

9A

MEDIUM-MU TWIN TRIODE

Miniature types used as phase inverters or push-pull amplifiers in ac/dc radio equipment and as multivibrators or oscillators in industrial control devices. Also used as combined vertical oscillators and vertical-deflection amplifiers, and as horizontal-deflection oscillators, in color and black-and-white television receivers. Outlines section, 6B; require miniature 9-contact socket. Each triode unit is independent of the other except for the common heater. For typical operation as a resistance-coupled amplifier, refer to Resistance-Coupled Amplifier section. Types 7AU7 and 9AU7 are identical with type 12AU7 and 12AU7A/ECC82 except for heater ratings.

12AU7A

12AU7A/

ECC82

7AU7, 9AU7

	7AU7	9AU7	12AU7A/ ECC82	
Heater Voltage (ac/dc):				
Series	7	9.4	12.6	volts
Parallel	3.5	4.7	6.3	volts
Heater Current:				
Series	0.8	0.225	0.15	ampere
Parallel	0.6	0.45	0.3	ampere
Heater Warm-up Time (Parallel, Average)	11	11	—	seconds
Heater-Cathode Voltage:				
Peak value	±200 max	±200 max	±200 max	volts
Average value	100 max	100 max	100 max	volts
Direct Interelectrode Capacitances (Approx.):	Unit No.1 Unit No.2			
Grid to Plate	1.5	1.5		pF
Grid to Cathode and Heater	1.6	1.6		pF
Plate to Cathode and Heater	0.5	0.35		pF

Class A₁ Amplifier (Each Unit Unless Otherwise Specified)

MAXIMUM RATINGS (Design-Maximum Values)

Plate Voltage	330	volts
Cathode Current	22	mA
Plate Dissipation:		
Each Plate	2.75	watts
Both Plates (Both units operating)	5.5	watts

CHARACTERISTICS

Plate Voltage	100	250	volts
Grid Voltage	0	—8.5	volts
Amplification Factor	19.5	17	
Plate Resistance (Approx.)	6250	7700	ohms
Transconductance	3100	2200	μmhos
Plate Current	11.8	10.5	mA
Grid Voltage (Approx.) for plate current of 10 μA	—	—24	volts

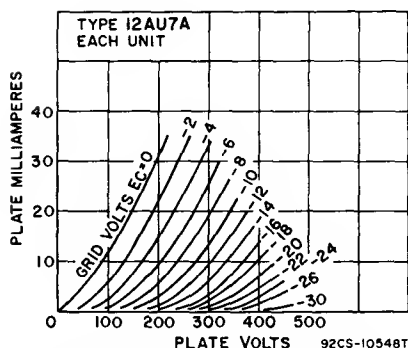
MAXIMUM CIRCUIT VALUES

Grid-Circuit Resistance:		
For fixed-bias operation	0.25	megohm
For cathode-bias operation	1	megohm

Oscillator (Each Unit Unless Otherwise Specified)

For operation in a 525-line, 30-frame system

	Vertical- Deflection Oscillator	Horizontal- Deflection Oscillator	
MAXIMUM RATINGS (Design-Maximum Values)			
DC Plate Voltage	330	330	volts
Peak Negative-Pulse Grid Voltage	440	660	volts
Peak Cathode Current	66	330	mA
Average Cathode Current	22	22	mA
Plate Dissipation:			
Each Plate	2.75	2.75	watts
Both Plates (Both units operating)	5.5	5.5	watts
MAXIMUM CIRCUIT VALUES			
Grid-Circuit Resistance	2.2	2.2	megohms



Vertical-Deflection Amplifier (Each Unit Unless Otherwise Specified)

For operation in a 525-line, 30-frame system

MAXIMUM RATINGS (Design-Maximum Values)

DC Plate Voltage	330	volts
Peak Positive-Pulse Plate Voltage#	1200	volts
Peak Negative-Pulse Grid Voltage	275	volts
Peak Cathode Current	66	mA
Average Cathode Current	22	mA
Plate Dissipation:		
Each Plate	275	volts
Both Plates (Both units operating)	5.5	watts

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance, for cathode-bias operation	2.2	megohms
---	-----	---------

Pulse duration must not exceed 15% of a vertical scanning cycle (2.5 milliseconds).

