 1¼" trailing edge stock that holds the Rocket City aileron horns in place. Where the horn rod exits at each end of the short brass tube, I put some heavy axle grease and, when the whole thing is epoxied in place, the horns are popped free for an unrestricted movement. Next, cover the wing cores. I used 1/16" balsa sheets that were then silk covered. Add the balsa block tips, and now you are ready to join the wing halves - - - again refer to the plans for the proper dihedral angle.

Horizontal Stabilizer: Cut the Stabilizer cores from the same foam as you used for the wing. Cover with 1/16" balsa and add the tips and elevator. Be sure to silk these items.

Vertical Fin and Rudder: Both were made from ¼" balsa and silked. Make a small notch at the rear of the stabilizer cutout on the fuselage, and slide the completed horizontal stabilizer in place. Epoxy and fillet with Epoxolite, making sure the stab is aligned 0-0.

Finishing: Here again, it's any mans choice, but I just can't seem to break away from the old standard dope and talcum powder method. Over the years I have used just about every type of finishing technique there is but, for all-around strength, beauty, and weight, I like Aero-Gloss dope. The entire plane was given about 5 coats of 50-50 dope and talc mixture, sanded between coats, and then the final color was sprayed on. Over a base coat of Aero-Gloss silver, the primary color was Aero-Gloss Fokker Red with Black trim. The Gold Stars were cut from regular MonoKote. When everything was installed, I put her on the scales and she topped out at 7½ pounds which I believe is well within the weight range of present day pattern aircraft, utilizing retractable landing gear.

Trim: As quoted by a good friend of mine, here's the part that separates the winners from the losers. "You can build the airplane perfectly, but unless you take the time to properly trim it, it will fly **you** instead of you flying it." First of all, make sure the engine, wing, and stabilizer are set at 0-0 thrust – don't eyeball this, measure it. Next, check the C.G. location as marked on the plans. Next comes the lateral balance. I check this by first removing the spinner, nut and prop, then turning the engine to its low compression stroke, place a Coke bottle under the engine shaft, and another one under the rear tail skid. If either wing tip drops, add any necessary weight to the wing tip until the wings are level.

At this point you're ready to fly and, as mentioned before, patience now becomes a factor and you should be prepared to spend a whole weekend, if necessary, to trim fly the airplane. I usually try to thoroughly trim and fly my airplanes a **month** of weekend flying, before I enter it in competition.

Well, that's the story behind the Phantom I, fellows – I hope you like it and will decide to build it. Of course, I'm partial, but I think it's the plane to watch in the coming contest seasons.

Good luck and happy flying! □

from page 55

S.O.A.R. Club of Chicago and the C.D., Dan Pruss. The event was held on a spacious, flat field of grass at Lewis University in Lockport, Illinois (60 miles south of Chicago), and most of the 132 contestants were quartered in the dorms at the school. This excellent arrangement heightened the spirit of comaraderie and promoted much cross-fertilization of ideas at the inevitable late-night bull sessions. The events ran like clockwork, and the contestants turned in over 1200 official flights in the three days of the contest, and yet we were finished by 3:00 P.M. each day! Eight winches were used and the motorcycle retrieval system was efficient though ear-splitting.

The events flown were 2-minute Precision, 15-minute Precision/Duration, and 10-minute Duration. One round of each task was flown each day. Each round of the 2-minute Precision and the 10-minute Duration was treated as a separate event for scoring; the best performance was awarded 1000 points and other scores were pro-rated. The three flights of 15-minute Precision/Duration were worth a total of 1000 points, while the other events were worth 3000 points each.

Trophies were awarded in each event, and there were big beautiful overall championship trophies (donated by RCM) for the three top scoring soaring aces in the overall point standings.

The big story of the contest was the super sensational overall win by 12-year old Jeff Mrlik, of the Greater Detroit Soaring and Hiking Society's Junior Team. No, I don't mean he won the Junior Prize – he won it all! His gorgeous airplane (which won the best Original Design Award for his dad, Jerry Mrlik) just seemed to stay up when Jeff told it to, and come down right where it was supposed to. Jeff's masterful effort narrowly outpointed Mark Smith and Otto Heithecker. The standings are detailed in the scoring table, so rather than go through each event I'll comment on some of the highlights as I remember them. Most of all I remember the hysterically happy Jerry Mrlik shaking my hand like King Kong after Jeff got the big trophy – or what about the fly-offs in 15-minute Precision/Duration; Otto had tied in Open with Ray Vandierdonck, and in Standard, Mark and Rod Smith had tied. So one 3-minute Precision flight was flown by each competitor. Ray served as helper for Otto; Otto was helper for Ray, and Mark and Rod did likewise. All hit the 100 point spot, and a couple of seconds decided Open in favor of Otto, Standard in favor of Mark.

