Electronic TUBES

21BNP4

CATHODE-RAY TUBE

21-INCH, RECTANGULAR, GLASS
FOCUS—ELECTROSTATIC
DEFLECTION—MAGNETIC
90-DEGREE DEFLECTION ANGLE

19⅛- BY 15-INCH PICTURE SIZE
FACEPLATE—SPHERICAL, GRAY
ALUMINIZED SCREEN
EXTERNAL CONDUCTIVE COATING

DESCRIPTION AND RATING

The 21BNP4 is a 21-inch rectangular, all-glass picture tube which provides a 19⅛- by 15-inch picture for direct-view television reception. It employs electrostatic focusing and magnetic deflection with the center of the focusing range designed to fall at or near the value of B+ voltage normally encountered in television receivers. The outstanding feature of this tube is that it requires no ion-trap magnet. This not only eliminates an external component but also avoids the aberrations inherent in ion-trap guns. Better focus and resolution are thus achieved at lower cost. In addition, the possibility of ion-trap magnet misalignment, which often causes reduced tube life, has been removed. Other features of the 21BNP4 include a high-quality fluorescent screen which is aluminized to increase light output and preclude ion-spot blemish, a gray faceplate which improves picture contrast, and a high-capacitance external conductive coating which serves as a filter capacitor when grounded.

GENERAL

ELECTRICAL

Heater Voltage	6.3	Volts
Heater Current	0.6 ± 10%	Amperes
Focusing Method—Electrostatic		
Deflecting Method—Magnetic		
Deflection Angle, approximate		
Diagonal	90	Degrees
Horizontal	85	Degrees
Vertical	68	Degrees
Direct Interelectrode Capacitances, approximate		
Cathode to All Other Electrodes	5	μμf
Grid-No. 1 to All Other Electrodes	6	μμf
External Conductive Coating to Anode		
Maximum	1500	μμf
Minimum	1200	μμf

OPTICAL

Phosphor Number—P4, Sulfide Type		
Fluorescent Color—White		
Phosphorescent Color—White		
Persistence—Short		
Faceplate—Gray		
Light Transmission at Center, approximate	71	Percent

MECHANICAL

Over-all Length	20 ± 3/8	Inches
Greatest Bulb Dimensions		
Diagonal	21 3/8 ± 1/8	Inches
Width	20 1/4 ± 1/8	Inches
Height	16 3/8 ± 1/8	Inches
Minimum Useful Screen Dimensions		
Diagonal	20 1/4	Inches
Width	19 1/8	Inches
Height	15	Inches
Neck Length	7 1/2	Inches

Bulb Contact—Recessed Small-cavity Cap, JETEC No. J1-21
Base—Small-shell Duodecal 6-pin, JETEC No. B6-63
Basing, JETEC Designation—12L
Bulb Contact Alignment
Anode Contact Aligns with Pin No. 6 ± 30 Degrees

Mounting Position—Any

Net Weight, approximate	25	Pounds

MAXIMUM RATINGS△

DESIGN-CENTER VALUES*

Anode Voltage†	18,000 Max	Volts DC
Focusing-Electrode Voltage	−500 to +1000 Max	Volts DC
Grid-No. 2 Voltage	500 Max	Volts DC
Grid-No. 1 Voltage		
Negative-Bias Value	125 Max	Volts DC
Positive-Bias Value	0 Max	Volts DC
Positive-Peak Value	2 Max	Volts
Peak Heater-Cathode Voltage‡		
Heater Negative with Respect to Cathode		
During Warm-up Period not to Exceed 15 Seconds	410 Max	Volts
After Equipment Warm-up Period	180 Max	Volts
Heater Positive with Respect to Cathode	180 Max	Volts

TYPICAL OPERATING CONDITIONS△

Anode Voltage π	16,000	Volts DC
Focusing-Electrode Voltage for Focus§	0 to 500	Volts DC
Focusing-Electrode Current	−15 to +25	Microamperes DC
Grid-No. 2 Voltage	300	Volts DC
Grid-No. 1 Voltage ♦	−28 to −72	Volts DC

MAXIMUM CIRCUIT VALUES

Grid-No. 1 Circuit Resistance	1.5 Max	Megohms
Grid-No. 2 Circuit Resistance	0.1 Min	Megohms
Focusing-Electrode Resistance	0.1 Min	Megohms

Protective resistance in the grid-No. 2 and focusing-electrode circuits is advisable to prevent damage to the tube. If applicable, one resistor common to both circuits may be used.

