



# 21ALP4

## CATHODE-RAY TUBE

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

19 $\frac{1}{8}$ - BY 15-INCH PICTURE SIZE  
FACEPLATE—SPHERICAL, GRAY  
ION-TRAP GUN  
EXTERNAL CONDUCTIVE COATING

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### DESCRIPTION AND RATING

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The 21ALP4 is an electrostatic-focus and magnetic-deflection, direct-view all-glass picture tube which provides a 19 $\frac{1}{8}$ - by 15-inch picture for television applications. The electron gun has a focusing voltage range of -0.4 to +2.2 percent of the final anode voltage and is used with an external single-field ion-trap magnet. Other features of this tube include a high-quality gray faceplate which increases picture contrast and detail under high ambient light conditions, and a space-saving rectangular face shape. An external conductive coating serves as a filter capacitor when grounded.

### GENERAL

#### ELECTRICAL

Heater Voltage . . . . .	6.3	Volts
Heater Current . . . . .	0.6 $\pm$ 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	$\mu\mu\text{f}$
Grid-No. 1 to All Other Electrodes . . . . .	6	$\mu\mu\text{f}$
External Conductive Coating to Anode		
Maximum . . . . .	750	$\mu\mu\text{f}$
Minimum . . . . .	500	$\mu\mu\text{f}$

#### OPTICAL

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



Supersedes ET-T1140, dated 8-54

**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 Number, ASA Designation—C171 Exp. 2		
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§ . . . . .	16,000	Volts DC
Focusing-Electrode Voltage for Focus $\pi$ . . . . .	−64 to +352	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
Ion-Trap Field Intensity◆, approximate . . . . .	40	Gausses

**MAXIMUM CIRCUIT VALUES**

Grid-No. 1 Circuit Resistance . . . . .	1.5 Max	Megohms
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\* 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 voltages 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.

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

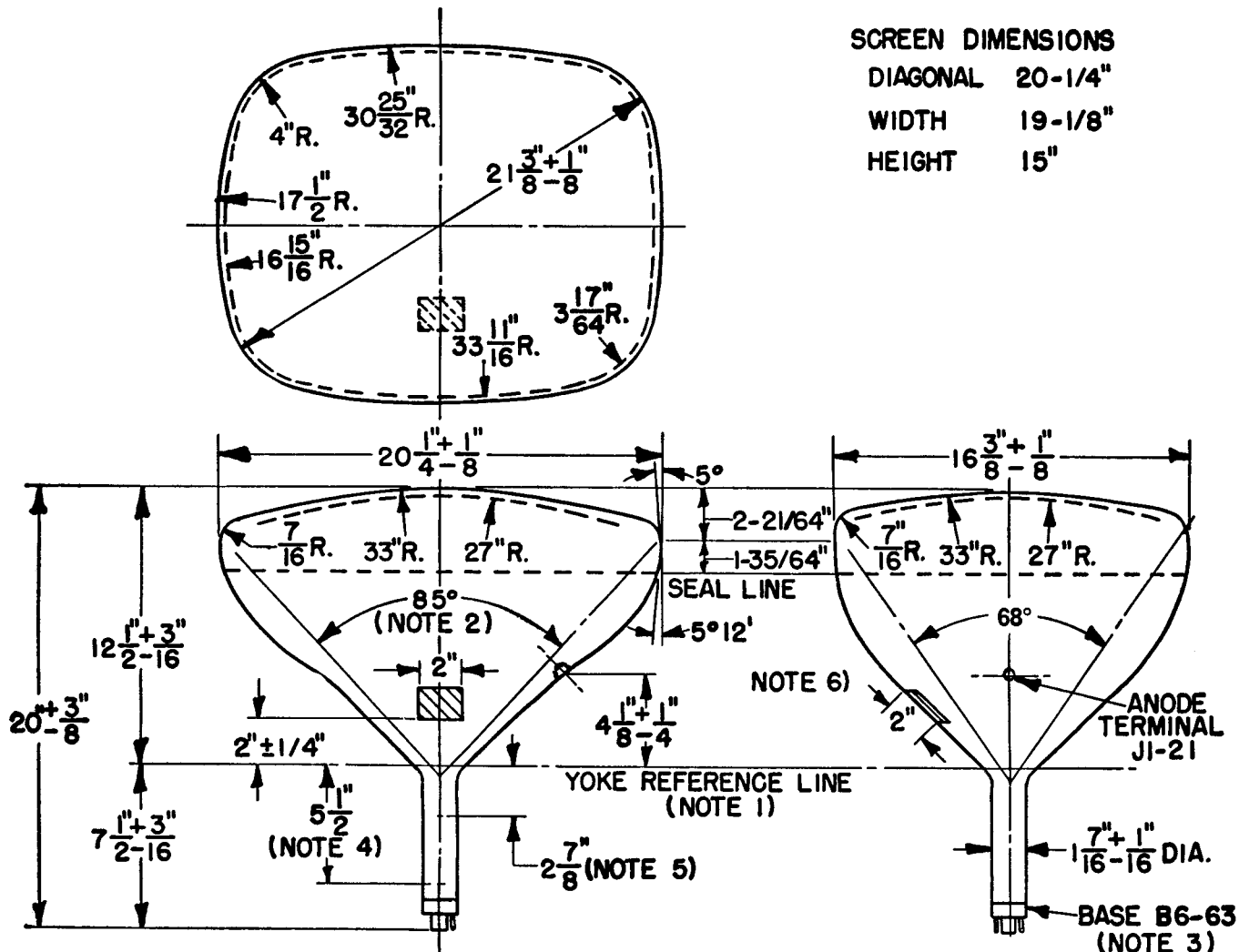
π The focusing electrode may be modulated within the stipulated maximum range without damage to the tube.

△ For visual extinction of focused raster.

◆ Single-field ion-trap magnet adjusted to optimum position, equivalent to 40 milliamperes through JETEC ion-trap magnet No. 117.

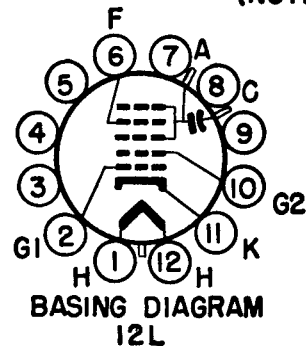
SCREEN DIMENSIONS

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 ION-TRAP MAGNET.
5. APPROXIMATE POSITION OF CENTERING MAGNET, IF USED.
6. EXTERNAL CONDUCTIVE COATING CONTACT AREA.



TUBE DEPARTMENT

GENERAL  ELECTRIC

Schenectady 5, N. Y.