

ELECTRONIC TUBE REFERENCE

11AR11

Voltage - Dual Pentode electronic tube

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
PENTODE-PENTODE

Duodecar twin semiremote-cutoff pentode designed for television intermediate-frequency amplifier stages.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12DM	BASE PINS	12
NOMINAL HEATER	11.2 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

12DM - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1	–	H – Heater	CONNECTED
PIN2	B	P – Plate (Anode)	CONNECTED
PIN3	B	G2 – Screen Grid	CONNECTED
PIN4	B	G3 – Suppressor Grid	CONNECTED
PIN5	B	G1 – Control Grid	CONNECTED
PIN6	B	K – Cathode	CONNECTED
PIN7	A	G3 – Suppressor Grid	CONNECTED
PIN7	–	IS – Internal Screen	CONNECTED
PIN8	A	P – Plate (Anode)	CONNECTED
PIN9	A	G2 – Screen Grid	CONNECTED
PIN10	A	G1 – Control Grid	CONNECTED
PIN11	A	K – Cathode	CONNECTED
PIN12	–	H – Heater	CONNECTED

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	200000 Ω
TRANSCONDUCTANCE	0.0105 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	2.5 W
MAXIMUM SCREEN DISSIPATION	0.65 W
<i>semiremote-cutoff</i>	

SECTION2 Pentode	
PLATE RESISTANCE	200000 Ω
TRANSCONDUCTANCE	0.0105 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	2.5 W
MAXIMUM SCREEN DISSIPATION	0.65 W
<i>semiremote-cutoff; second physical pentode section added to align section rows with SectionCount</i>	

11AR11 — Semiremote-Cutoff Twin Pentode

Overview

The **11AR11** is a duodecar-type, semiremote-cutoff twin pentode designed primarily for use as an intermediate-frequency (IF) amplifier in television receivers. It houses two electrically independent pentode units within a single Compactron T-9 glass envelope. This dual-unit configuration allows a single tube to perform multiple amplification stages, saving space and reducing component count in television chassis designs.

The 11AR11 belongs to a family of identical twin pentodes that includes the **6AR11** and **8AR11**. These three types share identical physical dimensions, internal construction, electrode structures, and electrical characteristics, differing solely in their heater ratings and warm-up characteristics to accommodate different power supply configurations.

Construction, Physical Dimensions, and Base Connection

The 11AR11 features a **Compactron T-9** glass envelope construction with a button 12-pin base (designation E12-70). The tube requires a standard duodecar 12-contact socket and can be mounted in any position.

The physical dimensions of the device are as follows:

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

The internal layout utilizes the **12DM** basing arrangement, which provides separate pin connections for the plates, screen grids (Grid No. 2), suppressor grids (Grid No. 3), control grids (Grid No. 1), and cathodes of both pentode units, alongside a shared heater and an internal shield. The pinout configuration, viewed from the bottom of the base, is assigned as follows:

Pin Number	Electrode Connection
Pin 1	Grid No. 1, Unit 1 (<u>1G1</u>)
Pin 2	Plate, Unit 2 (2P)
Pin 3	Grid No. 2 (Screen Grid), Unit 2 (2G2)
Pin 4	Heater (H)
Pin 5	Grid No. 3 (Suppressor Grid), Unit 2 (2G3)
Pin 6	Cathode, Unit 2 (2K)
Pin 7	Internal Shield (IS)
Pin 8	Plate, Unit 1 (1P)
Pin 9	Grid No. 2 (Screen Grid), Unit 1 (1G2)
Pin 10	Grid No. 3 (Suppressor Grid), Unit 1 (<u>1G3</u>)
Pin 11	Cathode, Unit 1 (1K)
Pin 12	Heater (H)

The inclusion of the internal shield (connected to Pin 7) is critical for minimizing capacitive coupling and crosstalk between the two high-gain pentode sections.

Heater Characteristics and Ratings

The 11AR11 is designed for series-string heater circuits or specific parallel arrangements. Its heater is designed to operate under the following parameters:

Parameter	Value
Heater Voltage (AC or DC)	11.2 V
Heater Current	0.450 A $\pm$ 0.030 A
Average Heater Warm-up Time	11 seconds

For comparison, the related [6AR11](#) operates at a nominal heater voltage of 6.3 V with a current of 0.8 A (800 mA), while the [8AR11](#) operates at 8.4 V with a current of 0.6 A (600 mA) and shares the 11-second average warm-up time.

