RADIO CONTROL and Model Aircraft WORLD

GRID LEAKS®

VOL. 7, NO. 3 MAY-JUNE 1966 35 CENTS

EIGHTH YEAR OF SERVICE

IN THIS ISSUE

- Phil Kraft's new multi —Das Ugly Stik
- Micro Proportional Two-Axis Control
- Letter from a Yachtsman
- New Products Reviewed
- 9V Rudder-Only Pulser

As most of you undoubtedly know by now, World Engines is kitting the DIGITRIO package. DIGITRIO is a three channel digital proportional system which was designed by Ed Thompson and is currently appearing as a series of construction articles in Radio Control Modeler magazine. Ed Thompson and RCM have given World Engines the exclusive right to kit the DIGITRIO system. Several of these systems have been completed and are being flown; some very enthusiastic reports are already coming in. Those interested in this control system may purchase components separately from the published parts lists, however, a little investigation will reveal that the prices of the parts' kits as packaged by World Engines cannot be beat and represent a substantial savings.

Transmitter Kit

The photo shows a completed DIGITRIO Transmitter with the Bonner Stick option. The Tx kit price of $69.95 includes all parts, crystal and hardware except the control stick assembly and the power pack. The aluminum case (7" wide x 5" high x 3" deep) comes with only the major holes punched. Holes in the printed circuit board have been drilled and the antenna bracket mounted. With each kit we include any pertinent information, minor improvements, circuit corrections, last minute component changes or notes from Ed Thompson. For example, in the Tx a better shielding setup was worked out and we are including notes on this. We'll try to keep you up to date!

Bonner Stick Kit

We are making the Bonner Stick assembly available in kit form less the pots (they are included in the Tx kit). We do not have assembly instructions for these as such however, we must say that they are not too difficult to assemble and quite a number of them have been sold for the DIGITRIO system. There will be an article in RCM later concerning this assembly. Price of the stick kit is $10.95.

Charger Kit

Bob McKnight here at World Engines has worked up a dual output battery charger just for the DIGITRIO system. It will charge the Tx and Rx simultaneously. The charging rate is in the safe area of 30-32 MA to allow longer battery life. The circuit is transformer based for shock protection. All components are mounted on a printed circuit board. Two indicator lights show when the unit is in operation. Price of the complete kit, punched case and all parts is $7.98.

Receiver — Decoder Kit

The DIGITRIO Receiver and Decoder kits contain all parts that are needed including etched and drilled printed circuit boards, all components, crystal, battery and servo connectors. Both the Rx and the Decoder fit into the punched aluminum case (1½" x 1⅝" x 2⅝") that is provided. The DIGITRIO Receiver kit price is $29.95 and the Decoder kit is $27.95.

Servo Kit

The DIGITRIO Servo was designed around the Controlaire Servo mechanics: motor, case, gears and rack. The amplifier circuitry was developed by Ed Thompson. It uses a regulated voltage to eliminate neutral drift. No short cuts were taken and only top grade components used. The circuit has proven stable and trouble-free. As to the servo mechanics we can only say, "we use them ourselves." With the servo kit as the others everything is furnished. Price is $24.95 for a complete servo kit DTSC-1 (a total of three is needed for the system). For those interested in using parts bought separately we also sell a kit, DTSM-1, of the servo mechanics and miscellaneous items at a price of $13.95.

Complete parts lists with prices for each unit of the DIGITRIO System are available upon request and free of charge from World Engines, Inc.

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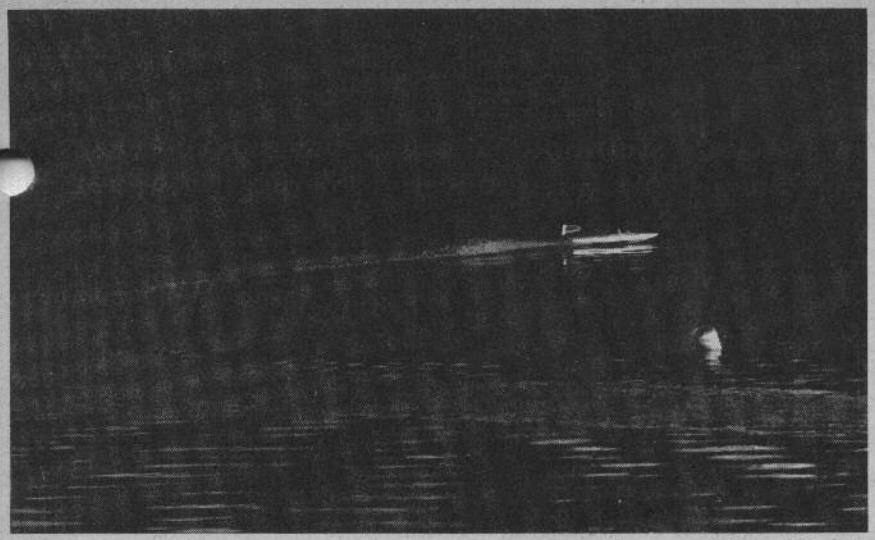

Courtesy of Octura Models

THE MONITOR

PROBABLY NO PRIOR development in the hobby publishing field caused as much "static" as the recent sale by Conde Nast of *American Modeler* magazine to Potomac Aviation Publications. A.M. is to go monthly with its January 1967 issue. GL's present editor will be editor of the bigger magazine. This issue of GL is his last.

Two aspects which require review here are, first, the changes which will result in GL and, second, the role of AMA in accepting an offer by A.M. to include in its future issues, as a special section, editorial messages of the Academy's magazine, *Model Aviation,* which ceases publication after its June issue. AMA members will receive AM as part of their membership package.

As for GL, Publisher Paul Runge will put on an editorial hat—while this issue was being completed, he already had been hard at work on July-August, which will be better than ever. It ought to be pointed out that GL is hardly a commercial magazine. It seeks, at some cost, to service RCers who believe that a publication should perpetuate the pleasanter aspects of RC which many value highly.

It would be understandable that competitive publications to A.M. might be concerned that AMA's membership, plus A.M.'s readership, would constitute the biggest circulation in the field, but the question seems academic, and that magazine indicates no intention to exploit *Model Aviation's* presence.

Criticism, which the modeler will not be concerned with, has been leveled at AMA for accepting the offer of a section, intended to bring AMA into contact with the tens of thousands of sport flyers, thereby increasing membership, and hopefully pulling that organization out of its "Dump the Deficit" status.

It is stated firmly that AMA's move to better itself was entirely within its bylaws, and was based on the unanimous approval

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RADIO CONTROL and Model Aircraft WORLD

GRID LEAKS

VOL. 7 NO. 3

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PAUL RUNGE, Publisher—WILLIAM WINTER, Editor
STEPHEN MUNDY, Art Director—BOBBIE RUNGE, Sec.-Treas.
Contributing Editors: R. Jess Krieser—Phil Kraft
Dick Jansson—John Worth—John Phelps—Norm Rosenstock

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THE COVER: George Walker displays his version of Phil Kraft's Class III design, Das Ugly Stik. Phil's plans, which appear on pages 8 and 9, show the plane in its original form. Walker embellished his with some tricky details. The trike gear would send Tony Fokker! This is one you can build quickly.

of its District Vice Presidents and others who make up its Executive Council. While some shops will not mention AMA, or support the Nationals trophy list, one has offered congratulations in person. *Flying Models,* incidentally, is going monthly.

There is a precedent to a magazine-AMA tie-in; such an arrangement existed in the past, although AMA members did not receive copies of the magazine as part of that arrangement. The truth of the matter is that AMA long has been in serious circumstances and the time was obviously at hand when someone had to come forward with significant assistance.

AMA is a national body, run at no profit, by elected people living in districts from Coast to Coast. Its record of achievement for model aviation is impeccable; it has done innumerable things which no individual or group of individuals, organized in any manner imaginable, could hope to do. Its Executive Council richly deserves highest praise for its unstinting efforts and sacrifice in improving the lot of competition modeling. It is surely enough that we keep asking what happened to the Juniors and not have to ask as well, what happened to AMA. This is no time for mavericks, nor personal abuse of those who have responsibility to meet, and duty to perform.

In closing, the writer expresses appreciation to GL's publisher and readers for permitting him in their home.

Price Winter

Readers Write

QUIET PROPS?

By the way, with all the noise about mufflers (pun), it occurred to me around four this morning that everyone may be peering at the wrong end of the engine. My Shopsmith is dead quiet when in use as a drill press, but the minute I change it up to a higher speed and add a saw blade it gets noisy as heck. In other words, the prop may be the little gadget that makes the nerve bothering scream, and not the exhaust port. Think of an AT-6 going through pitch changes, or an Electra's noise when the plane turns on the ground so that the blade resonance is lined up with your ears. Ghastly! May be a good time to go into the Quiet Prop biz . . .

BOB LOPSHIRE, Sarasota, Fla.

STICKY QUESTION

This letter is written in response to your comments in (The Monitor) in the Jan.-Feb. GRID LEAKS, concerning stick layout in proportional transmitters.

I have been under the impression that many or most flyers using a two-stick arrangement, use elevator and aileron together on a single stick and motor and rudder on the other stick. Basically this appears to be a one stick arrangement without rudder control.

I flew a Jenny all last season using a much modified Sampey 404. Incidentally, the 404 system works quite well with a good CB interference. The Jenny was flown initially as a Class 2 ship, using a stick for rudder and elevator. Later, after learning to fly, I converted to Class 3 operation and used the knob on top of the control stick for rudder. The other two major directions were for aileron and elevator.

On the basis of my past experience both as a beginner and later pilot proficient enough to prevent crashes, there appear to be a number of advantages using a single stick.

First: The problem of simultaneously moving two hands is avoided. (Pat your head and rub your abdomen with circular motions simultaneously) .

Secondly: Coordinated aileron and rudder turns can be made, which is a real advantage in using a Jenny.

Thirdly: You may save your airplane. The aileron linkage broke in flight on one occasion last summer (cause unknown at the time) and the plane assumed a fairly violent left turn. I tried to correct the attitude with aileron but to no avail. As the plane was about to take its final plunge into old Mother Earth, someone yelled, "give it right rudder." The rudder motion straightened the ship out so that it could be landed safely. I doubt if this maneuver could have been carried out by myself using two hands whereas the simple twisting motion at the top of the control stick sufficed.

Fourthly: I never pushed reed switches and really had no difficulty learning to fly with a single stick. I also feel that using the

(*Continued on page* 29)

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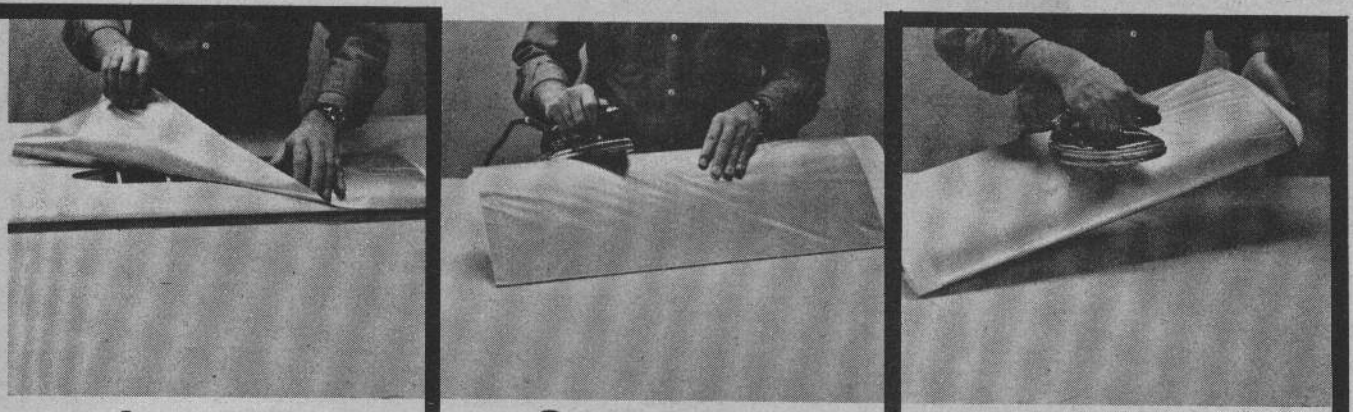

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The author-designer readies the ship for starting. The plane is a simplified version, as George Walker's model, right, indicates.

Das Ugly Stik

Something different in multi trainers with full pattern ability.

By PHIL KRAFT

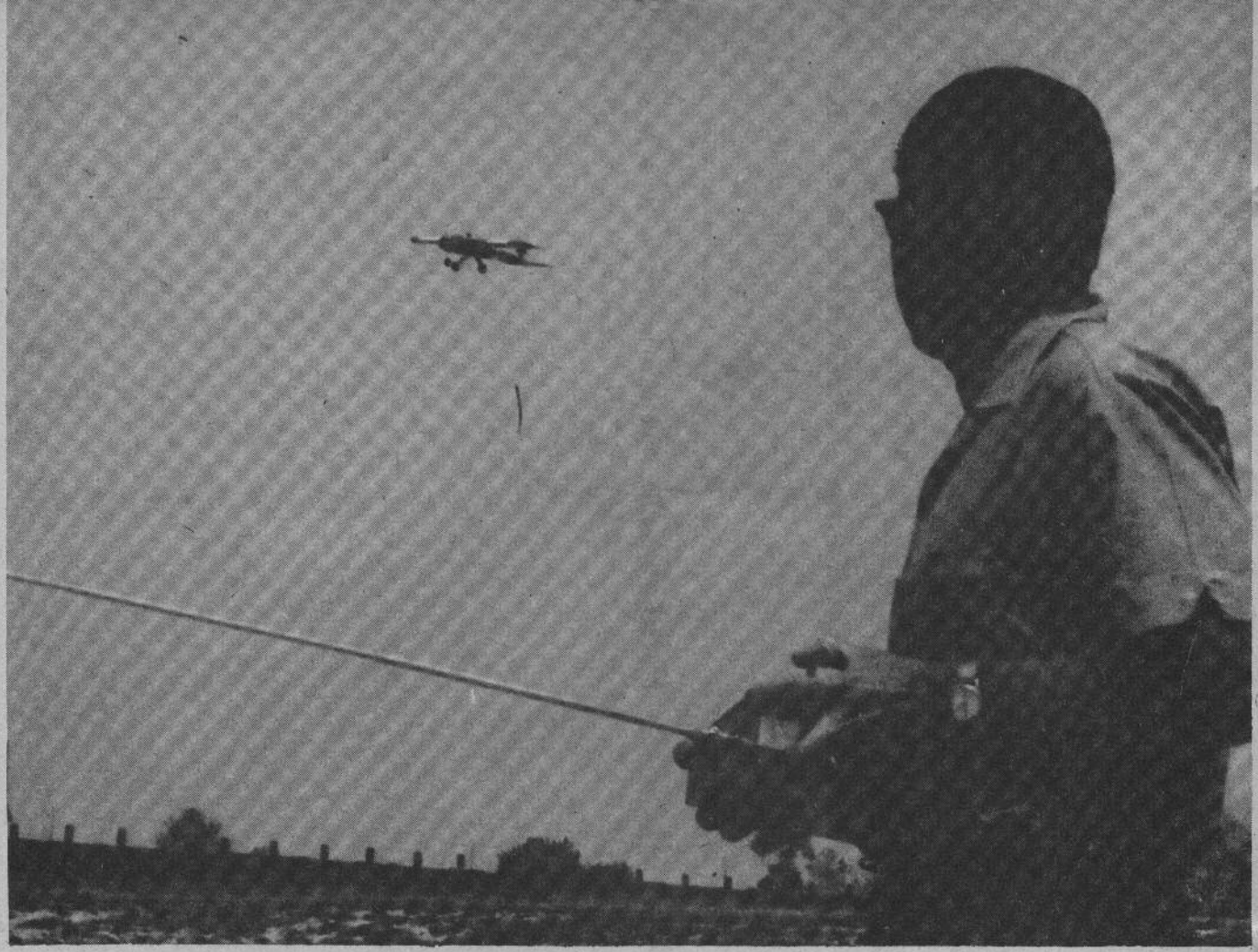
THE ORIGINAL CONCEPT of the Ugly Stik was to design a radio controlled aircraft which could be built in an absolute minimum of time. Its purpose was towards a flying test bed for new proportional control developments and an all-around shop airplane which could be used as a loaner for visiting flyers, testing repaired equipment, and any use which required an airplane which could be considered as expendable.

In the original form, the Ugly Stik was completely square. All surfaces were merely cut out of standard sizes of wood with no curves or frills whatsoever. The plans were finished on a Sunday afternoon some two years ago. A visit to our local hobby shop was made at approximately 4:30 to purchase the wood and other necessary materials. Taking time out for Sunday dinner, still the framework was completed by 10:00 o'clock that evening. Two more evenings were required for covering and doping, and on Thursday of that week, the ship was first flown.

