



Cunningham

RADIO TUBES

C-324-A

SCREEN GRID RADIO-FREQUENCY AMPLIFIER

The '24-A is a screen grid amplifier tube containing a 2.5 volt uni-potential heater-cathode which permits operation from alternating current. This tube is recommended for use primarily as a radio-frequency amplifier in carefully shielded circuits especially designed for it. The '24-A may also be used as a screen grid detector or audio amplifier.

CHARACTERISTICS

HEATER VOLTAGE (A. C. or D. C.)	2.5	Volts
HEATER CURRENT	1.75	Amperes
PLATE VOLTAGE*	180	250
GRID VOLTAGE	-3	-3
SCREEN VOLTAGE	90	90 max.
PLATE CURRENT	4	4
SCREEN CURRENT	Not over $\frac{1}{3}$ of plate current	
PLATE RESISTANCE	400000	600000
AMPLIFICATION FACTOR	400	615
MUTUAL CONDUCTANCE	1000	1025
EFFECTIVE GRID-PLATE CAPACITANCE	0.01 maximum $\mu\mu\text{f.}$	
INPUT CAPACITANCE	5.0 $\mu\mu\text{f.}$	
OUTPUT CAPACITANCE	10.0 $\mu\mu\text{f.}$	
OVERALL LENGTH	$4\frac{25}{32}$ " to $5\frac{1}{32}$ "	
MAXIMUM DIAMETER	$1\frac{13}{16}$ "	
BULB (See page 42, Fig. 11)	S-14	
CAP	Small Metal	
BASE	Medium 5-Pin	

* Maximum plate voltage = 275 volts.

INSTALLATION

The base pins of the '24-A fit the standard five-contact socket. The socket may be installed to operate the tube in any position. For socket connections, see page 39, Fig. 9.

The heater of the '24-A is intended for operation from a 2.5 volt winding of the power transformer. The voltage applied to the heater terminals should be the rated value of 2.5 volts under conditions of operating load and average line voltage.

The cathode connection to the heater should be made (1) to the movable arm of a potentiometer connected across the heater winding of the power transformer, or (2) to a mid-tapped resistor across the heater winding, or (3) to the mid-point of the heater winding itself. Recommended practice is to have no voltage difference between heater and cathode. If this practice is not followed, the heater may be made negative by not more than 45 volts.

The positive screen voltage for the '24-A may be obtained from a fixed or variable tap on a voltage divider across the high voltage supply, or across a portion of the supply.

Complete shielding in all stages of the circuit is necessary if maximum gain per stage is to be obtained.

APPLICATION

As a **radio-frequency amplifier**, the '24-A should be operated at the voltages given under CHARACTERISTICS. Plate voltage and screen voltage are not critical. In general, properly designed radio-frequency transformers are preferable to inter-stage coupling impedances, especially in cases where a high impedance B-supply may cause oscillation below radio frequencies.

As a **detector**, the '24-A may be operated either with grid leak and condenser or with grid bias (see page 16). For grid bias detection suitable operating conditions are: plate supply voltage of 275 volts applied through a plate coupling resistor of 250000 ohms, a positive screen voltage of 20 to 45 volts, and a negative grid bias (approximately 5 volts) so adjusted that a plate current of 0.1 milliamperes is obtained with no input signal. For grid leak and condenser detection, suitable operating conditions are: plate supply voltage 275 volts applied through a plate coupling resistor of 250000 ohms, a positive screen voltage of 20 to 45 volts, a grid leak of 2 to 5 megohms, and a grid condenser of 0.00025 μ f.

As a screen grid **audio-frequency amplifier** in resistance coupled circuits, the '24-A may be operated under the following conditions: plate supply voltage 250, grid bias -1 volt, screen voltage 25 volts, plate current 0.5 milliamperes (approximate), plate load resistor 0.1 to 0.25 megohm, and a grid resistor of 0.25 to 2.0 megohms.

