Modelers' Handy

Cyclopedia

RADIO CONTROL

Equipment & Operation

FOR MODEL AIRCRAFT AND BOATS

To Help You Get Into the Air. . . and Maintain Control That's Fun

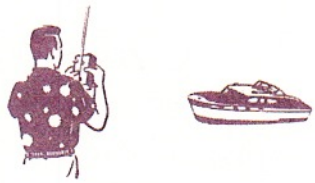
Fascinating Hobby for Everyone

radio control

What are the advantages of single channel? Multi channel?

Chief advantages of single channel are—inexpensive equipment, small size, light weight, simplicity of operation and ease of installation. No complicated wiring is involved, and single channel sets, being of simpler construction, are less likely to get out of adjustment; survive crashes and rough handling better, and can be installed in relatively small planes or boats.

The more elaborate multi channel sets are for the advanced hobbyist, and offer positive selection of several controls by pulsing individual buttons, or operating a "stick." Multi channel involves some knowledge of electrical circuits, as the wiring of the radio set to the various control mechanisms must be done by the modeler. A little experience with single channel will prepare the average hobbyist for the more complicated—and more costly—multi channel equipment.



What are escapements and servos?

Escapements and servo motors are two of the more popular forms of "actuators" used to operate the control surfaces of planes or boats; change motor speed; apply brakes, etc.

Commercial escapements are light weight, relatively inexpensive, and provide reliable operation. They can be linked to rudders, elevators and motor speed throttles to give a variety of controls.

When the radio receives a signal impulse, the contacts on its relay close "turning on" the escapement, which rotates a certain distance and remains there as long as the signal is held "on." This rotation actuates a torque rod or other form of mechanical linkage which moves the control surface (rudder or elevator). By sending a series of signals in rapid succession the operator can rotate the escapement to any one of several positions, each performing a separate function such as "right rudder," "left rudder," "up elevator," "motor speed control," etc.

Servo motors perform the same functions as escapements, but are driven by electric motors. Ordinarily, escapements are used with single channel equipment because of their versatility, and servos with multi channel sets, installed in larger planes or boats requiring more torque or thrust on the controls.

BY DELTRON

BASIC CONCEPTS OF RADIO CONTROL

A question and answer introduction to current R/C practice in the model field.

What is Radio Control?

Radio control is a means of guiding, or otherwise controlling airplanes, boats, vehicles or other distant objects by radio impulses transmitted through the air.

How does it work?

In its simplest form, radio energy is radiated from a low-power transmitter to a highly sensitive receiver in the object to be controlled. Through amplification in the receiver, this energy closes an electrical switch (known as a relay), which "turns on" an actuator. This actuator performs the function of turning the object, changing its speed, etc.

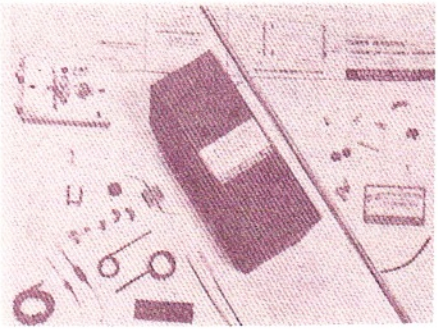
What are the Citizens Bands?

Two "examination free" radio frequencies have been allocated by the FCC for the use of hobbyists in radio controlling models. Licenses for the use of these frequencies are issued simply upon application to any citizen over the age of 21 years. The two frequencies available are 27.255 megacycles and 465 megacycles. All commercial equipment is designed for use on one of these frequencies. Other bands may be allotted in the future as the demand warrants.

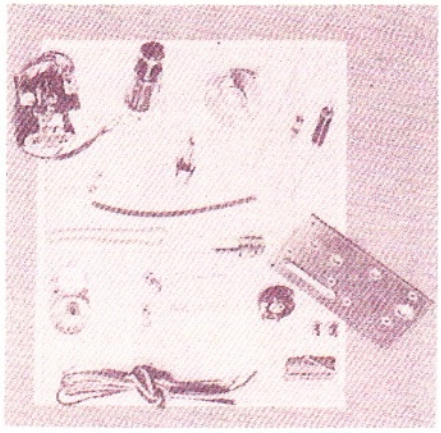
What is meant by "single channel" and "multi channel?"

Single channel operation utilizes a radio impulse to operate a single relay. When connected to the proper actuator, or actuators, quite a wide range of operation can be obtained with the simplest single channel set. Some single channel sets use the carrier wave (the radio frequency wave itself) to transmit and receive the signal. Others use a "modulated" wave, the relay circuit being sensitive only to an audio tone.

All present day multi channel sets use modulated waves, the transmitter being designed to send several different notes. The receiver separates these notes, channeling each to a different relay circuit. A multi channel receiver may have two, three, five or more relays, each sensitive to a different tone. These relays usually perform a single function, one giving "right rudder," another "left rudder," etc. An experienced multi channel operator can duplicate virtually any stunt or maneuver possible in a full sized airplane.

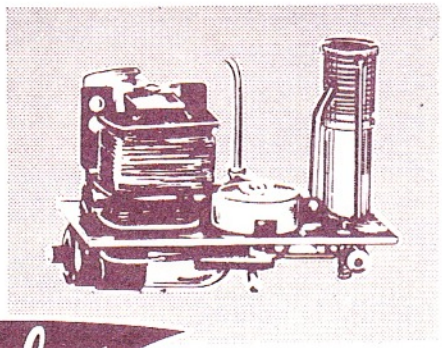


DE202K SUPER AEROTROL TRANSMITTER KITS. Includes stamped and formed painted metal chassis with all holes punched; all necessary electronic components, resistors, condensers, coils and chokes; finished sectional antenna; color coded wiring. This portable self-contained unit operates on 27.2 mc. Step-by-step instructions. **19.95**



DE203K SUPER AEROTROL RECEIVER KITS. Featuures locked-channel dust-core tuning, super-regenerator circuit, weighs 2¾-oz. less batteries. Includes finished, tested sensitive relay, dust-core tuner, drilled bakelite base with condensers and eyelets attached; all electrical components—condensers, resistors, coils, etc.; all contacts and color coded wiring. Step-by-step instructions. **13.95**

DE203 ASSEMBLED RECEIVERS. Same as DE203K Super Aerotrol Receiver Kit listed above, except completely assembled. **21.95**



Berkeley

FOR RADIO CONTROL—

DE202 ASSEMBLED TRANSMITTERS. Same as DE202K Super Aerotrol Transmitter Kit listed above, except completely assembled. **27.95**

DE201K SUPER AEROTROL COMBINATION KITS. A combination receiver-transmitter kit that saves the hobbyist $3.95. Includes everything found in DE202K Transmitter and DE203K Receiver kits listed below. **29.95**

DE201 READY-TO-OPERATE SUPER AEROTROL UNITS. Complete unit, 27 mc crystal control—no license required for operating. Includes transmitter, receiver and relay, escapement, 0-3 DC milliameter, sectional antenna. Everything, except batteries, for immediate use. **49.95**

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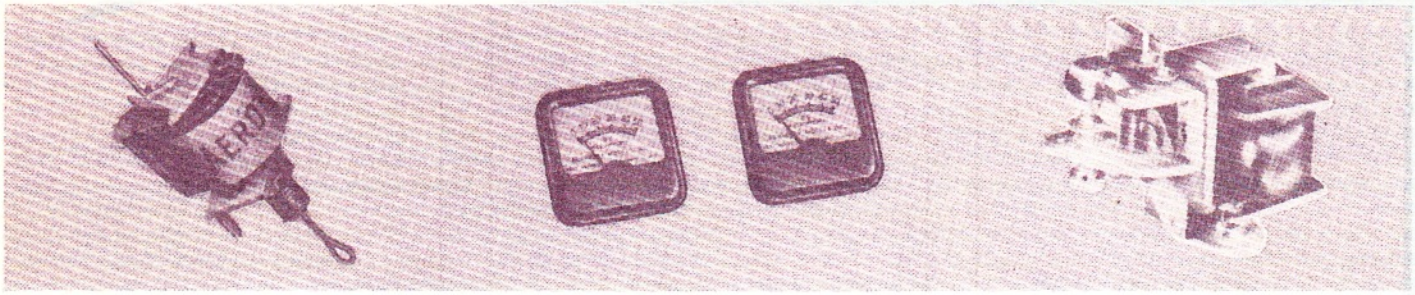
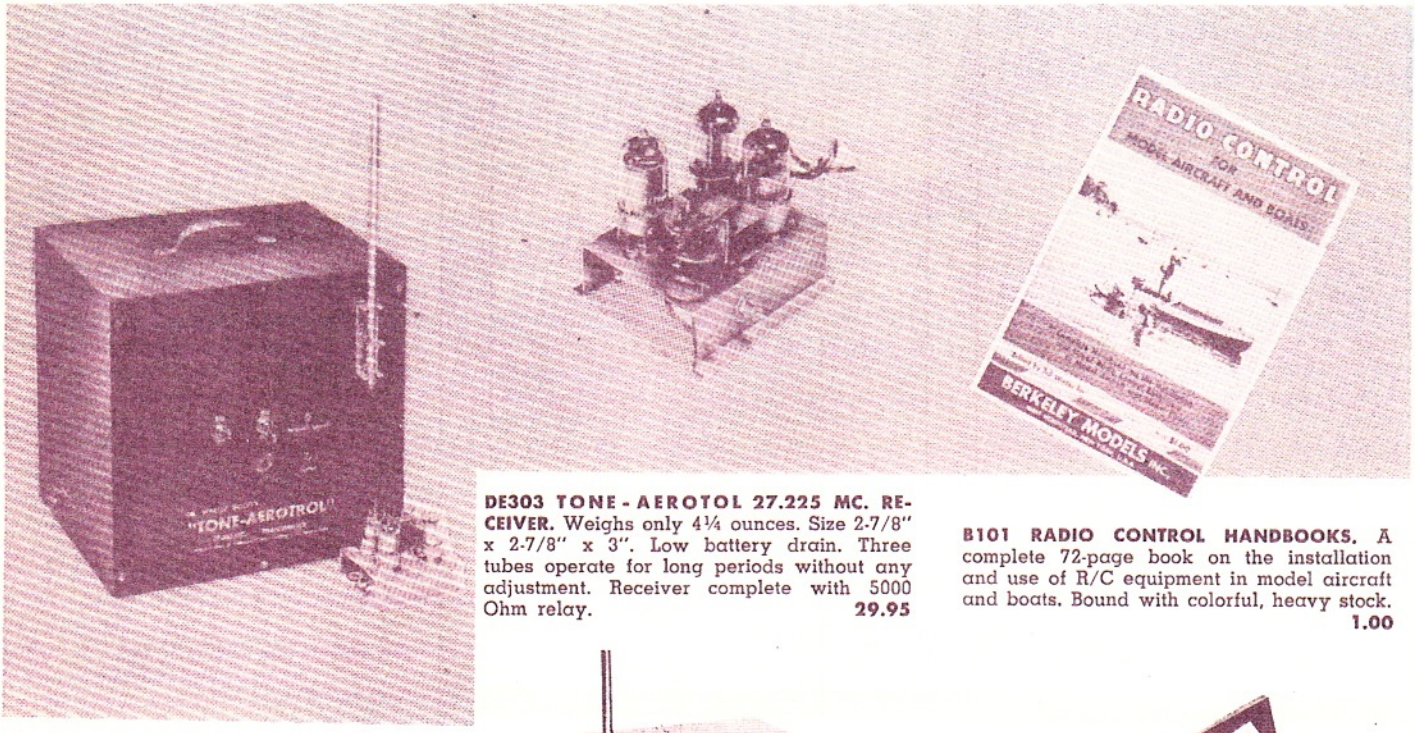