Obviously not much time was taken in sanding or painting. This was to be an expendable, utility airplane. As with most straight-forward functional designs, the Ugly Stik proved to be an excellent flyer. It was extremely stable, very easy to fly, and quite capable of contest performance. I am not sure who first applied the name Ugly Stik to the design, but whoever it was certainly applied a descriptive name. Wherever it was flown, I was subjected to a great deal of kidding about finally having developed an airplane even uglier than the Kwik Fli. There were also a great many requests for plans, particularly among the newcomers to radio control who wished for an easy-to-fly, rugged, expendable airplane to learn on—which this surely is.

There was in this early square design something suggestive of a World War I type aircraft. As a joke with assorted scribbling on the plans, we came up with a design vaguely reminiscent of the Fokker-Eindecker. The results were perhaps no less ugly, but did tend to produce a design with a certain amount of charm and appeal. Certainly it never fails to create a great deal of attention among the spectators at the local flying field.

Performance-wise, it of course can not be classed as an all out competition Class III model. However, it is certainly capable of winning contests in the hands of a good flyer. While the design has not been used a great deal for contest work, it has several wins to its credit in Class III. Its main virtue is as a trainer for the beginner in proportional (*Continued on page* 6)



Phil executes fly-by for benefit of lensman. He built basic frame in less than five hours, covered and doped in two more evenings.

Das Ugly Stik

(*Continued from page 5*)

control. I have always felt that is a waste of time for newcomers in our hobby to spend over a hundred hours on an elaborate Class III design to learn on. Inevitably, unless the beginner is of remarkably unusual talent, he's going to have minor or major accidents due to misjudgment in learning. Therefore the Ugly Stick fits the requirements perfectly as a trainer. It is about as simple as possible to construct. As stated before, it is rugged and very easy to fly.

For those merely wishing an expendable trainer, the scalloped strip ailerons, elevator and rudder can be dispensed with, and just straight forward construction used. However, the details toward making an early type of German World War I airplane add only an hour or so to the building time and create quite a novel appearance.

Construction is so straight forward that very little in the way of detailed step by step instructions are required. The grade of wood used throughout is not particularly critical as the flying weight can vary from 5¼ to 6½ pounds without materially affecting performance. Actually the Ugly Stik flies best at about 6 pounds using .56 to .60 engines. This gives lively flying.

The fuselage is absolutely straight and flat on the bottom. The first step in construction should be to cut the 3/32" plywood bottom sheet as indicated on the plans. Pin this to a flat work surface, along with the 3/32" bottom planking which is spliced to the plywood nosepiece. The fuselage sides are cut from ¼" sheet balsa as well as the bulkheads with the exception of the ¼" plywood firewall. Cement the bulkheads to the bottom sheet and then merely position the fuselage sides against the bulkheads and the bottom sheet. The firewall should be secured with a liberal application of epoxi cement for strength.

The stabilizer, elevator, fin and rudder can be cut from soft ¼" balsa sheet, although it is preferable to use the built up construction shown. The elevator can be installed during fuselage construction, if your work surface is large enough to accommodate it flat against the bottom sheeting. The construction is so designed that the fuselage can be completed including servo mounts, stabilizer, and rudder all in one step.

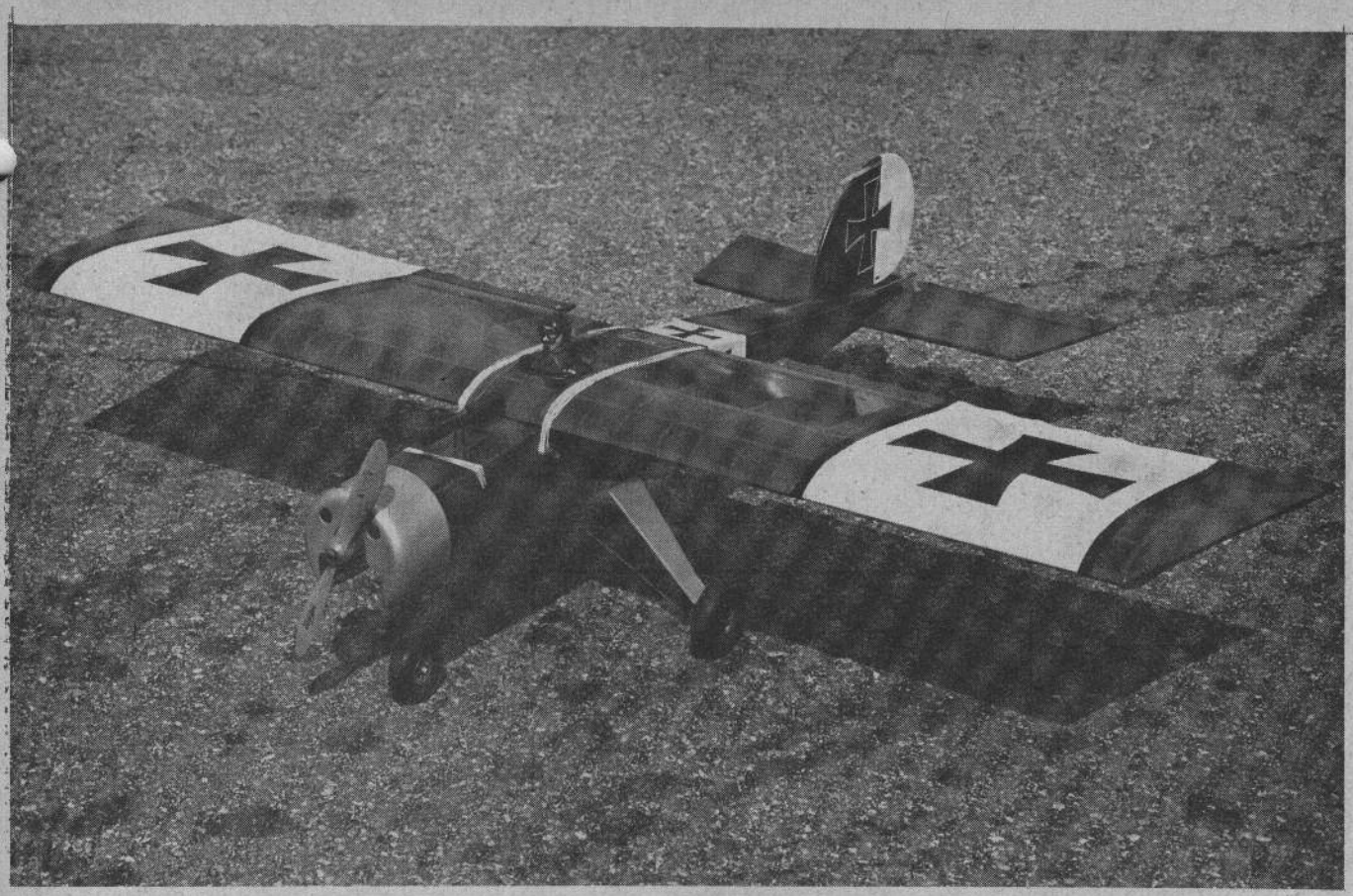
The wing has no dihedral, and the ribs are flat from the bottom spar to the rear. Therefore, no jig is required and the wing can be completed on any flat work surface. For maximum simplicity, the aileron linkage is external and holes are cut in the side of the fuselage to allow clearance for the servo as well as the piano wire pushrods to the aileron bellcranks.

On the original, only the wing was covered with silk. On the balance of the wood surface I merely utilized a good dope. The open frame construction of the wing has given no problem with warping, though we have seen some examples of other Ugly Stiks where apparently the builder propped it wrong while the dope was drying, resulting in some rather severe warps. Actually, removing warps from an open frame wing structure of this type is extremely easy. It only requires the use of heat while twisting against the warp to insure a flat wing surface.

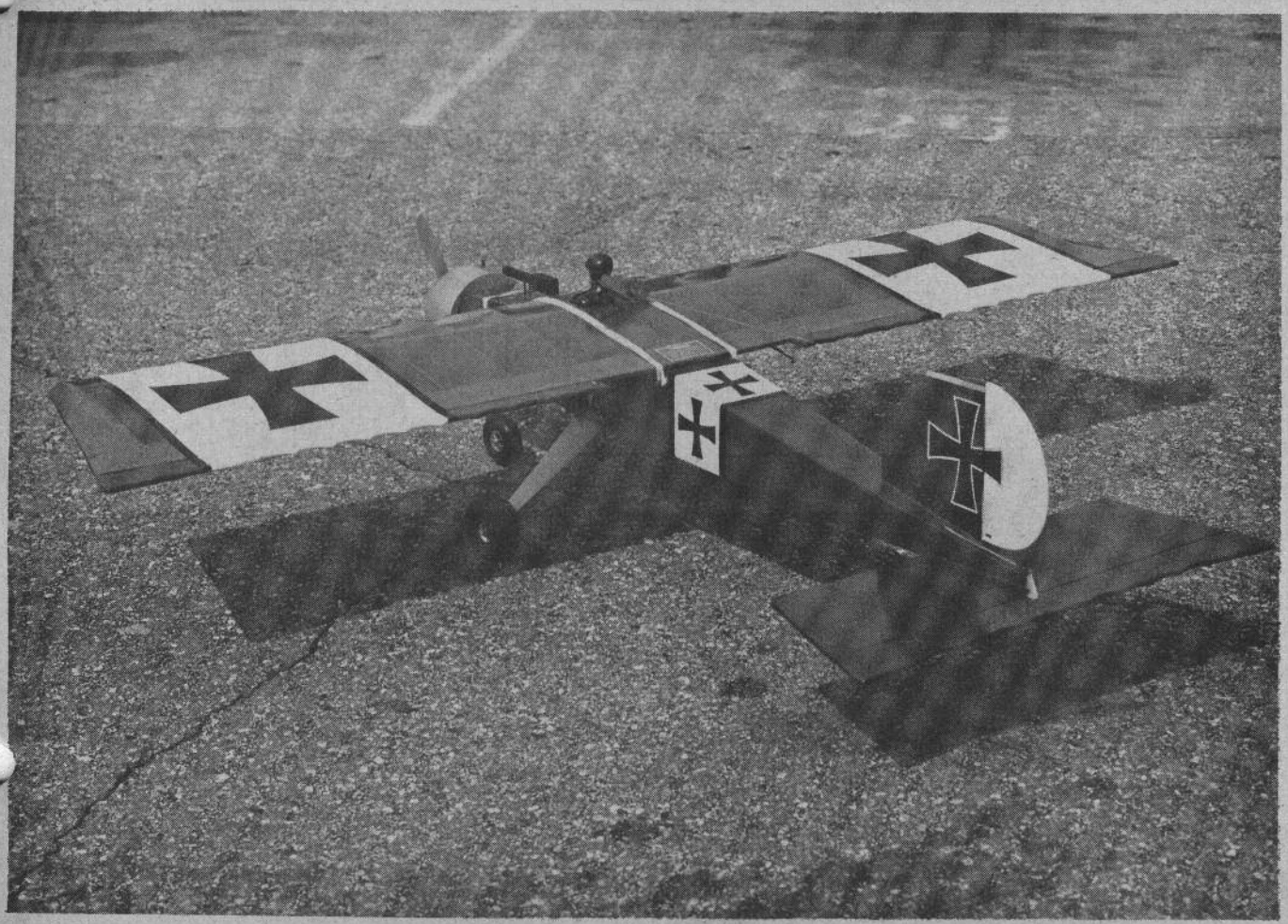
Flying of the Ugly Stik is equally as simple as the construction. The design is not overly critical to center of gravity location. It should balance approximately on the main spar or slightly to the rear. No thrust offsets are used.

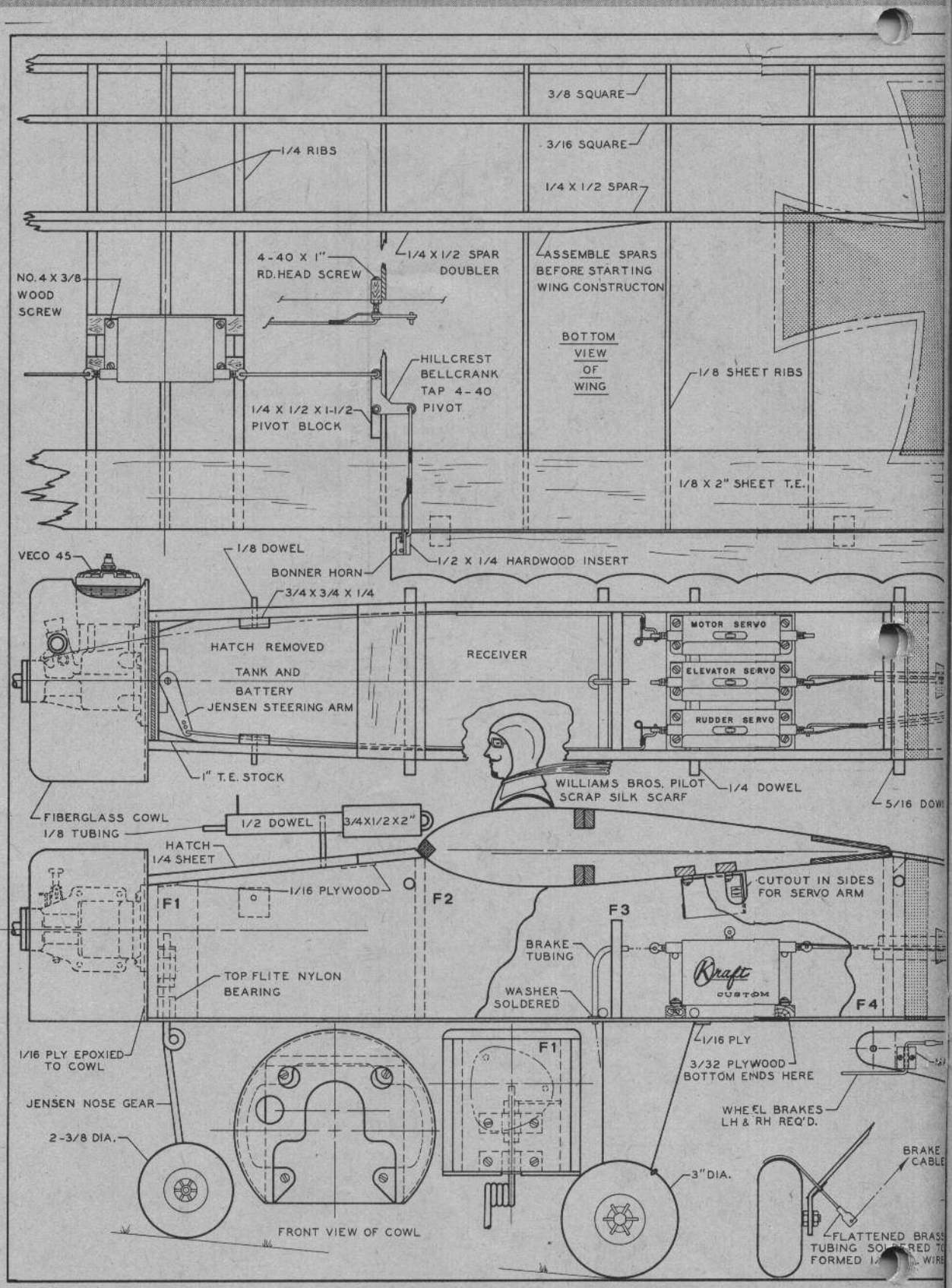
To sum up, considering the minimum amount of time and effort put into construction, I doubt that we have ever had more fun flying a radio-controlled model aircraft. We believe it is an excellent choice for the beginner and an ideal trainer for multi proportional flying.

Hope you enjoy it!

