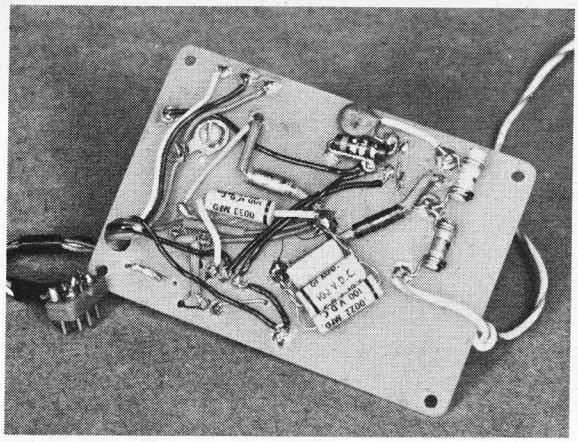
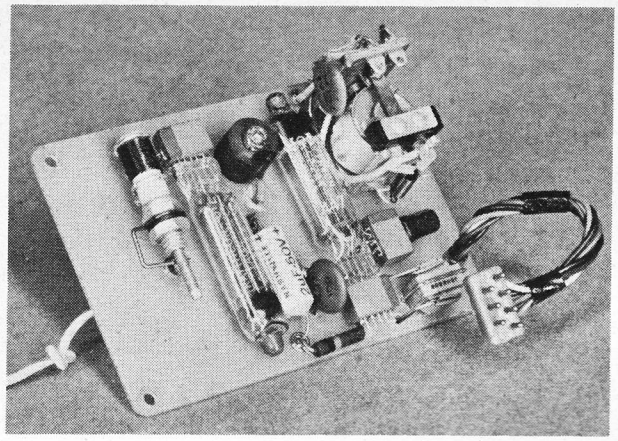
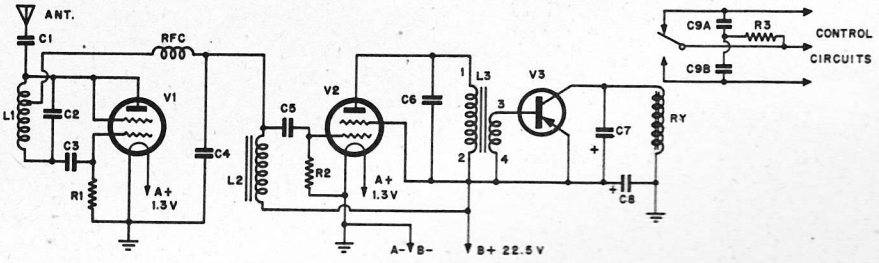
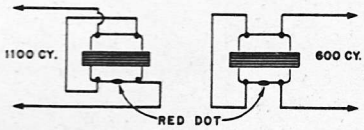


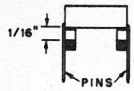






TYPE JE102 TPC TRANSFORMER AS L2 – VIEWED FROM LEAD END – .0047 MF AT C4

L3 LEAD SIDE



SOCKET MODIFICATION
FILE OFF SHADED AREA ON PINS

Radio Control Special! Part One . . .

Mac-Tone Receiver

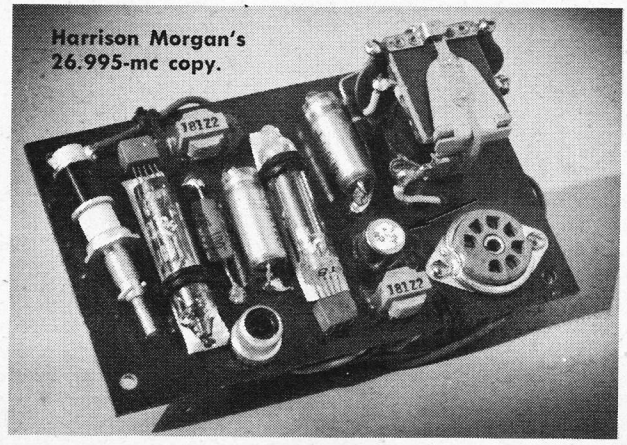
Here's a reliable 2 tube-one transistor single channel tone receiver, which incorporates a simplified form of audio filter. Gives fine operation on 50 or 27 mc, using 22½ volts B supply; designed especially for Kickin' Duck style proportional, is not particularly sensitive to "electrical noise." Has proven very effective for escapement flying, too.

