TYPICAL CIRCUITS USING THE G-E 6AR8

The G-E 6AR8 sheet beam tube is, by its very nature, suited for a number of circuit applications in amateur radio single sideband transmitting and receiving equipment. The following circuits illustrate these applications.

Component values as shown will provide normal performance of these circuits in most cases. However, in certain instances, the values of cathode resistances may require lowering to obtain optimum circuit performance. Also, shielding and other r. f. constructional practices, have not been shown.

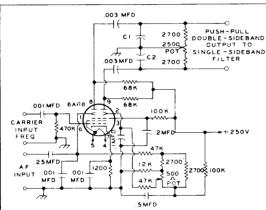


Fig. 3 Suggested circuit for a balanced modulator using the 6AR8 sheet beam tube with the audio signal applied to one beam deflecting plate, and the r.f. signal to be modulated applied to the control grid. All resistances are in ohms, 1/2 watt unless otherwise specified. "K" equals 1,000. Capacitance values are in microfarads (mfd), except where specified. Capacitors C1 and C2 should be equal in value, with a total series capacitance of the proper value to resonate the input side of the sideband filter at the operating frequency.

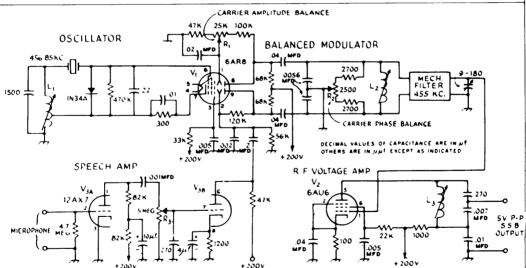


Fig. 4 Suggested schematic diagram of a simplified filter-type single sideband generator operating at 455 kilocycles. The G-E 6AR8 sheet beam tube combines the functions of carrier oscillator, and balanced modulator. The output from the 6AR8 plates is a double sideband, suppressed carrier signal. One sideband is removed after passage through the bandpass filter at the right. All resistances are in ohms, 1/2 watt rating unless specified. Potentiometers R1, R2 and R3 have composition elements. Capacitances are in micro-microfarads, unless value is specified in microfarads (mfd). Capacitors with polarized markings are electrolytic types.



Fig. 5. Suggested schematic diagram of a G-E 6AR8 sheet beam tube operating as a combined tunable oscillator (VFO) and mixer. Circuit values are shown for a tunable oscillator operating at 3.3 to 3.6 megacycles, with a 455-kilocycle SSB signal applied to one beam deflection plate. The sum of the two input frequencies appears in the output circuit, T1, tuned to the 3.8 to 4.0-megacycle range. The oscillator coil, L4, has an inductance of 4.7 microhenries. It was wound on a 3/4-inch diameter ceramic coil form, with 21 turns of No. 20 enameled wire spacewound 1 inch long. The cathode tap is 3 turns, and the grid tap 10 turns, from the grounded end.

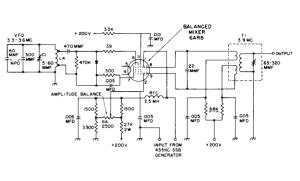
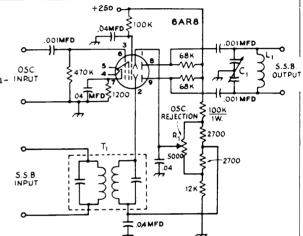


Fig. 6 Suggested schematic diagram for a 6AR8 tube in a balanced mixer circuit. This circuit is suitable for combining two input signals from a SSB generator and tunable oscillator (VFO), and obtaining either the sum or difference signal in the tuned output circuit, C1--L1. Conventional tuned circuits may be used here, and in T1. All resistances are in ohms, 1/2 watt, unless specified. Capacitances are in microfarads (mfd). A linear taper composition potentiometer should be used for R1.



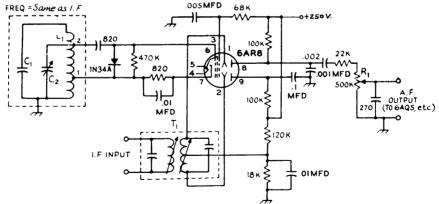


Fig. 7. Suggested circuit for a 1-tube product detector using the G-E 6AR8 sheet beam tube. The circuit contains its own carrier oscillator utilizing the cathode, control grid and number three grid elements. The beam deflecting plates are in the detection circuit, and the audio output signal is taken from the plates. The oscillator tuned circuit should have high capacitance for best stability. Taps 1 and 2 on L₁ should be about 5 and 25 percent, respectively, from the grounded end. Resistances are in ohms, 1/2-wattrating. Capacitances in decimals are in microfarads (mfd); those in whole numbers are in micro-microfarads (mmf).

BALANCED MODULATORS

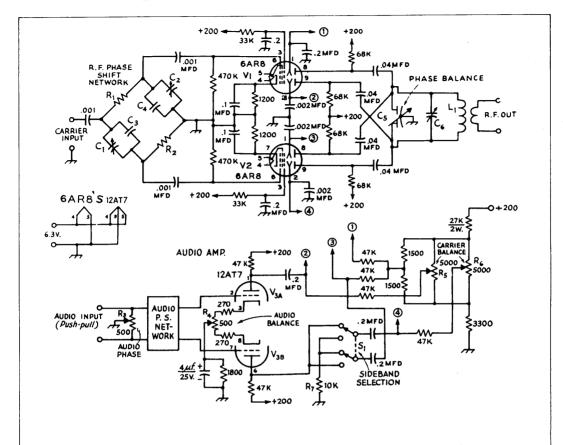


Fig. 8. Suggested schematic diagram for a phasing type SSB generator featuring a double balanced modulator with two 6AR8 sheet beam tubes. This circuit is suitable over the range from intermediate frequencies to approximately 30 megacycles. Capacitances are in micro-microfarads (mmf), except those marked "uf", which are in microfarads (mfd). Resistances are in ohms, 1/2 wat rating unless otherwise specified. Values for capacitors C_1 , C_2 , C_3 , C_4 , C_5 , and C_6 , and coil L_1 will depend on the operating frequency. Values for C_3 and C_4 should be chosen so that their reactance at the operating frequency is equal to the resistance of R_1 and R_2 , which should be 100 ohms each, with exact values closely matched.

A SSB exciter construction article with the 6AR8 as a balanced modulator was described in the July, 1956 issue of CQ, on pages 24 to 31. This filter type exciter was designed and constructed by William I. Orr, W6SAI.

Additional material on applications of sheet beam receiving tubes has been published in the March, 1960 issue of QST magazine.

A new article showing the G-E 6AR8 as a balanced modulator in a simple double sideband transmitter, reconstructed from a surplus Command Set transmitter, appears in the May 1961 issue of CQ magazine, on pages 48 through 51.

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A new type of miniature sheet beam tube which has low output capacitances, and thus is capable of operating in balanced modulator circuits well into the VHF region, has just been announced by the General Electric Receiving Tube Department. It is known as the 7763 and will appear in G-E HAM NEWS articles during 1962.