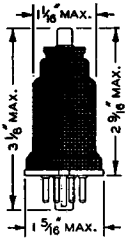
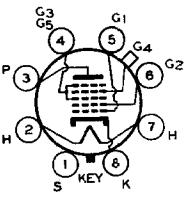


RCA-6A8

PENTAGRID CONVERTER



The 6A8 is a multi-electrode vacuum tube of the metal type designed to perform simultaneously the functions of a mixer (first detector) tube and of an oscillator tube in superheterodyne circuits. Through the use of this type, the independent control of each function is made possible within a single tube. For general discussion of pentagrid types, refer to FREQUENCY CONVERSION, page 31.

CHARACTERISTICS

HEATER VOLTAGE (A. C. or D. C.)	6.3	Volts
HEATER CURRENT	0.3	Ampere
DIRECT INTERELECTRODE CAPACITANCES (Approx.):*		
Grid No. 4 to Plate	0.03	μμf
Grid No. 4 to Grid No. 2	0.1	μμf
Grid No. 4 to Grid No. 1	0.09	μμf
Grid No. 1 to Grid No. 2	0.8	μμf
Grid No. 4 to All Other Electrodes (R-F Input)	12.5	μμf
Grid No. 2 to All Other Electrodes (Osc. Output)	5	μμf
Grid No. 1 to All Other Electrodes (Osc. Input)	6.5	μμf
Plate to All Other Electrodes (Mixer Output)	12.5	μμf
CAP		Miniature
BASE		Small Wafer Octal 8-Pin

* With shell connected to cathode.

As Frequency Converter

PLATE VOLTAGE	250 *max.*		Volts
SCREEN VOLTAGE (Grids No. 3 and 5)	100 *max.*		Volts
ANODE-GRID VOLTAGE (Grid No. 2)	200 *max.*		Volts
ANODE-GRID SUPPLY VOLTAGE (Grid No. 2)†	250 *max.*		Volts
CONTROL-GRID VOLTAGE (Grid No. 4)	−3 *min.*		Volts
TOTAL CATHODE CURRENT	14 *max.*		Milliamperes
TYPICAL OPERATION			
Plate Voltage	100	250	Volts
Screen Voltage	50	100	Volts
Anode-Grid Voltage	100	250†	Volts
Control-Grid Voltage (Minimum)	−1.5	−3	Volts
Oscillator-Grid Resistor (Grid No. 1)	50000	50000	Ohms
Plate Current	1.2	3.3	Milliamperes
Screen Current	1.5	3.2	Milliamperes
Anode-Grid Current	1.6	4.0	Milliamperes
Oscillator-Grid Current	0.25	0.5	Milliampere
Plate Resistance	0.6	0.36	Megohm
Conversion Conductance	350	500	Micromhos
Control-Grid Voltage, Approximate (Conversion Conductance = 2 μmhos)	−20	−45	Volts

† Anode-grid supply voltages in excess of 200 volts require the use of 20000-ohm voltage-dropping resistor by-passed by 0.1 μf condenser.

INSTALLATION

The base pins of the 6A8 fit the standard octal socket, which may be installed to hold the tube in any position.

The heater of the 6A8 is designed to operate on either d-c or a-c. For operation on a-c with a transformer, the winding which supplies the heater circuit

should operate the heater at its recommended value for full-load operating conditions at average line voltage. For service in automobile receivers, the heater terminals of the 6A8 should be connected directly across a 6-volt battery. In receivers that employ a series-heater connection, the heater of the 6A8 may be operated in series with the heater of other types having a 0.3-ampere rating. The current in the heater circuit should be adjusted to 0.3 ampere for the normal supply-line voltage.

The **cathode** of the 6A8, when operated from a transformer, should preferably be connected directly to the electrical mid-point of the heater circuit. When it is operated in receivers employing a 6-volt storage battery for the heater supply, the cathode circuit is tied in either directly or through bias resistors to the negative side of the d-c plate supply which is furnished either by the d-c power line or the a-c line through a rectifier. In circuits where the cathode is not directly connected to the heater, the potential difference between them should be kept as low as possible. If the use of a large resistor is necessary between the heater and cathode of the 6A8 in some circuit designs, it should be by-passed by a suitable filter network or objectionable hum may develop.

APPLICATION

As a **frequency converter** in superheterodyne circuits, the 6A8 can supply the local oscillator frequency and at the same time mix it with radio-input frequency to provide the desired intermediate frequency. For this service, design information is given under CHARACTERISTICS.

For the **oscillator** circuit, the coils may be constructed according to conventional design, since the tube is not particularly critical. The supply voltage applied to the anode-grid No. 2 should not exceed the maximum value of 250 volts. In fact, from a performance standpoint, a lower value is to be preferred, because it will be adequate to provide for optimum translation gain. Under no condition of adjustment should the cathode current exceed a recommended maximum value of 14 milliamperes.

The bias voltage applied to grid No. 4 can be varied from −3 volts to cut-off to control the translation gain of the tube. With lower screen voltages, the cut-off point is less remote. The extended cut-off feature of this tube in combination with the similar characteristic of super-control tubes can be utilized advantageously to adjust receiver sensitivity.

Refer to type 2A7 for typical circuit and coils. When the 6A8 is used in this circuit, its shell should be connected to ground.