

ELECTRONIC TUBE REFERENCE

1621

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

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
PENTODE

Octal power pentode similar to the 6F6, with documented push-pull Class-A1 operation producing about 5 W into a 4 kΩ plate-to-plate load. Designed for audio power-output service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7S	BASE PINS	7
NOMINAL HEATER	6.3 V / 700 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

7S - TERMINAL PINOUT

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

SECTION RATINGS

SECTION1 Pentode	
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	7.9 W
MAXIMUM SCREEN DISSIPATION	1.9 W
<i>Published promoted values applied where semantically applicable; additional table values retained in section parameters.</i>	

1621 — Power Amplifier Pentode

The **1621** is a ruggedized power amplifier pentode designed specifically for applications requiring high reliability and continuity of service. It is structurally and electrically similar to the standard **6F6** power pentode but is manufactured to tighter tolerances and quality standards to ensure dependable operation in critical industrial and communications equipment. Housed in a metal envelope with an octal base, the 1621 can be operated as either a pentode or a triode-connected power amplifier, primarily in push-pull Class A1 configurations.

Construction, Physical Dimensions, and Base Pinout

The 1621 features a robust construction utilizing a metal shell envelope designated as an **MT-8** bulb. It is designed to be mounted in any physical position. The physical dimensions of the tube are compact, matching the outline of the **12A6** beam power tube:

- **Maximum Overall Length:** 3-1/4 inches
- **Maximum Seated Height:** 2-11/16 inches
- **Maximum Diameter:** 1-5/16 inches

The tube is equipped with a **Small Wafer Octal 7-Pin** base. The electrical connections, viewed from the bottom of the tube, correspond to the **7S** basing diagram:

Pin Number	Electrode Connection
Pin 1	Metal Shell
Pin 2	Heater
Pin 3	Plate
Pin 4	Screen Grid (Grid No. 2)
Pin 5	Control Grid (Grid No. 1)
Pin 7	Heater
Pin 8	Cathode

Heater and Cathode Characteristics

The 1621 utilizes an indirectly heated, coated unipotential cathode. The heater is designed for operation from either an alternating current (AC) or direct current (DC) supply.

- **Nominal Heater Voltage:** 6.3 V
- **Nominal Heater Current:** 0.7 A

In circuits where the cathode is not directly connected to the heater, the potential difference between the heater and cathode must be kept as low as possible to prevent insulation breakdown and minimize hum injection.

Interelectrode Capacitances

The direct interelectrode capacitances of the 1621 are measured with the metal shell connected directly to the cathode. The approximate values are:

- **Grid to Plate (Input to Output):** 0.20 μpF
- **Input (Grid to Cathode, Heater, and Screen):** 7.5 μpF
- **Output (Plate to Cathode, Heater, and Screen):** 11.5 μpF

Maximum Ratings (Design-Center Values)

The maximum ratings for the 1621 are established under the Design-Center Rating System. These limits must not be exceeded under the worst-case operating conditions. The ratings differ depending on whether the tube is operated in a triode connection (with the screen grid connected directly to the plate) or in a standard pentode connection.

Parameter	Triode Connection	Pentode Connection
Maximum Plate Voltage	300 V	300 V
Maximum Screen (Grid No. 2) Voltage	—	300 V
Maximum Plate Dissipation	8.3 W	7.9 W
Maximum Screen Input	—	1.9 W

Typical Push-Pull Class A1 Operating Conditions

The 1621 is primarily specified for push-pull Class A1 amplifier service. The typical operating parameters are published for a two-tube configuration.

Push-Pull Triode Connection

In this configuration, the screen grid (Grid No. 2) of each tube is connected directly to its respective plate. Cathode-bias operation is the only recommended biasing method for this mode.

- **Plate Supply Voltage:** 327.5 V
- **Cathode Resistor:** 500 Ω (shared by both tubes)
- **Peak A-F Grid-to-Grid Voltage:** 54 V
- **Zero-Signal Plate Current:** 55 mA (combined for both tubes)
- **Maximum-Signal Plate Current:** 59 mA (combined for both tubes)
- **Load Resistance (Plate-to-Plate):** 5000 Ω
- **Total Harmonic Distortion (THD):** 1%
- **Power Output:** 2 W

Note on Cathode Bias: The actual operating voltage between the cathode and the plate is equal to the plate-supply voltage minus the voltage drop across the cathode resistor. For example, with a zero-signal plate current of 55 mA flowing through the 500 Ω cathode resistor, the voltage drop is calculated as:

$$V_{\text{drop}} = 0.055 \text{ A} \times 500 \Omega = 27.5 \text{ V}$$

Thus, the actual plate-to-cathode voltage under zero-signal conditions is:

$$V_{\text{plate-to-cathode}} = 327.5 \text{ V} - 27.5 \text{ V} = 300 \text{ V}$$

Push-Pull Pentode Connection

In standard pentode operation, the screen grid is operated at a fixed potential, independent of the plate voltage.

