

LLOYD SAGER'S NATS WINNING 'MAC-17'

CDC

# radio control

JANUARY 1965 50c

*Modeler*

AMERICA'S LEADING PUBLICATION FOR THE WORLD'S FASTEST GROWING HOBBY

**BUILD RCM'S SERVO AMP  
FOR THE BELLAMATIC II**

**Bob Holman Scale Views  
ALBATROSS DVA**

**PRODUCT REPORT: ORBIT PROPORTIONAL**



## EDITORS MEMO

By DON DEWEY

THE NEW YEAR of 1965 promises to bring about a whole new scope and flexibility to our hobby of radio control. The era of proportional systems is here, and in the coming months, there will be a dozen or more full-house rigs on the market. We've seen several, and for the most part, they look good. The price barrier on the new rigs will be broken, too, as anticipated — one manufacturer is already starting a pilot run on a system that will sell complete for \$380. Designers will have a greater freedom, and more and more realism will be the keynote to multi designs in 1965 — breaking the "look alike" rut of present day Class II designs. And with the revival of the Cleveland Air Races slated for Palm Springs in 1965, we'll be willing to bet that at least one sport and competition machine will have lines similar to these air racers.

Prefabrication will reach an all-time high — fibreglass fuselages and tail assemblies... foam wings and fuselages with hardwood veneer covering . . . higher strength to weight ratios. All adding up to faster building times with better end results

— more flying time and a higher degree of competitive and sport flying pleasure. More and more beginners will be coming into this hobby — not from the ranks of free-flight and ukie flying — but beginners in the true sense of the word: the brand new modeler. He will be anxious to take his place in the local club and at the local flying field, — anxious to meet the many challenges offered by R/C. What's in store for him? Eldon Lind, President of the B.I.R.D. Club of Long Beach expressed it perfectly in a recent issue of the Birds Eye Views:

"What makes our hobby what it is? I believe it is the constant challenges of the "firsts!"

- the first radio model
- the first successful flight
- the first multi-equipped model
- the first take-off
- the first landing
- the first complete solo
- the first outside loop
- the first 4-point roll
- the first inverted flight
- the first trophy
- even things like your first brakes

keep the challenge alive.

Then follow the big challenges:

- the first multi-engine ship
- the first retractable geared ship
- the first proportional flying
- the first major contest win

I have participated in many other recreations, but I find there are few that can be compared with radio controlled flying. There is always something new to learn, new to attempt, something to work toward, with each new ship contributing a little more to our knowledge — and our enjoyment."



Since the winter months are upon us, and a great majority of the nation's fliers will be designing, building, and overhauling for the first blue Spring sky behind the

snow banks, how about a bit of attention to model plane maintenance?

From Bill Nash in Southern California:

"In the course of the three years or so of flying radio control, I personally have sent many a multi streaking down to bite the dust, of which only a few had it coming. The majority were caused by inattention to the details of which radio flying is composed. For example, all of us are aware of the vibration in the airplane with the engine running, but what of the effect? I still see engines mounted with wood screws — or worse — nuts

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COMING NEXT MONTH - - - -



... KEN DWIGHT'S FULLY-SCALE HAWKER HURRICANE





# SUNDAY FLYER

by Ken Willard

"Hey, that's a real good looking biplane! Is that the one you're going to publish in the January RCM?" asked Carl, a fellow modeler, following a test flight of the Schoolgirl.

"Well, I was planning on it, but now I've got another idea," I replied. "Here. Read this letter. I'm thinking about publishing it, unabridged, and postponing the biplane a month. Tell me what you think."

He took the letter and started to read. First a smile came over his face. Then he began to chuckle. By the time he finished, he was laughing almost uncontrollably. So was I, as I recalled passages when he read them aloud.

After he regained his composure, he said — "You've got to print that. It's the greatest description of the trials and tribulations of the Sunday Flyer that's ever been written!"

I agreed. In fact, I had already decided to put off the biplane until February; I just wanted another modeler's reaction.

So here now, as I received it, is one of the best (if not *the* best) letters I've ever read on the mysteries — and miseries — of R/C as they appear to the great mass of all you Sunday fliers.

Tom Stence, of Ashland, Ohio, writes:

Dear Ken — Congratulations on your Sunday Flyer column, and to RCM for making the first move in the right direction that has been made by any publication in a long time. Imagine! Having a column all our own! Up to now the sport flier has been the poor relation, barely tolerated, and then only because he bought the magazines and kept the manufacturers in groceries.

If this sounds bitter, you can see why after you have heard my story. It isn't that I haven't had as much fun out of modeling as any hobby I ever rode — and I have ridden many of them — including but not limited to, amateur radio, photography and motorcycles. But to get on with the story:

Several years ago I became interested in modeling via the U/C route. This phase didn't last long, owing to vertigo and tendencies to list to port on the first few revolutions. Nor did the circumscribed orbit and frantic gyrations of a motorized kite have much appeal, either.

The next step was free flight. I bought a kit and went to work. Building the thing proved to be fairly easy, as I am a gunsmith by trade, and therefore accustomed to tedious and demanding work with little pay. I

also found that balsa is easier to work with than steel, and cement easier to use for sticking things together than a welding torch. The trouble began when I tried to trim out the model. Now, I knew absolutely nothing about this, and apparently, neither did the manufacturer of the kit, for there was no mention of it on the plans. And, so I set out to consult the local experts in these matters. In spite of the town having somewhat over 18,000 people in it, very few of them were modelers, and the few there had never heard of any sort of model which did not fly at the end of two strings! This led to the discovery that the ideas of trim derived from control line experiences were dim, if not to say, impractical.

Not having been disillusioned at that time, it occurred to me that all I needed to do was to buy some magazines. I guess you know how much information I got! In several years of buying magazines I never found enough practical information in them to pad a crutch for a rabbit, and the only thing I learned was not to waste money on very many magazines. They all seemed to be devoted to duplicating each other's efforts — if promoting competitions and running ads can be termed effort!

I had supposed that something as fundamental and necessary to success as the matter of trim would be amply covered. Actually, though, the subject was rarely mentioned, and then only to the effect that it "had been covered so often that it is not necessary to mention it here." I suppose it was covered that often — in the personal papers of Wilbur and Orville Wright. In fact, the careful avoidance of the matter led me to conclude that there was something objectionable about it, and that the subject should not be discussed in the presence of women and children.

The only method of learning to trim my FF's was that of trial and error, which will invariably work provided only that the number of trials exceeds the number of errors by one. As the method is destructive of both models and morale, it can only be recommended for those who have ample spare time and the patience of a later

(Continued on Page 47)





# SOLO

by Frank Justin

Last month we started you down the trail of Drone flying. At this point, you may wish to turn back, but hold on — you ain't heerd nothing yet!"

When it looks like you might average a crash per flight, it's a good idea to have lots of spare parts. San Diego was the Southern California headquarters for the Navy and the Navy was the Number One customer for aerial targets. It therefore stood to reason that somewhere around San Diego was a mountain of Drones waiting for me. Anyone that has been in the service knows that regardless of what it is the military needs, it buys heavy and stacks it high!

It took a little digging around, but finally we were told that there might be something like that out in the middle of some farming country below National City, almost at the Mexican border. After a day of patient snooping and question-asking, we found it — about an acre of junk yard with a high board fence, and containing

crate upon crate of Drone parts. Naturally, you don't walk flat in and say, "How much for six sets of wings, a couple of sets of tail feathers, and a fuselage or two?" You look at anything but the prize—jet engines, barrels of hydraulic parts, gas masks—all the time slipping in a few sneak looks to determine condition, quantity, and selection.

Then it is time. But first, we ask if he got any yellowtail fishing in this year? Or, "sure is a handsome dog you got to watch the place—even looks like he may enjoy human flesh." Now, we allow as how one of those crates sure would make a fine play house for the kids. How much? Well, yes, I noticed they had stuff in them, but it looked like junk... no kidding? A little airplane? Well, they would only deteriorate without a crate... how much for the whole ball of wax? I can buy the wood for a play house for that, but tell you what I'll do... give you half that and take three.

Okay, it's a deal...

There are a few times in a man's life that he does not experience buyers remorse — you know that feeling — you're driving home in a brand new car and wondering, "What am I doing with this clunker and thirty-six months of payments?" This was a good time for me... three cases of absolute junk (except to an RC'er) and only sixty dollars... boy! Did I put it over on that guy! He probably didn't pay much more than sixty dollars for the whole yard full...

All this hardware gave me a real chance to get a couple of trys in the next trip to the dry lake. Within two weeks we again headed for the desert. This time the crowd was even larger, and everyone ready to see a Drone fly. There was a measure of success this time... the Drone left the ground and headed for the wild blue in real smart fashion... it was a thousand yards off before I really felt I might complete a flight. At this moment, we lost the right rudder. Since it had a natural left, I had been beeping right from takeoff just to keep it straight! It quickly got its nose down, and in one and one half turns, slammed into the desert floor. There was not a single component that did not sustain major damage — both cylinders and the carburetor were off the engine, and the wings were linen bags of splintered wood, and the radio gear was now part of the two gallon gas tank.

Well, clean up the trash, head for home, and try to figure out what went wrong with the transmitter. Eventually, it was traced to the inability of the tone generator to stay within the band pass of the receiver filters. We scouted the surplus stores once again, and found the original G.I. transmitter. Inasmuch as it was in pretty bad shape, in addition to being a cumbersome monster, we took only the L/C components from the tone generator compartment. Stu Babcock probably doesn't remember it, but he got a call one day from a fellow who wanted to know what miniature tube would be right. I can still remember his reply, — "Pick something with a mu of about 17...". The way he reeled it off you would have thought this was the third call that day for miniature tube data!

I built the generator up in a small  
(Continued on Page 52)



# TOP OUT



Rudder RC line-up of portion of Radio Fliers League of San Antonio, Texas illustrating two of their popular designs. Separators are echeloned right, Air Condition's left. Group's success stems from balance of sport flying and contest experience built around good basic airplane design, constantly improved. Planes shown amassed 745 flying hours during 1964! Multi-xmtrs indicate equipment used.

**by jerry kleinburg**

The RC shopping season is upon us. While first ideas lean to new equipment, engines, and other dandy hardware, in this period between flying seasons, shopping also includes buying ideas and deciding which of these innovations or improvements are good enough to warrant investing time and effort to improve or simplify our radiocraft.

Or, maybe the more inventive who haven't been satisfied with what they've seen so far are in the middle of doping out some answers for themselves. In any case, there is always a need for items like a better nose gear, a more efficient construction method, a rework gimmick or two for better engine or carburetor performance, new ways to use actuators, etc., etc. This is a sort of hallmark of Class I; it's where do-it-yourself predominates.

It was noted last month that the trend for class I is in the direction of bigger planes and engines. Since simply scaling up an old design doesn't necessarily get the job done, it appears from this vantage point that

the "idea shopping season" will be especially active this year.

For instance, rudder and vertical stabilizer design is due for scrutiny, with hinge lines getting further alteration in attempts to improve nose attitudes during turns. Triangular rudders will become more popular, as testing the proportional effect of this shape progresses. Landing gears also will come in for some rework to improve taxiing as well as to reduce landing skip. Nose gears deserve a share of attention in view of the beating they absorb in rudder-only flying. The problem of providing ruggedness while keeping the nose gear light continues to be the basic one in this department.

Construction features on the increase include a wider use of veneers and laminations. In this regard, contact cement and epoxy glue continue to find growing favor since they eliminate warping when used with thin materials. White glues, incidentally, have just about replaced the old "airplane" cements for general RC use, while

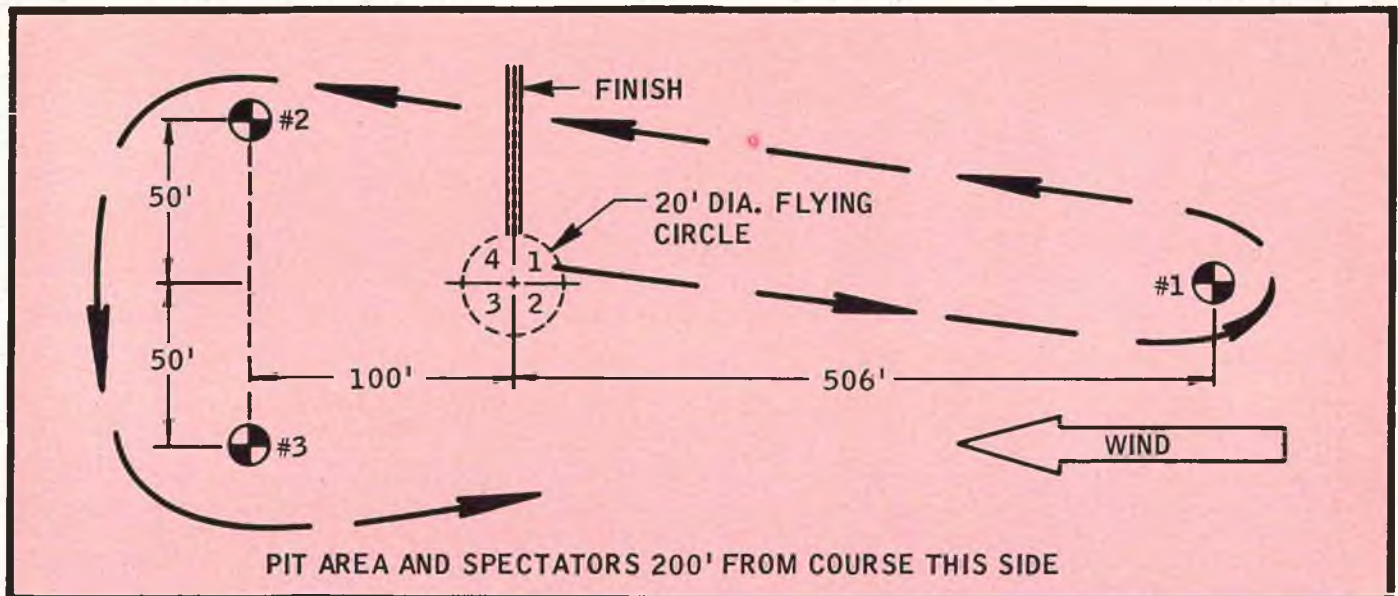
quick-hardening resins are showing up more and more at flying sessions for quick field repairs. Weight penalties for these adhesives are considered minimum and are more than offset by reduced building time and increased durability.

Of course, we will see some serious developments during the coming year in class I using foam plastic core construction, mostly for wings and stabilizers. A thing called servo travel shift is another innovation area that will see a great amount of activity. The general idea in travel shift is taken from class III elevator over-travel developments to improve their spin performance. Now, over-travel—being tried for class I taxi maneuver gains—has been matched with half-travel for gentle flying turns, making three distinct rudder modes possible.

All in all, it should be an interesting period and one which TOP-OUT will strive to cover fully in shaping up the Class I panorama. Your favorite construction methods, hints, and

*(Continued on Page 60)*





## IS THIS THE UP-AND-COMING EVENT?

# Goodyear Pylon races for R/C

By **JERRY NELSON**

Reprinted from E.B.R.C. "Carrier"

As the majority of active modelers know, pylon racing interest has waned of late. The winning models are deltas powered by not-so-stock engines with real blast type fuel. These ships are good for only one thing, and that is flying in the few pylon contests that are periodically held. The average flier actually hasn't got much of a chance against the top names that are flying these pylon racers.

As a solution to this lack of interest in a highly interesting event, I have proposed a new set of rules that I think will generate much more interest in pylon racing. Please bear in mind that these are not official rules and many changes may have to be made in them.

### Purpose Of Event

The purpose of this event is to stimulate full-scale Goodyear type midget pylon flying with "scale like" RC models. Speed is not the only goal for this event. Realism is the primary goal. In addition, the model can be

sport flown due to its throttle, which makes it a dual purpose model, not a one-shot affair.

All the rules are set up so that the average flier has a competitive chance against the expert fliers. This will be done by having models that are inherently moderate in speed because of their bulky fuselages and higher-than-normal wing loading. The engines that can be used are of standard R/C types, such as the Torp. 35, Veco 35, Johnson 36, Fox 35 and 40, Merco 35, S.T. 35 and 40, etc.

### Airframe Rules

Maximum span: 54 inches. Minimum wing area: 450 sq. in. Minimum weight: 4½ lbs. Maximum engine size: .40. Engine must have a workable throttle. Minimum outside dimensions of fuselage at cockpit location is 3½" wide and 7" deep. Model must have a spinner (AMA approved). Model must be able to demonstrate that it can taxi at a slow rate of speed. It need not be able to brake.

No delta configuration; no biplanes allowed. (I don't believe there was ever a Goodyear type biplane or delta.) Model must have two wheel gear with steerable tailwheel. Model must resemble a midget racer configuration. It need not have a cowled engine, cheek cowls, or wheel pants. It will have a 2" scale pilot or larger in a scale-like cockpit. Open cockpit or bubble canopy allowed. Model must have AMA license numbers preceded by the letter "N". In addition, the model will have a full set of racing numbers.

Possible additions to the above might include a bonus for a close-scale model, the bonus being given in seconds of time. Other additions might concern restrictions on propeller used (more standard engine thrust), and limitation to standard sport type fuels.

### Course and Rules

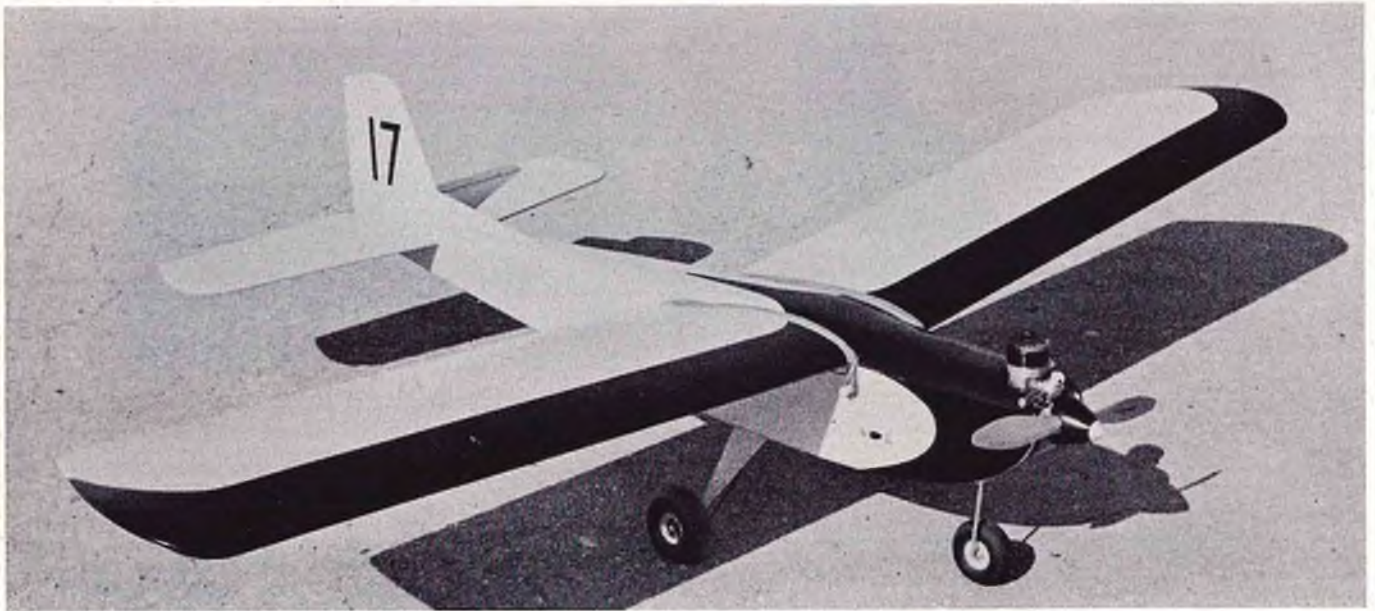
Course is ten laps of a quarter mile  
(Continued on Page 50)



## 1964 NATIONALS CLASS II WINNER

# The MAC SEVENTEEN

By LLOYD SAGER



Clean lines, all sheet construction, and an ability to perform aileron maneuvers characterize this remarkable Class II design.

We decided to name this model "MAC SEVENTEEN" since it is the seventeenth in a series of models designed by D. B. McDonald, otherwise known as Mac. Early in 1958, Mac designed and built No. 1 which was a rudder only job made strictly as a trainer. It performed so well that in the subsequent years 16 others with numerous variations were built in order to experiment with the basic design capabilities. These models included a bi-plane, a low wing multi version, and many of the shoulder wing versions like No. 17, with and without ailerons. One of the remarkable characteristics of this design is its rollability on rudder. Developed to perfection on No. 17, this model has as its claim to fame the ability to execute a rudder roll amazingly close to the best aileron roll.

In the development of the series, a significant new factor was taken into consideration. That's right, make the changes anticipated as desirable as possible for proportional control. The result, in our opinion, is an even better reed flier, and just what was wanted for proportional. The design, as presented here, is the proportional version, with but one slight change recommended for reeds.

It should be noted that this model is primarily a contest performer. It will, however, serve well as an intermediate trainer. The only reason we wouldn't recommend it as a basic trainer is simply because it is quite fast. Yet, it is so stable we get a lot of fun out of flying it with full up elevator, using throttle control to change altitude. The rudder remains very effective and the resulting ratio

of this slow speed flying capability to its full-bore fast pace is greater than any model we have ever seen or flown. Therefore, it can be trimmed to fly slow for training, but since we are past that stage, let's proceed with the contest version.

Mac has developed some construction techniques and design aspects that go hand-in-hand to produce an accurate model. That is, providing, of course, that good workmanship is exercised throughout! Herein lies one of the most important factors in building this or any other model. So, keep this in mind and you won't be disappointed in your version of the MAC SEVENTEEN. Now, since this is not a project for anyone without some model building experience, we will keep the construction details brief.



## Wing Construction

Start by placing a 1/16" x 4" sheet balsa trailing edge on the work surface. Add the T.E. stock and position absolutely straight as this is the reference for the alignment of the ribs, and consequently, affects the accuracy of the entire wing. Locate the lower spar, using the ribs as a guide, and block up the spar 3/16 of an inch. Now carefully position and glue the plywood root rib in place. Now it is an easy matter to add the front and rear spacers to locate the next rib. In this manner, complete the installation of spacers and ribs. The space between the last two ribs is left to vary and the tip rib is merely placed as required, which is less than two inches. The top spar goes in place next, followed by the top T.E. sheet which is 1/16" x 4", as are all sheets, except that material necessary to fill the center space. Add the 3/8" x 1" L.E. and let dry overnight.

