



ELECTRONIC TUBE REFERENCE

1612

Voltage - Radio Detector Converter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

HEPTODE

Low-microphonics industrial pentagrid amplifier-modulator equivalent to the 6L7, intended for radio mixing, modulation, and controlled RF amplification.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7T	BASE PINS	7
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Heptode	
PLATE RESISTANCE	600000 Ω
TRANSCONDUCTANCE	0.0011 S
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	100 V
MAXIMUM PLATE DISSIPATION	1.5 W
MAXIMUM SCREEN DISSIPATION	1 W
<i>Published promoted values applied where semantically applicable; additional table values retained in section parameters.</i>	

1612 — Low-Microphonic Pentagrid Mixer and Amplifier

The **1612** is a specialized metal-shell pentagrid tube designed primarily for applications requiring exceptionally low microphonic response. It is electrically identical to the standard **6L7** metal pentagrid

mixer but features ruggedized construction and rigorous testing to minimize microphonics. The tube is highly suited for volume expander-compressor circuits, superheterodyne mixers, and sensitive Class A1 audio and control amplifiers.

Construction, Heater, and Base Pinout

The 1612 is constructed with a metal envelope (MT-8 or 8A-1 bulb) and a coated unipotential cathode. It features a small wafer octal 7-pin base (7-T or 7T designation) and a miniature top cap. The top cap provides a direct connection to Grid #1, which minimizes input capacitance and isolates the primary control grid from the other electrodes.

The heater is designed for either AC or DC operation. 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 hum and leakage.

Heater Parameter	Value
Heater Voltage (AC or DC)	6.3 V
Heater Current	0.3 A

The physical dimensions of the tube are as follows:

- **Maximum Overall Length:** 3-1/8 inches
- **Maximum Seated Height:** 2-9/16 inches
- **Maximum Diameter:** 1-5/16 inches

The tube can be mounted and operated in any position. The 7-pin octal base connections, viewed from the bottom of the tube, are mapped as follows:

Pin / Cap	Connection
Pin 1	Metal Shell
Pin 2	Heater
Pin 3	Plate
Pin 4	Grids #2 and #4 (Screen Grids)
Pin 5	Grid #3 (Control/Oscillator Grid)
Pin 7	Heater
Pin 8	Cathode
Top Cap	Grid #1 (Control/Signal Grid)

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 1612 are specified with the metal shell connected directly to the cathode. The metal envelope acts as an internal shield, reducing stray capacitances and shielding the internal structure:

- **Grid #1 to Grid #3:** 0.20 pF maximum
- **Grid #1 to Plate:** 0.001 pF maximum
- **Grid #3 to Plate:** 0.10 pF maximum
- **Grid #1 to All Other Electrodes:** 7.5 pF
- **Grid #3 to All Other Electrodes:** 10 pF
- **Plate to All Other Electrodes:** 11 pF

Maximum Ratings

The maximum ratings for the 1612 are established under the Design-Center Rating System. Operating the tube beyond these limits may impair its performance and longevity.

Rating Parameter	Maximum Limit
Plate Voltage	250 V
Screen Voltage (Grids #2 & #4)	100 V
Plate Dissipation	1.5 W
Screen Dissipation (Grid-No. 2 Input)	1.0 W

Typical Operating Conditions and Characteristics

The 1612 can be operated either as a Class A1 amplifier or as a mixer in superheterodyne circuits. The dual-control-grid structure (Grid #1 and Grid #3) allows the tube's gain to be controlled by two independent signal sources.

Class A1 Amplifier Service

In Class A1 amplifier service, both control grids are biased to a typical operating point of -3 V. Under these conditions, the tube exhibits the following typical characteristics:

- **Plate Voltage:** 250 V
- **Screen Voltage (Grids #2 & #4):** 100 V
- **Control Grid #1 Bias:** -3 V
- **Control Grid #3 Bias:** -3 V
- **Plate Resistance:** 0.6 M Ω (600,000 Ω)
- **Transconductance (Grid #1 to Plate):** 1100 μ mhos
- **Plate Current:** 5.3 mA

- **Screen Current:** 6.5 mA

When a large negative bias is applied to both control grids, the transconductance is sharply reduced. With both Grid #1 and Grid #3 biased to -15 V, the transconductance from Grid #1 to the plate drops to approximately 5 μ mhos, demonstrating the tube's remote-cutoff capability.