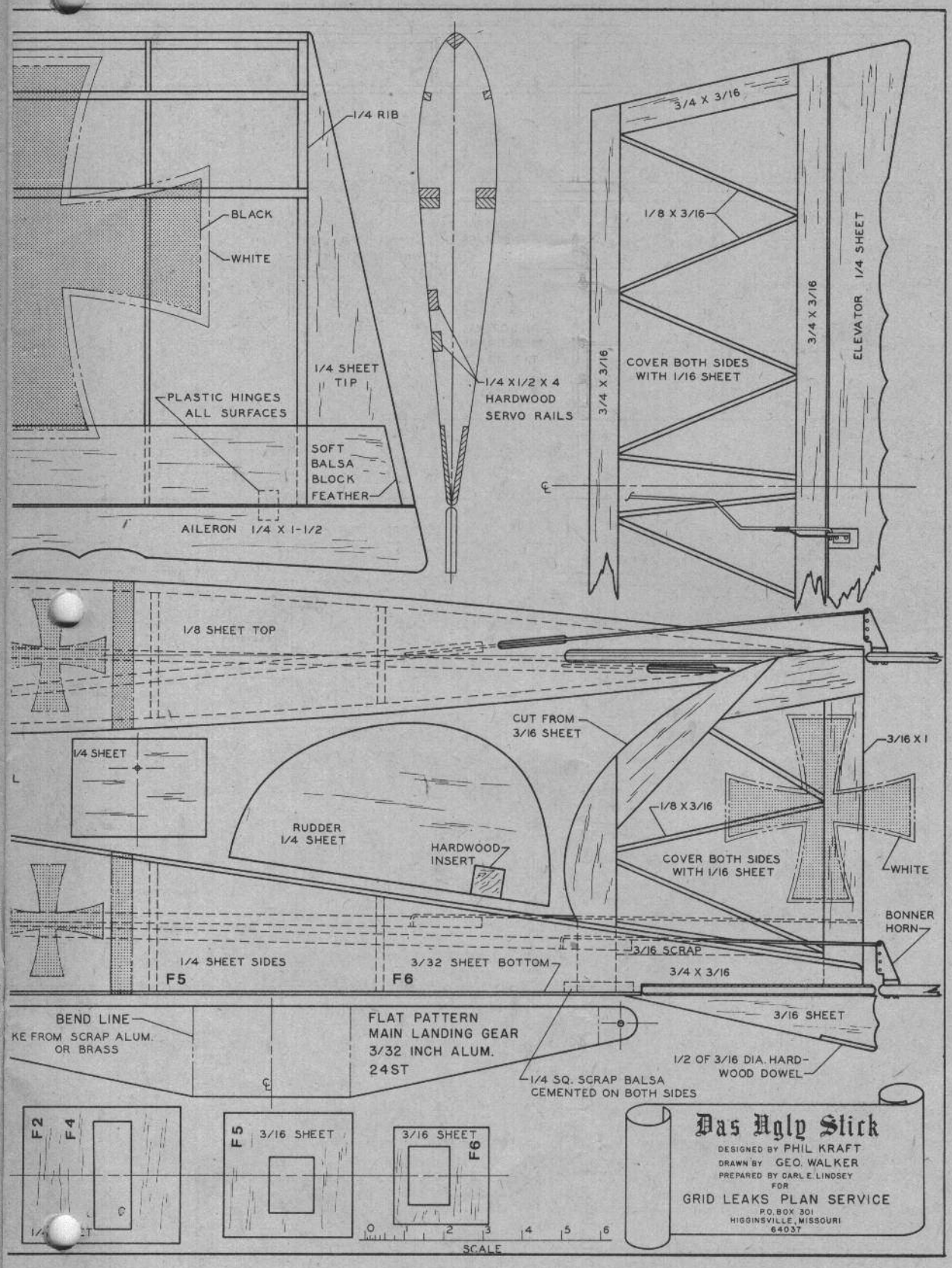


World War I type cowl and wing false ribs embellish Walker's ship. Excellent kit available from producers of Phil's Kwik-Fli kit.



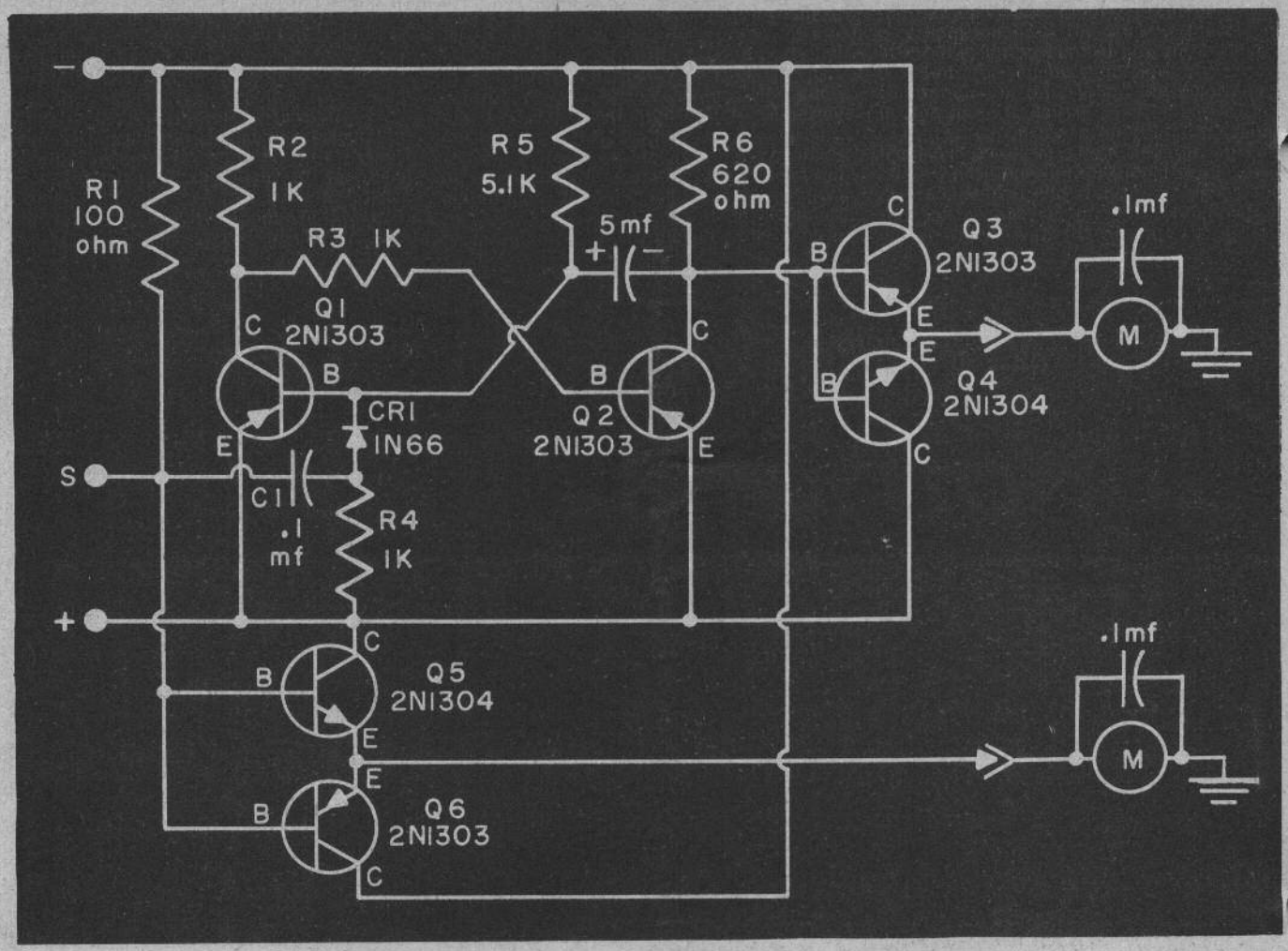


DAS UGLY STIK



b = 61.46
c = 13.4

FULL SIZE PLANS AVAILABLE—SEE PAGE 31



Servos are driven by respective amplifiers as open-end system with torque rather than position proportional to stick movement.

Micro Proportional Two-Axis Control

This ingenious dual-simultaneous system operates from a single-channel radio and makes speed of plane position change proportional to stick.

By NEIL S. DEYE

THIS SYSTEM is presented as a simple, low cost, proportional control system, small enough to be used in ¼A models. Basically, it is a pulse system very similar to existing systems. Conventional pulsers, transmitters, and relayless receivers can be used. The system consists of a K3VK layless receiver, rate decoder, two servo amps, two servo motors (Micro-Mo TO-5 with 41:1 gear ratio) and two pencells to operate the total system. (NOTE: It must be explained that, this being a superregen frontend, it has experienced interference difficulties in heavily populated areas. It would be a much safer system if tied into a relayless superhet receiver.)

The servo motors are driven by their respective servo amp as an open-end system. The basic feedback is mechanical and is supplied by centering springs. Motor torque rather than position is proportional to stick movement of the control box. Thus, control position is determined by command signal from transmitter, centering tension of spring which is a constant, frictional loads on linkage and air loads on the control surface. Since airspeed determines the air loads on the control surface, it thus acts as a load feedback loop which is a controlling factor in positioning of the control surface with a given amount of servo torque. This system then approaches that of true proportional, where the rate of change of the aircraft direction is proportional, to the stick displacement at the transmitter control box and is nearly constant for changes in aircraft speed. Limitations on this system are determined by the aircraft design.

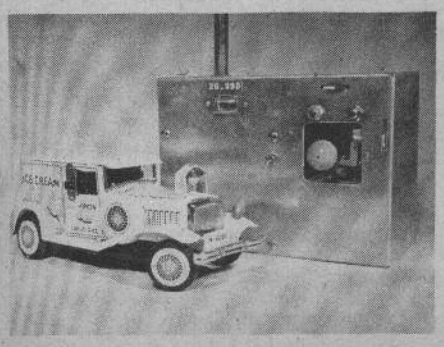
In the expensive proportional systems, feedback servos are used and the aircraft control position is proportional to the stick displacement at the transmitter. Thus the rate of change of the aircraft direction varies widely with the aircraft speed.

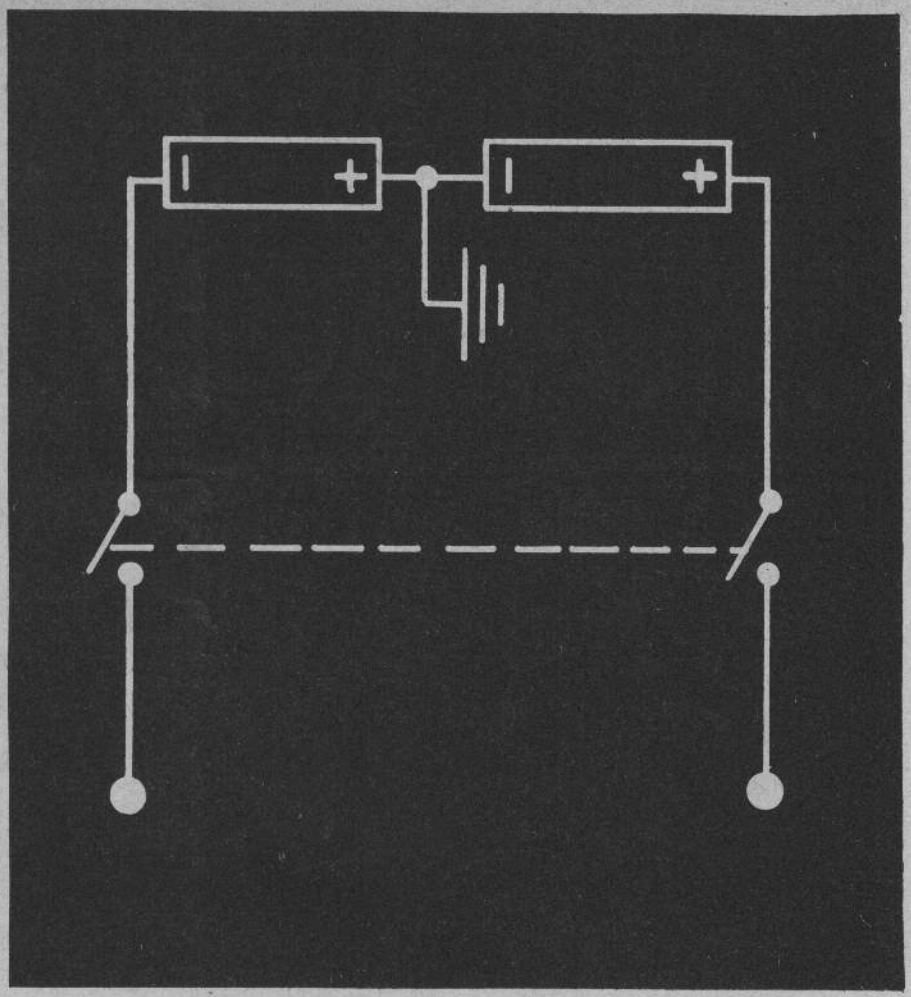
Output of the receiver is connected directly to a 100 ohm resistor, R1, which is used as a load. This value may be reduced if the decay time of the receiver output pulses exceeds 20 percent of the pulse width. This receiver output connects directly to the first servo amps., Q5 and Q6. This servo amp, is very simple, the transistors operate either saturated or cut off. When the receiver output is positive, the NPN is saturated and the PNP cutoff and the servo motor runs one direction. When the receiver output is negative and the PNP is saturated and the NPN cutoff and the servo motor runs the opposite direction. When the positive and negative receiver outputs are equal in time, the servo motor has alternately equal voltage pulses in opposite directions. Due to the rate, gear ratio and motor lag, the output shaft remains relatively motionless. At slow pulse rates a small dither of the motor shaft is apparent. As the symmetry of the wave form changes, the average voltage difference to the servo motor changes and thus its torque.

The receiver output is also connected to a differentiator, C1 and R4, and its positive edge via CR1 is used to trigger a monostable multivibrator, Q1 and Q2. The monostable multivibrator output is a constant duration pulse for each time its is triggered. Thus, if its pulse duration is equal to one-half the time between pulses, its output is symmetrical and a rate change will cause a proportional change in output symmetry. The pulse duration is determined by R5 and C2. As either R5 or C2 is increased in value, the time duration will increase and the rate for a symmetrical output or neutral for the servo motor will decrease. The output of Q2 is connected to the second servo amp Q3 and Q4, which operates as does the first servo amp Q5 and Q6.

The servo design is left to the individual. It should include the specified motor and mechanical centering. If a stop is used at 180 degrees, this will serve to return the controls to neutral in the event of equipment failure. If the stop is offset slightly from 180 degrees, then a slight control function, such as a gentle turn, remains with equipment failure. A SPDT switch can be incorporated into the stop to operate another control, such as a throttle servo from the rudder servo. Without stops the servo motors can run continuously and the controls will average near neutral. In such a case, threaded shafts could be used to drive a carriage and operate additional controls such as the throttle from the rudder servo, retracting gear, flaps, parachute drop, etc. from the elevator servo.

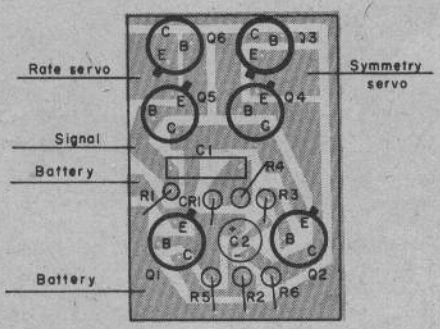
This ice cream truck was one of the author's projects and uses steering and electric drive motor propulsion.





Power supply is shown above. Basic feedback mechanical, supplied by centering springs. Air speed determines load on surface, acts as feedback loop, relative servo torque.

*Left and below, are shown the printed circuit board (actual size) and the arrangement of the components on the board. The author used the K3VK re*layless receiver but suggests the superhet *front end for protection.*



LETTER FROM A YACHTSMAN

This letter came to us as a layout with the pictures in place! May you enjoy it, too...

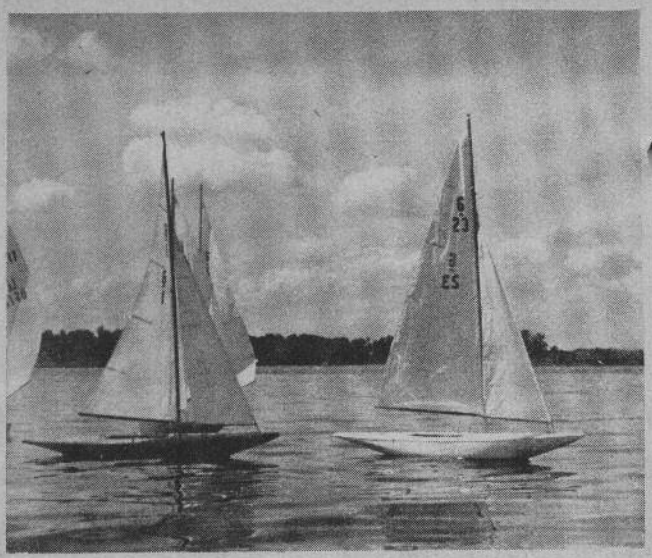
DEAR EDITOR: You asked how R/C model sailboat racing compares with the real thing. Perhaps these snaps will give you an idea. Like the big ones, the miniature fleet maneuvers for position at the start line. The objective here is to be on the line and under way at the start signal. There is about 30 seconds to go, below, and Number 1 has to give way to Number 5 under the starboard tack or right-of-way.

Above: The start was a good one. Three boats on the line, Number 1 had some catching up to do. The course is triangular. The first leg to windward. (We should be flying planes in this air.) Number 1 has his sights set on Number 23.

