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RADIO CONTROL MODELER

FEBRUARY 1964

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Year's Best Multi THE NORSEMAN by Ron Chapman

R/C modeler

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An Open Letter From The Editor

We like to feel there are no strangers in modeling — only friends we haven't had a chance to meet. Through the many letters we receive daily, we meet and get to know modelers from every part of the world. These letters — the suggestions and criticisms they contain — form our editorial policy, for this magazine exists solely for one purpose, and one purpose only — to serve the radio control modeler, whether he is in South Africa or Cleveland, Ohio.

Modeling in general, and radio control in particular, has come a long way since its beginning. The RC'er of today belongs to a new breed of modelers — a species that strives for knowledge, progress, and perfection, demanding the same in return from members of the hobby industry. Yet, there are those that would shackle this group to the gas tube era — a preservation of the status quo, as it were. This conservatism, this opposition to innovation and change — this retreat to the safe harbor of yesterday's accepted ideas and practices — is not only lacking in vision, but is cheating the modeler in moral obligation.

One specific citadel for this musty type of thinking is the solicitous and patronizing approach to product reviews. A vast majority of our mail contains pleas for honest, constructive, and detailed product reports. Whether the RC'er is a beginner with a few dollars saved up for his first single channel relayless rig, or a more advanced flier who is considering the purchase of a five hundred dollar proportional system, he wants to know as much as possible about the various choices so he can be in a position to make a wise decision for his investment.

And there is a big difference between an investment in months of flying pleasure versus an expenditure for a piece of equipment that requires an engineering degree to keep operating to some degree of reliability. Even more basic, the RC'er wants to know what is the best gear for his particular application.

The radio control modeler feels, and rightly so, that the model publications have a responsibility to provide him with the facts stripped of any prejudices or vested interests. The hobby dealer, eternally confronted with all manner of questions concerning various types of equipment, looks to the same publications for help in answering these questions. And yet, the modeler and the hobby dealer, feel quite strongly that these publications have let him down. Sugar coating a pill doesn't make the end result any different — it only makes it easier to swallow. And product reviews — if you can call them that — have been sugar coated and glossed over with no attempt to separate fact from fancy.

Any individual, or group of individuals, who deal in mass public communication, have a certain degree of influence, and must meet a high standard of integrity born of the responsibility that influence incurs. Based on the volume of mail we have received on the subject of product evaluation, the modeler does not feel that their publications have met this responsibility. A typical example, selected at random, was a so-called "review" of a manufacturer's "industrial plant," his "new, beautiful, and compact equipment," and a magnificent generality about how he knew his business in the radio control field. All well and good — except for a few discrepancies! This manufacturer, in fact, knew very little about the radio control field, and was forced, a few years ago, to cease production of his "new, beautiful, and compact equipment" in his "industrial plant" because it wouldn't work! The end result was that the radio control modeler spent his money for inferior equipment that failed to perform "according to specifications." How many modelers took those hastily written words to heart, lost their money, and subsequently became disillusioned with the entire hobby? And what did that disillusionment cost the hobby dealers and distributors, to say nothing of the rest of the model industry?

Another example of this is the relative newcomer to our hobby who reads a "review" of a new product in a model magazine, becomes enthused, and then is told by his hobby dealer — "We tried it and it doesn't work. Stick to the old reliable products and don't believe everything you read in the magazines. They have to support their advertisers!"

(Continued on page 59)

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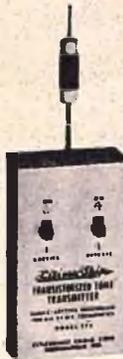


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Circle No. 104 on Reader Service Page

DEAR RCM:

ADDRESS R/C MODELER MAGAZINE • P.O. Box 487 • Sierra Madre, California

Thank you for a wonderful mag. But if you think you will get my subscription, think again! At least not until you stop printing the Reader Service page on the back of very valuable printing! My friends object to my tearing up their copies, and I'll be hanged if I will deface any of mine! Put it on a separate sheet and you will have my undying gratitude — buying two copies is expensive! Kidding aside, thanks for a great magazine.

Ken Berman
Shaker Heights, Ohio

Never let it be said we don't aim to please . . . this month's Reader Service is on the tear-out card. Even saves you five cents on postage! Thanks, Ken.

Beyond a doubt, this magazine has filled a real void in the hobby of modeling. I have found the articles well written, but most of all, they touch upon topics that generally are avoided by other periodicals. Also, they delve into the topic to a much greater depth with the result that the reader has a solid and working understanding of the subject matter. So, bouquet's to the staff.

Having mounted the soap box, there is one additional comment I would like to make. In the area of equipment reviews it seems to be the accepted practice of the reviewer to avoid real criticism of any RC gear of recent vintage. Personally, I feel this is the greatest disservice done to our hobby, yet it continues without any apparent restriction. When a young boy scrapes and saves to acquire radio gear that subsequently continually malfunctions and results only in frustrations and fly-aways, how does anyone expect the hobby to prosper? This is not restricted to the single channel rigs, as I witnessed one poor fellow rack up three planes with one of the ultra quad proportional rigs costing in the vicinity of \$700! Please do not picture me as a crank, as I realize that a certain number of malfunctions are bound to occur regardless of the quality control. I only request that you give us a true and accurate review, critical if warranted, and praiseworthy if deserved.

Mike Bothun
Bismarck, N.D.

You're so right, Mike — and you'll

find that we not only agree but have done something about it. Read the editorial this month and then read the reviews in this issue. Let's hope the other mags follow suit.

To say I like your magazine is putting it mildly. I used to feel the day was made when the other model magazines arrived in the mail, now I view them indifferently. I feel your approach is just what I have been looking for — it is honest in favor of the modelers and not a gathering of articles just to please the advertisers. At least it strikes me that way. I feel I am reading an article I can get something out of, and not just another long advertisement or sales brochure.

I would be one who could be classed an expert builder (been at it 20 years) but a rank amateur in RC flying and maintenance. Your articles are filling loopholes both in my knowledge and confidence in RC. I go along with W.W. Cook (Dear RCM) and after thinking I understand a simple receiver and escapement, still can't figure out what wire really goes to what connection between the two!

Chuck Large
Los Angeles, Calif.

Don't feel bad, Chuck . . . we know a prominent modeler and competition flyer who recently hooked his ailerons up backwards and dorked a good ship! Not to mention your editor who piled up the unsinkable Virus by having the wrong pulse rate on his pulser!

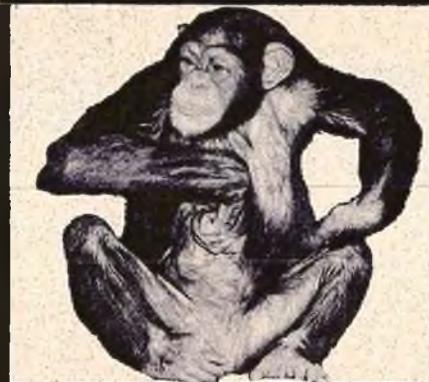
I enjoy reading your magazine very much. It has good information for experienced modeler and the beginner. (I am in the latter category). I would like to see, if possible, some information on upcoming contests and meets. Would like to attend some in my area but don't know when and where they are being held. Thanks.

Robert Seymour
Kenton, Ohio

If our readers would like a monthly contest calendar, write us and let us know. We can do this provided the various RC clubs let us know well enough in advance of their anticipated fly-ins.

(Continued on page 62)

BENCH BITS



HANK GIUNTA
Technical Editor

● There is at the present time, a very definite trend to steer the beginner toward the smaller models. Without debating the pros and cons of these miniscule mighty mites, we are all aware of the oft-stated advantages of these one-half, one-quarter, and one-eighth A ships: inexpensive, hard to destroy, relatively easy to repair, etc. What many modelers, especially the beginners, fail to note is the increased demand placed on the radio equipment due to the size requirement. The all-transistor relayless receivers, currently available, are very compact and very reliable *when used in accordance with the manufacturers recommendations.*

Present day escapements are, in general, very reliable when properly installed and wired. (For additional information on increasing escapement performance, refer to the October 1963 issue of RCM). This seems to place us at the next step in the control chain — namely the batteries.

The choice of batteries for these small ships can spell the difference between successful flights and repeated disasters. Most manufacturers indicate quite emphatically that carbon-zinc pencils should not be used. I'll say it again here — *don't use carbon-zinc pencils!*

Some of you may have been fortunate enough to have gotten away with using these cells in the past, but for those of you who are experiencing difficulty in obtaining satisfactory operation of your equipment would be wise to look into the battery problem. Let's take a closer look at some of the difficulties which may arise from a poor choice of batteries.

1. Receiver seems to work o.k., but the escapement drops out after a second or so. (With constant transmitted signal).

2. Receiver operation is intermittent; sometimes working well, sometimes not at all.

3. Escapement keeps pulling in and dropping out (cycles through) without any command from the transmitter.

4. System works properly for a time, then escapement begins recycling.

Taking these items one at a time, we can investigate some of the possible causes. *It is assumed, of course, that the transmitter is functioning properly.* If you have troubles at the transmitting end of the control link, the most elaborately designed and carefully built receiver can't do you one bit of good. With these assumptions in mind, let's proceed to problem #1.

1) Dropping out of the escapement after a second or two of delay is almost *invariably* an indication that the batteries are reaching the end of their useful life and should be replaced. Unless, of course, you enjoy picking up the

pieces of your airplane and rebuilding!

2) Intermittent operation: This problem of intermittent operation is one of the most difficult malfunctions to track down. There are many possible causes for this which will not be expanded upon here, but one of the possible causes lies right in that battery pack. If you have followed the radio control columns printed in many of the available magazines, you will probably vaguely remember some reference to the use of those so-called "leakproof" batteries. At the risk of boring those of you who are aware of the problem, I feel that the information is, nevertheless, valuable magazines, you will probably vaguely the "leakproof" batteries are sealed in a cardboard or metal container, into which the actual battery is placed. *Electrical contact to the cell is made with a floating cap held in place only by the crimp on the outside covering.* In the normal course of operation, this poses no problem, as the batteries were designed to be used in a pressure-type holder, such as a flashlight. However, when these batteries are used in our airplanes or boats, connections are normally made by soldering to the ends of the cells, or more specifically, to the *outside* ends of the cells. This is okay on the positive end, but the negative terminal is a seemingly never-ending source of grief. The next time you solder in a battery pack, peel off that outside covering and remove the end cap, then solder directly to the case of the battery. 'Nuff said.

3) Escapement-Receiver Cycling.

This problem can almost always be traced to the battery pack. Normally, it is caused by using batteries whose internal resistance is high, providing a feedback path for the voltage transients developed by the escapement. Installations which utilize nickel-cadmium batteries or alkaline energizers do not normally cause trouble. At any rate, try replacing the batteries with NiCads or alkaline cells if you are bothered with recycling. Faulty bypass capacitors in the receiver may also cause recycling.

4) Intermittent recycling after normal operation.

This is normally an indication that the batteries are reaching the end of their life and should be replaced. Again, faulty capacitors in the receiver could cause this condition.

What all of the previous discussion boils down to is that when you have a good chunk of the green stuff invested in a machine which is supposed to provide you with some recreation, don't skimp on that all-important battery pack. Here, the best is barely good enough!

○

BLUEPRINT FOR BEGINNERS

● In the first two installments of this series I tried to tell you beginners a little bit about simple radio control for model planes. Then I proceeded to describe a simple model that had all the features most suitable for the novice. Perhaps you will recall that I said — “One thing is certain — you’re going to bust up your airplane sooner or later. The less painful it is, the more likely you will recover!”

Ah, the irony of it all! I have just received my first confirmation of the truth of my prediction. To all you rank beginners I say, “Take heart — your airplane can survive almost anything except overconfidence!” Our eminent friend and cohort, the worthy editor of R/C Modeler, while flying his Virus with the proportional rudder control previously described, was having a fine demonstration of the gentle nature of the ship, when, for reasons which he will undoubtedly analyze and report on, the airplane went out of radio range. This resulted in full left rudder, a spiral dive, and the Virus became an epidemic of balsa splinters!

I thought you might get a kick out of this, but there was another objective in reporting it — namely, that you can’t be too careful in the preflight checkout of your model. And that checkout should cover the airplane alignment and balance, engine operation, and the guidance system, including transmitter, receiver, escapement operation, and control surface movements.

So let’s do a preflight checkout on your Virus. We’ll begin with the airplane alignment and adjustment. The wing, sitting on the cradles on top of the fuselage, can be moved forward or backward, as required, until the proper balance is achieved. If you’ve already glued in the dowels for mounting the wing, you can add modeling clay to the nose or tail as required. In any event, the balance is achieved when you can pick up the model from its normal resting position on the tricycle gear and it remains level when the “point of lift” is $2\frac{1}{4}$ ” back from the leading edge of

the wing. So, lift the model by the wingtips, with your fingertips resting $2\frac{1}{4}$ ” back from the leading edge. All three wheels should lift from the floor at the same time, the model hanging level when properly balanced.

Now check the alignment of the flying surfaces. First, let’s check the wing for warps. Even though you built it on a flat surface, it’s possible that a warp developed and should be removed. Put each panel back on the bench with the other panel angling up due to the dihedral. The flat undersurface of the tip rib should touch the tabletop along its full chord at the same time that the center section rib fits flat. Finally, “eyeball” the wing by sighting right down the center of the fuselage with the wing and stab mounted. Do it both from the front and the rear. It should look something like Fig. 1.

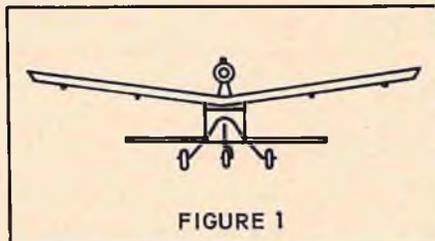


FIGURE 1

If either panel has warped, the leading edge and trailing edge will be out of parallel, as in Fig. 2. Here the wingtip is “washed in,” and the tip will lift more than the other wingtip, causing a

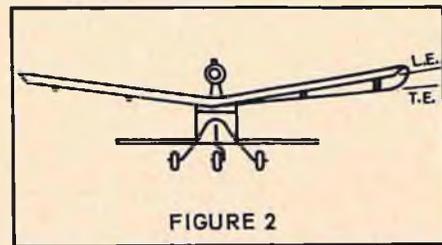


FIGURE 2

spiral to result. The difference in the angle at which the wing strikes the air will cause uneven lift. So let’s correct it. Use the dry heat method. Hold the wing panel over a burner on the stove with your hand under it. Your hand will serve as a heat indicator. The wood can stand any heat your hand can, but if you put the wood too close to the burner it could get too hot. So, heat the wood both top and bottom, and gradually you will feel it becoming pliable. Twist the panel in the opposite direction to the warp, and beyond the “neutral” point. Then remove it from the heat source and let it cool while you are holding it to the newly established setting. Quench it with cold water if you like. Then, when cool, release it — after you’ve tried this a couple of times you’ll find it easy to reset any sheet of balsa which has been treated with dope to any angle of twist you want. For now, though, you want to make the wing have parallel leading and trailing edges.

(Continued on page 44)



BY
KEN WILLARD

NORSEMAN



The end result of a long line of experimental prototypes, the Norseman III is the ultimate in total performance for multi-channel contest aircraft.

Photographs
and Text
by Ron Chapman

Toronto, Canada: Ron Chapman
A schoolteacher by profession, Ron Chapman has earned recognition as one of the world's top competition flyers. The Norseman is the cumulative result of his experience and continuing studies in model aerodynamics.





Like most good things, the Norseman is a product of evolution rather than revolution. It started back in 1959, after becoming dissatisfied with the Astro Hog. I sat down to evaluate ideal design configurations, and came up with a taper-wing ship called the "Dice." This design and subsequent modifications was built in large numbers by the local flyers.

The basic faults of this original design, resembling a Curtis P-40 in its early configuration, were bulk and weight. It was, however, successful in that it provided major wins in contests over a period of several years.

In 1961, I built several of Hal deBolt's original Simplex — since re-kitted as the Viscount. The new design experimentations included full-span ailerons, light weight and quick construction. Last season we departed from the Viscount's basic concept, which resulted in the Norseman, as presented here.

First came the inverted engine, which cleaned up the front end literally as well as visually, besides providing the ultimate in accessibility for the engine and nose gear.

Next, we evaluated the moment arms originally used in the "Dice" — arriving at a slightly longer nose for grooving and penetration. At this stage, I was still using a full symmetrical section and board wing shape.

This season marked the final stages of refinement. I returned to the semi-symmetrical wing, but utilized a blunt leading edge section to smooth out the pitch maneuvers. These changes were accompanied by a slight overall reduction in size as well as wing area. The result was a light, compact, and easy to transport aircraft, with pleasing lines and extremely fast and smooth. Another advantage was its outstanding performance in either a wind or in calm air. The Norseman is as simple to construct as a multi ship can possibly be, and persistent. Several have been built, and every one has flown off the board with only minor adjustments being necessary.

Now that you have the history, let's turn to the construction. I'm sure you will find it a pleasant surprise, and in addition, will be in for a really exciting flying season with the Norseman III.

Construction

A very unique system has been devised to provide a simple, strong, and true fuselage. The top block is cut to shape and hollowed out, but without rounding off the outside edges. This will allow

the top block to sit flat on the bench. By the use of a set square, the bulkheads can be glued squarely into position. If the top block has been accurately cut and the bulkheads glued squarely into position, a perfectly true fuselage will result. After installing the bulkheads, add the motor mounts and fuel tank. The fuselage sides are pinned and glued into position, and when dry, apply a second coat of glue to make sure a strong union exists between the top block and sides. Before the bottom sheet is applied, the pushrods are placed through the bulkheads and their alignment checked. Be sure a liberal coating of glue has been applied to the eyelets so they won't break loose. The bottom block and sheet are the last to be glued down. Finally, sand the entire assembly to shape.

In the fuselage construction, all unnecessary parts and time consuming fiddling has been eliminated. In looking at the fuselage, one might think that it does not look strong enough, but let me assure you that it is more than adequate. The lamination of the fuselage sides with white glue gives a strong side, and one that does not need a lot of extra bracing. The doubler sheet and fuselage side are dampened with water on both sides before the white glue is applied. This prevents the wood from curling, due to the moisture in the glue. Wax paper, placed between each assembly, will allow both to be clamped between two flat surfaces to dry. I use two pieces of birch plywood and some "C" clamps for this purpose. The stabilizer is glued to the fuselage, with the leather fillet supplying the extra strength, plus appearance, without the necessity for a doubler.

The wing construction is shown with a conventional leading edge, as I feel many modelers do not have the facilities for forming the round sheet type used on the prototypes. Fibreglass cloth and resin adds the strength to the center section of the wing, thus eliminating the need for a lot of extra bracing. The wing is also shown fitting into the front block for those who wish to use Cam Locks instead of rubber bands to hold the wing on. I might mention, I use a liquid plastic foam in the front center section of the wing for compression purposes in the event of a hard landing. I don't feel this is necessary, however, but having done this for quite a while, find that habits are hard to break.

The wing and stab show round tips for appearance only. Those who wish

to use block tips can make this alteration. The undercarriage bracing consists of $\frac{1}{4}$ " square balsa. This gives sufficient strength, as the nose gear takes the brunt of landing. Because sheet nylon hinges are used, the strip ailerons can be installed and sanded to fit the wing prior to covering. A good tip to prevent strip ailerons from warping is to rub a thin coating of fibreglass resin into the wood before any dope is applied to them. This will stiffen the wood so that they remain true and not be pulled out of shape by the dope. The aileron bell cranks are the same type as used on the Viscount and the measurement can be taken from the plan.

The stabilizer utilizes the construction developed by deBolt in his Viscount. This construction gives a light and strong structure, preventing warping. An external elevator horn is used as it is easier to adjust at the flying field.

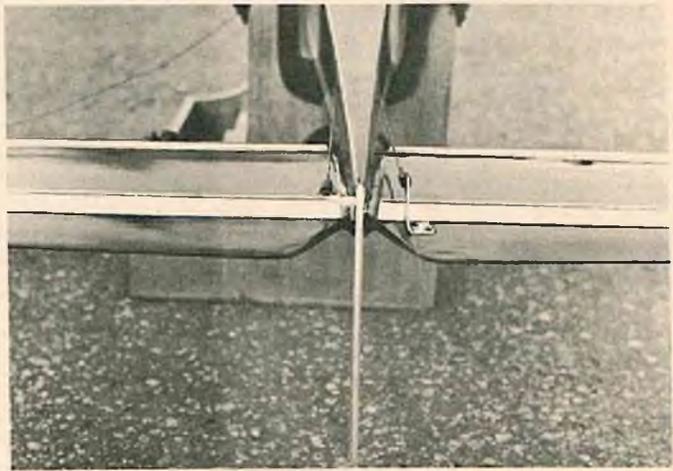
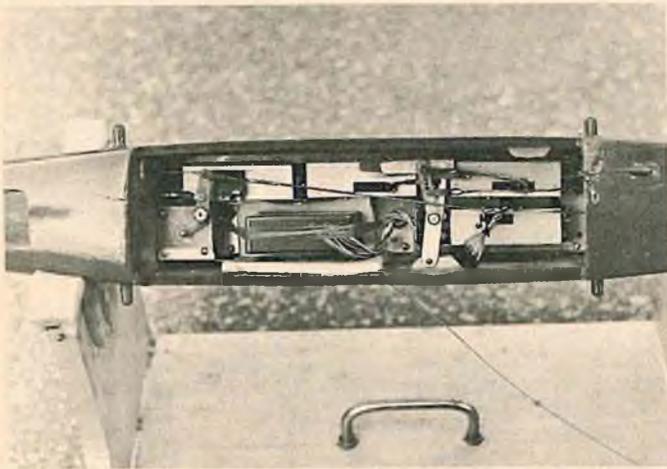
We used the servo tray configuration illustrated in the January issue of R/C Modeler. I strongly recommend that this system be used. My first reason is that the weight is concentrated in the area over the wing. Secondly, the maintenance is cut down due to the wires which are fastened down under the tray. Third, the trim bar is so versatile, it can be adjusted to give any degree of elevator and trim throw desired.

While on the subject of trimming, I do not feel that modelers spend enough time trimming out their ships. The only way to get a model to fly to its full potential is to trim it so it flies properly. The elevator control horn and aileron arms will give a good control movement to start with, but each model will vary slightly, due to heavy or light stabs. The only good way is to fly and trim, fly and trim, until the model performs properly.

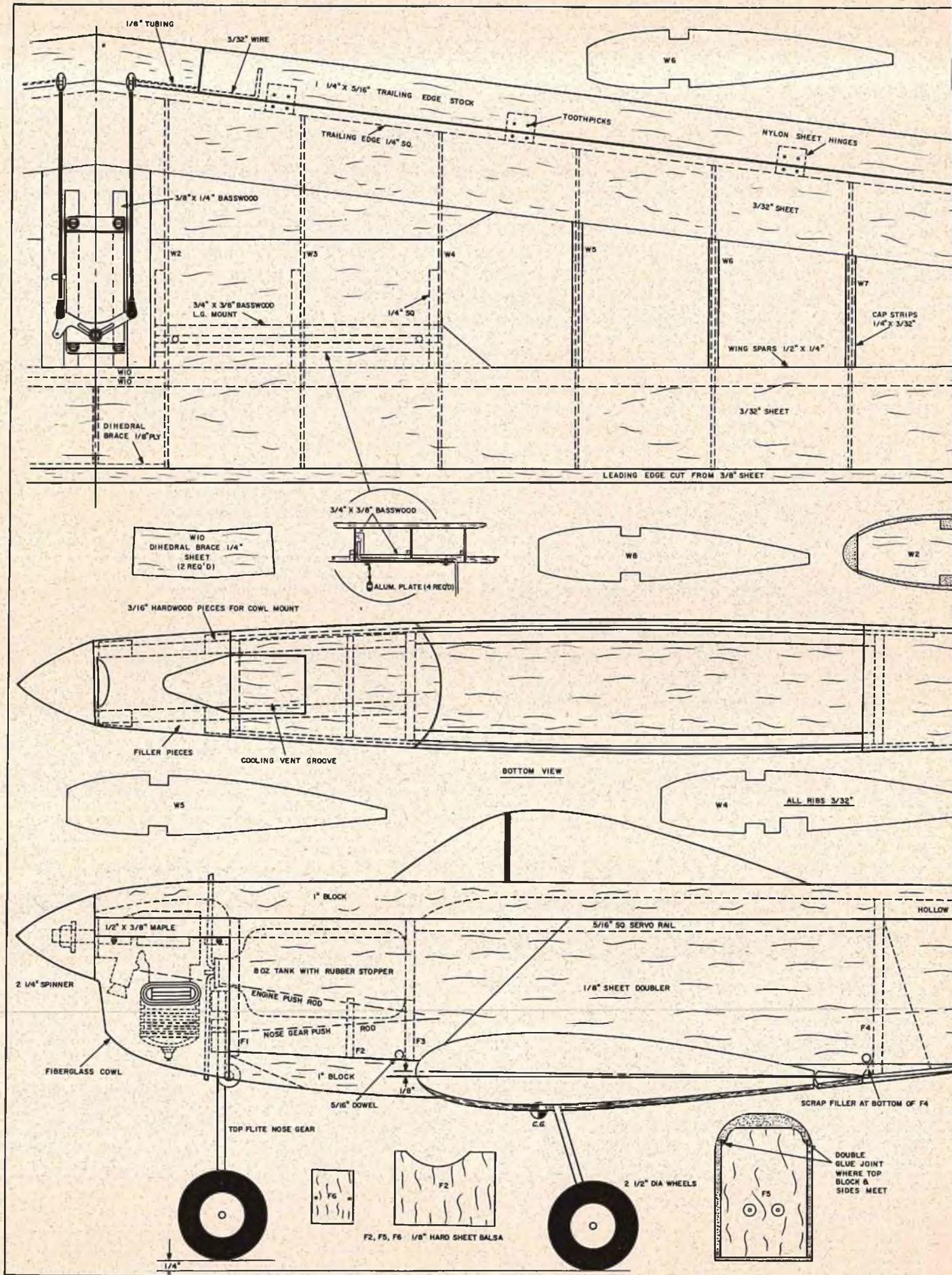
The cowl rates some mention, as few modelers have experimented with fibreglass. First, make a male mould of balsa, the shape of the finished cowl, less approximately $\frac{1}{16}$ " on each side to allow for material thickness. Next, the male mould is doped to a high gloss and then waxed until all the pores are filled. Now construct a four sided frame about six inches deep and place on top of several newspapers. Position the male

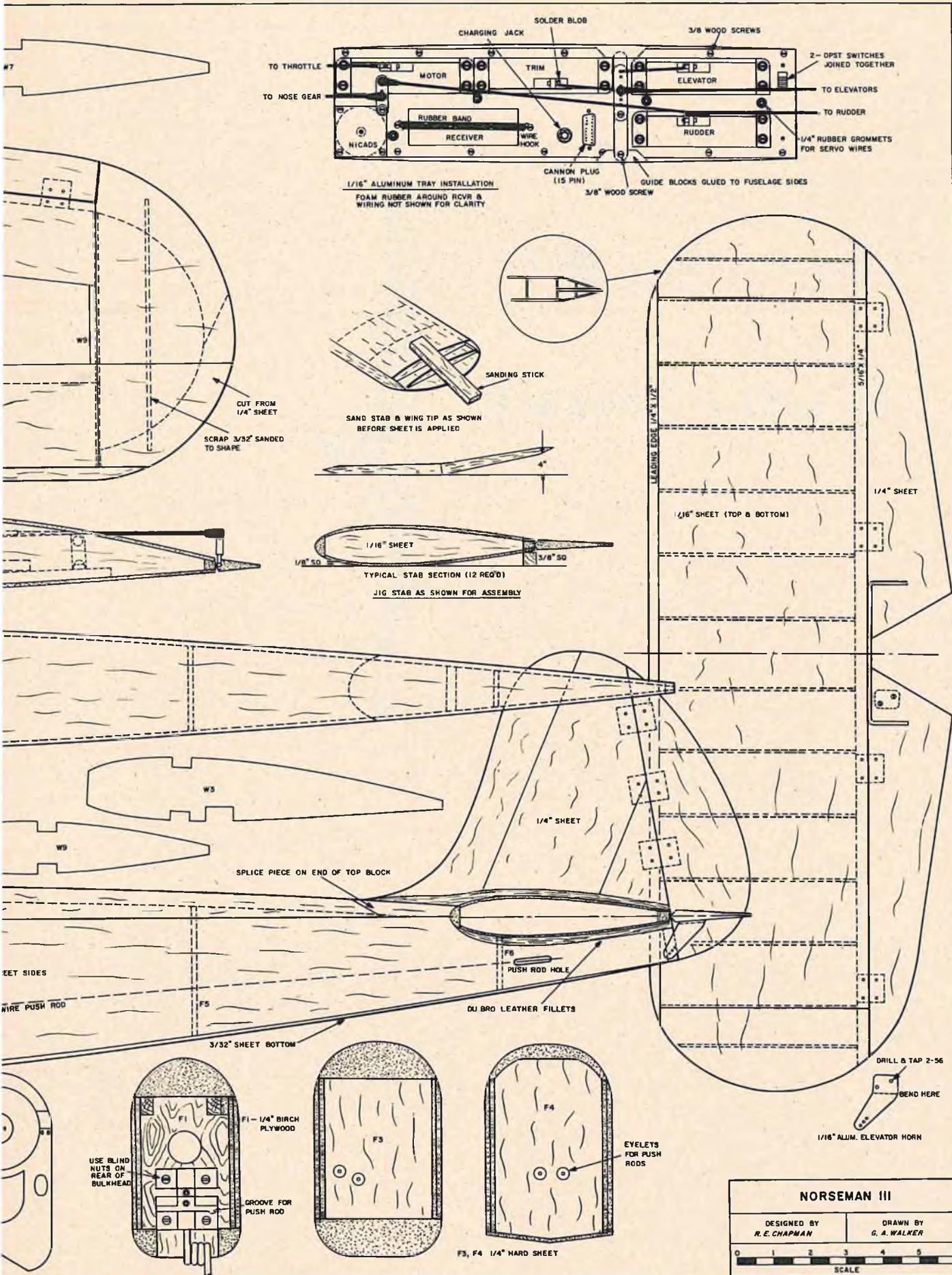
(Continued on page 57)

A
cowled-in
mill adds
to the
sleek lines.
Ease
of
construction,
beauty,
performance,
. . . the
Norseman.



