

ELECTRONIC TUBE REFERENCE

17CWP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Seventeen-inch direct-view picture tube with electrostatic focusing, magnetic deflection, and a straight electron gun. National Video documentation gives high-voltage operation to about 16 kV for monochrome television display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8HR	BASE PINS	8
NOMINAL HEATER	6.3 V / 460 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	16000 V
MAXIMUM SCREEN VOLTAGE	500 V
MAXIMUM HEATER-CATHODE VOLTAGE	180 V
CRT anode and grid-2 maximum ratings are promoted from the printed ratings block; other CRT-specific focus/drive/deflection values are preserved in parameters.	

17CWP4 — Electrostatic-Focus Magnetic-Deflection Picture Tube

The **17CWP4** is an all-glass, rectangular, direct-view cathode-ray picture tube designed for television receiver applications. It features electrostatic focusing and magnetic deflection, utilizing a short electron gun that eliminates the need for an external ion-trap magnet. The tube incorporates a wide-angle deflection system and a spherical filter-glass faceplate to optimize picture quality and minimize cabinet depth.

Mechanical Design and Physical Dimensions

The 17CWP4 is constructed with an all-glass rectangular envelope designated as bulb number **J132 1/2 A1**. It features a spherical faceplate made of neutral-density filter glass, which provides a light transmission of approximately **77%** to improve picture contrast under ambient light.

The tube has a short **1-1/2" neck**, which is made possible by its compact, straight-type electrostatic gun. The overall mechanical specifications are as follows:

- **Overall Length:** 11-5/8" $\pm$ 5/16"
- **Greatest Bulb Dimensions:**
 - **Diagonal:** 16-9/16" $\pm$ 1/8"
 - **Width:** 15-5/8" $\pm$ 1/8"
 - **Height:** 12-3/4" $\pm$ 1/8"
- **Minimum Useful Screen Dimensions (Maximum Assured):**
 - **Screen Area:** 155 sq. in.
 - **Diagonal:** 15-3/4"
 - **Width:** 14-3/4"
 - **Height:** 11-11/16"
- **Weight:** 10 lbs.

The tube uses a **B7-183** base and an 8-pin **8HR** basing arrangement. High-voltage connection to the anode is made via a **J1-21** bulb contact. This contact is aligned with pin position #4 within a tolerance of $\pm 30^\circ$.

Electron Gun, Deflection, and Basing

The 17CWP4 employs a straight-type electron gun that does not require an ion trap. It uses electrostatic focusing, where Grid No. 4 serves as the focus electrode, and magnetic deflection. The deflection angles of the system are:

- **Diagonal Deflection:** 110°
- **Horizontal Deflection:** 105°
- **Vertical Deflection:** 87°

The phosphor screen is designated as **P4**, which produces a white fluorescence with short-to-medium persistence. The tube's external surface is coated with a conductive layer that forms a capacitor with the internal anode coating.

Pinout Configuration (8HR Basing)

The electrical connections are made through the B7-183 base pins, viewed from the bottom of the tube:

Pin Number	Electrode Connection
Pin 1	Heater (H)

Pin Number	Electrode Connection
Pin 2	Grid No. 1 (G1)
Pin 3	Grid No. 2 (G2)
Pin 4	Grid No. 4 (G4) [Focus Electrode]
Pin 5	No Connection
Pin 6	Grid No. 1 (G1)
Pin 7	Cathode (K)
Pin 8	Heater (H)
Anode Contact	J1-21 (Anode, aligns with pin position #4 $\pm$ 30°)

Electrical Characteristics and Capacitances

The direct interelectrode capacitances of the 17CWP4 are approximately:

- **Cathode to all other electrodes:** 5 μ F
- **Grid No. 1 to all other electrodes:** 6 μ F
- **External conductive coating to anode:** 1000 pF (minimum) to 1500 pF (maximum) (expressed as 1000 min. μ F to 1500 max. μ F)

The external conductive coating must be grounded to serve as an effective filter capacitor for the high-voltage anode supply.

Maximum Ratings (Design Center Values)

The following maximum ratings are established under the Design Center system:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Anode Voltage:** 16,000 V
- **Grid No. 4 Voltage (Focus Electrode):** -500 V to +1,000 V
- **Grid No. 2 Voltage:** 500 V
- **Grid No. 1 Voltage:**
 - **Negative Peak Value:** 200 max. V
 - **Negative Bias Value:** 140 max. V
 - **Positive Bias Value:** 0 max. V
 - **Positive Peak Value:** 2 max. V
- **Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode during warm-up ($\leq$ 15 s):** 410 V
 - **Heater negative with respect to cathode after warm-up:** 180 V

- **Heater positive with respect to cathode:** 180 V
- **Grid No. 1 Circuit Resistance:** 1.5 max. MΩ

Typical Operating Conditions

Under typical operating conditions, the 17CWP4 is operated with the following electrode potentials:

- **Anode Voltage:** 14,000 V
- **Grid No. 2 Voltage:** 400 V
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -36 V to -92 V
- **Grid No. 4 Voltage (Focus Electrode):** -50 V to +350 V

The focus electrode voltage range of -50 V to +350 V is specified with the combined Grid No. 1 bias and video signal adjusted to produce an anode current of 100 μA on an 11-11/16" x 14-3/4" picture.

Focus Voltage Calculation

For anode voltages other than the typical 14,000 V, the required focus voltage scales relative to the anode potential. The focus voltage is calculated to be within **-0.4% to +2.5%** of the operating anode voltage.

For example, at the typical anode voltage of 14,000 V:

- **Minimum Focus Voltage:** $14,000 \text{ V} * (-0.004) = -56 \text{ V}$
- **Maximum Focus Voltage:** $14,000 \text{ V} * 0.025 = +350 \text{ V}$

These calculated limits closely align with the typical specified range of -50 V to +350 V.

Technical Summary

The **17CWP4** is a 110° magnetic-deflection, electrostatic-focus picture tube featuring a space-saving short neck and a straight-type electron gun. Operating at a typical anode voltage of 14,000 V (with a design center maximum of 16,000 V), it provides a 155-square-inch useful screen area on a P4 white phosphor faceplate. Its electrostatic focus electrode (Grid No. 4) operates typically between -50 V and +350 V, scaling dynamically as -0.4% to +2.5% of the anode voltage. The tube's design center ratings, standard 6.3 V heater, and 8HR basing make it a highly integrated display component for compact television chassis designs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1956 National Video

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

1956 NATIONAL VIDEO

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical Anode Voltage	14000 V	—
Phosphor	P4	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage Nominal	6.3 V	—
Heater Current Nominal	460 mA	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to All Other Electrodes Capacitance	5 pF	Approximate
Grid 1 to All Other Electrodes Capacitance	6 pF	Approximate

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