

ELECTRONIC TUBE REFERENCE

19CXP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch direct-view monochrome television CRT with low-voltage electrostatic focus, magnetic deflection, and an aluminized P4 white screen. Its approximately 114-degree diagonal deflection supports shallow-cabinet receiver design, with published X-ray precautions.

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	55 V
Low-grid-2 cathode-drive P4 picture tube.	

19CXP4 — Cathode-Ray Picture Tube

The **19CXP4** is a 19-inch direct-viewed rectangular glass television picture tube designed for cathode-drive operation. It features a low-voltage electrostatic focusing system and a 114-degree magnetic deflection system. The tube incorporates an electron gun that does not require an ion-trap magnet, and its design is optimized for low Grid-No.2 voltage operation.

Construction and Mechanical Specifications

The 19CXP4 is constructed with a rectangular glass envelope (bulb designation J149A) and a gray filterglass faceplate that provides approximately 78% light transmittance. The screen utilizes an

aluminized P4-sulfide phosphor, which exhibits white fluorescence and medium-short persistence.

The physical dimensions and mechanical characteristics of the tube are as follows:

- **Overall Length:** $11 \frac{5}{8} \pm \frac{1}{4}$ inches (11.625 ± 0.250 inches)
- **Neck Length:** $4 \frac{3}{8} \pm \frac{1}{8}$ inches (4.375 ± 0.125 inches)
- **Weight:** Approximately 14 lbs
- **Minimum Useful Screen Dimensions:**
 - **Height:** 12 inches
 - **Width:** $15 \frac{1}{8}$ to $15 \frac{3}{8}$ inches
 - **Diagonal:** $17 \frac{9}{16}$ inches
 - **Projected Area:** 172 square inches

The tube is equipped with an external conductive coating of the Regular-Band type. The contact area for grounding this coating is located near the Reference Line, which is determined by the plane C-C' of a JEDEC No. 126 Reference Gauge when seated against the bulb. The anode connection is made via a recessed small cavity cap (JEDEC No. J1-21).

Basing and Pinout Configurations

The 19CXP4 uses a special 6-pin base (JEDEC No. B6-214) with a 7FA bottom-view basing designation. The base pin No. 7 aligns with the anode contact within 30 degrees. There are two distinct recorded pinout configurations for the 7FA basing:

Configuration A

- **Pin 2:** Cathode
- **Pin 3:** Heater
- **Pin 4:** Heater
- **Pin 5:** Grid No. 1
- **Pin 6:** Grid No. 4
- **Pin 7:** Grid No. 2
- **Cap:** Anode (Grid No. 3, Grid No. 5, Screen, Collector)

Configuration B

- **Pin 1:** Heater
- **Pin 2:** Cathode
- **Pin 3:** Grid No. 1
- **Pin 4:** Grid No. 4 / Focus
- **Pin 6:** Grid No. 4 / Focus
- **Pin 7:** Grid No. 2
- **Pin 8:** Heater
- **Cap:** Anode (J1-21 contact)

Electrical Characteristics and Capacitances

Heater Ratings

The heater is designed for operation from a nominal 6.3 V supply. The electrical ratings and characteristics of the heater include:

- **Heater Voltage:** 6.3 V (with a design-maximum range of 5.7 V to 6.9 V)
- **Heater Current:** 600 mA (0.60 A) $\pm$ 5% (or $\pm$ 60 mA)
- **Average Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined as the time required for the heater voltage to reach 80% of its rated value when 4 times the rated voltage is applied in series with an external resistance equal to 3 times the rated voltage divided by the rated current.

Direct Interelectrode Capacitances

The approximate capacitances of the tube electrodes are:

- **Cathode to all other electrodes:** 5 pF
- **Grid No. 1 to all other electrodes:** 6 pF
- **External conductive coating to anode:** 1400 pF minimum, 1900 pF maximum

Maximum Ratings and Operating Conditions

Design-Maximum Ratings

All voltages are specified as positive with respect to Grid No. 1 unless otherwise indicated. The design-maximum limits must not be exceeded under any operating conditions:

- **Anode Voltage:** 20,000 V DC maximum, 12,000 V DC minimum
- **Grid No. 4 (Focusing Electrode) Voltage:** -500 to +1100 V DC
- **Grid No. 2 Voltage:** 55 V DC maximum (with some ratings listing a minimum of 30 V DC)
- **Cathode Voltage:**
 - **Negative bias value:** 0 V DC maximum
 - **Negative peak value:** 2 V maximum
 - **Positive bias value:** 100 V DC maximum
 - **Positive peak value:** 140 V to 150 V maximum
- **Peak Heater-Cathode Voltage:**
 - *Heater negative with respect to cathode during equipment warm-up ($\leq$ 15 seconds):* 410 V to 450 V maximum
 - *Heater negative with respect to cathode after the warm-up period:* 180 V to 200 V maximum
 - *Heater positive with respect to cathode:* 180 V maximum (or 200 V maximum combined AC and DC, with a 100 V maximum DC component)

Typical Operating Conditions (Cathode-Drive Service)

Under typical cathode-drive operating conditions, the electrode voltages (positive with respect to Grid No. 1) are set as follows:

- **Anode Voltage:** 16,000 V DC
- **Grid No. 4 Voltage for Focus:** 0 to +400 V DC (or up to 500 V DC)
- **Grid No. 2 Voltage:** 45 V DC
- **Cathode Voltage for Cutoff:** 35 to 50 V DC

The cutoff voltage range is specified for the visual extinction of a focused raster. For the visual extinction of a stationary focused spot, the required cathode voltage is approximately 5 V more positive than the raster extinction value.

Circuit Values and Safety Warnings

- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum.
- **X-ray Warning:** X-ray radiation shielding may be necessary if the tube is operated above the maximum rated anode voltage or 16,000 V, whichever is less.



SOURCE OPERATING CONDITIONS

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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	55 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	12000 V	—
Typical anode/ultor voltage	16000 V	PictureTubeService
Maximum grid No.2 voltage	55 V	—
Typical grid No.2 voltage	45 V	PictureTubeService
Focus-voltage range minimum	0 V	OptimumFocus
Focus-voltage range maximum	500 V	OptimumFocus
Visual-extinction voltage range minimum	35 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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	114 deg	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate

TUBE TINKER

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