

## AMA - DCRC SYMPOSIUM

**EDITOR'S NOTE:** The AMA-DC/RC Symposium is only one of this type gatherings held in the interest of the R/C'er. The Buffalo Bisons and Toledo Weak Signals have each held successful confabs so far--another at Indian-town Gap is scheduled for Labor Day. If your club is looking for a worthwhile R/C endeavor in your area, why not investigate the possibilities?

After some problems in getting started the committee presided over by M. L. Hill, has come up with some elegant arrangements for this year's symposium which is to be held on May 20 and 21. The brand new Georgian Motel which is on the District Line at Georgia Avenue in Silver Spring will be used. This will prove to be a pleasure to all and particularly to the ladies for it is very convenient for sightseeing in D. C. Public transportation is available one-half block away and it's only 20 minutes from downtown by auto. All sorts of restaurants are available nearby since it's in the middle of a good shopping district.

Arrangements for the technical session and banquet are equally pleasurable. These will be held at the Applied Physics Laboratory of Johns Hopkins University. This is about 30 minutes from the motel through Maryland countryside. You might want to examine the genuine Terrier missile and Transit satellite that will be on display. The auditorium features cushioned chairs along with facilities for movie and slide projection and sketch space on the blackboard. Dining facilities adjacent to the auditorium will have both buffet lunch and the evening banquet.

The technical program has also shaped up quite well

since the following will present some worthwhile information:

- "Performance of Superhet Receivers" - Vernon McNabb
- "Relayless Servo Systems" - Bob Elliot
- "Transistor Applications for Intermediate Class Systems" - John Phelps
- "Home-built Triple Proportional System" - Bill Hershberger
- "Engine Fuels and Throttles for RC" - Darryl Pugh
- "Space Control Quadruple Proportional System" - Zel Ritchie

The technical session will be held on Saturday and there will be an organized flying demonstration on Sunday. Where this will take place is not yet resolved. You may bring your planes to fly after the demonstration, or fly them for demonstration if the chairman of this event feels it should be flown.

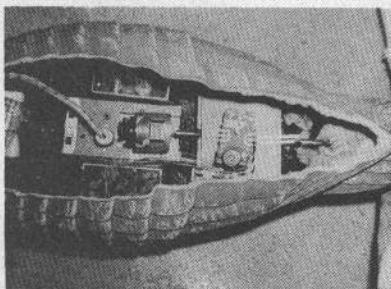
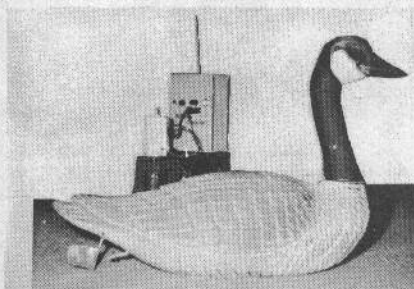
A circular describing the location of the motel and APL will be mailed out within a few weeks to all those on our mailing lists (mostly previous attendees). This will include a card for making reservations at the Georgian as well as for the banquet and sessions. The committee asks that you don't try to beat the gun and make reservations before you get the card - it'll just confuse the issue.

If you think you are not on the mailing list and would like to get the circular, drop a postcard to:

Maynard L. Hill  
10320 Crestmoor Drive  
Silver Spring, Maryland

## Q: When Is A Goose Not A Goose?

A: WHEN IT'S RADIO-CONTROLLED!



From Billy G. Hill of Sedalia, Missouri, come the photographs shown above and the following description

"The goose decoy is a pressed paper decoy available at most sporting goods stores and cost us \$3.00. It has a Marcytone single channel receiver and a Cobb Micro "4" servo. The batteries are in a Beta model B battery Box and an Acme #6 battery box. A 9 pin plug and socket connects the receiver to the batteries, servo and antenna.

The goose is powered by a Pittman Panther driving a 3/8 inch prop. Two 6-4 batteries are used for motor and balance. The antenna is run up the neck.

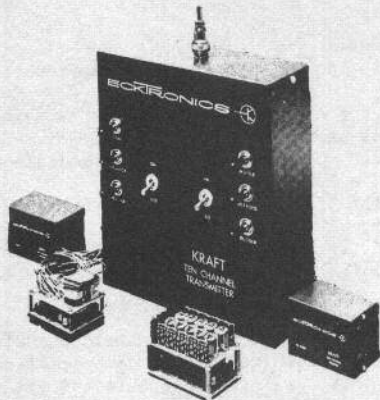
"The goose is fairly fast and when used to chase the ducks on the lagoon it gives good results--but cannot turn as tight as the ducks!

"It is owned by Bob Wilken of Sedalia and is about as real as the actual thing."

# What's New ?

## KRAFT Ten Channel Transmitter

COMPLETELY ASSEMBLED BY ECKTRONICS



The transmitter advanced radio controllers have been waiting for -- the ultimate in radio control. Featuring Triple-simultaneous operation, the Kraft ten offers positive control of five separate functions.

**CONSTRUCTION** -- Lever control switches custom-adjusted for positive contact and sensitive "feel". High grade anodized aluminum case designed for maximum rigidity. Chrome-plated antenna with screw-on type connector for easy removal. Glass epoxy printed circuit board.

**RF CIRCUIT**--Dual triode used as Master Oscillator-Power Amplifier. Amplifier doubles into output frequency. Fixed PI output circuit for optimum antenna coupling. Factory-tuned--no need for energy-consuming indicator bulb. Completely legal and will not become obsolete--easily converted to higher frequencies if new R/C bands should open up.

**MODULATOR**-- Transistor tone generator stabilized by high-Q toroid. Close tolerance capacitors and new subminiature ceramic potentiometers give exact match to receiver reed bank. Interchangeable tuning deck eliminates returning when using different receivers.

**OPERATION**-- Exclusive "Hi-Lo" Switch makes expensive "B" batteries last over ten times as long. Lowest battery drain of any transmitter on the market-- less than 9 mils with three simultaneous tones. Two rudder switches--one on each side of case--to facilitate advanced maneuvers. \$134.95

## KRAFT Ten Channel Receiver

Two new Kraft-designed receivers are now available to the radio controller who wants the best. Both ten channel versions, relay and relayless, combine reliable operation with light weight and smallest possible size.

**CONSTRUCTION** -- Bright-anodized aircraft aluminum case. Double-deck layout--two glass epoxy printed circuit boards.

**RF and AUDIO SECTION** -- Super-regenerative hard tube detector for maximum reliability. Three well-stabilized transistor stages provide maximum amplification. Temperature compensated for all-weather flying. Clean, high output delivered to reed bank.

## Relayless

Designed to operate with the new relayless servos, this receiver offers smallest size (less than 1 7/8" x 1 3/4" x 2 1/2"), light weight, and positive performance. Any number of channels from 2 to 10 can be employed. Price \$79.95

## With Relays

Utilizes highly reliable sub-miniature relays, yet smaller in size than most eight-channel receivers. Over all dimensions only 1 7/8" x 1 7/8" x 2 7/8"! The finest for advanced R/C fliers. \$149.95

**CONVERTER (Optional)** -- Internally mounted. Compact DC to DC power converter permits receiver to operate under aircraft servo battery supply of four 500 or 250 mah nickel cadmium type batteries in series. High efficiency with excellent voltage regulation.

Power Converter (factory installed--Either Model) \$14.95

Available from your dealer or Ace R/C.

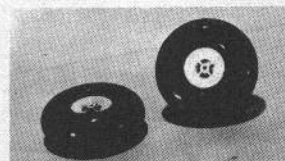
## A B C 4 AH BATTERY



FROM ABC BATTERY CO.

"We are now prepared to release the ABC 4 AH cell. This cell measure 6" x 2" x 1 1/2" and has a capacity rated at 4 AH at the one hour rate. These are good looking cells overall, and their performance is excellent. The list price is \$2.98. Even though the size is different than other ABC surplus cells, this cell will fit in transmitters if placed horizontally, and the list price of \$2.98 charged, warranted, and ready to use will make them an attractive buy." Available from your dealer or Ace R/C.

## F & N WHEELS AND H D SILK



F & N Products, Inc. announces New Air-Span wheels, extra light weight Nylon Hubs. This wheel is one of the finest in its field. Available in the following sizes. PLEASE ORDER BY SIZE AND NUMBER.

#NH1	2 1/4 inch	\$2.95
#NH2	2 1/2 inch	3.15
#NH3	2 3/4 inch	3.35
#NH4	3 inch	3.55
#NH5	3 1/4 inch	3.75
#NH6	3 1/2 inch	3.95
	Also a very Heavy Duty Silk for big models.	Per square yard 1.50

Order from F & N Products, Inc., 1024 Dodge Avenue Evanston, Illinois.

2 1/4, 2 1/2, 2 3/4 and Heavy Duty Silk will be stocked by Ace R/C.

# Plenty of Power

## THREE SUPPLIES FOR HOME BUILDERS

### 1. USES EASY TO GET PARTS

Here's a DC to DC converter your readers might be interested in. This converter is ideal for ground-based transmitters and is constructed from readily available commercial components. I am using it to power a four-tube MOPA type transmitter on 52 mc for use with a Smog Hog with a 6 channel MarcyTone receiver.

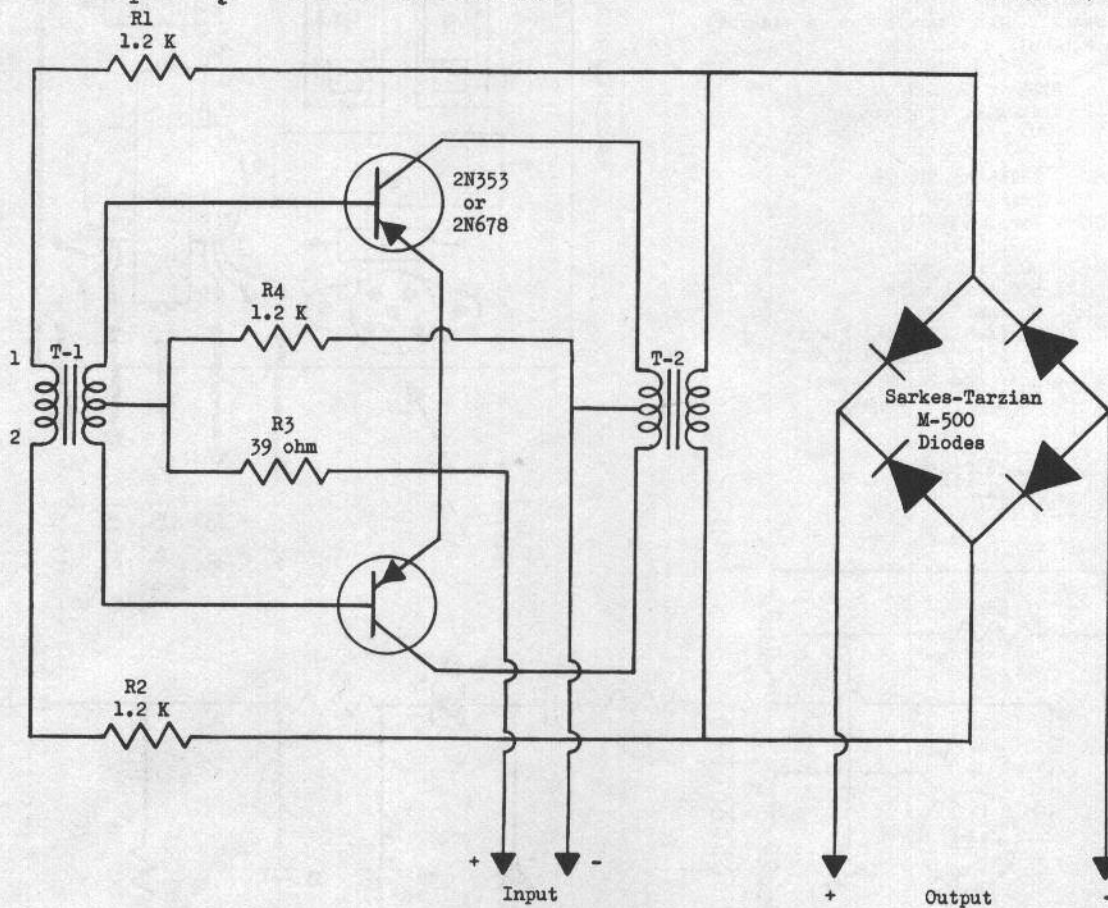
The transformers used are ordinary filament type. Any power transistor of the PNP type that meets the voltage and current requirements will do. Philco type 2N353 or Bendix type 2N678A are ideal for this circuit. Efficiencies of up to 60% can be achieved which compares favorably with the 35% to 40% efficiency of vibrator type supplies.

