

Color Picture Tube

Ultra-Rectangular
4 x 3 Aspect Ratio

Hi-Lite Matrix Screen
Light Neutral Screen Appearance

Electrical:

Electron Guns, Three with Axes

Tilted Toward Tube Axis Red, Blue, Green

Heater:

Voltage 6.3 V
Current 900 mA

Focusing Method Electrostatic

Focus Lens Bipotential

Convergence Method Magnetic

Deflection Method Magnetic

Deflection Angles (Approx.):

Diagonal 90 deg
Horizontal 78 deg
Vertical 60 deg

Direct Interelectrode Capacitance (Approx.):

Grid No.1 of any gun to all other electrodes 6 pF
Grid No.3 to all other electrodes 6.5 pF
All cathodes to all other electrodes 15 pF

Capacitance Between Anode and External
Conductive Coating { 2300 max. pF
1800 min. pF

Resistance Between Metal Hardware and
External Conductive Coating 50 MΩ

Optical:

Faceplate Filterglass
Light transmission at center (Approx.) 70%
Surface Polished

Screen Aluminized

Matrix Black opaque material

Phosphor, rare-earth (red) sulfide (blue & green) P22

Persistence Medium-Short

Array 382,000 Dot trios

Spacing between centers of adjacent
dot trios (Approx.) 0.024 in (0.61 mm)

Mechanical:

Minimum Screen Area (Projected) 185 sq in (1194 sq cm)

Bulb Funnel Designation JEDEC No.J510A06

Bulb Panel Designation JEDEC No.FP161-3/4 W1

Base Designation^a Small-Button Diheptar 12-Pin
(JEDEC No.B12-244)

Basing Designation JEDEC No.14BE

Pin Position Alignment Pin No.12 Aligns Approx. with
Anode Bulb Contact

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Operating Position, preferred Anode Bulb Contact on Top
Gun Configuration Delta
Weight (Approx.) 25 lb (11.4 kg)

Implosion Protection:

Type Rim Bands and Tension Band

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	{ 27.5 max. kV 20 min. kV
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Anode Current, Long-Term Average ^b	1000 max. μ A
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Grid-No.3 (Focusing Electrode) Voltage	6000 max. V
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Peak-Grid-No.2 Voltage, Including Video Signal Voltage	1000 max. V
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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): ^c	
Under operating conditions	{ 6.9 max. V 5.7 min. V
Under standby conditions ^d	5.5 max. V

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:	
DC component value	200 max. V
Peak value	200 max. V

Heater positive with respect to cathode:	
DC component value	0 max. V
Peak value	200 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 and 27.5 kV

Grid-No.3 (Focusing Electrode) Voltage	16.8% to 20% of Anode voltage
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Grid-No.2 Voltage for Visual Extinction

of Undelected Focused Spot. . . . See CUTOFF DESIGN CHART
in Figure 3

At Grid No.1 voltage of -75 V	80 to 280 V
At Grid No.1 voltage of -125 V	215 to 550 V
At Grid No.1 voltage of -175 V	355 to 820 V

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:^c

Under operating conditions:

When standby operation is not utilized 6.3 V

When 5.0-V standby operation is utilized^d 6.0 VUnder standby conditions^d 5.0 VGrid-No.3 Current (Total) $\pm 15 \mu\text{A}$ Grid-No.2 Current $\pm 5 \mu\text{A}$ Grid-No.1 Current $\pm 5 \mu\text{A}$

To Produce White Light of	Illum. D 6550 ^o K + 7 M.P.C.D.	Color 9300 ^o K + 27 M.P.C.D.
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CIE Coordinates:

X 0.313 0.281

Y 0.329 0.311

Percentage of total anode current
supplied by each gun (average):

Red 41 30 %

Blue 24 31 %

Green 35 39 %

Ratio of cathode currents:

Red/blue:

Minimum 1.35 0.75

Typical 1.70 0.95

Maximum 2.20 1.25

Red/green:

Minimum 0.95 0.60

Typical 1.15 0.75

Maximum 1.70 1.10

Blue/green:

Minimum 0.50 0.60

Typical 0.70 0.80

Maximum 0.95 1.10

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.

Light-Output Characteristic:

Typical White-Light Output $\left\{ \begin{array}{l} 80 \text{ fL} \\ 274 \text{ Nit} \end{array} \right.$

Measured within a 4 in (102 mm) diameter area centered on the tube face with the following operating conditions:

Anode Voltage 25 kV
Anode Current 1000 μ A
Grid No.3 Voltage Adjusted for focus
Color Temperature 9300° K + 27 M.P.C.D.