To ensure reliable operation and prevent insulation breakdown, the heater-to-cathode voltage must be maintained within strict limits:

- **Heater Negative with Respect to Cathode:** 200 V maximum (total DC and peak)
- **Heater Positive with Respect to Cathode:** 100 V maximum DC, 200 V maximum (total DC and peak)

Electrical Characteristics and Typical Operation

Under typical Class A1 amplifier operating conditions, each pentode unit of the 11AR11 exhibits high transconductance and high plate resistance. The typical operating parameters for each individual section, with the suppressor grid connected directly to the cathode at the socket, are outlined below:

Parameter	Value
Plate Supply Voltage	125 V
Grid No. 3 (Suppressor Grid)	Connected to cathode at socket
Grid No. 2 (Screen Grid) Supply Voltage	125 V
Cathode-Bias Resistor	56 Ω
Plate Resistance (Approximate)	0.2 M Ω
Transconductance	10,500 μ mhos
Plate Current	11 mA
Grid No. 2 (Screen Grid) Current	3.5 mA
Grid No. 1 Voltage (Approx.) for transconductance of 50 μ mhos	-15 V

The semiremote-cutoff characteristic is demonstrated by the control grid (Grid No. 1) voltage required to reduce the transconductance to a low value. A bias voltage of approximately -15 V reduces the transconductance to 50 μ mhos, allowing effective automatic gain control (AGC) action in television IF stages without sudden cutoff or severe cross-modulation.

Maximum Ratings (Design-Maximum System)

The maximum ratings are established under the Design-Maximum Rating System. These limits must not be exceeded under the worst-case operating conditions of supply voltage, component tolerances, and environmental variations. The ratings apply to each individual pentode unit:

- **Plate Voltage:** 330 V maximum
- **Grid No. 3 (Suppressor Grid) Voltage, Positive Value:** 0 V maximum
- **Grid No. 2 (Screen Grid) Supply Voltage:** 330 V maximum
- **Grid No. 2 (Screen Grid) Voltage:** Dependent on operating conditions (subject to specific rating curves)
- **Grid No. 1 (Control Grid) Voltage, Positive-Bias Value:** 0 V maximum
- **Plate Dissipation:** 3.1 W maximum
- **Grid No. 2 (Screen Grid) Input:**
 - For Grid No. 2 voltages up to 165 V: 0.65 W maximum
 - For Grid No. 2 voltages between 165 V and 330 V: Subject to specific rating curves

Interelectrode Capacitances

Because the 11AR11 is designed for high-frequency IF amplification, minimizing internal capacitive feedback is essential to prevent instability and oscillation. The direct interelectrode capacitances are highly controlled.

When measured with an external shield (such as EIA 309) connected to the cathode of the section under test, the typical capacitances are:

Capacitance Parameter	Unit No. 1	Unit No. 2
Grid No. 1 to Plate	0.026 pF	0.026 pF
Input: g1 to (k + $\underline{g2}$ + g3 + h + IS)	10 pF	10 pF
Output: p to (k + $\underline{g2}$ + g3 + h + IS)	2.8 pF	3.0 pF

Cross-unit capacitances are also minimized to ensure excellent isolation between the two pentode sections:

- **Plate of Unit No. 1 to Plate of Unit No. 2:** 0.016 pF to 0.02 pF maximum
- **Grid No. 1 of Unit 1 to Plate of Unit 2:** 0.002 pF maximum
- **Grid No. 1 of Unit 2 to Plate of Unit 1:** 0.004 pF maximum

These extremely low feedback capacitances (such as the 0.026 pF grid-to-plate capacitance) allow high-gain, stable IF amplification at television operating frequencies without requiring complex neutralization circuits.

Technical Summary

The **11AR11** is a high-performance, duodecar-type semiremote-cutoff twin pentode designed for television IF amplifier applications. By integrating two independent, high-transconductance (10,500 μmhos) pentode units into a single Compactron T-9 envelope, it provides a compact and efficient solution for multi-stage bandpass amplification. Operating with an 11.2 V, 0.450 A heater, the 11AR11 features robust design-maximum ratings (330 V plate voltage, 3.1 W plate dissipation per unit) and exceptionally low interelectrode and cross-unit capacitances, ensuring stable and reliable operation in high-frequency circuits.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1971 RCA HB3 Binder 5 of 7

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1971 RCA HB3 BINDER 5 OF 7

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	300 V	Inherited from explicitly referenced 6-volt parent type
Maximum Screen Voltage	300 V	Inherited from explicitly referenced 6-volt parent type
Plate Dissipation	2.5 W	Inherited from explicitly referenced 6-volt parent type

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	6000 μ S	Inherited from explicitly referenced 6-volt parent type



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1975 RCA RC30

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1975 RCA RC30

Section 1 · Pentode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1 to Plate	0.026 pF	—
Grid No.1 to other electrodes	10 pF	—
Plate to other electrodes	2.8 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate supply voltage	125 V	ClassA
Screen-grid supply voltage	125 V	ClassA
Cathode-bias resistor	56 ohm	ClassA
Plate current	11 mA	ClassA
Screen-grid current	3.5 mA	ClassA

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

[Catalog](#)
[Tube types](#)
[Full books](#)
[Blog](#)
[Feedback & corrections](#)

© 2026 Tube Tinker