



ELECTRONIC TUBE REFERENCE

16AMP7

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

CATHODERAY

Sixteen-inch long-persistence cathode-ray display tube using electrostatic focusing and electrostatic deflection. Its aluminized screen gives blue-white fluorescence with yellow afterglow, while high accelerating voltage supports a bright trace for specialized instrument display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	17600 V
<i>Published maximum ratings and characteristics promoted semantically from the approved source.</i>	

16AMP7 — Electrostatic Deflection and Focus Oscilloscope Tube

Overview

The **16AMP7** is a 16-inch direct-viewed, round glass cathode-ray tube designed for oscilloscope applications. It features electrostatic deflection, electrostatic focus, post-deflection acceleration, and an aluminized screen. The tube is equipped with a P7 phosphor screen as standard, which provides blue-white fluorescence, yellow phosphorescence, and long persistence. However, it can also be supplied with other screen phosphors. The faceplate is constructed of gray filter glass with an approximate light transmittance of 76 percent.

Mechanical Design and Physical Dimensions

The 16AMP7 is a large-scale cathode-ray tube with a nominal bulb diameter of 16 inches (with a tolerance of $\pm 1/8$ inch) and a minimum useful screen diameter of 15 inches. The overall length of the tube is 22 $3/4$ inches ($\pm 3/8$ inch). The tube weighs approximately 20 pounds.

Base and Contacts

The tube utilizes a **Medium Shell Diheptal 12-Pin** base (designation **B12-37**) with a **14Q** basing arrangement. It features specific external contacts for high-voltage and deflection connections:

- **Bulb Contact:** A recessed small cavity cap (designation **J1-21**) is used for the Anode No. 3 (post-accelerator) connection.
- **Neck Contacts:** Small ball contacts (designation **J1-25**) are provided for the Anode No. 2 and deflection plate connections.

Alignment and Deflection Geometry

The physical alignment of the contacts and traces is tightly controlled:

- The J1-21 bulb contact aligns with the D3-D4 trace within ± 10 degrees and aligns with Pin No. 11.
- The J1-25 neck contact (Anode No. 2) aligns with the D1-D2 trace within $\pm 2 \frac{1}{2}$ degrees.
- The D3-D4 trace aligns with Pin No. 11 within ± 10 degrees.
- A positive voltage applied to deflecting plate D1 deflects the electron beam approximately toward Pin No. 8.
- A positive voltage applied to deflecting plate D3 deflects the beam approximately toward Pin No. 4.
- The angle between the D1-D2 and D3-D4 traces is 90 ± 1 degrees.

Electrical Characteristics and Interelectrode Capacitances

The 16AMP7 operates with a nominal heater voltage of 6.3 Volts and a heater current of 0.6 Amperes (with a tolerance of $\pm 10\%$).

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the tube are approximately as follows:

- **Cathode to all other electrodes:** 7 μF
- **Grid No. 1 to all other electrodes:** 8 μF
- **Between deflecting plates 1-2:** 4 μF
- **Between deflecting plates 3-4:** 3 μF
- **Deflecting plate 1 to all other electrodes:** 12.5 μF
- **Deflecting plate 2 to all other electrodes:** 12.5 μF
- **Deflecting plate 3 to all other electrodes:** 8.5 μF

- **Deflecting plate 4 to all other electrodes:** 8.5 μF

Absolute Maximum Ratings

The absolute maximum ratings define the operating limits beyond which the safety and performance of the 16AMP7 may be severely compromised:

Parameter	Absolute Maximum Rating
Anode Input	6 Watts
Anode No. 3 (Post Accelerator) Voltage	17,600 Volts dc
Anode No. 2 Voltage	8,800 Volts dc
Anode No. 1 (Focusing Electrode) Voltage	3,300 Volts dc
Grid No. 1 Negative Bias Value	330 Volts dc
Grid No. 1 Positive Bias Value	0 Volts dc
Grid No. 1 Positive Peak Value	2 Volts
Peak Heater-Cathode Voltage (Heater negative with respect to cathode)	200 Volts
Peak Heater-Cathode Voltage (Heater positive with respect to cathode)	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate	1,650 Volts
Ratio of Post Accelerator Voltage to Anode No. 2 Voltage	2:1

Note: Anode input is defined as the product of the Anode No. 2 voltage and the average Anode No. 2 current.