Limiting Circuit Values:

High-Voltage Circuits:

Grid-No.3 circuit resistance 7.5 max. $M\Omega$

Low-Voltage Circuits:

Effective grid-No.1-to-cathode-circuit resistance (each gun) 0.75 max. $M\Omega$

X-Radiation Characteristic:

Maximum Anode Voltage at which the X-radiation emitted will not exceed 0.5 mR/h at an anode current of 300 μ A 33 kV

The X-radiation emitted from this picture tube, as measured in accordance with the procedure of JEDEC Publication No.64A will not exceed 0.5 mR/h throughout the useful life of the tube when operated within the Design-Maximum ratings: 27.5 kV anode voltage and 1000 μ A anode current. The tube should not be operated beyond its Design-Maximum ratings stated above (such operation may shorten tube life or have other permanent adverse affects on its performance), but its X-radiation will not exceed 0.5 mR/h for anode voltage and current combinations given by the isodose-rate limit characteristics as shown in Figure 1. Operation above the values shown by the curve may result in failure of the television receiver to comply with the Federal Performance Standard for Television Receivers, Sub-Part C of Part 78 of Title 42, Code of Federal Regulations (PL90-602) as published in the Federal Register Vol.34, No. 247, Thursday, December 25, 1969. Maximum X-radiation as a function of anode voltage at 300 μ A anode current is shown by the curve in Figure 2. X-radiation at a constant anode voltage varies linearly with anode current.

- a The mating socket, including its associated, physically-attached hardware and circuitry, must not weigh more than one pound (one-half kilogram).
- b The short-term average anode current should be limited by circuitry to 1500 microamperes.
- c 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 kilohms and 1 megohm. The surge voltage across the heater must be limited to 9.5 volts rms.
- d The use of a 5-volt standby condition in conjunction with 6-volt operating conditions 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.
- e Register is defined as the relative position of the beam trios with respect to the associated phosphor-dot trios.

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.

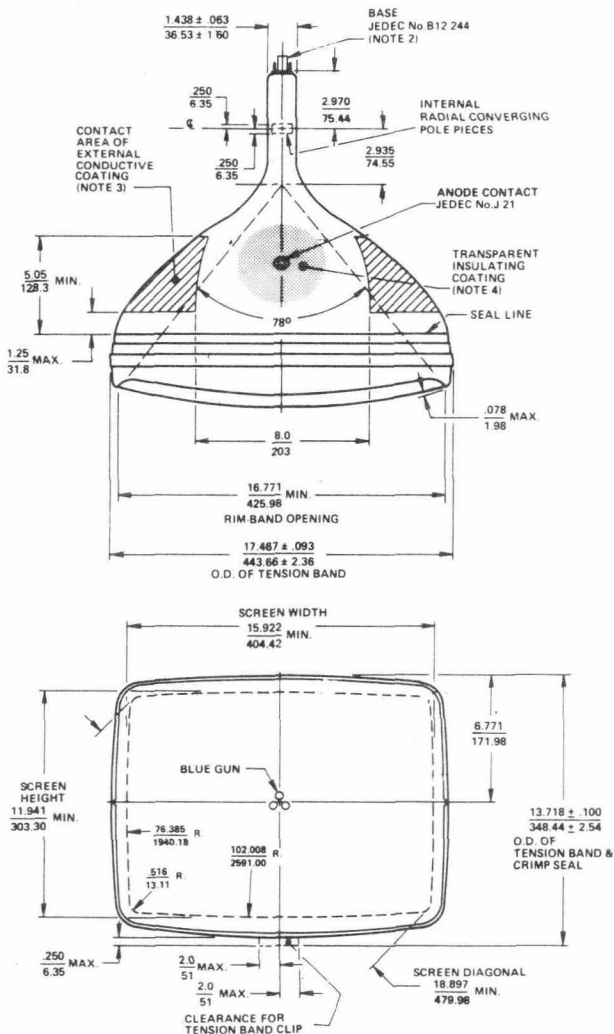
Note 4 — To clean this area, wipe only with soft, dry, lintless cloth.