Like big boats, skippers split tacks to get clear air. Number 5 hopes to be first at the mark and hold Number 11 in check. Coming

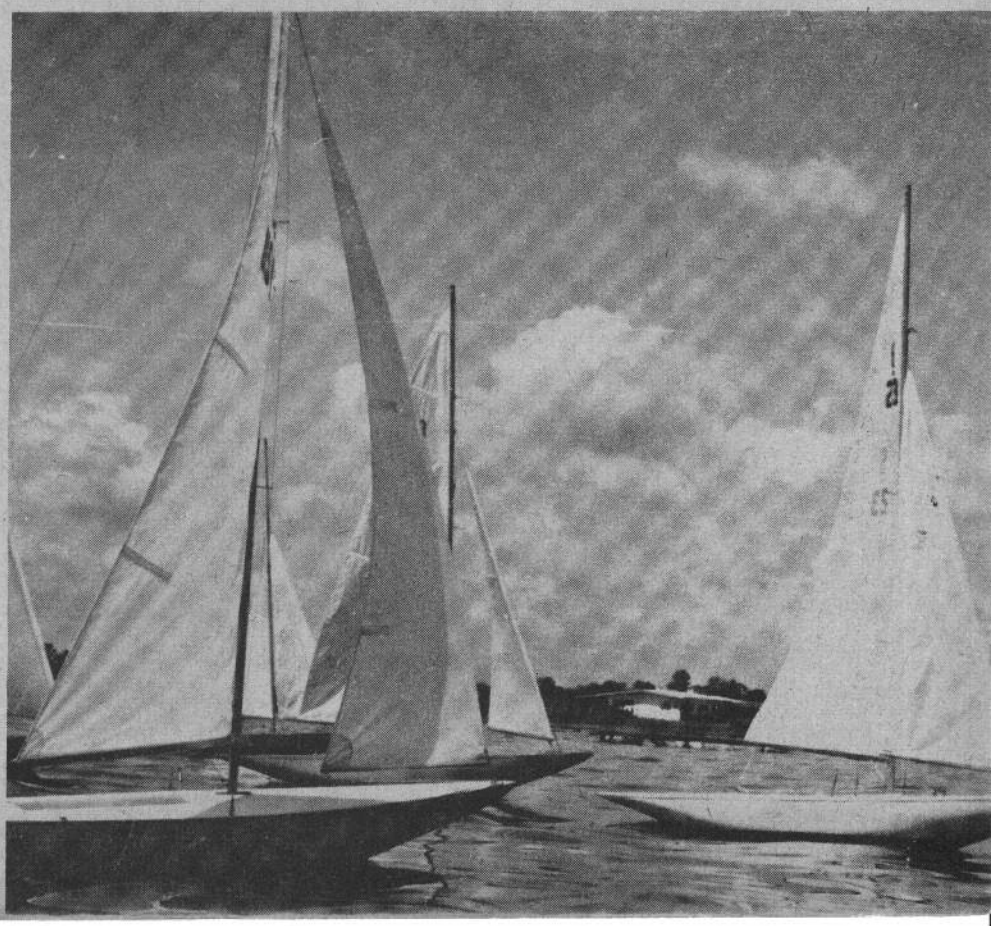
up on the mark Number 1 has overtaken Number 11 and challenges Number 5 who again is on a starboard tack--and has right of way.

On the second leg above, Number 5 tried to cut across to block Number 23's air and to force Number 1 to windward under the rule that permits "luffing."



A good tactic in heavier air but Number 5 got backwinded by 23 and above, Number 1 slacked her main just in time to grab a wind shift that nosed her into second.

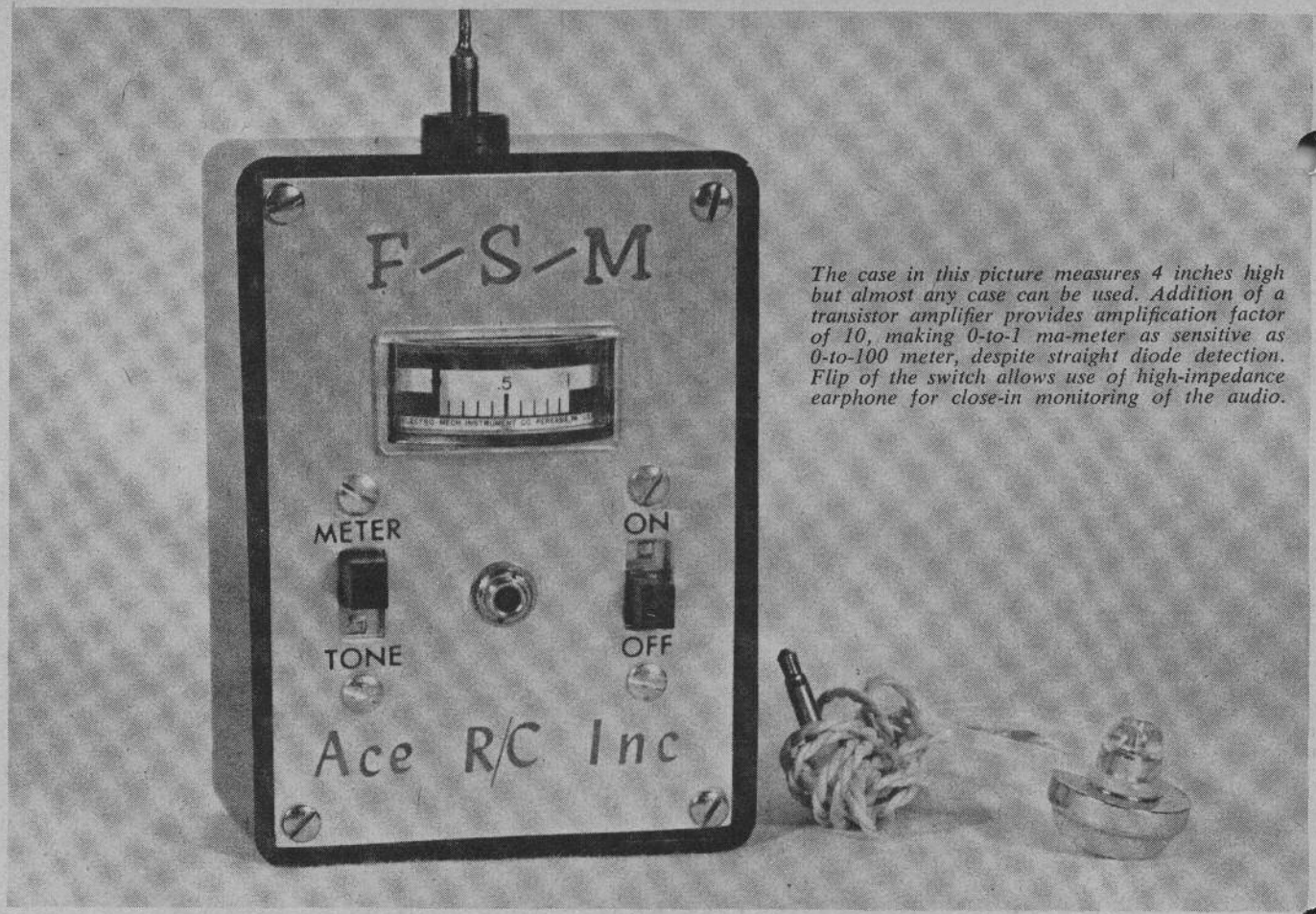
Number 1 ran into some trouble and on the home-stretch it was anybody's race again.



Just before the finish Number 11 got a puff of wind and posed a threat to everyone. At the finish, above, Number 23 won by a boat length; Number 1 was second and 5 and 11 will have to win third place in the club house.

Does this answer your question?

John Reynolds



The case in this picture measures 4 inches high but almost any case can be used. Addition of a transistor amplifier provides amplification factor of 10, making 0-to-1 ma-meter as sensitive as 0-to-100 meter, despite straight diode detection. Flip of the switch allows use of high-impedance earphone for close-in monitoring of the audio.

Build This Field Strength METER AND MONITOR

Simple, straight-forward circuit makes easy the duplication of this useful test instrument. It is intended for checking transmitters, more than interference.

A FIELD STRENGTH meter is one of the most useful test instruments you can have on your bench. It can help localize trouble instantly when you have equipment failure, as to whether it is in the receiver or transmitter. If in the transmitter, it can tell you if the transmitter radio frequency is putting out its signal at full strength. If it is, it can tell you by the addition of a simple high impedance earphone if the audio portion of the transmitter is sick, whether or not its tones are clean, or if they are garbled with whistles or noise. With this type of information, by elimination you can localize your transmitter difficulties.

The FSM (Field Strength Meter) pictured here, is available as a kit, but the circuit is so simple and straightforward that you can build it using almost any case that you may have, and also fix it up with a larger 0-to-1 milliameter you might have around.

Substitution of the diode detector also presents no problem. The addition of the transistor amplifier gives you an amplification factor of about ten, and results in the 0-to-1 milliameter being as sensitive as if it were an expensive 0-to-100 microammeter. Straight diode detection by itself just does not have enough power to work a 0-to-1 milliameter, but by using a low cost PNP transistor you can boost output considerably. Almost any PNP type of transistor can be made to perform satisfactorily here. Simply check for gain to make sure that it has adequate gain to amplify the signal as detected by the diode.

The FSM circuit shown has a DPDT switch which is used as an SPDT, which switches the unit from the meter to the phone jack, so that an earphone may be used for close-in monitoring. (Note: This is designed to check your own transmitter; it will not easily monitor interference unless this interference is nearby or very strong.)

The FSM-Monitor is housed in a small, black plastic case which is used for instruments. It measures 4 inches long, is 2 55/64 inches wide, and 1 9/16 inches deep. The four corners are tapped for 4-36 bolts. This makes it simple for an .032 aluminum front panel to be used.

The panel is punched so that it will accept the 0 to 1 ma edge reading meter, the SPST slide switch for on-off, and the DPDT slide switch for meter-audio, and a Switchcraft Tini-jack. A printed circuit base may be used to hold all of the components if desired, although point-to-point wiring may also be used. If it is, some 3-point tie-lugs will assist in the mounting.

If it is desired to use a PC base, a full size pattern is shown, so you can have a positive made of this, and by using copper laminate that has been coated with Kodak Photo Resist, etch your own PC base in ferric chloride.

You will note that the parts placement shows the mounting holes for both of the switches. In assembly, if you are going for a device similar to the kit pictured here, the switches and jack or placed in their proper place on the aluminum panel. When doing this, make sure the on-off switch is in the correct position when placed, since it can be placed upside down, unless it is double checked to make sure it is in the right relation to the on-off legend on the panel.

The case is then laid aside and the wiring of the PC chassis is begun. Since there are only five components on the board, and the board is now crowded, no particular order of wiring is required. Be sure to use a heat-sink when mounting the transistor and diode. This is just good practice any time when soldering in any germanium or silicon device. Also, if you are using another transistor than the one called for on the schematic, be sure that the EBC leads of your transistor go to the lands so marked on the parts layout.

When components have been placed and soldered in, solder on the wire lead-outs required for the meter, the earphone jack, and use a small snap connector for the 9-volt battery. This may be one of the small transistor radio-type batteries.

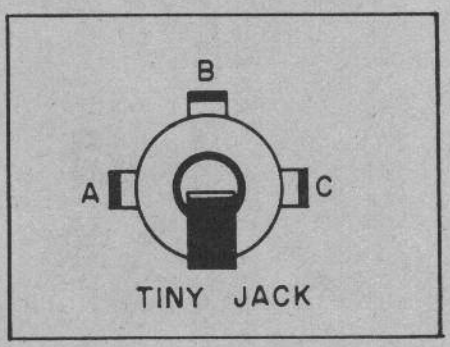
Place the PC board over the two slide switches so that the lugs of the DPDT and the SPST slides switches protrude. Do this with the copper side of the board next to the switches. With the switch lugs just barely through the PC board, solder the switch lugs to the copper. You may want to just tack solder the switches and then remove the switches from the cover to make it easier to get the soldering iron around the lugs. Now install the meter. With the switches soldered to the PC base, and the assembly back on the front panel, solder the wire marked "to the positive of the meter" to the positive lug of the meter. Do the same with the negative lead. Solder the two wires for the earphone jack. Consult the view showing how a closed circuit jack should be soldered. You make no connection at C on the jack.

Drill a 3/8" hole at the top of the bakelite case back far enough to clear the meter. Into this put an Amphenol 78-1P connector. To this solder the lead from the PC board marked "to antenna jack." This will be used to hold a piece of 1/16" music wire, 6" to 18" long, and will serve as the antenna. It would be well to use a piece of fuel tubing, dowel or wooden bead on the antenna tip to keep its sharp end from damage to your eyes or face.

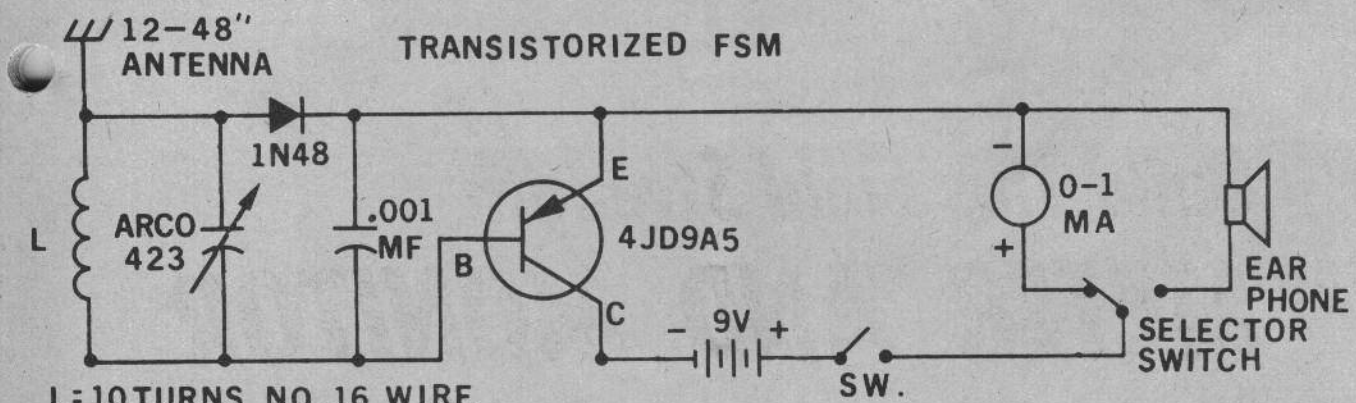
Snap the battery leads onto a 9-volt transistorized radio battery. Make sure the FSM switches are in the meter position, and turn the on-off switch on. Turn on your transmitter carrier. Position the two antennas fairly close, and simply tune the Arco trimmer for maximum deflection of your 0 to 1 milliameter. This Field Strength Meter is to check only the relative output of transmitter and final tuning.

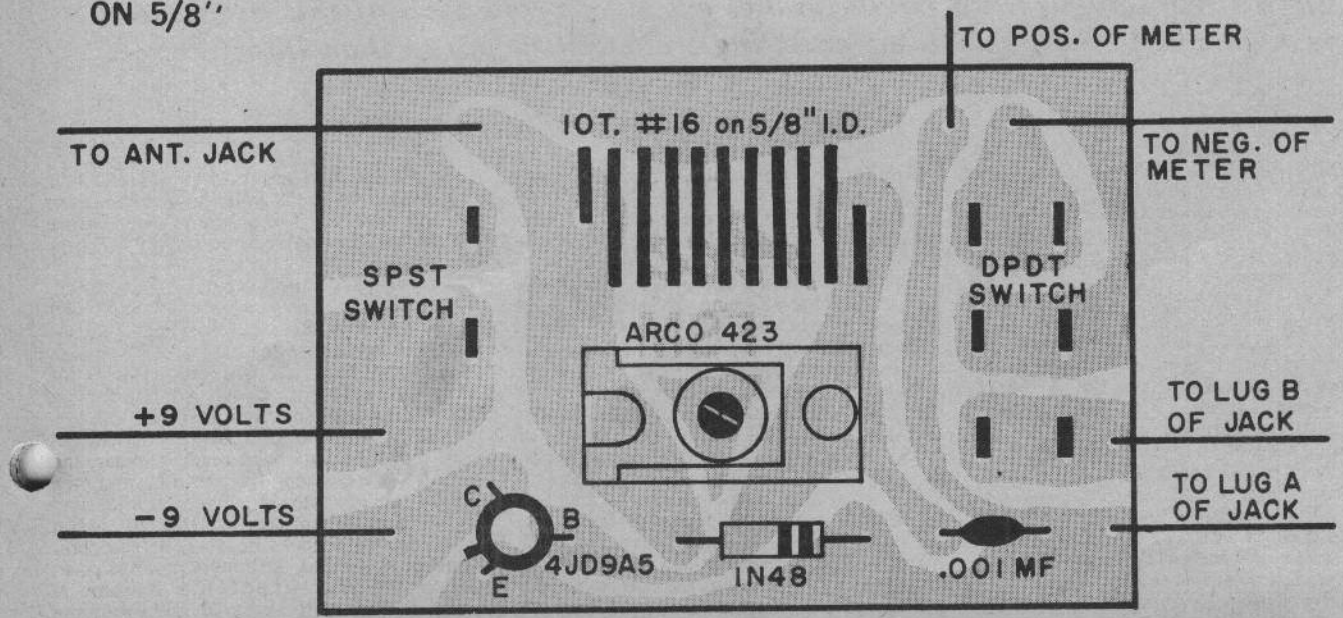
(*Continued on page* 28)

Although the printed circuit board is not a necessary item, the particular builder may prefer to make one, using full-size pattern.



The jack connections shown here can be related to the component drawing at bottom.





SEEN THESE

Single or dual stick Logictrol II proportional units by EK Products, Inc. feature expandability from five to seven controls. $425 to $520.

