

32-Volt Receiver For Small Plants

By B. W. EMBREE

MANY rural homes are now equipped with power plants of the 32-volt type, and there may be many who would be interested in building this type of set. This six-tube Super has proved exceptionally good. It employs three 6.3 volt tubes and three 25 volt tubes used in the following order: 6SA7 oscillator and first detector; 6SK7 I.F. amplifier; 6SQ7 second detector, A.V.C. and first audio; 25L6GT driver, and two 25L6GT's in push-pull.

New parts may be used if you can procure them, or possibly you may have a good radio around that you could rebuild. I have rebuilt quite a number of sets for 32-volt operation. Some of the sets were of the all-wave type, and they operated as usual after being rewired.

Voltage fluctuation has but little effect on the operation of the set. There is no change in operation between 28 and 38 volts, and it will continue to operate with only 20 volts. Naturally reception is very weak with so low a voltage.

LAYOUT AND ASSEMBLY

The radio was assembled on a chassis $5\frac{1}{2} \times 10 \times 3$ inches. This makes a compact outfit and there is plenty of room for mounting all parts. The antenna coil, oscillator coil and tuning gang from a Victor Little Nipper were used. The I.F. transformers were also Victor as used in the model 21 and 34A. The overall gain was high and there was no sign of oscillation due to the high gain. The AVC hookup proved to be very good. A tone control was used and worked well, but may be omitted. In such a case use a .01 mfd. condenser across the 25L6 plates.

The dimensions are given for those who may want to drill the chassis. It would be better to get one of a larger size if you are not able to get the one listed, so as not to have to crowd parts in. The driver transformer is mounted on top of the chassis, and the choke could be mounted directly below this on the bottom side. Large-capacity filters are used in the cathode and plate supply circuit. It is best to keep the plate and grid leads short, not to have them run parallel to each other.

A series-parallel filament hookup is used,

and the 25-volt filaments are on the positive side of the line. Connect the No. 2 pin of each 25L6 together, and to the positive side of the line. The No. 7 pin then is connected to a 6-volt tube filament. Each of the remaining filament pins on the 6-volt tubes are connected together, and from this point a 10-ohm resistor with a pilot lamp in parallel is connected to ground (chassis), which is the negative side of the line and completes the circuit. The pilot lamp is 6-8 volt type and should be .15 amp. but may be .25 amp. A heavy-duty resistor must be used, and should be capable of dissipating 5-10 watts.

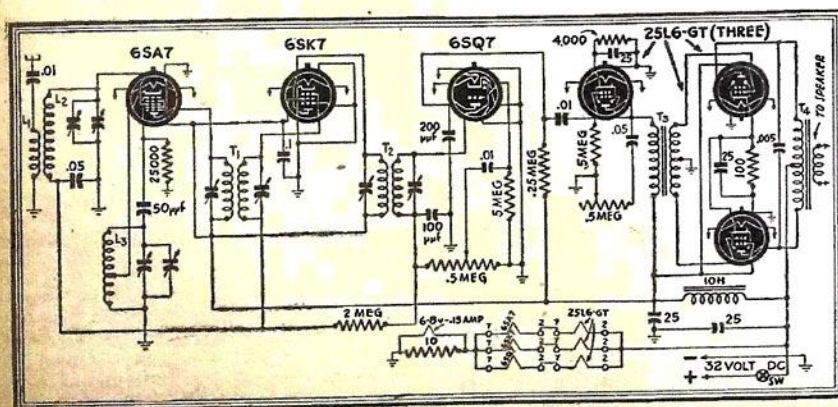
The next step should be to connect all the screens together, leaving the 25L6 driver open. This tube is used as a triode and the plate and screen are connected together. It will be well to tie the No. 1 pins of the 25L6's to ground, for these are the shield connections. A 4000-ohm resistor and 25 mfd. condenser are connected from cathode to ground of the 25L6 driver. The cathodes of the other two 25L6's are connected together and a 100-ohm resistor and 25-mfd. condenser connected from this point to ground. (The positive side of the condensers is wired to cathode.)

The next job is to mount the antenna and oscillator coils in the chassis and wire the oscillator circuit. This completed, mount the driver and I.F. transformers. Do not mount the tuning gang until the work is nearly completed as it may be damaged while the chassis is being moved around. Proceed with the wiring, first the I.F. transformers then the AVC circuit and antenna coil, leaving the antenna and ground lugs open.

