



ELECTRONIC TUBE REFERENCE

17Y9

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-PENTODE

Dissimilar dual pentode for television receivers, combining a high-transconductance video-output section with a signal pentode for sound IF, AGC, or sync separation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	10
NOMINAL HEATER	16.5 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION 1 Pentode	
PLATE RESISTANCE	40000 Ω
TRANSCONDUCTANCE	0.021 S
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	5 W
MAXIMUM SCREEN DISSIPATION	2.5 W
MAXIMUM CATHODE CURRENT	60 mA
Unit No.1 video-output pentode; 550 V plate/screen supply ratings retained as parameters.	

SECTION2 Pentode	
PLATE RESISTANCE	160000 Ω
TRANSCONDUCTANCE	0.0085 S
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	1.5 W
MAXIMUM SCREEN DISSIPATION	0.5 W
MAXIMUM CATHODE CURRENT	15 mA
Unit No.2 sound-IF/AGC/sync pentode; 550 V supply ratings retained as parameters.	

17Y9 — Double Dissimilar Pentode

A miniature, double dissimilar pentode designed for television receiver applications, combining a high-transconductance video output pentode and a versatile signal pentode in a single envelope.

Overview

The **17Y9** is a miniature, double dissimilar pentode designed primarily for use in color television receivers. It combines two distinct pentode units with different electrical characteristics in a single envelope. Unit 1 is optimized as a high-transconductance video output pentode, while Unit 2 is designed for service as a sound intermediate-frequency (IF) amplifier, automatic gain control (AGC) amplifier, or sync separator.

The 17Y9 is electrically identical to the [6Y9/EFL200](#) except for its heater ratings, which are configured for series-string television receiver designs.

Heater and Physical Construction

The 17Y9 features an indirectly heated cathode system. The heater is designed for series-string operation with a nominal current of **0.3 A** (300 mA). Depending on the rating system applied, the nominal heater voltage is specified as either **16.5 V** or **17.0 V**.

The tube is constructed in a miniature **T-6 1/2** glass envelope. It utilizes a **10-pin base** (basing configuration **10L**) and requires a specialized miniature 10-contact socket. The physical dimensions are:

- **Maximum Diameter:** 0.875 inches
- **Maximum Seated Height:** 2.625 inches
- **Maximum Overall Height:** 2.875 inches

Heater-to-Cathode Voltage Ratings

The insulation between the heater and the cathodes is rated to withstand significant potential differences, which is critical in series-string heater chains:

- **Heater Negative with Respect to Cathode:** 200 V (Total DC and Peak)
- **Heater Positive with Respect to Cathode (DC):** 100 V
- **Heater Positive with Respect to Cathode (Total DC and Peak):** 200 V
- **Peak Heater-Cathode Voltage (General):** ± 200 V

Pinout and Electrode Connections

The 10L basing arrangement provides separate connections for the control grids, screen grids, and plates of both units. Unit 1 features an internal shield connected to its cathode and suppressor grid (Grid No. 3). Unit 2 has its cathode and suppressor grid tied to a single pin.

Pin	Connection
1	Grid No. 1 (Unit 1) [G1P1]
2	Cathode, Grid No. 3 (Unit 2) [KP2, G3P2]
3	Grid No. 2 (Unit 2) [G2P2]
4	Plate (Unit 2) [PP2]
5	Heater [H]
6	Cathode, Grid No. 3, Internal Shield (Unit 1) [KP1, G3P1, IS]
7	Grid No. 1 (Unit 2) [G1P2]
8	Grid No. 2 (Unit 1) [G2P1]
9	Plate (Unit 1) [PP1]
10	Heater [H]

Electrical Characteristics and Typical Operation

The two pentode units in the 17Y9 are highly dissimilar, tailored to their respective roles in television circuitry. Unit 1 is a high-slope, low-resistance power pentode, whereas Unit 2 is a high-resistance, medium-slope signal pentode.