Then there was the late night foam glider contest which ended abruptly at 1:30 A.M. when a thunderstorm washed out the contestants, who were not feeling much pain by that point. Precision winner Bob Gill succeeded in turning in a flight of nearly 30 seconds with an 8" styrofoam Cirrus. The midnight bull sessions included rambling, marginally coherent discussions between the very entertaining Dick Shilling and me about fantastic and impractical design concepts, while Barbara Henon listened tolerantly and laughed. Another memorable moment for me was flying at the same time as Otto Heithecker on two occasions, getting higher both times and then sinking past Otto as he worked the weakest puffs of lift at altitudes under 150 feet while his plane was so far away it seemed that he'd never get

back. Or Barbara Henon getting the first max of the contest, her 11 foot machine just a dot on the horizon. Or Rick Walters losing altitude by flying his White Trash inverted.

Another highlight was having the chance to visit a bit with John Nielsen of S.O.A.R. This energetic and dynamic friend of soaring is always a pleasure to be with. On Tuesday, John had a business meeting that wouldn't wait, so . . . he moved it out to the field and had it at the scorer's table, excusing himself periodically to time or fly!

Interesting contrasts in flying styles were apparent. In the Precision events, for example, Rick Walters flew around the spot in 25 foot circles, while Otto Hiethecker made a huge right hand pattern. Open Precision winner Bob Gill speared the spot with the nose of his Cirrus while runner-up Dale Nutter just floated in with the spoilers up on his Grand Esprit. In Duration, several successful competitors had thermal sensors, but Jeff Mrlik and Mark Smith didn't seem to miss them as they unerringly found lift in the spotty conditions. Almost everybody tacked back and forth in lift, rather than circling, when the wind was strong. But it seemed that the winners were able to circle in the wind smoothly. Rod Smith hung his Windfree in a tiny patch of zero-sink at an altitude of about 60 feet for about two minutes on one occasion, while several larger planes flew near him, then headed off to land. It looked like witchcraft, but Rod would admit to no occult powers.

And I can't resist describing my own greatest thrill. In the next-to-last round of Scale, I needed a good score in the 2-minute Precision to sew up a trophy. But to my horror, as I came down the runway at 1:51, I was still about 30 feet high! No spoilers, no dive brakes – but lots of down elevator. The noise was like a fiberglass drum falling off a truck, but right in the 100 point spot at 2:00. My helper, Bob Gill, didn't know what to make of it when I started hugging him and jumping up and down.

Another vivid memory is of playing Frisbee while waiting for the scoring results, and trying to throw one that the Grand National Champion could catch with his foot.

Hard-luck Award went to junior Rebecca Rohrer, who lost a couple of long, high-scoring flights, when her plane blew way downwind and couldn't get back. Martini Award went to Scale winner Hugh Stock, who had the bartender mix him a glass of ice water with an olive in it so that he could be convivial, yet sober. Hugh lectured Rick Walters and me at length on the esthetics of a graceful spot landing, but his controlled crashes looked just like the fearsome Kamikaze specials made famous by Niel Nolte. Long Curved Wing Award went to Jim Porter, who assembled his 15 footer in the halls of the dorm and astounded everybody. Crash Award was shared by a number of 11 foot birdlike machines whose wings folded on tow. Justice-Is-Done Award went to Ernie Heyworth, who had all his gear stolen out of his car a few weeks back, then won an EK-logictrol radio as one of the fabulous door prizes. Others, incidentally, included a year's supply of Midwest Balsa, a Don Clark Thermal Sniffer, a beautiful winch, an ASW-17, a couple of Windfree's, and lots of wonderful goodies provided by the hobby manufacturers who bent over backwards to support this contest. I won a package of long servo arms.

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The team awards in the Senior Category went to the Torrey Pine Gulls representatives, consisting of Mark and Rod Smith plus Col. Bob Thacker. The genial Colonel made a good showing in the contest, and set some sort of record for broken towlines with his 6 pound plus airplane.

In the Junior team event, the Rocket City Radio Controllers from Huntsville, Alabama, sent up a hot shot junior team paced by Milt Woodham, Jr., and walked off with the team trophy. This, despite the big score which Jeff Mrlik had turned in on behalf of his team, the Greater Detroit Soaring and Hiking Society juniors. The boys from Alabama are theoretically inclined types and could be found in the dormitory bull sessions at all hours, describing, among other things, a 12 foot Liebeck airfoil wing which they are testing. This jewel was built in a huge jig and has a catenary dihedral built-in! The whole thing, with about six different types of concave and covex compound curves, is MonoKoted! If they had brought it, it surely would have received some sort of award.

A well-deserved second in Duration went to Max Geier, the only S.O.A.R. member to win a trophy (I think). This compensated somewhat for Max's bad luck in Scale. His beautiful Grunau Baby had a big lead after the static judging and did okay on its first flight, but it disintegrated on tow in round two, to everybody's dismay.