The output of this converter depends upon the load current, the turns ratio of the transformers, and the feedback. The load current will dictate the feedback required from  $R_1$  and  $R_2$ . Increased load requirements

will require decreasing the size of  $R_1$  and  $R_2$ . If made too small, the transistors will be destroyed. Increasing the turns ratio of the transformers will increase the output voltage. Increasing the input voltage will increase the output voltage. The circuit is polarity sensitive; if the circuit fails to oscillate, reverse leads 1 and 2 on T-1.  $R_2$  and  $R_4$  form a bias network to insure that the circuit will go into oscillation. Filter requirements are moderate because of the relatively high frequency of the oscillator. A simple L-C filter on the output of the bridge rectifier is more than adequate.

Keep up the good work in Grid Leaks. I personally prefer the "pro" type articles.

R. Martin-Vegue  
Detroit 39, Michigan



#### TYPICAL OPERATING CONDITIONS

T-1, T-2 = P-6134 Stancor Transformers

Load Current	Output Voltage	Input Current	Input Voltage	Efficiency
60 MA	310V	2.5a	12V	60%

T-1, T-2 = 4FMS Chicago Transformers

Load Current	Output Voltage	Input Current	Input Voltage	Efficiency
50MA	160V	2.5a	6V	59%

## 2. TRANSISTOR CONVERTER FOR TTPW

Have developed a transistorized DC to DC converter for the WAG TTPW transmitter. It has an output of 180 volts with 0.1% ripple and 45 volts with 0.3% ripple. There is no interaction between the ripple (at 750 cps) and any part of the transmitter, modulator, or pulsers.

I designed the converter around an available transformer, the Triad TY-68S. I used power transistors (2N256) which are low in cost. The total cost of parts is about \$20.00.

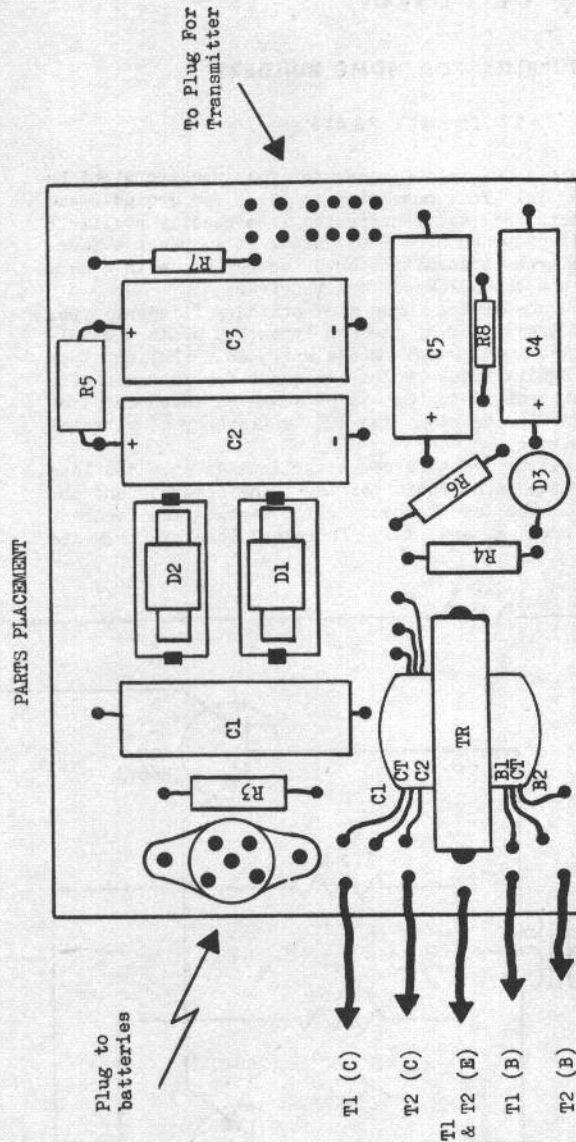
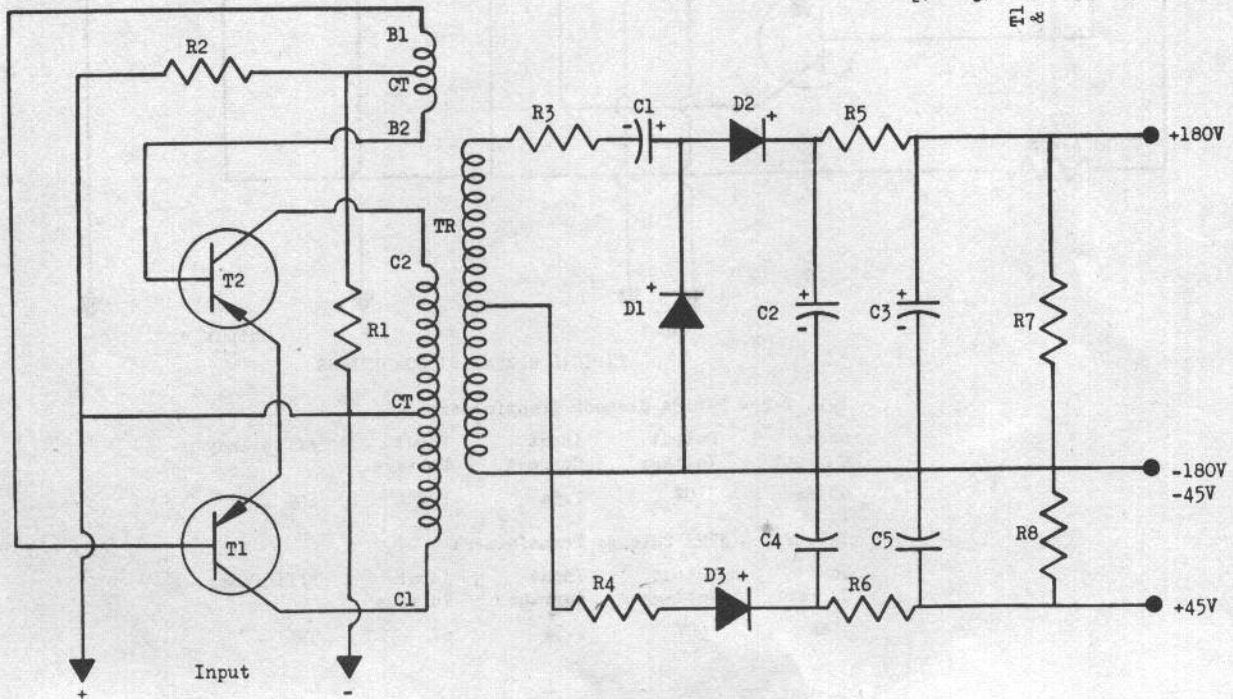
The converter is for 4.8 volt input (4 nicad batteries) which gave the best efficiency. However, the converter can be made for a 6 volt input merely by changing two resistors. The 6 volt input can be either nicad, lead acid, or large A cells. Efficiency is around 80% when using a 4.8 volt input and around 65% when using a 6 volt input.

I am a member of the DC/RC club and have talked to several members who have encouraged me to write it up. Walt Good was worried about the ripple--I have field tested the gear and these tests agreed with the bench tests--no adverse effects.

Enclosed is a schematic of my circuit and a diagram of parts placement on a bakelite board.

Richard W. Calfee  
Triangle, Virginia

- T1, T2 - 2N255 or 2N256
- TR - Triad TY-68S
- D1, D2 - Tazian M150
- D3 - 1N91 (GE)
- R1 - 50 ohm 2 watt
- R2 - 500 ohm 1 watt
- R3, R4 - 20 ohms
- R5 - 1K (4.8 V input) 1 watt  
3.3K (6 V input) 1 watt
- R6 - 1250 ohm (4.8V input)  
1K ohm (6 V input)
- R7 - 300K
- R8 - 100K
- C1, C2 - 10 fd 250 V
- C3 - 20 fd 250 V
- C4 - 1 fd 90 V
- C5 - 10 fd 90 V



NOTE: R1 and R2 on other side of board  
T1 and T2 were attached to case  
of transmitter using Motorola  
mounting kits. (For heat sink.)

### 3. SYNCHRONOUS VIBRATOR UNIT FOR ORBIT, ETC.

The vibrator supply I built is simply a synchronous vibrator job which requires no seleniums or silicones to rectify the output.

#### LIST OF PARTS

VIBR. Mallory Model #4, 5 pin 6 volt  
 TRANS. Electro Products #2593-4 or equivalent  
 C1 25 mfd 50 wvdc  
 C2\* .5 mfd 125 vdc  
 C3\*\* .03 mfd 450 wvdc  
 C4 120 mfd 450 wvdc  
 R1 5K 2 watt carbon  
 RFC-1 14T #16 solid ins. close wound, 1/2" diameter  
 RFC-2 2.5 mh 125 ma

\*C2 may be changed to a coax-type if desired, same rating.

\*\*The value of this capacitor may vary from .005 to .03, however the value used will depend upon that which gives lowest input CURRENT FROM THE BATTERY and least sparking at the contacts of the vibrator.

R1 is protection against damage should C3 become shorted.