The typical Class A1 amplifier characteristics for each unit are as follows:

Parameter	Unit 1 (Video Output)	Unit 2 (IF/AGC/Sync)
Plate Voltage	170 V	150 V
Grid No. 2 (Screen) Voltage	170 V	150 V
Grid No. 1 (Control) Voltage	-2.6 V	-2.3 V
Plate Current	30 mA	10 mA
Grid No. 2 Current	6.5 mA	3.0 mA
Transconductance	21,000 μ mhos	8,500 μ mhos
Amplification Factor (Grid No. 1 to Grid No. 2)	38	35
Internal Plate Resistance	40 k Ω	160 k Ω

Maximum Ratings

The maximum ratings for the 17Y9 are documented under both the Design-Maximum system and the Absolute Maximum system. Designers must adhere to these limits to ensure reliable operation.

Design-Maximum Ratings

Under the Design-Maximum system, the limits are:

Rating	Unit 1	Unit 2
Plate Supply Voltage	550 V	550 V
Plate Voltage	250 V	250 V
Grid No. 2 Supply Voltage	550 V	550 V
Grid No. 2 Voltage	250 V	250 V
Plate Dissipation	5.0 W	1.5 W
Grid No. 2 Input	2.5 W	0.5 W
Cathode Current	60 mA	15 mA
Grid No. 1 Circuit Resistance	1.0 M Ω	1.0 M Ω

Absolute Maximum Ratings

Under the Absolute Maximum system, the limits are:

Rating	Unit 1	Unit 2
Plate Voltage (Zero Plate Current)	600 V	600 V
Plate Voltage	275 V	275 V
Grid No. 2 Voltage (Zero Grid Current)	600 V	600 V
Grid No. 2 Voltage	275 V	275 V
Plate Dissipation	5.8 W	1.75 W
Grid No. 2 Dissipation	2.9 W	0.6 W
Cathode Current (Continuous)	66 mA	16.5 mA
Cathode Current (Short Periods)	93 mA	85 mA
Grid No. 1 Circuit Resistance	1.0 M Ω	1.0 M Ω

Circuit-Specific Operating Examples

The 17Y9's dual-unit architecture allows it to perform multiple roles in a television chassis. The following examples illustrate typical operating conditions for various circuit configurations.

Unit 1 — Video Output Amplifier

Unit 1 is designed to deliver high peak-to-peak output voltages into a video load. The following table outlines five typical operating points:

Parameter	Case 1	Case 2	Case 3	Case 4	Case 5
Supply Voltage	135 V	135 V	230 V	250 V	250 V
Supply Series Resistor	0 Ω	0 Ω	820 Ω	1,200 Ω	0 Ω
Voltage at Ebb	—	—	190 V	190 V	0 V
Plate Resistor	2.2 k Ω	4.7 k Ω	2.0 k Ω	3.9 k Ω	3.3 k Ω
Grid No. 2 Resistor	0 Ω	0 Ω	1.0 k Ω	1.0 k Ω	3.9 k Ω
Cathode Resistor	6.8 Ω	6.8 Ω	6.8 Ω	6.8 Ω	15 Ω

Parameter	Case 1	Case 2	Case 3	Case 4	Case 5
Peak-to-Peak Input Signal	2.5 V	1.4 V	3.6 V	1.8 V	5.5 V
Peak-to-Peak Output Signal	90 V	90 V	100 V	100 V	160 V

Unit 2 — Sync Separator

When configured as a sync separator, Unit 2 operates with low plate current and reduced transconductance:

Parameter	Case 1	Case 2
Supply Voltage	100-140 V	200-250 V
Plate Resistor	50 k Ω	50 k Ω
Grid No. 2 Voltage	75 V	75 V
Grid No. 1 Resistor	1.0 M Ω	1.0 M Ω
Grid No. 1 Voltage	-2.6 V	-2.7 V
Plate Current	0.1 mA	0.1 mA
Transconductance	250 μ mos	200 μ mos