The top leading edge sheeting goes on next and is held in place by 1/8" sq. balsa strips pinned to the L.E. This eliminates the need for making numerous holes in the sheeting which occurs when pinning directly to the ribs. The remainder of the sheet is held in place by weights so that no pins are used. Fill-in the center section of the top of the wing and let dry thoroughly. Finally, turn the wing over and block it straight before completing the bottom sheeting. Use the 1/8" sq. balsa and weights so there are no holes made in the bottom sheeting either.

Build the other wing panel in the same manner, then join the two, making sure to obtain the specified di-

hedral. Complete the dihedral joint and cover the center section. The wing should be covered and clear dope applied before adding the fuselage fairing. The latter can be made from soft block or 3/32" sheet.

## Horizontal and Vertical Stabilizer Construction

Construction is practically identical for these two surfaces. The leading edge is built up as an assembly from a 1/16" x 3/8" strip sandwiched between two 1/4" sq. pieces. Carefully block up the L.E. and locate and block up the T.E., making sure the center of the L.E. and T.E. are the same height above the work surface. Add the ribs and top sheeting and let dry thoroughly before turning over. Again, take care to block carefully, keeping the correct relation between L.E. and T.E., and allowing for the 1/16" sheet added to the first side. Add web stiffeners at the high point between the center ribs on the stabilizer. Add the doublers at the hinge points on both units and then add the 1/16" sheeting. Join the vertical stab to the horizontal stab accurately. The rudder and elevator can be added now, or after painting.

## Fuselage Construction

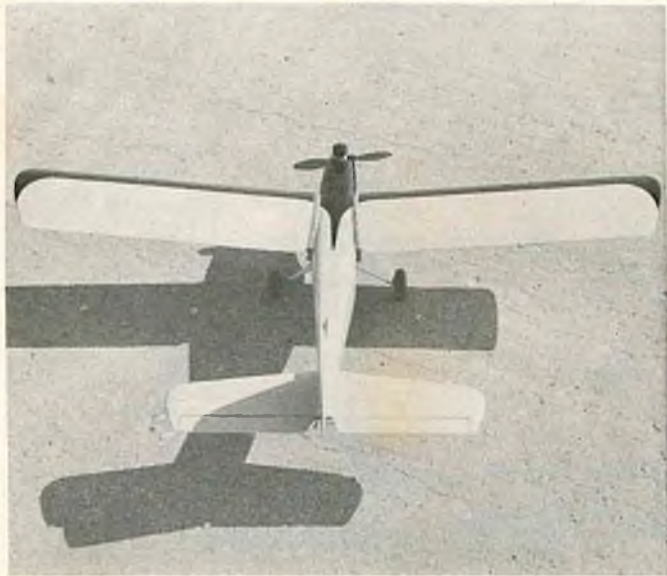
The accuracy of the fuselage is determined by the care taken to build the plywood box, using the plywood bulkheads, sides, floor, etc. Use 0-3/8 flat head woodscrews as desired for strength and ease of assembly. The box assembly includes the landing gear and servo mounting blind nuts and motor mounts, as well as the nose-



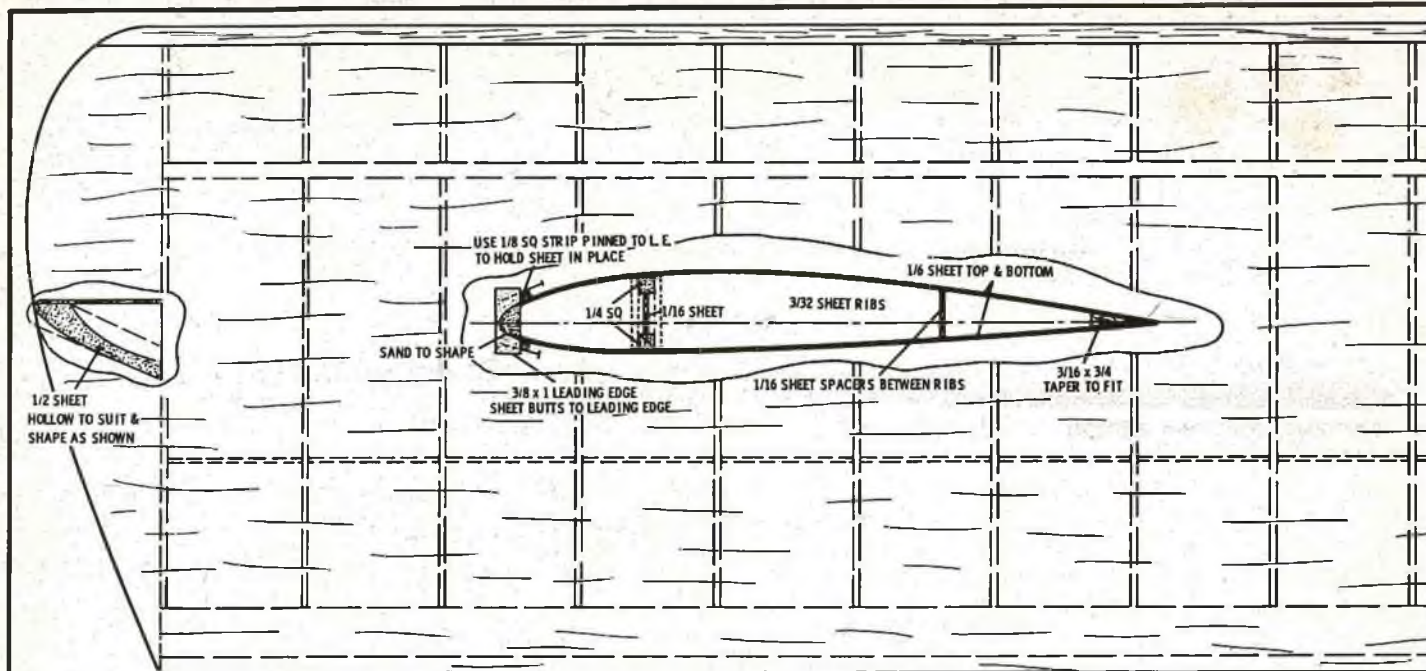
Lloyd and Mac Seventeen at Dallas after 1964 Nationals Class II victory. Bonner proportional in foreground.

gear steering bellcrank pivot. Make provisions for this hardware before putting the box together. Cut out as much of the plywood as possible without sacrificing strength and then be sure to fill in the cut-out areas with sheet balsa to prevent the side sheets from pulling-in.

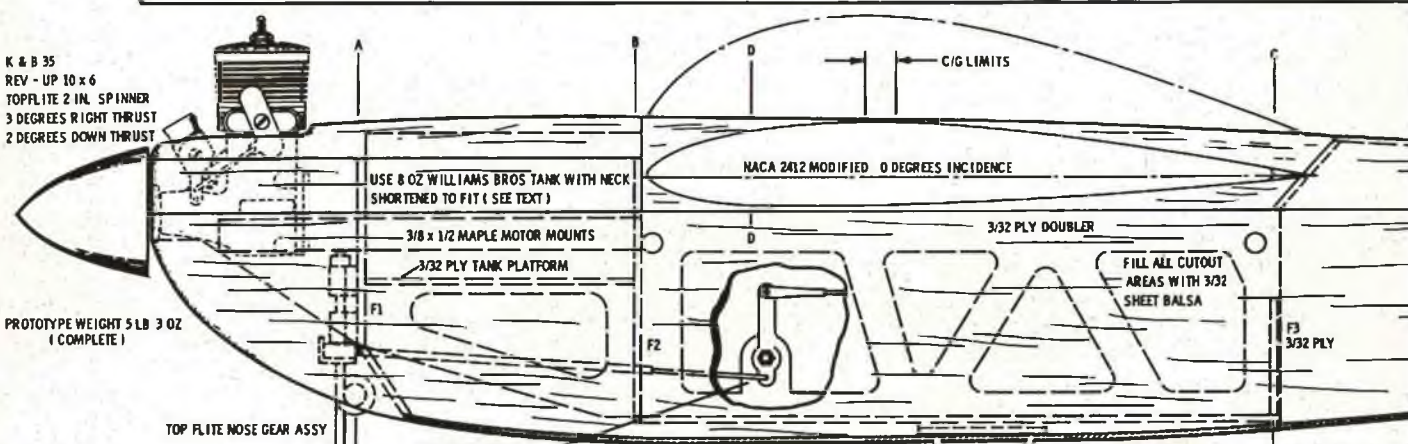
Make two side sheets and glue to the box, using the rear dowel holes and top edge of the box for alignment. Accurately align and center the ends of the fuselage sides and glue together with a filler block. Add all the formers and then install the tail assembly. Add the bottom sheeting followed by the top sheeting.



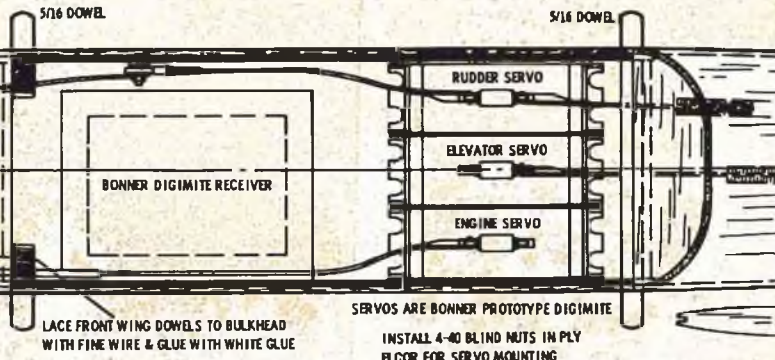
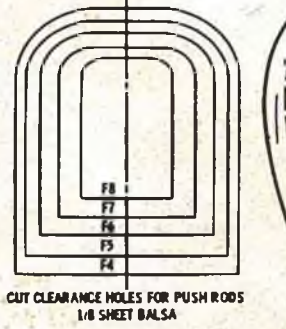
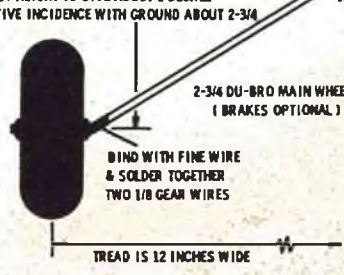
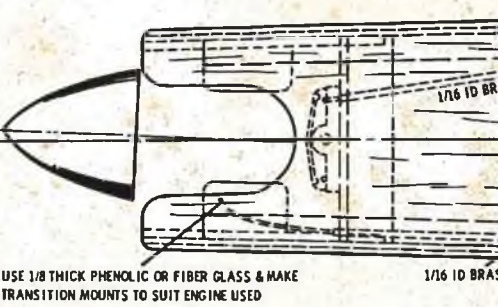




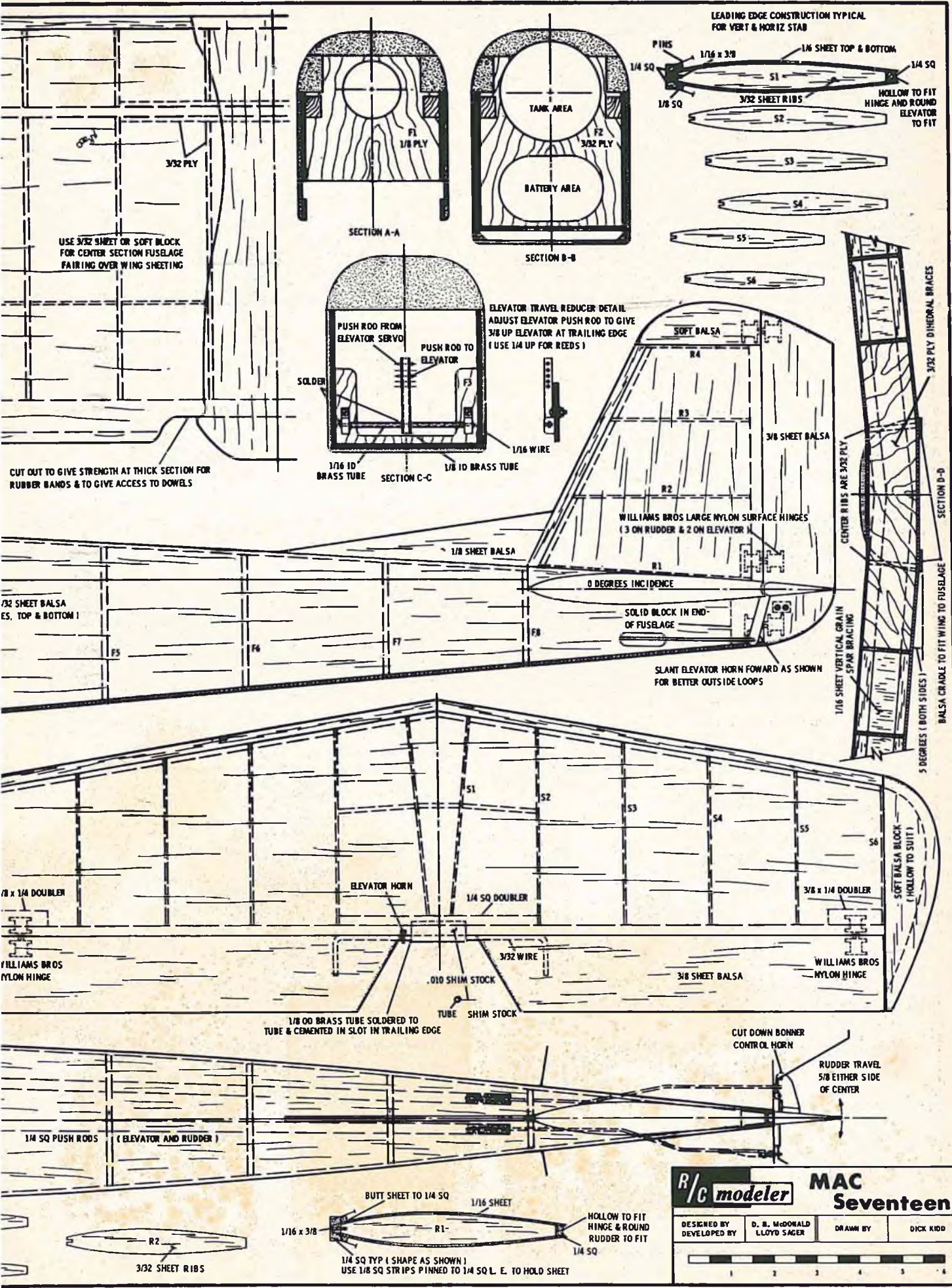
K & B 35  
 REV - UP 10 x 6  
 TOPPLITE 2 IN. SPINNER  
 3 DEGREES RIGHT THRUST  
 2 DEGREES DOWN THRUST



SOLDER BRASS BRACKETS (4) TO LANDING GEAR & BOLT GEAR ASSY TO 4-40 BLIND NUTS IN FUSELAGE GEAR PLATFORM





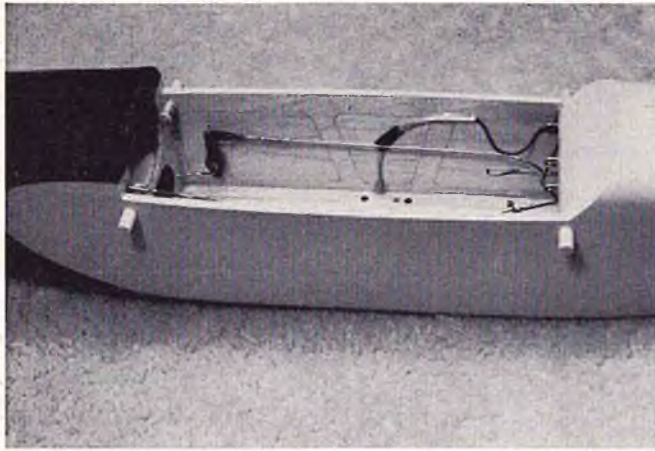


**R/C modeler** **MAC Seventeen**

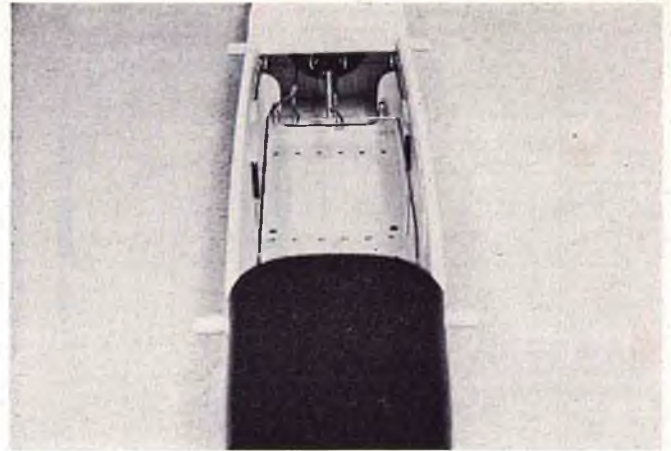
DESIGNED BY **D. B. McDONALD** DEVELOPED BY **LLOYD SAGER** DRAWN BY **DICK KIDD**

1 2 3 4 5 6





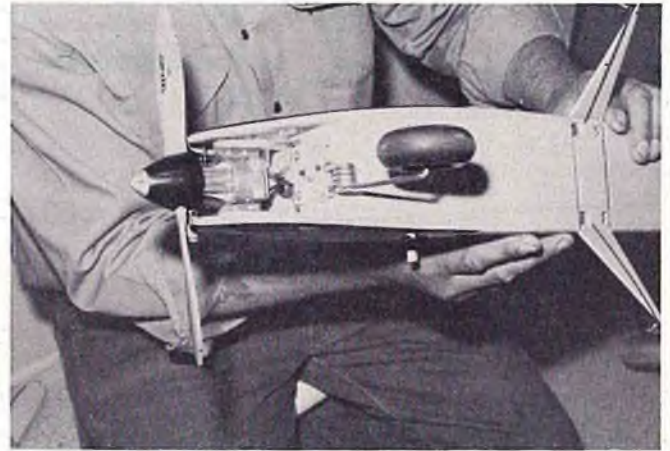
Cabin area of fuselage showing nosegear steering bellcrank, dowels "laced" to bulkhead, tubing for brake cables.



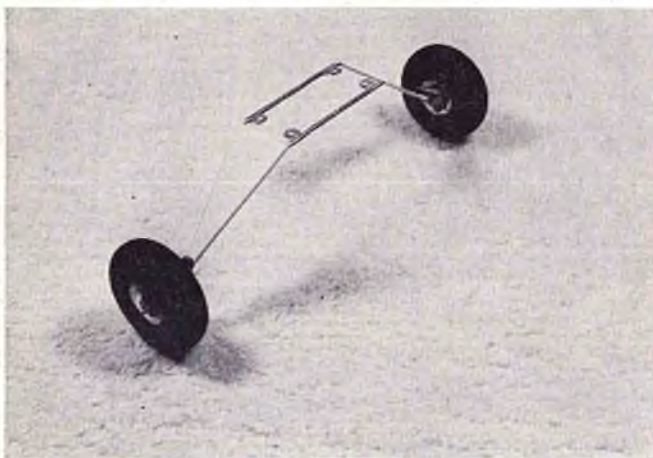
Equipment area in fuselage. Aft bulkhead near top of picture frames the elevator travel adjusting device. The end of the motor control pushrod is coincidentally in line with the device's cross bar.



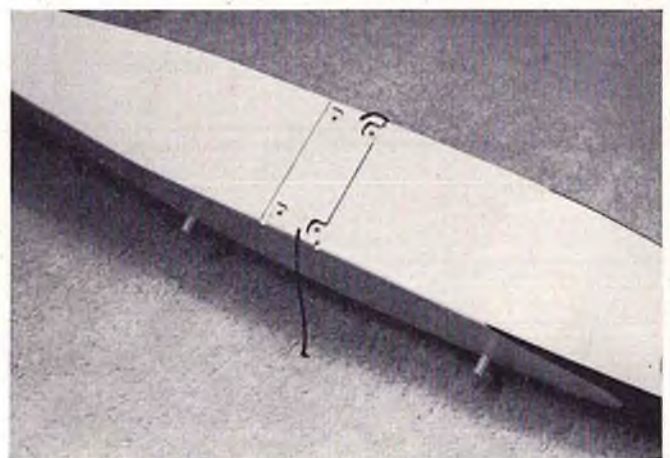
Fuselage view showing equipment installation — receiver (Digimite) is wrapped in foam. Antenna has since been put back inside. This is the wire running near the top along the right side.



Bottom view of forward fuselage. Landing gear and nose wheel installation shown.



Landing gear assembly — Note brackets soldered to wire for mounting. Drag brakes used but not detailed.



Bottom of fuselage with main gear removed. Note cutouts for attaching brackets. Balsa sheet filler used for neat appearance. Black cord is nylon brake line.



The fuel tank is an 8 oz. plastic clunk type but it must be shortened to fit. This is a simple process. Place the bottle neck down about two inches deep in boiling water for a minute or so. This will soften the neck area which may not be collapsed as required. Then hold the bottle, which is compressed to the correct length or shape desired, under cold water. Upon cooling, the bottle will hold its new shape. If not satisfied with the result, just repeat the process until it comes out right. The tank should be packed in the fuselage with foam rubber to prevent it from turning or wearing against the wood due to engine vibration.

The motor mounts are set far enough apart to allow the use of the engine of your choice. A good 35 like the K & B is plenty of power if you keep the weight below 5½ pounds. (The weight of the original version is 5 lb. 3 oz.) Use ⅛" thick fiber glass or phenolic sheet to make transition mounts to fasten the engine to the fuselage.

### Covering and Finish

One of the advantages of sheet construction is that medium weight silk span is very adequate for covering. Use of silk, nylon, or any other fabric is not recommended. Apply the silk span dry over a well prepared surface and leave it just loose enough so that after it is doped in place it can be dampened and shrunk to fit. Care should be taken not to apply the covering tightly, as it will draw the sheeting, causing a wavy surface over the ribs and formers. Finish with butyrate dope.

Should you have a minor accident resulting in a bruised or broken area in the sheeting, it is easily repaired. Sometimes, if the damage is not severe, the bad area can be cut out, strengthened on the inside, then replaced. To do this, cut out the bad area with a slant cut, making an irregular cutout so it is easy to tell which way to replace the piece. Use only white glue on such repairs as it will not affect the Butyrate surface. After repairing the damage, glue the piece in place and wash off any excess glue. After drying, sand lightly and touch up as required. If the bruise is minor, make a few pin holes in the wood and daub on some white glue thinned with water so it will soak in

thoroughly. When dry, the bruised area will regain its original shape due to the swelling of the balsa, and the area will be restrengthened.

### Flying

The first flight of MAC SEVENTEEN was just like the 100th. That is to say the model did come out accurately, as desired. Frankly, we must give credit where credit is due and also mention the advantage of having the new Bonner DIGIMITE proportional control system. The takeoff was simply a matter of easing back on the stick until the model broke ground. There was a slight left turn, so it was allowed to come on around while gaining altitude. Once at a comfortable altitude, back pressure on the stick was released and a slight nudge of the rudder trim control set the model on a straight and level course.