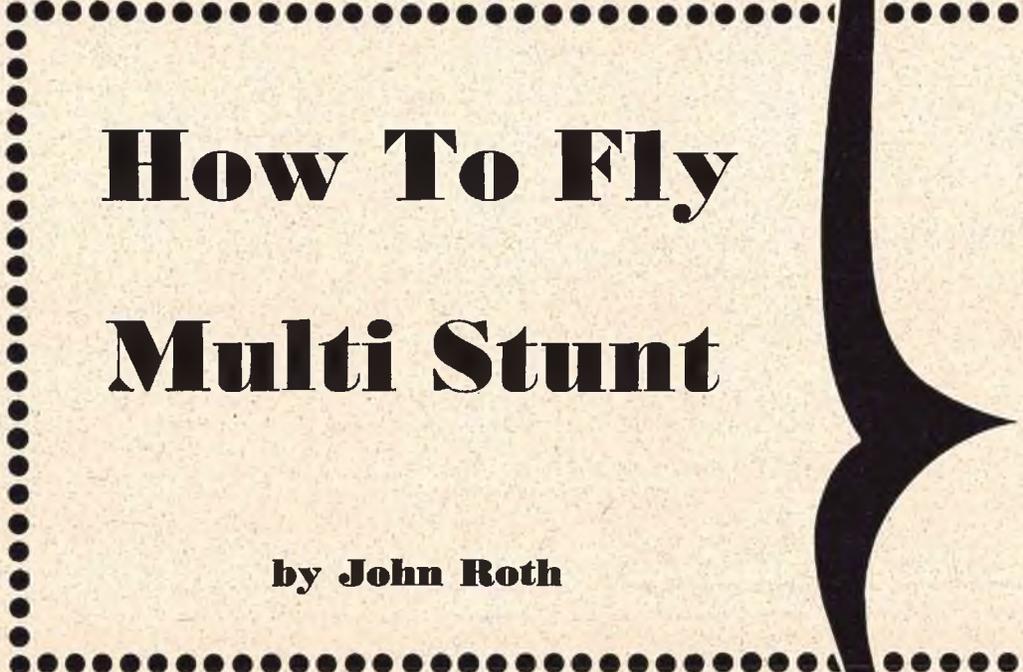
. **THE NORSEMAN**





NORSEMAN III

DESIGNED BY <i>R. E. CHAPMAN</i>	DRAWN BY <i>G. A. WALKER</i>
<p>SCALE</p>	



How To Fly Multi Stunt

by **John Roth**

Noted flier,
designer
of
Citation,
describes how
to perform
each
maneuver in
the AMA
Class III
pattern

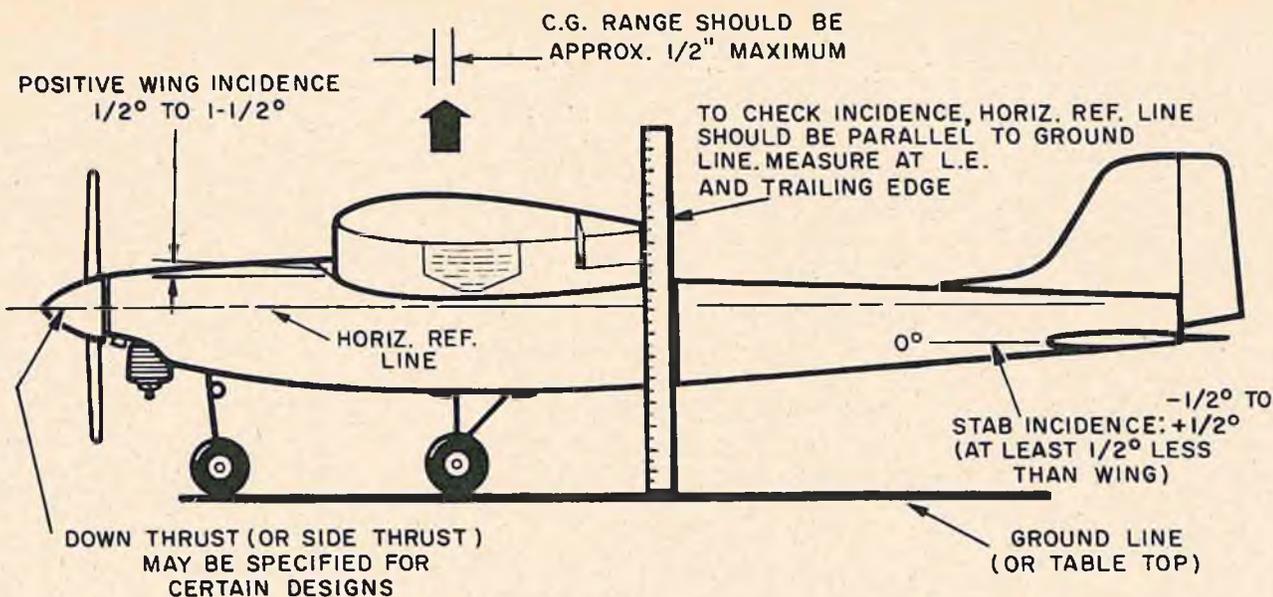
Text by John Roth
Illustrations by
Paul del Gatto

● No other phase of model flying offers as many thrills as RC multi, and to this we would have to add the fact that no other phase of modeling is more costly. This is why it is extremely advisable to approach multi model flying in the same manner that an experienced golfer approaches the tee — confident, cautious, and careful to survey the entire situation before making a move.

In other words, take your time, make haste slowly, and above all else, use an RC multi design which is not too hot to handle. There are several excellent kit designs available. To mention a few, there is the Top Flite Tauri, Goldberg Falcon, Midwest Tri-Squire, and the Jetco Citation.

We personally favor the Citation because it is large, light, easy to build and repair, and very forgiving to pilot error. This is in addition to the fact that we designed this particular model and have had several thousand flights from a total of four ships and assorted parts!

But getting down to this business of multi flying . . . to be sure there are variations in flying technique which can be attributed to the individual skill of the



flier, but as in any other sport or hobby there are established methods and procedures which one must follow in order to become proficient and to minimize losses in equipment and models.

This is, then, in essence, what we have tried to do in outlining the procedure we follow in flying multi stunt. We particularly recommend it to those who are just getting started and would welcome being steered in the right direction.

Preflight Check

Begin by first checking out both model and equipment to be certain that you don't start out with a handicap. The first thing to do is check the angular setting of the wing and tail, being certain they are as they should be, and minus any warps in the surfaces. This can be accomplished by blocking up the airplane until a predetermined reference line is parallel to the bench, then checking the relative settings of the wing and tail. If adjustments are in order, make them at this time.

Wing and stab warps, however slight, should be removed. These are easily detected by using the simple sighting method, with the aid of some basla strips as illustrated.

Check the center of gravity (C. G.) — this should be within $\frac{1}{4}$ " of the location given on a plan. Some designs will show a small range within which optimum performance can be expected. However, do not vary too much or you may find yourself in trouble. Some modelers will try moving the C. G. rearward, trying to make a spin entry easier, only to find that the spin recovery became even more difficult, or even impossible.

Check the thrust line, and be sure to use that degree called out on the plan. It is possible that you may have minor readjustments on your own particular model, but they will be slight.

The radio manufacturer has described

the installation and handling of his equipment. Before you fly, however, try dozens of fast impulses on all controls, holding simultaneous when desirable, to see that every control produces a response. If any signal is missed, repeat the test as often as necessary on the offending control, and correct the difficulty.

Always make a control check on the field before flying, to be sure that simultaneous operation is available. Loss of simultaneous during a critical maneuver close to the ground can be serious — in a contest it may ruin the maneuver or an entire pattern. Before the first flight, make such a control check with engine running and two helpers supporting the ship by its wing tips to determine if vibration is giving unwanted or sluggish,

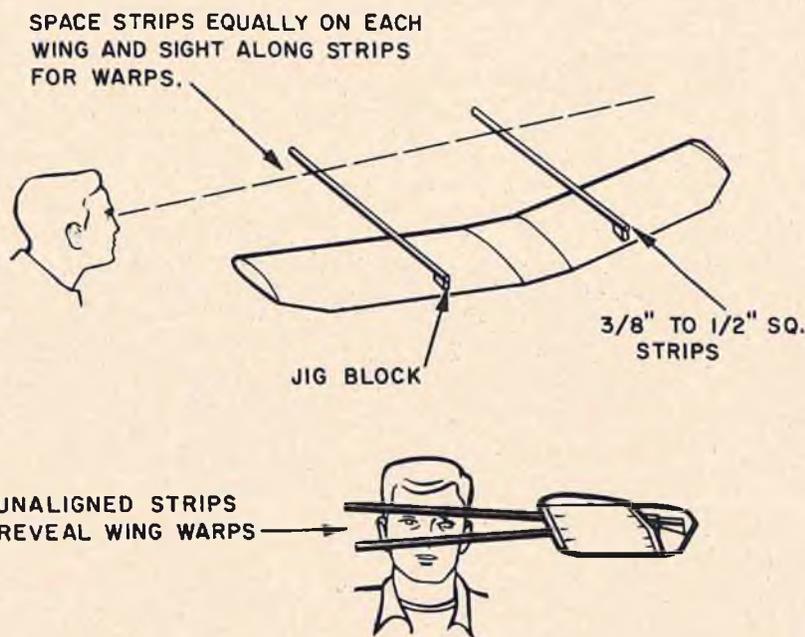
or even intermittent, control action — usually due to a tight-packed receiver of the relay variety. Be sure the surfaces move freely so that servo action is not impaired. If you have never flown multi before, have an experienced flier make the first few takeoffs and introduce you to the controls after a safe altitude is obtained.

Multi Maneuvers

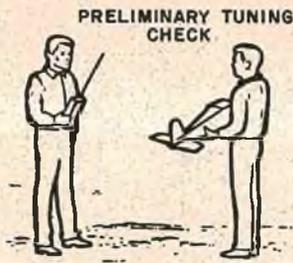
Takeoff

I make my takeoffs with a slight amount of "up" trim. Until you become so familiar with your ship that you can easily tell what trim you have effected,

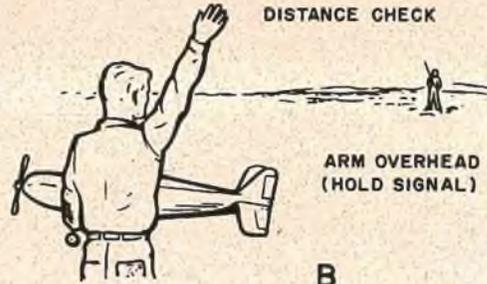
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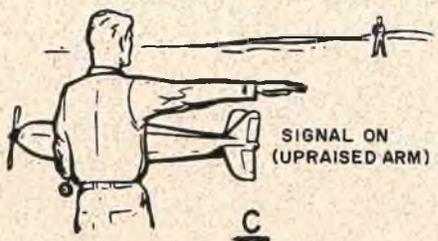
SIMPLE WING AND STABILIZER ALIGNMENT CHECK



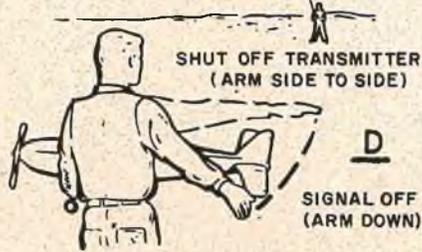
A



B

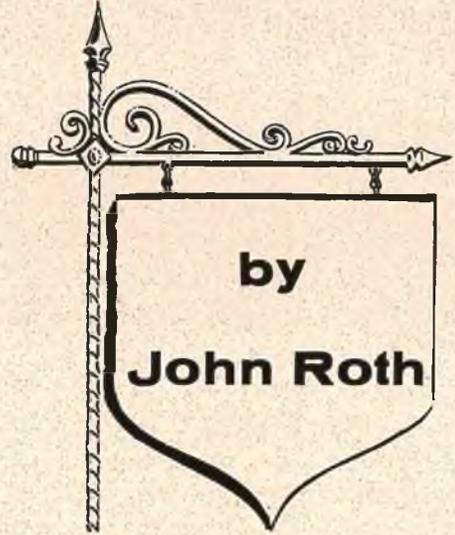


C



D

MAKE EQUIPMENT GROUND CHECK BEFORE ATTEMPTING ANY FLYING



MULTI STUNT

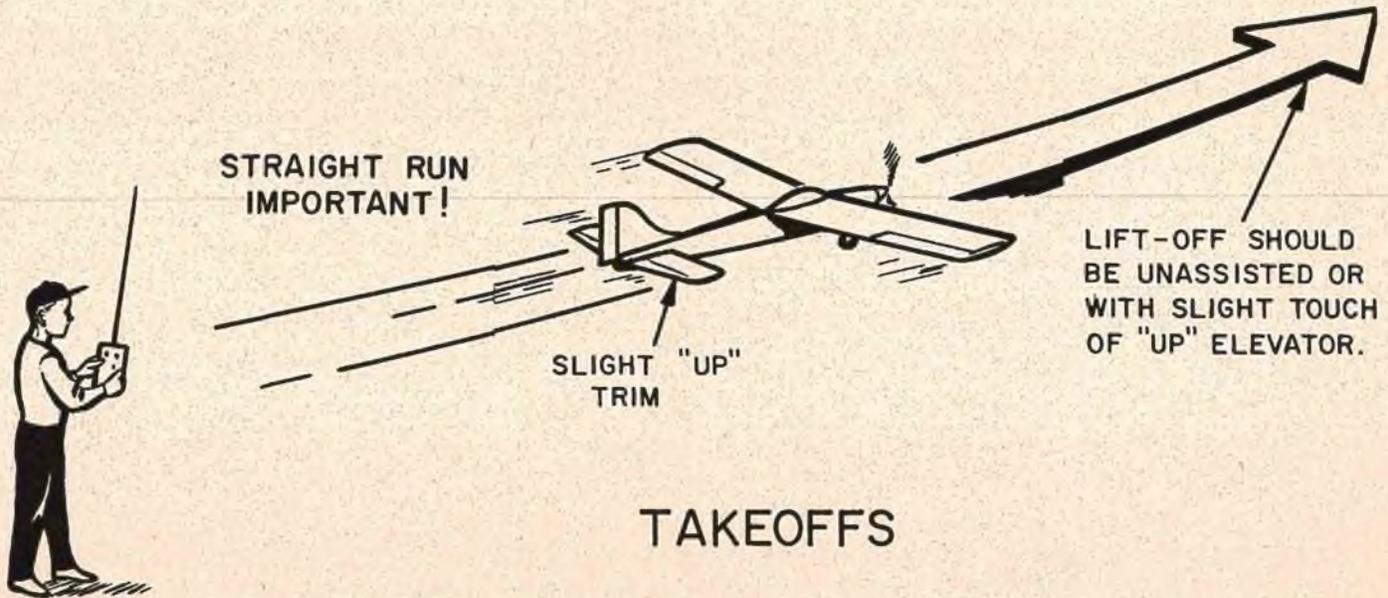
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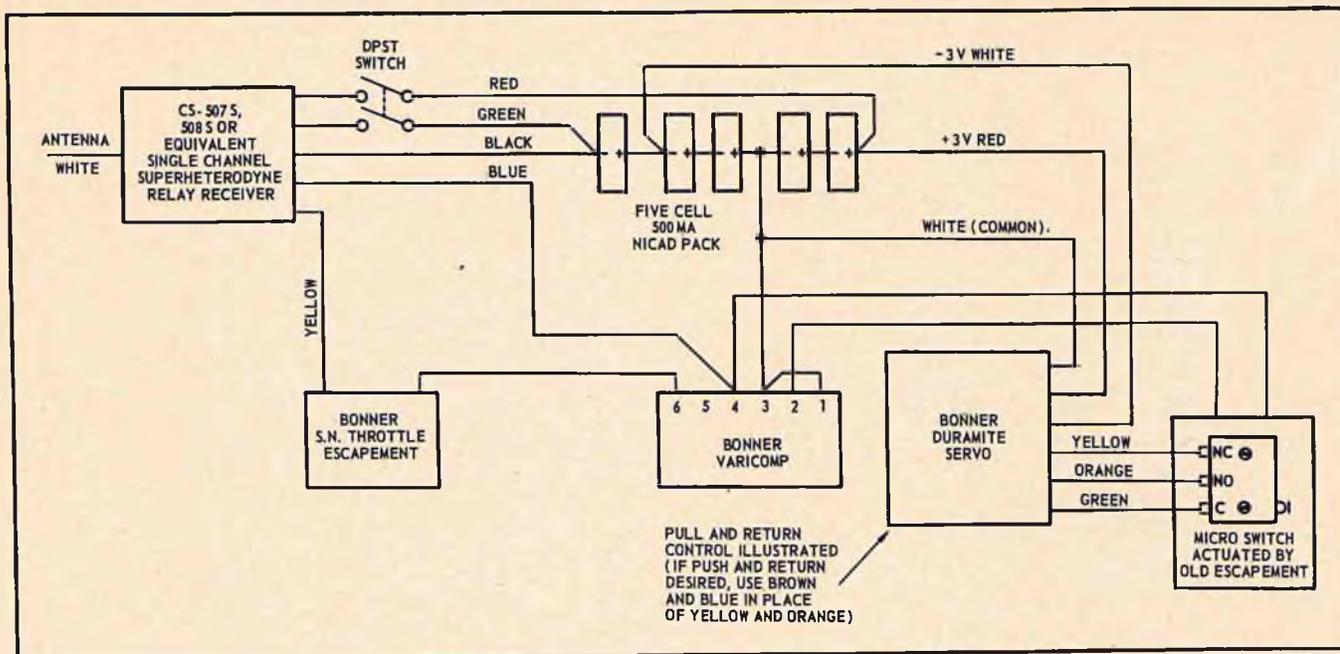
it is best to check your elevator position before starting the engine, then to set the "up" trim. Your model should run straight ahead, requiring no rudder corrections, then lift off by itself. The beginner can try very slight "up" trim at first, chopping the throttle if the run is obviously too long. Anyone who has flown multi, however, will have little difficulty lifting the ship off with a touch of "up" elevator.

The 360 Over Transmitter

I usually complete this AMA pattern maneuver with the same amount of elevator trim used on takeoff. The aileron is blipped to produce a shallow banked left turn. The "up" trim present makes blipping up elevator unnecessary to hold up the nose during the turn. Sometimes, of course, you may be too heavy on the aileron, or for other reasons, have to occasionally blip "up" elevator. It is best, of course, to make many introductory flights before trying to do formal maneuvers — performing many wide, shallow turns both ways to get the feel of things. After the 360, the required straight-out flight will necessitate a very brief touch or two of "down" trim to prevent a climb into the wind. The rest of the precision pattern introduces no additional problems. If things move too fast for you, you can always throttle back the engine slightly as required.

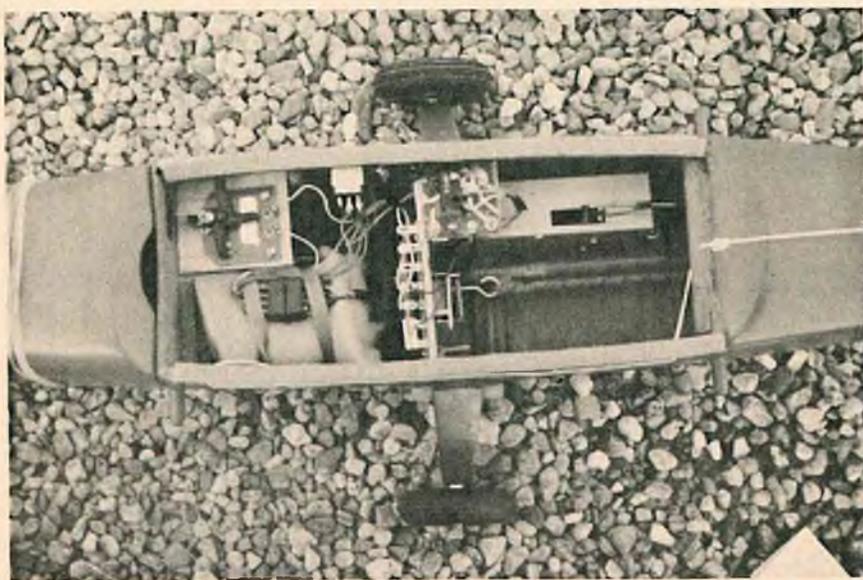
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Adding "Muscle" to single channel "up" elevator

by Bill Woodard



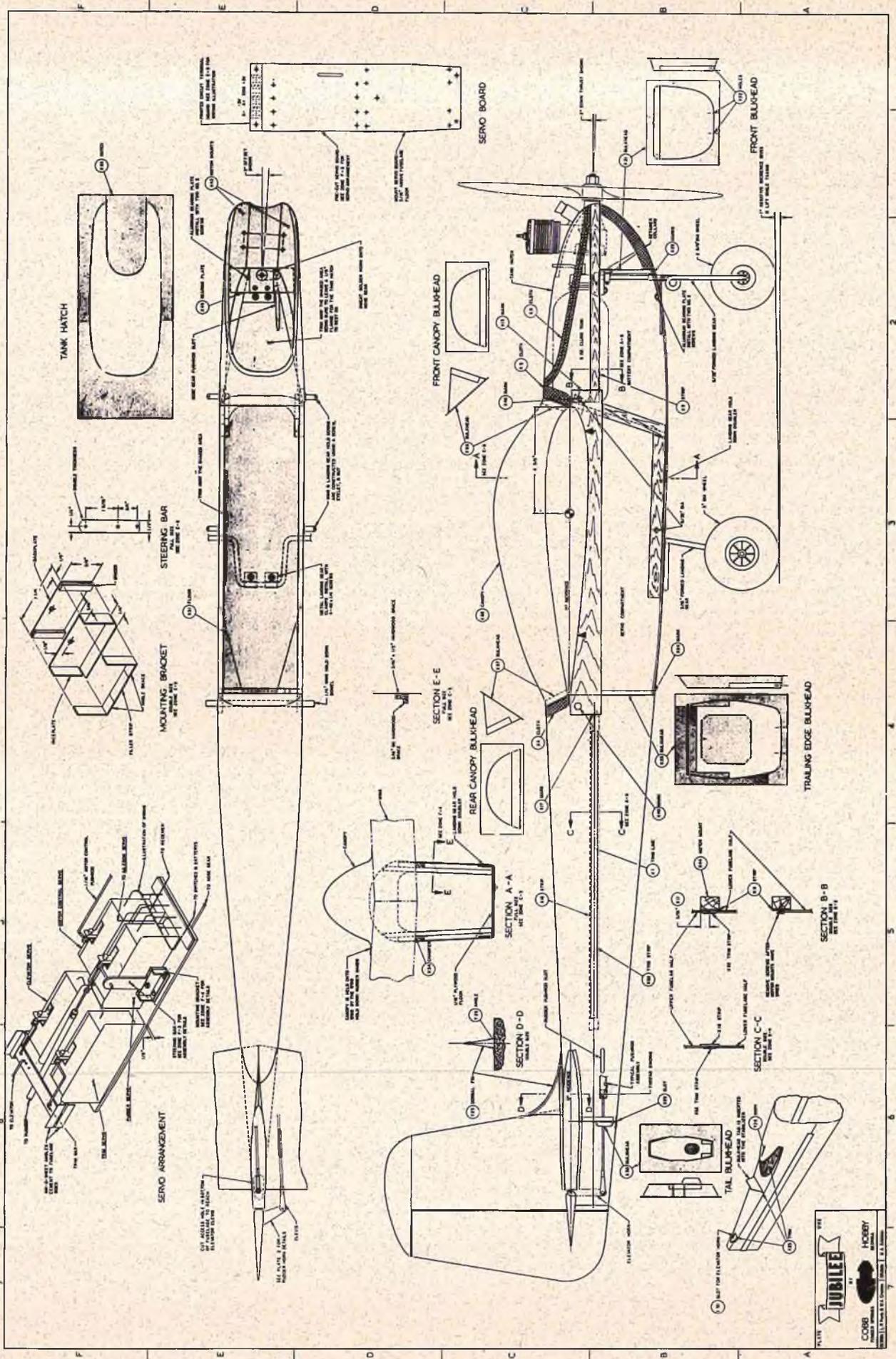
● If you have been flying single channel for some time, and are getting a little tired of having only rudder and motor control, yet are not quite ready to make the jump to multi, this system may be just the thing for you.

