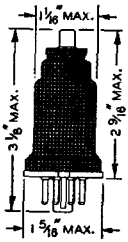
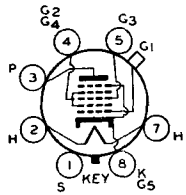



# RCA-6L7

## PENTAGRID MIXER AMPLIFIER




The 6L7 is a multi-electrode vacuum tube of the All-Metal type designed with two separate control grids shielded from each other. This design permits each control grid to act independently on the electron stream. This tube, therefore, is especially useful as a mixer in superheterodyne circuits having a separate oscillator stage, as well as in other applications where dual control is desirable in a single stage. The design of the tube is such that coupling effects between oscillator and signal circuits are made very small. This feature enables the 6L7 to give high gain in high-frequency circuits. For general discussion of pentagrid types, see Frequency Conversion on page 31.

### CHARACTERISTICS

| | | |
|---|---|---|
| Heater Voltage (A. C. or D. C.) | 6.3 | Volts |
| Heater Current | 0.3 | Ampere |
| Direct Interelectrode Capacitances:* | | |
| Grid No. 1 to Grid No. 3 | 0.12 | μμf |
| Grid No. 1 to Plate | 0.0005 *max.* | μμf |
| Grid No. 3 to Plate | 0.025 | μμf |
| Grid No. 1 to All Other Electrodes | 8.5 | μμf |
| Grid No. 3 to All Other Electrodes | 11.5 | μμf |
| Plate to All Other Electrodes | 12.5 | μμf |
| Cap | Miniature | |
| Base | Small Wafer Octal 7-Pin | |

### As Mixer

| | | | |
|---|---|---|---|
| Plate Voltage | | 250 *max.* | Volts |
| Screen (Grids No. 2 and No. 4) Voltage | | 150 *max.* | Volts |
| Typical Operation: | | | |
| Plate Voltage | 250 | 250† | Volts |
| Screen Voltage | 100 | 150† | Volts |
| Signal-Grid (Grid No. 1) Voltage | −3 *min.* | −6 *min.*† | Volts |
| Oscillator-Grid (Grid No. 3) Voltage** | −10 | −15 | Volts |
| Peak Oscillator Voltage Applied to Grid No. 3 (Minimum) | 12 | 18 | Volts |
| Plate Current | 2.4 | 3.3 | Milliamperes |
| Screen Current | 7.2 | 9.2 | Milliamperes |
| Plate Resistance | Greater than 1 | | Megohm |
| Conversion Conductance | 350 | 350 | Micromhos |
| Signal-Grid (Grid No. 1) Voltage for Conver. Cond. of 5 Micromhos | −30 | −45 | Volts |

** The d-c resistance in oscillator-grid-No. 3 circuit should be limited to 50000 ohms.
† Recommended values for all-wave receivers. * With shell connected to cathode.

### As Amplifier

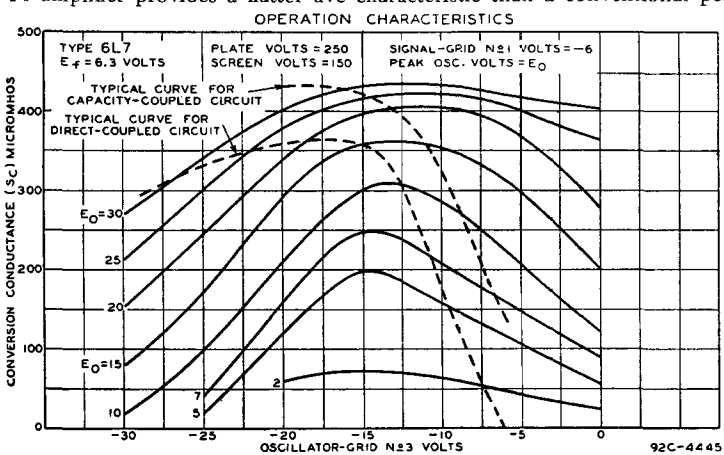
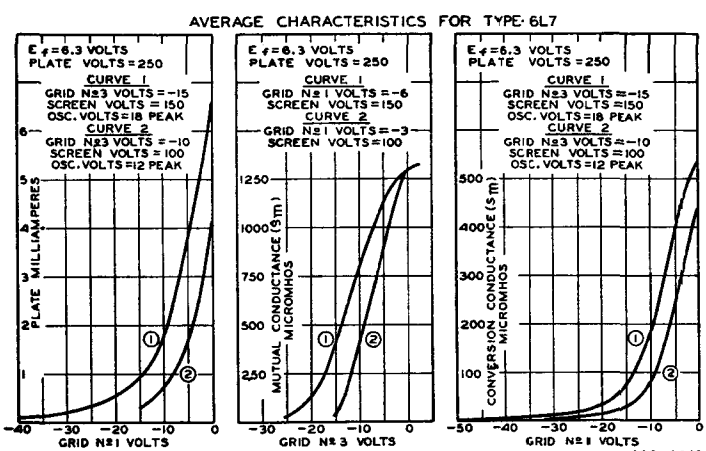
| | | |
|---|---|---|
| Plate Voltage | 250 *max.* | Volts |
| Screen (Grids No. 2 and No. 4) Voltage | 100 *max.* | Volts |
| Control-Grid (Grid No. 1) Voltage | −3 *min.* | Volts |
| Control-Grid (Grid No. 3) Voltage | −3 | Volts |
| Plate Current | 5.3 | Milliamperes |
| Screen Current | 6.5 | Milliamperes |
| Amplification Factor | 880 | |

| | | |
|---|---|---|
| PLATE RESISTANCE | 0.8 | Megohm |
| TRANSCONDUCTANCE | 1100 | Micromhos |
| TRANSCONDUCTANCE { −15 volts bias on Grid No. 1 / −15 volts bias on Grid No. 3 } | 5 | Micromhos |

## INSTALLATION

The **base** pins of the 6L7 fit the standard octal socket which may be installed to hold the tube in any position. For **heater** operation and **cathode** connection, refer to INSTALLATION for type 6A8.

## APPLICATION

As a **mixer** in superheterodyne circuits, the 6L7 can mix the input from an external oscillator with the radio-input frequency to provide the desired intermediate frequency. For this service, design information is given under CHARACTERISTICS.

As a **radio-frequency** or **intermediate-frequency amplifier,** the 6L7 should be operated as shown under CHARACTERISTICS. In this application, the 6L7 has the advantage that avc bias can be applied to both the No. 1 grid and the No. 3 grid. With avc bias applied to the two grids, a small change in avc voltage produces a large change in the gain provided by the tube. For this reason the 6L7 as an r-f or i-f amplifier provides a flatter avc characteristic than a conventional pentode.