The model was then ready for a thorough check-out. We tried the inside loops first. What a wonderful experience flying proportional. Just choose the size loop that looks best and pull back on the stick until it happens! After practicing some turns and getting the feel of the rudder, it was time to try a roll. You will have to see it to believe it! And if you see it, you will say those rolls must have been done with ailerons! After all, that's the aileron stick you are using to fly with.

Yes, that is the aileron stick, and you do fly this model as though it had ailerons. Ok!, before we lose you as a disbeliever, we will admit that the Immelman turn, Rolling Eight and Four-Point Roll suffer a little for lack of ailerons, but that is about all. Any AMA stunt maneuver can be done well with this Class II design.

We were anxious to complete that first flight and get the model back down and have another look at it. The landing was made with a slight cross-wind and there was a little difficulty correcting the drift without ailerons, but that problem has since been solved by experience—and by making a better approach; What we were anxious to learn after landing the model was how much elevator travel it took to get those nice size loops. The stick was pulled back to the loop position and the elevator travel measured. It was a bare ⅛ inch! At no time throughout the first flight or subsequent flights has it been

necessary to use full up-elevator except for a spin. We were able to determine the ideal travel for rudder and elevator for reed flying by carefully noting the stick movement that gave good sized maneuvers. Even more remarkable is the way the model will slow (very slow) roll on rudder **TRIM**. That is, this design will roll on rudder when it is deflected only ⅛ of an inch. Plenty of down elevator, about half travel, is needed at the right time and the result is a straight line, no-change-in-altitude roll.

Inverted flight seemed almost impossible—until we quit fighting the model and let it fly itself inverted. The problem at first was too much down elevator causing a climb out over the top. The best way, we learned, was to invert the model, either rolling or looping it, and then put in full down trim. This resulted in a slight inverted climb. Now there was time to experiment with turns. What's this? Left rudder makes it go left and right is right? Seems theory has it that rudder reaction is reversed when an airplane is inverted. If you want it to go right, you should give it left. Well, that's not the case here, and that's fine, so let's not be disturbed. It's easier to fly that way, anyhow!

In the three months following the first flight of MAC SEVENTEEN, one hundred and four more flights have been successfully and enjoyably completed and logged. We have tried almost every crazy stunt imaginable and found the model extremely groovy and snappy. And by snappy, we mean the model will snap-roll at any attitude, and yet all other flight characteristics are very smooth, giving no indication of the extreme amounts of elevator and rudder travel necessary for snap rolling, thanks to proportional control.

The reed version would be much too sensitive and erratic if rudder and elevator travel were sufficient for snap rolls. So, if you wish to fly your MAC SEVENTEEN on reeds, the snap roll maneuver should be sacrificed for smooth performance on the other maneuvers. By the way, that simple change to make a good reed job out of this design is simply to limit elevator travel to ¼ inch up.

However you choose to fly your MAC SEVENTEEN, — proportional, contest, fun or trainer, — we are sure you will enjoy it.





# BELLAMATIC II SERVO AMPLIFIER

By **DON MATHES**  
RCM Technical Editor

*RCM's servo amplifier for popular Bellamatic II provides relayless operation from standard reed bank. Designed for compact multi installations.*

R/C Modeler's Servo Amplifier for relayless operation of the Bellamatic servo was designed in answer to numerous requests for a servo driver for this small German import.

The Bellamatic II servo has ample power for all but the largest of multi aircraft, and is ideally suited for the smaller ship where standard servos would be too large. One of the main advantages of this particular amplifier design is that it does not require a split reed bank, for relayless operation, but rather, used a standard reed bank configuration with positive ground. Delivering full power to the

motor in both directions, the amplifier is short-circuit protected.

No appreciable return swing is noticeable, and with the slight drag of linkages to the control surfaces, none at all is apparent. The amplifier uses parts that are easily obtainable. A kit containing the printed circuit board and all components has been made available by Justin, Inc. for \$4.50 each, but the RC'er with minimum electronic assembly experience should have no difficulty constructing the board or wiring the amplifier.

Color coding of the wires is identical with that of commercial servos

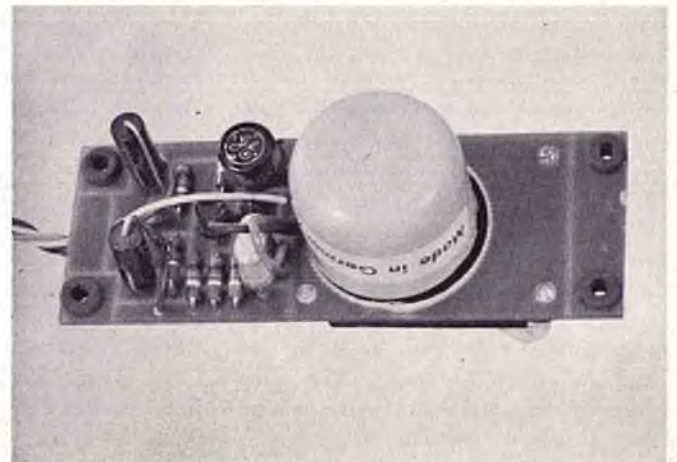
with the exception that the green wire from the bias battery has been eliminated. In fact, if your receiver operates reliably on 4.8 volts, the bias battery may be eliminated entirely, as it is not needed for the servo operation.

### Components

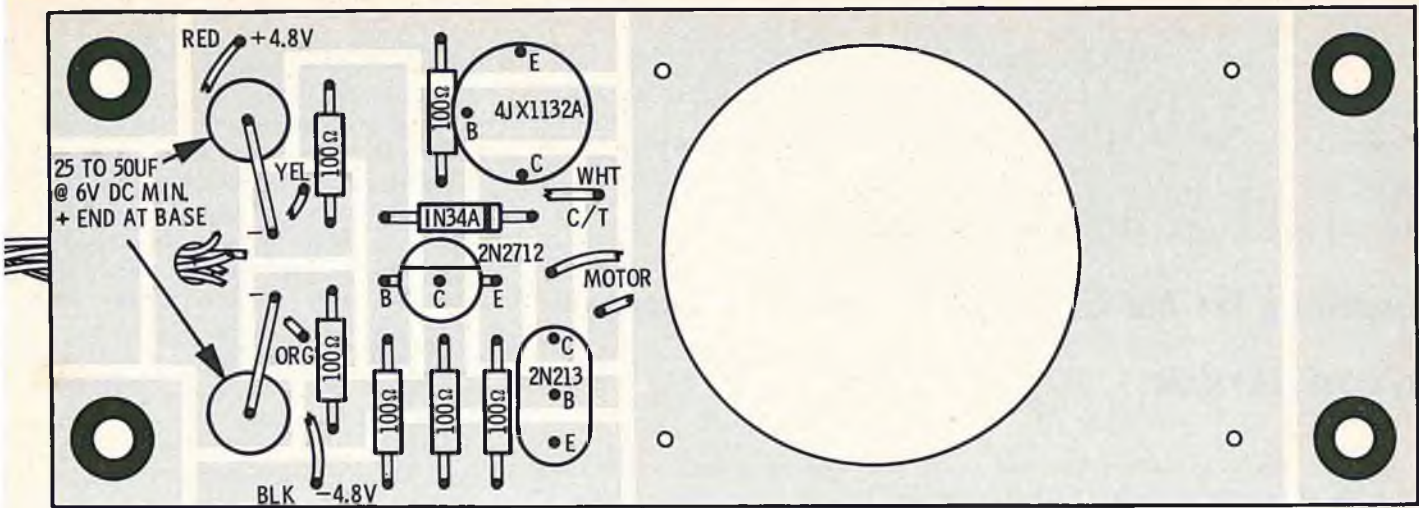
- 1—2N213 or 2N214 transistor
- 1—G.E. 4JX1132A transistor
- 1—2N2712 transistor
- 1—1N34A diode
- 6—100 ohm  $\frac{1}{4}$  watt resistors
- 2—25-50 mfd. 6VDC electrolytic cap.
- PC Board, hook-up wire.

**Amplifier board design to hold Bellamatic servo and mount in the smaller, compact multis. Weight is 1.5 oz.**

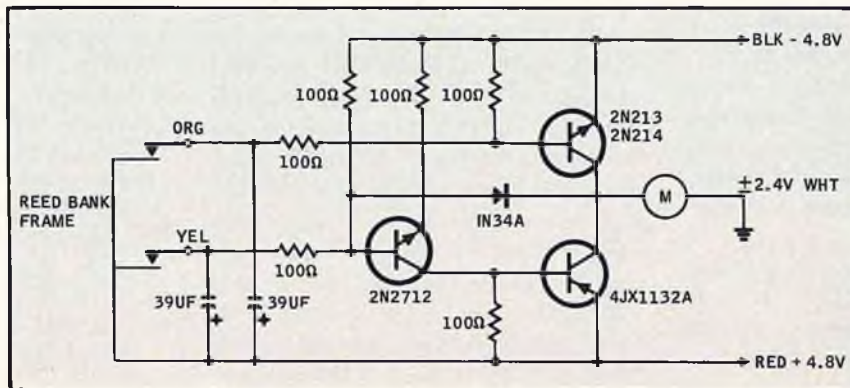
**Don Mathes with RCM Technical Artist Dick Kidd during engineering development of the Bellamatic amplifier.**







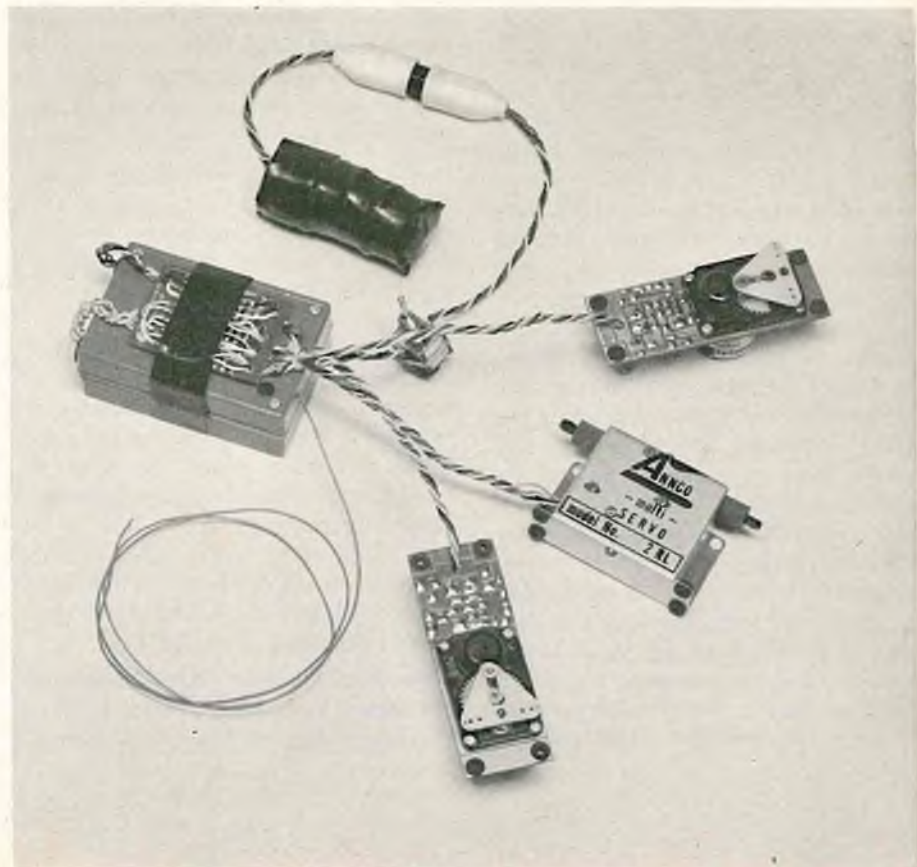
Above: Component layout for the servo amplifier. Schematic is shown below.



Full size printed circuit board layout.



Six channel receiver with Accutronics Accu-Tie, 225 ma nicad pack, two Bellamatics for rudder and elevator, plus Ancco servo for motor. All up weight is 11 ounces!





# NICKEL CADMIUM CONVERSION OF TUBE TRANSMITTERS

## Assembling The Ace A3.6CK 3.6 To 135 Volt Transverter

By DON SEKTNAN

With the advent of completely transistorized transmitters using small 9-volt batteries, there still remain many of the older 135 volt battery types in general usage. They may be a little cumbersome to handle from the standpoint of size and weight, but they are quite capable of producing a strong signal. Another point in their favor is the reduced strain on the family budget — the latter often not permitting the purchase of newer, and more expensive equipment!

These older, tube type transmitters can be updated somewhat in order to avoid the high consumption of 135 volt batteries, while reducing the battery complement weight at the same time. A transistorized converter that requires low voltage, such as 3.6 volts, and builds it up to 135 volts, is installed in the transmitter case. How this is accomplished can best be realized by visualizing the old car radio that uses a vibrator. The center contact in this vibrator moved back and forth between two contacts and built up the input voltage through a big transformer to a high AC voltage wherein it was rectified to a DC voltage by the usual OZ4 tube. A new, smaller size set up, using the same principle, can be made by using two transistors to take the place of the vibrator. A ferrox cup core coil, about the size of a quarter in diameter, and 3/4" high is also employed to build up the AC voltage. To rectify the AC voltage, four small silicon diodes are used as a full wave bridge. These parts, plus the other small components that make up the circuitry, occupy a space about the size of a playing card. One such transverter is distributed in kit form by Ace Radio Control, and is powered by three nickel cadmium batteries supplying 3.6 volts into the unit while putting

out 135 volts at a load of 20 milliamps. This is quite adequate for all of our single channel transmitters now in use.

The basic part of the whole system is the nickel cadmium battery. Although there are many suitable nickel cadmium cells in the Gould-National line, one exceptionally good bargain is the surplus wet cell type units. Each cell has a voltage of 1.25 volts and is available in a 4 amp hour rating. These are being sold by several RC shops that advertise in this and other publications, along with many surplus stores, such as C & H Surplus, Pasadena, California. For this type of operation, the nickel cadmium battery is very adaptable for use in a transmitter. It will maintain a relatively steady voltage when it is being discharged at high currents. It can also withstand extremely cold temperatures and still maintain a charge. Another advantage is that it can be stored in any state of charge without damage.

The electrolyte used in the 4-amp hour wet cell is a thirty percent (by weight) solution of potassium hydroxide in distilled water, providing a path for the current flow between the positive and negative plates. The electrolyte does not take part in the chemical reaction. The specific gravity remains constant when the battery is in either a charged or discharged condition. So, as a result, the state of charge cannot be determined by a test of the electrolyte. Neither can it be determined by a voltage test, due to the inherent characteristic of the voltage remaining constant during 90 percent of the total discharge time.

Another inherent characteristic of the nickel cadmium battery is that when the unit is in a low, or discharg-

ed condition, the electrolyte is absorbed within the plates to a point where it is not visible from the top of the cell or along the sides. As the battery is recharged, the electrolyte rises and reaches the level indicator when the battery is fully charged. This feature demands that the battery **must always be fully charged** before adjusting the level of the electrolyte.

Since the state of charge cannot be determined by a check of either the voltage or electrolyte, the charging input to a completely charged battery must be monitored in current and time until the ampere hour capacity of the battery has been reached. After this is accomplished, allow the battery to set for at least two hours, then adjust the electrolyte level only if it is required. This is directly opposite of that required for lead acid batteries.

During the use of this nickel cadmium battery, potassium hydroxide crystals form on the terminals and on the center vent and filler area. The best way to clean them is to rub with a small, dry hand scrub brush or tooth brush. If a neutralizer is needed, common boric acid is used.

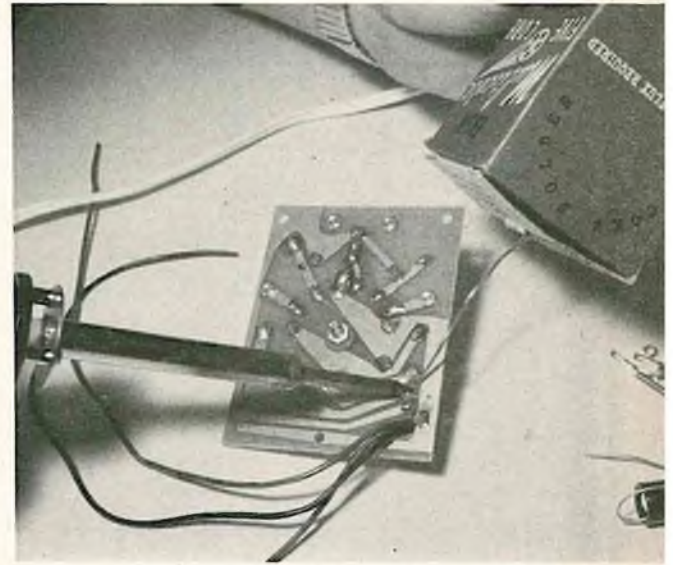
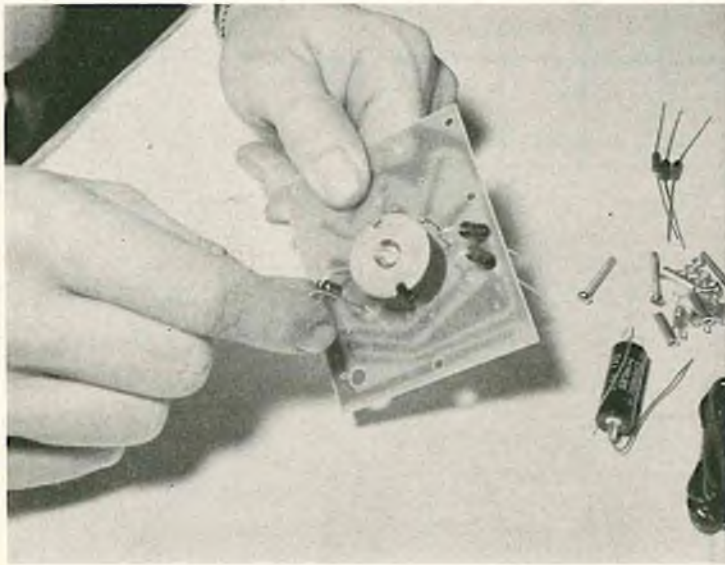
During the charging cycle there is need for a special precaution, and that is to remove the vent screw if it is of the solid type. There is another type that is drilled through from the bottom and terminates in a hole drilled perpendicular to it at the middle length of the screw. Around this hole there is a rubber sleeve that releases the gas pressure developed. This type of drilled screw can be left in during charging.

A good safe charging rate to follow on all nickel cadmium batteries, button, cylinder, or wet cell types, is ten percent of the rated capacity. On the wet cell type, the percent rate can be higher if needed, inasmuch as its construction will allow the gas formed from high charging rates to escape the cell. The dry type will rupture its case. As an example of the 500 mah button or cylinder type used in RC aircraft, the maximum rate would be 50 milliamps, and the 4 amp hour wet cell type would be 400 milliamps (or slightly higher).

The problem of charging the wet cell nickel cadmium battery can be solved very readily. Every RC'er has a car (almost everyone, anyway), and as a

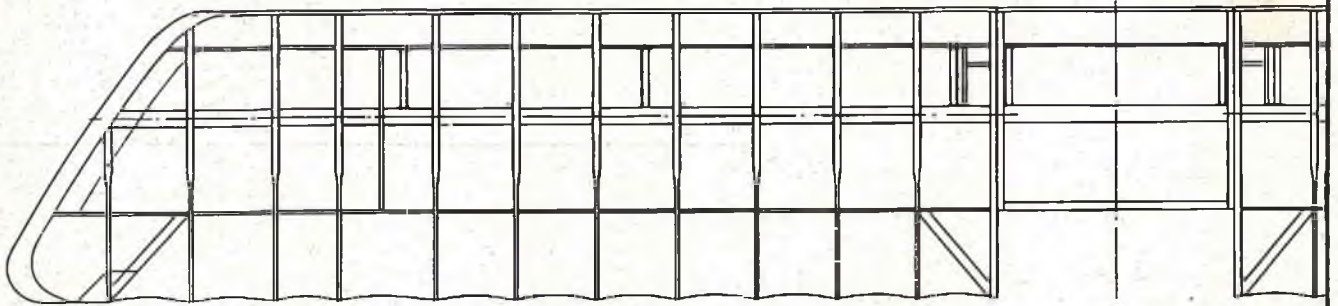
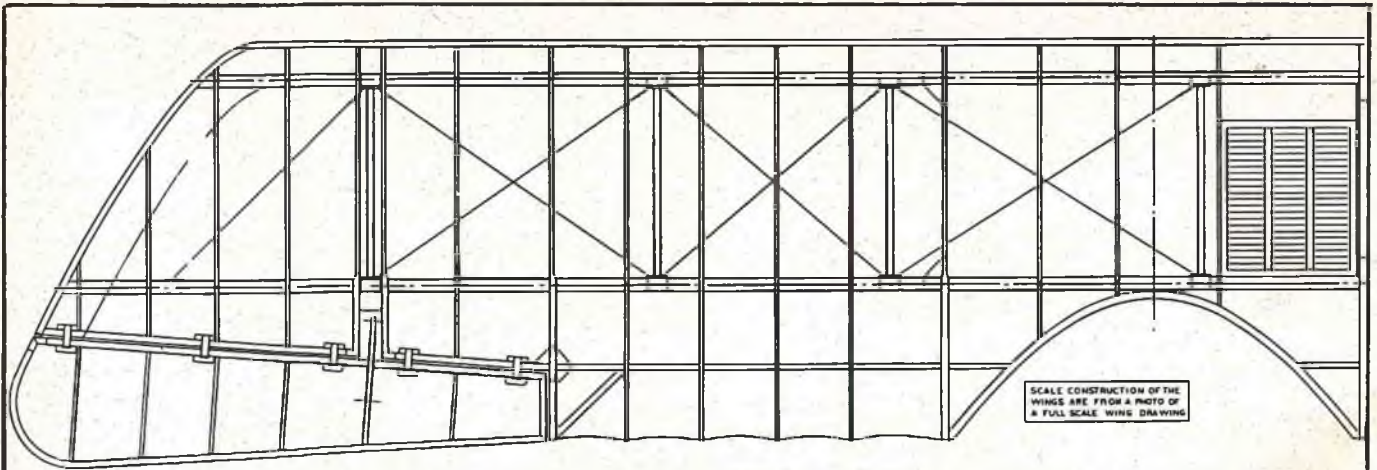
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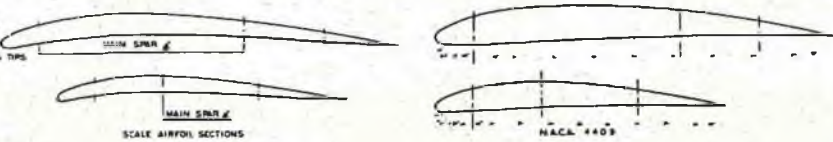


Check to be sure all required components are included in the kit. Mount the cup-core transformer. Solder the primary and secondary wires. Insert the four silicon diodes. Mount the two power transistors. Insert the 22 ohm and 330 ohm resistors. Insert the brown, black, and red hookup wires. Insert the electrolytic capacitor. Insert the 75K resistor. Solder all components. Trim excess leads. Insert the three mounting bolts and spacers. Hook up the transverter in your transmitter per the diagrams included in the Ace kit.