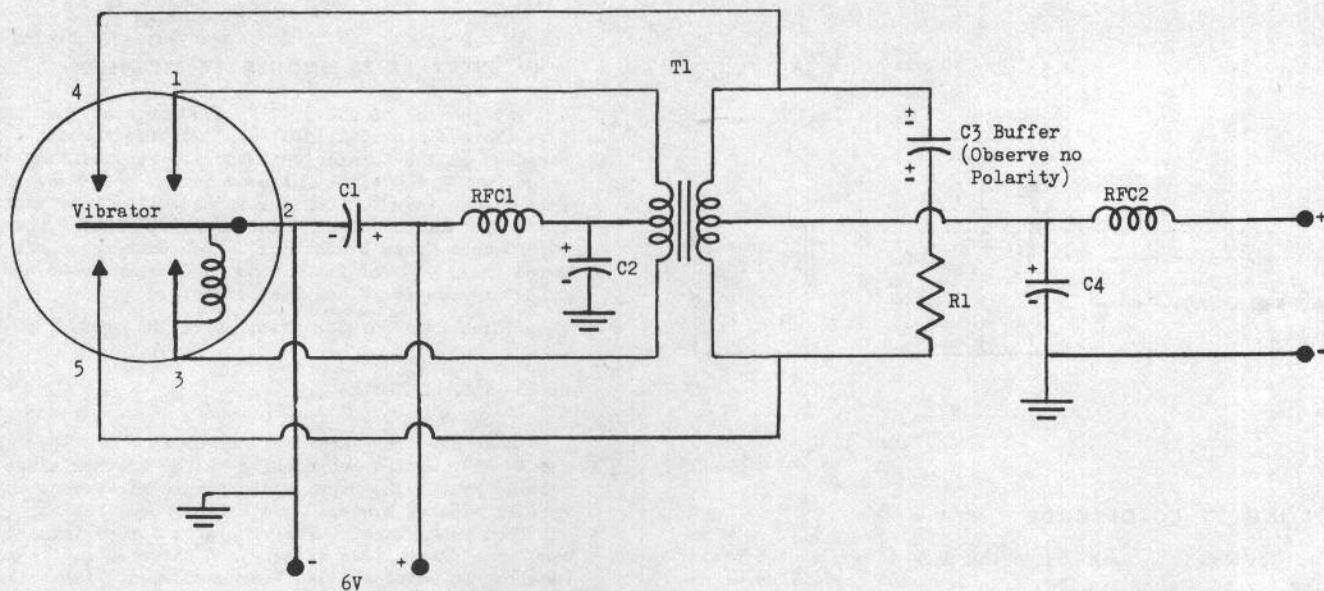
The whole thing is built on a chassis 1"H x 2 3/8"D x 5 1/2"W and is only 4 1/2" tall, including the vibrator. It fits nicely in the Orbit cabinet, along with the #2 ABC nicad.

On a scope, the output voltage looks like pure DC and, using two of these packs in parallel on a WAG transmitter, the voltage under transmitting conditions is 175 which is perfect.

I had three of these transformers lying around here and, if I need anymore, I'll have to locate some. However, I'm sure they can be found at most any radio supply house. In fact, Thordarson-Meissner markets one under the manufacturer's type #22R25 which will do nicely.

Enclosed is a sketch of this circuit, Paul, and if you can use it for Grid Leaks, help yourself. It isn't as compact as the power converters but everyone has a car battery and, if you balance this against the cost of 4 more nicads plus a converter, it's pretty reasonable.

This means that you can use a well-charged 6-4 for a lot of flying or stick five 4 amp-hr. ABC nicads in your pocket, hook them to the vibrator pack in the case, and you are portable!



All condensers are electrolytics.  
 C2 may be .5/50WVDC coax if desired,  
 in series with RFC1, with outer  
 shell grounded.

# Bits And Pieces

## PULSE ENGINE CONTROL

I have been getting your excellent and interesting GL this year.

You have skirted around the twin pitfalls of oversimplicity and over-complexity very well.

There is nothing in your mag which is very difficult to make in that it needs a lot of electronic instruments to set up, but for the experienced R/C modeller you have no pages which don't contain at least some valuable information.

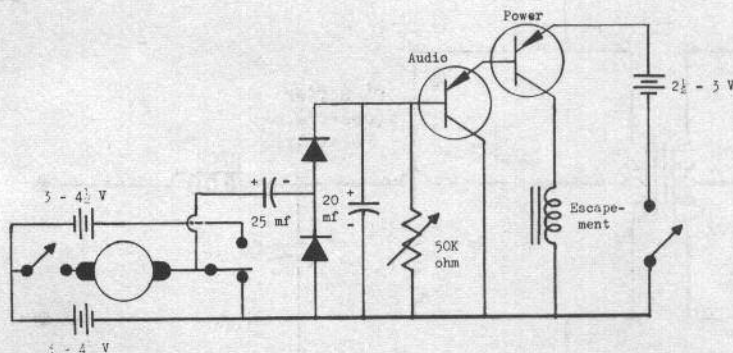
I have tried the transistorized engine control for S/S in the May-June issue of GL.

I have modified the circuit slightly so that the engine escapement is triggered by either full signal or full "off". This is so that if operating a tone CW receiver, the engine will go to "slow" if you are jammed by either strong CW or strong tone signal. This modification has made everything more critical, so the circuit needs high gain transistors.

It would be possible to arrange more controls this way since the original circuit can still be hooked up as before. If the original circuit drives escapement #1 and my circuit #2, then escapement #2 will work when pulsing stops but #1 will only work when pulsing stops on signal "off". These circuits don't contravene John Worth's dictation that there should be no mechanical compromise with basic S/S.

Yours faithfully,

R. Pask  
Yorks, England



## FLYING BY COLOR CODE

If you have been out to the park at one of the past few flying sessions, you have seen the sky filled with superhets flying together. It looks like a lot of fun--but--somebody is going to foul up and try to fly when someone else is up on the same channel. We are going to have flags tied to our antennas to designate the channel the transmitter is on. Here is a proposed color code:

RED - - - All superregens regardless of frequency  
ORANGE - - - 27.195  
YELLOW - - - 27.145  
GREEN - - - 27.095  
BLUE - - - 27.045  
WHITE - - - 26.995

(Reprinted from the Peoria R/C Tattler, September, 1960)

## TESTIMONIAL

Here's an unsolicited personal testimonial on the Alpha Tech R300 receiver. I'm flying an Aero 7 (approximately 400 flights to date and as many as 50 flights in one day) equipped with Alpha receiver and an R. E. Vari-Comp using third position as motor control on an OS Max .09. A friend has a scale Fokker utilizing an Alpha receiver also. This past week we have flown simultaneously, but get this! My Alpha T300 transmitter has a 26,995 rock and he uses a CitizenShip 8 channel transmitter on 27.145 mc--a separation of merely .15 of a megacycle and no interaction! The other day we did something we thought unique. We landed together after a dual flight touching our field almost simultaneously and not more than 10 feet apart!

As our group did not have a field monitor, I decided to convert my TR 4.5 to same via Gerald Gill's circuit in Grid Leaks Volume II, Number 5. I am using a T0037 as TR1 in the amplifier and a CK718 as TR3 in the TR 4.5 with best results. For a speaker, I use a 3" unit from an old Motorola AC-DC portable for highest volume. Antenna is an old automobile type, collapsible, approximately 58" extended. Although there is negligible drain on the TR voltage, the amplifier really sucks up the juice. Consequently, I use discarded pen-cells, a total of 7 for the amplifier, 3 for the TR. I get real nice volume, and it brings in the 10 meter and Class D Citizens Bands. I can get the Armed Forces Radio Network every day, Hams all over the country, and occasionally, the BBC in London. Even though I have picked up Class D voice communication while tuned to 26,995 on the monitor, I have flown my plane equipped with the Alpha receiver with no interference. (Who needs a superhet?!?!)

Al Janelle  
Green Bay, Wisconsin

## WHY EVERY RC'ER SHOULD BE LICENSED

At the end of the FCC's 1960 fiscal year on June 30, there was a total of 126,034 Citizens Radio station licenses on the Commission's books, representing an increase of 79,965 since the same date a year ago. Of the total, more than 105,000 are in the Class D service. Of the new stations added since July 1, 1959, more than 70,000 are Class D stations. The Commission has estimated that 90% of its incoming Citizens Band applications are now for Class D stations.

(Reprinted from Popular Electronics, October, 1960)

## FLIES SMALL SHIPS

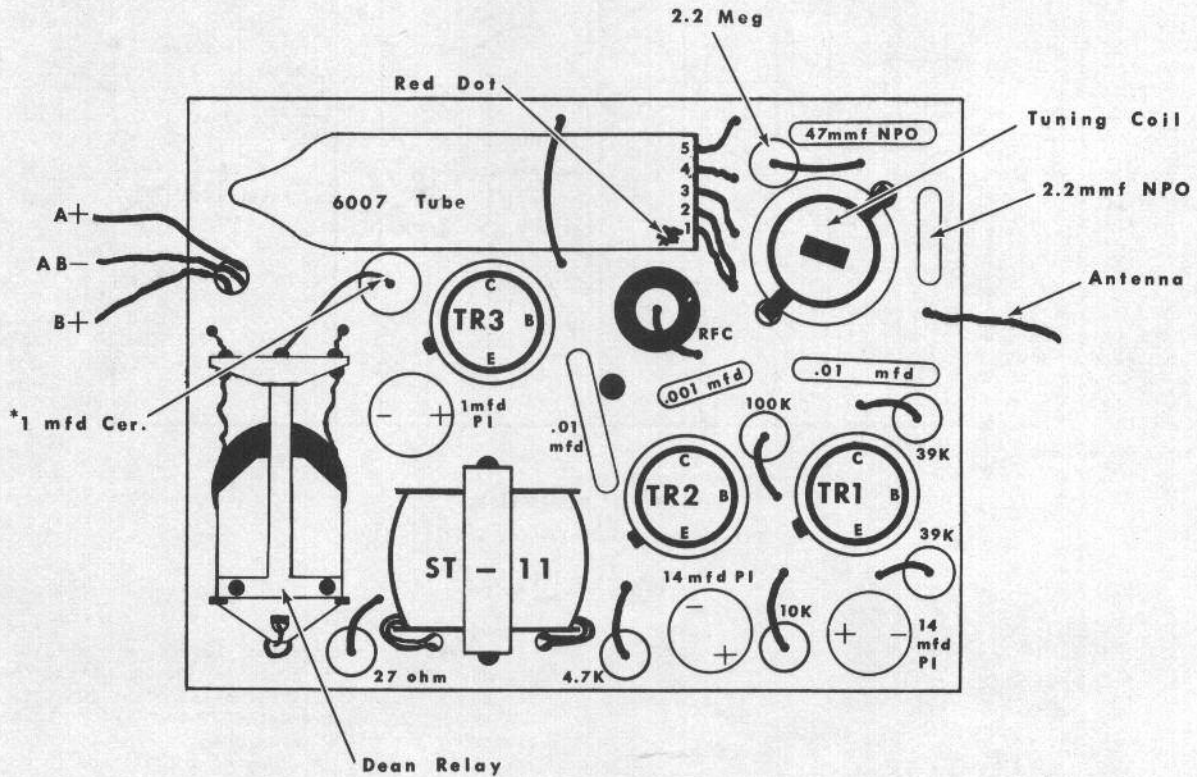
Have used the Kraft receiver in "Li'l Beau Bipe" and a 25" scaled down Live Wire Trainer since last writing you. The Bipe had a simple escapement and the Trainer a pulse system. Both flew good, as novelties; but I am going back to larger planes for performance. I used one submini 22 1/2 battery and three submini pencils (one for filament and two for escapement) in both installations. After flying each weekend for one month, the "B" was still up to 22 1/2 and the filament 1.3 under load! Either my meter is off, the batteries are exceptional, or the Kraft is unbelievably easy on batteries. Several satisfied users of other equipment either have or are about to go Kraft! (That is, in this area of Clark AB, P. I.)