DE205 SUPER AEROTROL ESCAPEMENTS. Self-neutralizing, rubber-powered. Coils assembled to ready made frame, all other parts ready for assembly. Weighs ½-oz. Outside static and interference will not affect it. **3.95**

MILLIAMETERS. Made specifically for use with Super Aerotrol units.

0-3 for use with receivers. **3.50**
0-50 for use with transmitters. **2.75**

DE304 SUPER-SENSITIVE RELAYS. An adjustable-contact R/C relay. 500 ohms resistance. Weighs less than 2-oz. High speed operation. 11 milliwatts sensitivity. Balanced low friction armature. **7.50**

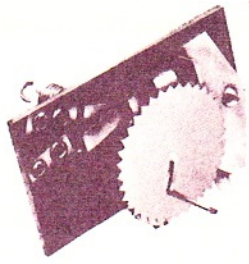


DE303 TONE-AEROTOL 27.225 MC. RECEIVER. Weighs only 4¼ ounces. Size 2-7/8" x 2-7/8" x 3". Low battery drain. Three tubes operate for long periods without any adjustment. Receiver complete with 5000 Ohm relay. **29.95**

B101 RADIO CONTROL HANDBOOKS. A complete 72-page book on the installation and use of R/C equipment in model aircraft and boats. Bound with colorful, heavy stock. **1.00**

DE302 TONE-AEROTROL 27.225 MC. TRANSMITTER. A High-Low Power Output control switch gives range control. Pilot light positively indicates operation. Metal carrying case with handle measures 8" x 10" x 10", weighs 15½ pounds. Comes complete with Crystal and Whip Antenna. **49.95**

DE206 FIELD STRENGTH METER—27.255. A field meter to test transmitters for optimum performance. Every flying club should have one. **19.95**

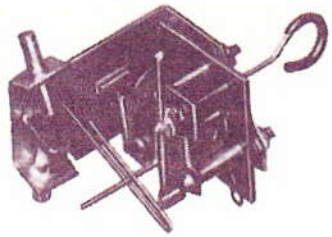


DE305 SUPER AEROTROL COMPOUND ESCAPEMENT. Gives multiple control with single channel radio control equipment. Ruggedly built to withstand abuse and operate heavy controls. Complete, ready-to-use. Instructions included. **5.95**

TUBES. Quality performance tubes for transmitting and receiving units.

RK61 Receiver Tube. **4.25**
XFG1 Receiver Tube. Sub-miniature tube with same characteristics as RK61. **3.50**

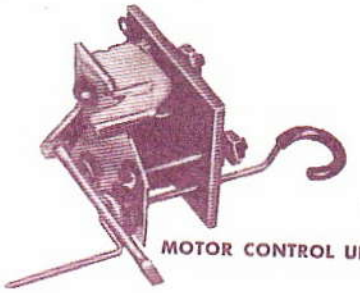
27.255 MC CRYSTALS. For use with transmitters. **5.25**



COMPOUND ESCAPEMENTS

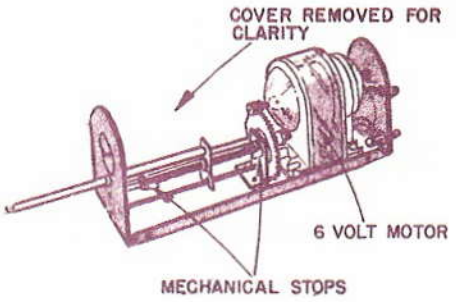
COMPOUND ESCAPEMENTS. A self-neutralizing, four position, speed regulated control unit . . . no sequence. Designed for operation with any single channel radio control while duplicating performance of three channel control. Weighs only 0.8 ounce. **14.95**

MOTOR CONTROL UNITS. A special valving arrangement actuated by a standard Bonner SN escapement. Reliable, low current drain; provides engine control and cut-off when used with compound escapement or other suitable switching arrangement. Controls venting into two fuel lines on engines having two needle valves. **9.95**

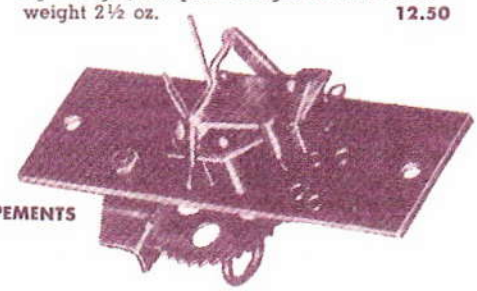


MOTOR CONTROL UNITS

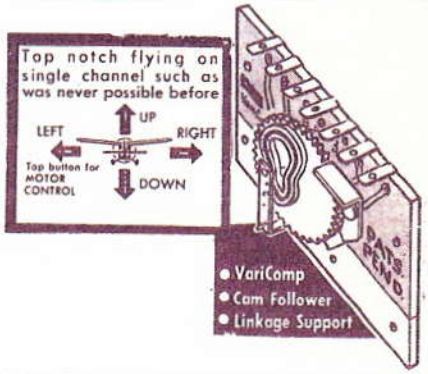
SELF-NEUTRALIZING ESCAPEMENTS. Designed to operate with any radio control. Weighs only ½-oz. Operates as low as 2 volts. Uses ⅛" flat rubber motor. Has ball bearing thrust bearing. Dead beat pawl action. Large contact area on pawl points for long life. Equipped with solder terminals and mounting studs. Has wide spaced journal bearing for miminum wobble. **6.95**



INFINITE POSITION CONTROL SERVO MOTOR. For use with R/C boats, cars and planes. Provides varying degree of turns in boats and cars. Permits finer control in confined areas. For use in planes, it permits controlled spins, low altitude pylon racing, loops, realistic take-off and landing. Features 3-6 volt motor with machined bearings, mechanical clutch, mechanical stops and lightweight, compact design. 1"x 3⅜"x 1⅝" weight 2½ oz. **12.50**



SELF-NEUTRALIZING ESCAPEMENTS

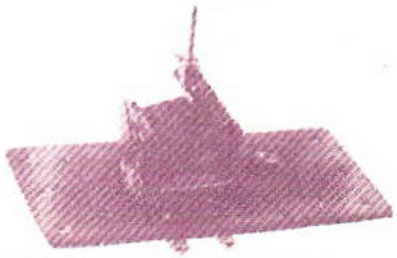


3-UNIT SINGLE CHANNEL MULTI-CONTROLS —(1) VariComp (2) Cam Follower (3) Linkage Support. Easy to install and operate. *VariComp* is a versatile and powerful compound escapement for every type of single channel control system from Rudder Only through Cascade Multi. One VariComp provides rudder control, operates quick blip engine control and control off third position. Any number of VariComps can be cascaded to provide unlimited number of controls. *Face Cam* eliminates control over travel, provides equal travel and keying time for right and left, and neutral third position. Controls never float. Perfect installation is assured by *Linkage Support*. **All 3. 8.95**

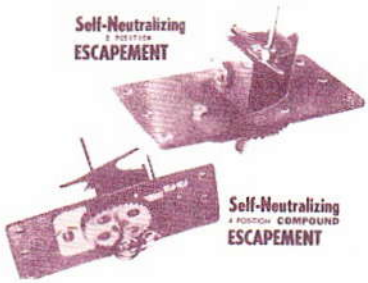
Dual Linkage Support. For flush mounting of two VariComps. **1.45**

Dual Combo. Consists of 2 VariComps and 1 Dual Linkage Support. **18.95**

SELF - NEUTRALIZING COMPOUND ESCAPEMENTS. Low battery drain—will operate with 4 strands of ⅛" flat rubber using 3 volts. Positive, non-skipping, operation is assured by precision, governor action speed control. Arms and dogs made of hard steel to prevent wear at critical points.