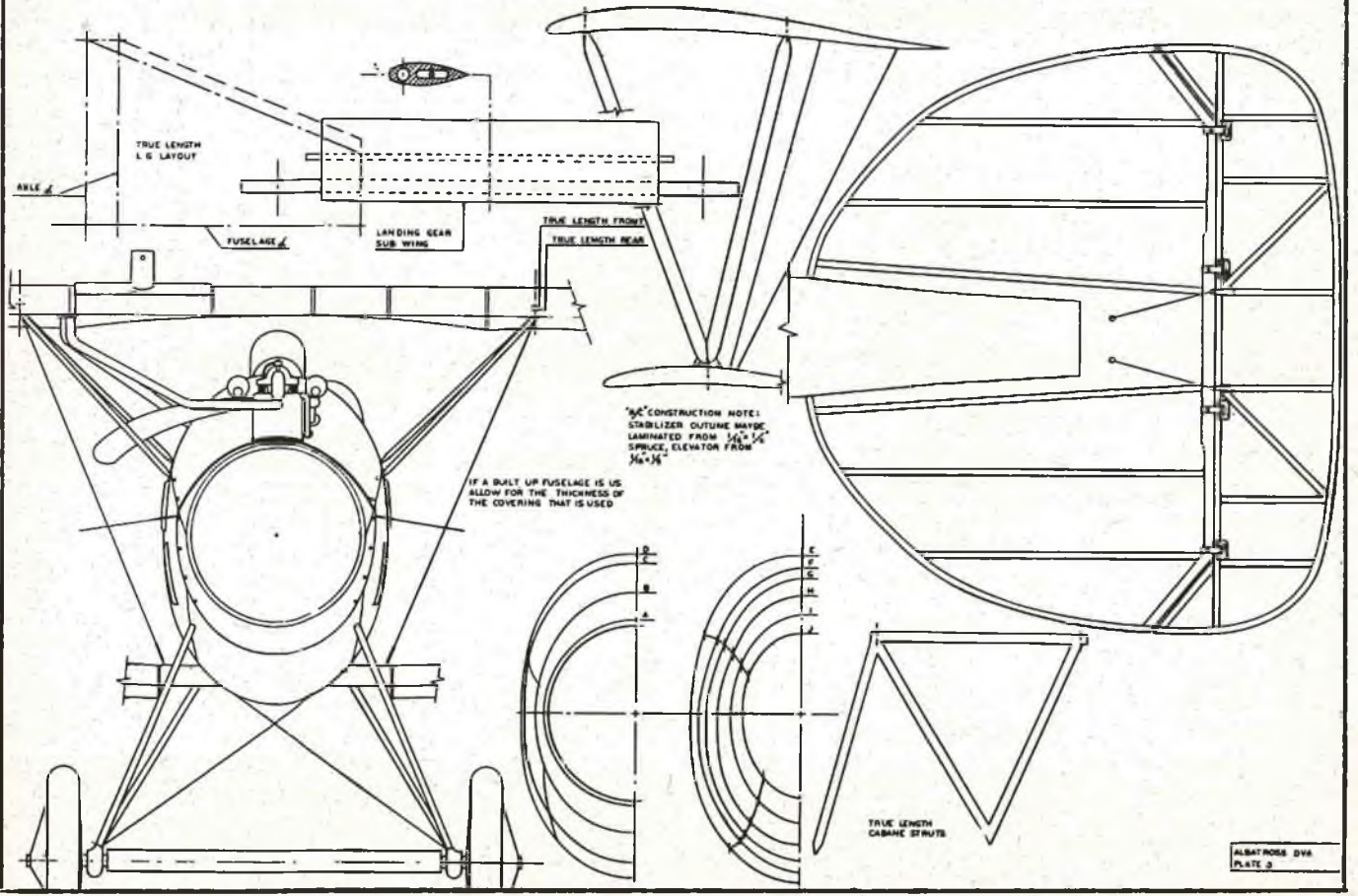


$\frac{1}{8}$ " SCALE DIHEDRAL AT THIS POINT LOWER WING ONLY  
WASHOUT LOWER WING TIPS AND ALLETONS



R/C NOTE: AILERON SERVO MAY BE LOCATED IN WING RADIATOR. 5/8" SPRUCE IS RECOMMENDED FOR ALL WING CONSTRUCTION EXCEPT THE RIBS.

FULLSCALE WINGS WERE PLYWOOD COVERED TO FRONT SPAR OF UPPER WING AND BRILLIANT SPAR OF LOWER WING











## The Falcon on Floats

By REV. ROBERT W. L. MARK

This past summer of 1964 evidenced a real boom in flying RC models on floats. This was due, in part, to the excellent floats now commercially available for all but the largest models. Since the CG Falcon 56 is one of the most popular sport models, and since it is an easy plane to build and fly, it was decided to try it with float operation. The Gee Bee Line 28" floats come with spreader bars and are easily attached to the Falcon. The landing wheels and gear structure included with the Falcon kit should be saved for another use. A new structure should be made from 1/8" wire according to the sketch. This is used to support the front of the floats, while the wire that comes with the float kit is adequate to support the floats at the rear.

Radio control equipment used on the prototype was standard commercial equipment — Controlaire UTT-10 transmitter, Controlaire 10 receiver, and three Bonner servos on rudder, elevator, and motor.

All other questions had to be worked out by actual experimentation and water flying. Where to mount the floats was one question. What size engine was another. How well would the model steer on water was yet another.

With regard to the first problem, the floats should be mounted so that the step is directly under the CG. In this position, the plane rides nicely on the water and flies level in the air. Insofar as the horsepower department is concerned, an OS Max 15 had been adequate for regular flying but proved unsatisfactory for ROW. An OS Max

19 was better, but marginal. We finally settled on an OS Max 29 R/C. When you need plenty of RPM's, you have it. With this mill, the Falcon will get off the water in 30-50 feet.

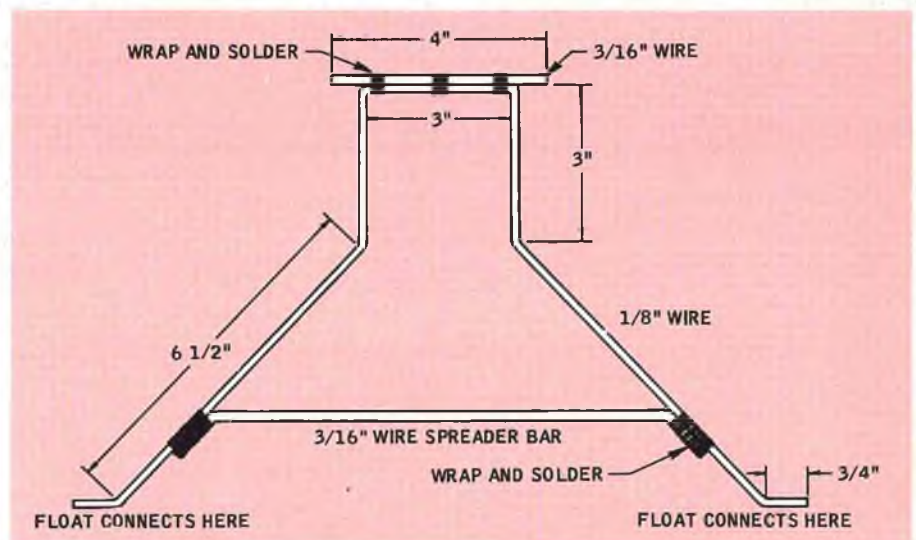
Experiments with the regular sized rudder and elevator proved them to be just right. At slow speeds on the water the steering is sluggish, but with a slight increase, the plane maneuvers very well. It is no problem at all to launch the plane from a dock, steer it around to take-off position, then bring it back to the dock when desired. The rudder area is sufficient, but considerable practice and skill are required. Experience has shown that only a very slight amount of up elevator is needed for ROW's. In fact, only small amounts of deflection is needed on either the rudder or the elevator, as the plane is very responsive, especially with the speed gen-

erated by the .29! Takeoffs should be very gradual, avoiding excessive amounts of up-elevator. Perhaps the most important thing learned from the past summer's flying was to avoid the danger of over control. Never throw the transmitter toggles on full — just blip them quickly and watch the plane. Very, very little control is needed to keep the plane flying smoothly. Too much control will inevitably result in a sudden rise and a deadly stall, or the plane will fall off to the right or left and cannot be righted. Always fly with either dead calm water, or at most, with a very slight breeze. Flying at any other time can be disastrous!

A good landing with the Falcon-on-Floats is a sight to behold — the plane mashes in easily and comes to rest gently like a seagull settling upon the water. Speed should be slowly cut down for the landing.

It is highly recommended that you put your receiver and battery packs in plastic bags to make them watertight. There is not much you can do with the Bonner servos due to their non-linear action. However, it should be mentioned that these servos were completely immersed in water at least ten times during the summer. After being taken out of the plane, taken apart, and thoroughly dried out, no damage of any kind was apparent.

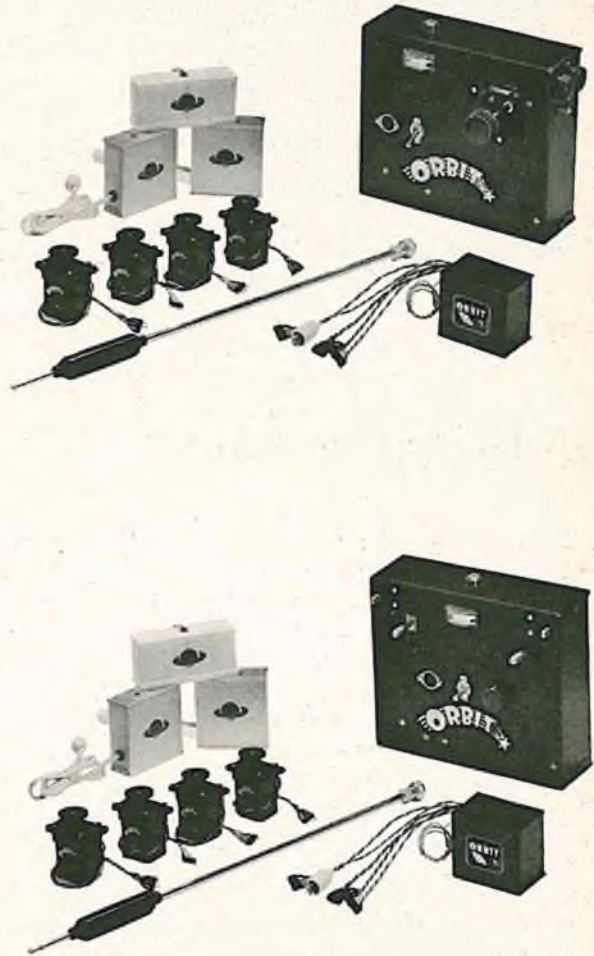
With the Falcon 56, the Gee Bee floats, the Controlaire equipment, the Bonner servos, and a Max .29, you have a plane that is just about perfect for good ROW takeoffs, exciting flights over the lake, and some beautifully landings. Give it a try!





# THE ORBIT PROPORTIONAL

**Space Control started it all —  
Now the long awaited  
Orbit Proportional System  
is competing in the fastest growing  
phase of R/C. Will it make  
it, or not?**



After several years of development, various test prototypes, design changes, and an assortment of successes and failures, the Orbit Proportional System is in full production. The familiar black box with the rocketing Orbit trademark is making its appearance at a time when virtually every major equipment manufacturer is frantically trying to get a proportional rig on the market, and in most cases, just as frantically tries to get it back again for further refinements. Orbit is in something of a hot spot with this new addition to their already extensive line of radio control products — a position of having to live up to a reputation of quality and reliability that they have established over a period of years with their single and multi channel equipment. Since they have set the pace, the question is — will the new proportional system come up to these standards? If so, who needs it, who will buy it, and what will those consumers get for their

money?

Basically, the Orbit proportional is an analog system along the classic Space Control lines. Available in both a single and two stick version, the two primary control functions (aileron and elevator) are operated by two audio tones. These two tones are varied through a relatively small change in frequency above and below the center frequencies of approximately 1750 and 3500 cycles per second. This produces the right and left aileron, and up and down elevator response. These tones are not transmitted simultaneously, but in separate segments. That is, one tone is sent for a short period, and then the other. The amount of time involved with the transmission of either tone does not produce an effect on the aileron or elevator. These controls are concerned only with the tone frequency.

Rudder control is achieved by varying the amount of time one tone is transmitted with relation to the other.

This is referred to as symmetry. Through any given period of time occupied by the high and low tones, the symmetry may be varied to a maximum of an 80-20 to 20-80 ratio. That is, 20 percent of the time may be low tone, with 80 percent as high tone. This would result in one extreme rudder position. Reversing the symmetry relationship would be the opposite extreme rudder. This symmetry is also infinitely variable with the 20-80 to 80-20 range for proportional rudder action.

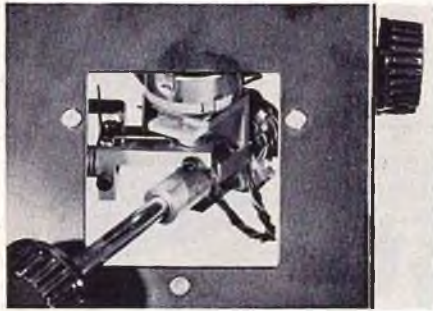
Throttle control is achieved by varying the rate at which the two tones are repeated, with slow rate giving low speed and high rate, high speed.

Therefore, by varying the two audio tone frequencies, the rate of repetition of these tones, and the symmetry relationship, a quadruple proportional action results.

#### Transmitter

Although our test system was the single stick version, a twin stick setup





Exterior view of single stick assembly.

is available. On the latter, the lever in the upper right hand corner is the throttle. The horizontally operated lever on the right is the aileron control. The black plastic knob just below and slightly to the left of the aileron stick is the aileron trim control. In the center of the transmitter is an on-off switch. On the left is the elevator and rudder control function. The lever in the upper left hand corner is elevator trim. In the top center of the transmitter is an RF meter.

On the single stick unit, the trim knobs will be found at the top on the right hand side of the transmitter. The knob closest to the front panel is aileron trim, while the rear knob is elevator trim. The lever protruding from the side, just below the trim knobs, is the throttle control. The single stick on the front of the transmitter contains all the primary control functions — rudder, aileron, and elevator. The on-off switch and meter function are the same as for the two stick version. Both transmitters feature all transistorized circuits, and incorporate good components. Trans-

mitter output is excellent, and well in excess of normal requirements.

#### Receiver

The superhet receiver in the Orbit Proportional System is a modular, twin-deck unit, designed for minimum size and weight with a maximum of strength. Circuitry is shown below.

#### Servos

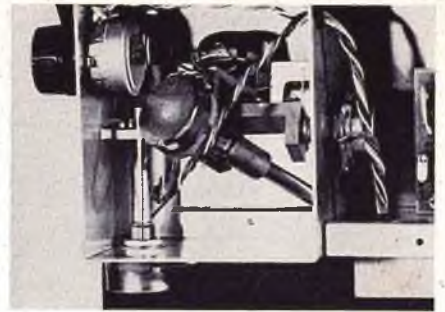
The closed-loop servos used in the Orbit system include a built-in feedback potentiometer for proportional operation. The servos start and running on as little as 12 to 15 milliamperes of current. The amplifier employed utilizes selected germanium and silicon semi-conductors for stable operation under extremes of temperature. Servo transit time is half a second from maximum to maximum. Output is of the disc type.

#### Battery Pack

The airborne battery pack provided with the Orbit system consists of a pack of four 1.25 ampere hour nicad cells, yielding an aggregate flight time of approximately three hours.

#### Findings

After a general checkout and examination of the single stick version of the Orbit Proportional System, the unit was given to RCM staff member Frank Justin for flight test evaluation. Walt Findlay, President of the San Gabriel Valley Radio Control League also participated in these test procedures. At Frank's suggestion, and with his assistance, Findlay, a proficient reed flier who had never flown proportional, installed the Orbit rig in an



Interior view of single stick assembly.

Orion, and proceeded with several days of flight tests so that we might get the opinion of an average RC'er for whom the majority of proportional sales are intended.

To begin with, this is a proportional multi-reed system. Once the initial flying, and definitely superior to excitement over the vast difference between reeds and proportional is overcome, a flight evaluation becomes a matter of comparing a given system to preconceived "ideals" or optimums of proportional control, as well as comparing that system to others that have been similarly tested.

The Orbit is a good, workable, and seemingly reliable system of proportional control. At no time was there any evidence of interference or blocking. And, like the old saying about "a bird in the hand", it will undoubtedly have a high initial sales impact on the RC consumer who is ready, willing, and able to lay out six hundred dollars for a new rig, for the Orbit is here, now — unlike the dozen or so other systems which seem always to be just a promise away. Deliveries are

Interior of single stick transmitter.

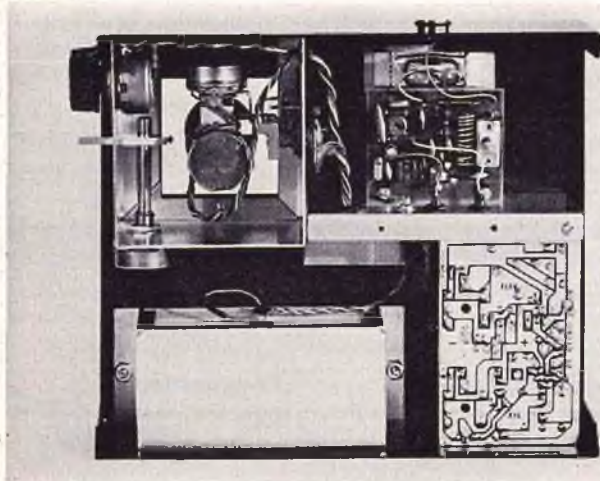
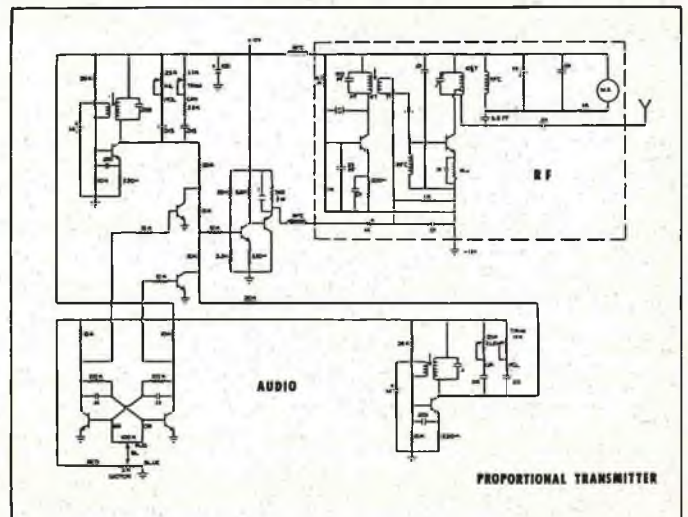


FIG. 1. Orbit proportional transmitter





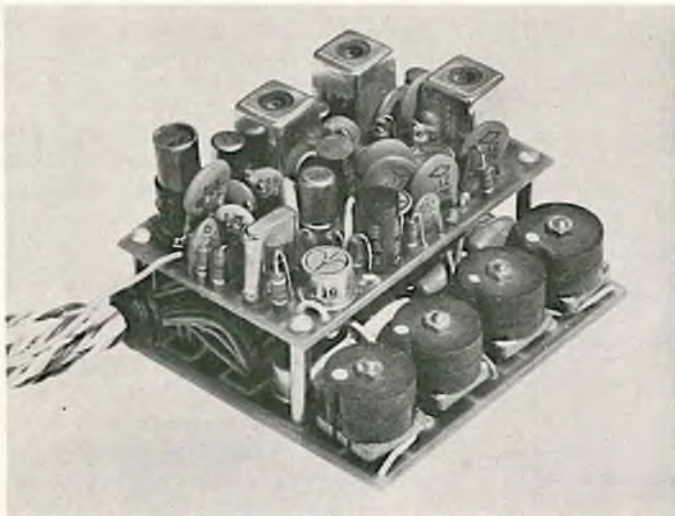


**Orbit analog servo**

being made to local dealers from current production runs which may hit a high of 150 units a month.

What will the consumer get for his money? For one thing, he will have a complete, packaged, pre-wired and cabled, ready-to-install system of proportional control in his choice of a single or twin-stick version. As mentioned, once the initial thrill of proportional flying becomes somewhat less frenzied, the consumer will find certain aspects of this system which fall short of the so-called "optimums". For one thing, a characteristic of an analog system, such as the Orbit, is poor servo resolution. For example, assuming your aircraft is flying at a speed of fifty miles per hour and you move the elevator control ten degrees, a servo with infinite resolution should go to exactly ten degrees — no more and no less. The Orbit system, however, does not follow the stick exactly, but is proportionate to the load imposed upon the surface — one undesirable characteristic of analog designs. This results in the necessity for moving the stick farther than necessary in order to end up with the required amount of servo travel — say,

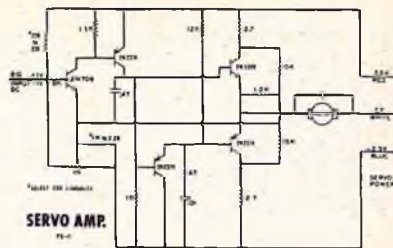
**The proportional receiver — sans case**



**Walt Findlay with test unit. Note unique aluminum channel servo mount.**

for example, moving the stick fifteen to twenty degrees in order to obtain the required ten degrees of servo movement. These servos also have a noticeable interaction, as well as being overly soft around the neutral position. They do, however, have more than adequate power and are extremely easy to mount in almost any aircraft equipment compartment. One main disadvantage concerns the throttle servo which moves 180 degrees out of phase when the transmitter is shut off, necessitating a very sloppy throttle installation in order to allow clearance for the throttle linkage to describe its arc inside the equipment compartment. Trim functions, and physical trim control location of all functions is good.

