



ELECTRONIC TUBE REFERENCE

11CA11

Voltage - Dual Triode Pentode electronic tube

CONSOLIDATED TECHNICAL DATA

3 SECTIONS

CONSTRUCTION

PENTODE-TRIODE-TRIODE

Multifunction Compactron combining a high-gain frame-grid video pentode with two high-mu, high-transconductance triodes for television receiver signal processing.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	12
NOMINAL HEATER	10.7 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	490000 Ω
TRANSCONDUCTANCE	0.0212 S
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	5 W
MAXIMUM SCREEN DISSIPATION	1 W

Sylvania 11CA11 high-gain frame-grid video-amplifier pentode within Compactron dual-triode-pentode. Maximum plate and screen supply 330 V; plate dissipation 5 W and screen dissipation 1 W, subject to conditional screen rating chart. Typical plate 200 V, screen 120 V, cathode resistor 65 ohms, gm 21.2 mA/V and approximate plate resistance 490 k Ω . Contains two dissimilar triode sections for cathode follower/video amplification. GE states 11CA11 identical to 6CA11 electrically except 10.7 V 0.6 A heater rating. Sylvania basing 12HN; existing database socket code not changed pending separate base-code reconciliation.

SECTION2 Triode	
PLATE RESISTANCE	10000 Ω
TRANSCONDUCTANCE	0.0063 S
AMPLIFICATION FACTOR	63
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	1.5 W
<i>Sylvania 11CA11 first of two physically distinct dissimilar high-mu triodes. Max plate voltage 330 V, plate dissipation 1.5 W. Typical plate 200 V, cathode bias resistor 270 ohms, grid bias -2 V, plate current 7.1 mA; mu 63, gm 6.3 mA/V, plate resistance 10 kΩ. Second triode differs electrically (mu 69, gm 5.5 mA/V, rp 12.4 kΩ), so do not compress or duplicate section constants. 10.7 V 0.6 A heater; Sylvania basing 12HN, existing socket code retained.</i>	

SECTION3 Triode	
PLATE RESISTANCE	12400 Ω
TRANSCONDUCTANCE	0.0055 S
AMPLIFICATION FACTOR	69
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	1.5 W
<i>Sylvania 11CA11 second physical triode, electrically dissimilar to first. Maximum plate voltage 330 V and dissipation 1.5 W. Typical plate 200 V, 270-ohm cathode bias resistor, plate current 7.1 mA, amplification factor 69, gm 5.5 mA/V, plate resistance approximately 12.4 kΩ. The other triode has mu 63, gm 6.3 mA/V, plate resistance 10 kΩ. Compactron combines both with video-amplifier pentode. Sylvania lists basing 12HN, retained database socket pending reconciliation.</i>	

11CA11 — Dissimilar-Double-Triode Pentode Compactron

A multifunction compactron containing a high-gain, frame-grid video amplifier pentode and two high-mu, high-transconductance triodes designed for cathode follower and video amplifier applications in color television receivers.

Overview

The **11CA11** is a specialized, multi-unit vacuum tube utilizing compactron construction. It integrates three distinct active sections within a single T-9 glass envelope: a high-gain, frame-grid pentode designed for video amplification, and two dissimilar high-mu triodes optimized for cathode follower and video amplifier duties.

The 11CA11 is designed primarily for use in color television receivers. Except for its heater characteristics and ratings, the 11CA11 is electrically and physically identical to the [6CA11](#).

Construction, Physical Specifications, and Basing

The tube features a T-9 glass bulb envelope with a 12-pin compactron base designated **E12-70**. The internal elements utilize coated unipotential cathodes. The physical dimensions of the device are defined by the **9-58** outline:

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 2.000 inches
- **Maximum Overall Height:** 2.375 inches

Its pin connections are arranged according to the **12HN** basing diagram.

Heater Characteristics and Ratings

The 11CA11 heater is designed for series-string or controlled-supply operation, featuring a controlled warm-up time to ensure reliable performance in television receiver circuits.

Heater Parameter	Value
Heater Voltage (AC or DC)	10.7 Volts
Heater Current	0.6 ± 0.04 Amperes
Average Heater Warm-up Time	11 Seconds

The average heater warm-up time is defined as the time required for the voltage across the heater to reach 80 percent of its bogey value after applying four times the bogey heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three times the bogey heater voltage divided by the bogey heater current. This is in contrast to the related [6CA11](#), which operates at a nominal heater voltage of 6.3 Volts and a current of 1020 mA, without a specified controlled warm-up time.

The heater-to-cathode insulation is rated to withstand the following maximum voltages:

- **Heater Negative with Respect to Cathode (Total DC and Peak):** 200 Volts
- **Heater Positive with Respect to Cathode (DC Component):** 100 Volts
- **Heater Positive with Respect to Cathode (Total DC and Peak):** 200 Volts

Electrical Characteristics and Typical Operation

The three independent sections of the 11CA11 exhibit distinct electrical characteristics. Typical operating parameters for each section are detailed below.