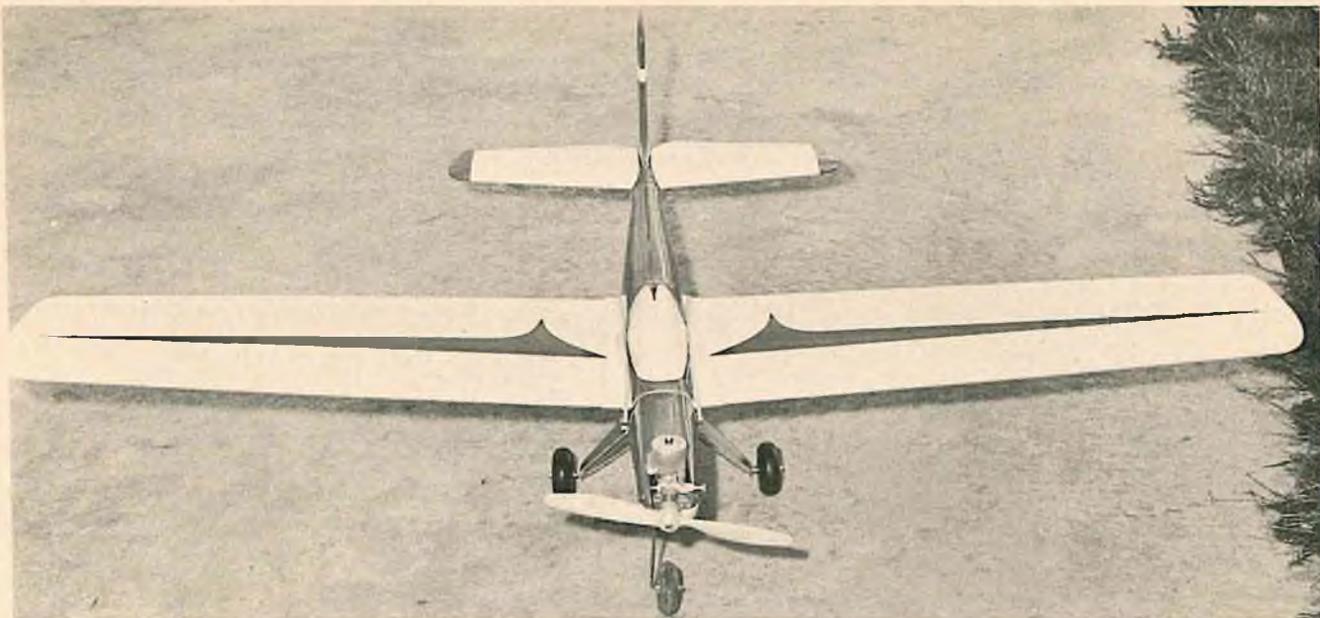
Basically, it will provide, in addition to the normal single channel control functions, a servo-operated up-elevator without the necessity of additional rubber bands, escapement modifications, or cycling through elevator control each time a command is given. This elevator function operates from the electrical third position on the rudder escapement. In addition to the above, we believe the system, as illustrated, has several advantages not normally found in single channel ships.

1. With the exception of one 50¢ micro switch, all extra components can be used when you do make the transition to multi.
2. Superhet operation, reducing the possibility of interference and allowing you to fly simultaneously with others.
3. NiCad batteries — no more soldering up battery packs, or wondering if you have enough power left to get in a few more flights.
4. You may trim your ship for level, or almost level flight, on high speed, giving performance resembling that of a six-channel ship.

If this sounds like the system you have been looking for, check through your miscellaneous parts box for the

(Continued on page 48)





Len Purdy's JUBILEE

RCM Editors test L. R. Purdy's amazing ready-to-fly multi.

● This month, following several weeks of extensive testing by your editors, RCM takes great pleasure in presenting an entire new concept in radio controlled model aircraft—introducing the Jubilee, by Len Purdy.

Basically the Jubilee is a ready-to-fly model for multi-channel usage. Design-wise, it is not much of a departure from the usual multi aircraft — but here the similarity ends! The result of Len Purdy's seven years of investigation, testing, and evaluating various building materials for use in model construction is one of the finest models we have ever had the privilege of flying — not only in the unique properties of the material used in its construction, but in its actual flight performance. This feeling is shared by all of the fliers who have had the opportunity of putting the Jubilee through its paces.

Quite frankly, we weren't overly enthused when we heard rumors about a "ready-to-fly" multi ship "constructed of some kind of plastic." We have seen, or conducted experiments with several domestic and foreign RC products that departed from the usual balsa and fabric construction. Usually an attempt was made to increase the longevity of the model by boosting its strength, with a resultant disastrous increase in weight. Where the strength-weight ratio was not

a prime factor, the experiments usually resulted in a flimsy ship that was considered successful if it could last for one erratic lap of the flying field without folding its wings! Add to this the problems of repairing specially fabricated materials, and the inability of most of those materials to withstand the hot fuels used in today's mills, and it is little wonder that the dream of a new and ideal building material has not progressed much beyond the stage of experimentation.

It is our belief that the Jubilee has not only overcome these problems in a highly satisfactory manner, but will, perhaps, open a whole new era in model construction, carrying the trend of pre-fabrication and pre-finishing to the highest degree possible.

The Jubilee is constructed of a patent-protected material known as Air-O-sheet, a custom made extruded sheet compounded of two different blends of resin specially formulated for model construction. Several different gauges of this material are used in the Jubilee, to conform to the findings of design stress analysis. Although the ship is completed except for painting, the plates accompanying this article will illustrate the unique and unusual method of fabrication. The wing, stab, and rudder cores, are of a very high grade of styro-

foam with hard balsa spars. Tips are premolded by vacuum forming. The fuselage is constructed entirely of several gauges of Air-O-sheet, including the formers and braces. Only the motor mounts and flooring are made from conventional hardwood. We found the Air-O-sheet to be tougher and more durable than conventional construction materials. The Jubilee fuselage was considerably lighter than its conventional counterpart would be, while the styrofoam filled wing was slightly heavier. The overall weight of the ship was equal to, or slightly lighter than conventional aircraft of the same size. We found the Air-O-sheet to be completely fuel-proof and compatible with lacquer, epoxy, and butyrate dope finishes. Temperature stability was excellent with brittleness occurring only when the temperature was reduced to 0 degrees F, and softening (and a resultant loss in strength) occurring only at temperatures above 200 degrees F — obviously far in excess of the normal operating range.

Prior to installing our radio equipment and the subsequent flight tests, we inflicted deliberate damage to the various surfaces of the ship in order that we might test the recommended method of repair. We experienced no difficulty in

(Continued on page 25)

working with the strips of Air-O-sheet and its adhesive, Air-O-cement, as provided by the manufacturer. The thinner gauge sheets follow any contour and cement bonding is instantaneous. Field repairs of almost any nature are possible with this material.

Before we elaborate upon the flight tests, let's take a look at this new construction as opposed to conventional building materials. Chart A lists various factors to be considered in the use of materials for model aircraft construction. Several such materials have been listed, including the new Air-O-sheet, and a relative value assigned to each in reference to the factor under consideration. Everyone will agree that it is a matter of opinion as to what material is "best" for any given application. Since it is easy to find fault with almost any product, or in this case, building materials, the charts are based on the "least wrong" concept. That is to say, each factor is considered separately with a rating assigned to it. For example, whereas the strength-to-weight ratio of balsa as a building material for radio controlled model aircraft is "good," the compressive strength is "poor." This, obviously, does not imply that balsa is unsuited for construction purposes. In each case, the material must be evaluated in the light of whether the strength-to-weight ratio, for example, is more important than the compressive strength of the material for the intended application. By the same token, Air-O-sheet, you will notice, is rated as "poor" for the factor of fabrication and formability. This simply means that the average home builder would find it difficult to "scratch build" a model equivalent to the Jubilee without the necessary vacuum forming equipment. Again, this does not reflect upon the "total" application of the material.

Chart B is a further breakdown of materials and their relative values for use in wing structures and fuselage structures. As an addendum to the charts, here are our feelings as to a general summation of the materials involved:

Balsa: This material will always find widespread application, but in view of the trend toward prefabrication and prefinishing, its time-consuming disadvantages foretell its decline as a "basic" material.

Fiberglass: This is a case where the materials own inherent advantage becomes its greatest disadvantage, specifically, the strength-to-weight factor. Although there are quite a few models in general usage that employ the use of fiberglass, the strength factor is overshadowed by the increase in weight. The specific gravity of the cloth and resin will definitely limit the use of this material to certain well-defined areas of application.

Poly-urethane foam: This material

Chart A					
BUILDING MATERIALS: PAST AND PRESENT					
	Balsa	Fiberglass	Urethane Foam	Styrene Foam	Air-O-Sheet
Tensile Strength	1	4	0	0	3
Specific Gravity	4	1	3	4	3
Strength-to-Weight	3	4	1	1	4
Shock Resistance	1	3	0	0	3
Compressive Strength	1	4	0	0	3
Elongation before Fracture	1	2	2	1	3
Temperature Resistance	3	4	4	4	3
Fuel Resistance	1	4	1	1	4
Weathering-Aging	1	4	1	3	3
Cost Factor	3	1	2	3	3
Formability & Fabrication	2	1	0	0	1
Ease of Adhesion	4	1	0	0	4
Painting	2	1	0	0	4
TOTAL RATING:	27	34	14	17	41
Rating equivalents: 4—Excellent; 3—Good; 2—Poor; 1—Fair.					

shows promise as a filler, but the cost and density of that currently available will limit its widespread usage.

Styrene foam: This is the filler material, or cores, used in the Jubilee. We feel it will find wide-spread use for this purpose.

Air-O-sheet: An excellent material, as evidenced by its usage in the Jubilee. Further development will prove it to be useful in all sizes of model aircraft.

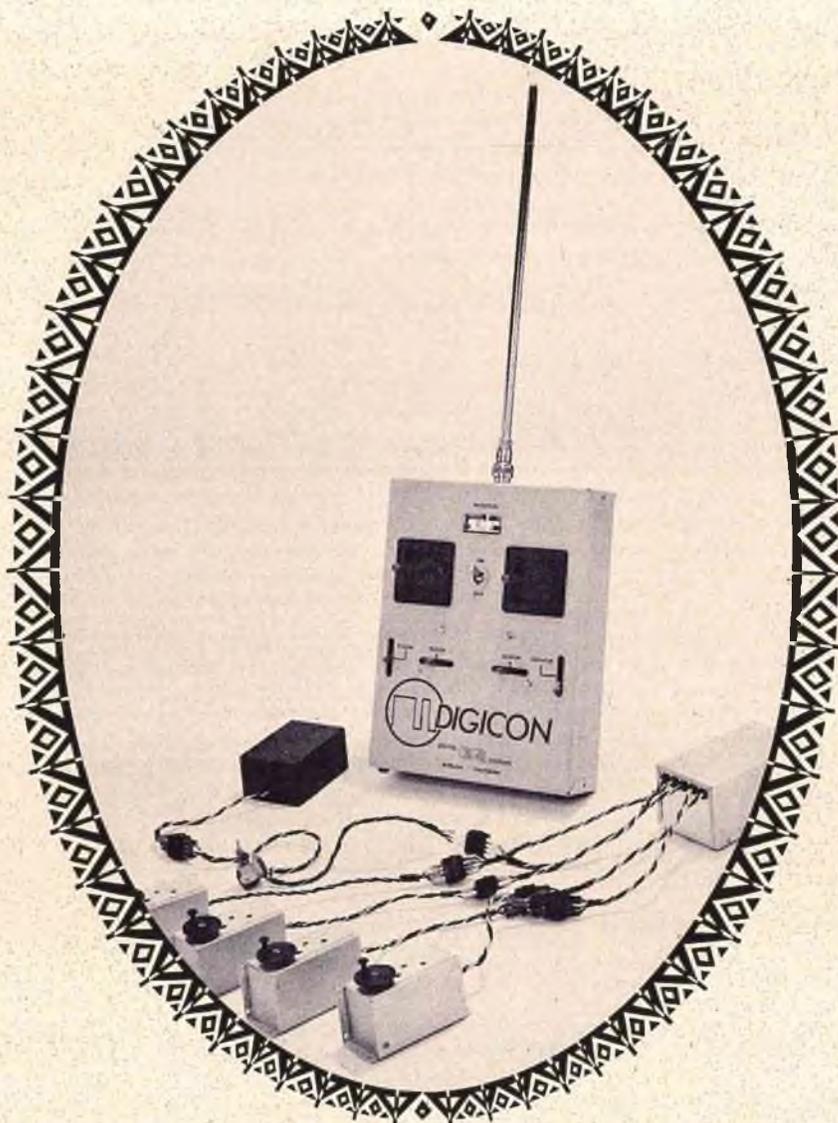
The prototype of the Jubilee tested by RCM had a wingspan of 65", length of 44½", flying weight of 6 pounds, and

employed a semi-symmetrical airfoil. Color of base material was white, with red, yellow, blue, and black trim. Paint was AMT model car lacquer with one coat of Poly-Aqua clear epoxy sprayed over the entire model. Flight equipment was as follows: Engine was a standard Merco .49 R/C with 6 ounce Veco clunk tank. Nose wheel was a 2½" Hillcrest and main gear wheels were 3" DuBro. No brakes were used. Radio gear consisted of a Kraft Custom ten channel

(Continued on page 49)

Chart B				
BUILDING MATERIALS FOR WING STRUCTURES				
	Balsa-Silk	Styrofoam Balsa-Silk	Styrofoam-Fiberglass	Styrofoam-Balsa Air-O-Sheet
Relative Weight	4	2	1	3
Strength to Weight	3	2	2	3
Time of Fabrication	1	1	2	4
Temperature Resistance	3	3	4	3
Rigidity	3	3	4	4
Ease of Fabrication	1	1	1	4*
Painting	2	2	1	4
Repair	1	3	1	3
TOTAL RATING:	18	17	16	28
*rating based on pre-cut blank being furnished by material supplier.				
BUILDING MATERIALS FOR FUSELAGE STRUCTURES				
	Balsa-Silk	Styrofoam Balsa-Silk	Moulded Fiberglass	Moulded Air-O-Sheet
Weight	3	2	3	4
Strength to Weight	2	2	3	3
Rigidity	3	3	4	3
Ease of Fabrication	2	1	1*	1*
Painting	2	2	1	4
Fuel Resistance	1	1	4	3
Ease of Repair	3	2	2	3
Time of Fabrication	1	1	2	4
TOTAL RATING:	17	14	20	25
*rating does not include moulded structures.				

Hank Giunta tests quad proportional offering from Digital Control Systems.



The Digicon Proportional

● The hottest topic of conversation these days seems to concern the full-house proportional rigs now on the market, almost on the market, and a nebulous group of "we'll have ours out as soon as we figure out how to make them work." And if you should tire of discussing the pros and cons of the currently available systems, the analog versus digital concept, or the single versus multi-stick controversy are always good for another hour or so of heated discourse. Add to this the rampant rumors about having to live next door to the manufacturer in order to keep your pearl of great price in working order, and it is little wonder the RC'er is somewhat reluctant

to hand over five C notes or more for the expensive privilege of controlling the wiggle of his control surfaces. In theory, proportional control is what we have all wanted and waited for—but in practical application, how does it perform? This is the sixty-four dollar question, and for this reason RCM's technical staff will, over the next few months, take a good, hard look at these proportional systems and try to divorce the facts from the proverbial well-paved road of good intentions. The one phase we cannot report on is reliability — for this elusive requirement of a good system can only be analyzed after months of continuous flying with any given system. We can

give you a report on the mechanical and electronic end of it, and an analysis of the laboratory tests we will conduct. As for the trial by fire — the actual performance of the system in the field in every day sport or competition flying — only time will tell. With these ideas in mind, RCM's first review is of the Digicon proportional system as manufactured by Digital Control Systems Company, North Hollywood, California. The unit we obtained for test purposes was taken from the manufacturer's assembly line, its mechanical and general operational features examined by the editors, then submitted to our Technical Editor for laboratory analysis. A second Digicon

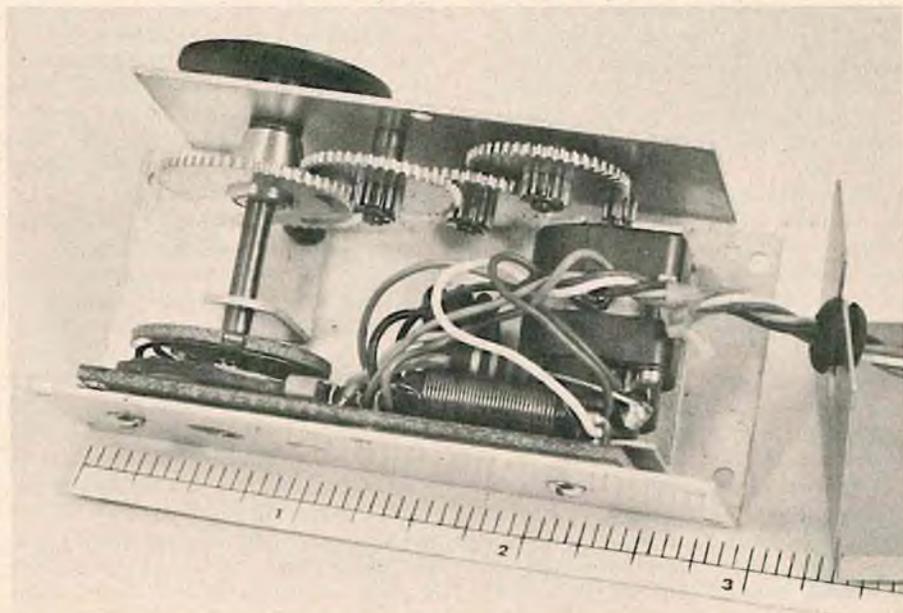
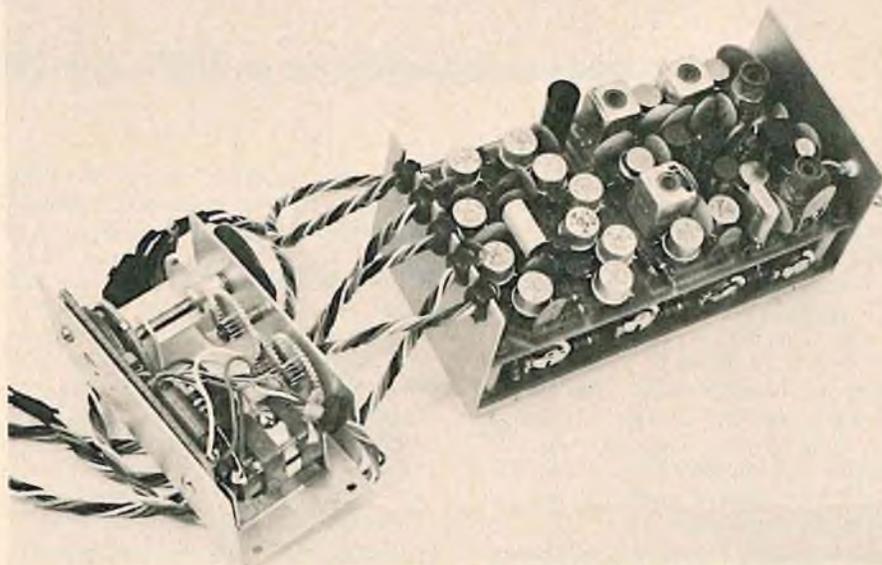
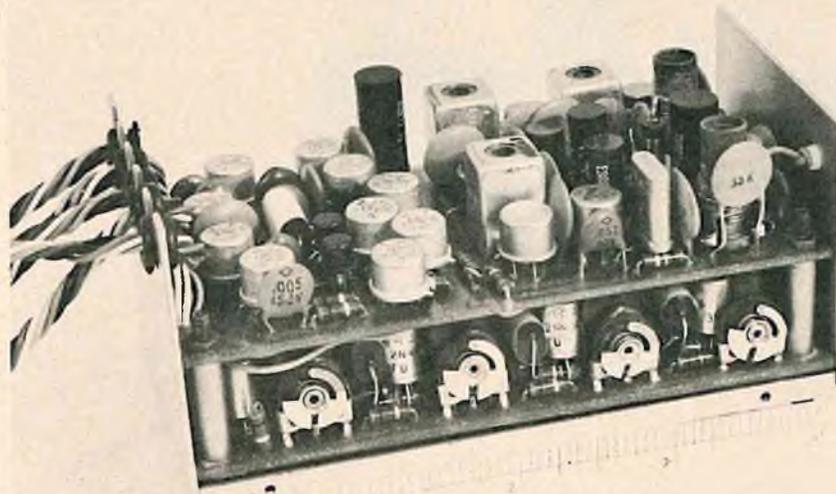
system was obtained from a customer/owner and tested in comparison with the original unit. These are the results of the tests on both units.

The Digicon proportional control unit operates on a digital control concept, providing four independent, simultaneous, fully proportional functions. The receiver is a transistorized superhet furnished on any one of the available frequencies from 26.995 to 27.255 mc. An RF amplifier stage provides increased sensitivity and maximum rejection of spurious signals. As illustrated in the photographs, modular construction techniques are used in the receiver, with the receiver itself, decoder, and four servo amplifiers contained in the receiver case. Unlike most of the proportional systems currently available, no electronic components are carried in the servos. This has one definite advantage in reducing "spare," or replacement servo cost. We noted that all plugs from the receiver were color coded to insure correct installation, the white being the power supply; orange, engine; yellow, elevator; green, aileron; black, rudder. The color of the antenna wire signifies the operating frequency, our particular unit being on 26.995 mc. Manufacturer's specifications for the receiver are as follows:

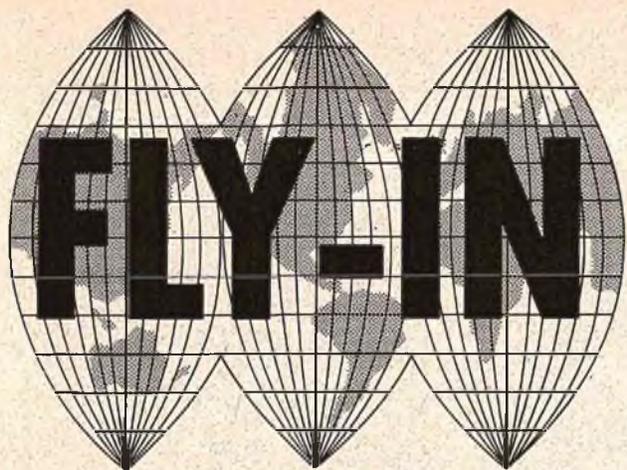
- Sensitivity Less than 10 microvolts for full control.
- AGC In full control from 10-100,000 microvolts. Less than 6 DB variation in information amplitude with 50% modulation.
- Bandwidth 5 KC @ 6 DB
- Intermediate Frequency 455 KC
- Power Supply 6 vdc nicad 250 mah for receiver. 7.2 vdc sintered plate nicad for servo amplifiers and servo motors.
- Modulation percentage required...50%
- Available Freq. 26.995 to 27.255 mc
- Operating temp. range.....0-140°F
- Size 4" x 2 $\frac{1}{8}$ " x 1 $\frac{7}{8}$ "
- Weight 8 ounces

Receiver tests by RCM are based on qualitative information only. The receiver evidenced excellent AGC characteristics. Nominal receiver sensitivity was approximately 2 to 3 microvolts, as measured using a Hewlett-Packard 608D generator. The pulse output at the second detector was monitored on a Tektronix 545 Oscilloscope.

The Digicon transmitter is an all-transistorized unit delivering $\frac{1}{4}$ watt output. Utilization of a low modulation percentage is used for the purpose of reducing interference to adjacent channel RC frequencies. Two control sticks



(Continued on page 54)



Kirkland Beachcomber Combo At Florida

Proportional dominates as 5000 view 10th Annual K.O.I.

Two hundred and thirty-seven modelers and an estimated five thousand spectators gathered at Masters Field in Opa-locka, Florida for the two-day, 10th Annual King Orange International Meet, held on December 28 and 29. The contestants, ranging in age from sixteen year old Gary Davis to sixty-two year young Art Christen, came from twenty-six states, and as far away as California. Entrants were competing for 175 trophies and merchandise awards, presented at a Monday night banquet following the competition.

Tough Class III multi competition characterized this years KOI, and was won by 1963 Nat's Champion, Jim Kirkland, flying his familiar Beachcomber and Sampey 404 proportional equipment. Total points were 166. Second place was captured by Charles Nunnery with 161 points, and third taken by Bob Doell with 134.

Dr. Walt Good and the Multibug were the winning combination for Class II action — Walt using the Wag TTPW dual proportional system. Gene Mills and Joe D'Amico captured second and third places respectively.

Gary Davis, Leonard McCoy and Fremont Davis were the top trio in the Rudder Only category, with only a 6 $\frac{2}{3}$ point spread between first and third place!

Scale competition was bested by Gene Mills Jr. and a nine foot span Taylorcraft pulled aloft by a ST.56. The slow flying and graceful Taylorcraft had a total wing area of 1700 square inches! Pete Hendricks was second in this cate-

gory with a modified Sterling P-63 Kingcobra, and Walt Schoonard followed close behind with an ever-popular biplane built from plans for a full size, home-built experimental aircraft. And how about Don Hass of Tampa showing up with a Boeing B-17 sporting two McCoy 35's and two Veco 19's! Don's bird didn't fly due to radio malfunction, but it was worth the price to see him drive a tire iron into the ground and lash the fuselage down with $\frac{1}{2}$ " manila hemp rope in order to hold this bird down.