Unit 2 — AGC Amplifier

In automatic gain control (AGC) amplifier service, Unit 2 operates under the following typical conditions:

- **Plate Voltage:** 100-150 V
- **Grid No. 2 Voltage:** 60 V
- **Grid No. 1 Voltage:** -1.3 V
- **Plate Current:** 1.0 mA
- **Transconductance:** 2,500 μ mos

Unit 2 — IF Amplifier

When used as a sound intermediate-frequency (IF) amplifier, Unit 2 provides high gain:

Parameter	Case 1	Case 2
Plate Voltage	135 V	150 V
Grid No. 2 Voltage	135 V	150 V

Parameter	Case 1	Case 2
Grid No. 1 Voltage	-1.9 V	-2.3 V
Plate Current	10 mA	10 mA
Transconductance	8,700 μ mhos	8,500 μ mhos

Interelectrode and Inter-Unit Capacitances

Because the 17Y9 houses two high-gain pentodes in a single envelope, minimizing capacitive coupling between the units is critical for stable operation. The direct interelectrode capacitances, measured without an external shield, are detailed below:

Unit 1 Capacitances

- **Plate to All Other Elements (except Grid No. 1):** 7 pF
- **Grid No. 1 to All Other Elements (except Plate):** 12 pF
- **Plate to Grid No. 1:** 0.095 pF

Unit 2 Capacitances

- **Plate to All Other Elements (except Grid No. 1):** 11 pF
- **Grid No. 1 to All Other Elements (except Plate):** 10 pF
- **Plate to Grid No. 1:** 0.140 pF
- **Grid No. 1 to Heater:** 0.100 pF (or <0.100 pF)

Inter-Unit Capacitances

- **Plate to Plate:** 0.150 pF (or <0.150 pF)
- **Grid to Grid:** 0.010 pF (or <0.010 pF)
- **Plate (Unit 1) to Grid No. 1 (Unit 2):** 0.100 pF (or <0.100 pF)
- **Plate (Unit 2) to Grid No. 1 (Unit 1):** 0.005 pF (or <0.005 pF)

Technical Summary

The **17Y9** is a highly specialized **double dissimilar pentode** designed for television receiver applications. It features a **16.5 V / 17.0 V, 0.3 A** heater suitable for series-string power supplies, housed in a **T-6 1/2** miniature envelope with a **10-pin base (10L)**.

Unit 1 serves as a high-transconductance (**21,000 μ mhos**) video output pentode capable of dissipating up to **5.8 W** (absolute maximum) and delivering large peak-to-peak output swings. Unit 2 is a versatile signal pentode with a transconductance of **8,500 μ mhos** and a plate dissipation rating of up to **1.75 W** (absolute maximum), making it ideal for IF amplification, AGC amplification, or sync separation.

With its low inter-unit capacitances and independent electrode connections, the 17Y9 provides a compact, dual-stage solution that reduces component count and chassis space in television designs.