LOGICTROL II, FOR PLANES, boats and cars is now being marketed by E. K. Products of Westminster, Calif. It is an expandable system offered with choice of single or dual-stick versions in both 5- or 7-control units.

EK Products has successfully marketed its Logictrol 3, 4 and 7 units for the past 18 months. Logictrol II also features small receiver size (1"x2"x3"), light flying weight (23 oz.), and convenient location of controls. It is available on the five CB frequencies, 6 meters, and on 72-76 mc (when FCC-approved).

Prices range from $425 for the Dual-Stick 5-Control to $520 for the Single-Stick 7-Control. EK Products offers factory conversion of the 5-control unit to 7-controls for $100. (EK Products, Inc., 14875 Dillow, Westminster, Calif. 92683).

The Mayfly (Myers Models, Stewartstown, Pa. 17363) is a thoroughly flight-tested radio controlled model designed for consistent, reliable, single channel flying with .049 displacement engines; offered in three forms: prefabbed kit, assembled kit and finished model. Wingspan is 36 inches; wing area 216 square inches.

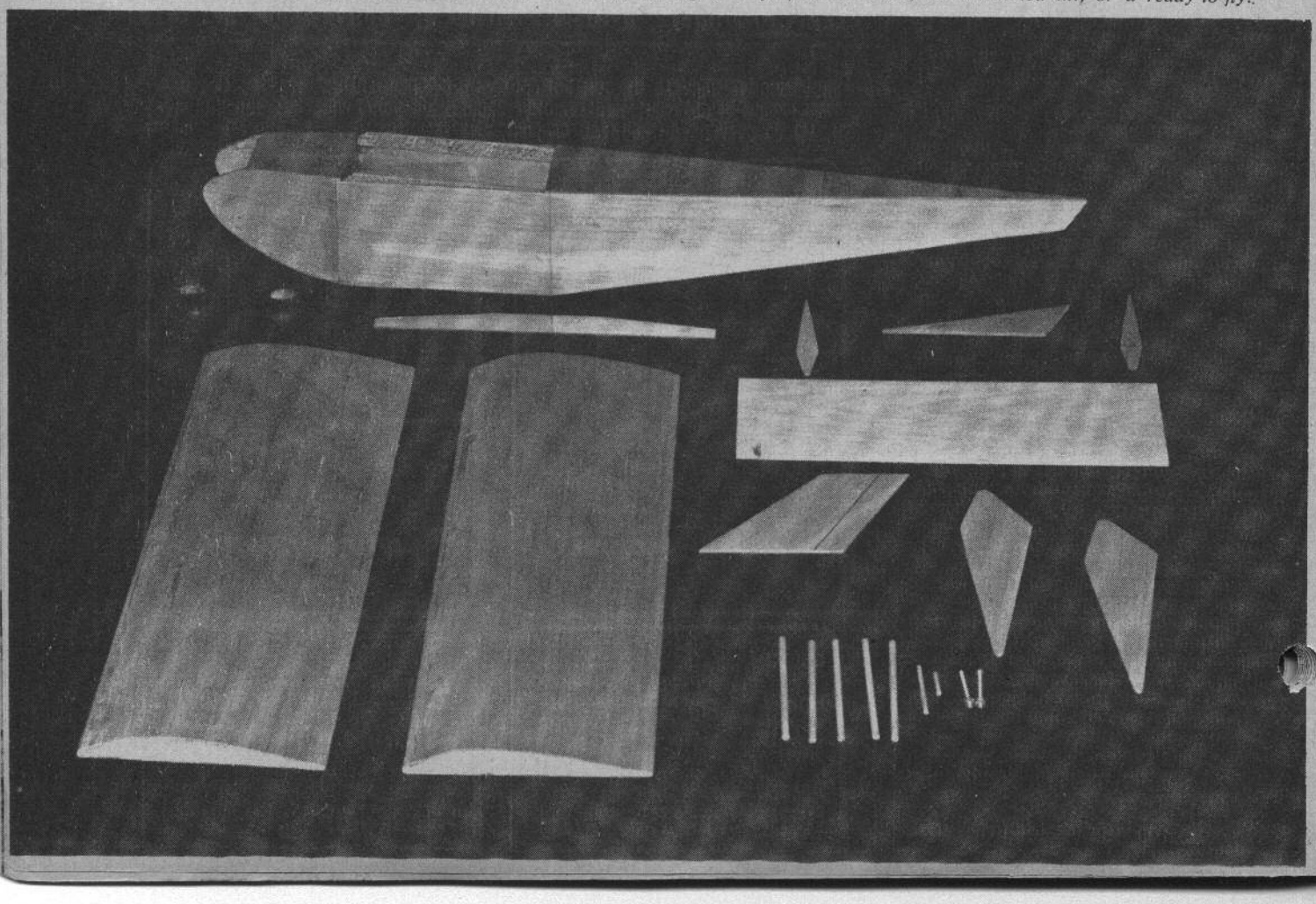
Rugged yet light construction is assured by the use of sheet balsa throughout, including both top and bottom of wing panels. All joints are made with model cement, contact glue, or epoxy, depending upon the stresses on the joint.

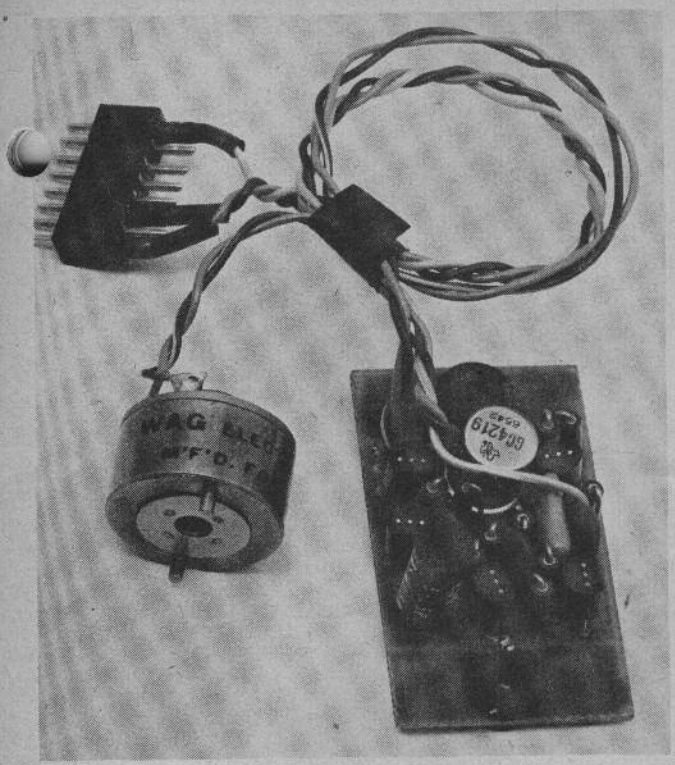
With .049 power the Mayfly will accommodate any single-channel radio system of either the relay or relayless type. Rudder actuators can be escapement, single channel servo, magnetic actuator, or pulse motor actuator such as the mighty midget, GO-AC, and Bellamatic servo. Plenty of space is provided for radio installations: the equipment compartment is 6" long x 2½" wide x 3½" high and a separate battery compartment is approximately 2½" long x 2¼" wide x 3" high. Although designed for single-channel radio installations, the Mayfly has been successfully flown with a four-channel receiver and two Annco servos, providing rudder and throttle control!

Mayfly #1 (Prefabbed kit): Fuselage is assembled, including plywood firewall and landing gear mount; wing mount with

(*Continued on page* 26)

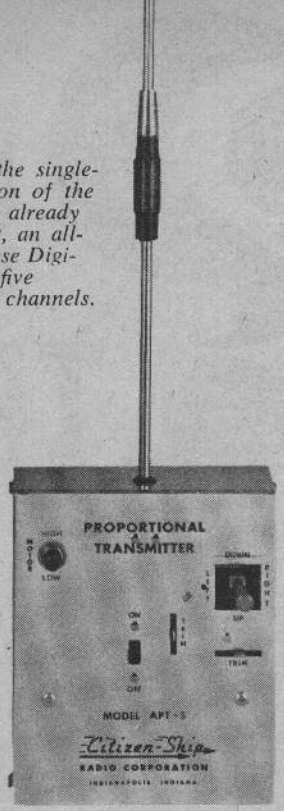
The Meyers' Mayfly suits a wide variety of tastes, coming as a prefabricated kit, an assembled kit, or a ready-to-fly..

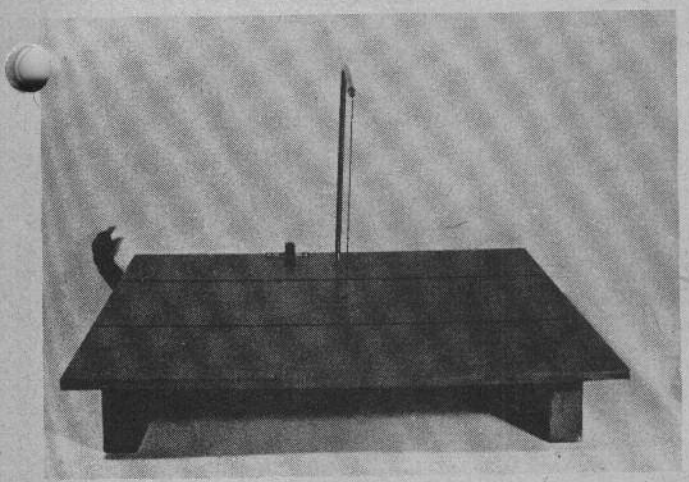




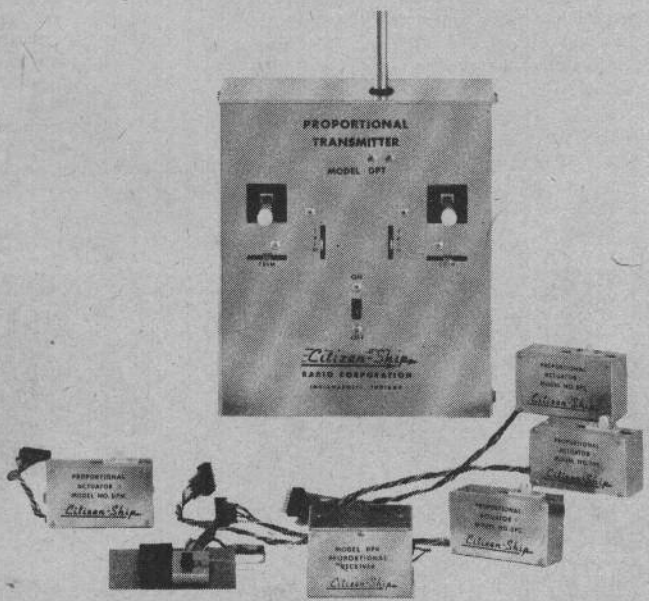
Pro Brake, by EK Products, puts that proportional action into your electric wheel brake. Works with existing units.

New from Citizen-Ship are the single-stick dual-simultaneous version of the familiar Analog Proportional already on the market, and, below it, an all-new one- or two-stick full-house Digital proportional which offers five simultaneous and trimmable channels.

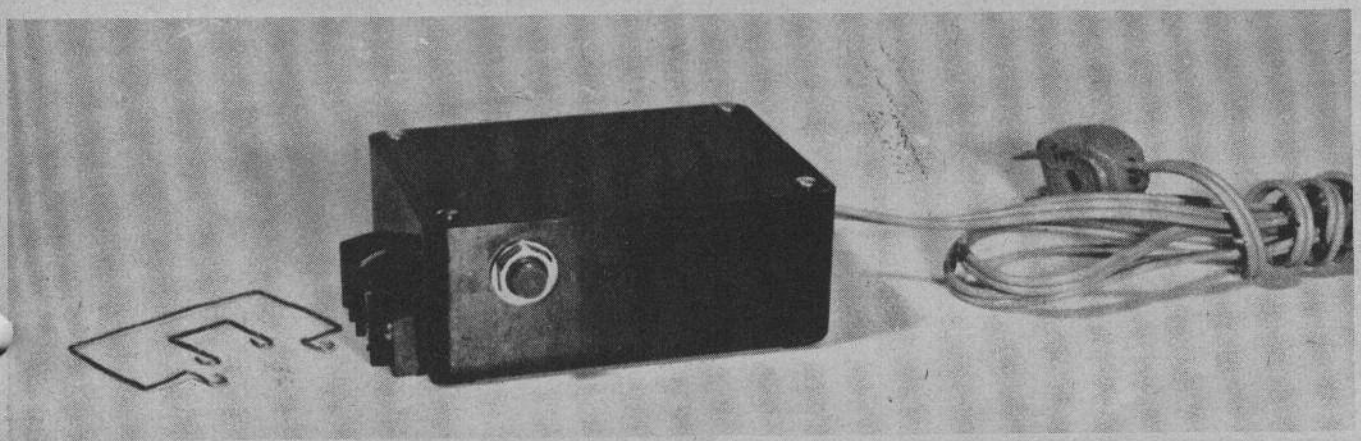




Bee Line's hot-wire jig saw cuts styrofoam quickly—not a bad idea either for cutting out those X'mas decorations.



Citizen-Ship Digital System comes with 4 servos; 5th purchased separately. All nickel-cads, charger. Includes batteries, charger.

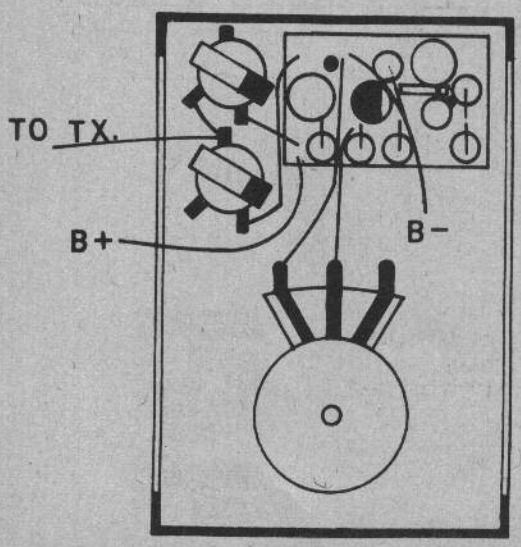


Bee Line's Foam cutter is a much needed too, handy for mak ing those awkward cut-outs in foam sections for wing servos, etc.

Small and compact, the pulser usually attaches to transmitter at old pushbutton hole, uses a 9V battery in the transmitter. Stops appear right and left of the knob.

A 9-Volt Rudder-Only Pulser

A simpler form of Jansson's GG pulser, this one varies pulse width.



THIS PULSER was designed by Dick Jansson for use in his Triple Treat Transmitter. In that transmitter it is used for full Galloping Ghost application and varies both rate and width.

Because there is a great deal of interest in rudder-only proportional, with the possible addition of motor control, we have taken the basic Jansson design of his Unijunction Pulser with the use of a variable bias NPN switch to follow the Unijunction oscillator to only pulse width control. This unit does this capably on a basis of 80/20%, and 20/80% on to off; 50/50 provides neutral.

This pulser was designed to work with most any of the 9-volt all transistor transmitters of the single-channel variety. We have heard from several users of these pulsers, one in the Pittsburgh area, who states, "I was one of the first in the Pittsburgh area to use the Jansson pulser. After having used three other pulsers (mechanical and relay type), the Jansson was a real honey. I am using it with a protrol stick, feeding a Kraft transmitter. I have used a variety of pulse rates for both the Adams actuator and motor driven types."

Another from Arkansas writes, "This is the best pulser I have ever seen. I have been able to make it go to a full off to a full on tone by reworking my pot. Attached to the Commander transmitter, it makes a honey of a combo."

Since the Jansson circuitry uses a transistor switch, it eliminates the item that has caused the most problems to beginners in the conventional pulser—the relay. Pulser relays are called critical beasts by some. Actually, they generally do require some initial adjustment, and the adjustment of a relay can take time, and unless you know what you are doing, and how you should be going about it, you can wind up a useless hunk of junk.