Two sets sets of judges were used in the Tenth KOI, with all contestants being judged by each set in separate rounds. Scoring was tight, but fair, with no complaints being registered by entrants. Judges were pre-selected from experienced members of the Tropic Aeros RC Club, annual hosts for the meet. A public address system kept the ready line constantly moving with none of the usual delays between flights.

The quality of flying at the Florida affair was at an all-time high. An interesting note was the number of proportional rigs used by the contestants, and totaling 42% of the total systems. These were broken down as follows: 2 Space Control, 3 Sampey 404, 1 Kraft, 1 Wag TTPW, 1 McEntee "kickin' duck", and 3 home brew. The balance of the multi systems were conventional reeds, with Kraft, Controlaire, F&M, Orbit, Citizenship, and Min-X predominant. And in case there's still any doubt about proportional being here to stay, or about its advantages, Sampey, Space Control, and Kraft sys-

tems took the first three places in Class III! We're pleased to note that third place winner Bob Doell, used the Weirick design "Candy" which appeared in the November issue of RCM.

As a final note on the King Orange for 1963, all agreed that it was the finest meet in the history of the annual event — there were no arguments, no protests, everyone got in his full flying time, and a general spirit of good fellowship prevailed. The weather was ideal for the first two days of the three day competition — Sunny and bright with the temperatures in the 80's. Fortunately, all events were run off in two, instead of the customary three days, — a wise decision as it suddenly broke into a severe storm on the third day! During the flyoffs, wind velocity never exceeded ten miles per hour.

Congratulations to all the winners, and to the hosts, the Tropic Aeros RC Club.

(Continued on page 30)

The Beachcomber — best of Class III at '63 Nat's and 10th KOI. To be kitted by Veco.

9' Taylorcraft, 1st in Scale. Mambo in foreground victorious in Class II.



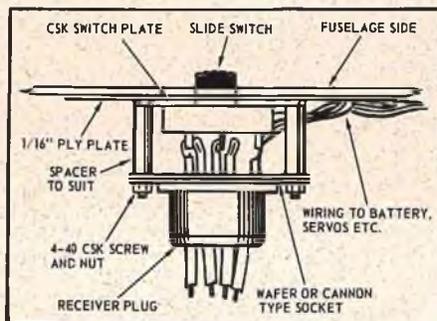
Name, RC Club City, State	Age Yrs in RC	Class Place	Plane	Span Area	Weight lbs/oz	Control System	Engine Prop
Jim Kirkland Guided Mites Valparaiso, Fla.	39 9	III 1st	Beachcomber	62 740	6/4	Sampey	Veco 45 11-6
Charles Nunnery Guided Mites Ft. Walton Beach, Fla.	33 5	III 2nd	Beachcomber	62 750	7/0	Space Control	ST 56 12/6
Bob Doell LARKS Carpinteria, Calif.	38 6	III 3rd	Candy	64 720	7/0	Kraft	Lee 45 11-6
Gary Davis DCRC University Park, Md.	16 7	I 1st	DeBolt Yankee	46 360	5/0	Kraft	KB 19 10-4
Leonard McCoy KCRC Lamar, Mo.	33 16	I 2nd	Original	54 550	5/6	Orbit	KB 45 11/6
Fremont Davis DCRC University Park, Md.	48 7	I 3rd	DeBolt Yankee	45 360	4/6	Kraft	KB 19 9-4
Dr. Walter Good DCRC Bethesda, Md.	47 28	II 1st	Multibug	68 780	6/6	WAG	Merco 49 12-4
Gene Mills Jr. AMPS Miami, Florida	28 3	II 2nd	Mambo	72 700	5/6	F&M	Veco 45 11/6
Joe D'Amico PARC Brooklyn, N.Y.	42 15	II 3rd	Original	56 720	7/0	Orbit Citizenship	Veco 45 11/6
Gene Mills Jr. AMPS Miami, Florida	28 3	Scale 1st	Taylorcraft	108 1700	8/6	F&M	ST 56 14-4
Pete Hendricks AMPS Miami, Florida	33 4	Scale 2nd	P-63 Kingcobra	66	6/6	F&M	Merco 49 11-7
Walt Schoonard RCACF Winter Park, Fla.	39 12	Scale 3rd	EAA Bipe	52	6/4	Orbit	Veco 45 11-5

FLY-IN

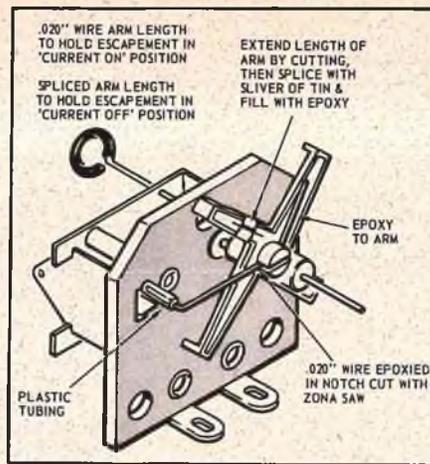
(Continued from page 29)

We'll kick off this month's Fly-In department with a few ideas submitted by our readers. First, from *Hardy Curfman* in the Mile Hi RC newsletter (c/o Norma Kelly, 61 Adams St., Denver, Colorado), a fuel tank holder made from the ever-popular Celastic. Hardy moulded the Celastic to fit the contours of the clunk tank used in his Falcon 56 and rested the edges on the motor bearers. This is a simple, quick, and practical answer to the problem of that hard-to-mount tank.

A modular switch and plug arrangement is the idea of *E. J. Banké of Hapeville, Georgia*. Fig. 1 is self-explanatory, and is one more way of eliminating the "plate of spaghetti" look so prominent in RC circles!



And just to prove that someone does read RCM, *Dr. Doug Davidson of Swarthmore, Pa.*, sent us a modification to the throttle control unit illustrated in the *Tried Squire* article by *Cdr. Dud Billet* (Nov. 1963 RCM). Having experienced difficulty in obtaining reliable "cruise" position on a three-position throttle set-up, Doug scraped up a sliver of tin can stock, a couple of inches of .020 wire, and a quarter inch length of thin plastic tubing to slip over the length of wire. Epoxy is used as the bonding agent, and a Zona saw blade is used to cut the notches in the arm to be lengthened. The tin sliver holds the severed arm in precise position until the epoxy has set, then becomes part of the bond. The piece of wire is so positioned that it hangs up on the armature until it has been returned to the "current off" position by the spring, insuring positive action on the lengthened arm. Fig. 2 illustrates the modifications used to obtain a no-slip, reliable "cruise" position on a standard Bonner SN.



Club News

Publicity — good public information — is one phase of our hobby where we sometimes fall far short of the optimum. For this reason, we were pleased to note the outstanding coverage given to our hobby of radio control by the St. Louis Globe Democrat in their Sunday supplement magazine. This three-page photo-article, entitled *Miniature Aircraft*, was devoted solely to RC, and featured the McDonnell Radio Control Model Airplane Club. This outstanding presentation described RC modeling as a highly advanced art and a well-respected hobby, and with its circulation of over one million readers, will go a long way toward promoting the good public relations we need so badly. RCM extends its congratulations to the McDonnell Aircraft club in St. Louis for their participation in this program.

Every week we receive letters from small groups of RC'ers who want information on starting their own RC club. In answering these letters we often feel that it is not so much the "starting" of a club that is difficult, but the "maintaining" of it, once the group is organized. All too often, a club starts off like a ball of fire, only to sicker out somewhere along the line for lack of active participation. *Karl Peters*, writing in *The Modulator* (*Pioneer RC Club, Inc., c/o Jay Miner, 708 Henrietta Ave., Sunnyvale, Calif.*), sums up this problem in a piece entitled "Where Are We Going?" which we would like to take this opportunity to reprint:

"Right now most members have heard the 'pros' and 'cons' of this question as applied to the Pioneer RC Club. The 'pros' believe the Club should be run by and for the active flyer; that a member should attend (a minimum of) one meeting each three months; that the Club should be more active and thus more interesting! that all members should take an active interest in the Club by attending Club meetings, contests, etc. The 'cons' be-

lieve that anybody who is willing to pay his dues is welcome to be a member; that it is not necessary that each member attend any given number of meetings, contests, etc. The terms of 'pros' and 'cons' is not meant to be argumentative, but simply to designate two lines of thought on what is required to be a member of this Club.

"The writer is among the 'pros' by choice. The only reason he can see for belonging to the Club is what he can do to contribute to other members and his own enjoyment of the hobby. He firmly believes that in order to enjoy this hobby, one has to be active in every sense of the word. This means:

"1) Attending all meetings, if possible.

"2) Being willing to take his share of the work that must be done in order for the Club to survive.

"3) Back up your officers and committees — which means active and wholehearted participation in all events of the Club."

And we feel that *Karl* has come up with a simple, yet complete, prescription for a successful RC club — all the fancy By-Laws won't do a bit of good without the three pre-requisites above. This is the formula for a successful organization.

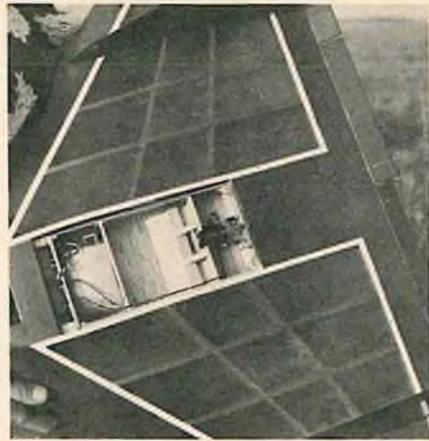
The Tenth Annual Toledo Conference, sponsored by the Weak Signals Club of Toledo, Ohio, has been scheduled for February 29 through March 1 at the Champion Spark Plug Company at the Toledo Airport. A history of this outstanding event was recently presented in *Model Airplane News*, and should be enough to stimulate the attendance of every RC'er able to make this annual affair. The 1964 program will include model competition, awards, speeches by leading RC experts, and Saturday night auction and door prizes. For more information on this meet, write *Ken Borror, Box 2864, Station B, Toledo, Ohio*.

This is the time of year for club elections, and we are pleased to announce that *Jack Chesney* has been elected President of the Meroke Radio Control Club, Inc. (c/o *Harvey F. Columbine, 401 Scranton Ave., Lynbrook, L.I., N.Y.*) *Norm Eiseman*, Vice-President, *Eric Quick*, Secretary, and *William Froeb*, Treasurer. The Meroke group now has a membership of 25, with general membership open to all RC fliers and boatmen. Meetings are held the 2nd and 4th Thursday of each month at the Church of the Transfiguration, Longbeach Avenue, Freeport, L.I., N.Y. An AMA license and either a CB or ham ticket is required for membership.

The annual banquet of the Lincoln Sky Knights (c/o *Bob Bates, 3844 S. 20th, Lincoln 2, Nebraska*) also marked



Great Britain's Ken Downton and 3/4 size Hustler. AM 15 mill. Terrytone single rx pulses MM. Outer ailerons used for trim only.



Ed Johnson winding up Merco 61 powered Taurus — a popular combo in England. Orbit gear. Hooded one is Pete Waters who flew at World Championships.

the date of their annual elections. New officers are Don Svoboda, President, Bob Bates, Secretary, and Lonie Charlson, Treasurer.

The Saginaw Valley RC Club is interested in exchanging club papers with other groups throughout the country. According to *Gerald Gill*, Editor (1981 Ribble Road, Saginaw, Michigan), their newsletter has been published monthly for three consecutive years. And when you're sending a copy of your club bulletin to old Ger, be sure to send one along each month to RCM!

Since many of you have asked for our comments on the new proportional rigs, and since we have only tested one of them to date (Digicon, this issue) here are a few notes on the Klinetronics Astro Guide system by Marvin Doucey, as printed in the Chord & Span (Illinois Valley RC Club, c/o Howard Halm, 920 W. Main Street, Ottawa, Illinois):

"I first flew the gear (Astro Guide) last spring, and after the first flight,

knew that I had to have one. So I started nagging Al Kline until he broke down. It was with the understanding that my unit was *not* a production model and problems would pop up — it wasn't, and they did.

"Few people realize the many problems that must be solved in a system such as this. There are range swamping, dead spots, battery drain, servo centering, and size, to name a few. All of these problems *must* be solved, one by one. And, incidentally, only *two* thumbs are required for flying!

"I have had my unit installed in a stock Taurus, and there is room to spare. I have heard that many people consider this a poor ship for proportional, but I have over 100 flights on mine now, and it does much better than it did with reeds.

"I think that Al, Phil, and all who worked on the Astro Guide equipment deserve a pat on the back. It's the *most!* Al tells me that he is now shipping units with all speed. Aldon Annis

received his last week and had it out Sunday. It performed perfectly right out of the box. There were *no* interference troubles when both of our rigs were in the air simultaneously."

And there you have the report of RC'er who is obviously happy with his new rig. We'd appreciate receiving consumer reports from every owner of the new proportional rigs of all makes. This will greatly aid us in preparing our own product reports on these new units.

Another annual election was held, this time by the St. Paul Model Radio Controllers, Inc., with Al O'Brien becoming the new Prexy; Bob Swearingen, Vice-President. Bob Logman, Treasurer, and John Henschel, Secretary. Congratulations to these, and all new officers elected by the RC clubs throughout the world to serve for the coming year.

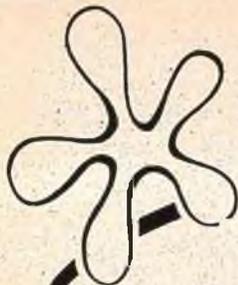
(Continued on page 55)

Magnificent Spitfire from Ken Taylor, Detroit RC Club.



Tom Brett accepting Class III honors at Detroit Invitational.





SHOWCASE '64

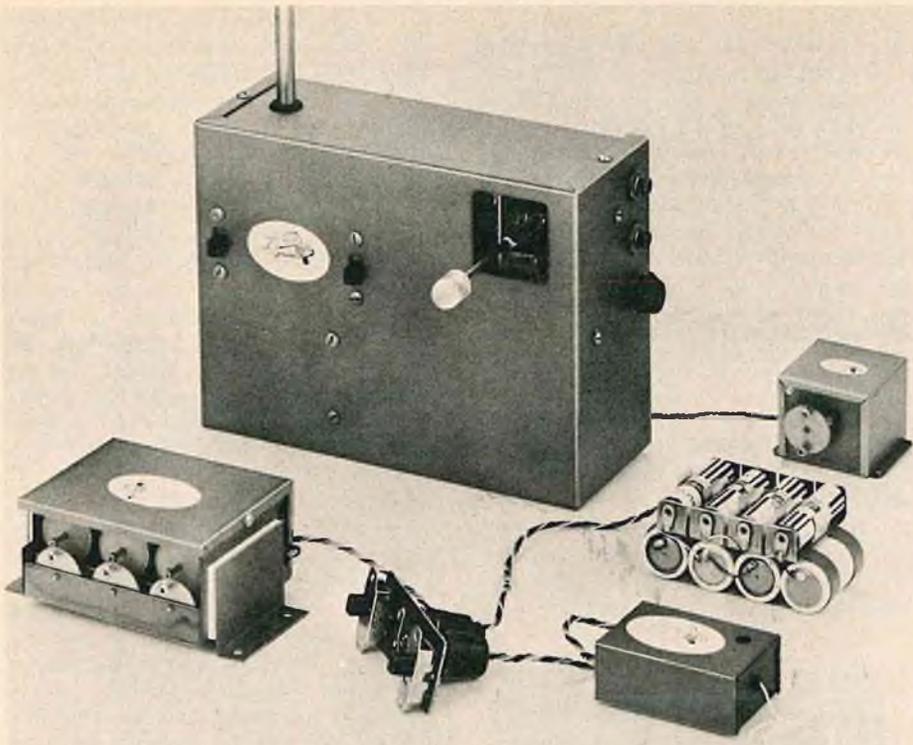


New single channel proportional system from Sampey.

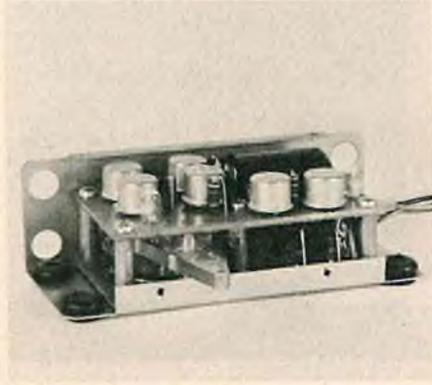
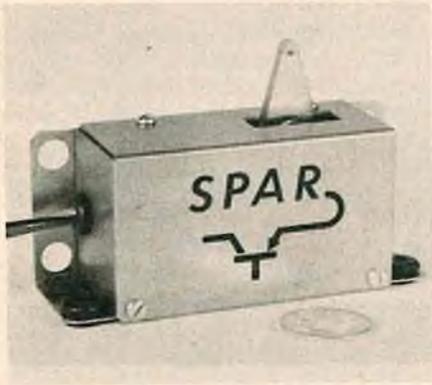
We have received numerous inquiries concerning the new **Multiplex Master**, non-interacting multiple simultaneous proportional control system, as manufactured by **Glass City Model Electronics**. Although we have not evaluated this system, here is the data as provided by the manufacturer:

The Multiplex Master is an advanced pulse proportional control system based on principles developed by the manufacturer during their ten years of experience in proportional control. This is a "wobble" free (only a slight quiver can be noticed) pulse system with completely independent and simultaneous controls of rudder and elevator, with selective, any position, throttle control plus fail-safe operation. Ailerons may be added by simply coupling the aileron servo by two wires with the rudder servo. All servos are geared 49 to 1 and are driven by rechargeable nicad batteries to provide adequate power for most RC kits presently available. The complete system consists of the Master Pulsemitter, an all-transistor tone transmitter combined with a mechanical pulser, the Master Multiplex, a 3-servo pack for rudder, elevator, and motor control, complete with all circuitry built-in; the Pulse-master, Superhet Receiver; the 1200-mah rechargeable battery pack; battery charger; and service kit. All batteries are included. The complete

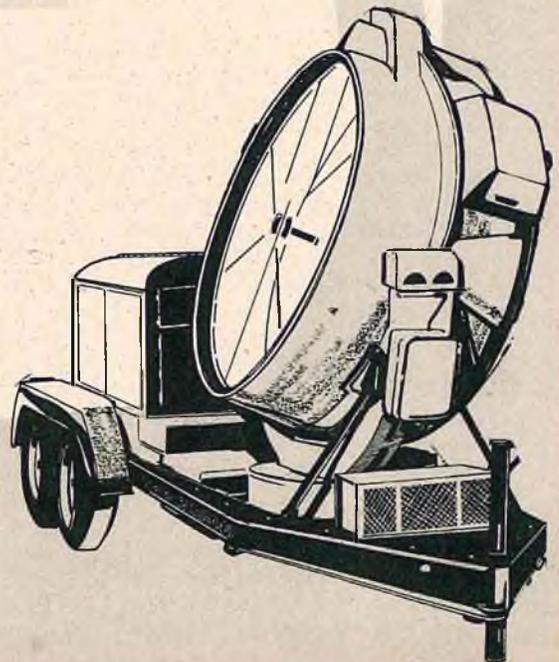
(Continued on page 36)



Multiplex Master proportional offering from Glass City.



Type 1-S closed loop servo from SPAR.



superhet system sells for \$199.95. The same system with a superregen receiver is priced at \$174.95. The aileron servo is available at an additional charge of \$10.95.

For a catalog and technical bulletin concerning the Glass City Multiplex Master proportional system, enclose 50¢ and *Circle #1 on the Reader Service Card.*

Spar Electronics announces the availability of their type **1S feedback proportional servo**, the first item of a new line of radio control equipment for model aircraft. A closed loop circuit using six transistors provides proportional control with exceptional positioning accuracy. The servo is light weight and rugged in design. A unique circuit feature prevents damage which might occur due to improper connections or overloading. A Micro-Mo motor is used in this unit which provides 4½ pounds thrust. Manufacturers specifications are as follows:

Input Signal 0 to ±0.0033 amp
from 1000 ohm source
Output Torque 4.0 lbs. *minimum*
Position Accuracy ±0.007 inch
Transient Time 0.5 seconds for
0.312 inch deflection
loaded into 1.0 lb.
Temp. Range 0°F to 120°F
Power Source..... +2.4VDC, -2.4VDC
at 0.225 amp max.
Reference Source +3.6VDC,
-3.6VDC at 0.004 amp.
Weight 2.4 ounces
Size.....H 1" x W 1-5/16" x L 3-1/16"

Current drain under full stall load conditions is reported to be approximately 220mah. According to the manufacturer, emphasis has been placed on achieving high reliability during actual flight. Every servo is tested by an environmental engineer at twice the vibration level normally experienced in flight. Vibration levels have been recorded at the servo mount of a model at full throttle using a .45 size engine. This recorded signal is played back into the vibration test equipment to which the new servos are attached during final checkout. Another indication of their reliability is a life test which consisted of 102,300 full control operations using an average 18.0 ounce load. Translated into our terminology, this means that a servo used, for example, for aileron control, in an aircraft flown on an average of 30 minutes a week, would have an indicated life expectancy in excess of five years. The SPAR servos may be used with non-proportional receivers of either the relay or relayless types. In addition, single servo operation is possible without the need for reference batteries. Type 2-S is manufactured for this purpose and intended for single channel proportional operation. Price of

the 1-S model is \$24.95. We have not as yet tested this unit, but have been following the progress of this manufacturer quite closely. We are looking forward to evaluating their new rudder/motor and quadruple simultaneous "full house" proportional systems which have been undergoing development for almost five years. First production units should be available in the early Spring. For information on the SPAR servo and for the data on the new proportional systems (when available), *Circle #2 on the Reader Service Card.*

We can't say any more about **Len Purdy's** ready-to-fly multi ship, the **Jubilee**, than we have already written in our complete product report in this issue. We have thoroughly tested the material used, and flight tested the aircraft in public demonstrations. It



rates our highest recommendation. The Jubilee is now being offered as a ready-to-fly RC model for reeds or proportional. Only three assembly steps are omitted to facilitate shipping — the modeler joins the prefitted wing halves, attaches the fin, and installs the landing gear. All other assembly is finished at the factory. Cement and instructions for the wing, fin, and gear are furnished, as is complete radio and push rod pictorial sketches. Shipped unpainted in white or yellow basic color. Specify base color preferred. Price is \$49.95 complete, and this amount must accompany order. The Jubilee will be shipped Railway Express collect. Send your order directly to L. R. Purdy, Powder Springs, Georgia. For further information only, *Circle #3 on the Reader Service Card.*

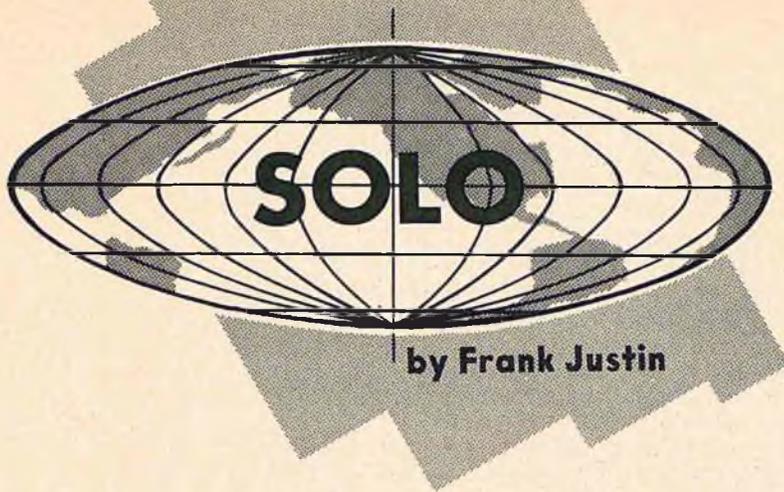
Blackwell Models Mfg. Co. announces a new ten channel multi RC

kit which is to be called the **Raider 10**. This is the culmination of four kits previously marketed and has the advantage of the experience gained in the kitting of their previous, and quite popular, RC models. Of low wing design, the Raider as a 59" span, 11½" chord, and an average wing loading of 18 ounces. On an overall average, the manufacturer states that the airframe requires under twenty hours to complete, ready for finish and covering. White not a rank beginners airplane, the Raider can be expected to be a successful RC project for the modeler who has had at least one trainer in his hanger and who has flown it successfully. The model is reported to fly the entire AMA pattern using a .45, even at field elevations as high as 7,000 feet. The Raider sports a new type shock coil main gear that will take any possible punishment without damaging the wing spar or structure. The nose gear is engineered for severe operation and has ample clearance for touch and go practice. The Raider will also handle any mill up to and including the Fox .59 without evidencing any erratic tendencies. For information on this soon-to-be-released kit, *Circle #4 on the Reader Service Card.*

Bob George and Gordon Anderson of **R. G. A. Specialties** became popular in our book when they introduced Glo-Life for model engines. As we mentioned in last month's Showcase, they also produce the **R. G. A. Servo Solver, Servo Overdrive, and Switcher Board** for use with Bonner servos. For our test of the Jubilee, we mounted our Transmites on the Servo Solver board and were more than pleased with the results. This servo tray neatly fit the Jubilee and eliminated the usual conglomeration of plugs and sockets. This tray is a printed circuit board of extremely durable construction with all mounting holes for the Bonner servos. It is rugged, compact, and eliminates a lot of work involved in normal multi installations. We heartily recommend this unit to all multi fliers. Price is \$7.95 and available through Ace Radio Control. The servo switcher and overdrive boards are small printed circuit boards that are installed in Bonner servos to provide an overdrive additional function. These are of the same high caliber exhibited in the Servo Solver. Price is \$2.25 each. For further information, *Circle #5 on the Reader Service Card.*

We've mentioned this one before, but we like it well enough to repeat it — **Willoughby Super Solder**. This

(Continued on page 52)



It has been suggested that I take another look at reeds versus proportional this month, but with all due respect to our editor, let's leave this dog lie for another issue — I'll have a proportional rig of my own flying by that time and maybe it will give me something to talk about from a personal involvement rather than just observation. After all, very few people I've talked to are going to knock a six hundred dollar investment — good or bad!