Typical Operating Conditions

Under typical operating conditions, the 16AMP7 is configured with the following parameters:

- **Anode No. 3 (Post Accelerator) Voltage:** 12,000 Volts dc
- **Anode No. 2 Voltage:** 7,500 Volts dc
- **Anode No. 1 Voltage for Focus:** 1,760 to 2,670 Volts dc
- **Grid No. 1 Voltage Required for Cutoff:** -160 to -240 Volts dc (for visual extinction of an undeflected focused spot)
- **Deflection Factors:**
 - **Deflecting Plates 1-2:** 96 to 150 Volts dc/Inch

- **Deflecting Plates 3-4:** 96 to 150 Volts dc/Inch
- **Modulation:** 37 Volts Max. (measured in accordance with MIL-E-1 specification at a post-accelerator current of 25 μ A)
- **Line Width 'A':** 0.5 mm (measured at a post-accelerator current of 25 μ A)
- **Focus Electrode Current:** -25 to +25 μ A dc (measured at a post-accelerator current of 25 μ A)
- **Spot Position (Undeflected):** Within a 20 mm square

Deflecting plates 1 and 2 are physically positioned nearer to the screen than plates 3 and 4.

Circuit Values

To ensure stable operation, the external circuit design must adhere to the following maximum resistance limits:

- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum
- **Resistance in Any Deflection Plate Circuit:** 5.0 Megohms maximum

Safety and X-Ray Warning

When operating the 16AMP7, precautions must be taken regarding X-ray radiation. X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if the tube is operated at voltages higher than the manufacturer's maximum anode voltage or 16,000 volts, whichever is less.

Technical Summary

The **16AMP7** is a specialized 16-inch round glass cathode-ray tube designed for high-performance oscilloscope applications. It integrates electrostatic focus and deflection with post-deflection acceleration to achieve precise beam control and high brightness on its aluminized screen. Standardized with a long-persistence P7 phosphor, it is well-suited for displaying slow-moving or transient waveforms. The electrical design is characterized by a 6.3 V, 0.6 A heater, moderate interelectrode capacitances, and strict operating limits, including a maximum post-accelerator voltage of 17,600 V and a maximum anode input of 6 W. Proper implementation requires adhering to specified grid and deflection circuit resistance limits and implementing adequate X-ray shielding when operating near high-voltage thresholds.



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 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	17600 V	—
Post Accelerator Voltage	12000 V	—
Anode No. 2 Voltage	7500 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P7	—
Focusing Method	Electrostatic	—
Deflecting Method	Electrostatic	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Electrostatic text	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Fluorescence	Blue-White text	—
Persistence	Long text	—
Phosphorescence	Yellow text	—
Screen Aluminized	Yes text	—
Maximum Line Width	0.5 mm	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Input	6 W	—
Maximum Post-Accelerator Voltage	17600 V	Anode3
Maximum Anode2 Voltage	8800 V	—
Maximum Focus Electrode Voltage	3300 V	Anode1
Maximum Grid Negative Bias	330 V	—
Maximum Grid Positive Peak	2 V	—
Maximum Heater-Cathode Voltage	200 V	EitherPolarity
Maximum Anode2-to-Deflection-Plate Voltage	1650 V	—
Post-Accelerator Voltage	12000 V	Anode3
Anode2 Voltage	7500 V	—
Focus Voltage Minimum	1760 V	Anode1
Focus Voltage Maximum	2670 V	Anode1
Grid Cutoff Voltage Minimum	-240 V	—
Grid Cutoff Voltage Maximum	-160 V	—
Deflection Factor Minimum	96 V/in	BothPlatePairs
Deflection Factor Maximum	150 V/in	BothPlatePairs
Maximum Modulation Voltage	37 V	—
Maximum Grid1 Circuit Resistance	1.5 Mohm	—
Maximum Deflection Circuit Resistance	5 Mohm	—

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