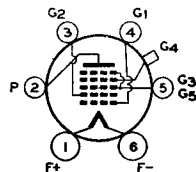


RCA-1C6

PENTAGRID CONVERTER



The 1C6 is a multi-electrode type of vacuum tube designed to perform simultaneously the function of a mixer tube and of an oscillator tube in superheterodyne circuits. Through its use, the independent control of each function is made possible within a single tube. The 1C6 is designed especially for use in battery-operated receivers. In such service, this tube replaces the two tubes required in conventional circuits and gives improved performance. It is especially useful in multi-range receivers which are often designed to cover frequencies as high as 20 megacycles. For general discussion of pentagrid types, see FREQUENCY CONVERSION, page 31.

CHARACTERISTICS

FILAMENT VOLTAGE (D. C.).....	2.0	
FILAMENT CURRENT	0.120	Volts
DIRECT INTERELECTRODE CAPACITANCES (Approx.):		Amperes
Grid No. 4 to Plate (With shield-can).....	0.3	$\mu\mu\text{f}$
Grid No. 4 to Grid No. 2 (With shield-can).....	0.3	$\mu\mu\text{f}$
Grid No. 4 to Grid No. 1 (With shield-can).....	0.15	$\mu\mu\text{f}$
Grid No. 1 to Grid No. 2.....	1.5	$\mu\mu\text{f}$
Grid No. 4 to All Other Electrodes (R-F Input)...	10	$\mu\mu\text{f}$
Grid No. 2 to All Other Electrodes (Osc. Output)..	6	$\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes (Osc. Input)..	6	$\mu\mu\text{f}$
Plate to All Other Electrodes (Mixer Output).....	10	$\mu\mu\text{f}$
BULB		ST-12
CAP		Small Metal
BASE		Small 6-Pin

Converter Service

PLATE VOLTAGE	180 max.	Volts
SCREEN VOLTAGE (Grids No. 3 and 5).....	67.5 max.	Volts
ANODE-GRID VOLTAGE (Grid No. 2).....	135 max.	Volts
ANODE-GRID VOLTAGE SUPPLY*.....	180 max.	Volts
CONTROL-GRID VOLTAGE (Grid No. 4).....	-3 min.	Volts
TOTAL CATHODE CURRENT.....	9 max.	Milliamperes

TYPICAL OPERATION

Plate Voltage	135	180	Volts
Screen Voltage	67.5	67.5	Volts
Anode-Grid Voltage Supply.....	135*	180*	Volts
Control-Grid Voltage	-3	-3	Volts
Oscillator Grid-Resistor (Grid No. 1).....	50000	50000	Ohms
Plate Current	1.3	1.5	Milliamperes
Screen Current (Approximate)	2	2	Milliamperes
Anode-Grid Current	2.6	3.3	Milliamperes
Oscillator-Grid Current	0.2	0.2	Milliamperes
Total Cathode Current (Approx.).....	6.5	7	Milliamperes
Plate Resistance	0.55	0.75	Megohm
Conversion Conductance	300	325	Micromhos
Conversion Conductance (At -14 volts on Grid No. 4).....	4	4	Micromhos

The transconductance of the oscillator portion (not oscillating) of the 1C6 is 1000 micromhos under the following conditions: Plate voltage, 135 to 180 volts; screen voltage, 67.5 volts; anode-grid voltage (no voltage-dropping resistor), 135 volts; and zero oscillator grid voltage. Under these same conditions, the anode-grid current is 4.9 milliamperes.

* Applied through 20000-ohm dropping resistor, by-passed by 0.1 μf condenser.

INSTALLATION

Refer to INSTALLATION on type 1A6.

APPLICATION

As a frequency converter in superheterodyne circuits, the 1C6 can supply the local oscillator frequency and at the same time mix it with the radio-input frequency to provide the desired intermediate frequency. For this service, design information is given under CHARACTERISTICS. It is important to note that the anode-grid voltage and the plate voltage must each be higher than the screen voltage.

For oscillator circuit information, refer to APPLICATION on type 1A6. Final adjustment of the 1C6 circuit should be such that the cathode current is approximately 6.5 milliamperes. The cathode current should never exceed 9 milliamperes under any condition of adjustment.

This tube, which is similar to the 1A6 although not directly interchangeable with it, requires twice the filament current of the latter, but offers the feature of an extended operating range at the higher frequencies. This feature is of particular value in the design of multi-range receivers, since the oscillator section of the 1C6 has sufficient mutual conductance to function at frequencies as high as 25 megacycles. In order to cover this same range of operation, the 1A6 requires the use of a triode connected in parallel with the oscillator section for frequencies above 10 megacycles.

The maximum conversion transconductance is obtained with an oscillator-grid current of slightly less than 0.2 milliampere. The size, inductance, and coupling of the oscillator-grid and plate coils will determine this value. The coupling of these coils should be adjusted to make the oscillator-grid current the proper value (approximately 0.2 milliampere) when a grid condenser of 250 μf and a grid leak of 50000 ohms are used. For details of oscillator-coil assemblies, refer to type 2A7.