All launches, by the way, were done with the winches set at six volts. Even the heaviest planes did fine on six volts. However, twelve volts was available if you wanted it, and Carter Carlson of S.O.A.R. described one flight made on twelve volts:

"He had a pretty light plane, just right for six volts, but no – we all tried to talk him out of it – anyway, he wanted twelve, so we hooked it up. And then he didn't pulse it, just stood on that pedal. Winch sounded like a turbine – wheeeeeh – then bang. Biggest piece of the airplane was like a popsicle stick. Winch sounded just like a turbine." Carter looked pensively into space, and you could tell he was seeing that plane scream up the line like a Formula I racer, then he shook his head, "just like a turbine."

The conditions during the whole contest were difficult, with brief periods of big strong thermals which would produce many maxes, followed by brief periods of strong sink (many 2-3 minute downers), and then long periods of dead air. As a result, the Duration events depended more on when you launched than on how you flew. Still, the best fliers and the best planes congregated near the top of the standings, so no sour grapes are justified. I am very strongly in favor of more rounds and shorter maximum times in a contest where launch time is decided by luck. For example, suppose the whole contest consisted of 12 rounds of 5-minute Precision (which would be quite feasible to fit in the same time as the 9 rounds we flew this year). The luck factor would be minimized because it would even out, and believe me, it is far from certain that anybody would be able to max every flight. This year's LSF tournament has "open winch" in an effort to solve this problem of launching-time luck, and they are de-emphasizing long duration flights. I hope that next year the Nats will consider the same factors in

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1973 RC SOARING NATS

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choosing the events.

While they're at it, they could enlarge the spot by six inches, since I always seemed to be six inches outside the damn thing!

The great job done by Dan Pruss, assisted by the S.O.A.R. stalwarts and by a great co-operative effort from the Greater Detroit Soaring and Hiking Society, can't be over-emphasized. Protests were few (most coming from a small coterie of malcontents) and sportsmanship was high, In all, a contest to remember, and I can only say that if you didn't go this year, you should definitely plan to do it next year. Where else can you see so many otherwise sane individuals staring up at a bunch of long skinny wings dead-sticking around in circles, working that sink for all it's worth? □

KWIK-STICK

from page 44

radio is installed so that the engine can be moved forward or back to aid in balancing the ship.

(4) The horizontal stabilizer, vertical fin, elevator, and rudder are cut from 3/16" balsa sheet, using the Ugly- Stik configuration. If you have an old Ugly-Stik you can use these parts from it; if not, take the dimensions from the plan and cut out the needed parts. Draw a center line on the horizontal stab and epoxy the vertical fin right on this centerline. Cover these parts with your favorite material - - - I used MonoKote on this ship and Flite-Kote on the little ship since the latter seemed to be a bit lighter, however, any of these materials are suitable. Do not be concerned about the ship being tail heavy because of the solid sheet tail surface. I had to add only about 1½ ounces of weight to the nose to balance it, and the all up weight was only 5 pounds, 8 ounces, ready-to-fly. One of the 'plus' factors of this airplane is being able to remove the complete tail unit for repair by removing only two screws. This is made possible by keying the tail unit in-between and under a 'U' shaped piece of plywood, spaced up from the longerons at the leading edge of the horizontal stab, with a piece of 3/16" balsa between the plywood and the longerons. (See the plans for size of these pieces and how it works.) Be sure to trammel the horizontal stabilizer before cutting out the 'U' shaped plywood piece, if you do this the tail unit will be in perfect alignment and will go back on straight if you should have to remove it for repair.

(5) Paint the fuselage with your favorite method, screw on the tail unit, mount your radio gear and place the engine in the mounting area, shift it to achieve the proper balance, and then mount it using four 6/32 bolts. The C.G. is shown on the plans so make sure to balance it as shown.

(6) Charge batteries, load the plane and other stuff in the car, go to the flying field and have a ball. Good luck.

BALSA - - - AND HOW TO WORK WITH IT

from page 39

[Editor's Note: Our apologies for the omission of proper credit to Aeromodeller Magazine for the Balsa tables.]

impacts, the remainder of the model surviving unscathed? In the simplest of terms, the mass of the rear end tends to continue after the rest of the plane has stopped and, if this continuation is not along the center line, then the tail group tends to pass the rest of the model either over the top, underneath, or to one side and, since the areas where the wing and tail are attached are usually fairly solid, something else gives just beyond those areas. The problem is not helped by so-called 'designers' who specify doublers from the nose rearwards, only to have them

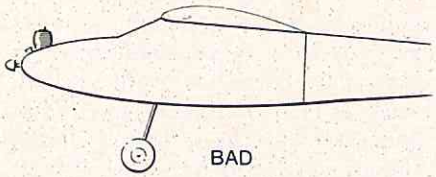

FIGURE 13

stop dead at the wing trailing edge (Figure 13). To these people, let us say, "At least taper them off or 'Bird's Mouth' them." (Figure 14.) Heaven

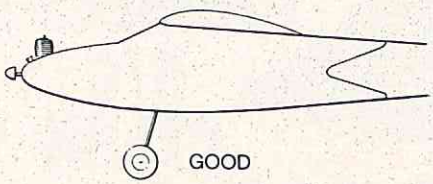

FIGURE 14

help full-size pilots if our designers did things like some modelers . . .

