

Color Picture Tube

Perma-Chrome **Banded-Type Implosion Protection**
90° Rectangular **HI-LITE Screen**
New Rare-Earth (Red) Phosphor **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^a 900 mA

Focusing Method Electrostatic

Focus Lens Unipotential

Convergence Method Magnetic

Deflection Method Magnetic

Deflection Angles (Approx.):

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.4 to all other electrodes 6 pF

All cathodes to all other electrodes 15 pF

External conductive coating
 to anode (Approx.) { 2100 max. pF
 { 1500 min. pF

OPTICAL

Faceplate Filterglass

Light transmission at center
 (Approx.) 43.5%

Surface Polished

Screen, on Inner Surface of Faceplate:

Type Aluminized, Tricolor, Phosphor-Dot

Phosphor (three separate
 phosphors, collectively)^b . . . P22—New Rare-Earth (Red),
 Sulfide (Blue & Green) Type

Fluorescence and phosphorescence
 of separate phosphors,
 respectively Red, Blue, Green

Persistence of group phosphorescence Medium Short

Dot Arrangement Triangular group consisting of
 red dot, blue dot, and green dot

Spacing between centers of adjacent
 dot trios (Approx.) 0.023 in (0.58 mm)

19HNP22

MECHANICAL

Minimum Screen Area (Projected) . . 180 sq. in (1161 sq. cm)
 Bulb Funnel Designation JEDEC No.J153 A1
 Bulb Panel Designation JEDEC No.FP155-1/2
 Base Designation Small-Button Diheptar 12-pin
 Basing Designation^c JEDEC No.14BH
 Pin Position Alignment Pin No.12 Aligns Approx.
 with Anode Bulb Contact

Operating Position:

For blue gun up Anode Bulb Contact on Top
 For blue gun down Anode Bulb Contact on Bottom
 Weight (Approx.) 23 lb (10.5 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	{ 22,500 max. 17,000 min.	V V
Total Anode Current, Long-Term Average	1000 max.	μA
Grid-No.4 (Focusing Electrode) Voltage:		
Positive value	1100 max.	V
Negative value	550 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 . . .	140 max.	V
Positive bias value	0 max.	V
Positive peak value	2 max.	V
Heater Voltage (ac or dc):		
Under operating conditions ^a	{ 6.9 max. 5.7 min.	V 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 17,000 and 22,500 V

Grid-No.4 (Focusing Electrode) Voltage . . -75 to 400 V

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^a 6.3 V

Under standby conditions^d 5.0 V

Grid-No.4 Current (Total) -60 to +60 μ A

Grid-No.2 Current -5 to +5 μ A

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)

Red	Blue	Green	
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 ± 0.47 in (± 11.9 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^e(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

Effective grid-No.1-to-cathode-

circuit resistance (each gun) 0.75 max. M Ω

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

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short circuit current of more than 750 mA 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 at 6.3 volts. 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 For curve, see *Group Phosphor-P22-New Rare-Earth (Red), Sulfide (Blue & Green)* at front of this section.
- ^c The mating socket, including its associated, physically-attached hardware and circuitry, must not weigh more than one pound.
- ^d For "instant on" applications, 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.

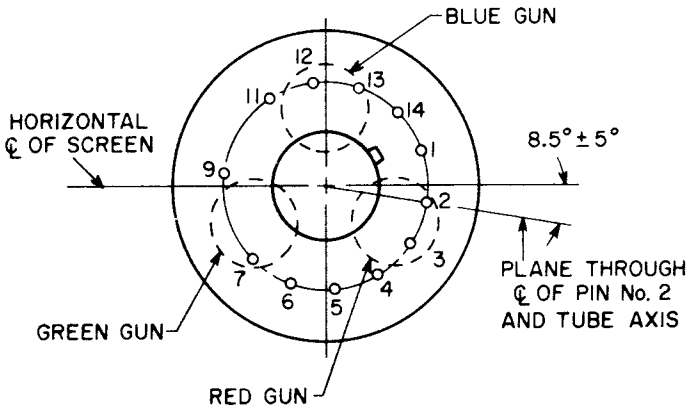
X-RADIATION WARNING

Because the 19HNP22 is designed to be operated at anode voltages as high as 22.5 kilovolts (design-maximum value), shielding of the 19HNP22 for X-radiation may be needed to protect against possible injury from prolonged exposure at close range.