Keep up the good job on spotting hot R/C equipment and kitting it so the non-technical R/C man has a 90% chance of success. Don't see how you can further this end much more; but, if possible, we'll be seeing bigger and better things from Ace R/C.

CWO Robert E. Maritz  
APO 74, San Francisco,  
California

# Kraft Single 27 Mark III Receiver

COPYRIGHT 1961 BY GRID LEAKS AND PHILLIP O. KRAFT



**\*THE NEGATIVE LEAD IS NEXT TO THE BOARD, THE POSITIVE LEAD IS UP AND CONNECTS TO THE NORMAL OPEN CONTACT OF THE RELAY.**

Constant improvement is one of the earmarks of the good R/C designer and a good R/C manufacturer. With the assistance of Phil Kraft, Ace R/C now introduces a Kraft Single Channel Mark III 27mc receiver in kit form.

Presented with this article is a drawing which shows the parts placement, the schematic which shows the few component changes, and a photograph which shows neat compact arrangement which is now housed in the Hi Impact Styrene crash proof box.

The unit is adaptable only to 27 since space is available only for the 6007 tube and not the 6AG4, therefore the Mark II version will be retained for the 50-54 mc kits.

A close study of the schematic and the parts layout will be very helpful in building this unit with the printed circuit board.

The printed circuit layout is deliberately not shown to avoid the indiscriminate use of the pattern layout for commercial purposes by individuals other than Ace Radio Control which has been granted exclusive rights for kits on these units.

As with the KR1 type, construction is simple and straight forward and operation is very similar with the exception that this unit allows transmitters which have modulation as low as 85% to be used. The audio CPS may range from 400 to 800 cycles per second, so that this particular receiver maybe used with a greater variety of transmitters than the old version.

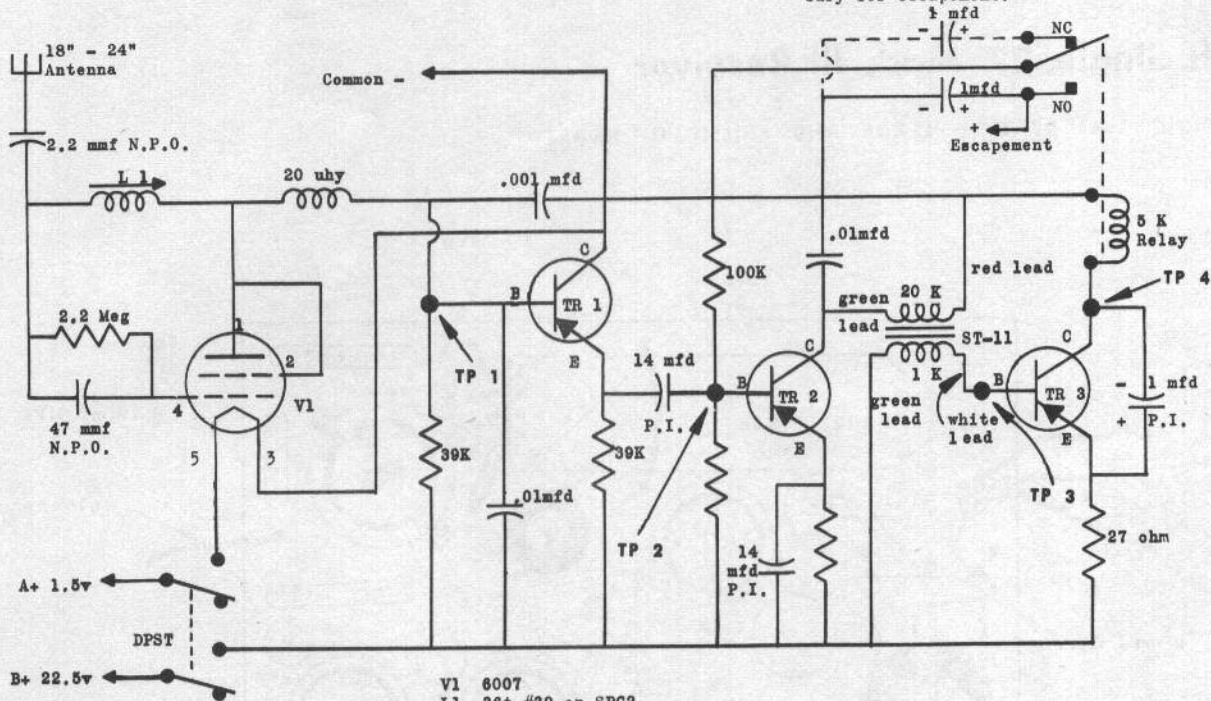
For the do-it-yourselfers a full size PC layout will be available, as well as step by step instructions, so that individuals wanting to make their own without any commercial intent can do so with copyright release granted by Ace Radio Control. A special step by step plan and PC layout full size are available from Ace by asking for the GL special on the Kraft Mark III, catalogue number GLKR III plans, and enclose 25¢ to cover cost of handling.

A completed drilled printed circuit board along with the plans and Hi Impact Styrene crash proof box also is available in combination, for \$2.25.

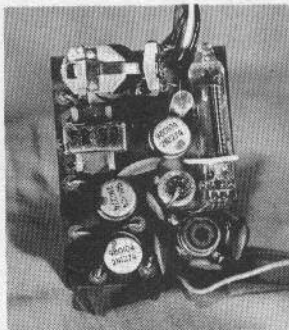
We believe Kraft Single Channel Mark III 27 will prove a valuable addition to the RC fraternity's increasing bevy of receivers that spell reliability and fun for the R/C fans.

(See other side for Schematic and Photo)

This 1 mfd electrolytic used only for pulse work, not necessary for escapement.



V1 6007  
 L1 36t #30 on SPC2  
 PI Plug In type electrolytic  
 TR1, TR2, & TR3 2N1370 or 2N1274



Users of the present series, who wish to reproduce the Mark III, may do so easily by consulting the schematic above and noting the few component changes. One IMPORTANT point, however--the TI transistors have the rotation of the C B E leads exactly opposite direction of the Philco types. A study of the TI base in "WHAT'S NEW" will make this clear. It is only necessary to bend the B lead over to conform to the Philco configuration.

### TUNING AN MOPA TRANSMITTER

I would like to give you my method of tuning up an MOPA transmitter which I think is much easier and a more accurate method than the method such as you suggest in your Kraft Multi-Fli transmitter instructions. I find it much simpler to place a V.T.V.M. across the circuit from the grid of the P.A. section of the tube to ground (pin 5) and then peak the capacitor CI in the oscillator tank circuit. You are metering the P.A. grid current and you want tune for peak reading. Then the output circuit can be tuned as per your instructions. Anyone who is qualified to tune a transmitter would certainly have a V.T.V.M. laying around.

Gordon Johns  
 760 S. Garner St.  
 Prineville, Oregon

### STABILIZING THE AEROMODELLER RECEIVER

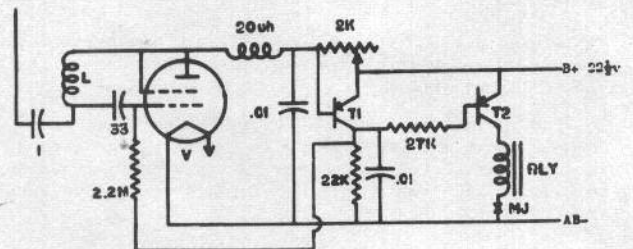
You may be interest to know that the receiver used in my plane was the "Aeromodeller" transistor receiver built from the GRID LEAKS issue. The receiver was constructed on a 1 3/4" x 2" piece of bakelite. The weight of the receiver was 1 1/2 oz. and the total receiver system weighed approximately 8 oz. The weight of the finished plane totaled 15 oz.

After reading about the temperature problem of this receiver, an emitter resistor of 220 ohms was inserted

in the first transistor amplifier. Also, the transistor driving the 5K relay was changed from a CK722 to 2N270. Apparently, these changes helped the receiver's operation because the receiver was exposed to temperature variation of between 40° and 90°, as well as low and high humidity conditions. Once the receiver was tuned for 1600 feet, it performed like a pro and never had to be touched.

James A. Miller  
 949 Harrington  
 Mt. Clemens, Michigan

EDITOR'S NOTE: The circuit referred to above, appeared in Volume I, No1, of GL. Since that issue has been out of print for some time, the circuit portion is reproduced.



L 32 turns #32 on 1/4" CTC Red Dot  
 V 3V4, 6007, 1AG4



# Simple Proportional System Gives R E M

**RUDDER, ELEVATOR, MOTOR, ALL FAIL SAFE ON SINGLE CHANNEL!**

**EDITORS NOTE:** Many kicking duck circuits have been published. Here is one of the simplest but practical circuits we have seen. This will provide a simple yet reliable approach. The circuit appears as though it could also be easily adapted to the new Min-X Compact Receiver.

About the first of October 1960 I wrote you about an all transistorized filter receiver that I was working on. Things are still going along but rather slowly. In the meantime I wanted to get something into the air, so I laid the receiver aside and tried out another idea. It is an electronic version of the galloping ghost.

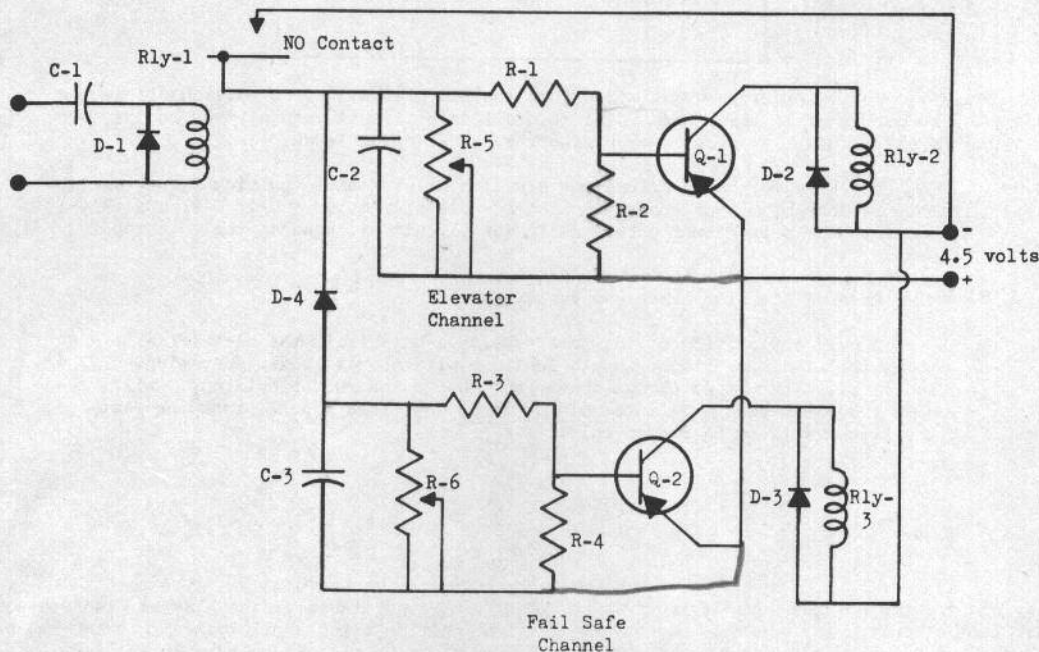
Basically it is a pulse forming network that employs a 100 ohm Gem relay. This pulse is sent to the elevator relay which is controlled by a transistor that has a long RC time constant in its base. The length of the time constant controls the time that the elevator stays down for each pulse sent to it. This time constant is adjustable so that an average pulse rate will give neutral elevator.