Although we feel, as a personal



**FIG. 2. Orbit servo amplifier**

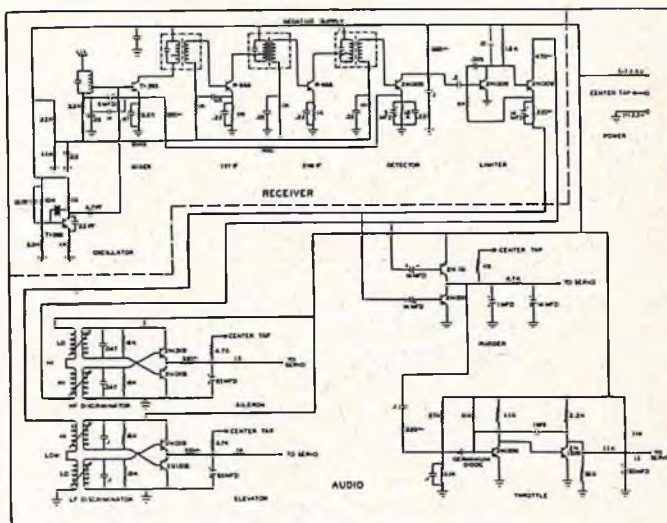
opinion, that a so-called "fail-safe" is unnecessary and somewhat useless with modern day multi designs, most proportional systems include this feature, including the new Orbit offering.

Insofar as the one stick or two stick controversy goes, we will continue to recommend the twin stick setup to both the reed flier and the newcomer, inasmuch as it is virtually impossible for the pilot to move the aileron stick straight across without introducing some up-elevator. The later is due simply to the fact that it is extremely difficult to move the hand and forearm in any but an arcing movement, which in turn, creates a greater amount of up elevator as the movement of the hand draws the stick closer to its extremity, either left or right. In addition, the large rudder knob on the single stick version is somewhat cumbersome, and creates a definite tendency on the part of the pilot to "grab" the stick, subsequently over-controlling the flight surfaces.

This, then, is the Orbit Proportional System. It is here, and available to the radio control enthusiast with six hundred dollars to spend. It is a good, and seemingly reliable system,

*(Continued on Page 55)*

**FIG. 3. Orbit proportional receiver**





# FROM THE GROUND UP

Though my mail represents a good cross-section of modeling interests, the past few months have been a top-heavy leaning toward mail from single channel pulse fans in general, and the more elaborate versions — such as Galloping Ghost and inductive kick systems, — in particular.

We don't mean to slight any particular type of control in favor of any other. But, the mail runs as much as nine to one in favor of discussing the complexities of "Poor Man's Pro", as Bill Steinhauser of Pittsburgh, Pa., calls it.

The interesting aspect of much of

the mail is that many who are becoming interested in this "nervous proportional" type of control movement are also Multi fliers who either find G-G and such a great change of pace, or do some down-to-earth experimenting.

I personally feel that much of the interest — especially lately in G-G — is a direct or indirect result of the impact of the new multi-proportional systems' arrival on the R/C scene. If this stimulates the hobby in general ... then it's all for the best.

One thing about this "Poor Man's Pro", you can get quite a bit from

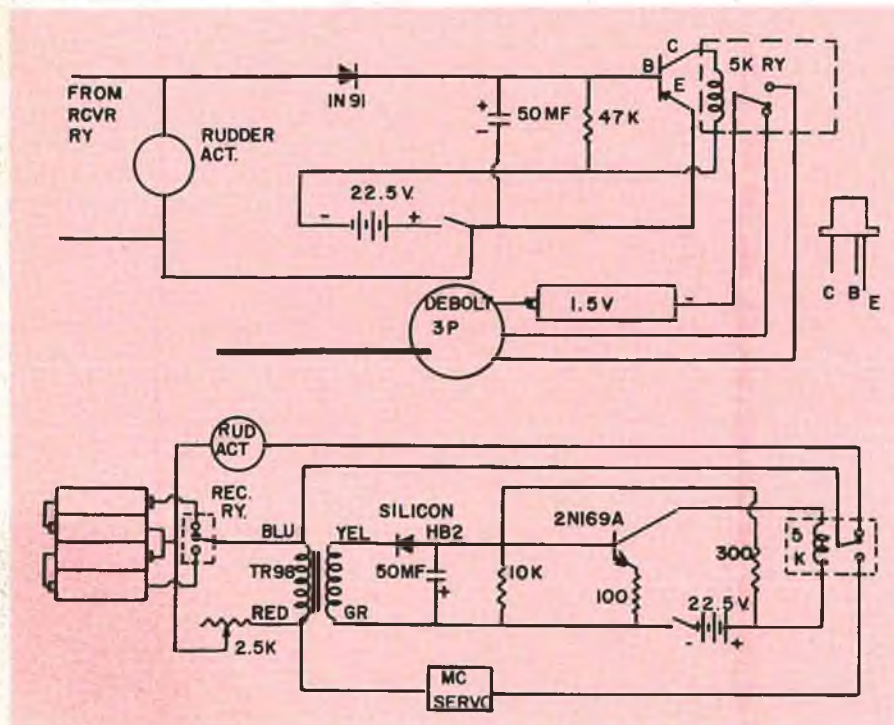


a nominal investment. The biggest investment is in time and patience... and you dooo need that!

I like it primarily because there are no hard and fast rules involved. No one draws a line down the road and says that this is the path to follow and you'll be judged on how well you stay on that line. You pretty much draw your own line and follow as you see fit. And, you'll probably succeed as long as you've got a stubborn streak which won't wash off!

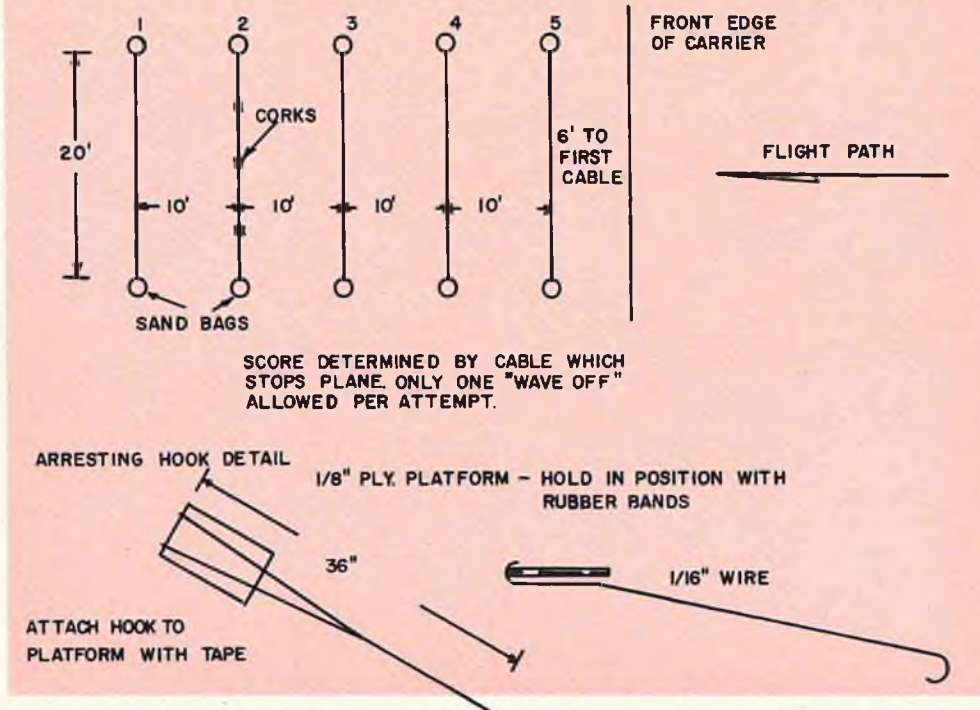
True, there are some ideas which have been laid down in order to get started. In a sense, you might argue that G-G, too, has its rules. The point is that the G-G rules are somewhat more vague and relaxed... general guide-lines which still leave much of the success or failure up to you. That sounds somewhat forboding — (but the fact remains, that when you do tifiably proud that you've ventured master the system, you can feel just-out into a rarified modeling atmosphere and returned intact! (well, almost intact!!!)

Several recent developments are adding to the flavor of experimenting with G-G. A couple of excellent pulsers for addition to present transmitters are now available. Many receiver manufacturers are placing special emphasis on pulsable receivers. A new pulser-transmitter combo in one small package (Min-X... reported here last issue) and matching receiver takes even more of the guess-work out of it. A set of pre-formed wire parts for the tail eliminates another old bugaboo. To more or less complete this picture





ARRESTING CABLES— 25 LB. TEST NYLON ANCHORED EACH AT EACH END WITH 5 LB. SAND BAGS & SUPPORTED 1/2" ABOVE DECK WITH CORKS



SCORE DETERMINED BY CABLE WHICH STOPS PLANE. ONLY ONE "WAVE OFF" ALLOWED PER ATTEMPT.

is a new series of small high-powered servos soon to be released by Air Guide Systems which will satisfy the growing segment of modelers who like their G-G ships on the large size... though the servos are somewhat smaller than the present Go-Ac.

One thing that has always been a source of amazement for me, with regard to G-G, is that it has been possible to take a group of completely foreign parts and make them work as a team. I'm not implying that in days past these parts were completely harmonious... they weren't. But, it was possible to get them to work with some degree of success. By the same token, too much fiddling frequently created many dischords!

Lately, several manufacturers of various components used in G-G setups have been giving more thought to the other parts involved with an eye toward standardization. This is a long overdue step in the proper direction. There has been a lot of midnight oil burned to improve upon the quality of the components used in this phase of the hobby... again, thanks in no small part to the development and interest in the more ultra forms of proportional control. — Score one more for the hobby!

It's still a tinkerer's hobby!!! And one whose tinkering may have opened up a new door for the advocates of

small G-G ships, is W. S. Blanchard, Jr. of Hampton, Va.

His idea involves using a small magnetic actuator in such a manner as to be able to effect G-G! He calls it "Relayless, 3V Poor Mans Galloping Ghost"... (we should simply call this the "Poor Man's Column") with an all-up weight of 3 oz!

The system consists of an Adams actuator (magnetic) limited to a  $\pm 45$  degree throw, flipping a rudder about  $\pm 30$  degrees. From here the plot begins to thicken, as the success depends upon a set of linkages which create the proper movement. It's all outlined but a picture would make the cheese binding, so I'm going to ask the author to supply a rough sketch which we can pass along to you. Seems like he's hit on a new wrinkle and a clever way to make a tiger out of those tiny ships!

So, how 'bout it Woody? The rest of us want to know more about your new wrinkle.

A real hot bed of all kinds of tinkering is the North Jersey R/C Club. For many years now this organization has been unique — not only because of their size and interest — but because they have maintained a sense of originality and individuality within their club which is rarely found today.

True, most clubs are made up of

varied interests — but many gradually gravitate toward one major type of R/C endeavor with a resulting loss of individual modeler identity... A kind of "follow the leader" attitude. The NJRCC, on the other hand has seemed to develop that rare quality where many different approaches are not only tolerated but promoted, and then integrated into a well defined club, with each member following his own "line" down a common road. Seems that they've found that conformity may be secure, but awfully dull!

(So, how's your club shaping up these days? Been noticing everyone wears the same color neckties, too?)

...almost forgot the real reason I brought up the NJRCC. A recent issue of their club clarion "Printed Circuit" contained two P.O.D. circuits (Pulse Omission Detector circuit — used to trigger a second servo in a primary pulse system) which you might want to jot down in your scrap book somewhere for later use.

Neither circuit is new but both are worthy of adding to your collection. One will trigger an escapement or a positionable servo. The other one uses a transformer which uses the electrical kick through the rudder actuator motor to trigger the rest of the circuit. The transformer version requires the

(Continued on Page 57)



## Accutronics Solo Proportional Servo

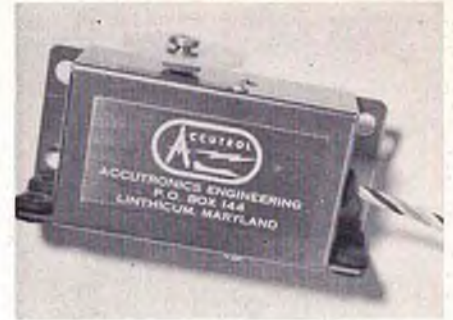
The 'PR' series proportional servos, as manufactured by Accutronics Engineering, Linthicum, Maryland, are designed to operate with any type proportional system that supplies a variable DC error voltage or control signal; as for example, the Orbit, Sampsey, Astroguide, and Dee Bee Mark II. In addition, they may be used with single channel systems when suitable filtering is applied.

The Accutrol servos operate on the same principle that has been accepted since the early Space Control units; that is, being a closed loop amplifier employing a feedback potentiometer to cancel the motor current. However, another stage has been added to the amplifier, allowing the drive motor to be controlled by two heavy duty

transistors (rated at 3 amps). This step has virtually eliminated the problems of transistor burn-out due to stalling or limiting servo travel. It is no longer necessary to provide linkages that will allow 360 degrees rotation of the servo output. This means, for example, that a steerable nose-wheel may be attached to the opposite side of the rudder output without fear of damage to the servo.

Accutronic servos employ a thermistor to compensate for changes in temperature. The servo will show no visible change in output or position from 0 to 140 deg. F.

The feedback pot element is of the carbon type, and has been tested for over five hundred flights without signs of undue wear. The carbon pot has



been utilized in preference to the wire-wound units, inasmuch as wire breakage in the latter means total servo failure.

Mechanically, the construction of the Accutrol Servo equals or exceeds that of any servomechanism we have seen. Internally, a modular type construction has been used, providing a very strong and quite compact unit. A Micro Mo motor is employed to drive the servo, each motor undergoing a complete re-work in order to increase its vibration resistance prior to being used as a servo motor. The Micro Mo gear train has also been reduced and built as part of the servo itself in order to further isolate the

*(Continued on Page 44)*

## Konac Systems Single Channel Economy Package

Konac Radio Control Systems of Keeseville, N.Y. is a rather unique radio control dealer. A mail order house specializing in radio control equipment only, Konac prepares complete single through multi-channel proportional systems — components that are guaranteed to make a compatible combination. In addition to the transmitter and receiver and associated instruction sheets furnished by the manufacturer, Konac provides its own Builder's Manual for the benefit of the newcomer to radio control. This one feature, alone, is outstanding, in our opinion — one company

that doesn't assume that you have five years of experience before you start!

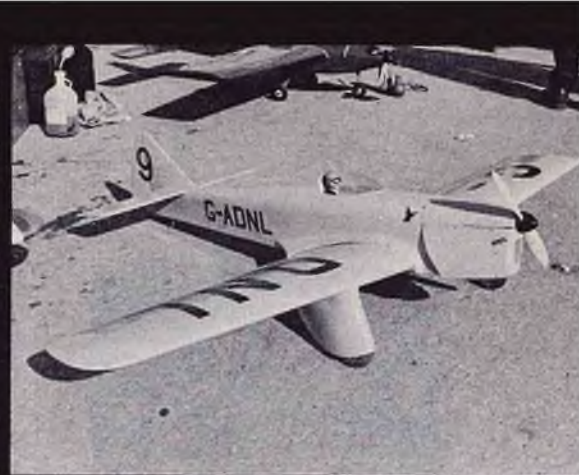
For our product report, we obtained the lowest priced Konac package—the single channel economy system. This included an assembled Controlaire Mule transmitter, assembled Controlaire 5 relayless receiver, Citizen-Ship SE-2 compound escapement, Eveready batteries for both transmitter and receiver, Top Flite Rascal rudder only kit, Cox PeeWee .020 engine, fuel tank, switch, prop, battery holder, hookup wire, foam rubber for receiver mounting, wing hold down bands, solder, nuts and bolts —



plus the Builder's Manual and manufacturers instruction sheets. The entire package for the newcomer to R/C at a price of \$55.95. If the same newcomer has had some electronic assembly experience, he can obtain this package from Konac with the transmitter and receiver in kit form for \$44.95. For the more experienced flier who would like to choose his own plane, engine, and hardware, the transmitter, receiver, escapement, and batteries only are available for \$37.50 in kit form or \$48.50 assembled.

*(Continued on Page 43)*





Don Lien's Pipe Aztec, 1st at LARKS Open.  
Below: Bill Baker's Sopwith Pup, 2nd.



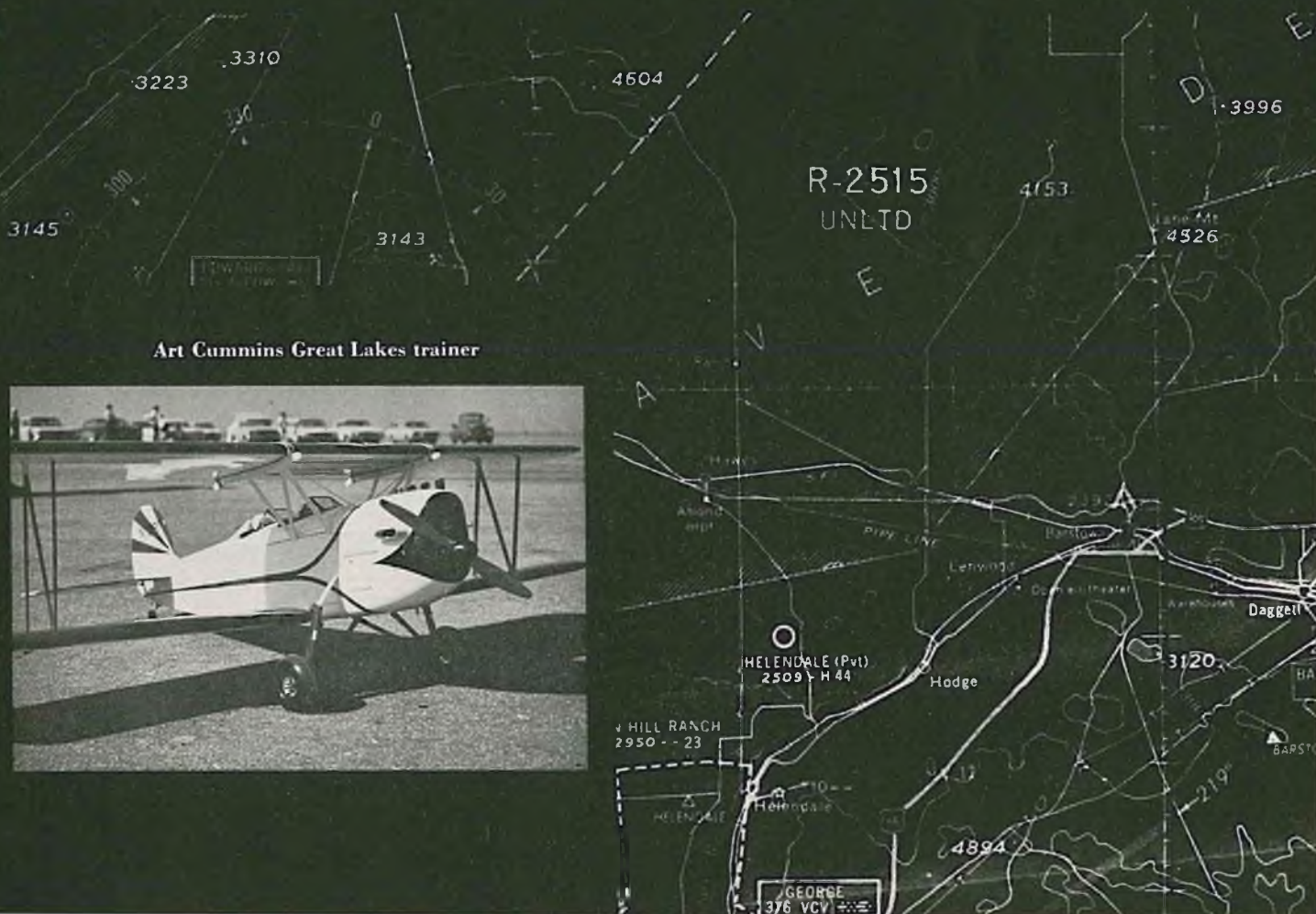


The L.A.R.K.S Open, held at Bakersfield, California, saw Class III Expert being dominated by Cliff Weirick, Phil Kraft, and Jerry Pullen. Weirick, flying his familiar, Nat's winning Candy design, used the new Bonner proportional for a first place win. Kraft and Pullen were using the Kraft proportional system. In Class II, Bill Williams managed to edge out Nat's champ Lloyd Sager, with Odino third. Gardner, Bowen, and Hallock were the winning trio in Class I. In the pylon event, Cliff Weirick was first; Doug Spreng, second; and Joe Foster, third. The scale event was well attended with a variety of outstanding entries, including Lou Proctor's "Bo-lero," Art Cummins white and red Great Lakes, Bill Baker's Sopwith Pup, Don Lien's two-tone blue Piper Aztec, Dave Lane's Great Lakes, Woody Woodward's Corben Super Ace, and Frank Cappen's yellow L-19 Birdog. Winners in this event were Don Lien, Woody Woodward, and Bill Baker with a point spread from 6.126 to 4.988.

One of the most impressive parts of the Bakersfield meet was the number of full-size plane fly-in's — ten plane loads of modelers in Cessnas, Bonanzas, Comanches, and an Apache. The only way to fly!



On October 3, 1961, the D.C.R.C. club met at Dahlgren, Va. for





an attempt at the existing R/C altitude and speed records. Maynard Hill, current world's altitude record holder, was unable to attempt to surpass his own mark of 13,320 feet due to fuel flow difficulties. Dr. Walt Good, with an old familiar 'Multibug' actually reached a record altitude of 14,600 feet when the tracking binoculars jumped a bit and lost sight of the 'bug'. It was last seen five miles away and headed across Chesapeake Bay. Due to the rulings that a ship attempting an altitude record must land within 1,500 feet of takeoff point, Walt's flight cannot be considered for an official record.

Several other altitude attempts were made during the weekend trials, including a team effort on the part of Joe Bazey, Earl Webb and Joe Solko with a large delta configuration. Highest mark for the trio was 10,600 feet. Bill Northrup was on hand with his 'Foo Too', but was unable to top out due to engine difficulties. Another attempt was made by Tommy McGram and a very interesting model. The latter, a large light model capable of being seen at high altitudes, carried 27 mc. telemetering equipment that relayed information concerning engine speed to the pilot. Difficulty with the 50 mc. radio equipment prevented an official attempt with this craft.

Bob Scott and Don Jehlik were on hand for the speed trials with a styrofoam delta covered with 1/32" plywood. A reworked McCoy 60 provided the power. Although the model may have reached 150 miles per hour on the test run, landing damage prevented further attempts at the speed record.

Perfect flying weather was the order of the day for the Annual RC/NC Contest, held at the Asheville-Hendersonville Airport, North Carolina, on October 24-25. In Class I, Ralph Corelle and Jim Thrift were first and second, respectively; in Class II, Bob Rector and Bill Hutchinson. Class III Novice saw Bob Mitchell, Bill Kinsland, and Jeff Hooper topping the scoreboard; Class III Expert went to Bob Smith and Eddie May, Jr.