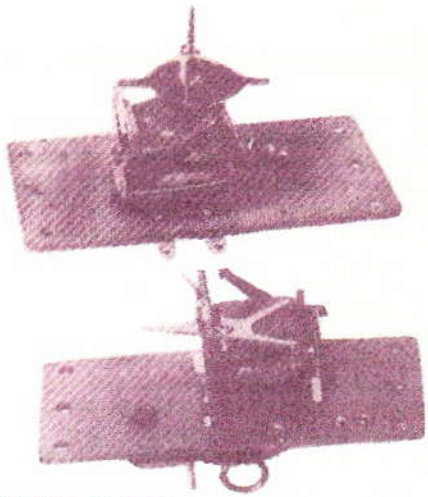


MOTOR CONTROL UNITS. Used for controlling double-jet, 2-speed engines. Fully self-contained—neither contains or requires a spring motor or rubber bands to necessitate winding. Gives positive speed changes with minimum possibility of engine stopping during changeover. **8.95**



2-Position Compound Escapement. Recommended for use in controlling models operated by regular controls where the added advantage of auxiliary controls of engine speed, etc. is not required. **5.95**

4-Position Compound Escapements. Gives the advantage of 3-channel operation when used in conjunction with a single channel radio — provides fully selective control, eliminating all bother and confusion of sequence type controls. Auxiliary control is fully independent of rudder control. **8.95**

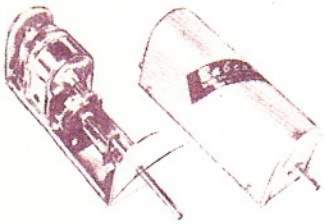


MOTOR BOAT ESCAPEMENT. For controlling rudder of model boats. 4-position, rubber band powered—operates on 3 volts. No battery drain except at instant of pulsating from one position to the next. Operates with any conventional single channel radio without added equipment. **8.95**

DOUBLE COMPOUND ESCAPEMENT. Provides fully selective control of rudder, elevator and motor speed all with a single channel radio. **10.95**

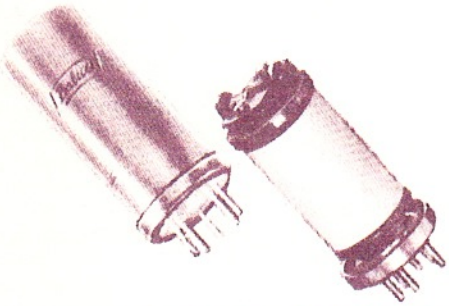
Assured R/C Reliability

Babcock
DESIGNED
AND ENGINEERED
FOR RADIO CONTROL



SERVO MOTOR

ELEVATOR SERVO MOTOR. Positionable or trimmable elevators for use on airplanes or rudders on boats. May be mounted directly to airframe or boat. Features are: 3-volts—motor reverses with change in polarity, employs slipping clutches rather than limit switched with their contact troubles, simple connections, infinitely positionable, full ¾" travel, ample thrust (1-lb.) for larger elevators, size 1"x 3½"x 1⅝", weight 2½ oz. **12.50**



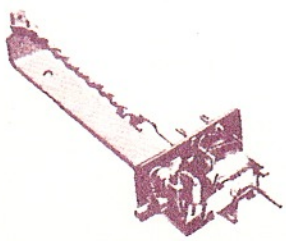
RELAYS FOR R/C RECEIVERS

BR-1 SUBMINIATURE RELAY. Sensitive relay for small engines. For use with Babcock radio control equipment. Plugs into standard 7-pin miniature tube socket. **9.00**

MARK II SUPER COMPOUND ESCAPEMENT

MARK II SUPER COMPOUND ESCAPEMENT. For all R/C model planes and boats, regardless of size. Special coaxial magnetic circuit guarantees greater efficiency; 8 ohm coil 2 to 3 volts; elevator and rudder control linkage furnished with unit; handles from ⅛" to ¼" rubber; simple to install—torque rod bearings in frame insure automatic alignment. **7.95**

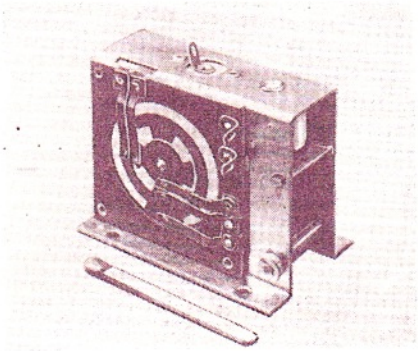
UNIVERSAL MOTOR CONTROL ESCAPEMENT. Operates on 2 to 3 volts; does not require an engine with two needle valves; crank arm and linkage permit speed control by alternate mechanical means. Completely self-contained unit, it can be wound by the crank-pin—uses standard rubber band for power. **8.95**



UNIVERSAL MOTOR CONTROL

Babcock

MOTOR SPEED CONTROL AND SEQUENCE REVERSING RELAY



MOTOR SPEED CONTROL AND SEQUENCE REVERSING RELAY. For battery powered R/C model boats, cars, trucks and other control use. Revolutionary new 8-position printed circuit contact wheel, rotated by an integral electromagnetic mechanism. Adequately handles any battery-powered motor, even 2 large motors in a twin screw installation. Maximum contact rating, 10 amps at 6 volts. Actuating circuit, intermittent type for low battery drain, 1 amp at 3 volts. Auxiliary 5 amp contact at top of relay, closed during time actuating coil is energized, may be used for other signaling devices. Rust-proof, corrosion-proof parts. Contacts of phosphor bronze, current-carrying elements rhodium plated. All other metal parts are cadmium plated. **12.95**

Babcock


BCR-4A

27.255 m.c. Equipment

3-CHANNEL RADIO CONTROL

FOR LARGE MODEL PLANES AND BOATS

BCR-4A MULTI-CHANNEL RECEIVERS. Virtually crash-proof. One simple tuning adjustment. Constant carrier, audio tone. Hermetically sealed relays and audio filter unit, not tuned reeds. Low current drain assures long life. Total installed weight including servos, batteries and receiver—2 lbs. Easy to install. Gives full pilot control of model planes and boats within a vision radius of 2 miles. Frequency 27.255 mc. Includes tubes, relays, connector and instruction book. **86.00**

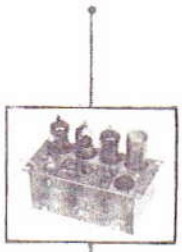
BCT-4 TRANSMITTER

BCT-4 MULTI-CHANNEL TRANSMITTERS. With 3-ft. whip antenna. Sturdy metal, gray Hammertone case 4¾"x 3½"x 8" high, weighs 4 lbs. with batteries. Hand-held, entirely self-contained. 4-position control stick, single tuning adjustment, radiation indicator, on-off switch. Range up to 2-miles in line of sight. Frequency 27.255 m.c. Includes tubes, crystal, antenna. **69.00**

BCR-4A INSTALLATION KITS. Contains connector to receiver, color coded wire, sleeving, battery connectors, DPST on-off switch, phone jack and milliameter jack. Simplifies receiver installation. **3.50**

SINGLE CHANNEL RADIO CONTROL

FOR PLANES AND BOATS WITH 16-OZ. LOAD CAPACITY


BCR-3

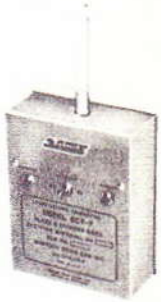

BCT-2

BCR-3 SINGLE CHANNEL RECEIVERS. Failure-proof military design, 3 hard tubes. Constant carrier, audio tone. Relay current change 0 to 6 MA through 10,000 ohm relay. Signal increases relay current. Extreme sensitivity, hermetically sealed relay, no adjustments. Non-critical antenna. Self-contained arc suppression. May use any good escapement. 4⅛" x 2-1/16" x 2¾" high, weighs 5.3-oz. **29.95**

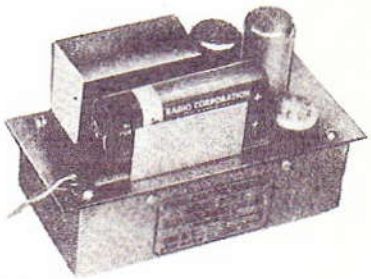
BCT-2 SINGLE CHANNEL TRANSMITTERS. Military design. Gray metal Hammertone case 4¾"x 3"x 8" high. Crystal controlled on 27.255 m.c. Separate modulator tube and audio oscillator. Loaded 3-ft. whip gives adequate range. Radiation indicator on panel —tune for maximum output. Uses standard flashlight cells and "B" batteries for power. Complete with crystal tubes, antenna. **39.95**

BCR-3 INSTALLATION KITS. All parts necessary for receiver installation. **2.95**

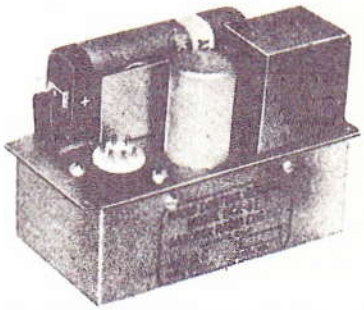
465m.c. Equipment



BCT-7 TWO-CHANNEL TRANSMITTER. A hand held, Class B, 465 mc, self-contained, battery powered unit. Equipped with 3-element beam antenna consisting of ½ wave length folded dipole radiator, reflector with .15 wave length spacing and director with spacing of .2. Size 8¾" high, 6¼" wide, 3" deep. High level plate modulation with two tone frequencies of 5 KC and 7 KC—70% peak modulation. Carrier applied simultaneously with either or both modulation tones. Comes in sturdy metal, gray Hammertone case. Complete with installation kit. **69.95**

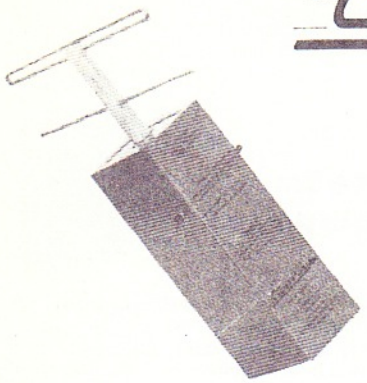


BCR-7 TWO-CHANNEL RECEIVER. Completely transistorized. Contains both 5 KC and 7 KC modulation frequencies. Relays operate by push buttons on transmitter, either independently or simultaneously. For proportional control operation, either or both relays can be pulsed, simultaneously or individually. As high as 25 cycles per second is practicable. Complete with installation kit. Size 4½" long, 2⅜" high, 2" wide. Weight including battery 10 oz. **69.95**