- **Plate Voltage:** 300 V
- **Screen Voltage:** 300 V
- **D-C Grid Voltage (Grid No. 1):** -30 V
- **Peak A-F Grid-to-Grid Voltage:** 60 V
- **Zero-Signal Plate Current:** 38 mA (combined for both tubes)
- **Maximum-Signal Plate Current:** 69 mA (combined for both tubes)
- **Zero-Signal Screen Current:** 6.5 mA (combined for both tubes)
- **Maximum-Signal Screen Current:** 13 mA (combined for both tubes)
- **Load Resistance (Plate-to-Plate):** 4000 Ω
- **Total Harmonic Distortion (THD):** 3%
- **Power Output:** 5 W

Grid Circuit and Input Coupling Requirements

To maintain stable operation and prevent thermal runaway or bias shifting, the input coupling circuit must be carefully designed to limit the resistance in the control grid circuit.

- **Coupling Methods:** Transformer- or impedance-coupling devices are highly recommended because they present low DC resistance to the grid.
- **Fixed Bias Operation:** Fixed bias may only be used if the grid circuit resistance does not exceed **0.05 M Ω** (50,000 Ω).

- **Cathode Bias Operation:** If the grid circuit resistance is higher than 0.05 MΩ, cathode bias is strictly required.
- **Maximum Grid Resistance:** Under cathode-bias conditions, the grid circuit resistance may be as high as, but must not exceed, **0.5 MΩ** (500,000 Ω). This maximum limit is only permissible provided that the heater voltage is tightly regulated and not allowed to rise more than 10% above its nominal rated value (6.3 V) under any operating condition.

Relationship to Other Tube Types

The 1621 is closely related to several standard receiving tubes:

- **Type 6F6:** The 1621 is classified as a "Special 6F6" power pentode. The electrical characteristics and family of curves published for the standard 6F6 apply directly to the 1621.
- **Type 12A6:** While electrically distinct due to heater and power ratings, the 1621 shares the exact same physical outline dimensions as the 12A6 beam power tube.

Technical Summary

The **1621** is a specialized, high-reliability power amplifier pentode designed for industrial and communication applications where continuity of service is paramount. Featuring a 6.3 V, 0.7 A heater, an MT-8 metal envelope, and an octal 7-pin base, it provides robust performance in push-pull Class A1 amplifier circuits. When operated in a triode connection, a pair of 1621 tubes can deliver 2 W of output power with an exceptionally low total harmonic distortion of 1%. In a standard pentode connection, the same pair can deliver up to 5 W of output power at 3% distortion. By adhering to strict grid circuit resistance limits and utilizing recommended coupling methods, designers can ensure long-term stability and reliable operation in demanding environments.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	300 V	ClassA
Screen voltage	300 V	ClassA
Control-grid voltage	-30 V	ClassA
Plate current	38 mA	ClassA
Screen current	6.5 mA	ClassA
Load resistance	4000 Ω	ClassA
Power output	5 W	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	4000 μS	ClassA

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1960 RCA Industrial and Communications Types

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

1960 RCA INDUSTRIAL AND COMMUNICATIONS TYPES

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	300 V	PushPull;ClassA1;TwoTubes
Screen supply	300 V	PushPull;ClassA1;TwoTubes
Grid bias	-30 V	PushPull;ClassA1;TwoTubes
Screen current	6.5 mA	PushPull;ClassA1;TwoTubes
Plate current	38 mA	PushPull;ClassA1;TwoTubes
Load resistance	4000 Ohm	PushPull;PlateToPlate
Power output	5 W	PushPull;ClassA1;TwoTubes



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1971 RCA HB3 Binder 3 of 7

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

1971 RCA HB3 BINDER 3 OF 7

Section 1 · Pentode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage	6.3 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Current	0.7	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid to Plate	0.2	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 1 -Shell – published value 1	1	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 1 -Shell – published value 2	5	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Pin 2 -Heater – published value 1	2	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 2 -Heater – published value 2	7	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 3 -Plate – published value 1	3	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 3 -Plate – published value 2	8	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 4 -Screen	4	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate Supply '	327.5 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid Voltage	54 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Load Resistance !plate-to-plater	5000 ohm	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Power Output	2 W	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
recommended. T Ae grid ci« uit may Dave aresi5t ante as Aigh 85, but not	85 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
greater Lhan, 0.5 megohm provided the heater voltage is not allowed to	0.5 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate	300 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen	300 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
D-C Grid Voltage #	-30 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak A-F Grid-to-Grid Voltage	60 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Load Resistance (plate-to-plate)	4000 ohm	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Power Output	5 W	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
,4 TYPe oT input coupl ing used should not introduce too mu[n resistance	4	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
0.05 meg onm, fixed Dias may De used; for nigher values, Cathode bias	0.05 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
ance as nigh as, out not greater than, 0.5 meg ohm provided the heater `/	0.5 ohm	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	300 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate Dissipation	6.3 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Max.-Sig. Plate Current	59 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen Voltage	300 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate Dissipation	7.9 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen Input	1.9 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Max.-Sig. Plate Current	69 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Max.–Sig. Screen Current	13 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.