In addition to the usual AMA classes, a Carrier Landing event was well set-up and equally well received. A considerable amount of interest was generated in this event, providing a nice show for the spectators and contestants alike. Bill Kinsland, Jeff Hooper, and Eddie May, Jr. captured the Navy event.

The three-year-old "West Suburban RC'ers Inc." of Chicago, with over fifty adults and ten Juniors, held their second Annual R/C Contest under AMA Sanction #491 on August 23rd. Under the leadership of event director Hugo Mosquera, twenty-eight contestants competed in Class II and III, Novice and Expert, for \$400 worth of prizes donated by members of the hobby industry. In Class III Expert, Dave Lundholm aced out Jimmy Grier for first place, with Harold Parenti filling the third slot. In the Novice category, Ron Nelson, R. Schreiber, and R. Reed were the winning threesome. In Class II, D. Foley, C. Mueller, and J. Reeves won top honors.

The West Suburban RC'ers are one of several very active clubs which are giving a new vitality to radio control activities in the Chicago area.

*(Continued on Page 59)*



**John Worth and Walt Good at Tracking Scope.**



**Joe Bazey, Earl Webb and Joe Solko.**



**Don Clark holds Maynard Hill's altitude ship.**



**Bob Scott and Don Jehlik with speed ship.**





First place winners, McDonnell RC Club 7th Annual. L to R: Ed Henry, Will Feldmeier, Dan Santich, Courtney Smith, Jack Clapp, Bob Williams, Art Treppler, and Bob Baldwin.



LCDR. Ted Wilbur, U.S.N.R., and modified Sterling Spitfire. Sampey proportional, O.S. 49. Retractable gear.



Ron Nelson, a Novice first in Class III at second Annual Chicago event.



Dave Lundholm, an expert first, at Chicago.



Denis Foley and winning Class II ship. Right, Sid Petterson, president of R/C Club of Chicago.



Chicago's great "Old-Timers" — Leo Galin and Frank Madl — forever active fliers.



# COMMENT

## No Rule Changes Slated for 1965 . . . Academy Working on Willow Grove Nat's

By **GEORGE WELLS**

### Rules and Nats Schedule Subject to Revision in 1965

Just when flying started to slack off in most of the country, the building season started to move in full swing; and several hot topics were proposed for hangar flying — then the Academy of Model Aeronautics has to come out with some matters for serious consideration!

The shame of it is that everybody snowbound was ready to discuss the perils of fiberglass fuselages, foam wings, and otherwise factory-made equipment which seems to be standardizing R/C. There was even some thinking to the effect that there wouldn't be any differences at all between the East and West Coasts, who have enjoyed a traditional feud as long as there has been R/C.

Another observer suggested establishing some R/C hate groups around the country based on the idea that the Californians enjoy good flying weather all year around, but then somebody remembered that Florida, Hawaii, and Texas also try to claim optimum flying conditions.

So, we were back where we started, with the Season of Good Cheer, the Academy's problems, and yet the prospect of having a little fun.

It seems that the rules for R/C have not been changed significantly for two long years. A number of critiques on rules have appeared in the model press, people have been yelping away with suggestions, both verbal and by letter, but practically nobody has bothered to try going di-

rectly to the R/C Contest Board which has the authority to change the rules. So long as this situation prevails it looks like a gala New Year, with continued grumblings toward everyone's pet event, whether it be Class I, II, III, Pylon or Scale.

AMA Headquarters is assuming its traditional role of late as the helpful arbitrator, and is determined to see that each elected board member knows what the others think so they can work out any changes without any railroading of the rules. Headquarters help is in the form of reproducing and distributing communications between members, along with a tabulation of the results.

As to the plaudits and the brickbats for any rules changes which may result, Headquarters says "No thanks—this is a Contest Board job". By the way, it turns out that there are no R/C rules changes in the works for 1965. The Contest Board started off on a batch proposed by such people as DeBolt, Dick Allen and Jim Kirkland, but has bogged down due to lack of response from some Board members. Seems like some of the people making noise about rules changes need to check and see if their local representative has been working. A word to the wise?

Meanwhile, Headquarters has other changes to consider while rules are being worked out. Constant pressure is applied to AMA and the Nationals Contest Committee to add events at the Nats, delete others. Overall, there is also the need to see what can be done

to reduce Navy personnel and facility requirements.

The Navy, which has been most cooperative and on which the Nats depends, has been assured that some reductions in its personnel requirements can be effected. A start was made in this direction this year at Dallas, where, in the largest AMA staff of contest assistants ever assembled, ran what might be termed the most efficient Nats ever.

Although it is too late to make major event changes for next year's Nats at Willow Grove near Philadelphia, a number of small but significant changes are in the works. Where such changes can be applied without disrupting matters drastically, they will be worked in.

For some fun, John Pond, AMA Vice President from California, is proposing an Old Timers event for the Nationals. This would be an off-the-cuff affair for fossilized Free Flighters flying vintage designs and requiring no big effort on the part of the AMA or Navy, he says. The event would be run mostly by the Old Timers themselves.

John, who is an R/Cer too, has written up an exhaustive set of rules for the event, but nowhere did we notice prohibition of Radio Control. Is this a loophole? If so, it might save a few of those Buzzard Bombshells?

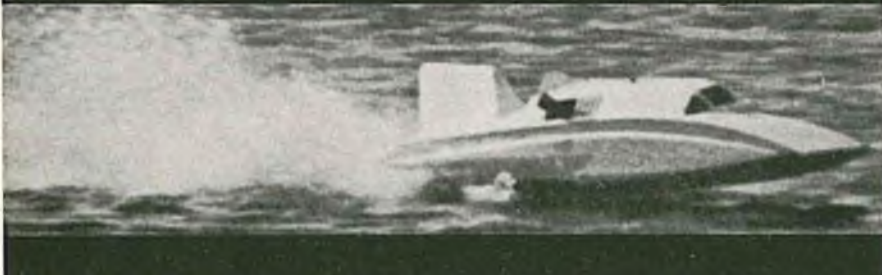
Also in the discussion stage is special Nats considerations for Juniors. One obvious plus is to permit late event registration, since Junior has a hard time declaring in June what he could be flying in July.

Another hot item is the possibility of late entry. In the past, Headquarters found from sad experience, that the only way to dispel all kinds of special favors and pressures was to have a hardnose cutoff date for Nats entry. Allowing last minute entries to dribble in had fouled up Nats planning in earlier years.

But the strict cutoff (and it was strict, as several would-be late filers found out) was also a breeder of hard feelings. Some thinking now has it that post cutoff date entries may be permitted, but those who so foul up the planning will have to pay through the nose to make the extra trouble worthwhile. From hardnose to pay-nose — that's progress!



# The Roostertail



The Official Publication of the International Model Power Boat Association  
 General Office: 2405 19th Avenue Broadview, Ill. 60155

A new booklet called "How To Plan For, And Run a Contest" is complete. Copies will be available shortly... well before the contest season, so that you can take advantage of the time schedule set up in the planning section. Send for your copy now, and we'll get one (or more) off to you as soon as they come from the printers. Price of the booklet is dependent on the number of your club members who are members of the IMPBA. Copy price \$2.00. Deduct 25% for each IMPBA member. For instance if you want the booklet, and do not belong to the IMPBA, it will cost you \$2.00 a copy. A club with 8 active IMPBA members gets one free!

Cy Crites, of the St. Louis M.P.B.C. is the author of this fine aid to clubs and has done a very thorough job in assembling and programming all the details which make a contest run smoothly. Cy is a veteran of some five years of contest directing, and last year did the planning for the 15th Annual IMPBA Regatta. All the information in "How To Plan For, And Run a Contest" is taken from experience, and is tried and proven. It will make any contest director's job easier. Who knows, even you CD's who have been though the mill might learn something. If nothing else, it will provide you with that check list you were going to make, so it would be easier "next year".

Welcome to the AURORA MODEL POWER BOAT CLUB, of Aurora, Illinois. Twelve members strong, from 12 years old to "Grandpa" McGowan

at 48 years, make a good, active all R/C club. They run at Mastadon Lake in Phillips Park, in Aurora. A very co-operative park board has encouraged these men to go ahead with big plans for their first annual regatta to be held early next year.

GEM Models (48 W. LeMoyné, Lombard, Illinois) has announced that it will give an award of \$25.00 in merchandise to anyone that sets an IMPBA world record, in any class, using any GEM kit. A record will be considered valid for the award if it breaks the last published record for that class and hull type. Records will be published in the Roostertail column as they occur, and a complete list will be published twice a year. Winners of the awards are eligible in the same class and type as soon as the new record is published. Also, the awards may be accumulated in order to earn larger kits or equipment. The \$25.00 award is good for any equipment which is handled by GEM. You might suggest that they send you the latest catalog along with your award certificate.

To apply for the GEM award, send the following to GEM within 10 days: Name; IMPBA no.; mailing address; the record breaking time certified by the Contest Director or chief timer; engine class; hull type; date; and a picture of you and your model with a brief description of your equipment.

**World Record as Recognized by IMPBA as of 1st November 1964**

## Radio Control Records

¼ Mile Oval—

Actual MPH-900/time in seconds

### Proto (Type 1)

- Class A .000-.100—None
- Class B .101-.200—Jim Miller, 1:26.7
- Class C .201-.300—F. Toth, 0:59.7
- Class D .301-.458—F. Toth, 0:52.9
- Class E .459-.670—G. Preusse, 0:49.8
- Class F .671-3.05—J. Zwack, 0:50.1
- Class H Steam—None
- Class J Elec. 0-10#—R. Paulikas, 4:35.0
- Class K Elec. 10-20#—R. Miller, 2:16.9
- Class L Elec. 20-30#—J. Conner, 1:11.1
- Class M Elec. 30-40#—J. Sitar, 1:49.4
- Class Q Unlimited Power—None

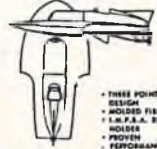
### Hydro (Hull Type 2)

- Class A—None
- Class B—Ron Zaker, 1:01.4
- Class C—Lee Pander, 0:53.0
- Class D—Gary Preusse, 0:50.7
- Class E—Earl Mundt, 0:42.5
- Class F—Earl Mundt, 1:04.5
- Class H-J-K-L-M-Q—None


### Unlimited (Hull Type 3)

- Class A—Scott Jordan, 1:44.4
- Class B—None
- Class C—Earl Mundt, 0:57.9
- Class D—Earl Mundt, 0:50.8

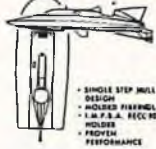
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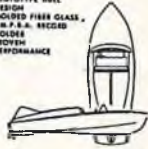
**CHALLENGER II**  
Hull, deck, engine well and cabin structure molded white fibre-glass. 36 1/2" long — 17 1/2" wide — Weighs 8.9 pounds — Uses a .45-.60. Also includes plans, complete instructions, and Plexiglas windshield. \$39.95.  
"Junior" model of above kit with similar content. 27 1/2" long — 13 1/2" wide—Weighs 4.5 pounds — Uses .15-.25. \$12.50



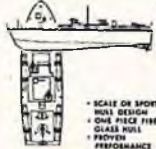
**MARAUDER**  
The Marauder's proven ski-boat hull design is another example of a true competition model. 29 1/2" long — 8 1/2" wide — Weighs 3 1/2-4 1/2 pounds — Uses a .15-.25. Hull, deck and engine well are molded white fibre-glass. Also includes complete plans and instructions. \$19.95



**WHITE HEAT X**  
For the large scale hydro model builder, the White Heat offers "ready built" competition capability in molded fibre-glass kit form. 42" long — 16" wide — Weighs 11-13 pounds — Uses an O&R Compact. Hull, deck and engine well are molded white fibre-glass. Includes windshield, complete plans and instructions. \$49.95



**COBRA**  
For model boating on a larger scale, the Cobra offers the builder remarkable stability for general competition or sport boating. 49" long — 16" wide — Weighs 11-13 pounds — Uses an O&R Compact. Hull, deck and hatch are molded white fibre-glass. Includes Plexiglas windshield, plans and complete instructions. \$49.95



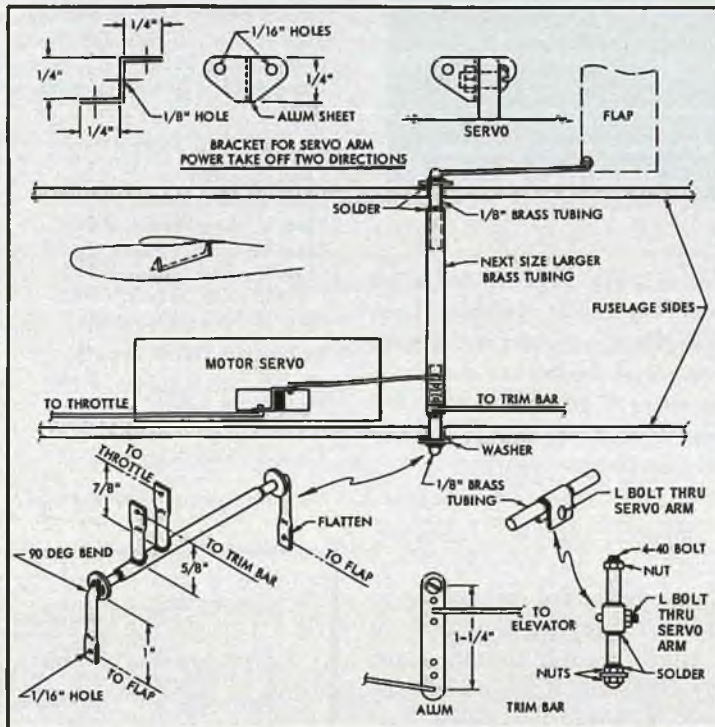
**INVADER**  
The low kit price includes a one piece molded fibre-glass hull and fully detailed plans for the construction of a P.T. boat. 39" long — 10 1/2" wide — Weighs 6-8 pounds — Uses a .19-.45. Deck and super structure are easily fabricated from plywood, spruce, and balsa wood available at local hobby shops. \$16.95

Distributors for Octopus, Cameron and O&R  
 Terms — F.O.B. Lombard, Illinois. Sorry — No C.O.D.'s. Add 10% the cost of the order for shipping charges (\$3.00 maximum in USA). Outside, airmails invited.  
 G. E. M. MODELS — 48 W. LeMoyné — Lombard, Illinois

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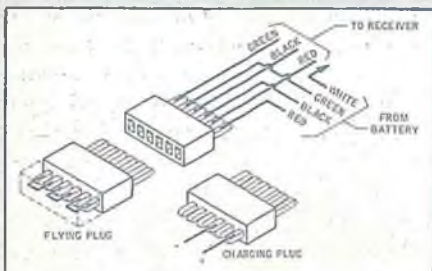
# SHOP and FIELD



Coupled flaps, throttle, and elevator up-tilt, as used by a folk on 56, is outlined above. Full-size, zinc anodes were used for flaps, although regular zinc could be used along with coupled airfoil. Throttle back in hinges into excess of speed with the added lift of the flap-covered canopy loop. The amount of up-tilt needed to balance the forward pitch will be dictated by the individual model.

—Chuck Cunningham

Inasmuch as switches have been a common problem insofar as R.C. usage is concerned, here is the "Orbit connector switch" which has proven completely reliable and is coming into gen-



eral use on the West Coast. The female half of a standard Orbit connector is mounted inside the ship and flush with the outside of the fuselage. The receiver and battery wires are connected as shown. The male half of the Orbit connector is permanently shorted, as shown, and when plugged in externally, completes the circuit. When you're through flying, simply remove the male half. A second type connector is used for charging and clocking voltages — all without the necessity for removing the wing from the ship.

—Bob Moran

D.C.G.C.? Double Cross Grain Covering, the conventional covering of an aircraft structure with silkspan, plus an additional layer of the same material applied with the grain of the paper at right angles to the initial covering. In order to cut down the number of coats of dope and filler needed to fill the grain on porous materials such as silk and nylon while retaining the same strength factor, try covering your wing with GM weight silkspan with the grain running spanwise in the conventional method. Apply this first layer dry, then apply water to shrink the silkspan. Apply two coats of thinned dope to seal. Now cover the wing with a second layer of silkspan, the grain running chord-wise. This time, apply the silkspan wet. Apply one coat of dope and allow to dry. Finish off with one or more coats of clear dope. This method provides a wing structure that is as strong, or stronger, than the conventional silk covered wing, while eliminating much of the tedious work in clear doping and filling. In addition, weight is kept to a minimum, and repairs are much easier than with silk.

—McDonnell M.A.C. 'Carrier Wave'

Having a problem keeping that wing in place? Obtain a tube of Metal Seal by General Electric, available at local hardware and auto supply stores. This material is silicon rubber, aluminum coated. Place a continuous bead of this on area where the wing contacts the fuselage, place some wax paper on top of the bead, then set the wing gently in place. Do not pull the wing down tightly, but apply just enough pressure to hold it in place. Allow to dry, then remove waxed paper. You have a seat that is molded to the contour of your wing, aiding in keeping out dust, dirt, and fuel.

—N.J.R.C.C. 'Printed Circuit'

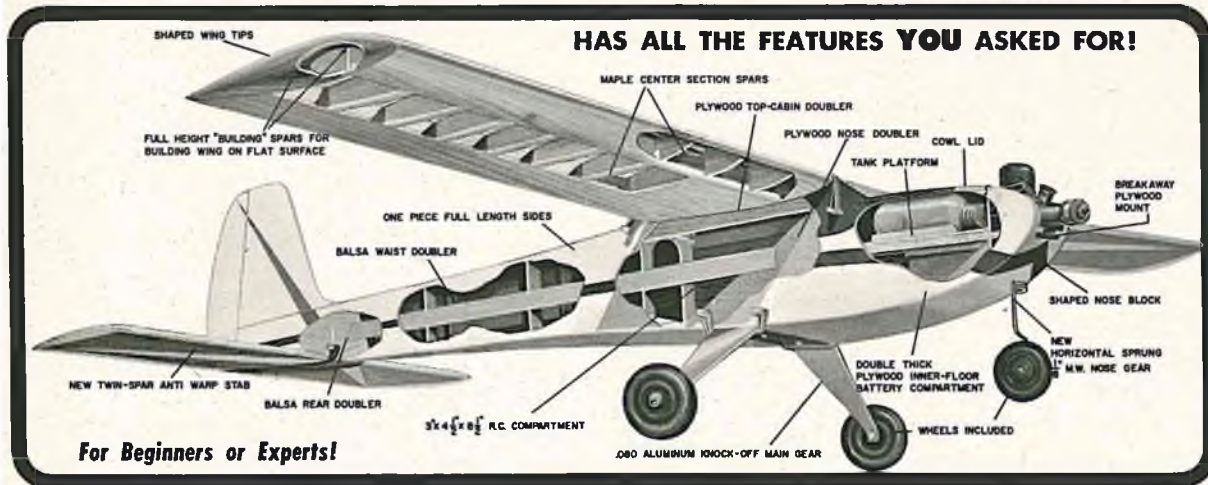
Zel Ritchie suggests using white glue for coating engine and fuel tank compartment instead of the usual fibre-glass epoxy resin. According to Zel, the white glue protects the wood from fuel and is not as brittle as the epoxy.

—L.A.R.K.S. Lark'



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## Konac Systems

(Continued From Page 34)

The Controlaire Mule included in the Konac Economy System is manufactured by World Engines, Inc. In addition to being one of the most powerful and reliable single channel transistorized transmitters on the mar-



ket, it has undoubtedly the highest consumer appeal of any single channel transmitter from an appearance standpoint. The entire unit seems to spell 'quality.' Average radiated power from the Mule is 135 milliwatts. Its overall efficiency is due to the use of specially graded Silicon RF transistors, the employment of a series tuned center loaded antenna, plus the use of collector modulation. Modulation, or tone frequency, is approximately 600 C.P.S. The total power input for all stages is approximately 42 ma at 9V, or about 380 milliwatts. Of this power, approximately 225 milliwatts goes to the RF power amplifier which, in turn, supplies the antenna.

The Controlaire 5 is a relayless, all-transistorized, super-regenerative receiver. Its output is terminated in the use of a switching transistor that will operate an escapement direct without the use of a relay. The "5" will not swamp from nearby transmitted signals and has excellent noise rejection qualities. It is also fully temperature compensated to operate between 0 and

130 degrees F. For operation, the receiver requires a tone modulated signal from 500 to 1000 cycles per second.

The CitizenShip SE-2 is one of the smallest compound escapements made in the world, and also, one of the most reliable. We have used them exclusively in all of our tests of small aircraft, and only on rare occasions have we experienced escapement malfunction.

The Builder's Manual accompanying each Konac System could be called a "friend at the bench" for it takes over where the manufacturers instructions leave off. It does not assume that you know more than you do, but is the guiding hand necessary to the newcomer. This mimeographed manual, along with the packaging of guaranteed compatible items into workable systems, is what sets Konac apart. We commend them on their speed of delivery, quality components and wise choice of products, along with the rather unique service they render to the radio control consumer.



## The Roostertail

(Continued from Page 41)

Class E—Gary Preusse, 0:47.1  
Class F—Earl Mundt, 1:045  
Class H—None  
Class J—Frank Toth, 2:09.0  
Class K—Earl Mundt, 1:12.2  
Class L—Gary Preusse, 1:07.3  
Class M—Earl Mundt, 4:36.3  
Class Q—None

### Straight 1/16 Mile—

Actual MPH—225/time in seconds

#### Proto (Hull Type 1)

Class A—None  
Class B—Jim Miller, 0:17.1  
Class C—Richard, 0:15.4  
Class D—Frank Toth, 0:11.5  
Class E—Gary Preusse, 0:10.8  
Class F—John Zwack, 0:10.0  
Class H-J-K-L-M-Q—None

#### Hydro (Hull Type 2)

Class A—None  
Class B—Victor Baney, 0:11.2  
Class C—Roy Northrup, 0:10.4  
Class D—Gary Preusse, 0:08.9  
Class E—Earl Mundt, 0:06.35  
Class F—Rev. F. Zimmerman, 0:08.3  
Class H-J-K-L-M-Q—None

#### Unlimited (Hull Type 3)

Class A—Scott Jordan, 0:20.7  
Class B—None  
Class C—Gary Preusse, 0:10.8  
Class D—Earl Mundt, 0:12.0  
Class E—Gary Preusse, 0:09.3  
Class F—Earl Mundt, 0:10.0  
Class H-J-K-L-M-Q—None

#### Tether Records

Class A Steam—Mike Succardo 58.44 mph  
Class A Gas—Henry Parohl 88.15 mph  
Max. Disp. 3.05 C.I.  
Class B Gas—Ed Kalfus 101.46 mph  
Max. Disp. 1.83 C.I.  
Class C Gas—Joe Horvath 104.52 mph  
Max. Disp. .915 C.I.  
Class D-M Gas—Joe Horvath 102.73 mph  
Max. Disp. .61 C.I.  
Class D-S Gas—Fred Suhr 93.26 mph  
Max. Disp. .61 C.I.  
Class E Gas—Joe Sampisa 71.82 mph  
Max. Disp. .458 C.I.  
Class F Gas—Frank Thornton 81.81 mph  
Max. Disp. .305 C.I.  
Class G Gas—Frank Thornton 70.37 mph  
Max. Disp. .20 C.I.  
Class H Gas—Bo Petre 49.45 mph (Sweden)  
Max. Disp. .050 C.I.