I've got a good friend who has been building radio control models for many years. In fact, we both started at the same time, and as years have gone by, have built many the same ships. Through his modeling career this individual has never become a proficient flyer. If someone makes his initial flights for trim and he takes over at a safe altitude, he's satisfied. I spent some time outlining a flight pattern and a program of familiarization to my friend so that he might get in more actual flying time. Someone more astute than I suggested that perhaps he was a "builder" and not a "flyer," and of course, this proved to be the answer. It made little difference to this modeler that he was building ships and buying equipment that had been designed for flight — he *enjoyed* the building — the selection of a better ship — the bull sessions at the field — the discussion of new equipment. This is his hobby and he follows it in his own manner. I make this point because there is need to realize that the full emphasis in our hobby cannot rest on competition alone — everyone must follow his own interests, whether it be in building, designing, electronics, or competitive flying.

Last week I had the opportunity to witness the first flights of a ship that had more fiberglass, celastic, hardwood and plywood in it than an average thirty foot cruiser! The owner explained

that he did not want his ship split open because of a minor crash. His last flight did not end in a minor crash — it was a major, and the ship ended up as just so much junk. I learned a good lesson at this flyer's expense — the extra weight made it extremely fast and tricky to handle. One personal New year's Resolution: I'm going to start building for flight and not stressing for crash.

Last month I told you about a fiberglass ship called the Talon, manufactured by GlasCraft in Santa Ana, California. Having purchased this fuselage, I built up a wing from a Top Flite Taurus wing kit. Initial flight tests were made with Kraft reed equipment and a Veco .45 mill. The Talon proved to be very sensitive in pitch, seemingly caused by the long Taurus wing throwing the tail moment out of proportion. A word of advice to anyone building this ship — shorten the wing 8" and keep it in the 19% section category. One good characteristic of the Talon was its excellent slow speed handling.

Our editor has informed the staff that we are going to write with the modeler foremost in mind. If we have to knock a product and lose an advertiser — tough. So here goes. The Berkeley "Bootstraps" is not a good radio control ship. The wood is soft and warped and the plans are inaccurate. What? You say Berkeley is out of business? Well give me time — it isn't easy to forget how to plug the good and ignore the bad in our industry. I'll get the hang of it in a month or so. The idea, of course, is to save the modeler a buck or two on equipment that won't perform, and also to try and raise the level of equipment to a point where we can rely on it to perform as advertised.

See you next month.

A M A

Additional Frequencies Requested of FCC

Asking the Federal Communications Commission for five additional frequencies outside the Citizens Radio Service 27 mc band for radio control of model aircraft, the Academy of Model Aeronautics documented its requirements in twin filings with the FCC on October 1, 1963.

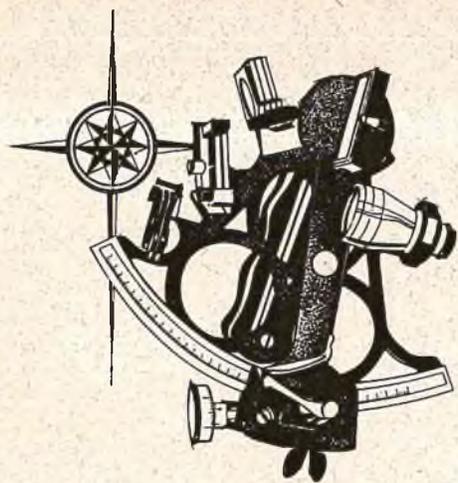
The first of the Academy's filings took the form of a comment in FCC Docket No. 15131 proposing to make available for mobile operations a number of frequencies with power not exceeding 1 watt in the 72-73 and 75.4-76 mc band, presently restricted to point-to-point communications use. Five frequencies were sought in this 72-76 mc band, with power not exceeding 1 watt.

The second Academy filing was an associated petition for rule-making asking for the assignment of certain presently unassigned guard band frequencies for the control of model aircraft, in the event that the five frequencies requested in the 72-76 mc proceeding could not all be made available.

The Academy petition listed a number of these guard band frequencies not presently allocated to any radio service but which could be utilized for model aircraft purposes after November 1, 1963, when the Commission's narrow band equipment standards become universally applicable, namely 35.20 mc, 35.68 mc, 43.20 mc, 43.68 mc, 152.00 mc, 152.240 mc, 152.480 mc, 152.840 mc, 157.740 mc, 158.100 mc, 158.460 mc and 158.700 mc.

The Academy filings explained that these additional frequencies were needed because of the increasing interference being received from Class D Citizens Radio Service stations and unlicensed (FCC Part 15) operations. Thus, model aircraft radio control operation are now conducted in the most congested part of the radio spectrum, where the number of licensed authorizations nears half a million, with again that many operating under Part 15 of the rules. The result has been that even modelers who operate with the most selective receivers are suffering interference, attributed to off-frequency Class D station operations and Part 15 operations conducted in close proximity to model aircraft radio control operations. The five addi-

(Continued on page 60)



REGATTA

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R/C boats require a variety of different propellers. The prop that works well on a runabout model might not give the best performance on a hydro. A cruiser model will require a different prop than the planing type hull. Two propellers, having the same diameter and pitch but with different blade area, may require different carburetor settings. They will also give different performance on the same hull and motor combination. The hull can be the best... different make gas engines of the same displacement, might require different propellers for best results. A little less pitch... a bit more blade area... more or less diameter... all of these factors enter into determining the best propeller for a particular hull and engine combination. The hull can be the best... the motor the most powerful... but if the prop isn't right, the resulting performance is just mediocre. A ratio of prop diameter to pitch of 1:1 to 1:75 gives a propeller for R/C boats that can be throttled down without stalling the engine, and at the same time, capable of giving a good speed at full throttle.

This is the starting point for selecting a suitable submerged propeller for your particular boat. Determine the stroke of your engine and multiply by 2.00 to 2.50 to find the approximate diameter two bladed propeller your engine will swing. The flywheel should be approximately the diameter of the propeller and its width approximately one-third the diameter. Use either cold rolled steel or drawn brass — do not use cast materials.

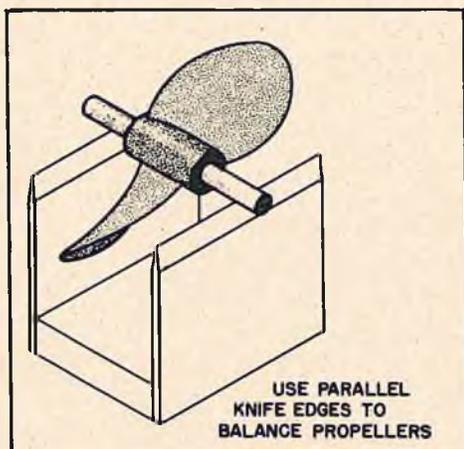
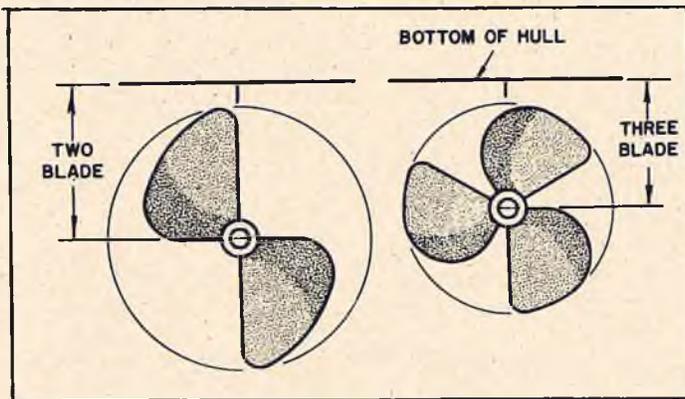
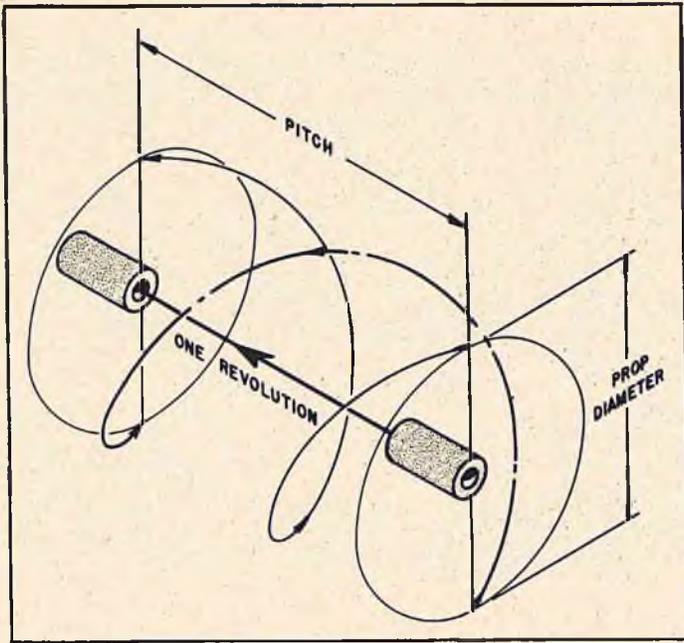
Use a smaller diameter and lower pitch prop for heavier boats as a starting prop. This will allow you to do some running to get the feel of the combination without overloading the engine. If it appears the engine is not loaded enough, install a prop with

slightly more diameter but with about the same pitch. If possible, check the speed with a stop watch rather than trying to judge the speed. The sound of the engine can be misleading as to the actual speed the boat is traveling. Many times a two blade propeller with its blade requires a certain diameter to absorb the power of the engine and provide enough thrust. This diameter may require the use of an excessively steep shaft angle to clear the bottom of the boat. This problem can be solved thru several approaches. The prop location can be moved back. The prop shaft itself can be run parallel to the water surface by the use of a universal joint (this being referred to as articulated drive). Another approach is to use a three bladed propeller as its diameter need be approximately 80% of a two blade prop of the same pitch. We tend to associate a two blade prop with speed, a three blade with power or heavier type boats, but one should not blindly rule out the use of a three blade prop on speed hulls nor the use of a two blade prop on slower type boats such as a cruiser model. The combination that gives the best performance is the one to use regardless of preconceived ideas.

A boat, due to its size, type, or weight, may require a larger prop than the motor in it is capable of swinging. In such a case the best thing is to either gear down the prop shaft and put on a larger prop, or install a more powerful engine.

All props should be balanced as per the sketch. Be sure to remove your prop from the boat when transporting to avoid damage or bending of blades or shaft.

The chart illustrates a number of propellers manufactured by Octura Models and their suggested usage. We feel you will find this listing valuable as a reference.



#1— $1\frac{7}{8}$ " dia. x $2\frac{1}{2}$ " pitch. Suitable for use with .29 to .45 engine depending on type hull, size and weight.

#2— $2\frac{3}{16}$ " x $2\frac{1}{4}$ " pitch. For use on .60 glow or ignition engine. Also suitable for electric motors. For runabouts, cruisers or heavy hydros.

#3— $2\frac{1}{8}$ " x $2\frac{5}{8}$ " pitch. Same use as prop #2 but having more blade area.

#4— $2\frac{5}{16}$ " x $2\frac{1}{2}$ " pitch. For use on .60 glow or spark ignition engine as well as electric motors. For light weight runabout and hydros. Works well on "Miss Unlimited's" hydros using hot .60 engine.

#5— $2\frac{3}{16}$ " x $3\frac{1}{4}$ " pitch. Same use as prop #4 but having more pitch.

#6— $2\frac{3}{16}$ " x $2\frac{1}{2}$ " pitch. Same use as prop #4 but slightly more blade area.

#7— $2\frac{3}{16}$ " x $3\frac{1}{4}$ " pitch. For use on .90 eng. as Forster 99 or Gannet 15.

#8— 2.8 " x 4 " pitch. For use with O & R Compact or engines of similar capacity. Works well on light cruisers such as the 42" Corvettes or on free running runabouts or hydros. Recommended for use on White Heat V.

#9— $2\frac{1}{32}$ " x $3\frac{1}{4}$ " pitch. Same use as prop #8 but for heavier boats.

#10— $2\frac{3}{16}$ " x $3\frac{3}{4}$ " pitch. For use with O & R Compact or engines of similar capacity. For light hydros or free running runabouts.

#11— $3\frac{1}{8}$ " x 4 " pitch. Same as #10.

#12— $3\frac{1}{32}$ " x 4 " pitch. For use with O & R Compact, Gannet 30 or engines of similar capacity. For large free running hulls.

NOTE: Props #1 - #7 tapped #10-32 — #8 - #12 reamed $\frac{3}{16}$ " diameter.

Propellers 62P thru 40P fit a $\frac{3}{16}$ " dia. shaft. Props 62P, 55P and 50P are slotted to fit the OC-6D drive dog. Props 35P and 30P are threaded 8-32.

30P— $1\frac{3}{16}$ " dia. x $1\frac{1}{16}$ " pitch. For use on .15 engines in cruisers or heavier hulls. Threaded 8-32. \$.45 ea.

35P— $1\frac{7}{16}$ " x $1\frac{7}{16}$ " pitch. For use on .15 to .19 engines in runabouts or hydros. Threaded 8-32. \$.55 ea.

40P— $1\frac{1}{16}$ " dia. x $1\frac{3}{8}$ " pitch. For use on .15 diesels to .29 glo engines. $\frac{3}{16}$ " bore or threaded 8-32. \$.65 ea.

45P— $1\frac{13}{16}$ " dia. x $1\frac{1}{32}$ " pitch. For use on .29 to .35 glo engines in runabouts or hydros. $\frac{3}{16}$ " dia. bore or threaded 8-32. \$.75 ea.

50P— $1\frac{31}{32}$ " dia. x $1\frac{7}{32}$ " pitch. For use on .35 to .45 glo engines in runabouts or hydros. $\frac{3}{16}$ " dia. bore — slotted. \$.85 ea.

55P— $2\frac{1}{32}$ " dia. x $2\frac{3}{16}$ " pitch. For use on .45 to .60 glo engines in runabouts or hydros. $\frac{3}{16}$ " dia. bore — slotted. \$.90 ea.

62P— $2\frac{1}{2}$ " dia. x $1\frac{25}{32}$ " pitch. For use on .60 glo engines in cruisers, runabouts or hydros. $\frac{3}{16}$ " bore — slotted. \$.95 ea.

AIRBORNE CONTROL LABORATORIES

FROM THE LAB

Vibration, next to operator error, is probably the major cause of R/C equipment failure. Electronic components are generally quite rugged, but continual stresses due to vibration can cause fatigue and eventual failure. With the popular "gold brick" design used by ACL and others it is somewhat more difficult to isolate the engine vibrations from the control equipment. However, we feel that we have devised an extremely simple yet highly effective mounting scheme that eliminates vibration without loss of rigidity along with servo thrust line. For details send a stamped self-addressed envelope and we'll gladly provide a sketch of the method.

In the '64 American Modeler Annual there is a fine article on CAR (Coupled Aileron & Rudder) that is well worth reading. The point; and it's worth emphasis here, is the ease with which CAR can be accomplished and the fine flying which results. This is important to the sports flier with an eye on equipment cost and performance. The article shows several methods to achieve CAR. Again, if you're interested in the method we use, drop us a note and we'll gladly send you the details.

The **ACL MARK II** is undergoing some revisions for '64. Complete details can be had on request, but here are the essentials. First, servo speed has been increased (without decreasing torque) to the point where we feel we have both adequate torque and speed. Servo speed will certainly be a topic of much discussion among proportional fliers in the future and we feel that the **ACL** servo will be one of the standards.

We're of the "high power school" for transmitters and have been working on a transistorized transmitter with real success. The engineering model is radiating within 10% of the power of our present tube type which has 2.5 watts into the final. We don't plan to use a special antenna; radiated power will come from input power. This avoids the problems of handling and tuning that goes with some of the special antennas.

Another item worth note is the **Mark II B**. This optional version of the **Mark II** allows separate mounting of the receiver and provides greater mounting ease and flexibility. One of the things we hope to do with this development is market a single channel receiver and transmitter to drive an escapement or pulse servo, that can later be converted to the **Mark II B**. This approach should allow a reasonable investment for the beginner without the expense of equipment obsolescence when expansion is desired. If this sounds like something you have been looking for, drop us a note. If there is enough early interest, we'll speed up the development.

One last item, We're moving. Our manufacturing and service facilities will be located in Endicott, N. Y. and our business office in Poughkeepsie, N. Y. This expansion will allow improved delivery and service and at the same time allow more attention to future development.

For our 11 page brochure on the **ACL Mark II** please enclose \$.25 to cover handling and mailing costs.

Airborne Control Laboratories
Box 1493, Poughkeepsie, New York

Circle No. 108 on Reader Service Page



Tri-Valley RC Club

1963 was a banner year for RC flying in South Bend, Indiana. In April a new club was formed — The Tri-Valley Radio Control Club. In June the new group received their AMA Charter, and throughout the summer boasted of fifty members, a majority of whom were active fliers. Their leased 40-acre flying field was the primary factor in starting the club, and is ideally located on a little-traveled road surrounded by farm land, and only a ten-minute drive from the city. Several acres of this soil-bank field, which has not been cultivated for several years, were cleaned up by the members to yield a large parking, spectator, and picnic area, located safely away from the flight line. The field incorporates a 200 by 400 foot smooth grass rectangle with two 250 foot closely-mowed grass runways. An unexpected bonus was discovered in the form of drinking water from an abandoned well in the spectator area, making the long summer afternoon much more enjoyable!

This year several members participated in contests around the area, achieving moderate success. Flying this year, however, has been mostly for fun, with sport flying likely to predominate in the coming year. The club's first organized activity was a family picnic at the field, lasting all one Saturday afternoon with various types of planned competition for members, their wives and children.

In 1964, the Tri Valley RC'ers have two goals in addition to field improvements. The first is to sponsor two con-

tests and the second being to encourage younger modelers to get into radio control. The first step toward stimulating the area's youth was to establish a one-half normal dues rate for members eighteen years and younger. Also toward this goal is an escapement-only competition class scheduled for next year's contests.

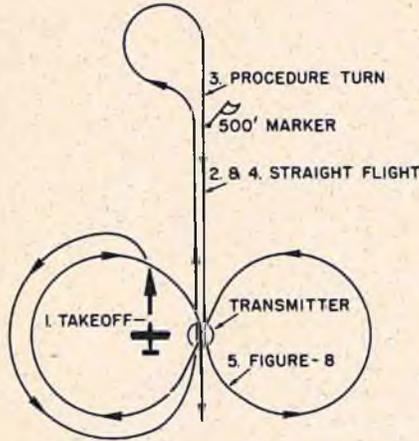
The Tri Valley group meets once a month at a local hobby shop owned by John Coleman, one of the principal charter members. Technical sessions on building, finishing, equipment installation and flight trimming, are planned for the winter meetings.

A few interesting facts about the Tri Valley Radio Control Club include one hundred percent AMA membership, all members possessing CB or ham licenses, and sixty percent of the membership active in flying during the past year. Approximately forty percent of the members are flying multi channel equipment with a higher percentage anticipated for the coming year.

According to Ray Emery, Secretary of the Tri Valley club, members are looking forward to the new year with enthusiasm, for the results of their first few months have been gratifying. It is interesting to note that this group initially considered the establishment of an RC club as an evil necessary for obtaining a good flying site. Today, all would agree that the existence of the Tri Valley Radio Control Club, RCM's Club of the Month, has enriched the enjoyment of all who are a part of its membership.

MULTI STUNT

(Continued from page 20)



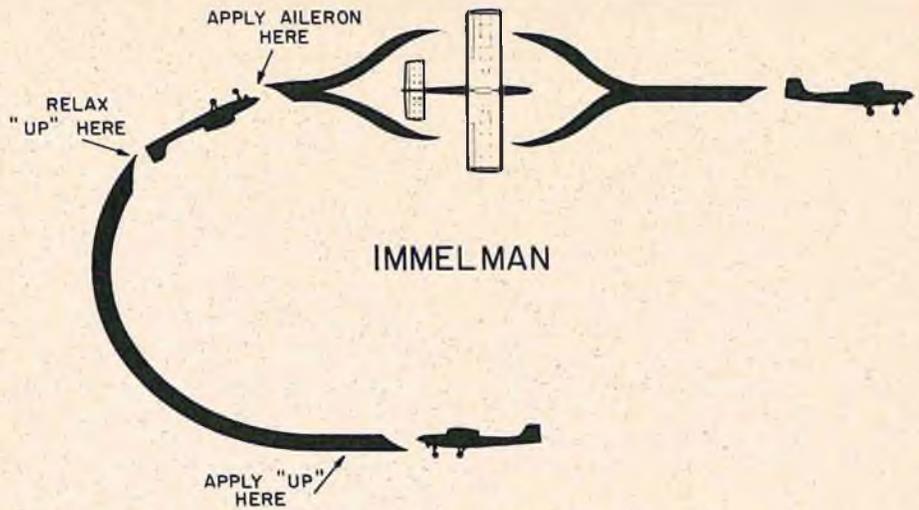
PRECISION A.M.A. PATTERN
(INCLUDES 360 OVER TRANSMITTER)

Wing Over

This is done by applying "up" elevator for a steep, near vertical climb toward the top of which, rudder is applied so that the ship turns in the same vertical plane until pointed straight down. As the ship nears the starting altitude, "up" elevator pulls it out. Executed properly, the recovery is straight out. I prefer to do this maneuver into the wind.

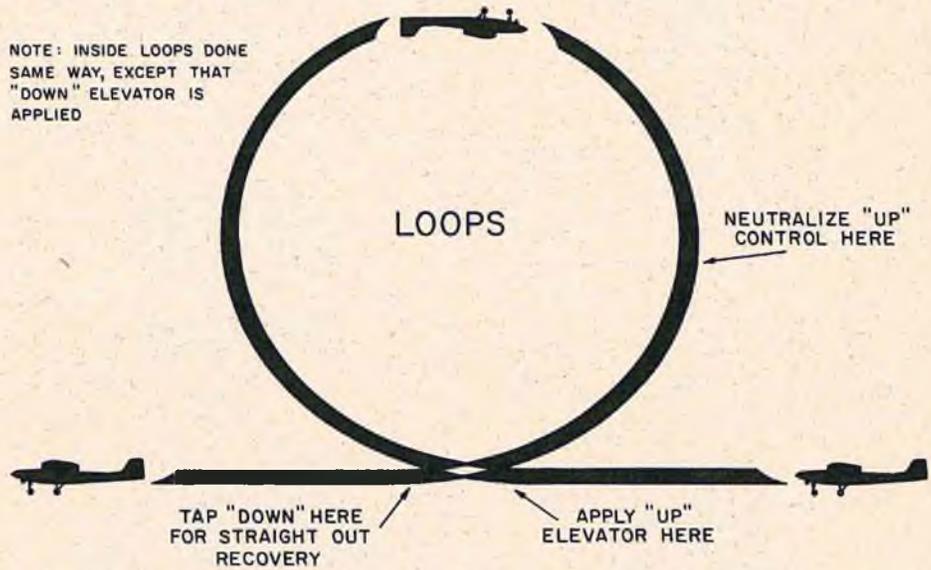
Immelman

This maneuver is entered by holding up elevator for a half inside loop followed by a half roll back to horizontal flight on a reciprocal heading. The "up" is relaxed before the top of the half loop is reached, at approximately the eleven o'clock position. It takes the remaining distance for the servo to attain neutral.

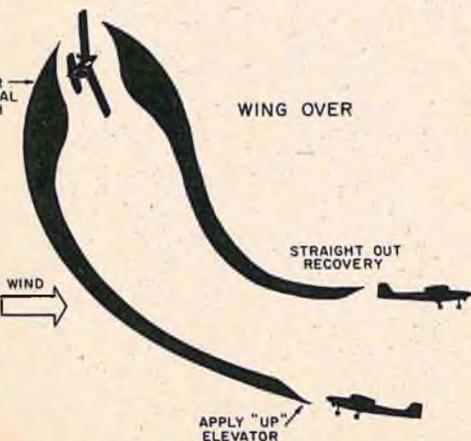


IMMELMAN

NOTE: INSIDE LOOPS DONE SAME WAY, EXCEPT THAT "DOWN" ELEVATOR IS APPLIED



LOOPS



Loop

The entry is from level flight—diving to pick up speed should not be necessary. Hold "up" elevator until the loop is three-quarters complete, then neutralize. As the ship comes out, a touch of "down" elevator is required for a straight out recovery, and not a shallow zoom. This recovery may not always be right on, so that a quick tap of "down" or "up" may sometimes be needed in order to follow through. If elevator is held continuously, consecutive loops should result — our Citation will track through the required three loops.

Outside Loops

Performed the same way as Insides, except that "down" elevator is used. I prefer to perform the outside loop in a down wind direction because there is much less apparent drifting with the wind. The diameter of the outside loop should be only slightly larger than that of the inside loops. In ships having a forward C. G. and/or a high gross weight, it will be observed that the diameter of each loop becomes less throughout the loop, so that each is completed at a lower altitude than the one before. As

speed decreases during the climbing portion of each loop, added wind drift will be experienced.

Roll

If aileron is held and no other control given, most multis will complete the roll with some kind of a dive. With speed, power and sensitive ailerons, an occasional ship can get through a roll so fast that no apparent loss of altitude is discernable — they roll on a straight line. However, an extremely fast roll is not pleasing to watch, and is apt to be downgraded by judges. It is commonplace, therefore, to require a touch of "down" elevator when the ship is coming into an inverted position at the half roll point. This insures that the roll is performed about a straight-line axis. Our Citation requires a very brief "down" elevator control at this point. Before the roll is entered, apply a touch of "up" elevator to raise the nose slightly.

Consecutive Rolls

These are done in the same way, entering by holding aileron in the direction of desired roll after first bringing the

(Continued on page 46)

BLUEPRINT FOR BEGINNERS

(Continued from page 11)

Next, check the alignment of the wing and the stab. Sight along the fuselage as before, only this time you're noting whether the wing and stab are set right, in relation to the fuselage, and each other. It should look as in Fig. 3.

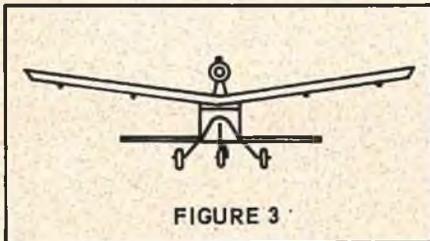


FIGURE 3

If the stab and wing are out of alignment, as in Fig. 4, then shave off a thin strip of balsa and glue it to one side of the bottom of the fuselage, sanding it until the stab rests on it and the other side of the bottom of the fuselage, and is aligned with the wing. I doubt if you'll have any trouble like this, however. The method of building the fuselage just about rules it out.