Having discussed the fuselage, let us now consider the wing in a little more detail. With electric winches and powerful Hi-Starts commonplace sights on the flying field, the glider

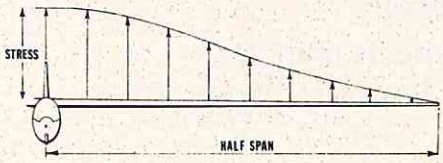

FIGURE 15

men know only too well at what point on a wing that failures usually occur. Usually in the first third of one wing. Right? If you plotted a graph of stress along a wing it would look something like Figure 15. Obviously it would be a risky business to put skin splices near the wing root when the outer 25% of a wing experiences such low stresses in normal flying. Joints near the tip are to be preferred and, if you don't feel capable of scarfing sheet through the thickness, then cut on the diagonal of the width and stagger or cross the joints – just as you wish.

Hopefully, the foregoing words will have been interesting or entertaining. If you are an old hand at the modeling game, perhaps I wrote something you didn't know. I will be first to admit that I learn something from fellow modelers every day – even from the rookies. Should you happen to be a novice, perhaps my words will help you along the road – but look around – ask questions. It would be a foolish man, indeed, who did not take time out to impart his knowledge unto others.

Lastly, a dedication of this article.

To my dear wife, Kathy who, like many modeler's wifes, has patience, calmness, and brings cups of tea, often at 2 A.M., while I'm unraveling many

design and development problems. That hand on my shoulder frequently capped many a potential explosion!

And, to Joe Bush, one of the old original 'Flying Tigers' and, without whom our flying field would be a poorer place. His words of wisdom and guiding hand to old and new flyers alike have made our flying sessions more enjoyable. Many are the 'first flights' made with Joe's hands on the stick or with him at our sides, mine included. All fields should have a guy like our 'Uncle Joe.' □

CUNNINGHAM ON R/C

from page 16

larger engines. Hurry up guys, I need one so I can slip over to the school grounds for a flight!

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Several months ago I commented on several new developments for full-scale aircraft that I had seen in other publications and, as you know, lots of letters were written in about these new developments. In the April 2, 1973, issue of TIME magazine, another new quirk was published. This is a paper aircraft developed by Richard Kline. According to the article and the pictures Mr. Kline has discovered a "whole new concept in aerodynamics." I couldn't tell from reading the article just what the development really was, but upon studying the pictures it appears that the airfoil on the wing seems almost an inverted airfoil. In fact, it seems to appear to have a flat top surface and a bottom surface that looks like the bottom of one of Ken Willard's seaplanes. Within a week of reading this article in TIME I received a letter from Bill Cooksey of Gisborne, New Zealand, sending me a copy of this same article in case I had not seen it.

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CUNNINGHAM ON R/C

from page 102

Bill also sent along a picture of his folded plywood aircraft built along the lines of my Pink Panther some years ago. Sure is a small world. Speaking of New Zealand, I received a letter from Don's and my long time New Zealand pen pal, Bill Aldridge. Bill commented on my talking about buying epoxy glue in commercial size cans rather than the small tubes. He has tried this, but found that he wasted less glue by going to the local chemist (drug store to us) and purchasing two 5cc glass syringes, without needles. He fills these, one for resin, the other for hardener and then mounts them in spring clips over his work table. Be sure to mount them with the spouts pointing up, otherwise the glue will seep out! When you need to mix up a batch, just grab your syringes and squirt an equal amount, just like using regular tubes. When refilling, don't forget which one had what stuff in it!

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Again, several months ago I read in Walt Schroder's MAN At Work in Model Airplane News the story of his serious illness. I've never met Walt, but have enjoyed his great contributions to our hobby for many, many years, and I was really surprised to read of his illness. But, what bothered me more was that this may be happening to many of us, and we really don't know what is going on. Just the other day I picked up a club newsletter and a similar illness/accident was detailed. I think that it is serious. For those of you who may have missed Walt's column, the jist of it was simply that he had been working on his latest creation in the basement of his home. It was winter, so he had been working with the windows shut, applying resin to his bird. After finishing work, he opened up the windows and aired out the place. Several weeks later he collapsed and numerous doctors were unable to find out what was wrong with him, but all of them began to point him toward the pearly gates. Finally, Walt recalled the incident with the resin, and it was determined that his system had been poisoned, and a cure could be affected. But the symptoms did not indicate this type of problem. How many of us, who have grown up with the smell of dope and glue, have turned to more exotic