This pulser also eliminates the need for an extra set of batteries. It must be used with a 9-volt transistor transmitter, such as the Commander, the Kraft KTX1, or the Jansson pushbutton type, and others. It

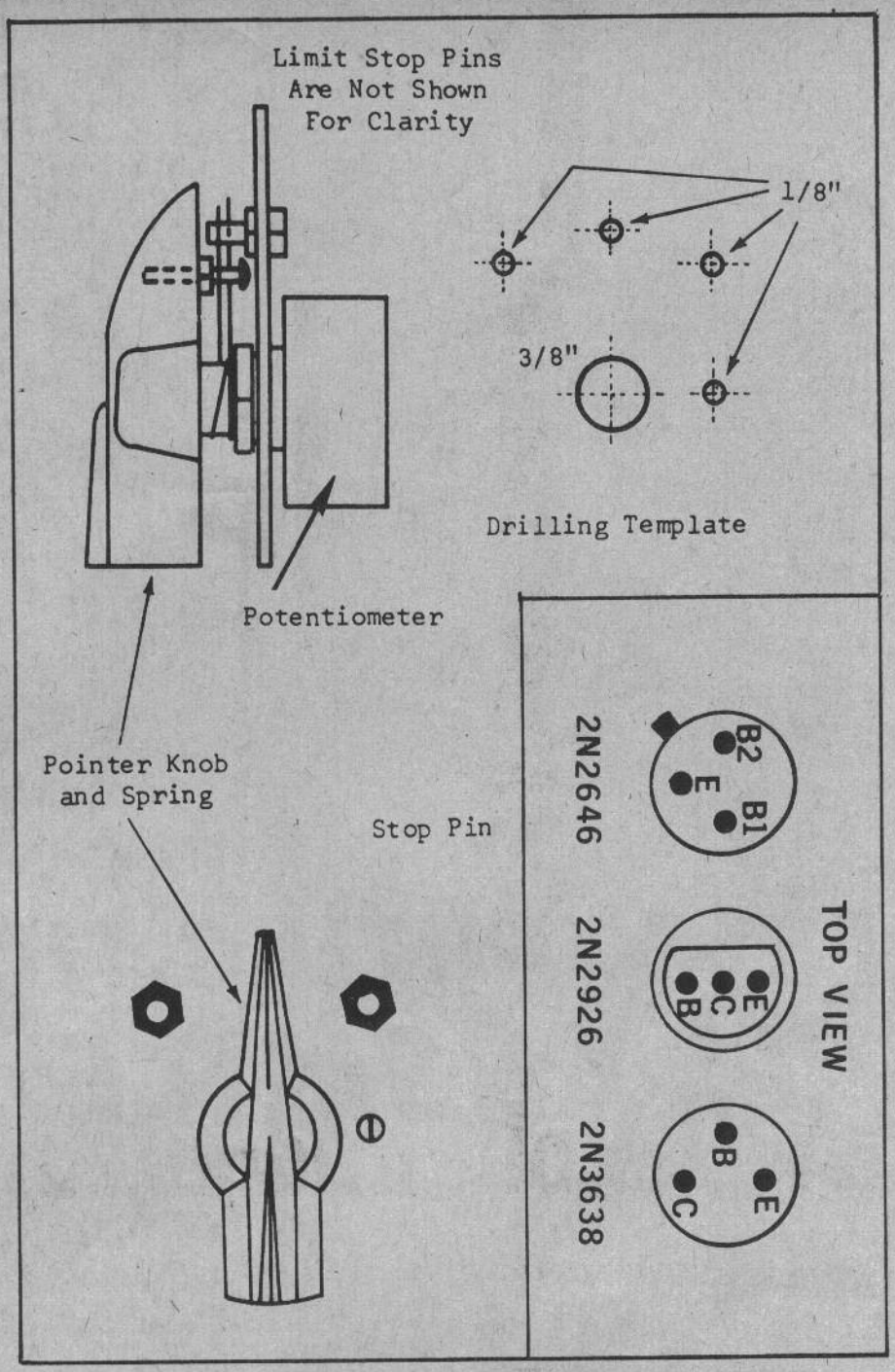
uses the same 9-volt battery for only a slight increase in drain. It simply usually hooks up where your old pushbutton used to be connected on the foregoing transmitters. Check schematics on any transmitter that you propose to use.

By providing full tone off and full tone pushbuttons for auxiliary control, you can go back to pushbutton flying by using just that pushbutton on your pulse case.

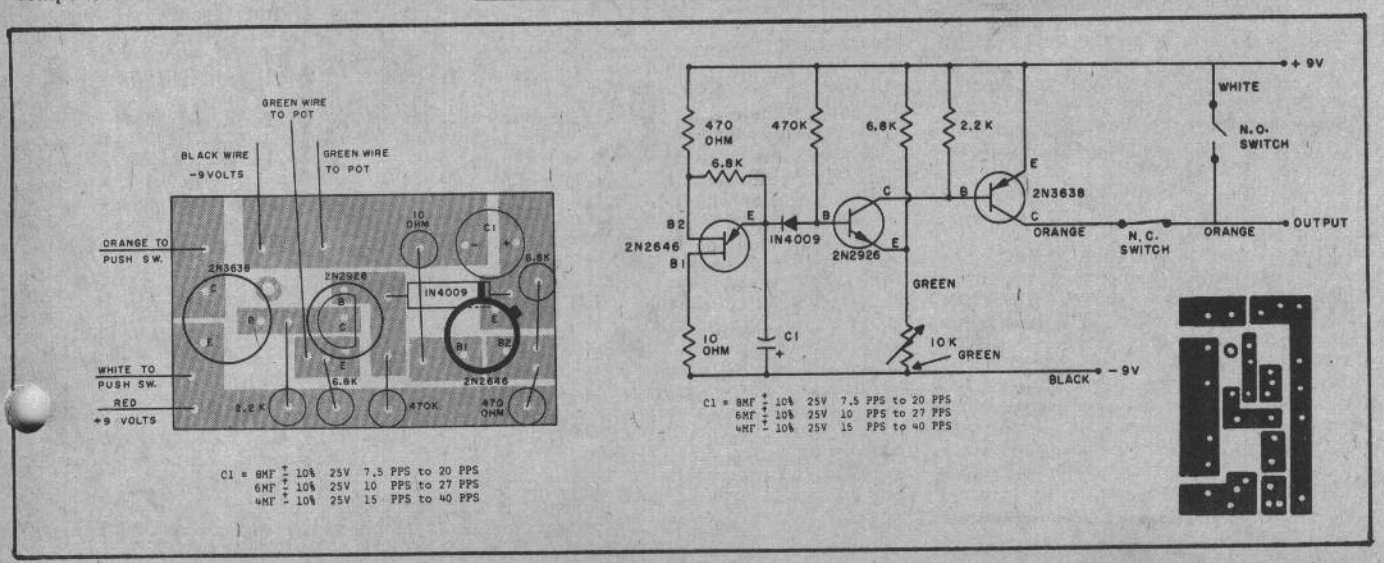
You will note in a call out below the schematic that three different capacitor values are given. You can choose pulser rates up to 40 pulses per second. This should please the experimenter who is working with analog feedback servos in his flight equipment. For simpler equipment a relay receiver equipped with an Adams actuator of either type, along with a pulse omission detector, or motor control discriminator, can provide many hours of dependable rudder only RC fun. A full-size PC board is shown, and can house all of the components except the two switches and the pot. The transistors are silicon, and you have complete temperature stability. A small metal case of 2 x 3 x ¾ can be used to house the PC board, the control pot, and the pushbutton switches. This can be mounted on the transmitter case front. You can remove the old pushbutton, mount the pulser case over it, and have space which can be grommeted to use for your hookup wire connections.

For a control knob, use a 2-in. Dakaware or similar type. Drill about ½" from the ¼" mounting hole with a #50 drill. Tap this with a 2/56 tap. Screw a nut onto a 2/56 x ⅜ in. machine screw. This goes into the hole that you have just drilled on the knob. A similar 2/56 x ⅜ in. machine screw is mounted on the pulser case, and this hooks up to a three or four turn scissor type spring made from music wire, to give you centering. Or you can use the Protrol spring, which is available commercially. It is also advisable to put in the limit stops as shown on the drawing. These can be several additional 2/56 screws bolted to the cover, or they may be the protrol stop nuts.

If the rudder action is not neutral when the control is in neutral, move the control to achieve the correct rudder neutral action, loosen the set screw, and allow the control to neutralize without moving the pot shaft. Retighten the set screw.



Right: Details of control knob and transistor connections. Below: Location for components on PC board and schematic.



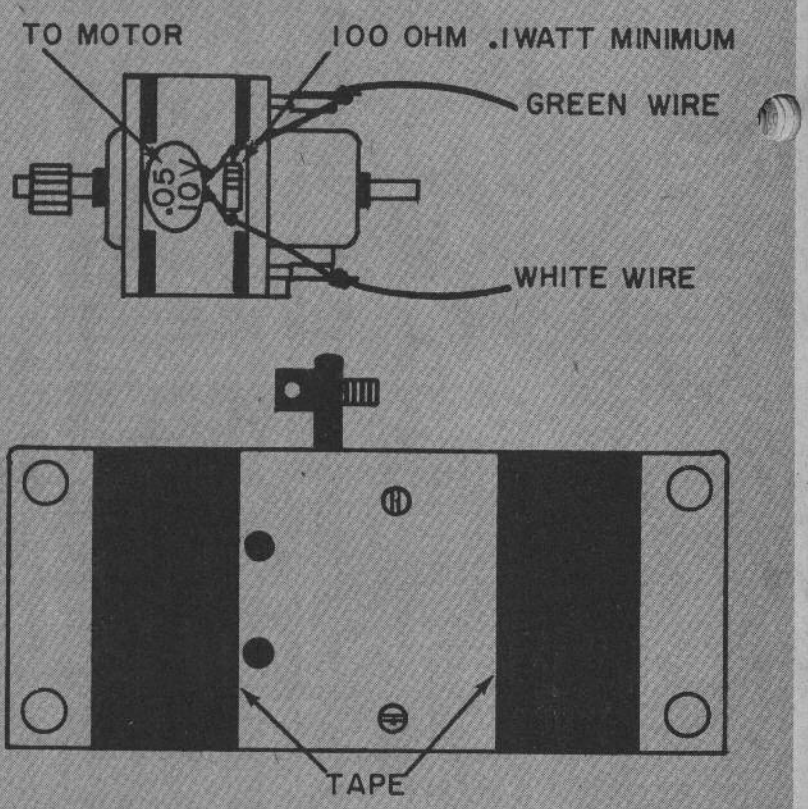


FIGURE A: Resistor is Stock No. 26MM450 100-ohm, ¼ Watt, from Allied Radio, 12¢ each (5-49 quantity); Capacitor 11L702, Centralab UK-10, 33¢ (1-24 quantity). Resistor and capacitor must be glued to motor to stop lead failure from vibration.

FIGURE B: Double wrapping with Scotch electrical tape prevents servo case opening when vibration loosens screws, or when overtightening may have stripped the hole (self-tapping screws).

PREFLIGHTING THE TRANSMITE SERVO

How a few simple precautions can improve the dependability of any reed control system.

By BILL CAMPBELL

THE BONNER TRANSMITE Servo "as received" is basically a well designed piece of equipment as the thousands of flights logged with it each year indicates. However, as with most items produced commercially there are a few improvements which can be made on the servo to increase its reliability.

Disassemble the Transmite per the following procedure (Refer to *R/C Modeler*. November 1963, "Probing the Transmite Servo," for some helpful illustrations):

Remove the grommets from the case. Take out the two sheet-metal screws which hold the cover on the servo, and carefully remove the cover by first sliding in an upward direction, the end opposite the motor. Now push a half-inch or so of the cable into the case through the cable grommet to relieve strain on the wires before next opening the case and sliding the cover free of the motor shaft.

Carefully open the servo as though opening a book so you can get access to the gears. Remove the washers, the quadrant gear and the combination gears from the gear posts. Note the location and sizes of the washers as they are removed since they must be replaced in the same locations on assembly.

The two screws holding the motor to the bottom of the case will have to be removed before the crown gear under the motor pinion can be removed. Also remove the screw holding the amplifier board to the bottom of the case. Now carefully slide the amplifier board out the end of the case opposite the motor. The motor will have to be removed at the same time and will have to be lifted slightly upwards and twisted sideways to clear the gear posts. The Transmite is now ready for a visual inspection and reliability upgrading.

Inspect all solder connections on the under side of the amplifier board, the motor and the switcher board in the cover. The yellow mylar tape which holds the wires to the amplifier board will have to be removed to inspect the solder connections concealed by it. Make sure your hands are dry and clean when handling the tape so it can be reused. Any doubtful solder connections should be resoldered using a good grade of noncorrosive fluxed solder. Use a hot iron of about 37 watts and hold the iron on the connection only long enough to insure a good joint. If you goof the first attempt allow the joint to cool for a few minutes before trying again to prevent heat buildup in the component you are soldering.

Check the hookup wires near the solder joints to make sure all the wire strands are present and not broken. Actually, I have yet to find a poor solder connection on a Bonner servo but have found a couple of hookup wires which needed cleaning up.

The necessity of noise suppression will be questioned by most flyers since they seem to get away without it. However, since it definitely doesn't hurt the system, and I am sure it cleans up quite a bit of radio frequency noise, I install a 100 ohm resistor and a .05 MF, 10 volt ceramic disc capacitor in parallel across the motor brushes as shown in Figure A. The resistor and capacitor must be glued to the motor to prevent vibration breaking the leads.

Work with the Bonner motor in a single-channel system has shown me that it is noisy enough to affect a single-channel receiver if it is not suppressed. The same noise gets into our multi receivers but the narrow bandpass of the resonant reeds does not respond to the noise and it is not easily recognized as being present. I do believe that noise will decrease the range

(*Continued on page* 32)

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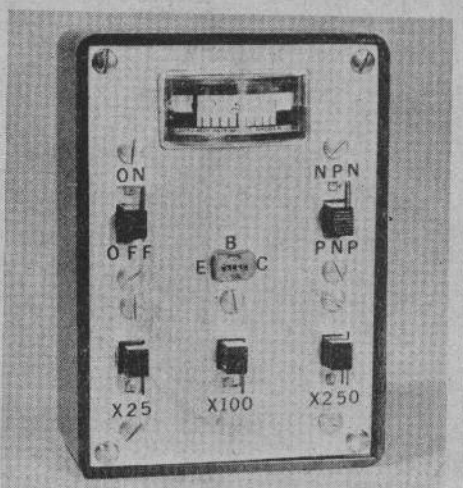


TRANSISTOR CHECKER KIT

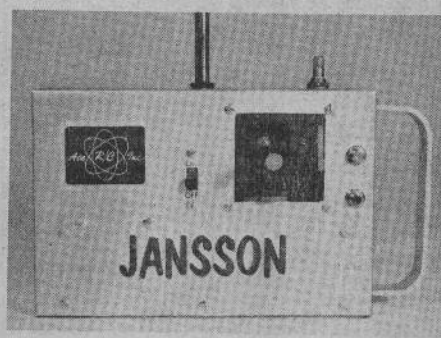
The Ace Transistor Checker Kit is a must for the R/C tinkerer who likes to design or build his own transistor pulsers, decoders, servos, etc. The Checker, when built according to instructions, will give good comparative rating checks, and allow you to match transistors, check for excessive leakage, choose the transistors for critical spots in your circuitry. It will measure beta in three ranges, 0-20, 0-100 and 0-200. Will check either NPN or PNP transistors at the flick of a switch. **Housed in a bakelite case, front panel of aluminum is completely punched.** Uses a 0-1 MA meter, which is also furnished. Transistor socket is on the front of the case for easy insertion of transistor to be checked. **Kit contains** case, prepunched panel, all switches, resistors, meter, socket, all required hardware and instructions. **No. 22K14—Transistor Checker Kit, $8.75**

FULL SIZE PLANS AVAILABLE

ACE R/C HAS FULL SIZE PLANS. In addition to all of the **Nelson Goodyear Racer Plans,** we also have the **Antic,** and plans for models that have appeared in GRID LEAKS.
Prices range from $2.00 to $4.00. If you've been looking for plans for scale jobs such as the **Curtiss Robin, the KR34, the Pietenpol Camper, Morane Saulnier,** or others, **Ace R/C has them available.** These are among the many items listed in our 1966 catalog.

BEE LINE FOAM WING CORES

Coming—The Bee Line of Foam Wing Cores, featuring the 1/84th inch birch covering. Available as plain foam, available as kits where you attach the birch ply, or with the birch plywood completely attached. Watch for our supplement, which is going to press, for the announcement of this fantastic line of wing kits made from Armalite. **Also, The Bee Line Foam Cutting Tool** for cutting gear mount slots, servo cut outs, slots for spars, trimming trailing edges, and a variety of other uses will be detailed. **This very handy device will be very reasonably priced.**

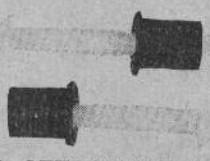


JANSSON TRANSMITTERS

Jansson uses silicon and unijunction transistors for rock steady stability. Uses standard 9 volt battery. Housed in a two-tone case with [illegible] finish, measuring a comfortable 7⅜" wide, 5" tall by 2½" deep. **The single channel model is pushbutton for rudder only,** is pushbutton type operated, with a click type pushbutton. **The Rudder Only Proportional** comes with a centering spring type knob attachment, and has two buttons attached for full on and full off. This model also has a handle for handling while flying and toting. **The Galloping Ghost** model features pulse rate and pulse width by use of a Bonner Digimite stick assembly. Also has full on and full off pushbuttons, and the handle.

Initially available on any of the following five spots: 26.995, 27.045, 27.095, 27.145 and 27.195. Please watch future ads for the announcement of the six meter equipment. Comes, unless otherwise specified, with a 450 to 900 CPS tone. Tone is adjustable. Other CPS ranges are available on request.