BASE SPECIFICATION – JEDEC No. 14BE

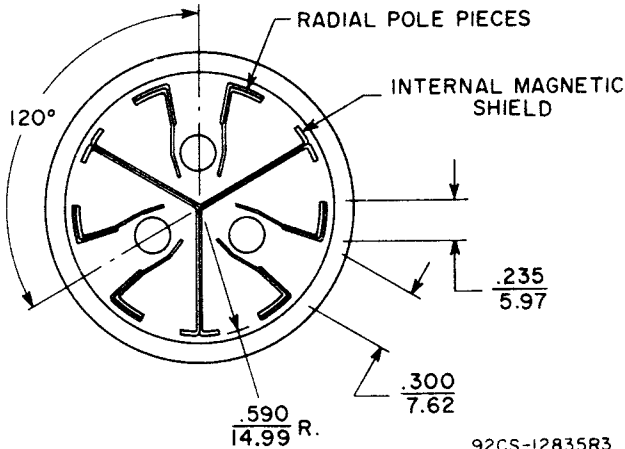
Pin 1: Heater	Pin 12: Grid No.1 of Blue Gun
Pin 2: Cathode of Red Gun	Pin 13: Grid No.2 of Blue Gun
Pin 3: Grid No.1 of Red Gun	Pin 14: Heater
Pin 4: Grid No.2 of Red Gun	Cap: Anode (Grid No.3, Grid No.5, Screen, Collector)
Pin 5: Grid No.2 of Green Gun	C: External Conductive Coating
Pin 6: Cathode of Green Gun	
Pin 7: Grid No.1 of Green Gun	
Pin 9: Grid No.4	
Pin11: Cathode of Blue Gun	

BOTTOM VIEW OF BASE



92CS-12816

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



92CS-12835R3

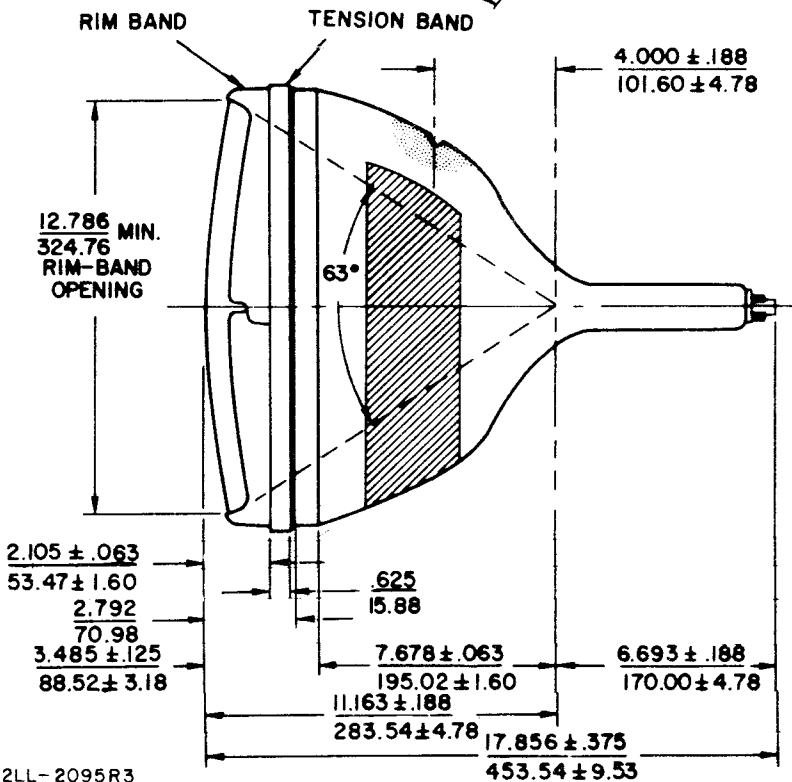
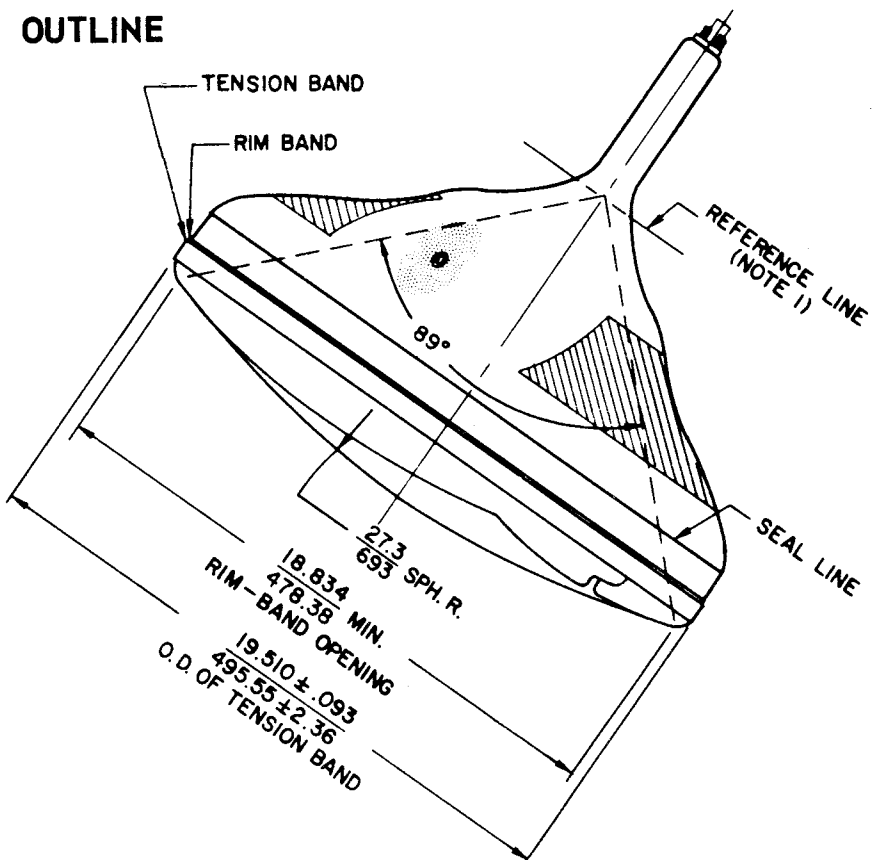
NOTES FOR DIMENSIONAL OUTLINE

