

Cunningham RADIO TUBES

CX-301A, CX-112A and CX-371A

FIVE VOLT FILAMENT TUBES

This group of tubes includes all those having filaments designed to operate at 5.0 volts with a current drain of .25 amperes. Of these, the CX-301A and CX-112A are general purpose tubes while the CX-371A is a power amplifier tube.



CX-301A

GENERAL PURPOSE TUBE

The CX-301A is a general purpose tube designed for use as a detector or an amplifier. This tube employs a thoriated tungsten filament rated at 5 volts, .25 amperes, and is designed for operation with a 6 volt storage battery.

Circuit Recommendations

AS A DETECTOR

When the CX-301A is used as a detector with grid leak and condenser, the plate voltage should preferably be not more than 45 volts. The grid condenser should have about 0.00025 mfd. capacity and the grid leak should have a resistance of 2 to 9 megohms, the latter giving greater sensitivity on very weak signals but with somewhat inferior fidelity.

AS AN AMPLIFIER

The CX-301A, when used as an amplifier, should have the following recommended grid biases applied whenever the plate voltage is over 45 volts.

<i>Plate Voltage</i>	<i>Negative Grid Bias</i>
67.5	3.0
90.0	4.5
135.0	9.0

In radio-frequency circuits there is little advantage in using more than 90 volts on the plate and when used for loud-speaker operation, the plate voltage should be 135 volts with suitable bias.

AVERAGE CHARACTERISTICS

Plate Voltage	90	135	180 volts
Grid Bias Voltage . . .	-4.5	-9	-13.5 volts
Amplification Factor . .	8.5	8.5	8.5
Mutual Conductance . . .	1500	1600	1700 micromhos
Plate Resistance	5600	5300	5000 ohms
Plate Current	5.2	6.2	7.6 milliamperes
Undistorted Power Output	30	115	260 milliwatts
Grid-Plate Capacitance .	8.1 mmf.		

DIMENSIONS

Maximum Overall Length	4 $\frac{11}{16}$ "
Maximum Overall Diameter	1 $\frac{3}{16}$ "
Base	Large CX

AVERAGE CHARACTERISTIC CURVES

(Pages 23 and 24)

Filament Characteristic—Fig. 6 shows the change of filament current with various filament voltages.

Plate Characteristics—Fig. 8 shows the relation between plate current and plate voltage at various bias voltages.

Mutual Characteristics—Fig. 7 shows a family of grid voltage-plate current curves at various plate voltages.

Dynamic Characteristics—Fig. 9 shows the effect of grid voltage upon the amplification factor, mutual conductance and plate resistance.

Output Characteristic—Fig. 10 shows the undistorted power output obtainable at various load resistances.

CX-371A

POWER AMPLIFIER TUBE

The CX-371A is a power amplifier tube designed for use in the last stage of an audio frequency amplifier. This tube employs a filament of the oxide coated type rated at 5.0 volts, 0.25 amperes, and is designed for alternating current or direct current operation.



Circuit Recommendations

Because of the high current flowing in the plate circuit some

sort of coupling device is desirable to prevent saturation or burn-out of the speaker coil. This coupling device may be a transformer or a choke coil and condenser. The transformer should have the proper ratio for the type of loud speaker used and the choke coil-condenser arrangement should have values of 10 to 30 henries and 2 to 6 microfarads, respectively.

If the power input to the CX-371A is supplied by a resistance coupled amplifier or a screen grid detector, the coupling circuit may contain a grid leak of not more than 1 megohm.

When a self biasing arrangement is used, the following resistance values will furnish satisfactory bias:

<i>Plate Voltage</i>	<i>Bias Resistance</i>
90	1580 ohms
135	1685 ohms
180	2150 ohms

When the volume requirements are such that maximum output is not needed, it is recommended that a low plate voltage be used.

RATING

Filament Voltage	5.0 volts
Filament Current	0.25 amperes
Plate Voltage (maximum)	180 volts

AVERAGE CHARACTERISTICS

Plate Voltage	90	135	180 volts
Grid Bias Voltage	-16.5	-27	-40.5 volts
Amplification Factor	3	3	3
Mutual Conductance	1330	1520	1620 micromhos
Plate Resistance	2250	1960	1850 ohms
Plate Current	12	17.5	20 milliamperes
Undistorted Power Output	125	370	700 milliwatts

DIMENSIONS

Maximum Overall Length	4 $\frac{1}{4}$ "
Maximum Overall Diameter	1 $\frac{3}{4}$ "
Base	Large CX

AVERAGE CHARACTERISTIC CURVES

(Pages 25 and 26)

Filament Characteristic—Fig. 11 shows the change of filament current with various filament voltages.

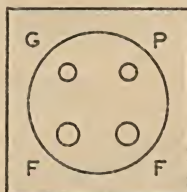
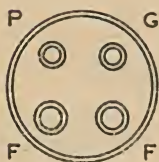
Plate Characteristics—Fig. 13 shows the relation between plate current and plate voltage at various bias voltages.

Mutual Characteristics—Fig. 12 shows a family of grid voltage plate current curves at various plate voltages.

Dynamic Characteristics—Fig. 14 shows the effect of grid voltage upon the amplification factor, mutual conductance and plate resistance.

Output Characteristic—Fig. 15 shows the undistorted power output obtainable at various load resistances.

BASE AND SOCKET CONNECTIONS



CX-301, CX-112A and CX-371A