Mixer Service in Superheterodyne Receivers

When used as a mixer, Grid #1 serves as the radio-frequency (RF) signal input grid, and Grid #3 serves as the local oscillator input grid. The typical operating parameters for mixer service are:

- **Plate Supply Voltage:** 250 V
- **Screen Supply Voltage (Grids #2 & #4):** 100 V
- **Control Grid #1 Bias:** -3 V
- **Control Grid #3 (Oscillator Grid) Bias:** -10 V
- **Plate Current:** 2.4 mA
- **Conversion Transconductance:** 375 μ mhos

Applications and Circuit Design

The primary feature distinguishing the 1612 from the standard [6L7](#) is its low-microphonic construction. During manufacture, the tube undergoes specialized assembly techniques and testing protocols to ensure that mechanical vibrations do not translate into electrical noise. This makes the 1612 highly recommended for high-gain audio preamplifiers, sensitive laboratory instruments, and volume expander-compressor circuits where microphonic feedback would degrade signal quality.

In volume expander-compressor circuits, the dual-grid control capability is utilized by applying the primary audio signal to Grid #1 while applying a variable DC control voltage (derived from the signal envelope) to Grid #3. This varies the gain of the stage dynamically. Because the characteristic curves of the [6L7](#) apply directly to the 1612, designers can utilize standard [6L7](#) load lines and transfer curves to calculate circuit performance, distortion, and gain margins.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Heptode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Equivalent Characteristics Reference	6L7	Source states characteristics and basing are identical to 6L7

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 · Heptode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA;Mixer
Screen voltage	100 V	ClassA;Mixer
Control-grid voltage	-3 V	ClassA;Mixer
Plate current	5.3 mA	ClassA;Mixer
Screen current	6.5 mA	ClassA;Mixer

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	600000 Ω	ClassA;Mixer
Conversion transconductance	1100 μS	Grid3=-3V



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

Section 1 · Heptode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltage	6.3 V	—
HeaterOrFilamentCurrent	300 mA	—
Conversion Transconductance	375 uS	SuperheterodyneMixer

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
OscillatorGridBias	-10 V	Converter



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 · Heptode

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	0.3	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid #1 to All Other Electrodes – published value 1	1	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #1 to All Other Electrodes – published value 2	7.5	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #3 to All Other Electrodes – published value 1	3	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #3 to All Other Electrodes – published value 2	10	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate to All Other Electrodes	11	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	0	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 1 -Shell – published value 3	5	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 1 -Shell – published value 4	3	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
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 -Grids #2d #4 – published value 1	4	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Pin 4 -Grids #2d #4 – published value 2	2	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 4 -Grids #2d #4 – published value 3	4	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 4 -Grids #2d #4 – published value 4	1	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate	250 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen (Grids #2 & #4) – published value 1	2 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen (Grids #2 & #4) – published value 2	4 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen (Grids #2 & #4) – published value 3	100 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Control Grid (Grid #1) – published value 1	1 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Control Grid (Grid #1) – published value 2	-3 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Control Grid (Grid #3) – published value 1	3 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Control Grid (Grid #3) – published value 2	-3 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate Res	0.6 Mohm	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Transcond. (Grid #1- Plate) – published value 1	1	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Transcond. (Grid #1- Plate) – published value 2	1100	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transcond. (Grid #1 - Plate)' – published value 1	1	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Transcond. (Grid #1 - Plate)' – published value 2	5	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate Cur	5.3 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen Cur	6.5 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
' Mith Grid I1 Dias = –15 volts; Grid /3 – published value 1	15 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
' Mith Grid I1 Dias = –15 volts; Grid /3 – published value 2	3 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid #1 to Grid #3 – published value 1	1 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #1 to Grid #3 – published value 2	3 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #1 to Grid #3 – published value 3	0.2 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #1 to Plate – published value 1	1 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #1 to Plate – published value 2	0.001 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #3 to Plate – published value 1	3 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Grid #3 to Plate – published value 2	0.1 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	250 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen Voltage	100 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate Dissipation	1.5 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Screen Dissipation	1 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

TUBE TINKER

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