BCR-8A SINGLE CHANNEL RECEIVER. Has modulation frequency of 5 KC; Babcock Type BR-1 relay, hermetically sealed and crash-proof. Hermetically sealed filters on spot frequency—these semi-ultrasonic frequency filters make this equipment immune from interference. Size: 4½" long, 2⅜" high, 2" wide. Installed weight including battery, 10 oz. Complete with installation kit. **39.95**

Citizen-Ship

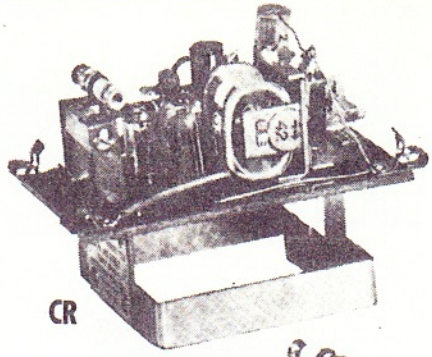


CC-1 Transmitter

CC-1 TRANSMITTER. New 465 mc. Transmitter. Economy version of the first equipment licensed on the Citizens' band for radio control models. Fool-proof . . . just plug in batteries and fly. **34.95**

CR RECEIVER. Original 465 mc Receiver that is a self-contained unit with a built-in antenna designed to receive signal from 465 mc Transmitter up to a mile or more. No adjustments are necesssary. Guaranteed to "fly out of the box"—very simple for use by the non-technical modeler. **29.95**

AR RECEIVER. 465 mc Receiver for small radio control planes including ½A. Has antenna removed resulting in volume reduction of 30%. Permits use of fuselage only 2½" wide. Has two simple tuning adjustments allowing it to be turned on the field. **24.95**



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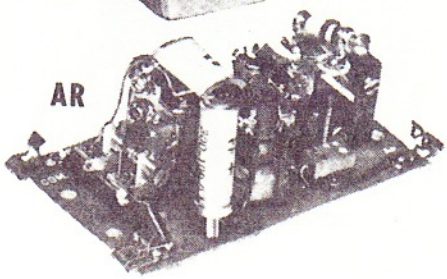


AR

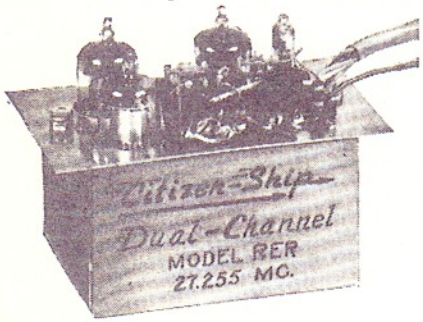
DUAL CHANNEL RADIO CONTROL EQUIPMENT

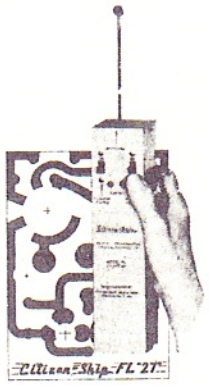
RER RECEIVER—Dual Channel Tone Receiver for 27.255 mc. Weighs only 7 ounces including protective steel box. Selectively closes either of two relays upon receiving correct audio tone. Tuned by built-in selective filters which are fixed and non-critical. Low idling current—hi plate current change. Extremely sensitive, yet simply designed for multi-channel operation. **39.95**

REX TRANSMITTER. 27.255 mc Class C Transmitter, Crystal Controlled — Tone Modulated. 3-tube fully tuned and adjusted for multi-control of model planes and boats. MOPA circuit. Right switch gives hi-tone—left, low-tone. Fixed tuning of tones requires no adjustments to match receiver selective filters. Long battery life. **39.95**

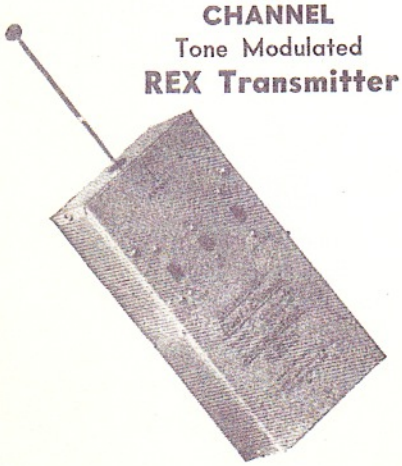
IRE INSTALLATION KIT FOR RER RECEIVER. Contains: Plug and socket with rubber shield, 500,000 ohm potentiometer, 2 pole on-off switch, open circuit phone jack, phone plug, 12" length hookup cable. **4.95**

Citizen-Ship RER Receiver





DUAL CHANNEL
Tone Modulated
REX Transmitter



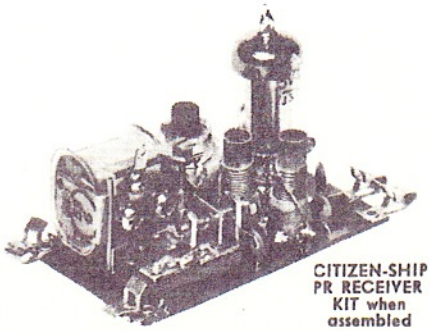
KITS . . . the Latest!

FL "27" TRANSMITTER. Printed Circuit Do-It-Yourself Kit. So small it handles like a flashlight. Built in tuning indicator with one adjustment only. Cost includes 27.255 mc. Crystal and powerful 3A4 Tube. **19.95**

FLX TRANSMITTER. Same as FL "27" factory assembled and tested. **24.95**

PR "27" RECEIVER KIT. Simple reliable hard tube 27.255 mc Receiver. Virtually crash-proof. Components all on same side of base for mounting on thick sponge rubber. Sensitivity so great, set will control model as far as eye can see it. Printed circuit base assures accurate, easy assembly. Comes complete with Relay and 3V4 Tube. **19.95**

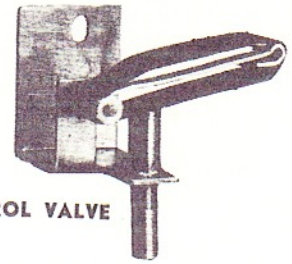
PLR "27" RECEIVER. This is the same as the PR "27" Receiver, except that it is *factory assembled and tested.* **24.95**



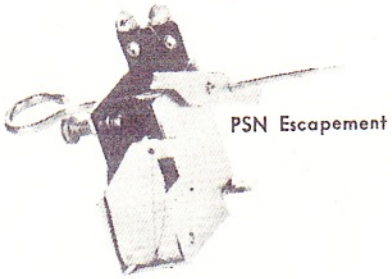
CITIZEN-SHIP PR RECEIVER KIT when assembled

Radio Control Accessories

CONTACT CONTROL



CONTROL VALVE



PSN Escapement

SE SELECTIVE ESCAPEMENT

MOTOR SPEED CONTROL

A new way to secure additional control with Single Channel equipment. Consists of *Contact Control* and *Control Valve*. *Contact Control* mounts on SE Escapement. Gives motor speed change with "fast beep" on transmitter operated switch. *Control Valve* mounts on PSN Escapement — can't miss; can't leak—suction cup seal. Quick and easy to mount, perfectly suited to new or existing control installations. Both for **3.95**

ESCAPEMENTS. Reliable from fully wound motor down to last few turns. Current drain from 300-600 M.A. depending on battery voltage. Adapted to new "rudder only" AMA rules. Use ⅛" flat rubber.

Available in 2 Types

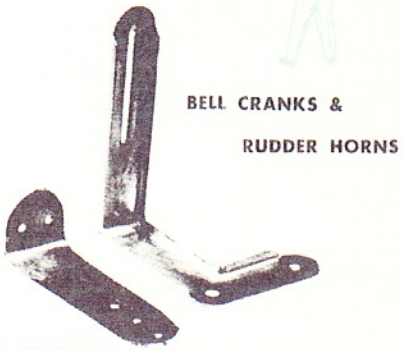
SE (Selective) Escapement. Selects right or left — at will. Always starts from same neutral. One pulse gives right rudder; two pulses left rudder. Weight—less than 1 oz. Mounting and space requirements interchangeable with PSN. **7.95**

PSN Escapement. Right and left come up in sequence when transmitter keyed. Neutral with no signal gives fail-safe operation. Guaranteed 25,000 operations. Dimensions 7/8" x 7/8" x 5/8". **5.95**

COMPLETE SPEED CONTROL SYSTEM

An outstanding value which consists of "Motor Speed Control," SE Escapement and PSN Escapement—all for **17.50**

TEST METERS. Know the condition of your batteries before take-off—meter accurately shows readings on plate current, flashlight batteries, filament voltage, "B" battery voltages. Includes voltmeter leads, milliammeter plug and plane jack. **22.95**

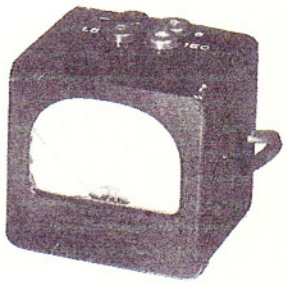


BELL CRANKS & RUDDER HORNS

BELL CRANKS & RUDDER HORNS. For forward location of escapement in radio controlled model aircraft. Features 3 degrees of rudder movement for Training, Sport Flying and Stunt. Rudder cannot drive back escapement in violent maneuvers. Permit easy adjustment in field. **.75**

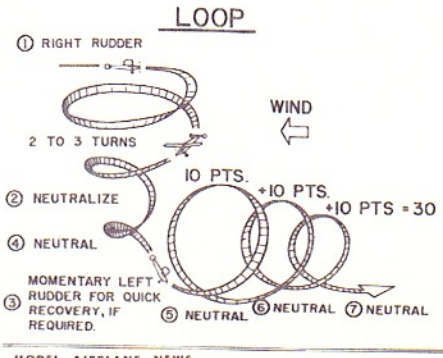
3V4 Radio Control Tubes	**each 2.10**
3A4 Radio Control Tubes	**each 2.10**
10,000 ohm Relay	**7.00**