The pulse that the 100 ohm Gem relay sends to the elevator circuit is also sent to a fail-safe circuit. The fail safe circuit is almost a duplication of the elevator circuit except that it has a still longer time

constant. As long as pulses are fed to the fail safe circuit the fail safe relay is pulled in and allows the elevator and rudder circuit to control their respective actuators. The time constant in the fail safe circuit base is also adjustable and is set so that the lowest pulse rate will just keep the fail safe circuit energized. In the airplane that I've been using this system, the elevator time constant is set for approximately one-tenth of a second and the elevator responds to a pulse rate change of about 3 to 12 pulses per second. The fail safe time constant is set for approximately one half second and keeps pulled in on the lowest rate. The fail safe circuit draws current as long as the system is being pulsed but the current is only 20ma. on the pencils. This is wasted but should the batteries or their wiring fail the fail safe circuit cuts off the actuators. I feel that this is a small price to pay for a circuit that will respond to several system malfunctions.

Another unusual circuit is the pulse forming system. As you know, a small transformer could have been used instead of the relay and the capacitor. By using the relay a constant pulse with plenty of power to charge the 60 mfd capacitors is available, and there is no interaction when the rudder pulse symmetry is changed for

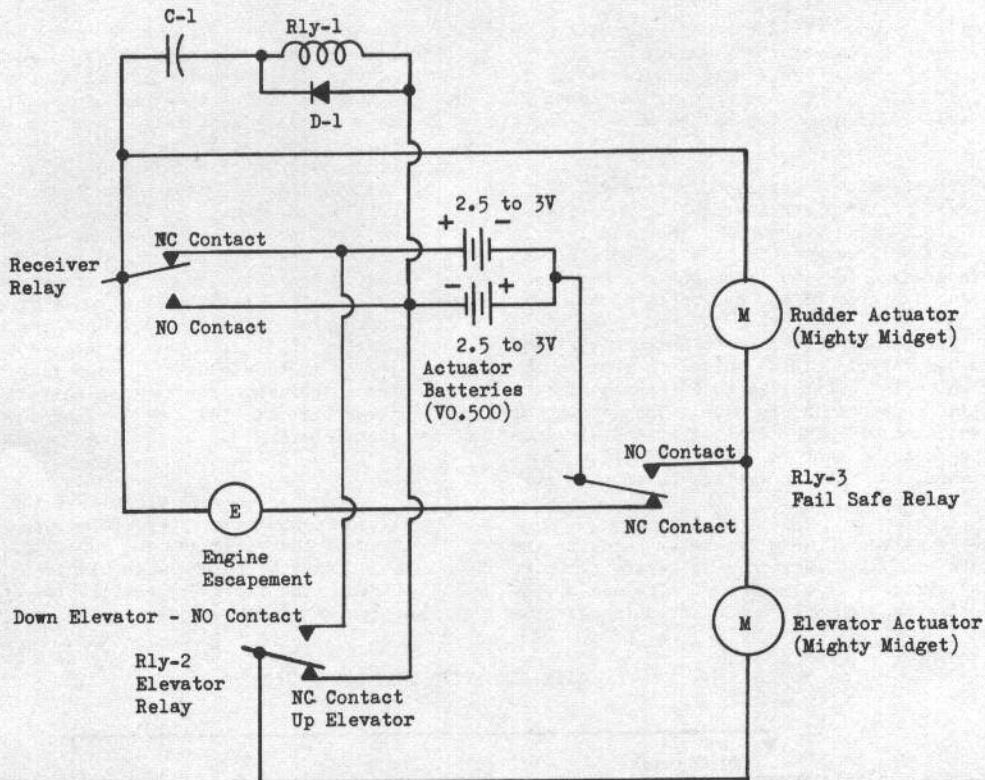
RATE SENSITIVE UNIT SCHEMATICS



Relay 1, 2, 3 - 100 ohm Gem  
 C-1 - Sprague TE-1092, 30 mfd 6V  
 C-2, 3 - Sprague TE-1101, 60 mfd 6V  
 D-1, 2, 3 - General purpose Germanium diode 1N34, 1N295, etc.  
 D-4 - High conductance Germanium diode 1N56, 1N91  
 R-1 - 680 ohm  $\frac{1}{2}$  watt resistor  
 R-2 - 1.5K ohm  $\frac{1}{2}$  watt resistor  
 R-3 - 1.2K ohm  $\frac{1}{2}$  watt resistor

R-4 - 47K ohm  $\frac{1}{2}$  watt resistor  
 Q-1, 2 - General purpose PNP transistor with an Hfe of 30 to 40  
 R-5 - 10K Subminiature Potentiometer  
 R-6 - 25K Subminiature Potentiometer  
 Adjust R-5 for neutral elevator on medium pulse rate.  
 Adjust R-6 to keep fail safe relay pulled in on the lowest pulse rate.

AIRCRAFT WIRING DIAGRAM



The receiver relay is wired into the circuit so that no pulsing allows the rudder to go to the right, until the fail safe circuit returns the rudder to neutral. This is done by reversing the rudder motor leads.

The elevator relay drives the elevator up as soon as pulsing stops, again, this is done by proper connections on the elevator motor. C-1, D-1, and Rly-1 comprise the pulse forming network in the circuit as shown on the foregoing page.

Observe actuator battery polarity as shown.

Should any portion of the rate sensitive unit fail, the elevator will go to neutral, and the flight should continue with normal rudder operation. The engine will attempt to change speed, but due to the rudder pulsing, will run down the escapement. This is nothing to be concerned about, since the rest of the flight will be on rudder only.

left or right rudder.

Several types of transistors have been tried for the elevator and fail safe circuit. Any general purpose PNP type may be used but R-1 thru R-4 may have to be varied to allow the transistors to conduct properly. I have found the values listed on the schematics will work quite well with Philco 2N223's. The capacitors are Sprague TE series, the same as used in the TR 4.5. This unit shares the same battery with the receiver, a TR 4.5 and peak battery current is 70ma. Minimum battery current is what the receiver draws with no signal being received. The unit will fit into a TR 4.5 receiver case and is held to the receiver case with two rubber bands. Battery life with a medium pulse rate is in excess of 5

hours.

No particular base layout is necessary. I built one unit up using a printed circuit and the original was the old type micarta board with eyelets.

The pulser is the heart of the system. I use a 6AK6 Multivibrator, but the Baisden pulser in Grid Leaks did equally well. The only changes required for the Baisden pulser is to increase the rate change. This is outlined in Grid Leaks but I used six volts and a 100 ohm pot.

Melvin L. Hall  
318 Harrison St.  
Biloxi, Mississippi

## More What's New

### GEM'S TINY MITES READY



.70" x .33" x .65" 5000  
ohms. 22 Milliwatts Pull In. 7 Mil-  
watts Drop Out. 1-Screw Mount.  
Extra Tie Points. Less than 1/4 oz.

At long last, Jaidinger announces that the Gem Tiny Mite relay, which has been held up due to government contracts, is available for the modelling public. Ace R/C has received a limited supply, and is now for the first time actively seeking orders for it. Will be stocked in the 5K ohm coil only. Check illustration for size of it --the smallest low price economical relay available for the R/Cer made in America. Only \$4.25. Specify 5K Tiny Mite when you order. From your dealer or Ace R/C.

### KRAFT SINGLE MARK III 27 KIT



The Kraft Single Mark III 27 mc receiver, is available now in kit form, complete with drilled PC board, High Impact Styrene crash proof box, Texas Instrument II transistors, 6007, and all other components to make this version of the most popular R/C receiver in history. The case measures 1 11/16 x 2 1/16 x 1", which is a size and weight reduction over previous models. Responsive to a wider frequencies of audio, requires less modulation and many other features means dependable R/C fun for the do-it-yourselfer. No increase in price--only \$19.95. Only available in 27 mc version.

Available separately, are the instructions, and the drilled PC board, with Hi Impact Styrene Case, only 2.25

### CONVERTING KRAFT TX. TO CW

Many request have been received for information on converting the Kraft Single Channel Transmitter to a combo unit -- one that will serve not only as the potent audio transmitter that it is designed to be, but also one that may be used as a straight CW or carrier job.

From Lundy Goesling of Cleveland, has come such a circuit, which is simplicity itself. It is presented in this issue under "Bits and Pieces." For the Kraft users  
Ace R/C has made up a simple kit to convert present Kraft Audio Transmitters to dual purpose units. Contains domestic DPDT Toggle, hookup wire, label for audio and CW, and detailed drawing and photographs--so that conversion may be done in a matter of minutes.

One extra hole is required in the case, and only a few wires need to be changed. Kraft CW Conversion Kit, from your dealer or Ace R/C, only \$1.00.

### SUBMINI TRANSFORMER

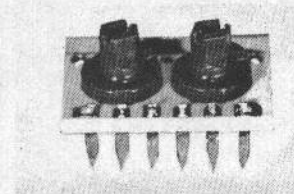


Many requests have been received for a domestic unit in ultra mini size to be used in place of the CR60, as well as being more universal to pulse type and other applications of this type. The major objection to most of these units up to now has been their price. But the uncovering of the JE102T transformer, which has an input impedance of 20K, and output impedance of 1K, solves the problem. Check the illustration for physical size. Has stiff leads for use with either PC or conventional wiring. And the price tag is only \$2.50. Will be coming in stock soon. Order early--shipped on first come, first served basis. At your dealers or Ace R/C.

### NEW DOMESTIC ANTENNA

A new high grade antenna is now being furnished as part of the Kraft Transmitter Combos. This is the Antenna Specialists of Cleveland job, known as the ASP211. It collapses to 9 3/4", extends to full 42". Although shorter than the TCU formerly furnished, there is no appreciable difference in RF output with the ASP211. It also makes the transmitter easier to handle since it is lighter in weight, but nevertheless very sturdily constructed. Comes with mike connector type male and female mount, including insulated washers. Only \$2.45.

### DUAL RADIOHM POTS



Just in is this little jewel of a dual pot designed for the audio worker. Made for PC work, unit measures overall (including mounting lugs) 1 3/16" long x 1 3/4" tall by 3/4" deep. Will be used in new Kraft 10 channel kits. Unit has 2 30K linear taper pots which may be easily adjusted for desired CPS required. The dual unit costs only a few cents more than old single pots. Dual 30 K Radiohm pots. ONLY 95¢

### 2 HENRY TOROID

To make audio tuning easier for the kit builder the new Kraft 10 features a 2 Henry Toroid. As with the 1 Henry - still being used and stocked - these are tapped at 1/3 of DC resistance. Newly manufactured by Torotel. Same physical size as 1 Henry units - the larger inductance cuts down on the amount of padding required and makes multi audio tuning a much simpler job. Off the shelf shipment. 2 Henry Toroid \$7.95. Still available 1 Henry Toroid \$6.95. From your dealer or Ace R/C.