Triode Section 1

Triode Section 1 is a high-mu triode operating typically under the following conditions:

- **Plate Voltage:** 200 Volts
- **Cathode Bias Resistor:** 270 Ohms

- **Grid Voltage:** -2.0 Volts
- **Amplification Factor:** 63
- **Plate Resistance (Approximate):** 10,000 Ohms
- **Transconductance:** 6,300 μmhos
- **Plate Current:** 7.1 mA
- **Approximate Grid Voltage (for $I_b = 100 \mu\text{A}$):** -6.3 Volts

Triode Section 2

Triode Section 2 is a high-mu triode with slightly different characteristics:

- **Plate Voltage:** 200 Volts
- **Cathode Bias Resistor:** 270 Ohms
- **Grid Voltage:** -2.0 Volts
- **Amplification Factor:** 69
- **Plate Resistance (Approximate):** 12,400 Ohms
- **Transconductance:** 5,500 μmhos
- **Plate Current:** 7.1 mA
- **Approximate Grid Voltage (for $I_b = 100 \mu\text{A}$):** -5.5 Volts

Pentode Section

The pentode section is a high-gain, frame-grid design. Its typical operation is characterized at two distinct operating points:

Parameter	Operating Point A	Operating Point B
Plate Voltage	40 Volts	200 Volts
Screen Voltage	120 Volts	120 Volts
Grid No. 1 Voltage	0 Volts	—
Cathode Bias Resistor	—	65 Ohms
Plate Resistance (Approx.)	—	490,000 Ohms
Transconductance	—	21,200 μmhos
Plate Current	68 mA	27.5 mA
Screen Current	17.6 mA	4.9 mA
Approx. Grid No. 1 Voltage (for $I_b = 100 \mu\text{A}$)	—	-5.0 Volts

Design Maximum Ratings

Under the Design Maximum Rating System, the maximum allowable limits for each section are as follows:

Triode Sections (No. 1 and No. 2)

- **Plate Voltage (Maximum):** 330 Volts
- **Positive DC Grid Voltage (Maximum):** 0 Volts
- **Plate Dissipation (Maximum, per section):** 1.5 Watts
- **Grid Circuit Resistance (Maximum):**
 - With Fixed Bias: 0.5 Megohm
 - With Cathode Bias: 1.0 Megohm

Pentode Section

- **Plate Voltage (Maximum):** 330 Volts
- **Screen-Supply Voltage (Maximum):** 330 Volts
- **Positive DC Grid No. 1 Voltage (Maximum):** 0 Volts
- **Plate Dissipation (Maximum):** 5.0 Watts
- **Screen Dissipation (Maximum):** 1.0 Watt
- **Grid No. 1 Circuit Resistance (Maximum):**
 - With Fixed Bias: 10,000 Ohms
 - With Cathode Bias: 10,000 Ohms

Direct Interelectrode Capacitances

These capacitances are measured without an external shield. The internal connections and shielding are reflected in the measurement conditions:

Triode Section 1

- **Grid to Plate:** 2.7 pF
- **Input (1Tg to [1Tk + 2Tk + Pk + Pg3 + h + IS]):** 4.7 pF
- **Output (1Tp to [1Tk + 2Tk + Pk + Pg3 + h + IS]):** 4.0 pF

Triode Section 2

- **Grid to Plate:** 2.1 pF
- **Input (2Tg to [2Tk + Pk + Pg3 + h + IS]):** 2.8 pF
- **Output (2Tp to [2Tk + Pk + Pg3 + h + IS]):** 2.0 pF

Pentode Section

- **Grid No. 1 to Plate:** 0.13 pF

- **Input (Pg1 to [2Tk + Pk + Pg2 + Pg3 + h + IS]):** 12.3 pF
- **Output (Pp to [2Tk + Pk + Pg2 + Pg3 + h + IS]):** 4.6 pF

Inter-Section Coupling

- **Pentode Plate to Triode Plate (Section 2) (Maximum):** 0.045 pF
- **Triode Plate (Section 1) to Triode Plate (Section 2) (Maximum):** 0.100 pF

Technical Summary

The **11CA11** is a twelve-pin compactron containing two high-mu triodes and a high-gain frame-grid pentode in a single T-9 envelope. Operating with a 10.7 V, 0.6 A heater with a controlled 11-second warm-up time, it is optimized for series-string color television designs, serving as a combined video amplifier and cathode follower. Its design maximum ratings allow up to 330 V on the plates of all sections, with the pentode capable of dissipating up to 5.0 W and the triodes up to 1.5 W each.

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