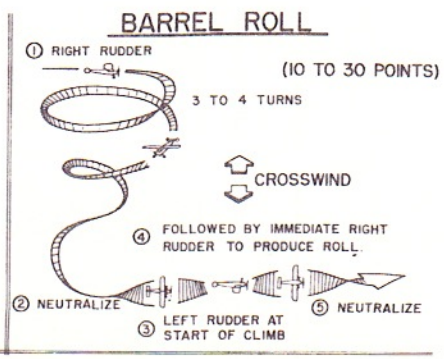
27.255 MC QUARTZ CRYSTAL. For use with Citizen-ship Radio Control equipment. **4.50**

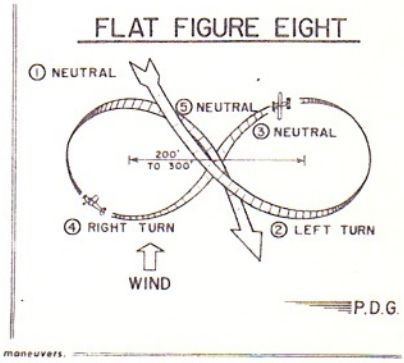


TEST METERS

STUNTING with R/C







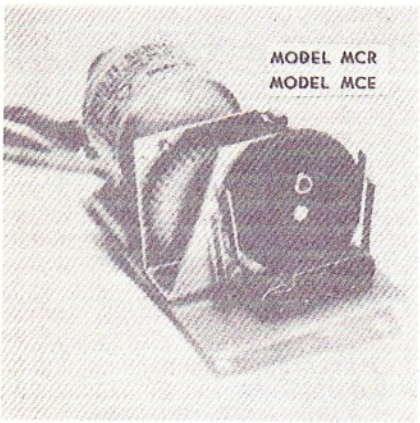
P.D.G.

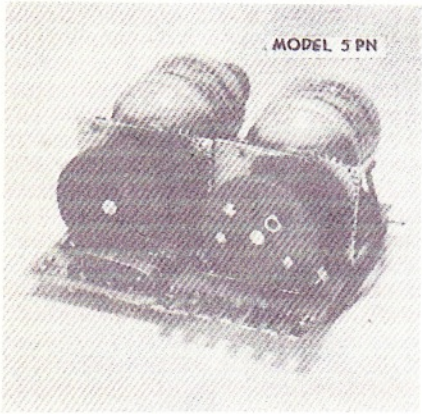
MODEL AIRPLANE NEWS

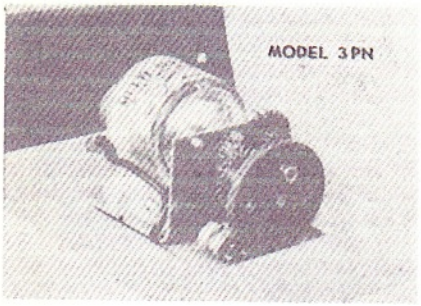
Common maneuvers.

FOR EASIER, SAFER FLYING

DE BOLT MODEL







DMECO

MULTI-SERVOS. Powerful, dependable motor driven R/C actuators. Provide selective control positions; use any radio—require no special equipment; give over ½-lb. of torque; use the very minimum of batteries; 5000 operations on 2 pen cells; fast and positive in action; no rubber bands are used. Made in 4 different models to fit every R/C need.

MODEL MCR MULTI-CHANNEL MULTI-SERVO. Positive, instantaneous rudder action in either direction, self-neutralizes itself electronically and provides proportional action. **18.95**

MODEL MCE MULTI-CHANNEL MULTI-SERVO. Immediate, non-jamming elevator movement in both directions, trimmable and self-centering for smooth flying. **18.95**

MODEL 5PN SPECIAL BOAT SERVO. A complete actuator for single channel radios that provides selective steering, forward speed, reverse speed and power shut-off for electric powered vehicles. **24.95**

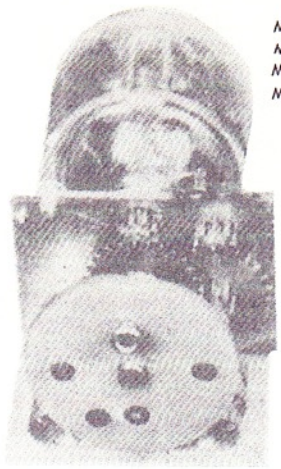
Model 2PN—2 positions with an automatic neutral for single control operation. **11.95**

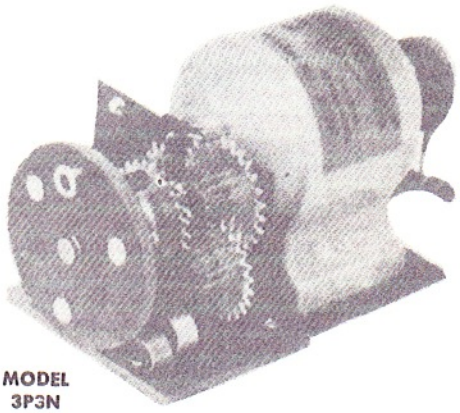
Model 3PN—2 positions with an automatic neutral, plus a 2nd servo circuit added. **14.95**

Model 2P2N—2 positions with two neutrals; use with 3PN for a 2nd air control. **11.95**

Model 3P—3 position actuator without an automatic neutral, engine control. **10.95**

Model 3P3N—3 positions and 3 neutrals. May be used in conjunction with a separate relay or with 3PN. **11.95**





POSITIVE FLOW FUEL TANKS For R/C and C/L Flying

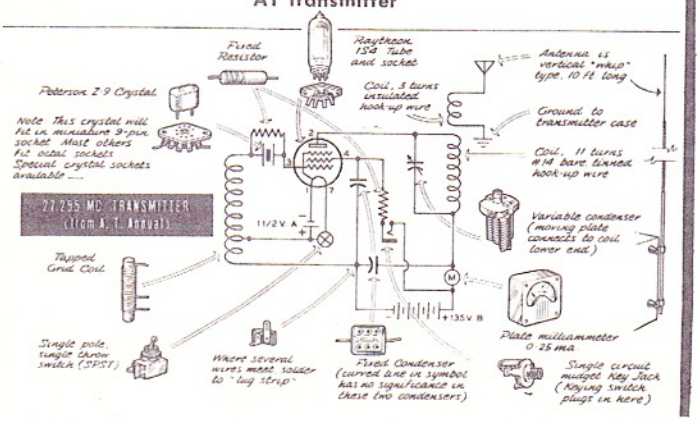
Internal swivel type tanks that assure trouble-free engine operation with a steady flow of fuel throughout all maneuvers—whether flying upright or inverted. Made of fuel-proof brass.

Available in 2 Sizes

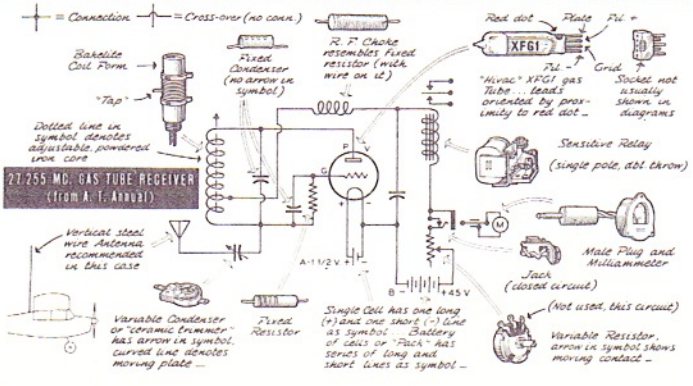
Model A: 2-oz.; 1½" maximum diameter; 2" over all length; 12 minute run with .15 engine; 6 minute run with .19 engine. **1.59**

Model B: 4-oz.; 1¾" maximum diameter; 3" over all length; 10 minute run with .29 engine. **1.69**

AT transmitter



AT recevier



R/C SYSTEMS

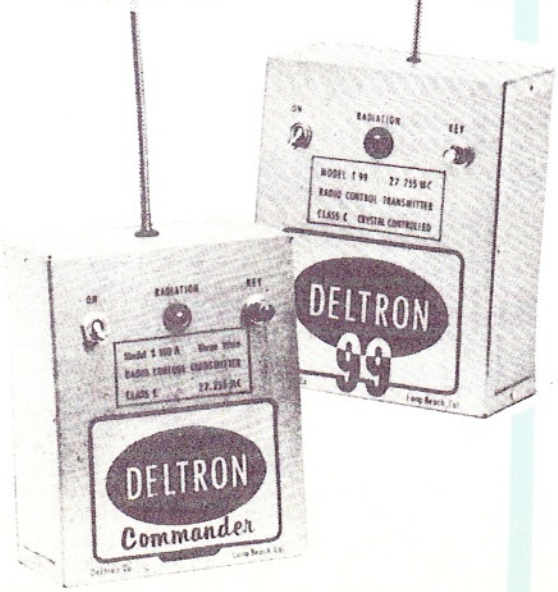
DELTRON R/C EQUIPMENT

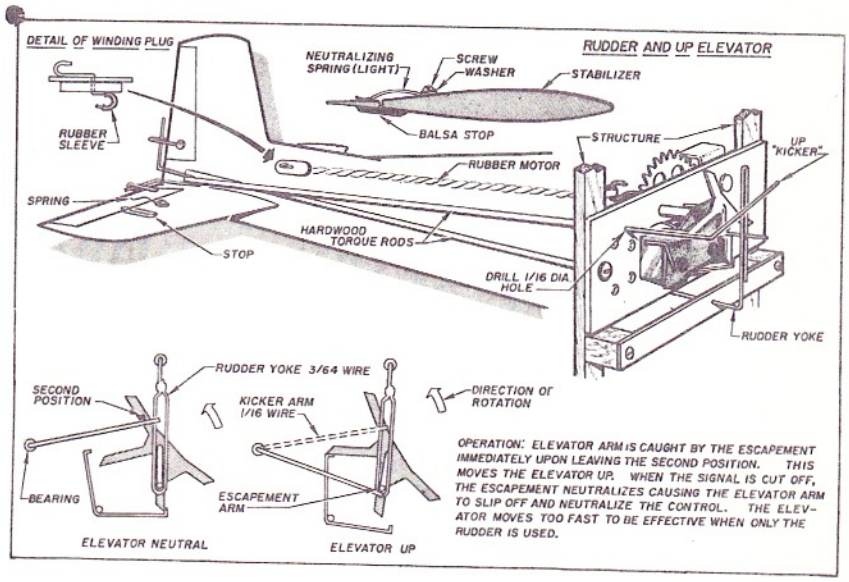
R10C SINGLE CHANNEL 27.255 MC RECEIVER. Featherweight, compact, extremely sensitive—this 2-tube Receiver is the "essence" of dependability. Low current drain makes use of subminiature batteries possible. Weight only 2¼ ozs., size 1⅝" x 2⅜". Single tuning plug; enclosed relay. Complete, fully assembled. **24.95**