△All voltages are measured with respect to cathode.

* The maximum ratings provide a ten-percent safety factor in accordance with the standard design-center system of rating cathode-ray tubes. The tube will withstand the combined effects of variations in line voltage and components provided the maximum design-center values are not exceeded by more than ten percent.

† Anode, grid-No. 3, and grid-No. 5 which are connected together within the tube are referred to herein as anode. If this tube is operated at voltages in excess of 16,000 volts, x-ray radiation shielding may be necessary to avert possible danger of personal injury from prolonged exposure at close range. The protective face-viewing window of apparatus using tubes of this type may provide such a safeguard. If the radiation measured in contact with this window does not exceed 6.25 milliroentgens per hour, the window will normally provide adequate protection.

‡ Cathode should be returned to one side or to the midtap of the heater transformer winding.

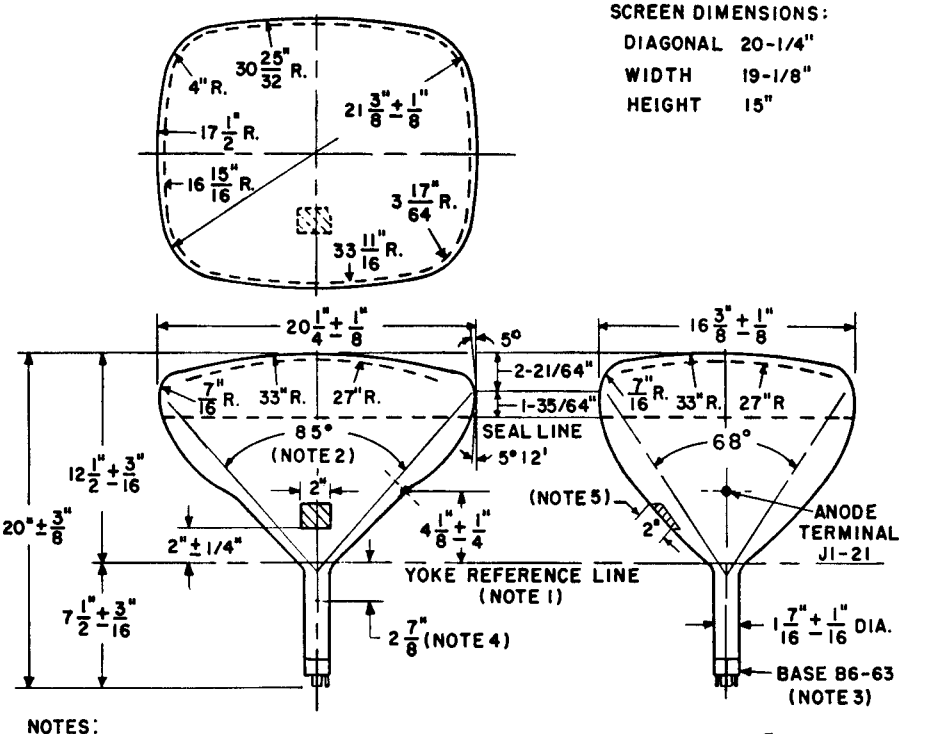
π Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 14,000 volts.

§ The focusing electrode may be modulated within the stipulated maximum range to improve over-all focus.

◆ For visual extinction of focused raster.

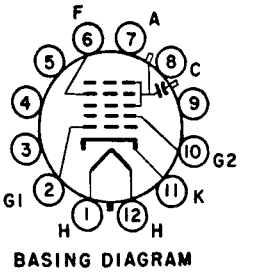
SCREEN DIMENSIONS:

DIAGONAL	20-1/4"
WIDTH	19-1/8"
HEIGHT	15"



NOTES:

1. REFERENCE LINE IS DETERMINED BY THE PLANE OF THE UPPER EDGE OF THE SHOULDER OF THE REFERENCE-LINE GAGE (RETMA NO. 116) WHEN THE GAGE IS RESTING ON THE CONE.
2. DEFLECTION ANGLE ON DIAGONAL IS 90 DEGREES.
3. ANODE TERMINAL ALIGNS WITH PIN-NO. 6 ± 30 DEGREES.
4. APPROXIMATE POSITION OF CENTERING MAGNET, IF USED.
5. EXTERNAL CONDUCTIVE COATING CONTACT AREA.



BASING DIAGRAM
12 L

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