### EXPERIMENTER'S TRANSISTOR



A fortunate buy allows us to pass on tremendous savings on this high quality PNP audio type transistor. Over run for the manufacturer of a computer, these are equivalent to 2N223, 2N224, 2N107, etc. Supplies are limited and when gone offer can not be repeated. Only 85¢ each. Available from your dealer or Ace R/C.

**TEXAS INSTRUMENT 2N1370**



Ace has added the TI line of Transistors in a few numbers. These are to be used in the Kraft 10 Transmitter and single Mark III Receiver. Feature good audio gain, these are PNP types. Only \$1.50. From your dealer or Ace R/C.

**NEW ITEMS FROM ACE**

Many new items of interest to the R/C modelers are reaching Ace R/C. We will list below some of these items which we think will be of interest to the modeler and which are not included in our catalogue. It is impossible to list all of them but here is a partial listing.

3/4 inch wooden balls ideal for pulser handles either the mechanical or electronic type, 4¢ each.

New plug in type capacitors in two sizes for 3 volt operation - - 10mf or 50 mf, either 95¢ each.

The Hi Impact Styrene box for the Mark III receiver is available separately in an ivory finish without silk screening, 1 11/16 x 2 1/16 x 1", only 20¢.

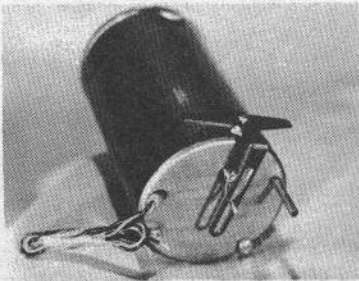
Also for the first time available from Ace R/C separately is the Fox .09 engine. The Fox engines have a fabulous reputation among the control line users and are gaining favor in smaller versions with R/Cers.

The Fox .09 is issued in the Snapdragon Combo, and comes with integral tank and instructions, but less the prop. \$4.95.

Also available is regular duty silk, imported from Japan by Aristol. This is the highest quality and it is designed for all average weight models. Per sq yard \$1.

2N214 Transistor is now in stock for special applications where a transistor of the NPN type is required. It is used in the "POD" circuit, and other circuits of the switching and servo type. In stock for immediate delivery from your Dealer or Ace R/C. \$1.98

**PROPOMATIC ACTUATOR**



Through the courtesy of G & M Hobby Specialties, Inc., we had the privilege of examining the Propomatic Actuator. As the name implies this device is for proportional control. Built around the famous Distler motor, the unit provides quite strong lever action for rudder control. Additional controls are provided by a pushrod for say, motor control, with full signal off or on. With either full off or on, rudder neutralizes. Device is fail safe. Has low drain, about 100 ma., with two sets of 3 volt batteries. May be adapted for Simpl-Simul type of operation. Altho a bit on the large size, unit is light and powerful. \$15.95

From G M Hobby Specialties, Inc., some of whose R/C gear has been mentioned in previous paragraph comes a new 1961 brochure. Contains many additional imported, and different R/C items. It's free, and worth getting; check address and write for it.. G M material is available direct from them, or may also be secured by your dealer from G M.

Address GM Hobby Specialties, P. O. Box 67, Wantagh, N. Y.

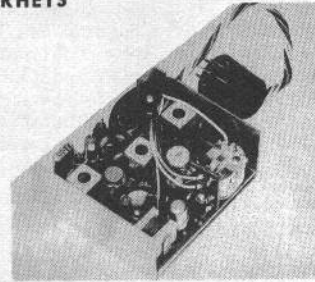
**MIN-X COMPACT RECEIVER**

**FEATURES:** Thoroughly tested, has one-year warranty, fully temperature compensated, unbreakable fiberclass-epoxy circuit board, equipped with Jaico relay for maximum versatility, follows high-speed pulsing, heavy-duty anodized case.

**SPECIFICATIONS:** Size: 2 1/8" X 1 11/16" X 1", Weight: 1 3/4 oz. (incl. relay, less case), operates on all FCC frequencies, only 2 pen cells required (3 volts) current drain: idle, 4 - 5 mils, on signal, 28 - 30 mils

**PRICE:** \$29.95, including case, less plug.

**MIN-X SUPERHETS**

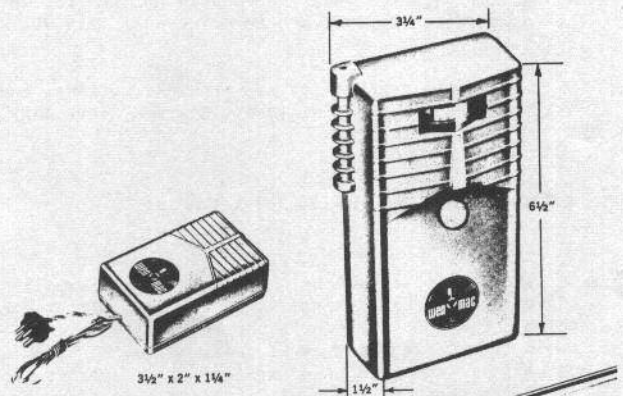


**FEATURES:** Convertible to 4, 6, 8, 10 or 12 channel operation. This receiver may be converted to multi-channel superhet operation at any time. Factory conversions are promptly handled for \$9.00 labor plus the conversion kit price and postage.

Does not need retuning. Balanced circuitry and quality components mean the Min-X Superhet should never require retuning. No special test equipment is needed.

Size: (Single and Multi) 2 1/2" x 2 3/8" x 1 1/16" - smallest available. Weight: Single - 4 oz. Multi - 4.5 oz., relayless Multi. Frequency Range: Determined by crystal: 26.995 - 27.045 - 27.095 - 27.145 - 27.195 - 27.255. Operating Temperature: Fully temperature compensated, 0° - 135°. Current Drain: Single Channel - Idle, 8-10 ma., On signal, 50 ma. Selectivity: 3 KC. Sensitivity: 2-4 micro volts. Relay Data on Single Channel: Jaico; Current Pull in, 20 ma. Setting: Drop out, 15 ma. Voltage: Maximum: 6.3 volts. Minimum: 4.5 volts, reduced sensitivity. \$59.95

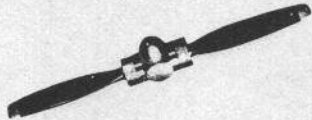
**R C BY WEN-MAC**



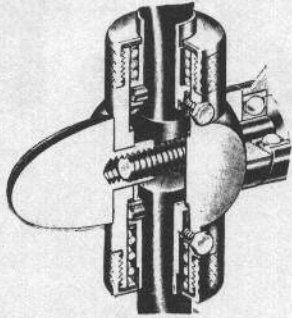
**TRANSMITTER # 506 Fully-Transistorized includes: Fully-Transistorized Transmitter; Center-Loaded Antenna \$29.98**

**SUPER-HETERODYNE RECEIVER #507 Fully-Transistorized includes: Super-heterodyne Receiver Fully-Transistorized; Antenna. \$39.98**

## AUTOPITCH PROPELLER



**MAKES STOP-AND-GO FLYING  
EASY FOR ALL R/C FLYERS**



Dynamic Models new AutoPitch propeller, announced for the first time at the Chicago Hobby Show, is the most revolutionary of its three new 1961 items. R/C modelers can now easily obtain a new degree of control over their planes previously only available to the expert after hours of exacting engine adjustments.

The AP-1 AutoPitch propeller (for .29 and larger engines) will deliver zero thrust at zero to 6,000 rpm, but automatically goes into full pitch as the engine rpm is increased. Previously, R/C modelers could only obtain zero thrust at the very critical and unstable 2,000 - 3,000 rpm range.

The AutoPitch propeller is of simple, safe design employing wooden blades manufactured in our own plant specifically for R/C use.

This sensational new addition to the R/C field has been thoroughly tested and proven. Doug Spreng, 1960 NATS R/C champion was asked to fly with one during the final stages of its development and has given his hearty endorsement to the AutoPitch as a new tool to open up a whole new era of R/C flying.

As an added feature, each AutoPitch will come equipped with extra shims. Removal of these shims will give reverse thrust to the propeller or allow the modeler to achieve a great number of other pitch variations and open still a wider area of use for this propeller.

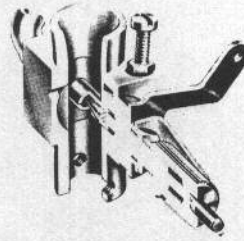
The small weight of the AutoPitch propeller also adds a flywheel effect to the engine for more stable performance and easier starting. The AutoPitch is also designed to bring added realism to the appearance of any model using this item. \$10.95

## NEW AUTO-MIX CARBURETOR



**GIVES CONSTANT FUEL-AIR  
MIX THROUGH FULL RANGE**

*Continued next column*



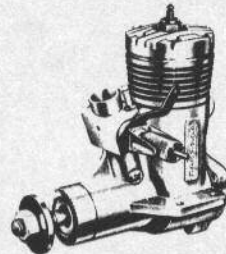
Dynamic Models patented AutoMix carburetor is another major breakthrough in product design. This revolutionary carburetor eliminates the need for an exhaust restrictor and, for the first time, makes possible the use of a pressure system with a carburetor.

The secret of the new AutoMix is its ability to deliver a constant mixture of fuel and air to the engine through the full range of carburetor settings. The AutoMix carburetor controls the fuel supply to the engine along with the air supply, thus eliminating the flooding produced by conventional carburetors at low rpm settings.

By eliminating the necessity to use an exhaust restrictor, Dynamic Models AutoMix carburetor will add many hours of life to your engine through reduction of operational heat produced by the exhaust restrictors necessary with old-style carburetors.

Dynamic Models AM-1 AutoMix carburetor is adaptable for any .29 or larger engine. \$6.95

## NEW JOHNSON .36 R/C ENGINE EQUIPPED WITH BALL BEARINGS

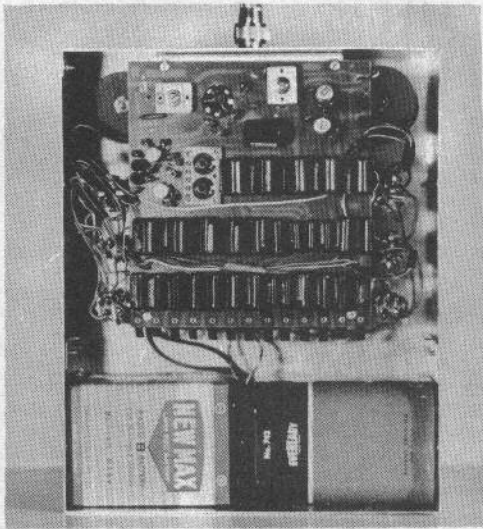


Dynamic Models takes great pride in announcing the largest edition to its fine product line of Johnson and Holland engines. The Johnson .36 R/C engine, together with Dynamic Models AutoMix carburetor, offers the finest R/C engine combination now available to R/C modelers.

