

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
CAMERA PICKUP

1850A

Specialized - Photo Tube electronic tube

RCA iconoscope television camera pickup tube optimized particularly for motion-picture film and slide scanning.

GENERAL CHARACTERISTICS

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

SECTION RATINGS

SECTION 1 Camera Pickup
No fixed ratings recorded.
Source-derived section; promoted fields populated where applicable.

1850A — Iconoscope Television Camera Tube

The **1850A** is a specialized television camera tube of the iconoscope type designed primarily for pickup from motion-picture film or slides. It is characterized by a very high signal-to-noise ratio combined with relatively low sensitivity. For applications requiring higher sensitivity, such as outdoor and studio live pickups, other tube types like the image orthicon are typically preferred.

Mechanical and Physical Characteristics

The 1850A utilizes electrostatic focusing and magnetic deflection to control its electron beam. The nominal deflection angle is approximately 55 degrees. The tube is physically large and requires specific mounting arrangements to function correctly.

- **Mounting Position:** The tube must be mounted such that its mosaic lies in a vertical plane.
- **Envelope Dimensions:**
 - Maximum width of the mounted tube: 8-1/8 inches
 - Height of the mounted tube: 10-3/16 inches $\pm$ 3/4 inch
 - Depth of the mounted tube: 12-13/16 inches $\pm$ 3/4 inch
- **Base:** Long Medium-Shell Small 6-Pin base.
- **Caps:** Two medium caps (conforming to JETEC No. C1-5).
- **Deflecting-Coil Requirements:** The deflecting yoke must have a minimum inside diameter of 1-1/2 inches and a maximum length of 2-1/4 inches.

Heater and Terminal Connections

The 1850A features an indirectly heated, unipotential cathode. The heater is designed for either AC or DC operation.

Heater Parameter	Value
Nominal Voltage	6.3 V $\pm$ 10%
Nominal Current	0.6 A

Pinout Configuration

The connections for the 6-pin base, viewed from the bottom, are assigned as follows:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 2
- **Pin 3:** Grid No. 3
- **Pin 4:** Grid No. 1
- **Pin 5:** Cathode
- **Pin 6:** Heater

In addition to the base pins, the tube features external caps and manufacturing-specific terminals:

- **SJ Cap:** Signal Electrode
- **G4 Cap:** Grid No. 4 (Collector)
- **Caps A, B, C, D:** Manufacturing caps. No external connections should be made to these terminals.

Interelectrode Capacitances

The capacitance values of the 1850A electrodes are measured under specified shielding conditions:

- **Grid No. 1 to all other electrodes:** 6.5 μ F
- **Signal Electrode to Grid No. 4:** 10 μ F (measured with an external shield)

Absolute Maximum Ratings

The following absolute maximum limits must not be exceeded to ensure the longevity and proper operation of the tube:

Parameter	Maximum Rating
Average Mosaic Illumination (averaged over max 1 second)	50 ft-c
Operating Temperature of Bulb (at the large end)	40 °C
Signal-Electrode Voltage	1200 V
Grid-No. 4 (Collector) Voltage	1200 V
Grid-No. 3 Voltage	450 V
Grid-No. 2 Voltage	1200 V
Grid-No. 1 Negative Bias Voltage	125 V
Grid-No. 1 Positive Bias Voltage	0 V
Peak Heater-Cathode Voltage (Heater negative with respect to cathode)	125 V
Peak Heater-Cathode Voltage (Heater positive with respect to cathode)	10 V
Grid-No. 4 Current	0.5 μ A

Typical Operation and Characteristics

Under typical operating conditions, the 1850A is configured with the following electrode potentials and circuit values:

- **Signal-Electrode Voltage:** 1000 V
- **Grid-No. 4 Voltage:** 1000 V
- **Grid-No. 2 Voltage:** 1000 V
- **Grid-No. 4 Current (unilluminated mosaic, including leakage):** 0.1 to 0.2 μ A
- **External Load Resistance:** 0.1 M Ω
- **Maximum Grid-No. 1-Circuit Resistance:** 1.0 M Ω
- **Minimum Peak-to-Peak Blanking Voltage:** 20 V

Calculated Operating Voltages

- **Grid-No. 3 Voltage (Beam Focus):** Calculated as 24% to 36% of the Grid-No. 4 voltage, yielding **240 V to 360 V** based on a 1000 V input.

- **Grid-No. 1 Voltage for Pattern Cutoff:** Calculated as 7% of the Grid-No. 4 voltage, yielding **-70 V** based on a 1000 V input.

Deflection and Signal Characteristics

When operated with a standard deflecting yoke (such as the RCA Type No. 201D76), the approximate peak-to-peak deflecting currents are:

- **Horizontal Deflecting Current:** 600 mA (peak-to-peak)
- **Vertical Deflecting Current:** 140 mA (peak-to-peak)

Under typical operating conditions, the ratio of the peak-to-peak highlight video-signal current to the RMS noise current is approximately 100.