SAGITTAL HEIGHTS AT POINTS $\frac{125}{3.18}$ BEYOND EDGE OF MIN. SCREEN

DIAGONAL	$\frac{1.485}{37.72}$	WIDTH	$\frac{1.044}{28.52}$	HEIGHT	$\frac{.582}{14.78}$
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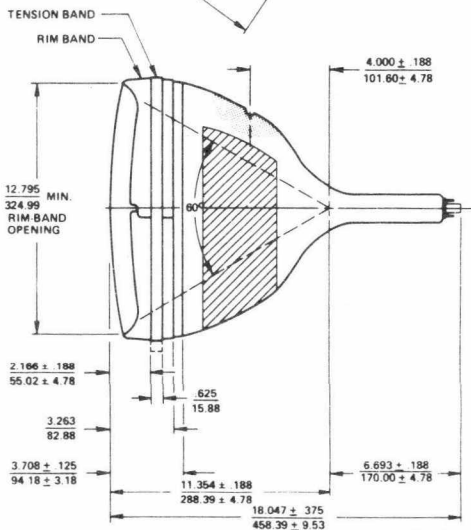
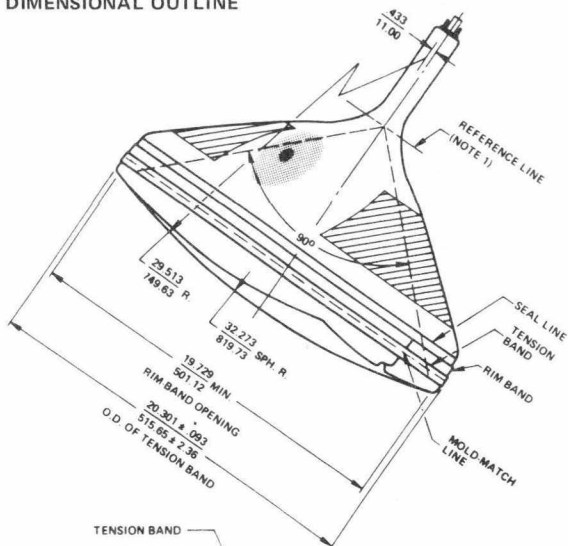
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DIMENSIONAL OUTLINE



Dimensions in Inches/mm unless otherwise noted

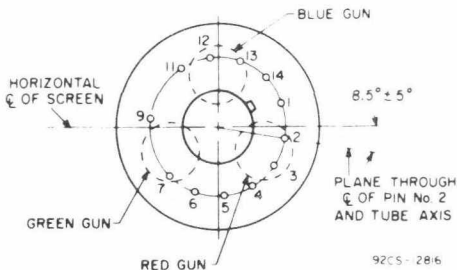
DIMENSIONAL OUTLINE



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BOTTOM VIEW OF BASE



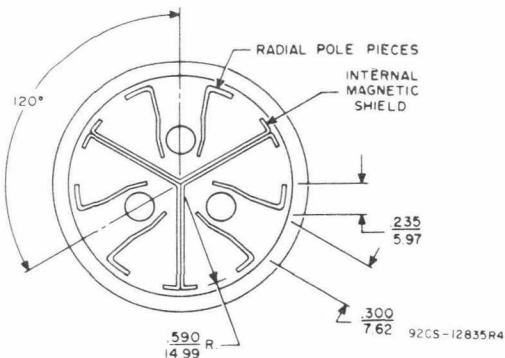
Base Specification — JEDEC No.14BE

- 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

Bulb Contact — Anode (Grid No.4, Screen, Collector)

C— External Conductive Coating

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



0.5 mR/h ISODOSE – RATE LIMIT CURVE
(JEDEC CURVE No.XC-2)

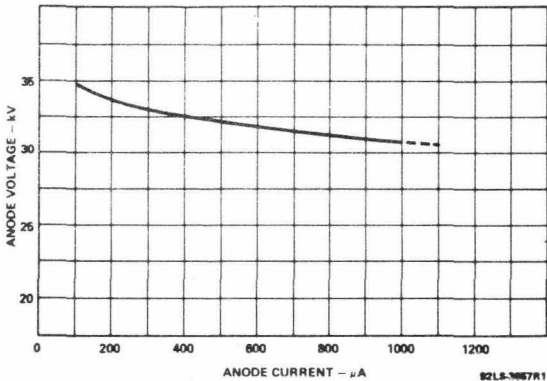


Figure 1

X-RADIATION LIMIT CURVE AT A CONSTANT ANODE
CURRENT OF 300 μ A (X-RADIATION AT A CONSTANT
ANODE VOLTAGE VARIES LINEARLY WITH ANODE CURRENT)
(JEDEC CURVE No.XC-1)