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CUNNINGHAM ON R/C

from page 106

paints; and how many of us really work in a well ventilated area – especially in the winter in the North and in the summer in the Southwest? Are a lot of us shortening our lives by not being careful with the stuff that we are using on the latest aircraft? How about breathing in all of the balsa sawdust floating around after a good sanding session; of resin particles after a thorough sanding of a glassed finish? For just a couple of bucks we can buy a foam face mask at the local hardware store that at least will keep the dust out of the snoot. It won't do anything for the fumes, but I'll bet that we take in a lot more particles than does a heavy smoker during the same amount of time. But, the fume thing can be much more dangerous than we know. We may not have a collapse like Walt did, we might suffer only some brain damage, or cause our reactions to get screwed up, thus being more prone to a traffic accident, or an accident with our aircraft. Let the warnings be taken seriously – it's important!

While on this subject, how many of us have suffered a loss of hearing over the years due to the loud scream of engines in our ears? I know that I have. Why, oh why, doesn't one of the many really smart men working with engines come up with a really good muffler. Sure, we have mufflers and they are better than nothing, but try standing right next to a powerful, well muffled automobile, or motorcycle, and think what it would sound like if it were allowed to roar its head off. Just look how the power of the standard .60 engine has been increased in the past five years. We really have a lot of power to spare. Engine design has jumped forward, but not so with muffler designs – let's get with it. Let's **really** muffle those engines. I recently flew in my first glider meet and it was beautiful, flying all afternoon and conversing in normal tones while three or four aircraft soared overhead on silent wings. I like powered flight, but why can't it be silent, too . . . .

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I recently purchased something that might be of interest to you builders who have limited space to build in, or like me, wanted to set up a small building area in the bedroom so that late at night, while watching TV isolated from all of the kids, a little building could be done. I purchased a 30" x 42" drafting table from the Montgomery Ward catalog. This table has a plywood top and has a height adjustment so that you can work at it sitting or standing. Also, the top has a tilt adjustment so that you can set it flat, slope it, or store it in a 90 degree position. It's really great! I also use it for drawing plans, so that when I am building on it I use another piece of plywood placed on top for a building board. It is fairly expensive, but you can duplicate it with a little white pine and a table saw. Check your catalog, it was selling for just under thirty bucks. It might even be a good club project to build several of these.

•

As I mentioned earlier, I competed in my first sailplane contest, flying an Airtronics Olympic 99. This is a very fine and enjoyable glider to build and to fly, but I noticed one problem, it doesn't seem to want to penetrate a breeze. I discussed this with the Fearless Leader and he passed on some sage

advice that I will pass along. Don tells me that the Olympic, as constructed from the kit, is set up pretty much as a great aircraft for the beginner – slow flying and easy to control. For better penetration, remove up to one-half of the incidence in the wing by jacking up the trailing edge of the wing in small increments. This, then, makes it a different aircraft to fly, one that will bore into the wind much better. Also, another tip from the Fearless Leader – if you need more nose weight, try using drape weights from the local yardage store. They come in various diameters and weights and, being "flat circles," easily fit into the nose of almost any sailplane.

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Our 1973 Readers Survey has been pointing out some interesting information that will be gone into at great length by Dewey, but one of the first things that we noticed is that many of the newcomers to R/C are also newcomers to the art of model airplane construction. In other words, our latest crop of beginners do not have a background in former modeling to fall back on to help them over the rough spots of getting into this hobby. With that in mind, I plan to once again delve into the pitfalls of the beginners in hope that I can shed some light on the mysteries of building and flying R/C aircraft. I hope that you long time readers will understand if I touch on some things that, to you, are now easy stuff.

However, I urge you to purchase RCM's Flight Training Course from their Anthology Library Series and to watch for and purchase Volume II of RCM's Flight Training Course now being prepared for publication.

If you have additional problems that you need help with, feel free to write me c/o RCM and I will be happy to answer your questions, if possible. However, individual replies are not always possible but we will try to answer your questions in this column when space permits.

See you next month - - - at the workbench. □

SUNDAY FLIER

from page 12

A classification based on decreasing number of points will be compiled, called "Partial Score A" (See paragraph 11).

9. Task B – Distance (See Sketch):
This task must be completed within 8 minutes from call by the Contest Director.
Tow line and engine run are the same as for Task A.
Actual flight time, after tow release or after end of engine run, must not exceed 4 minutes, during which the model must complete as many laps as possible from the starting base A to the base B and return.
The 150 metre distance from the starting Base A and Base B is divided in 15 fractions of 10 metre each.
A judge establishes when a model enters the starting base A and a flagman (or an audio system) is used to signal crossing of the base B.
For models which land between the two bases A and B within 4 minutes from entering the base A, also fractions of laps will be counted, in addition to full 150 metre laps.
Contestants must remain at the base A as shown on the sketch until the task is completed.
A classification based on decreasing number of total flown distance (metres) will be compiled and points given as described in Paragraph 11, thus establishing the Partial Score B.