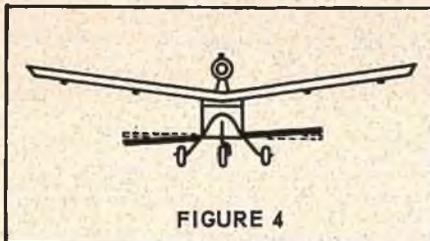


FIGURE 4

Now check your fin and rudder for warps. Remove the wing and sight down the length of the fuselage. The fin should be aligned with the center line, as in Fig. 5. If you see a warp, as in Fig. 6, remove it, just as you did with the wing. A twist in either direction gives the

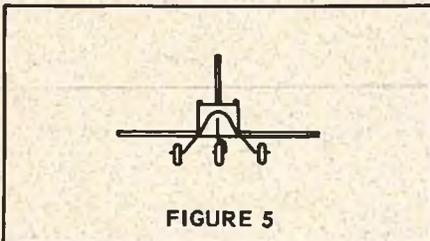


FIGURE 5

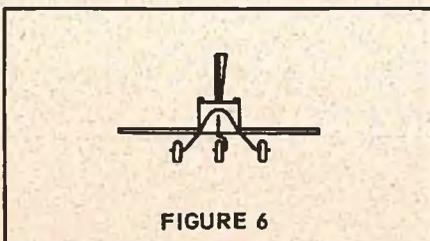


FIGURE 6

same flight effect as application of rudder, causing a severe and undesirable turn.

Now that all the flying surfaces are properly aligned, check out the landing gear. This is easy — just roll the model, making sure each wheel rolls freely. If you notice the model turning as it rolls, a simple bend of the nose wheel wire will correct it. It's not absolutely necessary, but it certainly makes for better takeoffs if the wheels track straight.

I'm going to assume that you've followed the first two articles in this series, and that you've read the manufacturers instructions regarding the installation and checkout of the engine, radio, and escapement or actuator. The way I see it is this — if you didn't read the first two articles carefully, and/or the manufacturers instructions as recommended, then you won't read these suggestions, no matter how detailed they may be. So I'm only going to cover some thoughts which may not have come up. Meantime, if you've already flown your Virus

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Circle No. 109 on Reader Service Page

and lucked out, these points may help out later — some time when you're repairing the job and trying to figure out "wha' happen!"

There's little need be said about the engine. If you use Cox's red label fuel, their .020 runs up a storm as long as the fuel is clean and the needle valve is set according to the instructions.

For convenience, I would suggest that you obtain standard glow clips for your booster battery leads. This clip is much easier than using two alligator clips and helps prevent shorting of the booster as well. Check with your hobby dealer.

As for the radio installation, the biggest item to watch for is that it rests properly in the compartment, and that your battery connections are firm. Along with the radio, the operation of the escapement must be free from binding, or the radio might just as well stay on your bench. Make sure the torque rod moves easily in the bearings, and that your rudder hinges allow free movement. Finally, check the whole operation *with*

the engine running, to make sure vibration doesn't affect it. Hold the plane, up by the wingtips as though it were flying and operate the radio with the engine running. If the rudder flops back and forth, shut off the receiver, and then if the rudder continues to chatter, the escapement neutral is vibrating off the stop and needs adjustment. This is rare. Alternatively, if the rudder stops fluttering when the receiver is off, and starts when you turn the receiver on, chances are you have loose connection. The most likely spot for this is at the battery box, although you may have a bad, or cold solder joint, at the escapement. Check it all thoroughly. Solder joints should be smooth and shiny. A cold solder joint can be recognized by its grayish, flaky appearance. Resolder the latter.

Everything working like it should? Then just one more check and you're ready to fly. This last check is to make sure the receiver is properly tuned and the batteries up to full strength. The latter is determined by putting a meter across the escapement contacts — if the batteries are low, discard them. The receiver and escapement combination will operate if the reading across the escapement is slightly over two volts (2.1V), but if that's the reading at the start of your flight, it'll gradually go lower and you'll lose control. With alkaline energizers, I wouldn't start a flight unless the reading was at least 2.4V under load (read across the escapement). Even then you'd be better off to put in new ones if you have them handy.

Two methods can be used to check the tuning of the receiver. With some transmitters (C&S or F&M are good examples), you can remove the antenna and tune the receiver by sending out a signal, getting as far away from the receiver as possible and still have it operate. Fine tuning the receiver can be accomplished by sending the signal from the maximum distance (approximately ten feet) and turning the tuning slug back and forth until the receiver operates or stops, then centering the slug. Actually when you get maximum distance, the slug can only be turned about 1/2 to 1/4 turn and still receive the signal. You should be able to get several feet away with the transmitter and still have reception.

For an absolute final check (and in some cases where a transmitter isn't supposed to be operated with the antenna removed), it will be necessary to get the assistance of a helper and make an actual distance check. Have your assistant walk out several hundred feet, operating the transmitter while you tune the receiver. One thing — be sure and agree on your hand signals in advance! If you've done a preliminary check close at hand, it is only necessary to check on and off signals during the range check.

The usual signal is arm overhead for press and hold, arm dropped for signal off, and arm side to side wave for transmitter off.

Ordinarily, I would suggest that you do a series of glide tests to check the balance of your model — and you certainly can do that if you wish. However, if you've checked the Virus for balance as recommended, and made sure there are no warps in any of the surfaces, then I believe with this particular design it is perfectly safe to go right ahead with your first powered flight.

The reason it is safe to proceed with the Virus is that with the high camber, single surface wing and the long tail moment, this model can be considerably out of perfect balance and still fly very well. But I'm going to say it once more for emphasis — no warps! There probably won't be any, since you built it on a flat surface, but double check and remove any that might appear. All models, even though perfectly balanced, will have bad flight characteristics if they are warped. That is, unless as sometimes happens, the warps cancel each other out. But don't depend on it!

For your first flight, and if at all possible, get an experienced RC modeler to help you. If you can, then you don't need to read the rest of this article, because any modeler of average experience will fly the Virus once and tell you it's just about the gentlest controlled job yet. But if you're by yourself, then do it this way:

First, pick a quiet day. The Virus flies well in the wind, but you won't know whether you are controlling it or the wind is making it bank and turn.

Next, if you have a runway so the model can take off, let it do so. Here again, most models for beginners might be better off if hand launched, but the Virus gear makes takeoffs so easy that the airplane actually gets into a better flight attitude by itself than if hand launched.

The model will run down the runway and slowly lift into the air. As the nose comes up, watch closely — if it starts to come up too high, press for right rudder to get the model into a climbing turn. Don't hold the signal too long, though, or the right turn will develop into a right spiral.

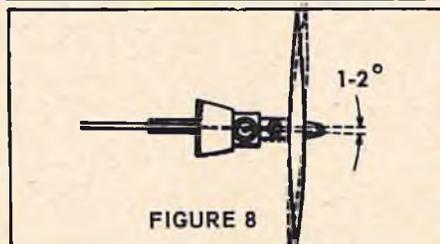
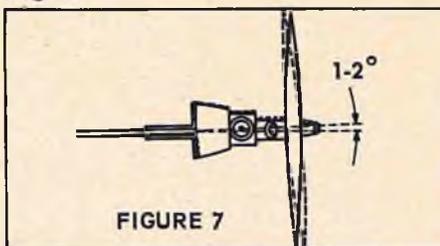
If, by chance, your motor alignment is slightly out, and the model leans over into a sharp turn, then give it opposite rudder to keep it from spiraling down hard. You'll have to keep doing this until the end of the flight. Afterwards, readjust your motor alignment for the next flight. It's also possible that your rudder or fin is slightly out of line. Here are the basic adjustments:

1. Model climbs to left, glides to left. Adjust rudder to right, a little at a time, until corrected.

2. Right turn in climb and glide.

Adjust rudder to left.

3. Tight left circle under power, with straight or right circle glide. Add right thrust to motor (1-2 degrees). See Fig. 7.



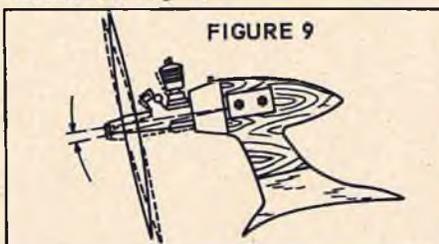
4. Tight right circle under power with straight or left circle glide. Add

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Circle No. 110 on Reader Service Page

left thrust to motor. See Fig. 8.

5. Model swoops under power and tends to stall, but glides well. Add down thrust. See Fig. 9.



6. Model glides well, but dives in under power. Take out some down thrust. (Very unlikely with the Virus).

All of the above adjustments are on the order of one or two degrees from the angles shown on the plans. The built-in downthrust of the Virus, which was arrived at only after trying several settings, will give a smooth transition

(Continued on page 57)

SHOWCASE '64

(Continued from page 36)

is a high quality solder which will solder landing gear wire, stainless steel, piano wire, and other dissimilar metals, and with strength up to 15,000 psi at elevated temperatures. This material was primarily designed to solder radio receiver, power pack, and servo wires in the field with an ordinary book match — and it will do just that! This material melts at 450 degrees and is a flux-core silver-bearing alloy. Price is 60¢ direct from Willoughby Enterprises, 14695 Candeda Place, Tustin, Calif. Overseas modelers can obtain Super Solder from their dealers via Exportations. An excellent product. Circle #6 on the Reader Service Card for information on the Willoughby line.

Sampey and Company, whose proportional equipment holds both the 1963 Nationals championship and the World's Altitude Record, announces a new single channel proportional system. The Starlite 200 series receiver employs a DDM-1 demodulation discriminator module as a proportional discriminator. New epoxy silicon transistors are used to provide extreme superregen narrow band operation and wide operating temperatures from 0-160 deg. F. Frequency coverage with this receiver is 26 mc to 150 mc. The receiver uses six transistors plus the DDM-1. A modulation omission detector circuit allows direct compound escapement operation, or the detector may be used for a motor control escapement when using the proportional output with a closed loop servo. Fail safe operation is provided when the servo signal voltage returns to zero volts. Input voltage is 6VDC. Size is 1½" x 2¾" x 7/8". Weight is 1.4 ounces. The companion Starlite 200 transmitter utilizes a single transistor (RF osc/RF output) to provide 100 mw output, however to provide the extra kick needed for low power operation, places a greater emphasis on the modulator which incorporates 3 transistors. The manufacturer states that, although the conventional loaded whip antenna has been eliminated, range exceeds that provided by a 1.5 watt input tube-type transmitter. The most unique development of the transmitter is the frequency oscillator. This is a

(Continued on page 52)

MULTI STUNT

(Continued from page 43)

nose up slightly with elevator. "Down" elevator will be needed on each roll coming into the half roll position. Primarily, this is a timing maneuver and only long practice will get it perfect. For judging purposes, it is better to do consecutive rolls downwind, since flaws in the rolls are much less apparent. When rolling into the wind, the ship has less movement over the ground so that every correction is magnified to the judges eyes.

Four Point Roll

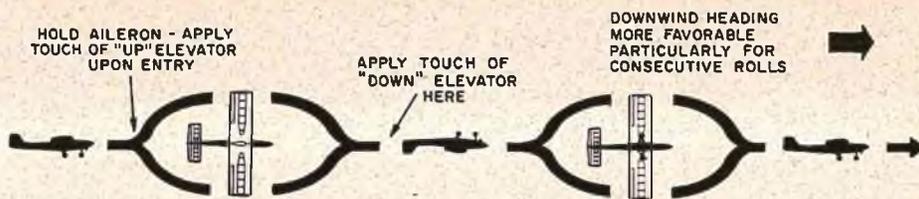
Unlike the ordinary roll, the rotation of the wings is halted momentarily at each quarter point of the roll — that is, with the wings 45 degrees banked, 90 degrees, etc. Before entry, raise nose slightly, then hold aileron as before. However, the precise point at which you get off the aileron to stop rotation at the quarter roll positions will require many attempts and much practice. Aileron will be neutralized slightly before each such position is reached — and at the top, when inverted, the usual slight "down" will have to be fed in. For judging, this maneuver is best performed on a downwind heading.

Cuban Eight

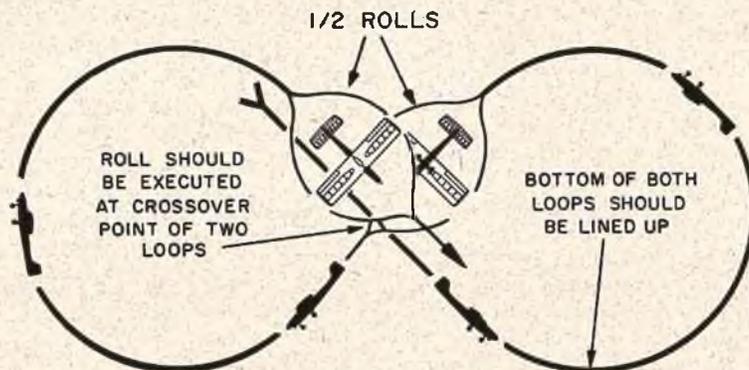
This is a real timing maneuver! The maneuver consists of a bit more than a half inside loop, followed by a roughly 45-degree dive during which the plane is rolled upright before the bottom of the dive is reached, followed by another half inside loop with the same dive and roll to recover. The bottoms of both loops should be on the same line — one not lower or higher than the other — and the rolls should be executed at the crossover point between the two loops. As the maneuver is completed, the nose will be down and "up" elevator is pulsed to attain a straight-out recovery.

Three-Turn Spin

Many people have trouble making an airplane spin — particularly light, stable machines which fly well on minimum



HORIZONTAL ROLL



CUBAN EIGHT

power. The entry is required to be made from a straight ahead stall. The stall is induced by "up" elevator, and as the stall breaks, hard-over rudder puts the ship into a spin. The spin continues as long as these controls are held — hard "up" and right or left rudder. Recovery takes place when the controls are neutralized. Sounds simple, but there's a lot of technique required. To approach the stall, the airplane is gradually slowed up by feeding in increments of "up" trim. Then, when the plane, throttle back, is fully slowed down, begin to pulse "up" elevator to raise the nose. Do this gradually. Occasionally, a plane will have a clean-break stall that can be seen. Usually, however, it is necessary to sense, or estimate, the point of actual stall (it is fairly obvious) and this is especially true at contests where the location of the crowd may force your making this maneuver farther out than ordinary. Or, alternately, in some less desirable spot. The recovery should be on the original heading. On our Citation, the best point to relax controls is after $2\frac{1}{2}$ turns, or on the opposite heading from that for the entry. Due to the "up" trim still present, the ship will want to climb from the recovery dive. To come out level, leave the trim alone, and pulse "down" elevator. As soon as the recovery

is complete, remove the "up" trim, and go back to high motor.

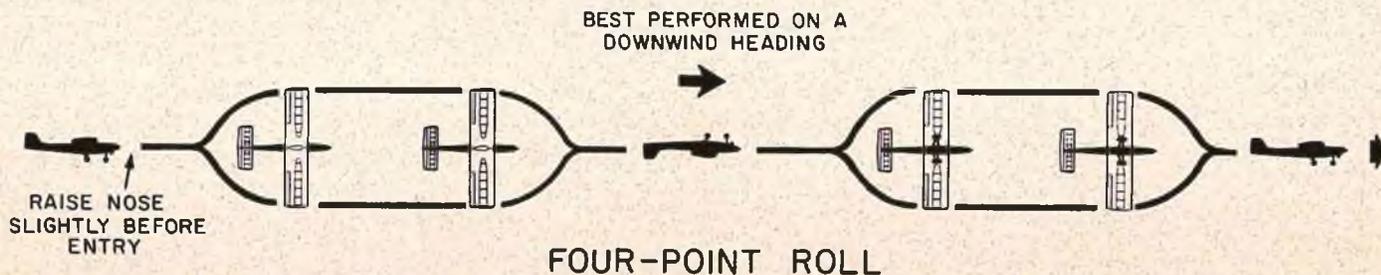
A reluctant spin entry can be sometimes forced by adding a touch of power. Of my four Citations, only one required this occasional slight increase as the hard-over rudder was applied.

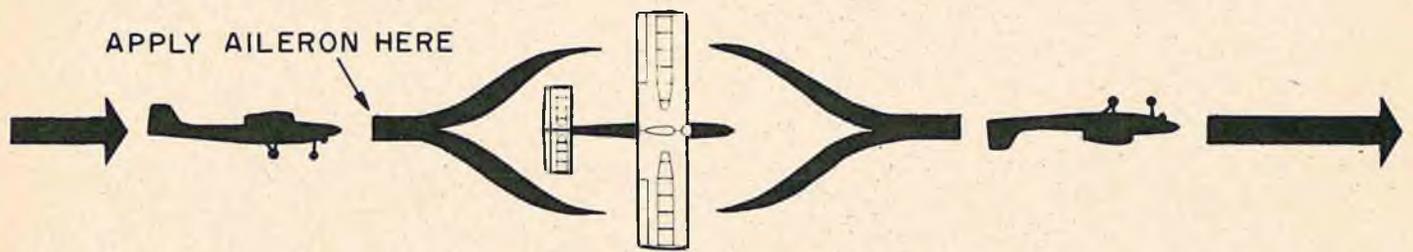
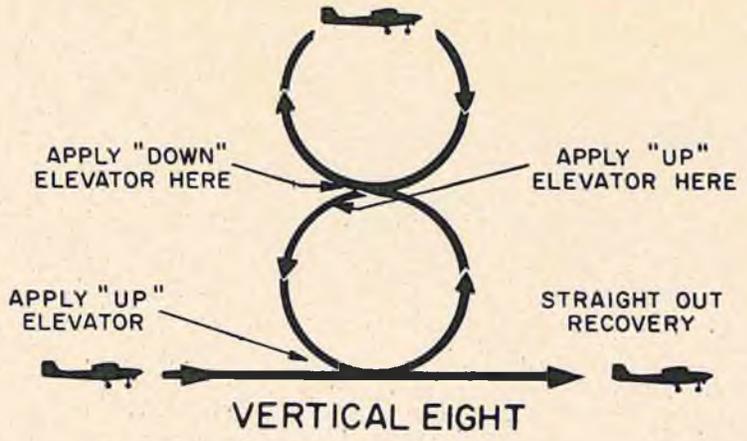
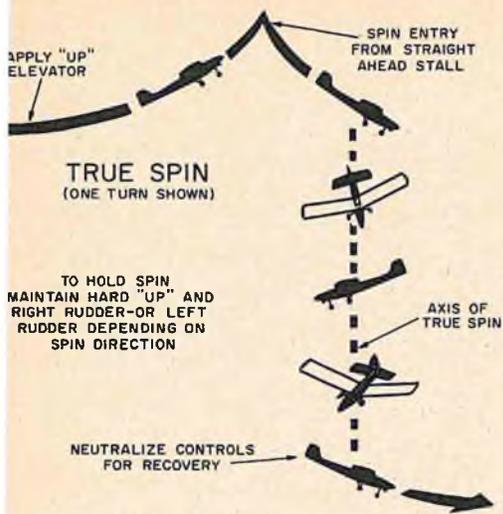
Inverted Flight

Most fliers prefer to enter from a half roll — as do I. However, I sometimes enter from a half inside loop, because on recovery, the nose can be positioned slightly up without difficulty. Our Citation tracks very well inverted or right side up from normal flight without use of special trim. Inverted flight can be achieved, too, after a half outside loop.

Vertical Eight

Entry is from straight and level flight, using "up" elevator to perform a half inside loop, at which point "down" elevator is applied to perform a full outside loop, at the bottom of which "up" is again given to perform the half inside loop which completes the bottom of the eight. Recovery from the bottom should be straight out. By relaxing "up" elevator with the plane in the nose down position near the end of the eight, and then blipping "down" as the ship comes into the bottom of the eight, you can achieve such a recovery.





INVERTED FLIGHT (ENTRY FROM HALF ROLL SHOWN)

The maneuver should be entered into the wind so that the outside loop portion is executed downwind, which minimizes drift.

Split S

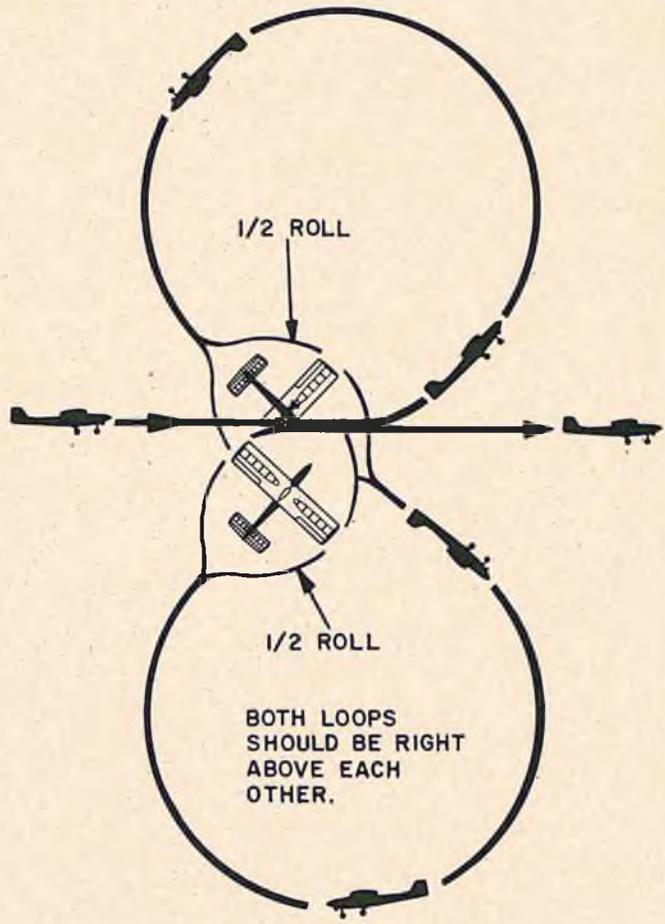
Entry is straight and level from a reasonably high altitude. Apply aileron to put the airplane on its back, immediately followed by "up" elevator to perform one half inside loop. Recovery is straight and level.

Rolling Eight

The rolling eight differs from the vertical eight in that an inside loop is performed after a straight-line entry with half a roll at the bottom of the loop. Entering another inside (downward) loop, the recovery is a half roll back to level, right side up position on the altitude and heading of the initial entry. Timing and anticipation need to be sharp because the rolling recovery after each half of the maneuver needs to be effected by the time the crossover point is passed through.

Traffic Pattern Approach

While it is nice to practice this in the same direction for consistency, contest conditions often make it necessary to approach after a righthand, instead of lefthand, turn off the cross-wind leg. The maneuver is made by flying into the wind, off to the side of the designated landing circle until the circle is passed, then a 90 degree turn is made passing



ROLLING EIGHT

(Continued on page 53)

new!

OMEGA 60



Tapered Wing
Span 60 inches
Area 525 inches
flat bottom airfoil

Engine .15 .19 .25

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Airframe Design by john zaic

The OMEGA 60 design is simple and practical. Control systems may be six or four channel servo, proportional or even simple escapement rudder only. Trike gear is of the flexible type for cushion landings. Extra roomy fuselage for more equipment space. The airfoil used allows more relaxed sport flying. These are only a few of the practical features that make the OMEGA 60.

\$9.95

SERVO ELEVATOR

(Continued from page 21)

following items:

1. One Bonner VariComp compound escapement. (Other makes could be used, but you must have one with an electrical third position in addition to quick blip motor.)
2. One SN escapement for throttle control.
3. Five NiCads in a plastic sheat or with a battery holder. In any event, you must be able to tap between cells. Our Rudder Bird uses a 500ma pack as this can be used to power a full house multi installation later on.
4. One Bonner Duramite multi servo. You can buy an amplifier for this later on when you make the switch to multi.
5. DPDT switch, servo mounting hardware, elevator control horn, linkage, etc.
6. You will also need one old Bonner VariComp or SN escapement. All that is required is that the magnet still actuates the arm when current is applied.
7. One micro switch of the very sensitive type with NC, NO, and C contacts. You may have to go to a surplus store for this part. Any switch that actuates with very little pressure and requires .020 of an inch travel or less should get the job done. (See photo). Also check to see that the switch has a hole, or holes, allowing it to be mounted on its side.

The heart of the system is the micro switch mounted on the circuit board of the old escapement in such a way that when current is applied to the escapement the arm contacts the switch but-

ton, which in turn, operates the servo. When power is released, the servo returns to neutral. The old escapement, with micro switch attached, is hooked up on third position of the rudder escapement. This unit was constructed in the following manner:

a) Inspect your switch to see if the plastic button is rounded on top. If so, file it flat. Your wife's fingernail file will do the job nicely).

b) Remove the wheel from the old escapement. This can be done by holding the wheel and rotating the rubber hook in a counter-clockwise direction, looking at the escapement from the rear. If you are using a VariComp, trim off all excess circuit board, leaving only enough room for the type of mounting you intend to use.

c) Relax the spring tension of the old escapement so that the arm just barely returns to its original position after current is applied and shut off.

d) Place the switch on the escapement board so that the arm will contact the button when current is applied. Hold the switch in place with a Perfect wood screw driven into the circuit board. Remember that the closer the arm comes to the magnet, the greater will be the prssure on the switch button, and you want as much pressure as you can obtain. With only one screw holding the switch it can now be rotated for small adjustments. Later, after mounting in the plane, and following final adjustments, it may be affixed permanently in place with epoxy cement.

e) Hook up the switch according to the diagram on the side of the Duramite servo and apply current to the old escapement. The servo should run each time the escapement is actuated and return to neutral when the current is shut off. If it works as described above, it is now ready for mounting in the airplane and wiring across the third position of the rudder escapement.

You are now ready to mount all components in the ship. In order to sim-

plify the linkage, the servo should be mounted to the rear of the rudder escapement. (See photo). In order to do this you may have to move the rudder escapement forward. This change will also allow you to carry more winds for extended flights. You are now ready to wire up the system as shown in the illustration. After wiring, check to see that your elevator operates every time the rudder escapement is held on third position. If it does not, readjust the position of the micro switch on the escapement board. After everything is working properly, fix the micro switch firmly in place by adding another screw or using epoxy cement.

Flying:

You have spent a considerable amount of time constructing your airplane and installing the gear. The following procedure should get you in the air without damage due to poor trim on the initial flights.

a) Adjust landing gear so that model tracks absolutely straight when the model is rolled by hand over a level surface.

b) Start engine and check out radio gear.

c) Release model.