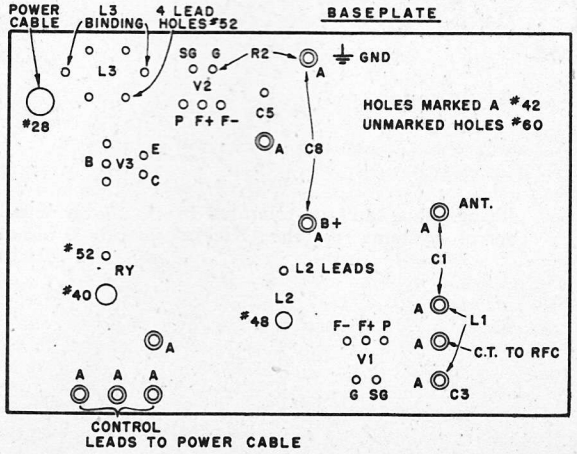
■ As with many other R/C developments, this receiver evolved through several stages from an earlier type, the Advanced Experimenter's Special III, a three tuber intended for CW use (ATH 6/55, p. 34). This was quite a good little receiver, but it didn't give a very large current change for the relay. Some time following the article, the set was shifted to tone operation, still using three tubes. When transistors started to get "hot," efforts were turned toward using one in the output stage; this was a success, and had two big advantages over the all-tube version. It allowed operation of the whole rig on only 22½ volts, and it assured a husky current change for the relay. Since then quite a bit of time has been spent on the receiver, and two different versions have been flown through several seasons, with very fine results. The set has been used principally on 50 mc but we'll give some 27 mc notes later.

There is nothing particularly unusual about the set, but it has rather simple circuitry, and it does work fine. 50 mc operation is a bit fussier than 27, of course (sometimes a lot more than a "bit."!) so we use the old reliable 1AG4 tube as the oscillator, VI. Since low voltage operation is also fussier—by "low voltage" here, we mean 22½ volts, as against the more usual 30 or 45 volts used for tube oscillators on 50 mc—every effort has been made to make the oscillator just as "happy" as possible. Hence, we use a ceramic coil form, fairly large wire on same, tap the RF choke down on the coil, employ very light antenna coupling.

A basic feature of the circuit is the use of an audio choke to feed DC to VI (since they are more readily available, tiny AF transformers can be used for L2, rather than the rarer chokes). Use of L2 in this manner has another happy result; the receiver has a much narrower AF range than most tone sets, and the peak of tone response may be selected at will, by use of different values of capacity at C4, and different connections of the two windings of L2. We prefer to have the audio response peak-up above 1000 cycles, to get away from possible interference from reed outfits and also the general run of single channel tone transmitters, most of which operate at from about 500 to 800 cycles.

One version of the Mac-Tone was flown during 1960 with an AF peak point of 1100 cycles. For various reasons, it was decided to go still higher, and the set shown here operates on 2200 cycles (the 1100 cycle unit was illustrated atop page 37, Sept. 1961 A.M.). Aside from the desire to get further away from possible interference, the tone response range was





raised so that a smaller capacity could be used across V3, while still maintaining maximum current through the relay, A larger capacity at this point (C7) makes the set more sluggish in high speed pulsing—this can't be tolerated in such control systems as the Kickin' Duck.

Tube V2 is a straight amplifier, and is transformer coupled to transistor V3. The output circuit of V2 is actually not quite as simple as it looks, for C6 and the primary of L3 form a quench filter that can be adjusted to make your receiver as sensitive or "dead" as desired. More on this in a moment. V3 runs with no bias, so when there is no tone coming in, but a CW signal has been tuned in, V3 draws practically zero current, as it also does if V2 is removed from the set. With a tone of the proper frequency, V3 will draw full current—in the case of the set shown here, which has a 7500 ohm relay, this is around 2.9 ma.

As noted, we prefer the 1AG4 as V1, for 50 mc operation, though other tubes have been used successfully—even the 6007! Quite a variety of tubes have been used as V2, the set in the Sept. issue having been used for well over a year with a 6007 in this spot, with fine results. The 6007 has the disadvantage of running a rather high B current, however, so a search turned up the CK522, which has ample gain for the job, but draws only around .25 to .3 ma. It has a 20 ma filament, and unlike many of the submin tubes, is still in production.

A wide variety of transistors will work fine as V3, the one specified being a good selection . . . and it was on hand. Only a moderate gain is required, and of course, low leakage is desireable. NPN types will do just as well, with the usual reversal of battery and capacitor polarities.

After two years of use, we feel this set has several big advantages. It can be made amply sensitive for any use; it offers considerable AF selectivity; cur-

(*Continued on page* 47)

Mac-Tone

(*Continued from page* 15)

cuitry is relatively simple; the set is rather insensitive to "electrical noise"; it works on fairly low B voltage; it is a good set for pulse uses; it will not overload with very strong inputs (works fine within a few feet of the Mac 50 transmitter); it is not fussy on percentage of modulation, will work on relatively low percentages.

Since the set was made to go in the same case as the Kickin' Duck chassis seen in the Sept. issue, the base plate is a little longer than actually necessary, but the full size of the actual receiver is shown on the chassis layout drawing. It could be squeezed into considerably smaller space, if necessary, but it's the old story—we *know* the version shown works right!

(*Part Two: Next Issue*)