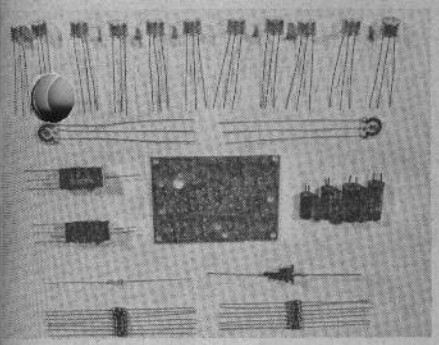
No. 11K44—Jansson Rudder Only Pushbutton, $34.95.
No. 11K45—Jansson Rudder Only Pulse, $49.95.
No. 11K46—Jansson GG Pulse, $64.95.



WING ATTACHING KIT

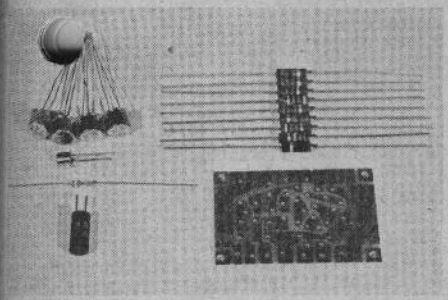
Here is a Wing Attaching Kit which is the simplest and most precise to use of any that have been announced to date. Formerly packaged by C & M, this is now an Ace R/C quality control product. It features the Well Nut (trademark). This is an expandable plastic. The Well Nut is simply placed into a correct size hole in the wing structure, and when the bolt is screwed into the Well Nut, it expands and defies pulling out. The Well Nut also acts as a blind nut to make this very easy to thread. Makes a n[illegible]nd faster wing installation, and does away [illegible]ly with the unsightly rubber bands.
No. 36L143— 8/32 Wing Fastening Kit, $1.49
No. 36L144— 1/4-20 Wing Fastening Kit, $1.49
No. 36L145— 10/32 Wing Fastening Kit, $1.49.
Other C & M products such as fuel tanks, fuel pump bulbs, living hinge material, spaghetti and heat shrink tubing, are now part of the Ace R/C QCP line. **See our 1966 catalog for details.**

Y R/C NEED . . . SERVING YOU SINCE 1953



KARLSSON DECODER KIT

This solid state decoder by Bob Karlsson was featured in the April 1966 issue of MODEL AIRPLANE NEWS. Provides proportional from your Simpl Simul System—electronically. Can be used with a GG pulser such as the Phelps, and your transmitter, or can be used with the new Jansson GG Simpl Simul transmitter. May be used with almost any receiver, although some relay type superhet receivers will require some slight additional electronic circuitry. The decoder electronically switches the width of the coded signal for rudder, and electronically switches the rate for elevator. Full off or full on reed switches are used to operate an Annco servo, or a T05 Micro Mo, or other type motor for motor control. For rudder and elevator use Bellamatic servos or the Dee Bee unit or the new Take Off HR1. **The Karlsson kit is complete** with etched and drilled PC base, 11 transistors, 14 resistors, 2 trim pots, diodes, 5 plug-in electrolytics, 2 reed switches, and all parts required to make, including metal case. **No. 15K33—Karlsson Decoder Kit, $29.95. Also available separately for the scratch builder is the Karlsson PC base,** completely etched and drilled.
No. 28K63—Karlsson Decoder Base, $2.95.



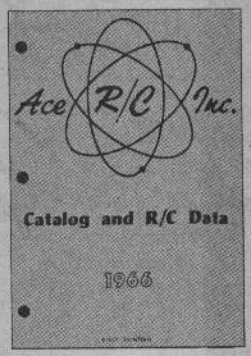
BASIC UNIJUNCTION PULSER KIT

The September-October issue of GRID LEAKS featured a Unijunction Pulser by Neal S. Deye. We have received requests to make a kit on this, and we believe our Basic kit will offer you many versatile approaches. **Our Basic Unijunction package contains** all capacitors, resistors, diodes and transistors, PC board and complete wiring instructions. **The Basic kit does not include** the control pots or the stick device that you decide to use, or the case, since there are great variety of ways in which you can go in getting your pulser into your case the way you want. **Featuring 9 volt operation,** the Unijunction Pulser may be used with the Commander, Mule and Mule II transmitters, and others of the same general characteristics.
No. 15K27—Basic Unijunction Pulser Kit, $7.95
The base for the 9 volt Unijunction Pulser is also available separately for scratch builders.
No. 28K62—Unijunction Pulser PC Base, $2.10

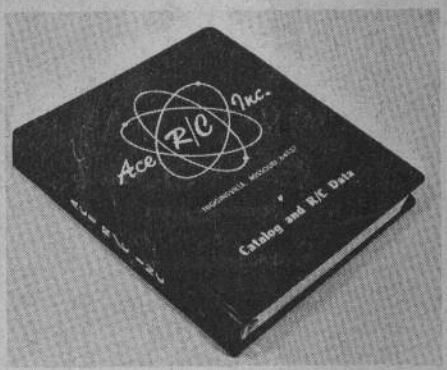
NICHROME WING CORES

With foam wings and accessories becoming increasingly popular, we have secured a quantity of .016 diameter nichrome resistance wire. This is ideal for making bows to cut styrofoam, or making a styrofoam cutter like a coping saw, using model train transformers. May be used as a replacement in many of the styrofoam cutting bows available, or making your own, or making your own cutting device, whatever size desired. 48" long . . .
No. 37L119—Nichrome Wire, special, 89¢.

AMA CLUBS ARE INSURED. IS YOURS?



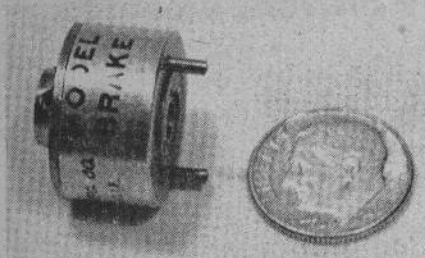
1966 R/C Catalog. This catalog has been completely revised, and has been systematized for your convenience. No longer is it necessary to paw through endless pages of material to try to find some elusive item. With the organization and comprehensive index, this problem is ended. Now with R/C Glossary and R/C—How it Works. In three hole binder punched form, the **Ace Catalog** forms the basis for the continuous and easy filing of additional material, including the regular supplements that come from Ace R/C to all of its regular customers. **Still only 10¢ for handling.**



Also available from Ace is a Virgin Vinyl Binder of the three hole standard type, which is silk screened so that it presents a real sharp appearance. This can be used to hold your Ace R/C catalog, the Ace R/C supplements, and additional R/C data that you gather and want to keep in a convenient place. **Virgin Vinyl Binder for the Ace R/C catalog only net $1.90, or order both the Ace R/C catalog and the Virgin Vinyl Binder for $2.00.**

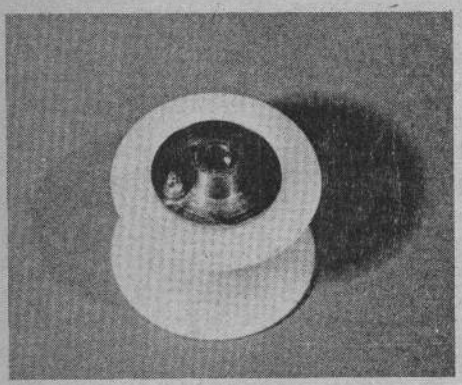
FUTABA HI-POWER TRANSMITTER

The Futaba FT5C Transmitter is an Ace exclusive. This is without a doubt one of the most powerful single channel transmitters, featuring 500 to 600 cycles per second at 100% modulation. **It is not to be confused with inexpensive jobs,** since this has almost a full watt input. Fully collapsible 54" antenna. Uses 8 pen cells for economical power. Has a quick type push switch for dependable action. Measures 6 x 4 x 1½".
No. 11K29—Futaba 5C Transmitter, $24.95.



Reliable brakes—won't lock!

An electric brake for your R/C models, developed by **Dr. Walter A. Good.** In the testing stage for over a year, this lightweight unit provides up to 8 inch ounces torque drag on 2.4 volts, with a drain of only 160 mils. May be used with 2 to 6 volts. Coil resistance is 15 ohms.
Now get electric braking for your R/C model in this Ace exclusive, by special arrangement with Walt Good.
Braking action is by magnetism—employs no shoes. Use of special formula alloy, cuts residual magnetism to almost nothing.
Will fit most R/C wheels. Designed for a 5/32" axle.
Packaged with one brake and complete instructions per package.
No. 25A55—Ace-WAG Electric Brake $6.95



WAG BRAKE HUB

Now a Delrin Hub for the WAG Brake. Allows the WAG brake to be completely self-contained for much neater appearance and added strength. Hub fits the DuBro tires. It is 1⅛" wide with the brake inserted. Two holes mate with the extrusions of the brakes for positive action.
May be used with any series of the WAG brakes that have been made on any one of the production runs. **These electric brakes are being proclaimed by modellers in all parts of the world as just the ticket. With the Delrin hub, also designed by Walt Good, you can't miss.**
No. 25K81—Brake Wheel Hub, $1.80

In ADDITION TO THESE ACE EXCLUSIVES, we also distribute R/C Craft by World Engines, C & S, Sterling, Sullivan, Top Flite, Lakin, Midwest, Special Edition Plans, Goldberg, deBolt, MRC-Enya, Eveready, Gould-National, Aristo, V-K, Andy Wright, C & M, Precision Products, Skyline, Flight Line, Aamco, Broadfield Citizenship, Hartman, Williams, Bonner DuBro, Mallory, Muter, Hillcrest, Acryjel, RGA, Flytronics, Fox, Kalmbach, and many many others.

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Seen These?

(*Continued from page* 18)

proper amount of incidence built into fuselage. Both wing panels are completed and ready for butt joining. Stabilizer, fin, rudder, wing tip and stabilizer tip plates are precut. Wing, tail section, and landing gear hold-down dowels are furnished cut to length. Aluminum landing gear blank, Trexler air wheels, machine screws and nuts are furnished. Rudder hinge material is supplied. ($14.95—add $1.00 for P.P.)

Mayfly #2 (Assembled kit): All items in #1 are included; in addition, wing panels are joined and taped, tail assembly is completed with rudder mounted and hinged. All that is necessary to complete model is to mount wheels on landing gear and apply dope finish. Dope is not included. ($19.95—add $1.00 for P.P.)

Mayfly #3 (Finished model): All construction is complete and model is entirely painted with color dope. Engine (.049) with integral fuel tank, and propeller is mounted on firewall. ($29.95—add $1.00 for P.P.)

Proportional Braking A new proportional braking system, PRO-BRAKE, is now being offered by EK Products Inc., 14875 Dillon, Westminster, Calif. 92683. PRO-BRAKE is designed for use with the new electric brakes currently on the market (e.g. Dubro, Good) and eliminates old-style "full-on, full-off" braking with their jerky decelerations, according to E. K. Products.

Designer of both Logictrol and PRO-BRAKE, Bob Elliott states that the new braking unit allows "gradual application of the brakes and smooth, controlled stops." He described braking as a "logical extension of proportional concepts into a much-needed application."

PRO-BRAKE is plugged into any of the auxiliary channels, and the necessary connection made to the brakes. It may be used in the aileron channel for Class II type airplanes. Now available for use with Logictrol RC units, it also will be available shortly for other RC units.

Size ⅝ x 1 x ¾"; Weight: 1 oz.; Power: 6V at one Amp (two brakes wired in parallel). Flight batteries or auxiliary source may be used, with an auxiliary source recommended for the brakes themselves. $10.95 from EK Products, Inc.

Hot Wire Jig Saw: The Bee Line Foam Cutter which scored a hit at the Ace table in Toledo, now has a companion. This is the Hot Wire Jig Saw—no moving parts, just a hot wire to cut styrofoam easily and quickly. Table is 12 x 22, has a throat of 6 inches. Transformer, with on-off switch, is completely safe. Use it for your planes and let the wife and kids use it to cut styrofoam decorations for Christmas, the Scouts, church, etc. ($7.95, from Ace R/C.)

Citizen-Ship Full-House Digital Proportional. Offering five completely proportional simultaneous channels at $349.95 suggested list, Citizen-Ship's (Citizen-Ship Radio Corp., 810 East 64th St., Indianapolis, Ind. 46220) comes with four servos (fifth purchased separately for $39.95), wiring board, rechargeable nickel-cads, and built-in charger.

System is fully wired. Aileron and elevator are located on righthand stick in the AER-type configuration, aileron and motor on righthand, in AMR configuration. Transmitter is 7½ x 6⅜ x 2¾, weigh 2¾ pounds. Superhet receiver on CB frequencies, weighs four ounces, measures 2½ x 1⅞ x 1¾.

Citizen-Ship Analog Intermediate. At suggested list of $249.95, this familiar system now comes in either one or two-stick configurations. AP is the two-stick, AP-S, single stick. It is dual-simultaneous, with

trimmable controls, plus trimmable motor control.

Foam Cutter. Bee Line is revolutionary foam cutting tool will cut gearmount slots, make servo cut-outs, cut slots for spars, trim trailing edges, cut gussett slots, etc. The unit is completely contained in a bakelite case, measures 4" long, 2 55/64" wide, and 1 9/16" high. It has an AC line cord, and pushbutton on-off switch. Simply use a guide, turn the switch on, place on the foam, and make a neat and true cut. Units come with 2 nichrome wires formed for gear mounts, and the other for servo cut outs. An extra piece of nichrome wire is furnished to make any type of cut out. One completely self contained, includes a transformer. Or it may be had less the transformer, and you can use your cutting bow transformer. Completely self-contained foam cutting tool, $10.95; less transformer, $5.95. (Ace R/C.)

Bee Line Wing Kits. Armalite Wing Cores have been announced by Bee Line, Grandview, Missouri, in three kit forms to suit the most exacting modeller.

Wing kits of the BL-21 "Do-it-Yourself" type will contain a precut airfoil, hardwood landing gear mounts, and plywood gusset material, and sell for $11.95.

The "Deluxe Kits", BL-22, feature precut airfoil, one-piece covering material of 1/84" thick birch veneer, and nylon hinge material, and sell for $22.95.

The "Premium Kit", BL-23 features covered airfoil with 1/84" thick birch veneer, which has one coat of lacquer sanding sealer applied, built-in strip ailerons, tips installed, hardwood landing gear mounts installed, plywood gussets, and nylon hinge material, for the price of $29.95. Available in 16 well-known aircraft types; write manufacturer for information.

Model Flyers Log. Fox Manufacturing Co., of Fort Smith, Arkansas, has announced the completion of preparation and printing of his new "Model Flyers Log."

Duke Fox, well-known in model aviation circles, has devoted a great deal of effort to the preparation of this log, which is designed to keep an accurate, systematic record of a modeler's flights.

Says Fox: "I have always wanted a prop-

(*Continued on page* 28)

Seen These?

(*Continued from page* 27)

erly planned Log Book to record my model flights in. After 30 years, I finally got around to designing and printing one." The log, which is patterened after acutal flight log books, includes columns for such data as the date, airplane, engine, fuel, plug, temperature, humidity, speed, flight duration, total hours, and remarks.

In addition, the book contains an easy-to-use speed chart for quick reference, engine tips, and other useful information.

The log sells for fifty cents at model and hobby shops. To the un-initiated, if such folk exist. Fox Manufacturing Company is a leading manufacturer of a complete line of model airplane engines, which range in price from $4.95 to $75; a line of quality-built, precision Glo-Plugs; and an assortment of fuels including "Fox Superfuel," "Duke's Fuel," "Missile Mist," and "Fox Blast."

Build This Meter

(*Continued from page* 17)

You can now plug the earphone in and switch to audio. When you push the tone button on your transmitter you will hear the tone. Remember audio is for checking the tone, and meter is for checking the carrier output on the meter. At this same setting, the Field Strength Meter will also provide a relative check for 50-54 megacycle equipment, but it will not be quite as strong. This is because it is operating at a harmonic.

In practice it is a good idea to pick a spot on your workbench where the FSM may be set each time, or even left permanently. Then always use your transmitter at the same relative spot, and you can see at a glance if the meter reading is as high as it was the previous times you checked.

You can also get some idea of relative output of other transmitters by checking their output reading against your transmitter. Of course, this is only relative indication, and to be a true report of field strength, the meter should be at least a wave-length away. This, however, requires precision laboratory equipment, and is beyond the capabilities of this rather simple piece of equipment.

This Field Strength Meter-Monitor is designed for simple checks. These it will do well. We believe you will find your Field Strength Meter to be an extremely worthwhile test instrument.

Readers Write

(*Continued from page 2*)

left hand for elevator trim, throttle and the panic button "low motor control" was more than satisfactory for me.