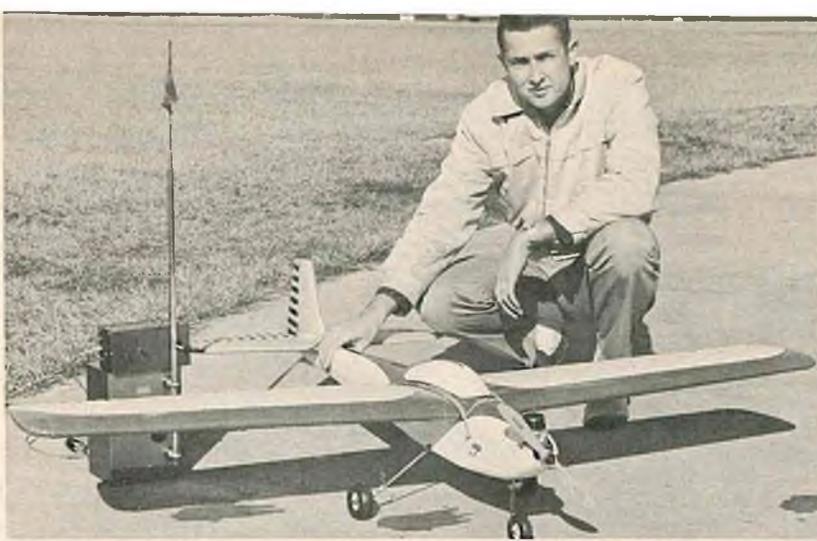
d) If the model turns violently while on the ground, under power, it will probably turn the same direction in the air. Hit low motor and find the cause of the turn.

e) If the model tracks straight under power, wait until it has built up a good head of steam, then press the transmitting button three times, holding the third pulse only a fraction of a second. When this is done, the model should break loose. If it does, then starts to sink back to the ground, hit low motor and apply a little up trim before the next attempt. If it does get airborne and then starts to fly level or with only a slight climb, you can apply more elevator and rudder commands to gain altitude and bring the model back over your head.

I would suggest that a *slight* climb be built into the final trim. This will provide ample insurance if any part of the elevator circuit fails to function while greatly simplifying takeoffs. Remember, you do *not* have simultaneous rudder and elevator control!

For those of you who are inclined to experiment a little further, I would appreciate hearing about a *simple* method of getting down elevator from this system while still retaining the up function. The possibility of operating brakes off of up elevator might also be explored.

From here on in, you're on your own! If you run into any problems or make additional improvements, I would appreciate hearing from you c/o R/C Modeler Magazine.



THE JUBILEE

(Continued from page 25)

superhet receiver, end mounted; Medco NiCad pack; and four Bonner Transmitters mounted on an RGA Servo Solver Transmitter tray. (The Servo Solver simplifies the installation, and proved to be the exact size for the Jubilee). A fifth servo for the aileron was mounted inside the painted canopy on top of the wing. A Skyline trim bar was used for elevator trim. Transmitter was the new Kraft Custom 10.

The initial test flight conducted by RCM Managing Editor Chuck Waas, was plagued by vibration affecting control surface movement. Upon landing, the nose gear proved to be slightly long and loose in its bearings, and the Jubilee cartwheeled, wingtip over wingtip. Although this was sufficient to cause extensive damage to a conventional multi ship, no damage was done to the Jubilee. Upon correcting the nose gear and receiver mounting problems, the Jubilee was put through its paces. It proved to be outstanding in all respects. Flight characteristics were similar to an Orion, although slower. It performed the entire AMA pattern with ease, with good inside and outside maneuvers. Vertical eights and rolls were excellent. The ship appears to have "built-in" spin characteristics, with the spins proving to be something to behold! Take-offs on all flights were very good. The Jubilee proved to be completely controllable at all speeds, and not tricky in any respect, as evidenced by the comments of the many fliers who handled the controls. Several beginners piloted the Jubilee and experienced little, if any, difficulty. In this respect, this new ship prove excellent for the

beginner to multi. In addition, its durability is far greater than the conventional ships to which we have become accustomed.

Overall flight test rating: Excellent, all respects.

By the time this article is in print, the first Jubilee's should be in full production. Price will be \$49.95, ready to "stuff" after a simple wing splice and gluing on of the tab. We feel this is a good price, and subsequently less than the amount of money invested in a conventional multi built from scratch. Finished wings will also be offered separately in a 2415 section tapered from 12" to 9". This is the stock Jubilee wing and will be priced at \$9.95.

Having thoroughly tested and experimented with the Jubilee, RCM offers the following suggestions in the event repairs should become necessary:

- 1) Thoroughly read all of the data furnished with the ship.
- 2) Go through the familiarization experiment shown on the instructions and note the effect of too much Air-O-cement. A little of this adhesive, working by capillary action, goes a long way — too much softens the material.
- 3) Don't get *any* Air-O-cement on the foam filler, should the latter become exposed by damage.
- 4) Make all repairs between two dissimilar materials with *epoxy* cement. Use only Air-O-Cement for repairs involving adhesion of Air-O-sheet to Air-O-sheet.
- 5) Use a .45 or .49 for best performance. Study the plans accompanying this article for the proper thrust angles.
- 6) For first flights, fly at $\frac{1}{2}$ to $\frac{2}{3}$ power so that you can get the "feel" of the ship.

We tested it and we liked it. The Jubilee has earned our highest recommendation. This ship can be ordered direct from L. R. Purdy, Powder Springs, Georgia. Price is \$49.95 and cash, check, or money order should accompany your order.

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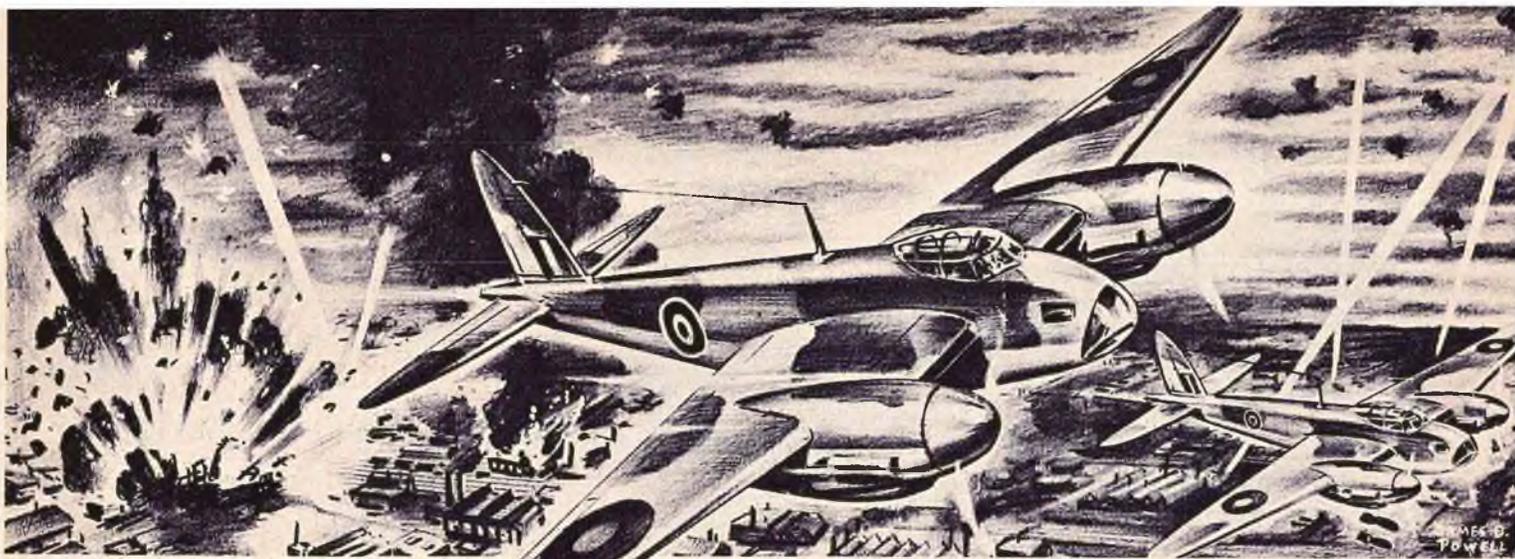
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Circle No. 115 on Reader Service Page



The Cleveland Story

● In March of 1919, a young man named Ed Packard started a new business by selling strips of wood which he had cut at a local cabinet shop, some wire fittings which he had fashioned by hand, rubber bands, hand carved propellers, Japanese "rice paper," acetone, colloidon, and some "banana oil" obtained from local pharmaceutical houses. With the next two decades, this business became one of the largest in the model industry—the world famous Cleveland Model & Supply Company.

Many of us who have been in modeling for a number of years remember the great Cleveland free flyers—the Playboy Junior and Senior, the Baby Playboy, the seven-foot span Stinson Reliant, and the kit that in 44 years has outsold any other ever manufactured, a 1938 design, the Cleveland Condor glider. This kit earned its reputation as the world's most popular flying model by selling over two and a half million kits! And in scale models, the letters C-D, Cleveland Designed, became synonymous with complete authenticity. And every kid who built models, built a Cleveland kit — from a simple 25¢ "dry" rubber kit, to the more elaborate contest designs marketed by this firm. Every model magazine contained full page advertising spreads for Cleveland products—articles on contest performance carried details of the most recent victories of modelers with Cleveland designs. And then, some forty years after its beginning, the Cleveland Company began to disappear from view — its ads were no longer predominant, and eventually were seen hardly at all. The last Cleveland kits were dusted off and

sold at discount prices from dealers' shelves, and suddenly, without realizing it, a new era of modeling had come into existence and a great company passed from view. This is the Cleveland story — how it happened, and why. It is the story of one man's contribution to the world of modeling, of his rise and fall from popularity, and of his quiet comeback, forty-four years later with yet another great contribution to our hobby. It is also the introduction of the Cleveland Company to a new generation of modelers.

In all of the years from 1919 to the present, Ed Packard's love for aircraft and good model building never died. Shortly after the first World War, Ed began gathering newspaper clippings and other meager data from any source possible, and designed his own full-size light plane in order to learn to fly. This was followed by two other designs — all prior to 1925. Packard was then associated with the Glenn L. Martin Co., working in assembly, wood, metal, and the welding and fabric shops. He worked, too at the Fokker Aircraft Corp., in similar endeavors. He was active in glider flying and was secretary of both the Cleveland Glider Club and the later formed Cleveland Glider Association. A prolific writer, Packard also wrote a thirty-five thousand word treatise on basic aerodynamics and model aircraft design. He was personally acquainted with many aviation notables, among them many of the early pioneers of flying — the top names in aviation's Hall of Fame. It was also during this period of time that Ed designed and built a "cyclecar" — better known today as a Go-Kart! And,

during this entire period, Packard was carrying on the first aviation authenticity research — collecting data and photographing planes and their important details. As the data was gathered, it was incorporated in the Cleveland kits that came from his model factory — over five hundred designs including superbly detailed scale jobs which consistently earned the world's highest honors for model kits. The Cleveland designs were so exquisitely detailed that many have become museum pieces. Yet, Cleveland kits *flew* as well—giving a very creditable performance in each and every case, as many of the oldtime modelers will agree. During 1933 and 1934, Ed Packard published a magazine, or "house-organ," entitled Cleveland Modelmaking News and Practical Hobbies — better known as Cleveland Model News. This publication, rated by many as the finest periodical ever published in the model industry, was intended to bring the world's finest model designs into the hands of model builders everywhere. It was also intended to further one of its publisher's greatest goals — to encourage really fine craftsmanship in the model field. Seven issues were published, then a fire at the uninsured printers plant caused a loss so severe that Cleveland Model News had to be discontinued. Today, a single copy of this publication is a collectors item — a complete set is almost priceless.

Prior to, and during WW II, a listing of the Cleveland kits available was like reading a history of aviation, for almost every full-scale ship had its Cleveland kit counterpart. The Gee Bee, Laird Solution, Wedell Williams Racer, Boeing 95 Mail Biplane, Arm-

strong Whitworth Quad, the P-38, Black Widow, Douglas A-20 — all were part of the Cleveland line.

And then came the postwar era. The following decade saw a decline in interest in scale "built-up" models, and realism and authenticity were forsaken for prefabrication. And rather than compromise with fidelity and accuracy, Cleveland Model Company gradually began to bow out of predominance in the model industry. In watching it pass, many old time model builders wondered if modelmaking too, as they knew it, would soon pass into obscurity. And this type of model building—the Cleveland way—taught and instilled the pride of accomplishment, the exactness of fine craftsmanship, encouraged patience, ambition, and the spirit of creativeness to the

modelers of its era — the businessmen, technicians, engineers, physicists, and average working man of today's fast-paced world. It was Ed Packard's belief — his dream, if you will, that persistent activity in good, creative modelmaking would help form the principles of good citizenship so important in each individual. And Ed Packard — and the Cleveland Model Company — founded on these principles — succeeded in these goals.

Today, all of us look for prefabrication — for the quick and easy way to build models — and this is not to be criticized, for this is an era of prefabrication by machine process. But most of us in modelbuilding, began our model activities in the "Cleveland era" — we began with solid principles of good modelbuilding. Many of today's top scale fliers still retain and use these principles in their fine models. All of us use some, or all, of the principles we learned in that era. But we *did* learn them!

Today, Ed Packard has come back into the modeling world with a new contribution, based on these principles. The Cleveland-Peerless company is releasing all of the great Cleveland designs in plan form. These plans — many of them collectors items — are among the finest scale plans in the world, and of immense value to the

scale builder. In many cases, printed sheets of bulkheads and ribs are available for the individual design. With so-called "scale" and semi-scale designs comprising the majority of sales from plans services throughout the country, this new service should prove to be extremely popular with scale modelers in the RC field. We obtained a set of plans for the seven foot Stinson, originally designed for RC, along with the available bulkheads and ribs. It's been a long time since we have seen scale detail of this nature. Cleveland-Peerless is making available their Historic Model Collectors Handbook-Catalog on a yearly subscription basis, which lists all of the available Cleveland designs. We suggest that all RC scale modelers write to Cleveland-Peerless at 4510 Lorain Avenue, Cleveland 2, Ohio for additional information on the currently available Cleveland services.

Perhaps even a few kits are still available — perhaps more will be manufactured if the demand so warrants it. We hope so. For this is the Cleveland story, where the nobility of conscientious labor and the joy of willing service has made that name one of the greatest in the history of modelmaking.



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(Continued from page 45)

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to do is send Aero-Trol one dollar deposit which is completely refundable with your first order of five dollars or more. In other words, the catalog is free to their customers and costs a buck to the curious.

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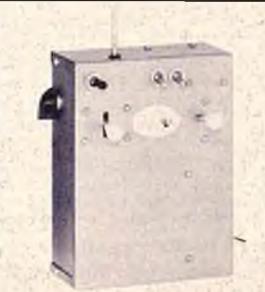
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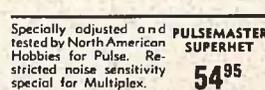
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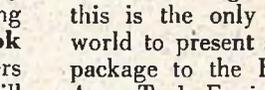
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according to Jere Tyrer, President of Aero-Trol Engineering advertisement this is the only RC supplier in the world to present such an ideal catalog package to the RC modeler. See the Aero-Trol Engineering advertisement in this issue and **Circle #8 on the Reader Service Card** for complete information. We feel you will be glad you did, for this catalog belongs in every RC'ers workshop.

From Ron Murray of Royal Products comes news of two new multitesters for RC use. The first is the TH-B36 Model, a handy unit measuring approximately two and one-half

22DB. Capacity: 10uuf to .001uf; .001uf to .1uf. Price is \$12.95. Carrying cases are available for both of these imported units. **Circle #9 on the Reader Service Card.**

A neat and compact two-pencil battery box has been made available by Hillcrest for use with single channel relayless receivers. This is the smallest battery box we have seen to date. Constructed from high grade heat and shock resistant plastic, the units are completely fuel proof and feature a sliding cover that holds cells

(Continued on page 58)

MULTI STUNT

(Continued from page 47)

the circle on the upwind side, then another 90 degree turn onto a downwind leg off to the side from the circle. When the pilot judges it is time to begin his approach, another 90 degree turn is made into a cross wind leg — this is well downwind from the landing spot. A final 90-degree turn is made toward the spot for the final approach. I personally prefer flying the ship onto the ground. If there is a wind, "down" trim may be needed to come in fast — I sometimes even pulse "down" elevator if I need to get closer to the ground. If low, a touch of "up" will make the ship "reach out." Brought in at the correct intersecting angle, no "up" elevator or "up" trim will be required. The ship will fly right on and pitch forward onto its nose wheel to stay down. On the Touch-and-Go, power is reapplied for takeoff after some ground run is achieved. This distance on the ground varies so much with different judges that the flier will have to suit himself to the individual contest. In calm weather, "up" trim can be used to slow down the ship.

Tail Slide

This is a difficult maneuver. The ship is brought into a steep climb attitude with "up" elevator, simultaneously throttling back, with the result that the aircraft will carry through to the stall point, hanging very nose high. If lucky, and if done precisely, the ship then will slide backward, tail first. As the slide develops, full "up" elevator may have to be given. The air flow now is from the back, and striking against the bottom of the "up" elevators, prevents the ship flopping abruptly onto its back, which would kill the maneuver. The nose should suddenly whip down and forward into a dive after "up" elevator is given. I have been able to perform tail slides with the Citation five times out of every six attempt. Sometimes elevator corrections are needed to achieve the proper climbing angle. The maneuver is easier when entered downwind. The downward entry builds speed for the attempt.

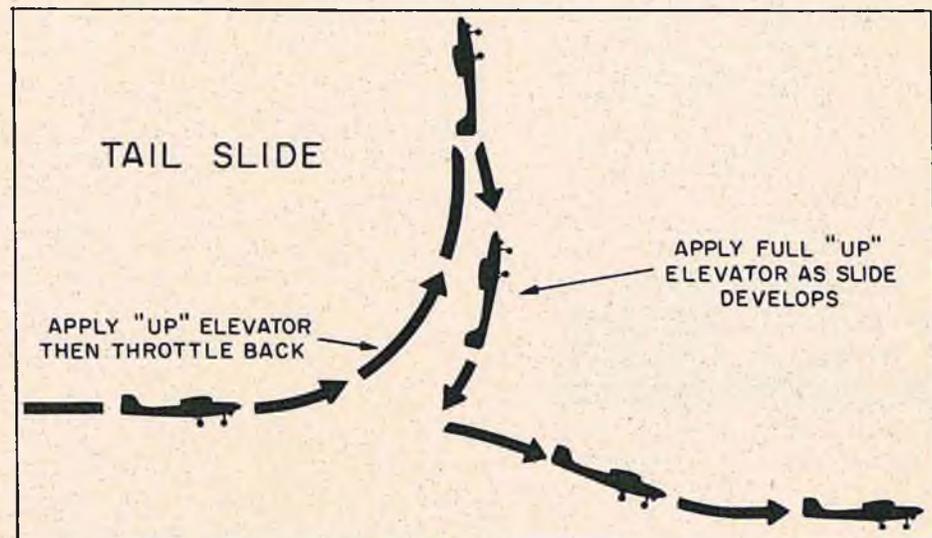
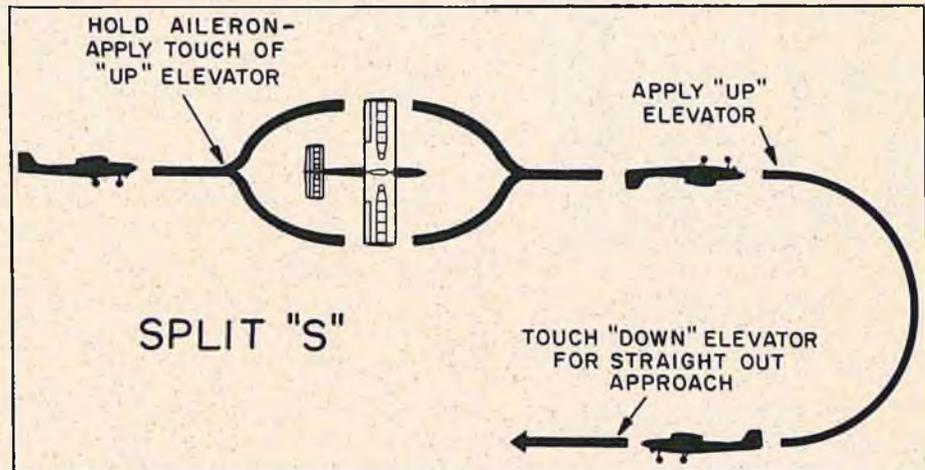
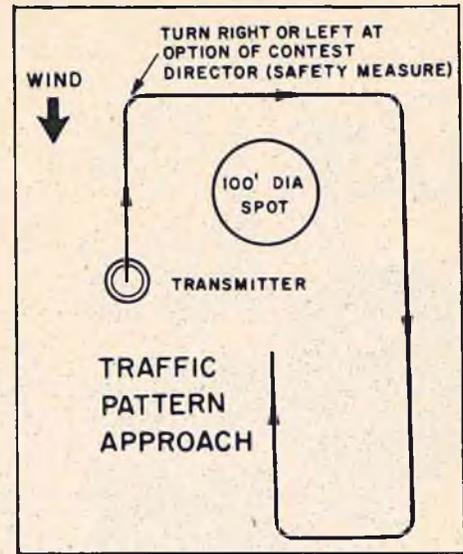
General

For good stunting, the aircraft must be built true and without warps. It must fly straight! No compromise can be made

with control surface adjustments as compensations. Corrections in flight must be minimized. All stunts must be entered with the ship lined up perfectly. If not lined up, take time to make corrections before the maneuver is begun — this is far better than making corrections during an actual maneuver.

Beyond this we might add that you can fly multi successfully for fun and sport if you have average eyesight and reflexes, and are willing to spend an occasional few hours at the flying field.

If you're entertaining the thought of flying in competition, check your eyeballs and make sure those reflexes are lightning quick! In addition, practice, more practice, and still more practice are in order — and when you're through, start practicing again!



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GRID LEAKS is enjoying the biggest boom of subscribers in its 6 year history. This is appreciated, but it is also bringing requests from many of the new subscribers for back issues. In fact, the pressure has become so heavy that we are going back into Volume 3 and making a limited re-run of all of this volume. Some few numbers of Volume 2 also remain, but present plans do not call for a re-run. This is a one shot offer, and if you want back issues, send in your order now! They'll be sent to you just as quickly as they are off the press.

While the printing is a different style from the "NEW" GRID LEAKS, these copies do contain the same valuable material. Once this run is exhausted, there will probably not be any further re-runs.

Limited quantities of Volume 2 are available. They are Nos. 6, 7, 8, 9 and 10.

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THE DIGICON

(Continued from page 27)

are used with the elevator and aileron control on the right, and the rudder and engine on the left. Both sticks are self-centering with the exception of the engine control function which stays in any position by a detent arrangement. All controls are trimmable by means of individual trim knobs. We experienced minor mechanical difficulties with the elevator and aileron stick "hanging up" in the upper-right position when it became entangled with the synthetic rubber face plates that cover the stick openings. This was reported to the manufacturer and subsequently corrected on all production models. We particularly liked the motor control level with its large number of minor "stops," enabling the engine to be trimmed to the smallest desirable increments of control. The transmitter is supplied complete with battery pack. When the transmitter antenna was connected and extended, and the transmitter turned "on," the radiation meter read three-quarters of full scale. Initially, the modulator in the transmitter failed to start in the correct mode, causing the servos to run to positions irrelevant to the control sticks. This is not uncommon when initially "firing-up" the transmitter, and all that is required is to simply turn the switch off and on again, which will correct the situation by starting the modulators in the correct mode. This does not occur during normal flying but is an initial "turn-on" phenomenon.

Manufacturer's specifications for the Digicon transmitter are as follows:

Power output One-quarter watt
Operating voltage 12 volts DC
Audio modulation.....Approx. 500 CPS
Modulation percentage 50%
Tuning range 26.955 to 27.255 mc
Frequency tolerance005%
Antenna 54" four-section collapsible whip
Operation time 5 hours continuous on one charge

Operating temp. range 0-140°F
Size 9 x 6 1/2" x 2 1/4"

RCM tests of the Digicon transmitter showed excellent frequency stability as monitored with a Hewlett-Packard 524D electronic counter. Equipment accuracy was .0001% plus or minus one count. The maximum frequency drift over two hours of continuous operation in varying temperature ranges from 70-120 degrees F, was 830 CPS, or approximately .003%. This is two times better than FCC requirements. Modulation was very clean and approximately 50%. The transmitter is minus any unnecessary frills, and has

apparently been designed for complete ease of operation. It is balanced correctly and extremely easy to handle.

The servos used with the Digicon system are proportional closed loop units, designed and built by Steeb, and driven by digital type solid state circuitry, and producing full torque regardless of the amount of control commanded or amount of load. There are no DC amplifiers to cause neutral drift with temperature or battery voltage changes. The centering accuracy is as good or better than reed systems. Servo response time is substantially better than reed systems. Manufacturers specifications for the servos and servo amplifiers (the latter contained in the receiver) are as follows:

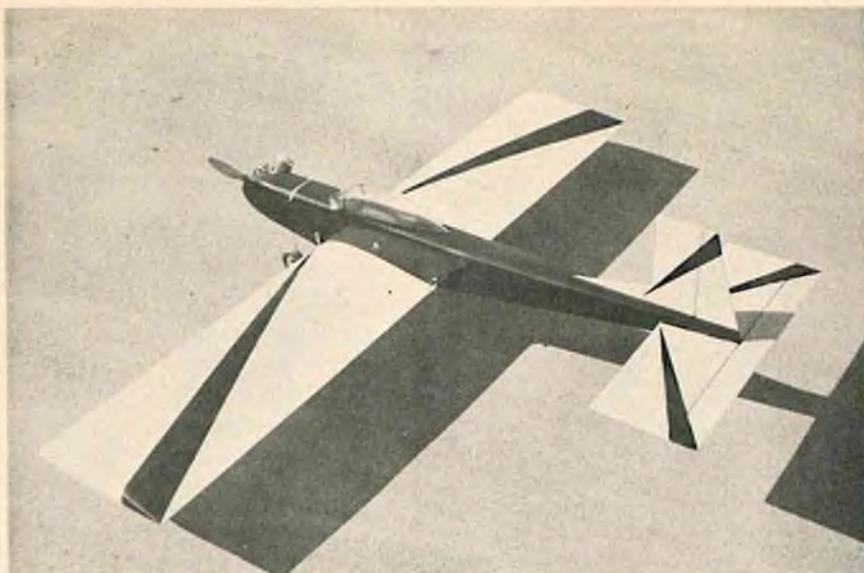
Servo centering accuracy ±1%
Response time Less than 10 milliseconds
Interaction None
Torque.....Full at any error amplitude
Drift ±1%, 0-140°F
Feedback pot Carbon

Our opinion on the Steeb servos are that they are one of the finest servo units we have seen to date. Using a carbon follow-up pot gives very little chance of catastrophic failure, as the servos will get noisy when worn, providing adequate warning that replacement is necessary. All units were exceptionally smooth.