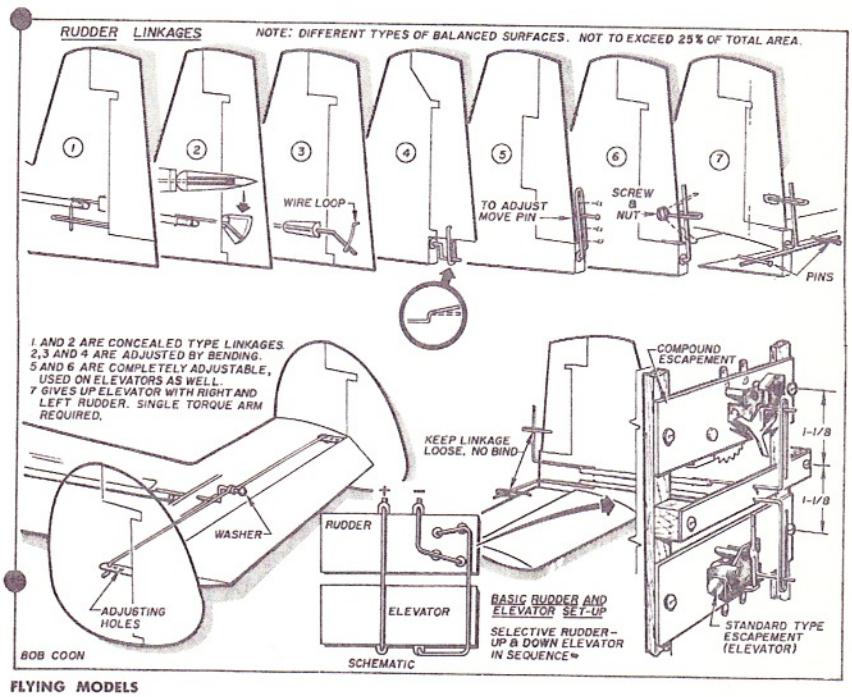
T100A COMMANDER DELUXE SINGLE CHANNEL TRANSMITTER. Class C—27.255 MC. 3 full watts of power packed into a lightweight anodized aluminum case with large battery capacity. Has silver plated printed circuit, collapsible antenna and is factory tuned and adjusted. Rapid pulsing action. **29.95**

T99 TRANSMITTER. Long range, Class C, 27.255 MC. Has newly developed printed circuit—making it years head in performance and economy. Comes in aluminum case with large battery capacity. Factory tuned and adjusted. Price less batteries and antenna. **21.95**

DELTRON ANTENNAS. — Plated, rust-proof with static ball. **.75**







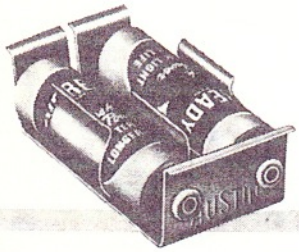
FLYING MODELS

For Greater Power

BURGESS BATTERIES

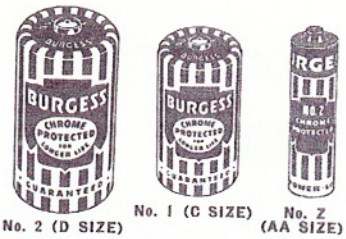
AUSTIN Craft

BATTERY BOXES
FOR RADIO CONTROL



Radio Control Battery Boxes

No.	Type & Voltage	Each
113	Single 22½V	.40
114	Double 22½V	.50
115	Triple 22½V	.85
116	Single 30V	.50
117	Double 30V	.50
134	Single 15V	.40



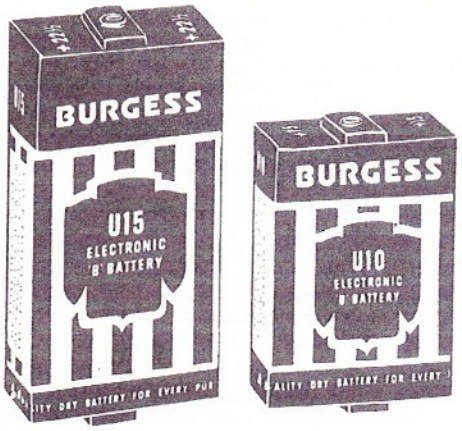
No. 2 (D SIZE) No. 1 (C SIZE) No. Z (AA SIZE)

A complete range of sizes and voltages for all R/C uses Each battery is chrome protected to keep the power fresh; sealed in steel and plastic for longer life and dependability.

No. 1 Batteries. 1½ volts, size 1-15/16"x 63/64". 12 to carton. **Ea .15**

No. 2 Batteries. 1½ volts, size 2⅜"x 1-21/64". 48 to carton. **Ea .15**

No. Z Batteries. Penlight, 1½ volts, size 1-31/32"x35/64". 24 to carton. **Ea 2/.25**



U10. 15 volts. Size 1-7/16" x 39/64" x 1". Flat pressure terminals. **1.10**

P45 "B" Batteries. For R/C operations and portable radios. 67-1/2 volts. Size 1-7/8" x 3-1/2" x 5-9/32". Snap type terminal. **2.85**

No. 2Z2P1 Ignition Batteries. This is the 3 volt battery used with model airplanes, boats and cars. Plug in terminal, plug furnished. Size 1-3/16"x1-3/16"x2-13/16". 12 to carton. **Ea .75**

No. XX30 "B" Batteries. 45 volts. Glove snap terminal. For use in R/C operations. Size 2-17/32"x31/32"x3-21/32". 6 to carton. **Ea 2.25**

No. XX45 "B" Batteries. 67½ volts. Glove snap terminal. For use in R/C operations. Size 2¾"x1-11/32"x3-43/64". 6 to carton. **Ea 3.25**

No. U15 Electronic "B" Batteries. 22½ volts. Flat contact terminal type. For use in R/C operations. Size 1-31/32"x9/16"x31/32". 20 to carton. **Ea 1.40**

No. 4F "A" Batteries. 1½ volts, two hole socket uses plug No. 2744. For use in R/C operations. Size 2⅝"x2⅝x4-3/32". 6 to carton. **Ea 1.25**

No. K45 Batteries. 67½ volts. Glove snap terminals 2-11/16"x2¼". 6 to carton. **Ea 2.95**

No. U20 Batteries. 30 volts. Flat pressure terminals. Size 2-17/32"x39/64"x1". 20 to carton. **Ea 1.65**

Glossary

Actuator—Electro-mechanical device for moving controls.

Antenna—Conductor, as long wire, rod, etc., to intercept (as on receiver) or radiate (as on transmitter) energy, in radio form.

Armature—That part of the relay which is movable under influence of changing magnetic strength.

Battery—Power source for portable electrical or electronic device.

Carrier—Short for carrier-wave, current or frequency of radio wave.

Channel—Single, particular frequency of radio wave.

Choke—High inductance coil opposing passage of pulsating current, but allowing direct current to flow.

Circuit—Path of electrical current, returning to source.

Condenser—Two conductors divided by non-conducting medium.

Crystal—Quartz or Rochelle salt crystal cut in small thin disc or square for maintaining a given frequency.

Escapement—Actuator driven by power of spring or twisted rubber.

Filament—Heater in a tube, similar to the filament wire in light bulb.

Filter—Combination of resistances, inductances, etc., to allow passage of certain frequencies intended to operate more than one actuator. Replaces function of reed bank.

Megacycle (MC)—One million cycles per second.

Meter—Device to indicate measured electrical quantity of current, resistance, etc.

Milliampere (MA)—One-thousandth part of an ampere.

Milliameter—Meter reading milliamperes.

Modulation—Controlled variation of amplitude or frequency of carrier wave according to transmitted signals.

Ohm—Amount of resistance at 1 volt and 1 ampere.

Plate—Output element, or anode, in vacuum tube.

Polarity—Indication of which terminal is positive and which negative.

Potentiometer—Device for varying amount of current flowing through a lead. Called "pot" for short.

Pulse—In modeling terminology, a system by which repeated signals are transmitted, varying as to length and/or rate.

Receiver—A radio receiving set.

Relay—Device which operates a second circuit from current changes in the first circuit.

Resistance—Opposition to current flow.

Resistor—Unit of known, desired resistance placed in circuit to reduce or limit current flow.

Servo—Electric motor-driven actuator.

Tone—Sound, having particular pitch, superimposed on carrier wave, to operate controls by means of modulated or audio receiver. An audio modulated transmitter-receiver system.

Transmitter—Radio transmitter for broadcasting the signals.

Volts—The "force" in a battery or power source which pushes the current through the circuit.

Wave Length—Distance between peaks of same polarity; equal to velocity over frequency.