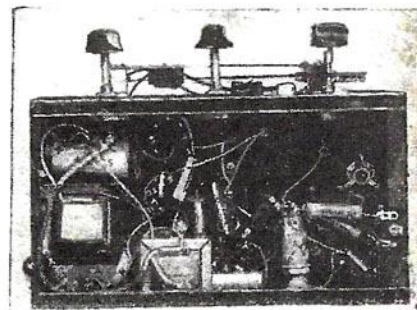
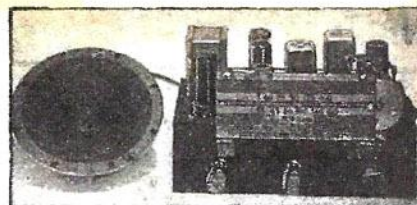
SAFETY PRECAUTIONS

Place a .01 mfd. condenser from one lug to the antenna terminal and one from the other lug to the ground terminal. These may be on an insulated strip fastened to the chassis. You may find that the set will work OK without a ground connection. Short leads are now connected to the terminal strip for aerial and ground connections.

The condenser in the antenna lead is for safety should the wire come in contact with a live line outside. This would burn out



Standard tubes are used in the receiver, the special circuits adapting it to low voltage.



Front and bottom views of the 32-volt radio.

the primary winding of the coil. The condenser in the ground lead is necessary when you use a ground wire on the set. If the lighting-plant system has been grounded as it should be, and the power cord be plugged in wrong, the positive side of the line would be connected through the cord and the ground lead to the negative side of the line and short out the system.

The volume control should now be put in the chassis, also the tone control if you wish to use one. The tone control shown operates very well and is worth putting in the circuit.

The filter condensers should now be wired into the circuit, and the filter choke and output transformer mounted—on chassis or speaker—and wired in the circuit. If you may have an electrodynamic speaker on hand which has a field resistance of from 125-200 ohms you may use this, and connect the field directly across the 32 volts. If such a speaker is used, power consumption will also be increased.

Recheck the wiring carefully and if all is correct solder power cord to switch and to chassis, place tubes in their proper sockets and plug the power cord into the outlet. If a voltmeter is available check voltage between chassis and switch lug with negative side of meter connected to the chassis. If polarity is not correct pull the plug and reverse it. Circuit resistance will be approximately 10 ohms if an ohmmeter test can be made with available equipment.

TUNING AND ALIGNMENT

When everything is in order, tune in a station, and proceed to adjust the trimmers for maximum gain, keeping the signal low. I would suggest that you use Meissner I.F. transformers for these are peaked at 456 Kc. at the factory, making them reliable for this work when a generator is not available.

The first procedure will be the high-frequency adjustment. Tune in a station that you know at about 1500 Kc., then adjust the oscillator trimmer so dial and station frequency correspond and adjust antenna trimmer for maximum gain. Of course, the dial and tuning unit must correspond in order for this to be done. If the gang does not have a set of oscillator tracking plates it will be necessary to use a padder in series with the oscillator coil and tuning gang. It will be adjusted near 600 Kc. so as to receive the stations at the proper dial settings. In this case it will be

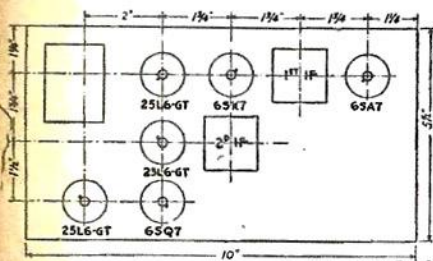
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necessary to repeat the 1500 Kc. setting if the padder condenser has been moved very far as this padder will affect the adjustment of the 1500 Kc. trimmer. A signal generator for this work is much more satisfactory but when not available the foregoing procedure will be satisfactory.

The parts may be any standard brands that you may be able to obtain. Purchase the best grade available as the set will only be as good as the poorest part, being poor economy to spoil a good job because of one or two inferior parts. Be sure to get coils and condensers matched to each other, if possible.



The following parts are suggested if available, a choice of Victor or Meissner being given. However, any coils and condensers can be used, if they are properly matched to each other.

Parts List

- L1, L2—Ant. coil, Victor No. 32572; Meissner No. 14-1022.
- L3—Osc. coil, Victor No. 32962; Meissner No. 14-1033.
- T1—Input tran., Victor No. 33722; Meissner No. 16-5740.
- T2—Output tran., Victor No. 33723; Meissner No. 16-5742.
- C1, C2, C3, C4—Var. con., Victor No. 32968; Meissner No. 21-5214.
- Padder con., Meissner No. 22-7005 (required only if using Meissner gang).