Total airborne weight of the complete Digicon system is approximately 32 ounces. Complete price from Digital Control Systems Co., including servos, wiring, switch harness, built in nicad charger, nicad battery packs and charging cord is \$495.00. Spare Steeb servo units are \$14.95 each. The equipment, including transistors, is warranted by Digital Control Systems to be free of defects in workmanship and materials for 90 days from date of purchase.

It is worth noting that both Digicon units tested were almost identical in performance specifications. It is also worthy of note that all Digicon proportional systems are taken from final assembly and flight tested by the manufacturer prior to shipping to the customer.

Although, as mentioned, we have no way of analyzing reliability standards, the tests conducted by RCM equalled or exceeded the manufacturers specifications in all cases. We feel that the design concept of the Digicon system is excellent, and based on our findings as listed above, recommend this proportional system to the serious multi channel flyer. Those owners of Digicon systems contacted by RCM concurred in these recommendations. The technical and instruction manual for the Digicon system is available for twenty-five cents and can be obtained by writing Digicon, c/o R/C Modeler Magazine.



No dihedral, fast construction characterizes Kwik-Fli, new multi design from Phil Kraft. To be featured in RCM.

FLY-IN

(Continued from page 31)

One of our favorite single channel ships is the deBolt Ercoupe. The photo of Walt Staff with his version of this versatile little RC ship, was forwarded to us by Virginia King of Citizen-Ship Radio Corp. Walt was one of the winners in the Awards Program, conducted each year by Citizen-ship. The Ercoupe uses the MDL receiver, SE-2M escapement, and the popular TTX transmitter, all by Citizenship. Walt has taken one first and a second place in local rudder only contests with this bird, now two years old and still going strong. ROG's are said to be excellent.

Contest Data

One of the most discouraging aspects of a contest director, or program chairmans job, is the lack of participation in club contests. Where participation in these events once meant a day of fun for everyone involved, the emphasis, either real or imagined, seems to have shifted to the "fly for blood" category. This is not meant to imply that the competitive spirit has ever been missing from our contests, but it has become alarmingly apparent that the newcomer to our hobby will not only fail to enter contests, but will often drop out of a club completely where the emphasis is primarily one of trophy collecting. The many letters we receive on this subject can best be summed up in one from Eldon Lind, CD for the BIRDS of Long Beach, California:

"Lack of participation in contests is a problem I believe RCM could help

solve. We have many model builders and flyers, but the percentage who participate in contests is ridiculously low.

"Why? Is it that they don't think they can win? Is it that they feel they will be embarrassed? Is it that they are ashamed of their airplanes? Is it that the entry fees are too high? Is it that they aren't notified of contests? Or, is it that they are simply afraid of competition?

"I enjoy the challenge of building; I enjoy the challenge of installing the equipment to work properly; I enjoy the challenge of being able to fly my models; I enjoy the companionship of fellow modelers in "fun flying"; but I also feel the most enjoyment obtained is the challenge of Contest Day — trying to make everything work right at the right time — particularly my own thumbs! I have been building and flying model airplanes most of my life. I thought I was an average modeler, but I enjoy flying in contests now. The first few contests you enter you will feel as if your legs are made of rubber and your hands are all thumbs — you goof in every way possible, but you go home determined to improve your ability.

"Maybe our present system of contests could be improved upon, and I don't mean by eliminating precision flying. Maybe more awards should be given for the best construction and the nicest finishes, since this too, plays a big role in our hobby. Also, maybe an award for the fellow who tries so hard but has bad luck (equipment, crashes, etc.). Maybe even booby prizes!

"One thing I would like to call attention to is that any other competitive hobbies or sports have numerous classes for the amount of skillfulness the person has perviously proven. By

(Continued on page 56)

BEWARE OF THE R-C BUG!



This "bug" lurks in your workshop and in the flying field. If you have ever attended a flying session or an RC contest you may have been bitten by its' deadly sting!

HOW TO COMBAT THE R - C BUG!

The surest way to ward off this affliction is to try to compete in RC without the BEST equipment available and without the means to purchase a really good RC rig. In other words, if money is holding you back from your full share of RC fun, you have the perfect cure.

WHAT IF YOU ARE 'INCURABLE'?

If you do have that surge in your blood, and yearn to fly with the best of them, with equipment of which you can be proud, we may be of help to you — we have been to thousands of others over the past four years. AERO-TROL Engineering was founded by modelers, to solve modelers problems! Dealing in RC items exclusively, we are the originators of the famous "Fly Now Pay Later" plan, and feature all major RC makers.

SOMETHING NEW HAS BEEN ADDED!

Now you can get the equipment choice of your dreams and take up to 24 months to pay for it. And here's a BIG plus — as a bonus we provide Credit Life Insurance on all account balance at no additional cost to you. This EXTRA protection for you and your family is just another reason why thousands of modelers have switched to AERO-TROL Engineering.

GET ALL THE FACTS — FREE

We don't care if you are a novice or an expert — if you would like to know all the facts about our services to you, just write your name and address on a post card and send to us. We will promptly send you COMPLETE information and everything you will need for getting started right now with America's leading supplier of Radio Control Equipment — exclusively.

THINKING ABOUT GOING INTO MULTI?

We have helped hundreds do just that. Stacks of letters testify to our customers' gratitude in helping them get into the "Real Fun" of RC! — with a payment plan that makes sense. Mail that card today — you'll be glad you did.

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3/8	15¢		24¢	
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BLOCKS AND PLANKS

	12" LONG	HOW MANY	18" LONG	HOW MANY	36" LONG	HOW MANY
1x2	12¢		18¢		36¢	
1x3	18¢		27¢		54¢	
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3x3	49¢		99¢		149¢	

EXTRA SPECIAL: 1/8 x 5 x 24 sheets 15¢

All wood under 8" density unless you say otherwise. Okie pays the freight on ten bucks or more. Check the stuff you want, give us your name and don't disremember to send check or money order.

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ADDRESS _____ CITY _____

Circle No. 119 on Reader Service Page

FLY-IN

this I mean amateurs aren't competing with experts. Perhaps we could change our system to have Beginners, Novice, and Expert in Class I, Class II, and Class III.

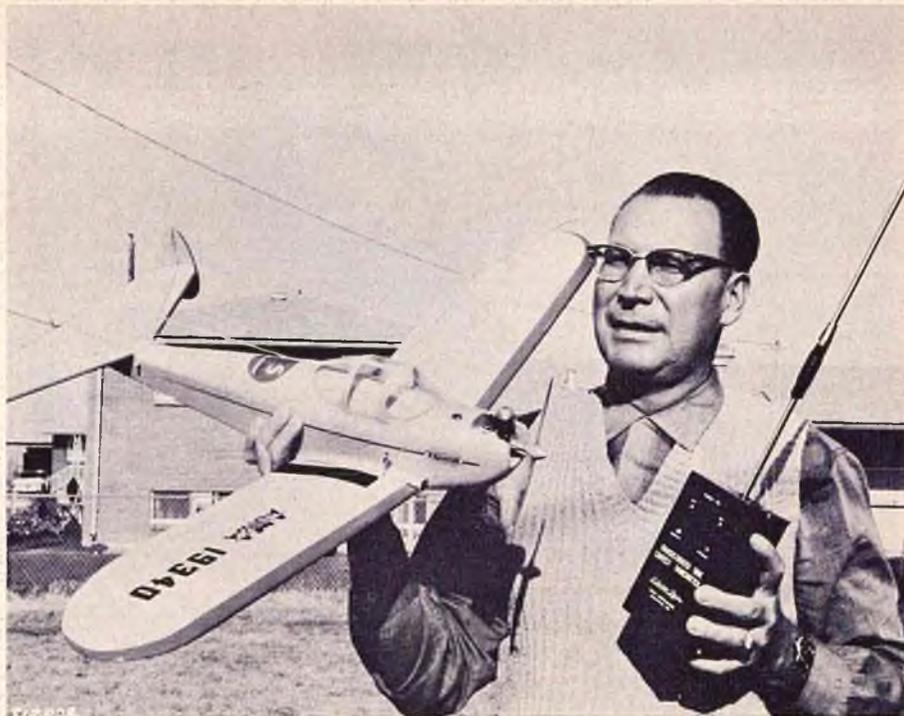
"Contest Directors and the people that work with them, before and during the contest, work hard to make it a success. So if we can just find the answers to increase participation in our contests, then the director and his assistants will feel well repaid, and our hobby will soar to even greater heights.

"So, Don, what I am wondering is if RCM could make a survey of some type to help obtain what the modelers themselves really want if they are to participate in the local, regional, and national contests?"

Eldon J. Lind

This letter, in our opinion, not only states the existence of a very definite problem, but asks some very challenging questions. Since hiding your head in the sand seems to solve problems only for ostriches, we have provided a questionnaire in this issue for your comments on the problems of contests in general, and a space for your comments concerning this year's Nationals at Dallas, Texas. Since we have agreed to assist the National Committee in finding out just what the RC'ers want at the 1964 Nationals, and subsequently to present these findings to the Academy, we would appreciate the response and participation of every RCM reader on this matter. Two areas of questions are involved — one for contests in general, and one for the radio control segment of the Nationals. This is your opportunity to voice your opinion — speak now, or forever hold your peace! The Nationals will be what you want it to be *if* you tell the Academy what you want. Your local club contests will be what you want them to be, *if* you let us know so that we may present this data to all club contest directors.

Although late in reporting, the 11th Annual Detroit RC Club Invitational held Sept. 7-8, was a big success, bringing together twenty-one of the nation's top fliers. Spectator attendance left little to be desired, with 2500 persons watching the two day affair. Since the majority of contestants were top contest pilots, they were judged



W. F. Staff with rudder-only Ercoupe. Citizenship gear.

on minute refinements of their flights. For example, scores were downgraded for not crossing directly over the transmitter on straight flight, figure eight, and landing approach. All takeoffs and landings had to be accomplished in a designated runway measuring 15' x 300' for maximum scoring. Four such runways were marked off to accommodate any change in wind direction. Five judges were utilized for the meet, with high and low scores eliminated and the three remaining flight tallies averaged. Point differences between the first few positions were slight, due to the quality of flying. Following the five preplanned rounds, Sunday afternoon was set aside for free flying, an innovation by the Detroit club to include nerve busters as ground-skimming inverted passes, team flying, and a bomb dropping exhibition. Ernie Kratzet was CD for the event. For a little unintentional spice, Pappy deBolt retracted his gear before the ship was airborne — no prang, just a few butterflies!

Final standings of the Detroit Invitational were: Tom Brett, 1st; Ron Chapman, 2nd (see the Norseman, this issue); Les Fruh, 3rd; Maxey Hester, 4th; H. Coleson, 5th. Thanks to Larry Mage of the DC Club of Detroit (512 Jeffrey Ave., Royal Oak, Michigan) for the data.

The Fall contest of the Fresno Radio Modelers (c/o Alex Chisholm, 615 E. Belmont, Fresno, Calif.) saw Dick Simons winning Class I single Channel, Meade Hallock, Class I Multi (Nova, Dec. '63 RCM); Dick Moore, Class II, Jack Brockman, Class III; and Jerry Faas, Pony Express.

And that's all she wrote for this month. Andy. Send in your club papers and contest data — and don't forget to send in the contest questionnaire.



Two speed machines—Geff and Maurice Franklin's Pylon Dusters. Bird in foreground uses Oliver Tiger 15. Orbit gear in both.

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Wght.: 5 lbs.

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THE NORSEMAN

(Continued from page 15)

mould at the bottom of the frame, and pour some plaster on top of the mould. Plaster of paris can be used, although your local building supply store probably has some proper moulding plaster in stock. When the plaster has dried, the male mould can be removed, and the imperfections filled in. You now have a female mould to manufacture cowls. There are many releasing agents available, but I use paraffin wax melted and poured into the mould, with the excess being poured off. Once a good coating of wax has covered the female mould, a layer of heavy fibreglass cloth is placed into the mould and pushed down until it follows the contour. Paint a coating of resin over the cloth, and when it has set, repeat, until three layers of cloth have been added. After the three layers have set, the cowl is removed and the small air bubbles filled with resin. The cowl can be sanded nicely with production paper (180 Silicon Carbide), which is available from any auto paint supply company. Carefully sand the cowl to fit the nose, then cut and sand the necessary openings. Once you have the female mould, you go into business producing them if you desire, as the female mould does not wear out with use. Believe me, the cowl is worth the effort, as it adds looks and ease of maintenance for the engine and nose gear.

As for starting the engine, I flip the model over and hold it in a cradle, the latter doubling as a field box. This makes starting an inverted motor easy, and nice to work on when necessary. I have experienced no difficulty with an inverted engine insofar as idle is concerned, and when you see the model taxi out and hear the comments of the spectators, you'll feel it's worth the extra effort!

from power to glide.

Make the first few flights of short duration until you get the model adjusted just the way you want it. The regular tank with the Cox .020 gives about two minutes of power, so you won't have to worry too much about flyaways — particularly if you've picked a quiet day. If there is a wind, be sure and fly the model *upwind* so it will always be drifting towards you rather than away from you.

Finally, just in case you don't have a smooth runway, here's the way to hand launch the Virus. Again, it's best if you have a friend who can launch it so you can be behind him and ready with the transmitter if necessary.

With the engine running and radio turned on, have your friend hold the model for a moment while you check the controls to be sure they are responding properly to your command. Then, at your signal, he should run smoothly forward, holding the model *level*, and with a smooth arm action, launch the model right at the horizon — not up!

The engine will then bite into the air-stream and pull the model into its normal climb. Another thing, don't heave the model so fast that it develops excess speed and a resultant zoom-up, because it will stall and dive to the ground before you can correct it. The best launch is one where the model virtually flies right out of your hand.

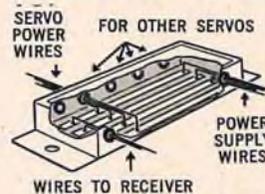
On the first flights your action should be mostly short commands of right or left rudder for gentle turns. After you get the hang of it, you can hold the commands longer, and if you wish, increase the rudder throw. Then you can get spiral dives with swooping recoveries. And after that, you're ready to add elevator control and go into stunting.

But that's another story. For now, you've got the Virus. There's no cure for the R/C fever that the Virus gives you. But who needs a cure for such a fever?

This concludes our three-part series, Blueprint for Beginners. We'd appreciate hearing your comments and about your experiences with the Virus — write us, care of R/C Modeler Magazine.

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- Practically eliminates wire breakage from vibration
- Saves on plug cost
- Simplifies wiring multi radio equipment
- Weighs only 1/2 oz.

Made of High Impact Plastic, complete with circuit board ready for wiring, and rubber grommets.

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SHOWCASE '64

securely in place. Mounting holes are provided in order that two boxes can be attached back to back when four cells are required. Price is 45¢ each, available at your hobby dealers. For information on the Hillcrest line, *Circle #10 on the Reader Service Card.*

We had the pleasure of examining a **backplate throttle control** unit for the McCoy 60, sent to us by **Maurice Franklin** in England. This is one of the nicest pieces of work we have seen — very smooth and reliable throttle control for a fine mill. This unit will enable the multi flier to adapt the renowned McCoy 60 to RC use and

should prove as popular here as it has in England. The price is a pleasant surprise, too — \$7.95, complete. For additional information, *Circle #11 on the Reader Service Card.*

The first American book containing information about all of the Italian aircraft of the 1930-45 period has just been published by **Aero Publishers, Inc.** Jonathan W. Thompson compiled **Italian Civil & Military Aircraft, 1930-1945**, after more than two years of intensive world-wide research and study. This new book contains the history, construction, description, use, special features, camouflage and markings, insignia, engine data, armament, specifications, performance, and comparisons with major Allied and Axis Type. An outstanding feature of this book is the great number of illustrations that are included. There are 550 photographs, plus 72 three-view and 87 side-view drawings, and 2 pages of drawings depicting insignia and paint schemes. List price of this 304 page book is \$8.50. RCM has found this book to be excellent as a reference text on full-scale aviation and for the scale enthusiast who demands complete accuracy. It is a superb addition to the already superior line of publications by Aero. *Circle #12 on the Reader Service Card.*

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KLINETRONICS ASTROGUIDE

- Fully transistorized transmitter and receiver.
- First commercial system to use Bonner "Duramite closed loop" Servo. More than enough power to operate, nose gear, brakes, etc. Thermistor temperature compensated from -20° to +160° F. New Servo lid has feed back pot built into it and wired to new amplifier and connectors.
- System uses 4 separate tones for control of all functions simultaneously. These tones are electronically commutated without the use of relays, so that only one tone is on the air at a time. The commutation rate is 60 CPS.
- The transmitter has 4 separate lever type controls, each is trimable from the XMTR, fully metered for output and battery. Aux. channel provided for landing gear operation.
- Receiver used Superhet R.F. with toroid tone filters. Separate cables are provided for each servo and are terminated with a connector. Uses ESP-6 pack for power. Receiver size: 2 1/8" x 2 1/8" x 2 5/8", weight 7 Oz. Temperature compensated from 0° to 140° F.
- Transmitter has usual high output Klinetronics is noted for. Requires 12 V NiCad power supply.

Price complete — including XMTR — REC. servo lids with amplifiers, all Ni Cad power packs and connectors custom charger \$499.95

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Proportional closed loop Servos with amplifier complete as a separate item for use on space control, Sampey, Dee Bee, and other proportional control systems. Fits in standard Bonner "Duramite" or "Transmite" servos... SSA-P complete \$25.95. Gives you the power to operate those extra controls.

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EDITOR'S MEMO



(Continued from page 6)

And that last line is the paradoxical key to the problem — a well established, solicitous approach to the advertiser that has destroyed the confidence of the modeler, and has prevented the advertiser himself from giving you, the consumer, better products in line with your requirements.

We have discussed this problem at length, not only with the modeler, but with major manufacturers of reliable equipment, and find that their thinking is in total agreement. The consumer and the manufacturer are not on opposite sides of the fence — they're on the same team. In most cases, the manufacturer is an active RC'er himself, depending upon the trust and confidence of the modeler for his livelihood. Whether this manufacturer works from a "modern industrial plant," or assembles his equipment in his garage, is of very little consequence. It is the end result that matters. One of the most successful and highly respected manufacturer of radio control equipment, did in fact, just recently lease a new plant in order to keep pace with increased production demands, having produced for several years, one of the most widely used lines of RC equipment from his own garage. Other manufacturers, engaged in filling military electronic contracts along with their radio control products, have more elaborate facilities. And each of them — large and small — have told us that they depend upon the model publications to review their products, and to present their exact findings to the modeling consumer. It is their feeling that this will create a whole new aura of trust in the manufacturer, and in the publications that serve the industry, and will enable the manufacturer to provide the modeler with better equipment in accordance with these findings.

We do not presume to establish ourselves as the conscience of the model industry or its various publications.

Rather, we have taken a long look at our own objectives and responsibilities, and have formed a new editorial policy in keeping with the trust and confidence afforded us by the new breed of modelers we serve. This policy delegates the "sugar coating" to the editorial cutting room floor where it belongs. It is in keeping with our responsibilities to you, to the manufacturer, to the advertiser, to the hobby dealer, and to the state of the art.

For these reasons, we will present in each issue, one or more complete product reports on items that have been submitted to us by the manufacturer for this purpose. These items will be thoroughly reviewed by our technical staff, checked when possible against another unit of the same manufacture, and our findings and opinions presented in full — without editing, and without knowingly omitting any pertinent data.

Obviously, it would be impossible to review every product now on the market, both from a standpoint of time, personnel, and finances. Therefore, these product reviews will be limited to those submitted by the manufacturer, and selected by the editors for their general interest and appeal to the majority of radio control modelers. This may range from a full house proportional system, as reviewed in this issue, to a simple escapement for single channel usage. You may be assured we will use every facility at our command to give you all of the pertinent data concerning the products under consideration.

Those products listed in the Showcase section of R/C Modeler are primarily new products, either on the market, or forthcoming. Those that have been submitted to our offices and examined by our consumer staff, will be so noted in that section. Those based on press releases will also be so noted. No preference will be given to any concern, advertiser or non-advertiser, on those items selected for review.

You have asked us to take this stand and have been justified in so doing. This editorial, the policy it represents and will set into motion, will draw fire from segments of the model industry. So be it. This magazine, as all other publications, is supported primarily by its advertising. Without it, R/C Modeler would cease to exist. We feel that the majority of advertisers concur in this new policy, feeling that it will aid them to provide you with what you want in the way of equipment and accessories, while installing a new confidence and trust between the modeler, the manufacturer, the dealer, and the publications.

And for these reasons, we challenge our competitors to follow suit.

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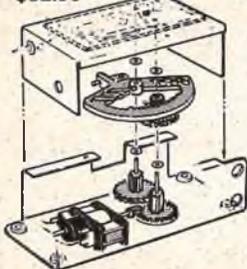
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Circle No. 124 on Reader Service Page

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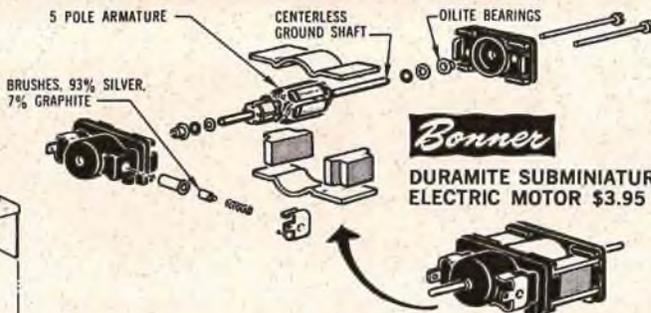
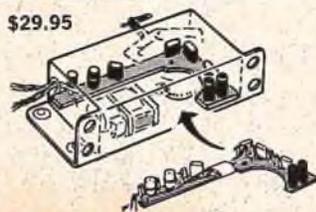
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DURAMITE SUBMINIATURE ELECTRIC MOTOR \$3.95

The design and production of R/C actuators must be of high quality in order to prevent malfunctions and loss of control.

Another, less obvious requirement is to prevent drop-off of performance from wear during long-life usage. Otherwise periodic adjustments will have to be made in the system.

The exceptionally high quality of Bonner R/C actuators provides insurance, both against malfunctions and performance changes during long-life usage.

Bonner R/C products are sold by leading hobby shops throughout the world.

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RADIO EQUIPMENT

ORBIT single channel transmitter, Ecktronics relay receiver. Stick box. Escapements. New. Highest bid. Floyd Damron, 110 N. 3rd, Rio Vista, California.

CONTROLAIRE 10 relayless superhet receiver. Medco servo and receiver pack with charger Simul Transmitter. \$160. Isaac Fite Jr., 272 Hirliman Road, Englewood, N.J.

UP TO 50% trade-in allowance on your old radio control units for a new single or multi channel unit in most popular makes. Listing of used equipment sent upon request. Phil-Nick Hobby Supply, P.O. Box 84, Oaks Corners, New York.

F & M Hercules and Midas with Deans Reed bank on 27.145. \$120 with batteries. Orbit plugs and receiver NiCad pack. Spare receiver, \$35. Perigee kit \$20. Have additional gear and engines for sale. Bill Phinney, 5027 Loring Circle, Lincoln, Nebraska.

WANTED: USED 10 or 12 channel transmitter and receiver in good condition. Prefer Orbit. Also 5 to 8 Transmite servos. Bruce Boss, 7606 Midbury, Dallas, Texas.

(Continued from page 37)

tional frequencies were accordingly requested to be made available for the remote control of model aircraft by radio in the Citizens Radio Service, but with any other uses of these five frequencies in that Service specifically excluded. Only in this way, the Academy filings stated, would the radio control operations of the modelers be freed of the destructive interference presently being experienced in the 27 mc band.

The Academy's comment and petition were prepared by Ed Lorenz's AMA Radio Control Committee, in association with the Washington communications attorneys retained by the Academy for the purpose of obtaining these additional frequencies — Jeremiah Courtney and Arthur Blooston. Mr. Courtney is a former FCC Assistant General Counsel and his office specializes in non-broadcast radio problems.

PLEASE ENROLL ME AS AN AMA MEMBER for which

I enclose \$.....Date of Birth.....

Age as of July 1, 1963

Junior Class (under 16)

Senior Class (16 to 21)

Open Class (21 and over)

Membership includes subscription to Model Aviation and free Rules Book. Check main interest:

Radio Control Free Flight.....
Control Line.....

Name

Street

City and State

Send to: Academy of Model Aeronautics
1025 Connecticut Avenue, N.W.
Washington 6, D.C.

A SPECIAL THANKS TO OUR READERS . . .

. . . for making RC Modeler the most widely read radio control publication in the world, with a circulation far in excess of its competition, and still growing.

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DEAR RCM:

Would be interested in hearing from the clubs on this subject.

Enclosed is the Reader Service page from your December edition of RCM. Would appreciate any additional RC information regarding products available to dealers. Foremost is the need of accurate, up-to-date information, prices, etc. on new and tried products available to the RC hobbyist. Since we dealers have to serve them, it is necessary that we have the most up-to-date information and prices available on the RC equipment they are interested in. Pictures, specs, and prices from many manufacturers seem to be pretty hard to come by. Therefore, any assistance RCM may be able to render will be greatly appreciated.

Hobbycraft Hobby Shop
Nashville, Tenn.

How about it, you manufacturers and distributors? The dealers can't sell your products if they don't know about them!

May I say many thanks! I have finally chased down a copy of the November issue, and although I was unable to purchase it (everyone was sold out), I did get a chance to see my advertisement as well as the mention in the Showcase section. As a matter of interest, the ad brought many inquiries. I do not know what your circulation is at present, but I can honestly say that I received as many replies as I ever have from ads in.....

Words I am sure you have been hearing from many sources, but let me add my two cents worth also. I have heard nothing but praise from many of my RC buddies, and this of course includes my own sentiments in regard to your efforts with the magazine. It is truly a fine piece of workmanship and fills a much needed gap in the world of aeromodeling. Keep up the good work and please call on me if I can be of any help.

Gordon Madison
Hobby House Plans Service
Los Alamitos, Calif.

Thanks to you, Gordon. RC'ers who missed the blurb in the Showcase section might be interested in the fact that Gordon carries the plans for models of all types that have been published in both domestic and all major foreign magazines. You can contact him at 12112 Ballantine Drive, Rossmoor, Los Alamitos, Calif.

ANOTHER FIRST . . .

R/C MODELER

READER SERVICE

As a service to its readers, R/C Modeler will provide you with any additional information on any of the products advertised or editorially featured in this issue. In addition, where-to-buy information is available for the merchandise of the advertisers listed below.

Aero Models	48
Aero-Trol Engineering	55
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Arcadia Wheel & Hobby	49
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RC Modeler will be happy to answer any of your technical questions or problems, whenever possible. If your question includes items you saw in RC Modeler, please give us the page number and issue when you write.

RC MODELER READER SERVICE

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