- Note 1:** With tube neck inserted through flared end of reference-line and neck-funnel-contour gauge JEDEC No. G 162 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.

BASE
EDEC No. B12-244
(NOTE 2)



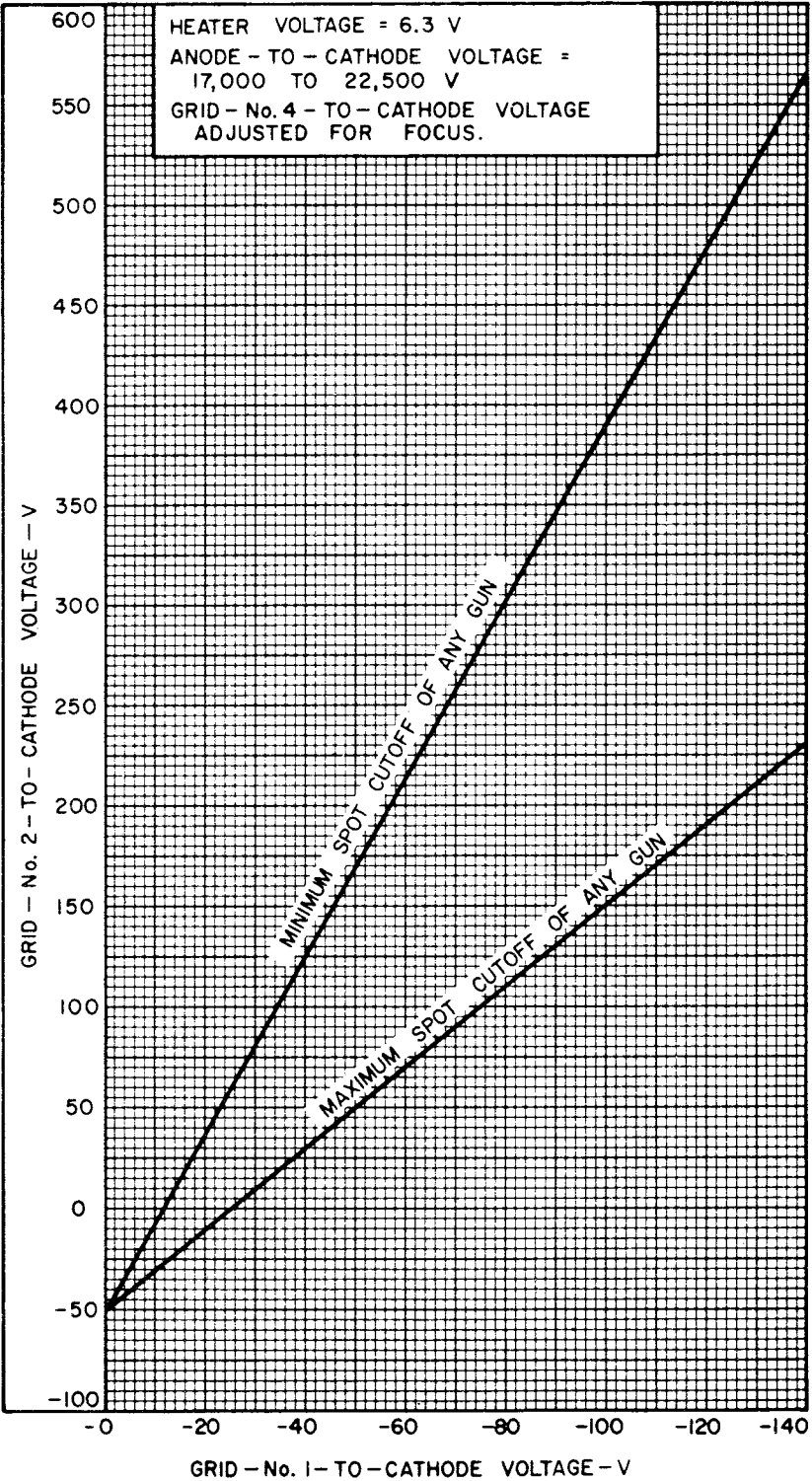
OUTLINE



92LL-2095R3

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CUTOFF DESIGN CHART



92LM-1083R4



Electronic
Components

DATA 4