



ELECTRONIC TUBE REFERENCE

1610

Power - Pentode Single (NOT beam) (under 10W) electronic tube

CONSOLIDATED TECHNICAL
DATA

1 SECTION
CONSTRUCTION
PENTODE

RCA RF power pentode designed for transmitting service. Manufacturer documentation provides radio-frequency power ratings appropriate to an RF output tube rather than a receiving-type audio power pentode.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	5
NOMINAL HEATER	2.5 V / 1.75 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Pentode	
TRANSCONDUCTANCE	0.0025 S
MAXIMUM PLATE VOLTAGE	400 V
MAXIMUM SCREEN VOLTAGE	200 V
MAXIMUM PLATE DISSIPATION	6 W
<i>Published maximum ratings and characteristic values promoted from the approved source.</i>	

1610 — Crystal-Oscillator Power Pentode

The **1610** is a filament-type power pentode designed primarily for use as a crystal oscillator and radio-frequency (RF) power amplifier. It features a coated filament and is capable of operating at maximum ratings at frequencies up to 20 megacycles, and with reduced input at frequencies up to 110 megacycles. In historical catalogs, the 1610 is classified as a discontinued type listed for reference.

Filament, Mechanical, and Pin Connections

The 1610 is constructed with a coated filament and housed in an ST 16 glass bulb with a medium 5-pin base. It requires a small five-contact socket for installation. To ensure proper operation, the socket should preferably be installed to hold the tube in a vertical position, mounted either base up or base down.

The filament is designed for either alternating current (AC) or direct current (DC) operation. The filament and base pin connections, viewed from the top of the socket, are as follows:

- **Pin 1:** Filament (+)
- **Pin 2:** Plate
- **Pin 3:** Grid (Grid No.1)
- **Pin 4:** Screen (Grid No.2)
- **Pin 5:** Filament (-)

Filament Parameter	Value
Filament Voltage (AC or DC)	2.5 V
Filament Current	1.75 A

Electrical Characteristics and Capacitances

The 1610 exhibits a transconductance of 2500 micromhos (μmhos) when measured at a plate current of 31 milliamperes. The direct interelectrode capacitances of the tube are defined with respect to the filament mid-tap, grid No.3 (suppressor grid), and grid No.2 (screen grid) as follows:

Capacitance Parameter	Value
Grid-No.1 to Plate (Grid-Plate Capacitance)	1.2 μpF
Grid-No.1 to Filament Mid-Tap, Grid No.3, and Grid No.2 (Input)	8.6 μpF
Plate to Filament Mid-Tap, Grid No.3, and Grid No.2 (Output)	13.0 μpF

Maximum Ratings (Continuous Commercial Service)

For RF power amplifier and oscillator service under Class C Telegraphy (key-down conditions per tube without amplitude modulation), the maximum Continuous Commercial Service (CCS) ratings are:

Parameter	Maximum Rating
DC Plate Voltage	400 V
DC Screen Voltage (Grid-No.2)	200 V

Parameter	Maximum Rating
DC Grid-No.1 Voltage	-100 V
DC Plate Current	30 mA
DC Grid-No.1 Current	3 mA
Plate Input	9 W
Grid-No.2 (Screen) Input	2 W
Plate Dissipation	6 W

When operated at these maximum CCS ratings, the plate of the 1610 shows no color. Under modulated conditions, essentially negative amplitude modulation may be used, provided that the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.

Typical Class C Operating Conditions

The 1610 can be operated under typical Class C Telegraphy conditions at two distinct plate voltage levels. The typical operating parameters for these points are outlined below:

Operating Parameter	Condition A	Condition B
DC Plate Voltage	300 V	400 V
DC Screen Voltage	125 V	150 V
DC Grid Voltage	-60 V	-50 V
Peak RF Grid Voltage	110 V	75 V
DC Plate Current	30 mA	22.5 mA
DC Screen Current	13 mA	7 mA
DC Grid Current (Approx.)	2.5 mA	1.5 mA
Screen Resistor	13,500 Ω	35,000 Ω
Driving Power (Approx.)	0.25 W	0.1 W
Power Output (Approx.)	5 W	5 W

Application and Circuit Design

When utilized as a crystal-controlled oscillator, the 1610 requires specific circuit values to ensure stable and reliable operation:

- **Grid-Leak Resistance:** The grid circuit should be operated with a grid-leak resistance of approximately 30,000 ohms, with a power rating of at least 1 watt.
- **Screen Voltage Supply:** When the tube is configured as an oscillator, the screen voltage should not be left floating; it must be obtained either from a fixed voltage supply or from a potentiometer connected across the main plate-voltage supply.
- **High-Frequency Limits:** While the tube can be operated at its maximum ratings up to 20 megacycles, operation at higher frequencies up to 110 megacycles is permissible only with reduced input.

Technical Summary

The **1610** is a specialized 2.5 V filament-type power pentode designed for crystal oscillator and RF power amplifier applications. It features a robust 6-watt maximum plate dissipation rating under Class C service, a transconductance of 2500 μmhos , and low grid-to-plate capacitance (1.2 μF) suitable for high-frequency stability. Housed in an ST 16 bulb with a medium 5-pin base, it provides reliable performance up to 20 megacycles at full ratings, and up to 110 megacycles with reduced input, making it a highly capable component for transmitter and oscillator designs within its specified operating envelope.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1938 RCA Transmitting Tubes

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

1938 RCA TRANSMITTING TUBES

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	2.5 V	Nominal
HeaterCurrentNominal	1.75 A	Nominal
Maximum Plate Voltage	400 V	—
Maximum Screen Voltage	200 V	—
Maximum Plate Dissipation	6 W	—
Maximum Frequency	20 MHz	Published full-rating frequency guidance
RFPowerOutput	5 W	ClassC crystal oscillator

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	2500 μ S	Typical



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1956 RCA Transmitting Tubes

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

1956 RCA TRANSMITTING TUBES

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate/Inverse Voltage	400 V	Source rating

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Dissipation	6 W	—