10. Task C – Speed (See Sketch):
This task must be completed within 5 minutes from call by the Contest Director.
Tow line and engine run are the same as for Task A.
After tow release or after end of engine run, model must fly a closed-course distance from Base A to Base B and

return, in the shortest possible time.
Time is taken when the model enters Base A (after tow release or end of engine run).
Model still aloft when 5 minute time expires will be assigned one more second of flight time, than the slowest model completing the Task within 5 minutes.
A classification based on increasing times to complete the two 150 metre laps course will be compiled and points given as described in Paragraph 11, thus establishing the Partial Score C.

11. Partial Scores:
Partial Scores A and B are proportional (for each task) to the ratio between the contestant points and the points of the winner.
Example:
Winner 560 points
score 1000
XY Contestant 400 points
score = 1000 x $\frac{400}{560}$ = 714

For Task C (Speed) the score is inversely proportional to the above mentioned ratio.
Example:
Winner 25 seconds
score 1000
XY Contestant 50 seconds
score = 1000 x $\frac{25}{50}$ = 500

12. Final Score:
Final Score is compiled by adding the Partial Scores A, B, and C for each contestant.
In order to be included in the Final Score, a contestant must have completed Task A and either Task B or Task C.

13. Landings:
All penalties and additional points, as per Paragraphs 8 and 9 are given when a model has come to a complete rest and measurements are taken from the model nose.

14. Ties:
Task C (Speed) is repeated in case of ties.

15. Insurance:
All contestants must have a sporting document (USAL affiliation card, FAI Sporting license or equivalent document) as well as an adequate insurance protection for damages against persons and their belongings.
The latter clause is waived for foreign contestants.

16. Time Keeping:
For Tasks A and B, times are kept when a model comes to a complete rest, and not when it hits the ground or a ground based obstacle.
For Task C times are taken in tenths of a second, for sake of accuracy.
For Task C crossing of Base A at the completion of the course may happen when the model has already hit the ground.

17. Assistants to Contestants:
For each task, every contestant is permitted to have only one assistant, who must be located as follows:
For Task A, at 50 metres from the landing spot, at least.
For Task B and C, on the Base A line, at no more than 10 metres from the contestant.
No signalling device of any kind is permitted which might disturb judges, flagmen and other contestants.

18. Inspections:
Contest Directors may take random inspections of models during the competition and within 50 minutes from its completion.

19. Spectators:
Contest Directors will keep spectators out of the contest area.
Contestants and their assistants are re-

quested to follow all instructions given by the contest officials.

So, now you know how to design a glider, and how to run a glider contest. Thanks to Bert Striegler and Walt Good, both of whom graduated from the Sunday Flier classification long ago, but who appreciate the needs of Sunday Fliers who want to know how to improve.

It's nice to have friends like that. □

ENGINE CLINIC

from page 85

time repairing a crash damaged engine or radio. And, yet, if a realistic labor charge is made the owner will really scream. I can speak first hand from the engine repair end of the business. It is real easy to tie up a couple of hours checking out a crash damaged engine and yet many fellows think that a $5.00 labor charge is plain robbery. And engine repairs are relatively simple compared to what a radio manufacturer has to go through to straighten out your bent receiver, servos, etc. However, repairs are an obligation a manufacturer must fulfill when selling a product. But – this is the reason a manufacturer will only service the product he imports or sells. So gang, if you ever have a friend or connection who can pick you up Brand X engine, or radio, on his next trip to Japan, bear in mind that you might have some trouble getting it serviced afterwards. MRC services only the Webras and Enyas that they import and sell. World Engines services only the Super Tigres, O.S.'s, etc., that they import and sell. The same situation applies to most of your other importers of foreign engines. So be forewarned.

Now, Capt. Leist, in the case of the Futaba which was formerly imported by MRC. They no longer import this radio, but now market their own U.S. made line of radios. Incidentally, the new MRC line of radios were developed by Don Mathes. Don is an old time name in the radio game having marketed his own 'reed' sets many years ago, designed the Deans 'reed' radios, later joined Kraft during development of the first proportional radios, etc. and is now with RS Systems. Don, along with Doug Spreng, were the first to develop the digital radio which we are using today; the original digital concept, as applied to model radios, being

Doug Spreng's brainchild.

Futaba has now set up their own distribution network and have an ad in RCM. Whether the U.S. importer here in California will service your Okinawa-purchased radio, I do not know. You will simply have to drop them a line. If not, there are fellows who do service radios and run ads in the classified section from time to time. I naturally cannot vouch for their ability or how well they perform the service. You will have to take a gamble on this. There is no major company that specializes in the servicing or repair of model radios that I know of.

