

ELECTRONIC TUBE REFERENCE

19CHP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch direct-view monochrome television picture tube with electrostatic focusing, magnetic deflection, and an aluminized P4 screen. Manufacturer documentation places it in the high-voltage picture-tube family used for bright, high-contrast receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8HR	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

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	20000 V
MAXIMUM SCREEN VOLTAGE	70 V
Low-grid-2 cathode-drive P4 tube with no ion-trap magnet.	

19CHP4 — Rectangular Glass Television Picture Tube

The **19CHP4** is a 19-inch direct-view rectangular glass television picture tube designed primarily for cathode-drive service. It features a low-voltage electrostatic focusing system, 114-degree magnetic deflection, and an aluminized screen with a P4-sulfide type phosphor. The tube's design eliminates the need for an external ion-trap magnet, and it incorporates a controlled heater warm-up time for series-string or parallel heater applications.

Construction and Mechanical Characteristics

The 19CHP4 is constructed with a rectangular glass envelope and a spherical faceplate made of gray filterglass, which provides approximately 78% light transmission to enhance picture contrast under ambient light. The tube utilizes the J149A bulb and has a nominal neck diameter of 1-1/8 inches (1.125 inches, with a tolerance of +0.043 inches and -0.025 inches).

Key mechanical dimensions and physical characteristics include:

- **Overall Length:** 11-5/8 $\pm$ 1/4 inches
- **Neck Length:** 4-3/8 $\pm$ 1/8 inches
- **Weight:** Approximately 13.5 to 14 pounds
- **Operating Position:** Any
- **Screen Dimensions (Minimum Useful):**
 - **Height:** 12 inches
 - **Width:** 15-3/16 to 15-3/8 inches
 - **Diagonal:** 17-3/8 to 17-9/16 inches
 - **Projected Area:** 172 square inches

The tube is equipped with an external conductive coating (regular band) that must be grounded, with the contact area for grounding located near the reference line. The high-voltage connection is made via a recessed small cavity cap (JEDEC No. J1-21) located on the bulb cone. The base is a small-button Neoeightar 7-pin configuration (JEDEC No. B7-208) with an 8HR basing designation. Pin 4 of the base aligns with the horizontal centerline of the tube within 30 degrees on the same side as the anode contact.

Heater and Warm-Up Ratings

The 19CHP4 is designed with a heater that has a controlled warm-up time, making it suitable for use in television receivers with series-connected heater strings.

- **Nominal Heater Voltage:** 6.3 V
- **Heater Current:** 600 mA (with a tolerance of ± 30 mA or $\pm 5\%$)
- **Average Heater Warm-Up Time:** 11 seconds
- **Heater Voltage Limits (Design-Maximum):** 5.7 V minimum to 6.9 V maximum

Pinout and Basing Configuration

The 19CHP4 uses the **8HR** bottom-view basing arrangement. The electrical connections are allocated as follows:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 3:** Grid No. 2
- **Pin 4:** Grid No. 4 (Focusing Electrode)
- **Pin 6:** Grid No. 1

- **Pin 7:** Cathode
- **Pin 8:** Heater
- **Anode Cap (Ultor):** Grid No. 3, Grid No. 5, and Collector (Screen)
- **C:** External Conductive Coating (must be grounded)

Note that Grid No. 1 is connected to both Pin 2 and Pin 6.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 19CHP4 are measured as approximate values:

- **Grid No. 1 to all other electrodes:** 6 pF
- **Cathode to all other electrodes:** 5 pF
- **External conductive coating to anode (ultor):** 1000 pF minimum to 1500 pF maximum

The capacitance of the external conductive coating to the anode serves as a high-voltage filter capacitor when the coating is properly grounded.

Design-Maximum Ratings

The following design-maximum ratings represent the absolute limits within which the 19CHP4 must be operated to ensure reliability and performance. All voltages are specified as positive with respect to Grid No. 1 unless otherwise noted.

Parameter	Minimum Value	Maximum Value
Ultor-to-Grid-No. 1 Voltage (Anode Voltage)	10,000 Vdc	20,000 Vdc
Grid-No. 4-to-Grid-No. 1 (Focusing) Voltage	-400 Vdc	+1250 Vdc
Grid-No. 2-to-Grid-No. 1 Voltage	40 Vdc	70 Vdc
Cathode-to-Grid-No. 1 Voltage (Positive Peak)	—	150 V
Cathode-to-Grid-No. 1 Voltage (Positive Bias)	—	100 Vdc
Cathode-to-Grid-No. 1 Voltage (Negative Bias)	—	0 Vdc
Cathode-to-Grid-No. 1 Voltage (Negative Peak)	—	2 V

