Color Picture Tube

Hi-Lite Matrix Screen
90° Rectangular
New Green Phosphor
Antiglare Integral Protective Window

Perma-Chrome
High-Resolution Gun
Unity Current Ratios

ELECTRICAL
Electron Guns, Three with Axes
Tilted Toward Tube Axis .............. Red, Blue, Green
Heater, of Each Gun Series
Connected within Tube with
Each of the Other two Heaters:

Current at 6.3 V\(^2\) .................. 900 mA

Focusing Method ...................... Electrostatic
Focus Lens ................................ Bipotential
Convergence Method .................. Magnetic
Deflection Method .................... Magnetic

Deflection Angles:

Diagonal ............................... 89 deg.
Horizontal ............................ 78 deg.
Vertical ................................ 63 deg.

Direct Interelectrode Capacitances (Approx.):

Grid No.1 of any gun
to all other electrodes .............. 7.5 pF
Grid No.3 to all other electrodes ..... 6.5 pF
All cathodes to all other electrodes ... 15 pF
External conductive coating
to anode ................................ \{ 2500 max. pF
........................................ 2000 min. pF

OPTICAL
Faceplate and Protective Window .......... Filterglass
Light transmission at center (Approx.) .... 67.5%
Surface of Protective Window .......... Treated to minimize specular reflection

Screen .................................. Aluminized

Matrix .................................. Black opaque material
Phosphor, rare-earth (red),
sulfide (blue & green) .................. P22

Persistence ........................... Medium-Short
Array ................................ 422,550 Dot trios
Spacing between centers of adjacent dot trios (approx.) .... 0.029 in (0.74 mm)
MECHANICAL
Minimum Screen Area (Projected) . 295 sq. in (1905 sq. cm)
Bulb Funnel Designation .......... JEDEC No.J195-1/2
Bulb Panel Designation .......... JEDEC No.FP196-1/2
Protective Window Designation ... JEDEC No.SP196-1/2
Base b .......................... Small-Button Diheptar 12-pin
Pin Position Alignment .......... Pin No.12 Aligns Approx. with Anode Bulb Contact
Operating Position ............ Anode Bulb Contact on Top
Weight (Approx.) .................. 42 lb (19.1 kg)

MAXIMUM AND MINIMUM RATINGS, DESIGN-MAXIMUM VALUES
Unless otherwise specified, values are for each gun and voltage values are positive with respect to cathode

Anode Voltage ........................ 27,500 max. V
........................................ 20,000 min. V

Total Anode Current,
Long-Term Average .................. 1000 max. μA

Grid-No.3 (Focusing Electrode)
Voltage ............................ 6000 max. V

Peak-Grid-No.2 Voltage,
Including Video Signal Voltage ....... 1000 max. V

Grid-No.1 Voltage:
Negative bias value .................. 400 max. V
Negative operating cutoff value .......... 200 max. V
Positive bias value .................. 0 max. V
Positive peak value .................. 2 max. V

Heater Voltage (ac or dc):
Under operating conditions \(^a\) ... 5.7 min. - 6.9 max. V
Under standby conditions \(^d\) ............. 5.5 max. V

Peak Heater-Cathode Voltage:
Heater negative with respect to cathode:
  During equipment warm-up period not exceeding 15 seconds ........... 450 max. V
  After equipment warm-up period:
    Combined AC and DC value .... 200 max. V
    DC component value .......... 200 max. V
Heater positive with respect to cathode:
  AC component value .......... 200 max. V
  DC component value .......... 0 max. V

EQUIPMENT DESIGN RANGES
Unless otherwise specified, values are for each gun and voltage values are positive with respect to cathode

For anode voltages between 20,000 and 27,500 V

Grid-No.3 (Focusing Electrode) Voltage ........ 16.8% to 20% of Anode voltage
Grid-No.2 and Grid-No.1 Voltages for Visual Extinction of Focused Spot. See CUTOFF DESIGN CHART

Maximum Ratio of Grid-No.2 Voltages, highest Gun to Lowest Gun in Any Tube (At grid-No.1 spot cutoff voltage of -100 V) .......................... 1.86

Heater Voltage:

Under operating conditions:
- When standby operation is not utilized .................................. 6.3 V
- When 5.0-V standby operation is utilized ................................ 6.0 V

Under standby conditions ........................................... 5.0 V

Grid-No.3 Current (Total) ....................................... -45 to +15 μA
- Grid-No.2 Current .................................................. -5 to +5 μA

To Produce White of 9300°K + 27
M.P.C.D. (CIE Coordinates x = 0.281, y =0.311):

Percentage of total anode current supplied by each gun (average) .................................. 34 32 34 %

Ratio of cathode currents: Min. Typ. Max.
- Red/blue .......................................................... 0.75 1.10 1.50
- Red/green ....................................................... 0.65 1.00 1.50
- Blue/green ..................................................... 0.60 0.91 1.30

Displacements, Measured at Center of Screen:

Raster centering displacement:
- Horizontal ...................................................... ± 0.45 in (± 11.4 mm)
- Vertical .......................................................... ± 0.45 in (± 11.4 mm)

Lateral distance between the blue beam and the converged red and green beams .............................................. ± 0.25 in (± 6.4 mm)

Radial convergence displacement excluding effects of dynamic convergence (each beam) .............................................. ± 0.37 in (± 9.4 mm)

Maximum Required Correction for Register (Including Effect of Earth’s Magnetic Field when Using Recommended Components) as Measured at the Center of the Screen in any Direction ................................ 0.005 in (0.13 mm) max.