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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
For cathode-bias operation	0.5 MΩ	Published in approved EFL200 target datasheet entry; Section1
Heater Voltage 6.3	16.5 V	Published in approved EFL200 target datasheet entry; Section1
Heater Current 0.8	300 mA	Published in approved EFL200 target datasheet entry; Section1
Peak Heater-Cathode Voltage ±200	200 V	Published in approved EFL200 target datasheet entry; Section1
Grid-No.2 Voltage 250	250 V	Published in approved EFL200 target datasheet entry; Section1
Cathode Current 60	15 mA	Published in approved EFL200 target datasheet entry; Section1
Plate Dissipation 5	1.5 W	Published in approved EFL200 target datasheet entry; Section1
Plate Voltage 170	150 V	Published in approved EFL200 target datasheet entry; Section1
Grid-No.2 Voltage 170	150 V	Published in approved EFL200 target datasheet entry; Section1
Internal Resistance 40	160 kΩ	Published in approved EFL200 target datasheet entry; Section1
Transconductance 21000	8500 μS	Published in approved EFL200 target datasheet entry; Section1
Grid-No. 1-Circuit Resistance 1	1 MΩ	Published in approved EFL200 target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate to All Other Elements (except grid No.1)	7 pF	Published in approved EFL200 target datasheet entry; Section1
Grid No.1 to All Other Elements (except plate)	12 pF	Published in approved EFL200 target datasheet entry; Section1
Plate to Grid No.1	95 pF	Published in approved EFL200 target datasheet entry; Section1
Grid No.1 to All Other Elements (except plate)	10 pF	Published in approved EFL200 target datasheet entry; Section1
Plate to Grid No.1	140 pF	Published in approved EFL200 target datasheet entry; Section1
Grid No.1 to Heater <	100 pF	Published in approved EFL200 target datasheet entry; Section1
Plate to Plate <	150 pF	Published in approved EFL200 target datasheet entry; Section1
Grid to Grid <	10 pF	Published in approved EFL200 target datasheet entry; Section1
Plate (Unit No.1) to Grid No.1 (Unit No.2) <	100 pF	Published in approved EFL200 target datasheet entry; Section1
Plate (Unit No.2) to Grid No.1 (Unit No.2) <	5 pF	Published in approved EFL200 target datasheet entry; Section1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current 30	10 mA	Published in approved EFL200 target datasheet entry; Section1

1975 RCA RC30

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
For cathode-bias operation	0.5 MΩ	Published in approved EFL200 target datasheet entry; Section2
Heater Voltage 6.3	16.5 V	Published in approved EFL200 target datasheet entry; Section2
Heater Current 0.8	300 mA	Published in approved EFL200 target datasheet entry; Section2
Peak Heater-Cathode Voltage ±200	200 V	Published in approved EFL200 target datasheet entry; Section2

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No.2 Voltage 250	250 V	Published in approved EFL200 target datasheet entry; Section2
Cathode Current 60	15 mA	Published in approved EFL200 target datasheet entry; Section2
Plate Dissipation 5	1.5 W	Published in approved EFL200 target datasheet entry; Section2
Plate Voltage 170	150 V	Published in approved EFL200 target datasheet entry; Section2
Grid-No.2 Voltage 170	150 V	Published in approved EFL200 target datasheet entry; Section2
Internal Resistance 40	160 kΩ	Published in approved EFL200 target datasheet entry; Section2
Transconductance 21000	8500 μS	Published in approved EFL200 target datasheet entry; Section2
Grid-No. 1-Circuit Resistance 1	1 MΩ	Published in approved EFL200 target datasheet entry; Section2

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate to All Other Elements (except grid No.1)	7 pF	Published in approved EFL200 target datasheet entry; Section2
Grid No.1 to All Other Elements (except plate)	12 pF	Published in approved EFL200 target datasheet entry; Section2
Plate to Grid No.1	95 pF	Published in approved EFL200 target datasheet entry; Section2
Grid No.1 to All Other Elements (except plate)	10 pF	Published in approved EFL200 target datasheet entry; Section2
Plate to Grid No.1	140 pF	Published in approved EFL200 target datasheet entry; Section2
Grid No.1 to Heater <	100 pF	Published in approved EFL200 target datasheet entry; Section2
Plate to Plate <	150 pF	Published in approved EFL200 target datasheet entry; Section2
Grid to Grid <	10 pF	Published in approved EFL200 target datasheet entry; Section2
Plate (Unit No.1) to Grid No.1 (Unit No.2) <	100 pF	Published in approved EFL200 target datasheet entry; Section2
Plate (Unit No.2) to Grid No.1 (Unit No.2) <	5 pF	Published in approved EFL200 target datasheet entry; Section2

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current 30	10 mA	Published in approved EFL200 target datasheet entry; Section2

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