Parameter	Minimum Value	Maximum Value
Peak Heater-Cathode Voltage (Heater negative to cathode, warm-up ≤ 15 s)	—	450 V
Peak Heater-Cathode Voltage (Heater negative to cathode, after warm-up)	—	200 V
Peak Heater-Cathode Voltage (Heater positive to cathode)	—	200 V

Typical Operating Conditions (Cathode Drive Service)

Under typical operating conditions in cathode-drive service, the electrode voltages are set relative to Grid No. 1 as follows:

- **Ultor-to-Grid-No. 1 Voltage:** 16,000 Vdc
- **Grid-No. 2-to-Grid-No. 1 Voltage:** 50 Vdc
- **Grid-No. 4-to-Grid-No. 1 Voltage for Focus:** -50 to +250 Vdc (or 0 to 400 Vdc)
- **Cathode-to-Grid-No. 1 Voltage for Visual Extinction of Focused Raster:** 32 to 50 Vdc

For visual extinction of an undeflected focused spot, the absolute bias required increases by approximately 5 V relative to the raster extinction value.

Deflection and Scanning Angles

The 19CHP4 utilizes magnetic deflection to scan the electron beam across the screen. The deflection angles are:

- **Diagonal Deflection:** 114°
- **Horizontal Deflection:** 101°
- **Vertical Deflection:** 86°

Maximum Circuit Values

To maintain stable operation and prevent damage to the tube's electron gun, the maximum resistance in the Grid No. 1 circuit must be limited:

- **Grid-No. 1-Circuit Resistance:** 1.5 M Ω maximum

The external conductive coating must be securely grounded to the receiver chassis to complete the high-voltage return path and provide proper shielding.



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

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Focusing method	Electrostatic	—
Deflection method	Magnetic	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—



SOURCE OPERATING CONDITIONS

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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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
FocusingMethod	Electrostatic	—
DeflectionMethod	Magnetic	—
Phosphor	Aluminized P4 white	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngles	101H/86V/114D	—
Cathode To All Capacitance	5 pF	—
Grid1 To All Capacitance	6 pF	—
ExternalConductiveCoatingToAnodeCapacitanceMaximum	1500 pF	—
ExternalConductiveCoatingToAnodeCapacitanceMinimum	1000 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
AnodeVoltageMaximum	20000 V	—
AnodeVoltageMinimum	10000 V	—
FocusingElectrodeVoltageRangeMaximum	-400 to +1250 V	—
Grid2VoltageMaximum	70 V	—
Grid2VoltageMinimum	40 V	—
Grid1NegativeBiasMagnitudeMaximum	155 V	—
Grid1PositivePeakVoltageMaximum	2 V	—
HeaterCathodeVoltageMaximum	450 V	Warmup<=15s;HeaterNegative
HeaterCathodeVoltageMaximum	200 V	AfterWarmup
HeaterCathodeVoltageMaximum	200 V	HeaterPositive
Anode Voltage	16000 V	—
FocusingElectrodeVoltage	0 to +400 V	—
Grid1VoltageForCutoff	-35 to -72 V	—
Grid1CircuitResistanceMaximum	1.5 Mohm	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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1971 RCA HB3 Binder 1 of 7

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

1971 RCA HB3 BINDER 1 OF 7

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Heater warm-up time	11 s	—
Maximum anode/ultor voltage	20000 V	—
Minimum anode/ultor voltage	10000 V	—
Typical anode/ultor voltage	16000 V	PictureTubeService
Maximum grid No.2 voltage	70 V	—
Typical grid No.2 voltage	50 V	PictureTubeService
Focus-voltage range minimum	-50 V	OptimumFocus
Focus-voltage range maximum	250 V	OptimumFocus
Visual-extinction voltage range minimum	32 V	FocusedRasterExtinction
Visual-extinction voltage range maximum	50 V	FocusedRasterExtinction
Maximum grid No.1 circuit resistance	1.5 megohm	—
X-ray shielding warning	Present	HighAnodeVoltage
Maximum cathode positive bias voltage	100 V	CathodeDrive
Maximum cathode positive peak voltage	150 V	CathodeDrive
Maximum cathode negative peak voltage	2 V	CathodeDrive
Peak heater-cathode voltage during warm-up	450 V	HeaterNegative;Warmup<=15s
Peak heater-cathode voltage after warm-up	200 V	HeaterNegative
Peak heater-cathode voltage heater positive	200 V	HeaterPositive

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	LowVoltageElectrostatic	—
Deflection method	Magnetic	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Screen type	White	P4
Ion-trap magnet required	No	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	114 deg	Approximate
Faceplate light transmission	78 %	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid No.1 to all other electrodes capacitance	6 pF	Approximate
External conductive coating to anode capacitance minimum	1000 pF	Approximate
External conductive coating to anode capacitance maximum	1500 pF	Approximate

TUBE TINKER

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