Dear Clarence:

Have been considering installation of positive tank ventilation on my ST .23/Semco combination. Do you know of the availability of a small fitting for this purpose? Where is the best place on the muffler stack or muffler itself? Would there be a fitting to replace the little screw that holds the rear part of the strap to the muffler?

Would really like to have air filters for all my engines. I've tried wiring slices of the K & B filter material to my carbs but with a muffler too, priming is a hassle because with a finger choke the carburetor bell soon cuts through the material. A razor slit in the foam for sticking a primer-nozzle through works for a while, but the whole thing is a Mickey Mouse operation.

Yours very truly,
Mike Corbett
Indianapolis, Indiana

The Veco pressure fitting, Part No. 6723 is ideal for this purpose. Although intended as a pressure fitting when using crankcase pressure to pressurize your fuel tank it will work just as well as a tap for muffler pressure. The best place to tap (4-40) for the fitting is anywhere in the main muffler body just behind where the body joins the exhaust manifold. If you have any doubts, check any of your current mufflers that have a pressure fitting already installed. If you are using a muffler on an engine, then using muffler pressure to slightly pressurize your fuel tank is the only way to go. Pressure will make for a much more consistent engine run from the beginning to the end of the tank. At idle, pressure becomes negligible, and does not load up the engine as other forms of tank pressurization will do.

As for your K & B air filter, I do not really see what your problem is. I have been using them for a couple of years with no problem. If you are having trouble with the venturi of your engine cutting the foam, you must have a pretty sharp edge on your carburetor neck. Take a little #320 grit wet-or-dry emery paper to it. How hard are you pushing when you choke

the engine? It doesn't take much pressure to close off the venturi for choking.

Dear Mr. Lee:

Would you, per chance, have any facts or figures on crankcase pressures on engines .40 and up. Have an O.S. Max .49. Want to pump up a tank for operating retracts with air cylinders of a given size??? Found a company that makes miniature cylinders (Goldberg retracts).

Bill Sargent
West Springfield, Mass.

I do not have facts and figures regarding exact pressure for each make of engine but, in general, any engine of .40 displacement or larger will put out a minimum of 5 pounds of pressure if you tap the crankcase directly under the intake. The port in the crankshaft that governs crankshaft timing then becomes a timing valve for using the engine as a pump, so to speak. Now most engines have a strengthening web directly under the intake so locating a pressure fitting here is a problem. The only solution is to move it off to the side slightly. Viewing the engine from the bottom with the crankshaft pointing away from you, the tap should be to the left of the web, but as close to it as possible.

Dear Mr. Lee:

I have an Enya .60 III with a stock carburetor and a Northfield Ross muffler. The set-up of the muffler on the engine is such that the rotating exhaust baffle does not have to be removed to mount the muffler. Would it be advisable to run the engine this way or would you suggest that I remove the exhaust baffle when using the muffler? If so, why?

I am using this engine with a Fox idle bar plug and K & B 500 fuel to swing a 13-4 prop on a 72" Sterling Piper Super Cruiser. My idea was to slow the engine down for a more realistic flight and not tear around the sky. Is this to much prop?

Any help you can give me on these matters would be greatly appreciated.

Thank You,
Frank Costello
Dover, N.J.

By all means, Frank, if you can retain the exhaust baffle in conjunction with the use of a muffler then by all means do so. The only reason for removing the exhaust baffle is due to interference of the baffle linkage with the muffler attaching strap. The use of the baffle helps engine acceleration considerably.

Your Enya will swing the 13-4 okay, but it is a pretty good load. Rather than load the engine down, which only increases the heat and wear, it would be better to use a smaller prop and throttle back slightly. You wouldn't connect a trailer full of rocks to the back of your car to slow it down, so why do the same thing to

your model engine?

Along the line of mufflers and the problems incurred trying to use the muffler and still retain the exhaust baffle, Dick Shirey has sent in his solution to the problem which is practical and easily fabricated.

Dear Sir:

In the July issue in Engine Clinic, I read a letter from a reader who asked about installing a muffler on a K & B .40 and what he should do about the exhaust baffle. I have seen this question asked before and I think I have a good solution for those who would like to leave the exhaust baffle in and still use a muffler. I can vouch for the statement that it would be better if the baffle could be used with the muffler. I have tried using the engine with it out and the holes plugged and I have found it better to use the baffle.

I have used this method for about a year and a half now with no problems at all. It is really easier than plugging the holes and then re-adjusting your carb to make it idle and pick-up properly.

I think that the sketch is self-explanatory. (See sketch on page 10.)

Sincerely,
Richard L. Shirey
Sewickley, Pa.