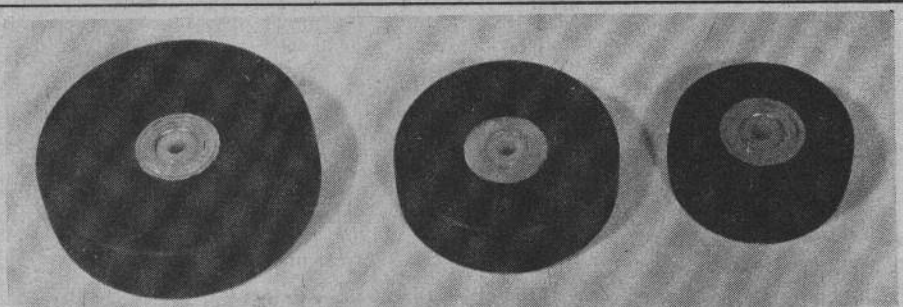
Fifthly: After seeing very competent flyers in the Nashville area fly with digital systems using aileron elevator on single stick, and fly inverted low passes very precisely, I am inclined to wonder if the alleged interaction between elevator and aileron is not imagination.

I would also like to know if you know how many Class 3 airplanes flying today could be saved from a crash if the ailerons suddenly became inoperative, by using remaining rudder, elevator and motor controls?

RICHARD A. MELAND (Major),
Fort Campbell, Ken.

● *This is the kind of letter GL likes to receive. It occurs to your hapless editor that he may have confused everyone, including himself, with fuzzy allusions to "one stick" when, in many instances he was thinking, while writing, of aileron and elevator on the right stick, as one stick, whereas the reader undoubtedly pictures a true one-stick arrangement with rudder as a knob atop that stick. To clarify, perhaps belatedly, our own comments on two vs one stick, sought to distinguish between elevator and rudder on the left side with aileron and motor on the right, in contrast with rudder-motor, left, with aileron-elevator, on right.*

(*Continued on page 30*)



Slick nose wheels with integral aluminum hub by Barton—1-5/8, 2, and 2-7/16.

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BUILDS HIS OWN

Like to congratulate all you good people at GL and RADIO CONTROL WORLD for the fine quality of your mag. Have been building radio for five years now and with the exception of my 10-channel rig all my gear is homebuilt. I get a great deal of pleasure building my own radio equipment from construction editorials and gen received from fellow modelers. It gives one a great sense of accomplishment to go out on a nice day and fly a model which has been built completely from scratch. I would like to compliment John Phelps as well as the mag for their fine editorials. Have built two of the Phelps all silicon transistor transmitters and both have good power output and excellent stability. Keep up the good work and keep those radio gear editorials coming.

LAC N. FIELD,
RCAF STN. Gimli, Manitoba

FRENCH FAVORITE, TOO

I am always very interested to receive GL and RADIO CONTROL WORLD, and each time there are very interesting matters: either radio descriptions, or airplane views. I am always interested. I thank you for the "Bits & Pieces" page 30, Number 6. With the help of Bob Penko, I have been able to repair six TO5 Micro Mo motors. As they

are expensive, it is worth it!

Here we are a good number of flyers, 20 models at least every Sunday on the field, from small rudder only to full-house multi. This summer I was very busy with Seaplanes (with good success) and we are trying to introduce Pylon Racing a la Jerry Nelson. Surely it will catch like wildfire because it is such fun.

COMMANDANT FRANCIS PLESSIER,
Base Aerienne, 13—Istves, France

6-METER FAN

I would like to commend you for your work with GL and RADIO CONTROL WORLD. It is about the best refuge for those who "roll their own." Thanks especially for remembering those choosing to operate on 6 meters. Through the years you've been kind enough to include material for us even though we must be a minute minority. It is appreciated.

I read your editorials faithfully and enjoy them.

THOMAS E. NALLEN, Chicopee Falls, Mass.

SANTA?

I think the proper heading should be "Dear Santa," because again you've done it —pulled another surprise.

I think that a sure sign that age has crept up on us is, when for example, we drool and get goose pimples whenever such an article appears in a publication as the one on page four of the September-October issue. This is all the more remarkable when we consider how old the Robin is as compared to the modern, efficient, and sleeked, designs of today.

MANUEL SANTA ANNA, Woonsocket, R.L.

ANOTHER OLDIES FAN

I enjoy your magazine, especially articles like the old Fairchild (Krieder-Reisner). I am honestly a bug for the old ones, because I know them the best. The only really "modern" airplane that I like is the Stearman PT-13, so you can see that I do like the old ones.

Present project is Waco RNF or INF, in 2 in. equals 1 ft. scale. Original project was designed around Orbit 10-channel, but school came along (I need a degree in math and physics), so the project is shelved, and will probably fly with a new proportional set. Information on these old Waco's is hard to find, but I've been pretty lucky on some "finds." Have located information of UBF-2, QCF-2, and more to come. It is always interesting to see the old ones, their production methods, and they are always a source of much pleasure.

PHILIP MERCIER, Gardena, Calif.

GHOULIES AND BEASTIES

I have just finished reading Ghoulies and Beasties in the January-February issue of RADIO CONTROL WORLD.

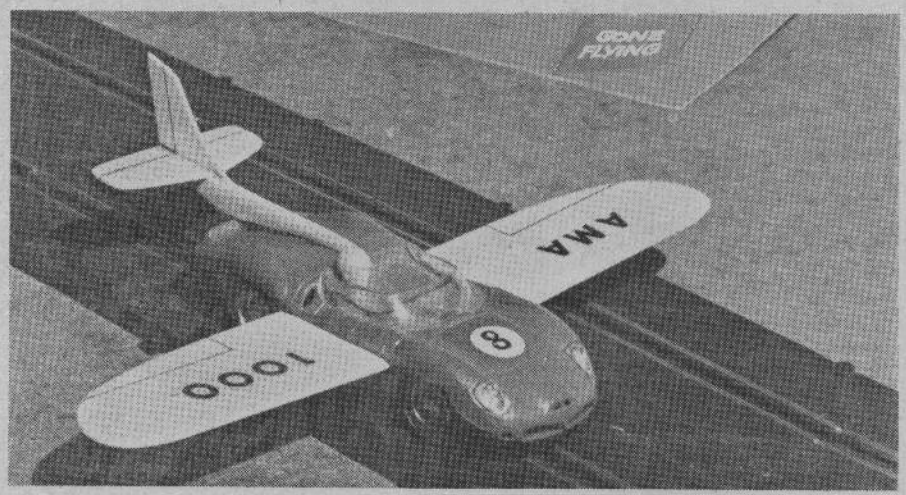
I have been flying radio-controled gliders for a while now and cannot believe the RC glider record is only 2,624 feet. I know I have had mine above that several times.

Please send me a clarification on this, because if this is the record now, I am going to try for it. Where can I obtain all of the rules necessary for the RC glider category?

About six months ago I complained about the amount of non-airplane type of articles which were in GL. I am glad to see that either the magazine or myself has changed. I now enjoy reading GL from cover to cover.

RONALD SANDS, Temple, Pa.

• *Information on FAI rules and what is required to make an international record attempt, may be had by writing the Academy of Model Aeronautics, 1239 Vermont Ave., NW, Washington, D.C. 20005.*



SLOTS OF FUN

Pete Moss, (no relation to Stirling), darling of the slot race set, has quit racing. He claims it was because of his big wreck at the Hobby Trade Show. Pete popped his slot in the hairpin. It was bloody awful. A three-quarter inch scratch on the bonnet of his Lotus.

Pete had been in the same groove too long—was ready for a change—for some real excitement—for flying a model airplane.

Pete never got off the ground in his first model airplane contest. But, now he is on the right track, has joined the Academy of Model Aeronautics.

Retired slot racers attention! Pete Moss says, "For real speed, thrills, satisfaction and attention—build a model airplane and join the AMA."

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Transmite Servo

(*Continued from page* 22)

of the receiver since the ACC circuitry sees the noise as a signal and turns down the gain of the receiver which reduces sensitivity and range to the signal you're trying to get through to the receiver. The 100-ohm resistor does increase the motor current drain by about 24 milli-amperes, but I think this is a fair price to pay for the noise suppression.

The hookup wires should be strain relieved to prevent vibration from breaking the wires near the solder joints where the weakest part of the wire seems to be. One of the best methods I have found is to apply Goo, (a rubber cement appropriately named by the manufacturer, Walthers) to the wires for at least one-quarter of an inch back from the solder connection and let the Goo bridge over to the circuit board or the motor brush holders for adequate support. I have usually applied this only to the wires on the switcher plate and to the motor leads. It can also be applied to the hookup wires where they enter the amplifier board, but it is not necessary to smear it on any wires which are strain relieved by the mylar tape. Be very careful that no Goo gets on the switcher plate circuit pads as it is a very good insulator.

After the Goo has dried, reassemble the amplifier board and its insulator, the crown gear, the combination gears and washers and the motor to the bottom of the case.

With the quadrant gear in place sight across the top of the case and see if the wipers on the quadrant can be seen. They should be at least one-thirty-second of an inch above the level of the case, adjust them by bending until they are.

Carefully close the cover and watch as it goes shut that the wires inside the servo are out of the way of any moving parts. Install the two screws which are supposed to hold the cover on the servo. Do not over-tighten as these are easily stripped. Now wrap a double layer of tape such as scotch plastic tape completely around each end of the servo case as shown.

This insures that the case will stay together even if the two screws vibrate loose or if you did happen to strip one during installation. If the servo has any oil on the case from being handled by castor oil covered hands or other source it will be necessary to clean the case with alcohol or a quick swipe of thinner or acetone to get a good stick job on the tape.

The white wire on the motor seems to give about as much trouble as everything else put together in the Transmite if a rather simple precaution is not made. The precaution is to push the white wire about one-half inch back into the case through the cable grommet after the case has been closed and the wire cable's slack taken out during assembly. It seems that repeated tugging on the cable eventually breaks this wire at the motor.

I now like to twist the wires into some semblance of a cable. They can also be braided if you have the time and inclination. In either case make at least one cable tie within a quarter-inch of the grommet where the cable exits from the servo. I usually make two more, one about half way up the cable and the third right at the connector.

The Bonner Transmites are many times used right out of the box, but I have found the steps discussed here to give me more confidence in the continued reliable operation of the servos and consequently in the entire control system.

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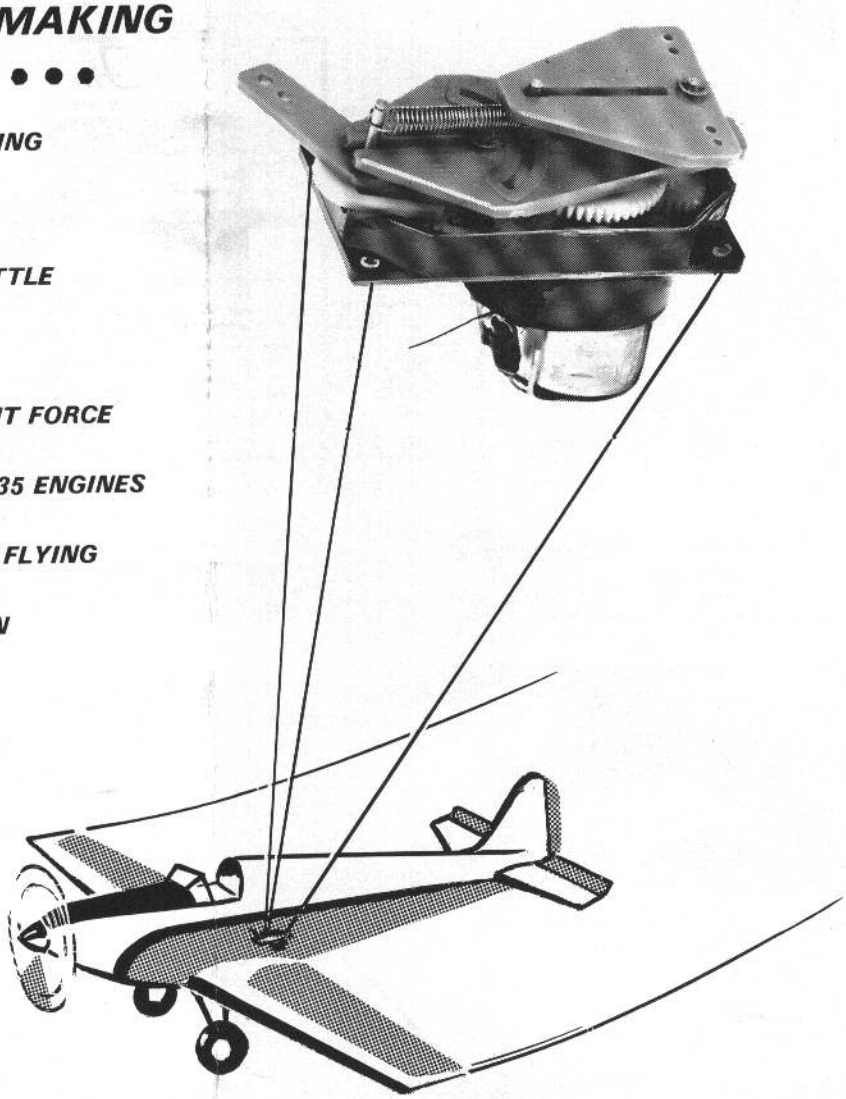

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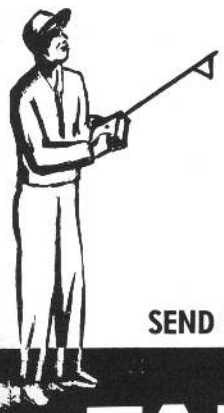

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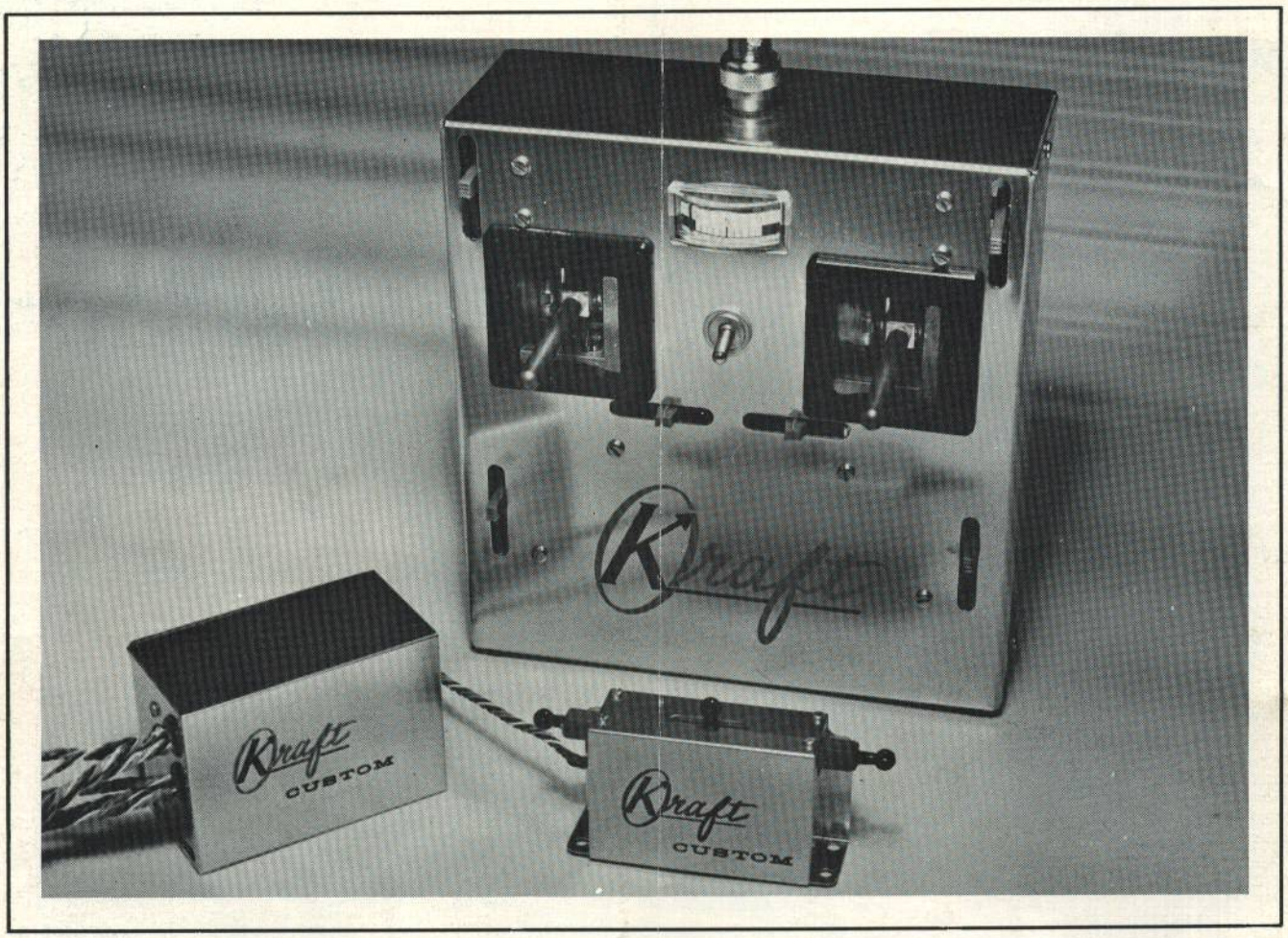

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