The use of precision ball bearings in the new Johnson .36 R/C engine opens an entirely new field of use for this size engine in R/C flying. Tests run in our factory prove that this engine will equal most .45 cubic inch displacement engines in performance.

For those R/C modelers who want the very most in power output from this engine the patented AutoMix carburetor (included with each Johnson R/C) will allow the use of a fuel pressure system. No other R/C engine-carburetor combination can offer this possibility. To easily facilitate the use of a pressure system each Johnson .36 R/C comes with a pressure fitting as standard equipment. \$29.95

## KRAFT TRIPLE 10 KIT



Finally, deliveries have been made on the Triple Simultaneous Kraft 10 channel transmitters. Pilot models in considerable number have been out in the field in a number of sections of the country for well over a year and the circuit has been finalized for a considerable length of time.

The delay resulted from the fact that the Designer Phil Kraft, Ecktronics, and Ace Radio Control were all wanting to come to the market with the finest mechanically as well as electronically engineered piece of equipment.

The units now contain two printed circuits boards, the wiring has been considerably simplified, and with the new step by step instructions, means greater simplicity for the builder, whether he is a rank beginner or an old contest pro.

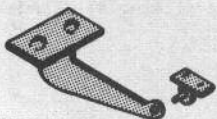
The unit definitely is designed for 10 channel Triple Simultaneous operation and kits are offered on this basis at \$95.95.

### G L WILL TAKE SUBSCRIPTIONS

Announcement from Ron Moulton and D. J. Laidlaw-Dickson of AEROMODELLER and MODEL MAKER and RADIO CONTROL MODELS & ELECTRONICS informs us that Ace Radio Control has been appointed as a subscription agent for each of the three foregoing British publications, published by Model Aeronautical Press Ltd.

Subscription prices for "Radio Control Models & Electronics", for "Aeromodeller", and "Model Maker" are \$4.00 per each for a 12 issue monthly subscription. If you desire a subscription for any one of the foregoing simply send us your check in the amount of \$4.00 and we will forward your name along with your remittance to the publisher concerned and see that your subscription is started via Sea Mail as soon as possible. If you desire two, simply forward \$8.00; if you desire all three forward \$12.00 for annual subscriptions to all three.

### NEW AILERON HINGES BY WILLIAMS



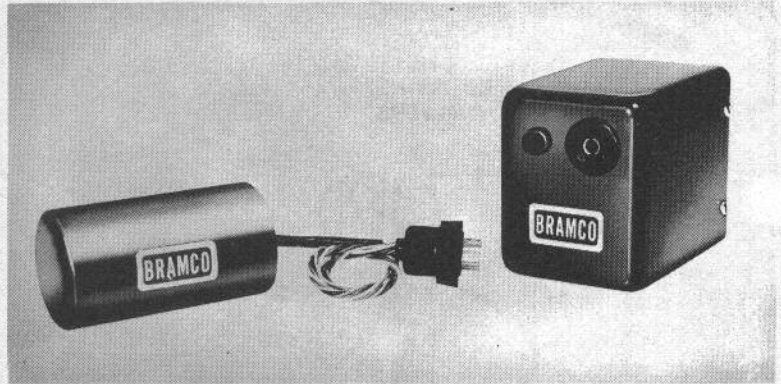
**TYPE "B"**  
LOWER SURFACE MOUNT  
SMALL PAIR ..... 49¢  
LARGE PAIR ..... 59¢



**TYPE "C"**  
REAR SPAR MOUNT  
SMALL PAIR ..... 49¢  
LARGE PAIR ..... 59¢

## NEW FROM BRAMCO

We have two new items of interest to the R/C market, they will be ready for distribution soon.



The first item is our new receiver and servo power supply with companion battery charger. The receiver-servo pack includes five 500 ma nickel-cadmium batteries and a 30 volt DC inverter. The Bramco Power Pack supplies 30 VDC @ 15 ma for the receiver B requirements, 1.5 VDC for the receiver filaments and servo bias, and plus and minus 3 VDC for the servos. Total size of the unit is 1 1/4" rd. by 2 1/2" long and weighs seven ounces, which is considerably lighter than normal, comparable battery configurations. The Bramco Power Pack is completely potted in epoxy resin in a blue anodized, drawn aluminum container -- and this type of construction renders it almost indestructible. All internal connections are terminated at a seven pin miniature tube type plug on the end of a four inch cable which is also firmly molded into the epoxy. It will mean much neater and easier R/C installations. Permanent mounting is not necessary; it can be wrapped in sponge rubber and placed in any convenient compartment.

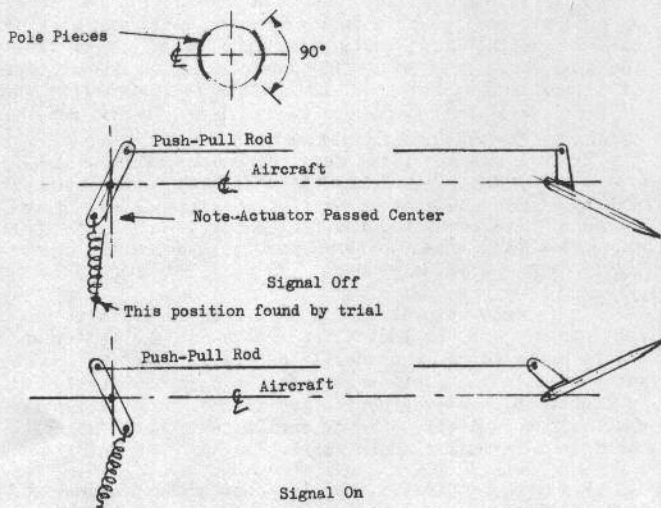
The companion charger, which plugs directly into a 110 VAC receptacle (no cord required) includes a very low drain pilot light which indicates when power is applied to the charger. It has a regulated output voltage which is designed to match the receiver power pack. Operation, is simplicity at its best. The entire charging operation consists of plugging the charger into the wall outlet and plugging the power pack into the charger. No switches, no adjustments or measurements whatsoever are necessary. The price of the Bramco Power Pack-Charger Combo is \$39.50.

The second new item of interest is the Bramco ten channel hand held simultaneous transmitter. It features a new streamlined package which is both smaller and lighter, but contains all standard Bramco features and more!! The control switches are laid out with standardization in mind. A new power amplifier circuit features about a 30% increased output over previous Bramco designs. Bramco has always stressed high-put transmitters, and the increase in output of the new transmitter is important in view of the increasing Citizen Band Class D interference. The Bramco circuit still features toroidal oscillators, isolated by high gain modulator tubes which couple the audio to the power amplifier through Bramco's balance control, an essential item for precise simultaneous tuning. All components are highest quality, many of which are of military types. A new precision pot makes tone adjustments-- by far the easiest and precise. A decorative handle and a new diecast chrome nameplate, on a deep Bramco blue anodized case, make this transmitter as excellent in appearance as it is in performance. This transmitter was designed to accommodate both the competitive expert, and the rank novice. Price of the new ten channel hand held simultaneous transmitter is \$112.00.

Orders will be accepted by Ace R/C for the Bramco equipment listed, to be shipped at the earliest possible date on a first come first served basis, until it is possible to stock for off-the-shelf delivery.

# Bits And Pieces

## SPING LOADED ACTUATOR



Here is some information on the set-up on my models for the last year and a half. The receiver is the Que-tone with power transistor instead of a relay. For those not familiar with it, it uses a sub-miniature valve followed by two audio transistors, transformer coupled and a direct coupled power transistor. The H. T. battery is 22½ volts and the drain on this is less than half a milliamp, so the very light ones will do. All the transistors work from the actuator battery. In the original design this was quoted as six volts, but mine goes quite satisfactorily on three. This receiver will interchange between a number of different models, all of which have magnetic actuators using a disc magnet. The actuator current depends on the model used. The heaviest is 200 milliamps, which will spiral a model of about five feet span. The most often used is a 44 inch span, Mills 1.3 cc powered model, which will spiral dive right with 40 milliamps, and spirals to the left with no current. The total power on this model then is 120 milliwatts. Few people realize how little power is needed to spiral a model.

A sketch is enclosed showing how the actuator is fixed up to give turn to the right with signal, and left without. With signal the current is flowing through the coil and the rudder is pulled round to the limit allowed by the spring. Without signal the current is off, and the spring pulls the actuator rotor back. It pulls it back just past the center, and the permanent magnet then takes over and pulls a bit further, up to the limit allowed by the spring. The position of the spring anchorage is found by trial to give the best operation.

This scheme would seem to be of particular interest to Cpt. Plessier, since by actuator is just about the same size as his, (G-L. Vol.2, No. 7) and takes only slightly more power than his relay. He quotes 20 ma. receiver current with a 5 volt battery, this equalling 100-milliwatts. His existing coil might do but the whole construction might need to be more precise. On my actuator the gap between magnet and pole piece is only about two 'thou', and the coil core is solid soft iron. It seems to me that this scheme would allow him to dispense with the relay and actuator battery. If only I had time I would try it myself.

Howard Boys  
89 Gatesby Road  
Rugby, England

## TR 4.5 TIPS

I noticed there has been trouble with range on certain TR 4.5's. This is no small problem and is greatly aggravated by temperature. The bulk of the gain loss lies in the AO1 super-regenerator. Approximately 60 DB gain change can be expected from 25° to 0° c (Room temperature to 32°F) for the entire receiver. Of this 60 DB the audio and switch stages account for about 4 DB because of hfc change (10% drop for the 25°C temperature drop) and another 16 DB due to lack of operating point stabilization. This leaves something near 50DB attributable to the AO1 stage.

If the malady is complex, a partial solution is simple. In 12 instances, all different receivers, operating point change in the AO1 has picked up at least 30 DB. This simply involves reducing the 10k arm of the AO1 bias divider to an optimum value between 4.7K and 6.8K.

A drop in sensitivity of 60 DB is 1000/1 change in minimum discernable signal. To give a idea of the magnitude, one would have to beef up a 1 watt transmitter to 1KW to nullify the change.

Another tip concerns the 6007 and some transistors supplied as part of your kits. The leads must be pre-tinned or they will dry solder every time. If the defect is not apparent at first, time will shake it out with the usual consequences. Lead scraping and light tinning do the trick - the usual semiconductor soldering precautions prevail in the tinning operation. Most domestic suppliers tin leads. (Note; 6007 is imported from Holland).

J. H. Phelps  
17 FoxBerry Lane  
Liverpool, New York

## CURING "NOISE"

In reply to your letter concerning the Micro "4" I'd suggest that you get a receiver which has a tube detector which should improve the problem with the electric motor noise. A 10 ohm resistor across the brushes might help but it is usually the receiver being too sensitive and being actuated by the transmission of the electric motor.

I tried a 10 ohm resistor across brushes of a Micro 4 to cure noise but an 8 MF 6 v Condenser across the brushes fixed it. I have a Micro "4" and a 3 Pos servo in my place and they work fine now. Have you tried the Eveready E91 pencils? They are the stuff.