FROM THE SHOP

from page 2

If you're going to use K & B Superpoxy over any form of covering material where you plan to use dope as a filler, K & B definitely recommends the use of nitrate dope. This is relatively inexpensive and is available by the gallon container at the local airport. We would not recommend the use of butyrate dope under Superpoxy. With regards to filling the wood under the Microlon, treat this just as if you were covering the structure with silk, nylon, or other covering material. In other words, I would advise a fine sanding followed by several coats of clear dope, lightly sanded between each coat. You can, if you prefer, use a talc and dope mixture, but it is not necessary.

Dear Sir:

Would it be within your editorial policy to tell me if the mail order radios, such as the Hobby Shack Cirrus and the Hobby Lobby 5, which sells for substantionally less than some of the higher price radios, are inferior in quality and performance due to their lower price tag? I am a sport flyer, not a contest type, and don't have a lot of money to spend for a proportional system. Would one of these radios fill my needs? (name witheld by request)

We have extensively flown both the Hobby Shack Cirrus and Hobby Lobby 5 proportional systems and

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have experienced no difficulties with either one of them. Both of these radios are produced by large RC manufacturers – World Engines, Inc., in the case of the Hobby Shack Cirrus, and EK-logictrol who manufactures the Hobby Lobby 5. What you get for the price is one of their standard high quality radios for which the mail order house has contracted to buy a large amount per year in order that the manufacturer can be guaranteed a sale of, say, a thousand radios in a twelve month period, all of which are alike and easily reproducible. In other words, there are no options available on these radios. For example, you can't have a single stick and an additional channel and your choice of servo configurations. These radios are manufactured to a given standard and if you want a choice as to stick configuration, such as open or closed gimbal, servo configuration such as large or small, linear or rotary output, then you're going to have to go to the higher priced radios. If the configuration offered by the manufacturer and the mail order house fills your needs, and you could care less about optional extras, then you need have no worry about the performance of the radios.

Dear Don:

How about publishing an article that will show how to move the control sticks on a transmitter in order to perform the standard and contest maneuvers. You may have published an article like this in one of your past issues but there are a lot of new people in this hobby, like myself, who never read it.

I find it very difficult to learn how to make these maneuvers by listening to and watching an experienced pilot. You can only watch one thing at a time. If you are looking at his hands you cannot see what the model plane is doing and vice-versa. The article should have plenty of diagrams or pictures which will show where and what the model plane is doing when the control sticks are in certain positions and a step-by-step series of pictures of how the sticks should be moved in order to complete a maneuver. Perhaps you can make a series of articles by showing two or three maneuvers each month. This will give some time for your readers to practice before he proceeds to the more difficult maneuvers.

Many thanks for publishing a great magazine.

Yours Truly,
Anthony LaVardera
Bellmore, N.Y.

We're ahead of you on this one, Tony. This is a very complex subject to treat properly and we've been a year and a half in the preparation of Flight Training Course, Volume II, which takes you all the way from the construction of your first pattern aircraft, to trimming it out, to a chapter on each of the maneuvers that you will

be expected to perform in a contest circuit. These chapters are detailed with step-by-step techniques and easy-to-follow drawings. In addition, each chapter gives you practice techniques for the specific maneuver detailed in that chapter, along with what the contest judges will be looking for and what you would be down graded for in the contest circuit. We think you will like Volume II of the Flight Training Course – it will be available shortly.

Dear Mr. Dewey:

As an RC'er and also a dealer, I would like to make a suggestion concerning the anthology series. So far I have read all of the books in the series and have only praise for the beautiful job that you have done. However, it seems to me that another volume is called for and would receive great acceptance among the R/C modelers. I suggest that you bring out a volume devoted entirely to Finishing Model Aircraft.

Thank you,
Bob Suler
Peoria, Ill.

Thanks for the suggestion, Bob. Again, 'Finishing The RC Aircraft' is the title of another book currently being prepared for the RCM Anthology Library Series. You will find just about every finishing technique from the old stand-by, silk-and-dope, to the newest covering techniques for the plastic film materials. This will be available in a few months.

Dear Sir:

I would like to point out a possible safety hazard that was printed in your July issue, "For What It's Worth" column. Ken Rose of Ontario, Canada, states how he dries his models odor free in foul weather by using a clothes dryer. This is fine if the dryer is operated in the fluff or no heat position. But if the dryer is operated with heat and with the door open, air which is normally heated over an electric element or by gas flame is not carried from the dryer. This results in severe over heating.

Although all dryers are protected by a safety thermostat in most cases, the temperature of the top of the dryer will still get hot enough to cause a burn. This is also extremely hard on the heating element.

Keep up the fine work on an excellent magazine.

Sincerely,
Steve Noyes
Ticonderoga, N.Y.

You're absolutely right, Steve, and we're sorry that this one slipped through. We have enough hazards with many of the materials with which we work without introducing another into the shop.

* * *

That's it for this month – hope you like the issue. Drop us a note with your specific questions and we will do our best to come up with an answer - - - or at least a SWAG! In any case, we would like to hear from you.

Good flying. □