#### Tether Proto

Class A—None  
Class B—None  
Class C—Charles Baxman 42.65 mph  
Class D-M—Wesley Paridee 70.31 mph  
Class D-S—Wesley Paridee 70.38 mph  
Class E—Tom DeMeskey 53.25 mph  
Class F—Charles Baxman 64.74 mph  
Class G—Ted Light 50.56 mph  
Class H—Bill Marshall 20.73 mph

#### Tether Outboard

Class A—None  
Class B—None

Class C—None  
Class D—Wesley Paridee 22.44 mph  
Class E—Raymond Scott 16.70 mph

#### Tether Outboard Proto

Class A—None  
Class B—None  
Class C—None  
Class D—Charles Baxman 18.97 mph  
Class E—Raymond Scott 19.70 mph

#### Tether Airscrew

Class A—None  
Class B—None  
Class C—None  
Class D-M—William LeFeber 88.26 mph  
Class D-S—Clifford MacBride 88.23 mph  
Class E—Pete Yanczer 67.66 mph  
Class F—Chadd Rector 85.71 mph  
Class G—None  
Class H—Chadd Rector 52.32 mph

Letter to the President from R. J. Weirick, Tri-City Controllers, Beloit, Wisc. on change of rules for "family running":

"I don't believe that another person, proxy or otherwise, should be allowed to run a boat for either record or contest prize. You asked about this in the September issue of RCM and wanted opinions on the subject so here is mine, not anyone else's, MINE. If anyone in the family is allowed, what would be wrong with allowing someone outside the family to compete? Granted, if the wife or one of the kids should win, it would show their skill at steering that hull around the course. Let each member build his own boat, there is skill in building a boat and installing the equipment, too. Now, you say that you and many others can't afford superhets for everyone; neither can I, but when my boys get big enough to build and compete, I'll bet their boat and mine can be fixed so that the radio can just be plugged in where needed. Would it be fair for a person who had a top boat to train all the members in his family to just steer this boat around the course with the boat builder doing all the starting and engine tuning? There is a certain amount of skill in knowing when the engine is running the best. As you know there is a certain amount of upkeep to a boat. I'm not saying that a father or husband shouldn't help his family with building and installing the equipment, but to do the work for them and everyone use the same completed setup? NO, in my opinion it should not be allowed."

## Accutrol Solo

(Continued from Page 34)

motor from mechanical shock.

Externally, the output wheel has been pinned to its shaft, and the output pot follower attached by a set-screw. Since there is no force on the follower, there is no possibility of either turning in respect to the other, even in the event of a severe crash. As a result, neutral position cannot move accidentally, as in servos with the output wheel screwed onto the end of the shaft. The output shaft runs through the servo and is terminated in brass bearings at both ends, a very desirable feature that insures maximum strength and smoothness. The gears employed are made by Accutronics, and are constructed of precision machined aluminum for smoother performance with less backlash.

The overall height of the Accutrol Servo has been held to 1 $\frac{5}{8}$ " (measured from the mounting board to input crank), allowing for ease of installation in today's narrow, sleek RC designs. Overall size is 1 $\frac{1}{4}$ " x 1-3/32" x 2 $\frac{1}{4}$ ". Weight is 3 ounces. Thrust is six pounds, with a total travel of  $\frac{5}{8}$ ".

The servo amplifier employs six transistors and one thermistor. Voltage requirements are 2.4V for servo and motor power, 2.4V feedback reference, and 0.7V control signal. A slight variation from the feedback reference and control signal voltages will change the position of neutral and the amount of travel. If you should require voltages other than those specified, Accutronics will adjust the servo to the voltage required for the system specified at no charge. (For example, the Space Control proportional system requires a 2.4V reference and a 0.8V control signal). Special voltages may also be ordered direct from the factory.

The Accutrol Solo is mounted in the aircraft in either a flat or upright position and with a standard DuBro servo mounting kit. Control linkage should be connected to the output crank by means of the DuBro PS-I link which was specifically designed

(Continued on Page 55)



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## Editor's Memo

(Continued from Page 4)

and bolts without washers. I won't do that anymore. Not since my engine fell out. That airplane didn't fly too well without the weight in the nose. Hit a Cadillac. Another thing about vibration — how many guys bother to check for it after repacking receivers? The engine should be throttled up and down through its entire range while the surfaces are carefully watched. Should a particular frequency "hit" the reed bank, it is better to find it out on the ground.

I used to get a lot of damage from running into objects with the wing leading edge. (I even run into them without it!) At the suggestion of the Sepulveda Basin Fliers, two inch wide cloth hinge material doped to the leading edge during construction will eliminate those dings. Some fliers use a lot of plywood during construction to strengthen the wing area. I will use this opportunity to point out that the top contest fliers may not use any at all! Not as a criterion, but I don't use any plywood in my wings. Our RC wings are overstressed as it is, and to make my point, take note that any wing that you see fail is the result of poor construction or has suffered external damage at one time or another.

On the subject of plywood, 1/32" is lighter than the conventional balsa doublers for fuselage sides, while equaling or exceeding the strength factor.

The Northeast Corner Bowery Boys are rapidly becoming renowned for their unorthodox (?) approach to this hobby. When you add to this the fact that the boys behind the iron and bambo curtains are prone to slight exaggerations, you have all the makings of an international incident. What we're getting at is a rather embarrassing situation in which Radio Peking recently announced that they had shot down a pilotless, full-size, camera equipped, high altitude radio controlled reconnaissance aircraft over Red China. Naturally, the State Department denied the allegation. What actually happened, it seems, is that during the course of their recent First Open Contest, the Bowery Boys launched a weird looking, high-aspect radio ship with servo operated camera out over a secluded valley area

where this nudist convention was in progress... somehow they ran out of range, and the last view of the ship had it gaining altitude and gradually disappointing in an Easterly direction!

The Pylon races at the NECBB Open was something to behold. Despite the fact their top pylon pilot was in Champaign, Illinois ducking a federal fugitive warrant, they managed to fly two ships at a time around the course. Each in different directions. This was a real spectator sport. Seven of them were maimed...

Since more and more beginners are coming into the hobby, we thought that some R/C definitions pertaining to the idiomatic phraseology used by manufacturers might be in order. Thus, from the Middle Tennessee R/C Society "Glow Plug:"

Unconditional guarantee: We made it—you bought it.

Range check: Didn't fly away—this time.

Highest quality components: Cheapest we could buy.

Immediate delivery: Pilot model just completed in back room.

High sensitivity: Anything in the vicinity will trigger it.

Newest circuitry: We copied the best we could find.

No tuning required: Won't do any good anyhow.

Easy on batteries: No. 6 doorbell type, that is.

Relayless: Needs relay to work. \$6.00 extra.

Finest balsa: Wormhole free.

Die cut: Fifteen cuts from the same blade (crunch!)

Vibration immune: All parts welded in.

Proportional: Easier crashes.

Quadruproportional: First four crashes easier.

Congratulations to Willie "The Fink" Northrup who is the new R/C head of that little eastern mag... Wild Bill sent us a picture of his pad, covered by snow, which read: "This is snow. It's on our house. It's on the ground. It's in the trees. It's white. It's cold. This is when we build models and other stuff. Don't you wish you had snow?"

No, Willie. We don't.

See you down the road...



## Sunday Flyer

(Continued from Page 8)

day Job. I was a bit short on both items, but learned to trim them anyway.

But, having learned to fly my free-flights, I also learned that the Law of Probabilities does not work for FF men, and a model will land in the top of the only tall tree in a forty acre field with the odds several thousand to one against it. I further learned that a four foot model can hide in a two foot burdock, and further still, that chasing free flights is no avocation for one from whose cheeks the bloom of youth has fled.

At this point, my thoughts turned to radio control. This might have been predicted for one who has been a radio ham for more than twenty-five years. But with one or two possible exceptions, this thought caused me more trouble than any I have ever had. From mere confusion in free flight, the situation in R/C degenerated into chaos. Turning to the magazines again, I discovered that it was utterly impossible to determine what constituted a complete system of control; what was compatible with which; how anything worked, or even why it worked at all. There were glib references to kicking ducks, galloping ghosts, and mickey mice, but nothing to indicate what in tarnation was meant by it all. The only things not left in doubt were the prices, and the curious fact that the products of each and every manufacturer worked better than those of every other manufacturer. It wasn't that the electronics were any particular mystery, but I needed to know something about their practical application to model control.

One possible solution which suggested itself was to buy some of everything and read the directions, but on checking the prices again, I concluded that this was applicable only to those owning oil wells in Texas. Later, I found that it wouldn't have worked anyway, due to the quaint English of the Japanese, and the disinclination of American manufacturers to tell anybody anything! Instead, I sent off for a popular book

(Continued on Page 48)



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**Sunday Flyer**

*(Continued from page 47)*

which proved to be a goldmine of information — most of which was out of date, and little of which pertained to anything I needed to know. The author had, however, kindly provided a brief course in basic electronics. It occurs to me now that I should have sent to the American Radio Relay League for a book on basic radio in hopes that it might have contained something on models!

On reading the construction arti-

cles, I discovered that there were numerous, even a surplus, of hotshot models guaranteed to be "contest winners." This gave rise to the interesting question of where they got the designs that lost contests. But, as there was no mention of these, I concluded that contests must be run on the old Mexican Army system, in which they are all Generals. In any case, none of these interested me, as I supposed that one started at the top only in well-digging and parachute jumping, neither of which interested me then, or since. All I wanted to do was fly.

I had learned in free flight that one is "assumed" to have had two years of experience before he starts, and it soon became apparent that the same condition, or worse, pertained to R/C. In those rare instances where it was hinted that the contest winning ship actually contained a radio system, it was even more rarely hinted that some past information had been published about it. Obviously, something was wrong with me, as not only had I undertaken to fly models without having the pre-requisite two years of experience before I started, but I had failed to subscribe to the magazine five years before I knew they existed.

I realize now that it was negligence on my part.

The upshot of the whole affair was that I decided on single channel, with escapement operation. This decision was undoubtedly influenced by the well-digger theory mentioned previously, and I wanted to start at the bottom.

In this case, it is really rock-bottom, as one is at once confronted with the malfunctioning propensities of escape-

ments in general. Now, an escapement is as simple an electro-mechanical device as one is likely to encounter in this age of miracles, and as one has paid something like three times its apparent value, and twice as much as any comparable gadget in any other category, the beginner is likely to assume that it ought to work.

There is no instance on record of a beginner getting one that did.

But enough about escapements. Choosing the brand of gear appeared to be the least of the problems involved, since, as every brand of equipment was claimed to work better than every other brand, it seemed impossible to go wrong. Actually, this proved to be quite incorrect, and as the matter turned out, it was impossible to go right. Along with arguing with wives and income tax men, this is one of the few activities known to man in which there is no mathematical possibility of winning. Regardless of what brand you choose, from that point on, any expert can show you where you went wrong. Those who have a different brand reject yours on the grounds that it is not the kind they chose.

The rest reject it on the equally fundamental grounds that it is.

Nor can one be guided by previous electronic experience, owing to the total lack of information on what is inside the stuff. I thought, at first, that this might be due to modesty, or to the understandable desire to conceal from competitors how the claimed ten kilowatts of radiated energy were derived from a handheld transmitter with a 9 volt transistor battery in it. Later, I learned that it was to disguise the fact that all the parts were oddball stuff, appearing on no conventional list, and not to be obtained by any means short of special order accompanied by an Act of Congress. You can find a clutch of Auk eggs easier than a repair part for a receiver, leaving one only with the dread alternative of sending it back to the factory. As most of us will testify, in the latter case it will come back working worse than when it was sent in, and three returns are necessary to accomplish the repair.

Well, in any event, I did learn to fly R/C, and by precisely the same method I learned to trim free-flights

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— with even more trouble, less help from the magazines, and in fact, in the face of what appeared to be active opposition on the part of those who form magazine editorial policy.

And these are the people who wonder where in Hell the Juniors are!

Nor is this seeming opposition confined only to those who edit magazines, manufacture radio gear, or make escapements, but it is aided and abetted by culprits who manufacture kits. The beginner cannot know, and will not be told, that his contest-inspired bomb will prove to be a wildly overpowered, unstable, ballooning bundle of agitation, less suited to his need than a set of sidepockets to a hog; Or, that he will have to substitute plywood and honest balsa for the reclaimed elder pith that came in the box; that his wing and stab will warp like gum boards in a barnyard; that the landing gear is an atrocity and unworthy of the name; or that the entire abomination will never fly with the engine pitch and attack angles dictated by the plans. No, he will know none of these things until they prove to be his undoing, and the basis of his decision to take up stamp collecting or guns, in which case he will be exposed to a new set of sharpies!

And now you are probably wondering why I have inflicted this sad (but typical) tale on you. The answer is simple. I had some suggestions to make and had thought of writing some letters to editors, but it occurs to me that you have influences and contacts that I lack, so if you can find anything worth while in what follows, you can do more with it than I can.

I might point out, before going any further, that very little will be original. All I am doing is borrowing ideas from the hobbies of shooting and Amateur Radio. Enclosed are some clippings from American Rifleman magazine, and QST, the official Amateur Radio magazine. These came from the first two issues picked up at random.

As you see, re-running fundamentals from the first two issues from time to time is a regular practice, and I think it is one we should undertake. The "illustrated definitions" department looks like

something one of the model magazines could feature, too. This helps the beginner to understand what he has read, and to develop his hobby vocabulary.

Then, you will see a page of ads on some booklets. These are only a part of the beginner's help offered by the American Radio Relay League. It seems to me that many people simply won't send for books. For those, the magazines have to run fundamentals. Those who will send for books can get them. One method of getting these books into the right hands would be to distribute them at the lowest possible cost and try to see that they are on the dealer's counter and some of the news racks. The ARRL is using this approach with considerable success.

Now, there are some ideas to work on. And, as a personal opinion, I have felt that the stress on competition ought to be considerably reduced. There is no sense whatever of duplicating and re-duplicating coverage of the activities of a relative handful of the modelers at the expense of material that would be more useful to far more modelers.

—Tom Stence

Tom certainly has a way of making his point. There's a lot of truth in everything he says. In my own articles I've frequently stated that "details on flying trim have been covered before, and don't need repeating here." This assumes, as Tom says, that the reader has read previous articles. So Tom, in the future, if I don't cover the details, I'll at least be specific and say what books or periodicals are a source of reference.

As for the magazines and the amount of coverage provided for guys like Tom, again he makes a good point. So good, in fact, that Don Dewey and Chuck Waas recognized it and started up RCM for the express purpose of filling the void. And we're going to try — all of us who write for RCM — to get up on the step and give you the information you want. This is not to say that the other periodicals haven't tried; they have, and if you had a library of past issues you'd find the information. But like Tom says, it should be repeated fairly regularly for newcomers — and as refresher infor-

(Continued on Page 64)

## RC MARKET PLACE

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**Goodyear Pylon**

(Continued from Page 14)

course, for a total of 2 1/2 miles. Timing starts at takeoff. Multiple flying is encouraged and mandatory for record purposes. Record trials must be won with a minimum of three ships flying simultaneously. No pylon helpers allowed. At the #1 pylon there will be an official flagman. Models will be flagged after passing the #1 pylon. No flagging at #2 and #3 pylons unless the pylon is cut.

Models will use staggered takeoffs for multiple takeoff with three second intervals between them. Each model is timed separately. A maximum of four planes per heat at a minimum altitude of twenty feet.

**General Comments**

A national organization could be organized if the interest is generated in this event. The organization could be called the NMPRA — National Miniature Pylon Racing Association, and would be the rules governing body for all pylon racing.

The potential of the event is great. Many of the better fliers are looking for something different to try out. Stunt flying is becoming much too specialized, and—let's face it—a lot of work.

To encourage this new event and try out the rules, I have built a prototype racer called the Lil' Knarf. It has about 480 sq. in., 48" span, Torp 35 R/C, and Orbit Proportional System using only three channels with coupled aileron and rudder. The weight is a husky 5 1/4 pounds. The ship has a fully cowled engine, pilot, and cockpit detail, wheel pants and a high gloss Hobby Pox finish. At the high weight, the ship is very easy to fly and quite stable. The glide is actually slower than many stunt ships I have seen. High speed is about the same as an average high performance stunt model. The airfoil used is of flat-bottom configuration, which makes it very easy to build. The model's performance in regard to stunting isn't bad. It will do everything except outside loops and vertical eights. Basically, the Lil Knarf turned out to be a very practical sport multi-channel model.

This, then, is what may be the up and coming event in R/C — miniature pylon racing. Let's get started.



# Citizen-Ship

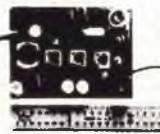
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## Solo

(Continued from Page 10)

cabinet that would plug into the mike jack of any transmitter and drive it with the five tones I needed — 300, 650, 955, 1390 and 3000 CPS. The Drone had a fail-safe feature that was rather clever. The 995 tone was transmitted continuously in absence of the other four tones. In the event that the 955 spot was interrupted for more than five seconds, or in fact, if anything went wrong with the transmitter, receiver, or power supply, a relay would drop out cutting power to a small electromagnet that held the latch of the parachute door closed. When this door flew open, it activated a magneto ground, stopping the motor. We often wished we could have used this system, but found that the weight of the parachute was more than the ship could handle.

With the new radio equipment, we tried it again. This time a good ten minute flight was tucked under our belt. The landing was another story! When we shut the motor down, the Drone started a glide like a bowling ball off the Golden Gate bridge. Looking back on all this, I can see that I should have let my speed build, then

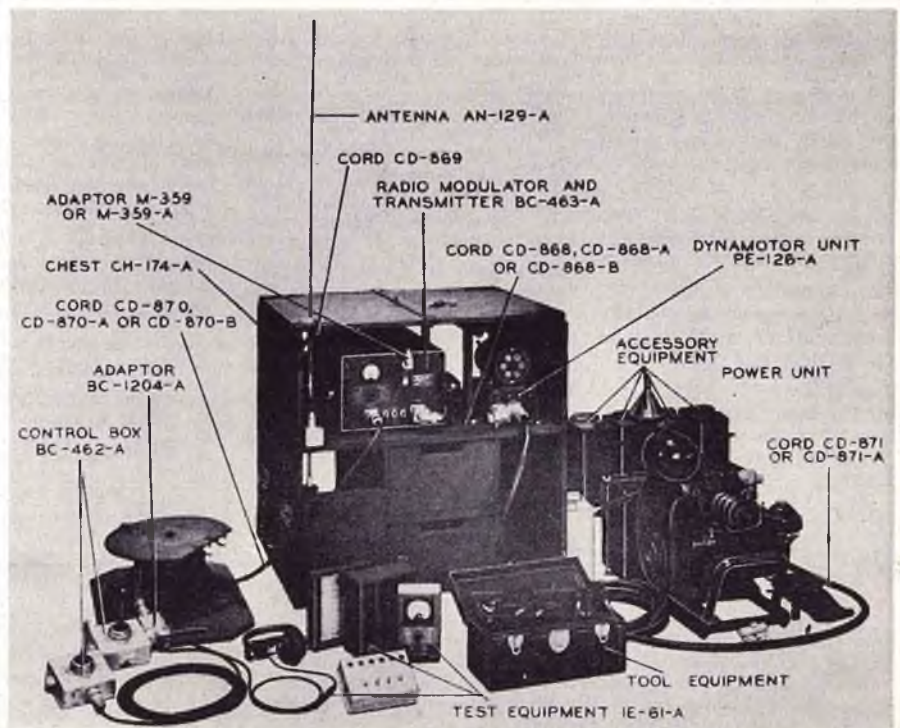
flare out only when very close to the ground. As it was, my first thought was to establish a glide. Each time I tried coming back on the stick, a stall would result — stalls that were anywhere from ten to fifteen feet above the ground! And each one fatal to some part of the airframe!

About this time in my Drone career I began to be regarded with awe. Not the awe reserved for a four-minute miler, but more like, "Aw, come on— is that guy for real?"

All was not waste though, for a company in Pasadena was awarded a contract to build two hundred small drones. As it happened, they needed a consultant, and believe it or not, since I was the reigning Drone flier available, the job was mine. This came about primarily because of the fact that the men they really needed were all working for their competitors! The new little Drone, under this contract, was a sixteen pound bird with six foot wings and a ten tube receiver that drew one amp! Powered by a Fox .59 with self neutralizing rudder and trimmable elevator as the only available controls, this was a perfect example of how not to do it! The wing and tail were of balsa construction with nylon covering. The fuselage

(Continued on Page 56)

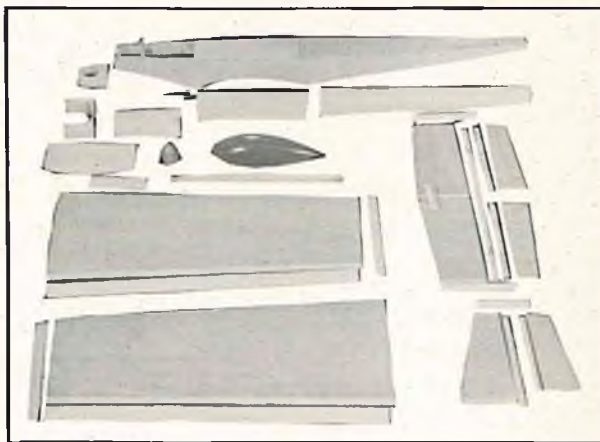
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### Orbit Proportional

(Continued from Page 31)

with each unit individually tuned and checked out by Bob Dunham at Orbit. It does have certain disadvantages, most of them inherent with analog systems in general, and certainly not confined to the Orbit design alone. As the proportional picture increases in scope, and with over a dozen manufacturers preparing their systems for the ever-widening RC market, we predict that the digital concept, with its infinite resolution and lesser degree of complexity, will become the standard for future proportional systems. This will be a natural evolution, much as reeds emerged as the standard for multi-channel in their battle with bandpass filters several years ago.

Although we have no way of verifying reliability of the Orbit system without extensive air time under a variety of flight and temperature conditions, we are certain that any system bearing the Orbit name will maintain the same high standards of reliability which have keynoted Orbit's progress over the years.