A. M. Harley  
318 East Ave.  
N. Augusta, S. C.

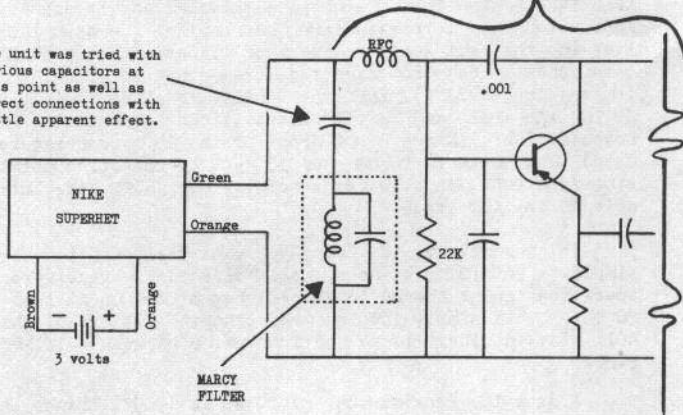
## WANTS TRANSISTORIZED XMTR.

Congratulations on a fine publication. I have built several Ace kits (Kraft transmitter and receiver, Worth pulser, TR 4.5) all with excellent results. I am currently working on a single channel control system to give simultaneous rudder and elevator by separating width and rate signals to avoid interaction. Also trim-able motor control using Dickerson and Shows "POD" is included in system. I will send you the technical details when I have them finalized if you think your readers might be interested. How about working up an all-transistor transmitter with better than flea-power. The high cost; of the required transistors could easily be justified by higher efficiency and the fact that wet-cells could be used directly for power instead of using power converters or high voltage B batteries.

William A. Segraves  
3708 Chestnut Street  
Philadelphia 4, Penn.

Audio Amplifier and Relay Section of Kraft Single Channel

The unit was tried with various capacitors at this point as well as direct connections with little apparent effect.



Notice the trend in receivers lately is toward selective tone rigs to combat the interference. I had occasion recently to work on such a system where several units were to be operated in a warehouse. I developed receivers using F & M Nike front end, Kraft amplifier, and relay circuit, with a Marcytone filter connected directly across the output of the Nike. This combination proved to be very sharp in tuning with the response of the filter apparently being much sharper than the Marcy configuration. When I gave it a try, I was not interested in range for my purpose so never checked it over the 100 yards with the 30 milliwatt transmitter I was using.

Even with just the available filters (6) and R/C frequencies (5 avail. for Nike) it adds up to 30 combinations.

My Nike's didn't require a constant C-W signal for a stable idle which would help cut down the jamming of the airplanes. Anyhow I will throw it in, if you can use it you are welcome. (The response of the Nike drops off rapidly at the higher frequencies but I had adequate operation at 3200 cps.)

Owen S. Black  
4920 Cypress Ave.  
Carmichael, Calif.

Reprinted from NJRC "Printed Circuit"

Several months ago the Printed Circuit published an R/C Dictionary that has proven of inestimable value to the modeling fraternity the world over. Never lacking courage, PRINTED CIRCUIT again sets out on a project of a service nature; and brings the following from Mr. Stolk. Neil has spared no expense in proving out the tenets of the following treatise:

Ever since the first model staggered aloft, modelers have been plagued by the unceasing antagonism of nature. Only abundant quantities of patience and forbearance have permitted the fraternity to cope with her whims and nail down a few minor facts about the operation in the wild blue yonder.

It is only natural for uninitiated arrivals to expect Nature to be logical and neat--but she isn't, and anyone pounding on the cellar door will have to become reconciled to the facts that: (a) Science is usually out to lunch, (b) The most effective teacher of all, experience, is essentially the gradual acceptance of Nature's capricious refusal to hold still.

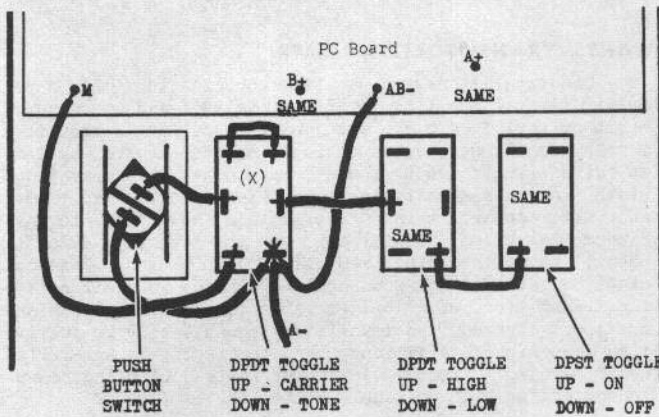
Far from complete, the list continuously grows and contribution of new laws is invited. Address to the attention of Dr. Finagle, care of this newsletter.

DR. FINAGLE'S UNIVERSAL R/C LAWS, or WHY SO MUCH DOESN'T HAPPEN LIKE IT SHOULD.

- 1st Law: If anything can go wrong, it will.
- 2nd Law: Do not believe in miracles - rely on them
- 3rd Law: In any collection of malfunctioning equipment, the item that is most obviously above suspicion - beyond all need of checking - is the source of trouble.
  - Corollary I - No one whom you ask for help will see it either.
  - Corollary II - Uninvited kibitzers will spot it immediately.
- 4th Law: If a breadboard layout functions perfectly, all subsequent flying versions will malfunction.
- 5th Law: No matter what the result, there is always someone eager to misinterpret it.
- 6th Law: The most authoritative instructions pertaining to the assembly and operation of an R/C device will be promptly disregarded by the recipient.
- 7th Law: The more innocuous any damage appears at first glance, the further its influence will extend.
- 8th Law: The most careful estimate of final wing loadings will approach a reasonable degree of accuracy only through division by the factor 0.5.
  - Corollary I - Construction time estimates approach fact only through multiplication by the factor 2.7.
- 9th Law: The most vital item of gear required for operation at any distant meet will be left behind on the work bench.
- 10th Law: Experience is in direct ratio to equipment ruined.
- 11th Law: Always leave room for an explanation when something doesn't work (also known as the Open Door Policy)
- 12th Law: Any error in any calculation will be in the direction of most harm.
- 13th Law: The correct method for recovery from any low altitude maneuver will become self-evident during retrieval of the larger pieces.
- 14th Law: It is usually impractical to worry beforehand about troubles - if you have none on the bench they will invariably show up at the field.
- 15th Law: All life-hours and cycles of operation in airborne equipment will expire at high altitudes over concrete runways. AMEN!!!!

C W FOR KRAFT TX.

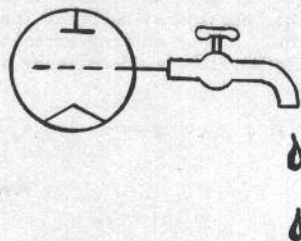
As mentioned in What's New, a simple conversion is available to present owners of Kraft Audio Transmitters--this allows potent CW operation when used in the High position. Only a DPDT Toggle (shown as X) and simple additional wiring is required. Circuit courtesy Lundy Goessling, 14718 Shaker Blvd., Cleveland, Ohio



CONVERSION SWITCH FOR CARRIER OR TONE ON KRAFT TRANSMITTER.



# Grid Leaks At Play



This issue of Grid Leaks, we believe, brings you a greater variety than any of its immediate predecessors. We can make this statement without successful fear of contradiction because we have definitely striven to hit a broader cross section of our readers than at any time in our history.

We know very definitely that there is more "What's New" in this issue than in any previous issue. This is due not only to the fact that the trade show was held in Chicago in February but also due to the fact, we feel, that there probably has been a greater variety of new items introduced to the R/C Modeler in the early part of 1961 than there has been any comparable time of the Citizens Band Radio Control examination-free spots.

One point we would like to make at this particular stage, is the fact that every item in "What's New" is being presented without Grid Leaks or Ace Radio Control receiving one cent in advertising revenue. "What's New" is being presented as a distinct readers service to show readers of Grid Leaks what is new in this Radio picture.

Never in eight years of serving the R/C needs of the hobbyist have we seen a comparable period in which interest has been so high. Words at the trade show in Chicago hinted that this was the best trade show, as far as Radio Control exhibits were concerned, of any that have been held in the recent years.

Not only were there many Radio Control items presented at the show but "What's New" in this issue of Grid Leaks presents many new items that have been presented since the trade show closed.

Actually, it is virtually impossible for a small publication such as Grid Leaks to list every item that is shown by all manufactures that pertain to Radio Control, and to the many manufacturers whose products we left out because we didn't have time to see everyone at the trade show we must humbly apologize. The many items that are presented in "What's New" we feel, however, are a fairly representative cross section of many items that have and will hit during 1961.

We know the pinch we at Ace R/C have been in during the past several months -- it has been terrific -- and has resulted in some backorder situations which have been beyond our control entirely. The only consolation that we have from this matter is that Ace Radio Control, has been one of the outfits that has had the least backorders of any manufacturer or distributor in the country, if word we get from our dealers and individuals is any indication. In almost every instance where there have had to be backorders they have been due to situations beyond the control of anyone here.

This particular issue of Grid Leaks presents several new ideas and several requests from readers for new circuitry. We invite your pictures, we invite your comments, we invite your schematics and circuits and ideas. Remember, Grid Leaks' prime purpose is for the distribution of Radio Control knowledge to a world wide band of Radio Control Fans.

The subscription list of Grid Leaks is constantly growing; it may eventually even begin to carry itself as a paying operation. We hope that that day arrives; in the mean time, any circuits that you have, which you wish to share with fellow R/Cers throughout the world, we'd like very much to see them.

Meantime, our best of luck on your flying, boating, or R/C ventures during 1961. We've got several exciting things lined up for future issues. We hope to attend several of the symposium types of meetings as well as the Nationals at Willow Grove and bring you reports of additional things we see which we believe will be of interest to our readers.

Yours very sincerely,

GRID LEAKS

Paul F. Runge  
Editor- Publisher

GRID LEAKS--R/C DATA SERVICE is published bi-monthly by Ace Radio Control, Box 301, Higginsville, Missouri. It is entered at the Post Office at Higginsville, Mo., and is copyright 1960 by Grid Leaks and Ace Radio Control.

If you have ideas you would like to share with other R/C fans throughout the world, we welcome them. All ideas are given careful consideration from the point of view of trying to help R/C by sharing experimental--and sometimes not fully developed--ideas among a growing subscription list.

If you want to insure your getting every issue of Grid

Leaks, but your dealer is out, subscriptions are available on a ten issue basis for \$2.00. Some back issues, primarily of Volume 2, are also available. Price of the back issues, however, is 35¢ per copy.

Subscribers are advised that Grid Leaks MUST be notified of a change. Postal regulations do not permit the forwarding of copies, nor will the Post Office issue us a change of your address. This is the responsibility of each subscriber.

Address all correspondence to Grid Leaks, C/O Ace R/C, Box 301, Higginsville, Missouri.

NOTICE TO ALL EUROPEAN READERS

By arrangements with Malcolm Douglass of Radio Control Equipment and Accessories, 19 Byron Drive, Rawcliffe Lane, York, England, Grid Leaks is available on a

subscription basis to arrive via first class mail through Mr. Douglass for 25/0 for the 10 issue volume. Subscription will be begun with the current issues unless otherwise specified. Direct all subscriptions for delivery in Europe to the above address.

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