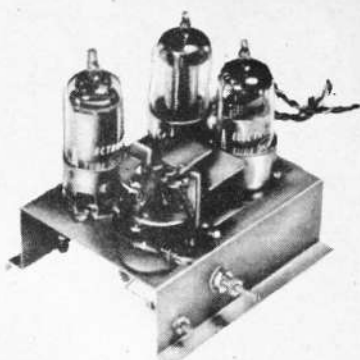
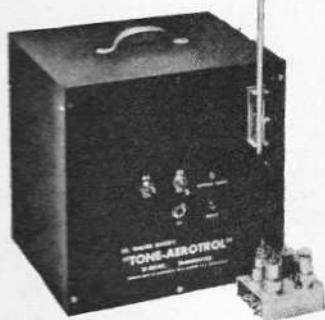


Tone-Aerotrol Transmitter and Receiver



■ Berkeley Models' Tone-Aerotrol 27.255 mc. equipment is unique in that it is manufactured with the full indorsement of the originator, Dr. Walter A. (Guff-Rudderbug-Wag) Good. Receiver was originally a construction article in the May 1954 issue of this magazine, while the June issue carried full details of the transmitter. Shortly after the articles were published, Berkeley procured several sample units from Dr. Good and has had them in field use ever since. These extensive checks were expected to indicate that some changes would be needed to prepare similar equipment for sale; after innumerable tests, however, the two units are being sold in almost the identical form in which they appeared in print.

Only significant change on the receiver is substitution of a Kurman relay (a new type with screw contacts) for the original Sigma 4F; this saves about an ounce of weight. On the transmitter, the

3V4 oscillator screen grid resistor has been dropped to 47K ohms. Berkeley furnishes a shorter antenna than was used with the original, since field strength tests show it to be just about as effective. Because the circuits are virtually unchanged from those in the issues mentioned, we are not printing them again here.

As the name implies, Tone-Aerotrol equipment involves audio frequency operation, and does not depend upon CW operation like much of the R/C apparatus now in use. While this means that the units are somewhat more complex than the usual one- or two-tube receivers and transmitters, the advantages of AF operation have been well proven. For one thing, lots less transmitter power output is required, yet range is more than ample for any R/C use. There are no "sensitivity" adjustments on the receiver; you have only one tuning adjustment. The receiver is not fussy as to antenna length or loading; once you have it tuned up, the set seldom needs further attention. The transmitter is of the oscillator-amplifier type, which assures good stability, since changes in antenna loading have no effect on frequency. Even if you can grab hold of the antenna, the only result is a slight drop in signal strength.

Tone equipment, in general, is less susceptible to interference—something to ponder in these days of crowded R/C frequencies. While the receiver can be bothered more by "electrical noise" in a model than gas tubers, it is no worse in this respect than many single hard tube receivers; actually, the Tone-Aerotrol receiver was not designed to be extremely "hot," and doesn't need to be, since the transmitter has quite a fair amount of power output.

The receiver is mounted on an aluminum chassis, with the single tuning adjustment projecting from one side. Antenna connection is made at a soldering lug under the chassis; battery and escapement connections are made via flexible leads. The receiver can be fastened to a sheet of plywood to which you cement a half-inch-thick pad of sponge rubber. Mounting may be in any direction, but maximum protection is afforded by fastening the receiver vertically against a sturdy bulkhead in the model, with tubes and relay projecting toward the tail. Since the relay current runs from zero to about 2½ ma., heavy spring

Dr. Good's R/C sets originally appeared as projects in this magazine. They're still available on Hobby Helpers plans #554A and #654A.



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tension and wide spacing can be used for the relay, making it very intensive to vibration.

Berkeley's transmitter consists of a small enclosed chassis (which carries all the actual circuitry) fastened inside a much larger case that acts as additional shielding and affords good ground capacity; the latter making it possible to properly tune the antenna system and get plenty of power out to the receiver. While the inner chassis, which measures 3 x 4 x 5" (with tubes bringing the 4" vertical dimension up to about 6½") can be removed easily from the large case for mounting in some other manner, this is not recommended unless the new mounting completely encloses the unit and batteries. Reason for this is that a little R.F. power can sneak out from the oscillator which might tend to overload the receiver when the xmtr is close to the model. "Double-shielding" on the Tone-Aerotrol minimizes this.

In operation, receiver plate current is normally high, when no signal is coming in. When you turn on the transmitter the receiver plate current will *rise* slightly; when the keying button is depressed, this current *drops* sharply. The transmitter runs with the two R.F. tubes on at all times, the key merely turning on and off the third tube, which acts as a tone generator and modulator. The transmitter uses what is termed "grid modulation," which is entirely suitable for the purpose. However, it gives rise to an odd indication which might puzzle the user who is not aware of it; actual power output of the transmitter *drops* when the key is pushed. This is indicated by a dimming of the output indicator lamp on the front panel.

No meter is furnished with the transmitter; normally none should be needed. The lamp mentioned shows actual power output; all you have to do is tune for "brightest" light. If trouble-shooting should be needed at any time, there are two pairs of "test points" on the chassis for measuring oscillator or amplifier plate current. Transmitter comes completely adjusted; the only further adjustment needed when it is put in actual use is a touch with the antenna tuning condenser, which may be reached from the front of the case. A Hi-Lo switch on the panel cuts the B voltage to the two R.F. tubes. It is useful for tuning up close to the transmitter and for range checks with the receiver.

Specifications: Tone-Aerotrol transmitter. Uses 3V4 oscillator on 27.255 mc., 3V4 power amplifier, 3A5 multi-vibrator and modulator. Modulation frequency about 400 cycles. Black-crackle-finished case measures 8 x 10 x 10" high, has On-Off toggle switch, Hi-Lo switch, key jack, indicator lamp and screw for antenna tuning on front panel. Two-section collapsible antenna is 33" long when folded, 58" when extended; fits into special bracket on transmitter front panel, held with one wing nut. Normally open key button in small metal box. Weight of transmitter complete with batteries—15½ lbs.

Battery requirements. A—1.5 V. at 400 ma. (Eveready 742 or equiv.). B—135 V. Osc. draws about 6 ma. plate current and Amp. about 10-12 ma., with Power switch at Hi. Amp. power input is about 1.6 W. and power into the antenna is about .5 W. Total plate current is 18-20 ma., whether key is pressed or not. Suggested B battery—two 67½ V. units (Burgess XX45) or three 45 V. units (Eveready 482 or equiv.).

Tone-Aerotrol receiver. Three tubes; 1U5 super-regen. detector (diode used as AF detector), 1U4 AF amplifier, 3V4 relay tube. Kurman 5000 ohm relay with screw-adjusted contacts. Overall size 2¾ x 3 x 2¾" high, including tubes. Weight, 4.15 oz. One adjustment, for tuning by means of coil slug. Recommended antenna length—24".

Battery requirements: A—1½ V. at 200 ma. (At least one size C flashlight cell or two pen-cells in parallel should be used). B—45 V. at 2.75 ma. (no modulation). Use one Burgess XX30 or equiv.