12AV5GA

Refer to type 6AV5GA.

12AV6

Refer to type 6AV6.

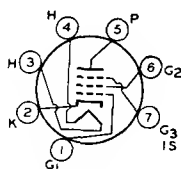
12AV7

Refer to chart at end of section.

12AW6

SHARP-CUTOFF PENTODE

Miniature type used as an rf or if amplifier up to 400 MHz in compact ac/dc FM receivers. Outlines section, 5C; requires miniature 7-contact socket. Heater: volts (ac/dc), 12.6; amperes, 0.15. Except for heater ratings and terminal connections, this type is identical with miniature type 6AG5.



7CM

12AX3

Refer to type 6AX3.

12AX4GT 12AX4GTA

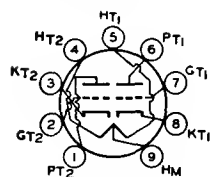
Refer to chart at end of section.

12AX4GTB

Refer to type 6AX4GTB.

12AX7

Refer to chart at end of section.



9A

HIGH-MU TWIN TRIODE

12AX7A
12AX7A/
ECC83

Miniature types used as phase inverters or twin resistance-coupled amplifiers in radio equipment. Outlines section, 6B; require miniature 9-contact socket. Each triode unit is independent of the other except for common heater. For characteristics and curves, refer to type 6AV6. For typical operation as a resistance-coupled amplifier, refer to Resistance-Coupled Amplifier section.

Heater Arrangement:	Series	Parallel	
Heater Voltage (ac/dc)	12.6	6.3	volts
Heater Current	0.15	0.3	ampere
Heater-Cathode Voltage:			
Peak value		±200 max	volts
Average value		100 max	volts
Direct Interelectrode Capacitances (Approx.):	Unit No.1	Unit No.2	
Grid to Plate	1.7	1.7	pF
Grid to Cathode and Heater	1.6	1.6	pF
Plate to Cathode and Heater	0.46	0.34	pF

Class A₁ Amplifier (Each Unit)

MAXIMUM RATINGS (Design-Maximum Values)

Plate Voltage	330	volts
Grid Voltage:		
Negative-bias value	55	volts
Positive-bias value	0	volts
Plate Dissipation	1.2	watts

EQUIVALENT-NOISE AND HUM VOLTAGE (References To Grid, Each Unit)*

Average Value	1.8	μV rms
---------------------	-----	--------

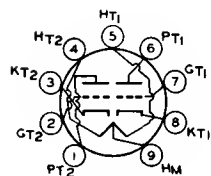
* Measured in "true rms" units under the following conditions: Heater voltage (parallel connection), 6.3 volts ac; center tap of heater transformer grounded; plate supply voltage, 250 volts dc; plate load resistor, 100000 ohms; cathode resistor, 2700 ohms bypassed by 100-μF capacitor; grid resistor, 0 ohms; and amplifier covering frequency range between 25 and 10000 Hz.

Refer to chart at end of section.

Refer to type 6AY3B.

12AY3
12AY3A

MEDIUM-MU TWIN TRIODE

12AY7


9A

Miniature type used in the first stages of high-gain audio-frequency amplifiers. Outlines section, 6B; requires miniature 9-contact socket. Each triode unit is independent of the other except for the common heater. Use of the 12.6-volt connection with an ac heater supply is not recommended for applications involving low hum. For typical operation as a resistance-coupled amplifier, refer to Resistance-Coupled Amplifier section.

Heater Arrangement:	Series	Parallel	
Heater Voltage (ac/dc)	12.6	6.3	volts
Heater Current	0.15	0.3	ampere
Peak Heater-Cathode Voltage		±90 max	volts
Direct Interelectrode Capacitances (Approx., Each Unit)			
Grid to Plate		1.3	pF
Grid to Cathode and Heater		1.3	pF
Plate to Cathode and Heater		0.6	pF

Class A₁ Amplifier (Each Unit)

MAXIMUM RATINGS (Design-Center Values)

Plate Voltage	300	volts
---------------------	-----	-------