LIMITING CIRCUIT VALUES

High-Voltage Circuits:
- Grid-No.3 circuit resistance ....................................... 7.5 max. MΩ
In order to minimize the possibility of damage to the tube caused by a momentary internal arc, it is recommended that the high-voltage power supply and the grid-No.3 power supply be of the limited-energy type, in which the short-circuit current does not exceed 20 milliamperes.

Low-Voltage Circuits:

Effective grid-No.1-to-cathode-circuit resistance (each gun) ........ 0.75 max. MΩ

The low-voltage circuits, including all heater circuits, should be analyzed by assuming the color picture tube heater is connected directly to the receiver chassis ground. Under these conditions the circuits to the elements of all tubes, including the color picture tube, operating from the same heater winding and all connections of any other circuits to the heater winding should each have an impedance such that their respective power sources in combination will not supply a continuous short circuit current of more than 750 milliamperes total in the assumed picture tube heater ground connection. The leads from all other circuits must be separated from the picture tube leads by a minimum distance of 0.25 inch (6.4 mm) to prevent energy transfer to the picture tube circuits. Such current limitation will help prevent picture tube damage in case of momentary cascade arcing.

a) For maximum cathode life, it is recommended that the heater supply be regulated. The series impedance to any chassis connection in the dc biasing circuit for the heater should be between 100,000 ohms and 1 megohm.

b) The mating socket, including its associated, physically-attached hardware and circuitry, must not weigh more than one pound.

c) The use of a 5-volt standby condition in conjunction with 6-volt operating condition is recommended to improve the reliability of the color picture tube by extending the emission wear-out life and reducing other gun-related defects. A maximum heater voltage of 5.5 volts (Design-Maximum value) may be maintained on the color picture tube when the receiver is in the "off" (standby) position. All other voltages normally applied to the tube must be removed during standby operation.

d) Register is defined as the relative position of the beam trios with respect to the associated phosphor-dot trios.

X-RADIATION WARNING: Because the 25BCP22 is designed to be operated at anode voltages as high as 27.5 kilovolts (Design-Maximum value), shielding of the 25BCP22 for X-radiation may be needed to protect against possible injury from prolonged exposure at close range.
BASE SPECIFICATION – JEDEC No. 14BE

Pin 1: Heater
Pin 2: Cathode of Red Gun
Pin 3: Grid No.1 of Red Gun
Pin 4: Grid No.2 of Red Gun
Pin 5: Grid No.2 of Green Gun
Pin 6: Cathode of Green Gun
Pin 7: Grid No.1 of Green Gun
Pin 9: Grid No.3
Pin 11: Cathode of Blue Gun
Pin 12: Grid No.1 of Blue Gun
Pin 13: Grid No.2 of Blue Gun
Pin 14: Heater
Cap: Anode (Grid No.4, Screen, Collector)
C: External Conductive Coating

BOTTOM VIEW OF BASE

LOCATION OF RADIAL-CONVERGING POLE PIECES VIEWED FROM SCREEN END OF GUNS

NOTES FOR DIMENSIONAL OUTLINE

Note 1: With tube neck inserted through flared end of reference-line and neck-funnel-contour gauge (JEDEC No.G162) and with tube seated in gauge, the reference line is determined by the intersection of the plane C-C' of the gauge with the glass funnel.

Note 2: Socket for this base should not be rigidly mounted; it should have flexible leads and be allowed to move freely. Bottom circumference of base will fall within a 2-inch (51-mm) circle concentric with bulb axis.

Note 3: The drawing shows the size and location of the contact area of the external conductive coating. The actual area of this coating will be greater than that of the contact area so as to provide the required capacitance. External conductive coating must be grounded with multiple contacts.

Note 4: To clean this area, wipe only with soft, dry, lintless cloth.
OUTLINE

REFERENCE LINE (NOTE 1)

MOLD-MATCH LINE

SEAL LINE

36.375
698.52
SPH. R.

24.449 ± 0.093
620.99 ± 0.36
PROTECTIVE WINDOW

24.566 ± 0.093
623.38 ± 0.36
MOLD-MATCH LINE

17.024 ± 0.093
432.4 ± 2.36
PROTECTIVE WINDOW

1726.3 ± 0.093
438.48 ± 2.36
MOLD-MATCH LINE

4.494 ± 0.125
114.15 ± 3.18

3.064
77.83

9.707 ± 0.063
246.56 ± 1.60

6.693 ± 0.188
170.00 ± 4.78

14.201 ± 0.188
360.71 ± 4.78

20.894 ± 0.375
530.71 ± 9.53

Dimensions in
Inches unless otherwise shown

Dimensions in
mm

RCA
Electronic Components

DATA 4
8-69
HEATER VOLTAGE = 6.3 V
ANODE-TO-CATHODE VOLTAGE = 20,000 TO 27,500 V
GRID No. 3 - TO-CATHODE VOLTAGE ADJUSTED FOR FOCUS.