Mosaic Illumination Requirements

The required illumination on the mosaic depends on the source material:

- **Steady highlight value for slides:** 4 to 6 ft-c
- **Average pulsed highlight value for motion-picture film:** 10 to 20 ft-c

Electro-Optical Characteristics and Curves

The spectral sensitivity of the 1850A spans the entire visible spectrum, covering approximately 3500 to 7000 Å. The peak sensitivity is located in the blue region of the spectrum, at approximately 4500 Å, when evaluated under equal values of radiant flux across all wavelengths.

The signal-output characteristic of the tube exhibits a non-linear relationship between the highlight illumination of the mosaic and the resulting signal output. Under continuous daylight fluorescent lighting with balanced scene blacks and whites, an optimum back lighting level, and a beam current of 0.2 μA , the signal output rises from approximately 0.05 μA at an illumination of 0.3 ft-c to approximately 0.23 μA at 20 ft-c. The output curve demonstrates a characteristic knee, indicating a saturation effect at higher illumination levels.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · CameraPickup

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
illumination of	6	illumination of 4 to 6 foot-candles on the mosaic for slides and an average
value of pulsed highlight illumination of	20	value of pulsed highlight illumination of 10 to 20 foot-candles for motion—
Voltage (AC or DCY . v v v v v	10 V	Voltage (AC or DCY . v v v v v 6 0 v 4 v v v v u s 6. 3+ 10% volts
Current. & & & &	6 A	Current. & & & & 4 4 e e 6 s 4 e e e s s e e e 0. 6 ampere
SIGNAL-ELECTRODE VOLTAGE + &«	1200 V	SIGNAL-ELECTRODE VOLTAGE + &« 4 ¢ ¢ 4 o o e o o « s & & = 1200 max. volts
GRID-No,	1200 V	GRID-No,4 (COLLECTOR) VOLTAGE, « & « ¢ s ¢ o o s & 2 s » 1200 max. volts
GRID=NO	450 V	GRID=NO.3 VOLTAGE. ¢ ¢ « ¢ o + o o 5 o s o o s s « » 2 @ 450 max. volts
GRID-NO.,	200	GRID-NO.,2 VOLTAGE., . . ¢« ¢ ¢ & o o o s o o o o o o s o {200 max. voits
Negative bias value, . . . + . « . « . 0 0«	125 V	Negative bias value, . . . + . « . « . o o« . . 125 max. volts
Positive bias value. . +« « « + « v v + &« +v « &	0 V	Positive bias value. . +« « « + « v v + &« +v « & 0 max. volts
Heater negative with respect to cathode	125 V	Heater negative with respect to cathode. 125 max. volts
Heater positive with respect to cathode	10 V	Heater positive with respect to cathode. 10 max. volts
GRID~No	0.5	GRID~No.4 CURRENT. . v v ¢ v 4 o & o & o « + « = & 0.5 max. Hamp
Signal-Electrode Voltage « « + « + + « o &	1000 V	Signal-Electrode Voltage « « + « + + « o & 1000 volts

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No	1000 V	Grid-No.4 Voltage., . . . « ¢ 4 ¢ ¢ a s+ o v 4 & o« 1000 volts
Grid-No	3	Grid-No.3 Voltage (Beam Focus)——
24% to 36% of Grid-No.4 Voltage. 240 to 360 volts	360 V	24% to 36% of Grid-No.4 Voltage. 240 to 360 volts
Grid=-No	1000 V	Grid=-No.2 Voltage., . . . + . + « =« « ¢ + & & & 1000 volts
7% of Grid-No.4 Voltage. . . . « ¢ + ¢ . . =70 volts	70 V	7% of Grid-No.4 Voltage. . . . « ¢ + ¢ . . =70 volts
Grid-No	0.2	Grid-No.4 Current (With no illumination on mosaic) 0.1 to 0.2 Hamp
Minimum Peak-to-Peak Blanking Voltage	20 V	Minimum Peak-to-Peak Blanking Voltage. 20 volts
Vertical (Peak to peak). . « ¢ o o « ¢ s o« o »	40 mA	Vertical (Peak to peak). . « ¢ o o « ¢ s o« o » 40 ma
Grid-No. -Circuit Resistance « + « ¢ o« + ¢« » o o	0	Grid-No. -Circuit Resistance « + « ¢ o« + ¢« » o o 1,0 max. megohm
BEAM CURRENT	0.2	BEAM CURRENT: 0.2 MICROAMPERE
92CM--6404 F2CM	-6404	92CM—6404 F2CM
92CM~489IR3	489	92CM~489IR3
AR'	2.5	AR' 1S 2.5° MAX. ROTATION OF MOSAIC

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
External Load Resistance + . + + ¢ v v o o	0.1	External Load Resistance + . + + ¢ v v o o 0.1 megohm

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes, and their source documents.

[Catalog](#)
[Tube types](#)
[Full books](#)
[Blog](#)
[Feedback & corrections](#)

© 2026 Tube Tinker