Quality Accessories

ARISTO-CRAFT
DISTINCTIVE MINIATURES

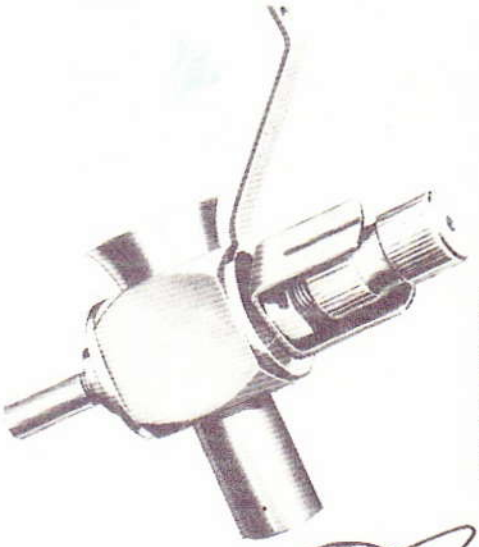
ARISTO MULTI-TESTER

27.255 CRYSTAL. For use with Aristrol R/C equipment. **4.50**

ARISTO-CRAFT MULTI-TESTER. A sturdily built, accurate testing device that covers every R/C need. It has a full 2⅝" meter face, easy to read and allows the hobbyist to carry one meter for all R/C checks. In addition he can also check resistance of his R/C components, battery voltages, etc. Pocket size, the Multi-Tester measures 4⅝"x 3⅛"x 1⅛" and is housed in a high impact, strong, black plastic case. **14.95**

ARISTROL 3-D TWO-TUBE LORENZ RECEIVER KIT. Lowest tube idle, 1-2 milliamperes. Tube life should be 350 hours or more. Very low filament drain 65 m.a. One set of pencells could last all flying season. Kit is complete with all assembly instructions, installation data, R/C hints, trouble shooting and flying data. **8.95**

3-D 2 TUBE RECEIVER



BRAMCO PRODUCTS

BRAMCO

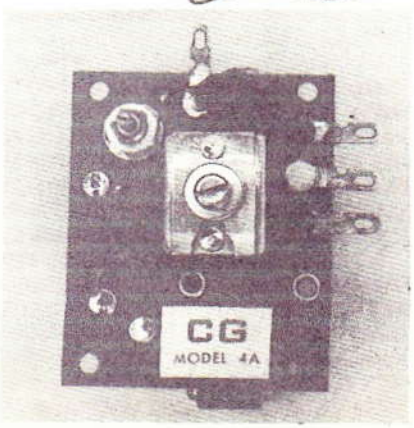
REMOTE CONTROL THROTTLE. For 2-cycle engines, .19 to .35; for Radio-Control and U-Control models with Veco, K & B, Fox and most other engines. Works in any position; fully variable speed range, including shut-off; does not "load-up" engine—varies fuel mixture; operates by servo, escapement, or third line; easy to install . . . plugs into venturi of present engine. **4.95**

JAICO

GEM RELAYS

RADIO CONTROL RELAY. Weighs less than ½-oz., has high sensitivity and is crash-resistant. Low contact resistance with fine silver points. ¾" high, 17/32" wide, 11/16" long. One screw mounting. 5000 ohm coils. Has two extra tie point terminals to mount conductors or resistors. **4.95**

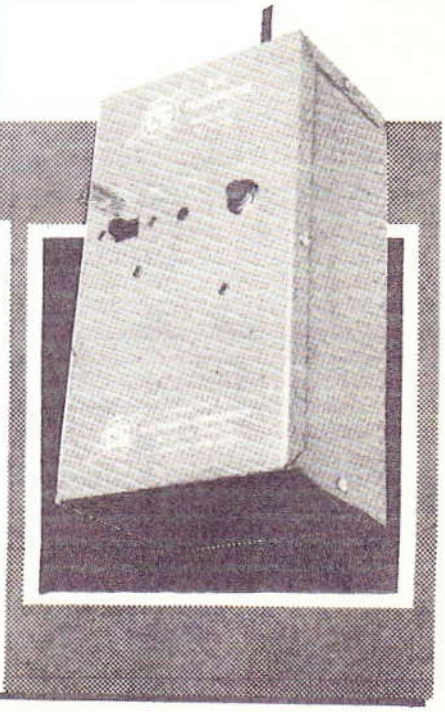
CG



MODEL 4-A RECEIVER. Designed for remote control in model aircraft boats and cars. The 4-A receiver weighs slightly more than 1 oz. which is ideal for installations in small models. It uses a standard receiving type tube that is inexpensive and available at all radio repair shops. Operating frequency is 27.255 mc. **12.95**

T-11 TRANSMITTER. An economical hand held unit designed for radio control of models equipped with 27.255 mc. receiving equipment. The transmitter operates with an input of 1.5 watts to the plate of a power oscillator. The power output is approximately .3 watt, crystal controlled to conform to FCC requirements. **22.95**

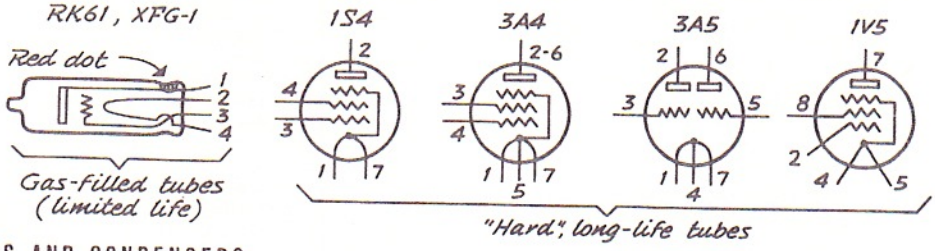
INSTALLATION KIT. For E.C.E. Radio Control equipment. **1.98**



SYMBOLS

MOST WIDELY USED R/C TUBES

Always read tube and socket leads clockwise looking at bottom —



STANDARD COLOR CODE FOR RESISTORS AND CONDENSERS

COLOR	FIGURE	MULTIPLIER
Black	0	1
Brown	1	10
Red	2	100
Orange	3	1000
Yellow	4	10000
Green	5	100000
Blue	6	1000000
Violet	7	10000000
Gray	8	100000000
White	9	1000000000

Examples:

- Brown, green, red rings or dots on cond., 1500 ohms
- Yellow, violet, orange - 47000
- Orange, orange, green - 3.3 megs.

- Most common resistor markings: 1st. fig., 2nd. fig. Read left to right in ohms. Multiplier. Silver or gold for tolerance (most res'trs don't have this)
- Simplest mica condenser markings: 1st. fig., 2nd. fig. Read left to right in mmf. Multiplier
- Ceramic condenser markings: 1st. fig., 2nd. fig. Read left to right (wide band at left) in mmf. Multiplier

Extreme left & right bands show temperature coef. & tolerance — (of little interest to R/Cers) Bands, dots found on ceramics

SWITCHES

Single pole, single throw (SPST)

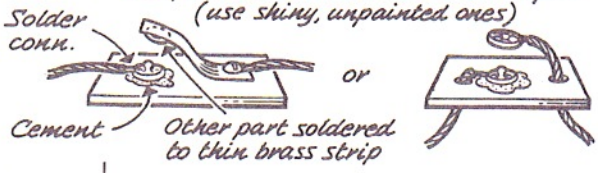
Double pole single throw (DPST)

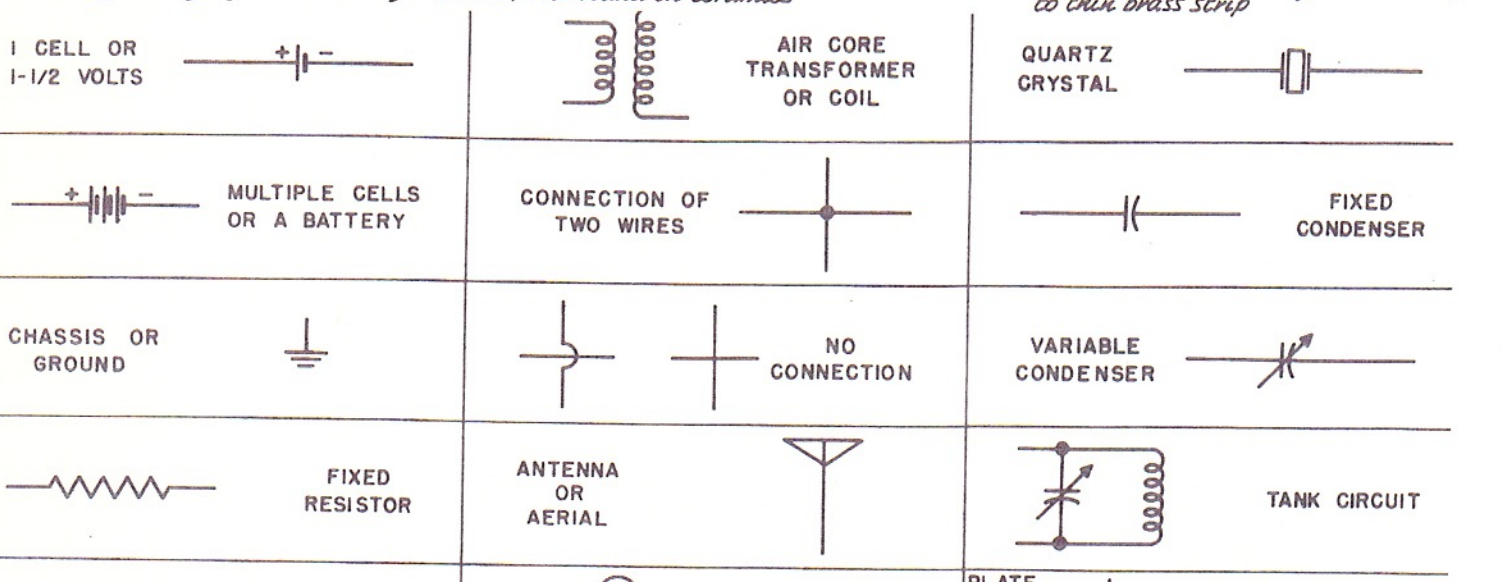
Dotted line denotes both parts move together, no electrical conn.

