



ELECTRONIC TUBE REFERENCE

101M

Voltage - Triode (single) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TRIODE

Quick-heating filamentary triode for audio-frequency amplification or modulation, designed for rapid readiness in professional communications equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	4
NOMINAL HEATER	3.75 V / 250 mA	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Triode	
PLATE RESISTANCE	6000 Ω
TRANSCONDUCTANCE	0.00108 S
AMPLIFICATION FACTOR	6.5
MAXIMUM PLATE VOLTAGE	180 V
MAXIMUM PLATE DISSIPATION	2 W
Coated-filament audio-frequency amplifier triode intended where quick filament heating is required; max plate dissipation 2.0 W.	

101M — Filamentary Triode Vacuum Tube

A directly heated, filamentary triode designed for audio-frequency amplification and modulation applications requiring rapid filament heating.

Overview

The **101M** is a filamentary-type triode developed by Bell Telephone Laboratories and manufactured by Western Electric. It is designed specifically for use as an audio-frequency amplifier or modulator. The primary design feature of this tube is its quick-heating filament, making it suitable for equipment where rapid operational readiness is required. For applications where filament heating time is not a critical factor, other members of the 101 series of tubes are recommended to obtain better thermionic life.

Construction and Filament Characteristics

The 101M utilizes a directly heated, coated filament cathode. The filament is designed to reach operating temperature rapidly.

Filament Parameter	Value
Filament Current	250 mA (D.C.)
Nominal Filament Voltage	3.75 V
Cathode Type	Coated Filament
Heating Method	Direct

The filament resistance of the 101M increases slightly during its first year of operating life. The nominal voltage of 3.75 V represents the stabilized value after this initial operational period.

Mechanical Specifications, Base, and Pinout

The tube is constructed with an **ST14** glass bulb and a medium 4-pin base with a bayonet pin, designated as the **A4-36** base.

Physical Dimensions

- **Maximum Overall Height:** 4-1/2 inches
- **Maximum Bulb Diameter:** 1-13/16 inches
- **Maximum Base Sleeve Height:** 0.972 inches
- **Pin Diameter:** 0.125 ± 0.003 inches (for all pins except where noted)
- **Bayonet Pin Dimension:** 0.129 inches maximum, measured from the top of the bayonet pin to a point on the stud where the combined diameter of the stud and solder does not exceed 0.129 inches.

Mounting Position

The 101M should preferably be mounted in a **vertical** position. If horizontal mounting is necessary, pins #1 and #2 must lie in the same vertical plane to ensure proper filament alignment and prevent sagging.

Pin Connections

Viewed from the bottom of the base, the pin connections are:

- **Pin 1:** Grid
- **Pin 2:** Filament
- **Pin 3:** Plate
- **Pin 4:** Filament

The plane of the filament is oriented relative to the base pins as indicated in the mechanical layout.

Electrical Capacitances

The direct interelectrode capacitances of the 101M are measured without an external shield:

- **Grid to Plate:** 6.0 μF
- **Input (Grid to Filament):** 3.9 μF
- **Output (Plate to Filament):** 2.8 μF

Maximum Ratings

The maximum ratings are specified under the Design-Center system:

- **Maximum Plate Voltage:** 180 V
- **Maximum Plate Dissipation:** 2.0 W
- **Maximum Plate Current:** 15 mA

Typical Operating Conditions (Class A1 Amplifier)

The 101M is characterized for Class A1 amplifier service at two typical operating points:

Parameter	Operating Point I	Operating Point II
Filament Current (D.C.)	250 mA	250 mA
Plate Voltage	130 V	160 V
Grid Voltage	-8 V	-10 V
Peak A-F Grid Voltage	8 V	10 V
Plate Current	6.8 mA	10.2 mA
Transconductance	1080 μmhos	1240 μmhos
Amplification Factor (μ)	6.5	6.5
Plate Resistance	6000 Ω	5200 Ω

Parameter	Operating Point I	Operating Point II
Load Resistance	6000 Ω	5200 Ω
Maximum Signal Power Output	60 mW	100 mW
Total Harmonic Distortion	3.4%	3.2%

Characteristic Curves and Interpretation

The electrical behavior of the 101M is further defined by its characteristic curves, which are plotted with a constant filament current of 250 mA D.C.:

- **Plate Characteristics (Plate Current vs. Plate Voltage):** These curves show plate current variation up to 20 mA for plate voltages up to 260 V, plotted across grid bias values from $E_c = 0$ to -28 V in 4-volt steps.
- **Transfer Characteristics (Plate Current vs. Grid Voltage):** Plotted for plate voltages (E_b) of 70, 100, 130, 160, and 190 V, showing the grid control range down to -28 V.
- **Amplification Factor vs. Grid Voltage:** The amplification factor remains remarkably stable, staying between approximately 6.3 and 6.5 across grid voltages from 0 to -28 V and plate voltages from 70 V to 190 V.
- **Plate Resistance vs. Grid Voltage:** Shows the plate resistance rising sharply as the grid bias becomes more negative, particularly at lower plate voltages. At typical operating points, it ranges between 5200 and 6000 ohms.
- **Transconductance vs. Grid Voltage:** Plotted for plate voltages from 70 V to 190 V, showing transconductance decreasing as the grid bias becomes more negative.

Technical Summary

The **101M** is a Western Electric medium-mu filamentary triode designed for audio-frequency amplification and modulation where rapid filament heating is required. Operating with a nominal 3.75 V, 250 mA filament, it provides an amplification factor of 6.5, a plate resistance of 5200 to 6000 ohms, and a maximum plate dissipation of 2.0 watts. Its design features a medium 4-pin bayonet base and an ST14 bulb, requiring specific vertical or oriented horizontal mounting to ensure reliable operation.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

2026 Western Electric 100s

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

2026 WESTERN ELECTRIC 100S

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filament voltage	3.75 V	—
Filament current	250 mA	—
Maximum plate voltage	180 V	—
Maximum plate dissipation	2 W	—
Maximum plate current	15 mA	—
Plate voltage	130 V	ClassA; OperatingPoint1
Grid voltage	-8 V	ClassA; OperatingPoint1
Plate current	6.8 mA	ClassA; OperatingPoint1
Power output	60 mW	ClassA; OperatingPoint1
Total harmonic distortion	3.4 percent	ClassA; OperatingPoint1
Plate voltage	160 V	ClassA; OperatingPoint2
Grid voltage	-10 V	ClassA; OperatingPoint2
Plate current	10.2 mA	ClassA; OperatingPoint2
Power output	100 mW	ClassA; OperatingPoint2
Total harmonic distortion	3.2 percent	ClassA; OperatingPoint2

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	6 pF	Without external shield
Input capacitance	3.9 pF	Without external shield
Output capacitance	2.8 pF	Without external shield

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	6000 ohm	Representative published operating point
Transconductance	1080 uS	Representative published operating point
Amplification factor	6.5	Representative published operating point

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and their source documents.

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