### Accutrol Solo

(Continued from Page 44)

to fit the crank employed.

The only maintenance required is to keep the servo clean and free from an accumulation of dust and grime. The amplifier module is ruggedly designed and constructed, both mechanically and electrically. Besides being virtually crash-proof, it is virtually burnout proof when voltage limits are maintained. The amplifier will not burn out if the linkage or control surface becomes jammed or stalled, regardless of the duration of this condition.

Various Accutrol Solo models are available as standard units; for example, Model PR101-1A for the Sampey proportional system; PR101-1B, for the Sampey 404B; PR101-2, for the Space Control system; PR101-2K for the Klinetronics Astroguide; and PR101-3 for the Dee Bee and other pulse systems.

In addition to the Solo, Accutronics trade name for their individual servo, the Accutrol Trio is also available for most systems. This unit can be iden-

tified by the Model series number PR301. All of the features incorporated in the Solo will be found in the Trio. The latter servo is constructed of the exact same components, but using three amplifier modules, three motors, etc. In the Trio, the three servo sections are pre-wired together with a connector for a separate Solo servo for use on ailerons. The Trio is intended for use only with quad proportional systems.

Each servo from Accutronics is covered by a one year warranty from date of purchase. The Accutrol Solo is \$40, while the Trio is priced at \$120.

Our opinion of the Accutrol Solo? This is one of the finest proportional servos we have seen, and surpasses many of the commercial units furnished with available quad proportional. It is also highly recommended by RCM for use with single channel closed-loop systems. For use with home brew systems we recommend that you write Accutronics Engineering, P.O. Box 144, Linthicum, Maryland, outlining the type of system, your requirements, and voltage specifications.



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*(Continued from Page 52)*

was of riveted aluminum panels. The ship was rather ugly, although this was not true of the prototype furnished to this company by Radio-Plane with gear by Babcock. The latter was a sleek looking rig with the receiver shown in the photo. The large drones were called R-CATS (Radio Control Aerial Targets), while the little drones were designated, or nicknamed, R-KITTYS.

I can still remember the first flight that I was asked to make with the R-KITTY. We left for Twenty-Nine Palms, a small community in the high desert north of Palm Springs, long before daylight. With a stop for breakfast, we made it just in time for the sun and the wind to come up. We set up on a small dry lake bed, and while the factory crews were setting up the equipment, I put in a flight with a Trixter Beam. The wind was so strong that I flew for ten minutes with the nose in the wind and still made my landing 100 yards down wind!

There was no landing gear on the

R-KITTY, so they were going to start the motor, and hand it up to a hand-launcher standing in the bed of a stake truck. He was instructed to hit the cab roof with his fist when he thought they were going fast enough for a launch. I checked my controls, and off they went. The launcher needed both hands just to hold on, so the truck reached a speed of forty miles per hour before he started kicking the cab. By this time the truck was getting pretty small, and seeing the R-KITTY next to impossible! I did, however, see something detach itself from the truck, so started feeding in some rudder to bring it downwind and into view.

Boy! did it come downwind! I had to hold full up just to keep it level, and as it raced past me, I started another turn to get the nose into the wind. With all the up elevator used, the turn lost altitude, the ship skimmed the ground, clipped the prop, and came to a sliding halt. You don't just change the trim when it is a factory operation — you pack up your



gear, head for home, analyze the flight movies, turn the findings over to engineering, and make drawings on the blackboard. Then you change the trim.

But the R-KITTY did fly, and some thirty National Guard units got several ships each to play with. There was, however, never a repeat order, which speaks volumes for the reliability and flyability of the R-KITTY! Captain O. A. (Olie) Strickland was Commander of the R-CAT group at Fort Bliss, Texas. As a practicing modeler and winner of several of the inter-service RC contests, he was asked for his opinion of the R-KITTY. Had these suggestions been followed, I feel the R-KITTY would have been a valuable training tool, even today. The idea behind this program was to supply to Drone pilots a cheap trainer. It took an average pilot three drones to learn how to fly, and at a price of close to \$3,000 each. The R-KITTY would have saved the taxpayer money, as they were to be supplied at \$500 each.

We went back to our own Drones, seasoned failures. Several more flights were made and some stunts tried. One loop was as sexy as it ever got, and each flight ended in a controlled crash. It finally dawned on me that it would be a lot more fun to stick to straight RC, and I've been faithful to small stuff ever since. However, I understand that some of Ryan's pure jet "Firebee" aerial targets might get on the surplus market.

Boy! I can hear that jet motor whining already...





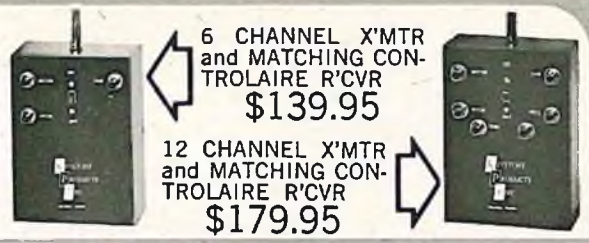
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**From the Ground Up**

*(Continued from Page 33)*

use of a positionable type servo such as a Hillcrest.

Some wag sed, "Resolutions, like laws, are made to be broken." He also comes up for parole again in a few days!

This is the season for resolutions, though. And one of the best you could make and keep — in the model category — would be to take a beleaguered and bewildered R/C newcomer under your wing in the months ahead. For most of us, this is the season of building, repairing, reviewing, waiting and resolving never to be caught flying again with that receiver switch off.

If you happen to notice an interested newcomer haunting your field as this season comes to an end, why not get in touch with him and offer your experience and assistance? R/C is a hobby to be shared and much more enjoyable when you have a large and enthusiastic group — especially when looking for lost planes!!

At this juncture, some will feel that they have just begun to master the hobby themselves and are therefore hardly qualified to assume instructor status. This is not entirely true... or at least shouldn't stop anyone from offering whatever help he can. (This is not intended to be a lecture!!)

I frequently get letters from beginners who would give anything to find someone locally to whom they could

turn for help in getting started. These potential R/Cers want instant help of the most basic nature... some want only to see what an R/C ship looks like in the flesh. Those of us who indulge in discussing R/C on a national scale can only offer fragmentary help at any one sitting, and this is not the "instant remedy" that a beginner needs.

True, the hints and kinks we receive from you and pass along are more often than not a welcome balm to several troubled tinkerers at that moment. But there is still a big gap (to an endless abyss!!) of basic, on-the-spot type help which needs to be administered.

*(Continued on Page 62)*

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## Fly-In

(Continued from Page 38)

The largest and most successful radio control meet ever held in St. Louis would most accurately describe the McDonnell 7th Annual RC Contest, held August 29-30. This year's fly-in hosted fifty-five contestants from six states, averaging one flight in less than every five minutes. Sixteen trophies and \$600 in merchandise were awarded to the winners in eight events. In Class III Expert, Art Treppler was victorious with 176 points and also the highest single flight score of the meet (97). Jim "Hammerhead" Fielding was second in this event, along with winning the Testor's Best Finish Award. Jim's magnificent "Hammerhead," winner of the Toledo Best Finish Award and the R/C Modeler Magazine Editor's Trophy (also at Toledo) will be featured in a forthcoming issue of RCM. In Class II, Jack Clapp, Charlie Reed, and But Atkinson were one, two, three. Class I Expert was tested by Courtney Smith. Dallas Armstrong and John Slater were second and third in the latter event. In the Pylon category, Bob Baldwin rounded the markers in 1:17.3. Right behind him was Bob Williams, with a time of 1:20.9, and third was Jim Fielding with 1:21.3.

This could truly be rated as one of the finest meets of the year, hosted by a club for whom we have the utmost admiration. Congratulations to the McDonnell group, and to Ed Henry, their CD for the Annual affair.

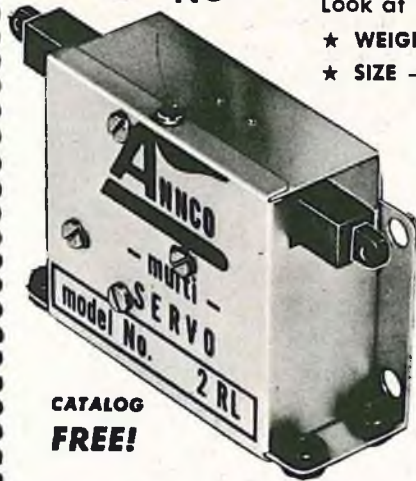
Sponsored by the Air Force Association of Amarillo, Texas, the ARKS held an R/C contest on October 17-18. Trophies were awarded through third place in each event with merchandise prizes through fourth place. Judges were furnished by the Civil Air Patrol Squadron of Amarillo. First place winners in each event were: Lt. Joe Gross, Cl. III; John Kelly, Cl. II; Truman Judd, Cl. I; Roy Finley, Cl. I Jr.; Jerry Welborne, Scale, and High Point. Max Reasher was the C.D. for the Amarillo R/C Society fly-in.

All USAF RC'ers are urged to contact Lt. James L. Simpson at 149 Ellington, El Paso, Texas 79908, giving their name, address, plus a brief history of their radio control activities.

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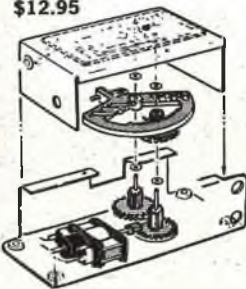
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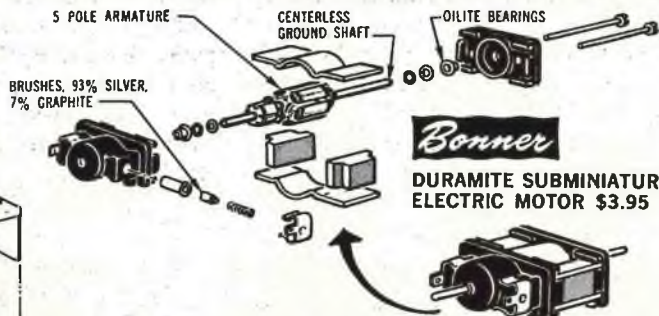
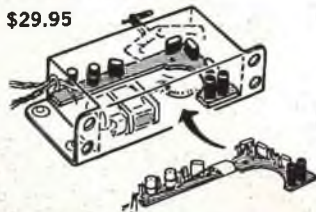
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## Top Out

(Continued from Page 12)

how-to's will be welcomed here to pass on and become part of the big development picture.

Now that the dust has settled and there's been some time to fully digest the results of the Dallas Nationals, two or three points stand out as significant steps forward in conducting the annual RC event.

Frequency and equipment limitation—accepted by the RC fraternity with unanimity indicating it was a timely move—were paramount of the changes tested during the week that saw a record 1200 official RC flights logged. Use of superhets only for Citizen Band frequencies, with careful processing of transmitters for frequency alignment before and during flying sessions, made possible safe simultaneous operation of four flight lines to give all contestants plenty of chances at the hardware. The number of entrants who, in line with pre-contest announced rules, had to change frequency to equalize flight lines was minimal, indicating a balance of channels in general use.

Other notable firsts, reflecting the thorough contest preparation that was evidenced throughout the meet, were the score sheet duplicates given to contestants after each flight and the periodic rotation of judges between all flight lines. The judges, Navy pilots all, received many hours of pre-contest orientation along with a thorough sunburn. Because of the outstanding contest preparation, judge management, and experience generally gained, new advances have been made which will influence contests from this point on.

As a result of it all, leading fliers put in as many as 15 flights, and aided by level judging, made class I a real cliff hanger. Right down to the last day, first place for Open was within the reach of at least seven fliers, with Pete Petri and Tom Williams setting the pace. Pete jumped into the top spot the first flight Monday and it wasn't till Thursday that Tom caught up to him — and then only by 3.5 points — with a best two flight total of 78.5 points. The clincher for Tom that Thursday was a whopping 45.5

(Continued on Page 64)



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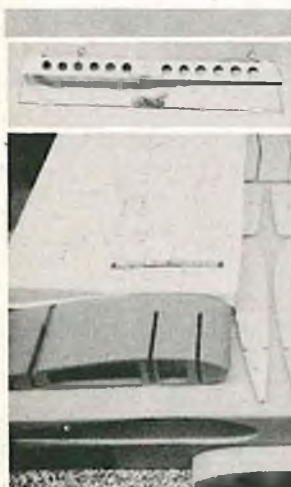
(Continued from Page 24)

result, most of them will have a combination 6 and 12 volt trickle battery charger. These can be bought at discount and catalog stores at an average price of \$3.95 and supply up to 1 amp of current. The only addition that has to be made is to add an electrolytic capacitor of about 50 volt, 50 mfd across the output leads. This helps to smooth out the pulsating DC current. Then, in series with one of the leads, add a 50 watt, 10 ohm variable resistor in order to vary the charging rate. On the wet cell battery, keep

the rate down just short of foaming the electrolyte. There is also a combination high and low charge rate battery charger on the market, distributed by Ace Radio Control, and available in kit form at most RC shops for about \$11. Another good possibility for a power pack supplying a DC voltage is the one made by Strombecker for their 1/32 scale road racing sets. All that would be needed is a variable resistor to vary the charging rate. Their economy power pack is listed at 10 to 16 volts at one amp output. Even a 6 or 12 volt car battery can be used to charge nickel cadmium batteries. A good article on using automotive type light bulbs for resistors on chargers, plus a listing of connections

to the various bulbs by charge rate, appeared in the January 1963 issue of Model Aircraft World, formerly published by World Engines, Inc. As can be seen by this chart, there are numerous ways of setting up equipment to act as chargers.

One last word of information concerns the nuts that are on the wet nickel cadmium cell posts — they aren't just ordinary steel nuts, but constructed of solid nickel. Always try to obtain the solid nickel nuts and inner cell connector bars for your pack. Stanton R/C, in Chicago, sells these nuts, connectors, pressure release vent screws, and in fact, the entire wet cell described in this article.



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**From the Ground Up**

*(Continued from Page 57)*

This whole sticky business comes to mind again because of a rash of comments contained in various club papers lamenting the lack of new blood and the loss of some of the old blood. Like most any hobby, many will enter, some will stay, and yet others will wander back out. Unlike many hobbies which don't require a vast preponderance of homework to make it a success, R/C taxes its protagonists to constantly search for more of the answers... and all its proponents to glean all the information they can from any source available. Luckily, for the hobby, it is fascinating enough to stimulate a desire to learn more.

Early last year, at the urging of several fertile minded R/C enthusiasts, I did some exploratory delving into the possibilities of carrier type landings with R/C ships. It was thought, by those who proposed this experiment, that it might be an interesting addition to contests on all levels.

My story only outlined the possibilities, with the ulterior motive of stimulating interest and more definite procedures from other interested modelers. The idea got off to a roaring

standstill and proceeded like a stampeding herd of turtles — typical of many R/C ideas which have been tossed into the arena in the past. Then, just as typically, and after the required period of time for serious deliberation, one or two clubs will roll up their sleeves and get to work.

Some have already tried this and added it to their schedule of "fun events". We would like to present a sketch of a very simple, yet well thought out Carrier Deck arrangement which is well within the capabilities of any sized club. The material requirements consist merely of ten small sandbags, some nylon fishing line, some corks and a place to spread it all out. The layout, quite conceivably, could even be nothing more than an area of your present landing strip marked off in a 20 by 46 foot rectangle right on the grass — though a raised platform would be a bit more authentic.

Frankly, the simpler the layout, the more chance such a "fun event" has of becoming a contest "regular". The event outlined here places a minimum financial burden on the club treasury. The method of attaching arresting hooks to planes is — as it must be — the simplest... nothing will kill a proposed idea quicker than requiring a highly complicated mechanism be add-

ed in order to complete!

The sketch was submitted without any name or identification. I'd appreciate hearing from the club which recognizes it as theirs so credit can be given where it's due.

No column of this type would be worth its salt without an occasional technical letter from some of our more esteemed modelers. Therefore, it is with gladdened heart, tearfilled eyes and a runny nose, that I pass along the contents of a paper prepared by Dale Hock describing his Terrain Avoidance Computer:

"Since I have considerable difficulty landing an airplane, I decided to incorporate some electronic help in executing this seemingly difficult maneuver. The problem to be solved was that of inducing enough up trim at just the right moment to prevent too harsh a contact with good old terra firma, while not inducing excess trim to create the well known balloon effect.

It had been previously established that by using the Doppler effect of reflections obtained from microwave transmission, and electromotive force of sufficient magnitude would be created to accomplish the desired result; i.e., up trim chronologically keyed to



terrain contact and proportionally incremented to the rate of descent.

The heart of the system is the gear train and governor assembly taken from a Swiss music box. Caloric energy taken from this assembly and fed to a suitable thermo-element creates the current necessary to establish the descent cut off at a pre-established distance from terrain, while the very nature of the wildly swinging governor assembly restricts the current in a ratio inversely proportional to the rate of descent. The latter takes care of the balloon effect.

Simple power limits render the system ineffective at altitudes where maneuvers are performed purposely that effect the terrain time-distance evaluations. Basic microwave circuits were used in the exciter but it took considerable research to determine that common brass tubing was the best coupler for the caloric energy released from the governor-collector assembly. The wave form of the current emitted from the exciter and returned to the assembly was found to be sinusoidal which eliminated the need for any saturable reactors to suppress variations within the system itself. Since the energy created by the system is both mechanical and electrical the brass tubing is terminated at a dielectric and the intelligence is evaluated by a phenomenon known as electrostriction. Dimensional concepts were kept to a minimum and the entire unit shock mounted and installed under the bubble canopy on the wing thus permitting visual observation as well as affording protection from the elements."

So writes Dale Hock on his Terrain Avoidance Computer... a device which would probably have saved an estimated one million model planes each year if a stray fly hadn't become entombed inside the canopy gumming up the whole schmeer!

Information such as this doesn't come to me by accident. Modelers, their friends and even my editor send it to me... so I'm really not to be blamed. In the same mail was a "first" for Gordon Pearson of Farmington, Michigan.

Good ole Gordon sent me the first and only letter he's ever written to a model magazine in 23 years of building. I can believe it — you're supposed

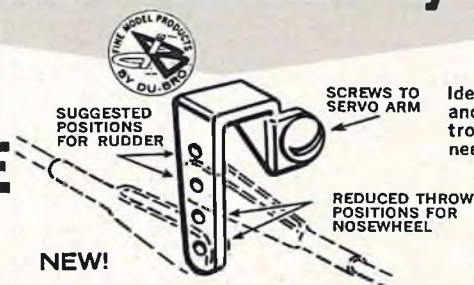
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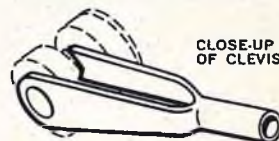
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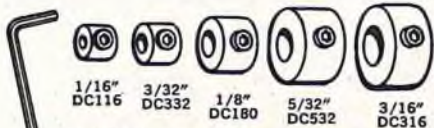


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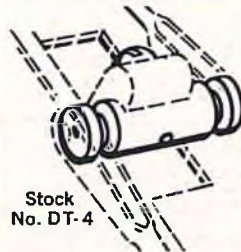
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to use regular typing paper old buddy — not half a yard of silk!... I'm serious — it's a long and detailed epistle written on model silk. Good grade, too!

It should be stated that Gordon is a real avid G-G fan (which probably accounts for the flimsy letter) and we'll pass along some of his comments and experiences — including his novel Florsheim 11.5 airfoil sec-

tion in a future column.

In the meantime, drop a card, letter, or a bolt of silk, and tell me what's keeping you from sleeping nights. Glossy black and white pics, sketches of your brainchildren plus general chit chat is always welcome. Write me in care of the mag or my place of incarceration, P.O. Box 2555 Schenadady, NY 12309 — (it do get crowded in here)!



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*(Continued from Page 49)*

mation for oldtimers too.

Just last month I mentioned that if your equipment didn't work after all checks had been made, send it back to the manufacturer. Undoubtedly many of you have had the same experience that Tom has with that "dread alternative." But remember that the business is getting more competitive all the time — and the "two guys in a garage" type business is getting scarcer. And they are the ones who, for the most part, gave the manu-

facturers the bad reputation on speed of repair and return.

In fairness to the manufacturers, let me quote from another letter I received. A. J. Serfass, of Brookfield, Missouri, writes:

"—I gave the plane an up in the power dive and got nothing. It buried into the cow pasture clear up to the wing. Stuck in the ground just like an arrow would. — I sent the receiver in to Phil Kraft Monday and got it back Friday of the same week. Good service, huh?"

Incidentally, A.J.'s flying site requires hand launching. He says "Ever hand launch a Taurus with one hand and hold the transmitter with the other? The maiden flight is pretty hairy sometimes!"

So all you Sunday fliers take heart. Your problems are not unique, and this column is for you to air them. But next month, for sure, I'll publish the bipe. Here's a shot to whet your appetite. See you then.

## Top Out

*(Continued from Page 60)*

point flight that was eventually 7.5 points higher than anyone else, giving Tom the newly-established Highest Single Flight trophy. Friday dawned and Tom was faced with Petri at 75 points, Mel Santmeyer with 72, Jack Gardner at 71, George Gorden with 69.5, and Bob Angus and Rogers Barton both at 64.5 points. On that last pattern day Williams and Angus were able to better their scores. Petri held on, ending up in a dead heat with Williams and 357 total points, en-

titling both to a Highest Total Point trophy, another new category awarded this year. For Tom Williams, the pride of Oklahoma City, it was a clean sweep, a goal he has been after many years, and ably earned in 1964.

Class I participation, despite predictions of reduced activity, held to the same percentage set at Los Alamitos last year. Flying, from any standpoint, reached new standards in quality as it did in quantity. Veteran class III fliers registered appreciative, if not surprised, recognition of the smooth and dependable class I performances as flight after flight was racked up. It appeared to all that rudder flying had finally come of age with respect to air work.

The real significance of current Class I rules, with regard to equipment allowed, became increasingly clear during the first trial year. This significance turned into solid recognition at Dallas as evidenced by the very real accomplishments of all the Class I contestants. To this observer, who believes the basic purpose of Class I rules is to promote better flying and broaden participation, current rules provided a big step forward, and when analyzed in depth, show their potential in achieving further progress — progress obvious from the fine records posted in that hot week in Dallas.

It is equally obvious that future Class I changes, both in rules and contest procedures, should proceed to build upon these advances; to strive to find ways of bringing about even better performance from a single control surface and to encourage, by virtue of that performance, increased participation. By finding means of broadly sharing experience as well as recognizing and facing our real problems, Class I will continue to provide the challenge and pleasure it afforded in the past. In the delightful prose (Nov. RCM) of our Japanese member, Azuma Kudo — "But, being charmed with the conciseness and simplicity of form in single channel RC, I am working with it continuously in order to obtain the best possible performance" — we realize the extent of the common bond that exists in this corner of the RC spectrum.

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