Preferred types of slide switches — as seen from end: or

(Types with any sort of bat contact usually unreliable)

Simple switches from dress snaps: (use shiny, unpainted ones)



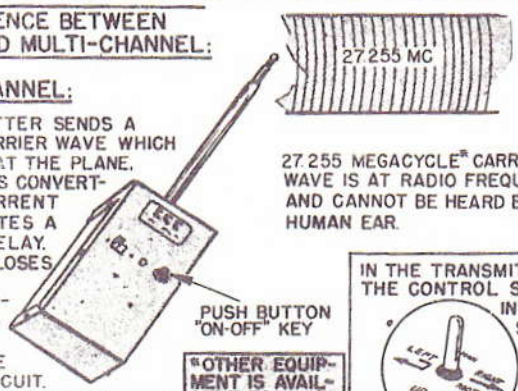


MULTI-CHANNEL R/C EQUIPMENT

THE DIFFERENCE BETWEEN SINGLE- AND MULTI-CHANNEL:

SINGLE-CHANNEL:

THE TRANSMITTER SENDS A 27.255 MC* CARRIER WAVE WHICH IS RECEIVED AT THE PLANE. THIS SIGNAL IS CONVERTED INTO A CURRENT WHICH OPERATES A SENSITIVE RELAY. THE RELAY CLOSES AND OPENS A PAIR OF ELECTRICAL CONTACTS THAT OPERATE THE CONTROL CIRCUIT. (SEE FM DATA SHEET NO. 11 FOR FULL DETAILS)



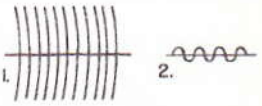
27.255 MEGACYCLE* CARRIER-WAVE IS AT RADIO FREQUENCY AND CANNOT BE HEARD BY THE HUMAN EAR.

*OTHER EQUIPMENT IS AVAILABLE FOR 465 MEGACYCLE OPERATION.

MULTI-CHANNEL:
(TONE-CONTROL)

A TYPICAL THREE-CHANNEL HAND-HELD TRANSMITTER.

27.255 MEGACYCLE (MILLION CYCLES PER SECOND) BROADCAST SIGNAL IS A COMBINATION OF:

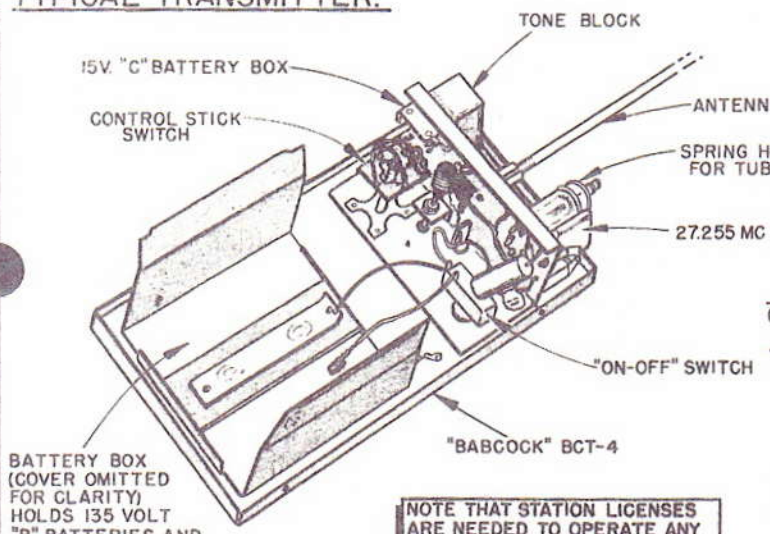


(1) A 27.255 MC CARRIER-WAVE -- SAME AS SINGLE-CHANNEL.

(2) AN AUDIBLE SOUND OR TONE. THE RECEIVER SORTS OUT THE TONE AND DISCARDS THE 27.255 MC.

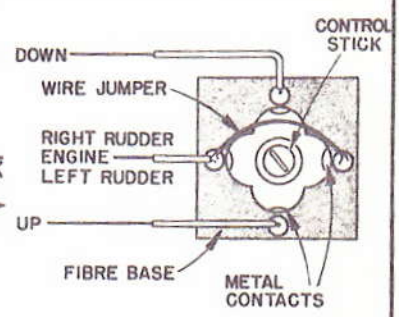
IN THE TRANSMITTER SHOWN, THE CONTROL STICK IS MOVED IN THIS MANNER. SEE THE WIRING DETAIL SHOWN BELOW FOR COMPLETE UNDERSIDE DETAILS.

TYPICAL TRANSMITTER:



A MULTI-CHANNEL TRANSMITTER CAN SEND THREE OR MORE TONES. EACH CONTROL CHANNEL OPERATES ON A SEPARATE TONE--THREE TONES PROVIDE THREE CHANNELS. THE "BABCOCK" BCT-4 TRANSMITTER SENDS THREE TONES, AS AN EXAMPLE--300~(CYCLES PER SECOND), 720~ AND 1620~.

CONTROL STICK SWITCH



NOTE THAT STATION LICENSES ARE NEEDED TO OPERATE ANY R/C EQUIPMENT. FILE FORM 550 AT YOUR F.C.C. DISTRICT OFFICE.

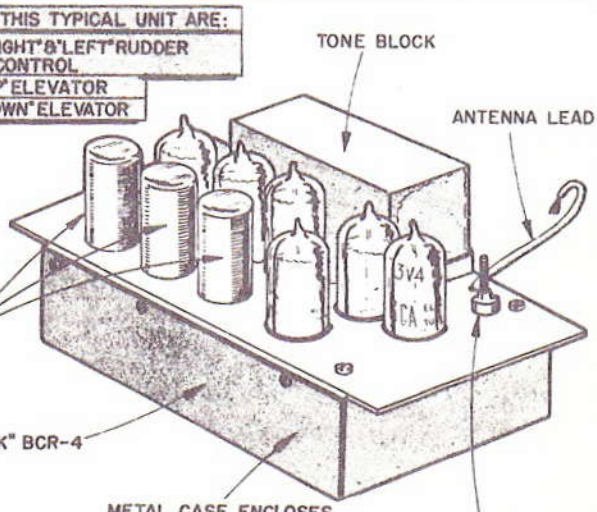
THE CONTROL STICK IS MOVED TO MAKE CONTACT, TO OPERATE THE DESIRED CHANNEL. ONLY ONE TONE CAN BE SENT AT A TIME! NOTE THAT "RIGHT", "ENGINE", OR "LEFT" IS OBTAINED BY PULSING THE CONTROL STICK BACK AND FORTH UNTIL THE MODEL RESPONDS TO THE PROPER CONTROL.

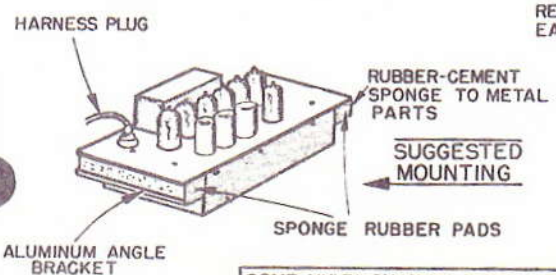
TYPICAL RECEIVER:

THE TONES ARE RECEIVED, ONE AT A TIME, AND ARE FED INTO THE TONE BLOCK WHICH PASSES A CURRENT TO THE RELAY WHICH OPERATES THE PROPER CONTROL CIRCUIT. NOTE THAT THE 27.255 MC SIGNAL IS ONLY USED AS A CARRIER TO TRANSMIT THE TONES. THE RECEIVER WILL NOT OPERATE ON A 27.255 MC SIGNAL ONLY--CORRECT TONES ARE A "MUST."

THE TONE BLOCK IS AN ELECTRICAL FILTERING (TUNED) CIRCUIT, AND HAS NO MOVING PARTS.

TONES RECEIVED BY THIS TYPICAL UNIT ARE:	
300~	OPERATES "RIGHT" & "LEFT" RUDDER AND ENGINE CONTROL
720~	OPERATES "UP" ELEVATOR
1620~	OPERATES "DOWN" ELEVATOR





SOME MULTI-CHANNEL SETS USE TUNED METAL REEDS--SIMILAR TO A HARMONICA WITH ELECTRICAL CONTACTS--TO SORT OUT THE TRANSMITTED TONES.

BY BOB BURAGAS

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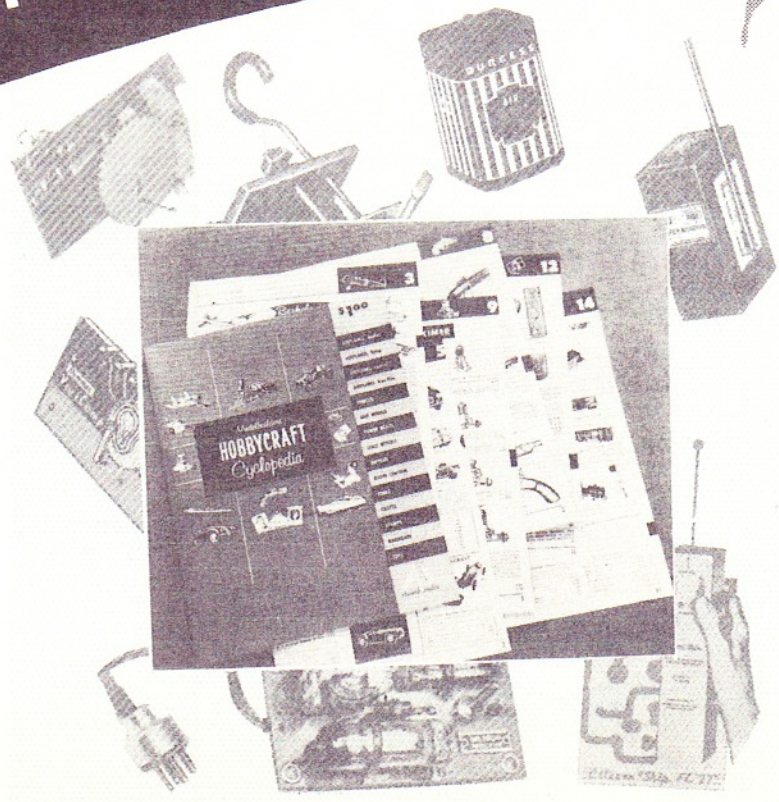

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