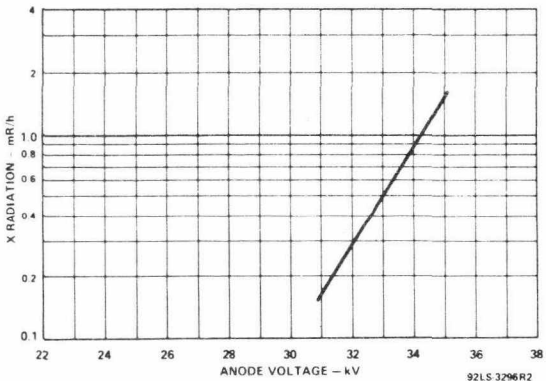
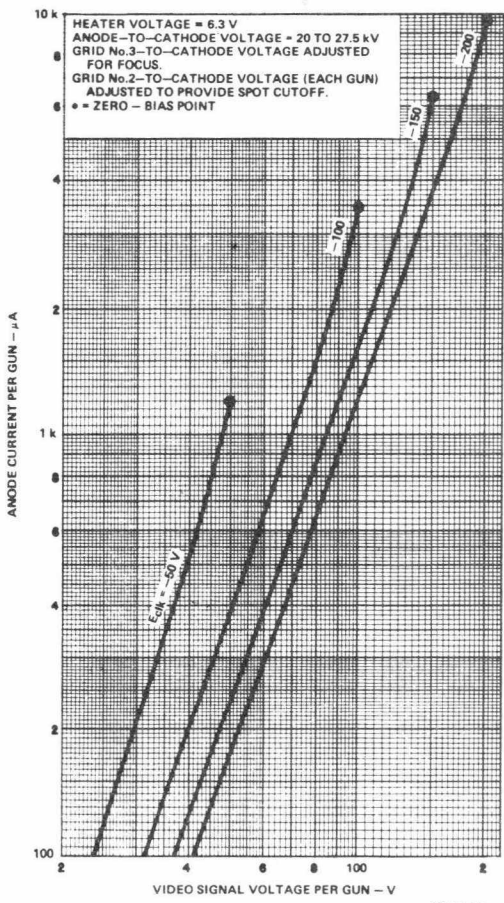


Figure 2

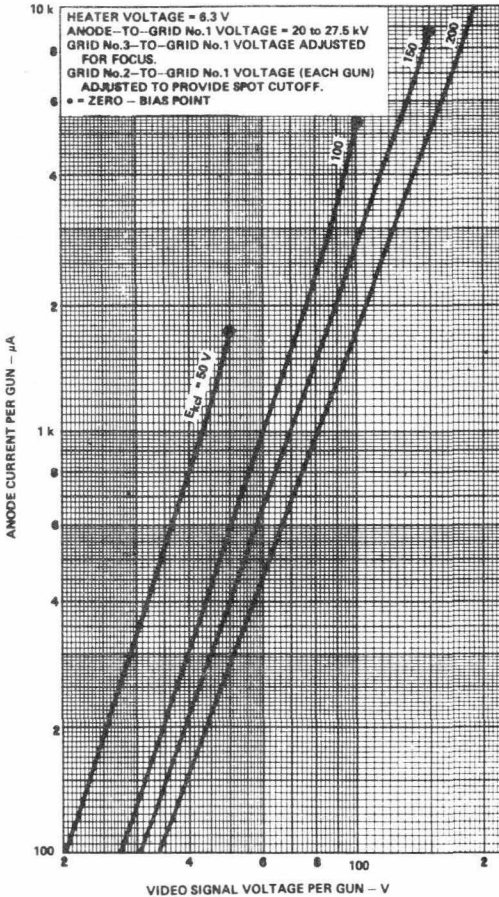
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TYPICAL DRIVE CHARACTERISTICS, GRID-DRIVE SERVICE



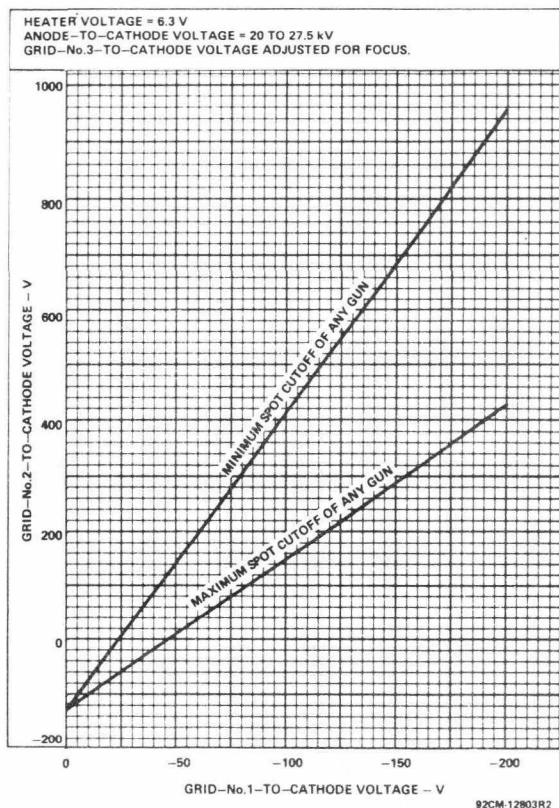
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TYPICAL DRIVE CHARACTERISTICS,
CATHODE-DRIVE SERVICE



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CUTOFF DESIGN CHART



IMPORTANT: Refer to sheet Safety Precautions For Color Picture Tubes at front of this section.

FIGURE 3