



# 21AUP4-B/21AUP4-A

## CATHODE-RAY TUBE

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

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

ALUMINIZED SCREEN

### DESCRIPTION AND RATING

The 21AUP4-B/21AUP4-A is an electrostatic-focus and magnetic-deflection, direct-view all-glass picture tube for television applications. This tube provides the same large 19 $\frac{1}{8}$ - by 15-inch picture area as do 21-inch, 90-degree-deflection tubes. The electron gun has a focusing voltage range of -0.4 to +2.2 percent of the anode voltage and is designed for use 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, a reflective aluminized screen to increase light output, 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 ± 10%	Amperes
Focusing Method—Electrostatic		
Deflecting Method—Magnetic		
Deflection Angle, approximate		
Diagonal . . . . .	72	Degrees
Horizontal . . . . .	67	Degrees
Vertical . . . . .	53	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 . . . . .	750	μμf
Minimum . . . . .	500	μμf

#### OPTICAL

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



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## MECHANICAL

Over-all Length . . . . .	23 $\frac{1}{32}$ $\pm$ $\frac{3}{8}$ Inches
Greatest Bulb Dimensions	
Diagonal . . . . .	21 $\frac{3}{8}$ $\pm$ $\frac{1}{8}$ Inches
Width . . . . .	20 $\frac{1}{4}$ $\pm$ $\frac{1}{8}$ Inches
Height . . . . .	16 $\frac{3}{8}$ $\pm$ $\frac{1}{8}$ Inches
Minimum Useful Screen Dimensions	
Diagonal . . . . .	20 $\frac{1}{4}$ Inches
Width . . . . .	19 $\frac{1}{8}$ Inches
Height . . . . .	15 Inches
Neck Length . . . . .	7 $\frac{1}{2}$ Inches

Bulb Number, ASA Designation—J171F

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  $\pm$  30 Degrees

Mounting Position—Any

Net Weight, approximate . . . . . 25 Pounds

## RATINGS\*

### DESIGN-CENTER VALUES†

Anode Voltage‡ . . . . .	20,000 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 . . . . .	-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

**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 voltage 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.

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

π For visual extinction of focused raster.

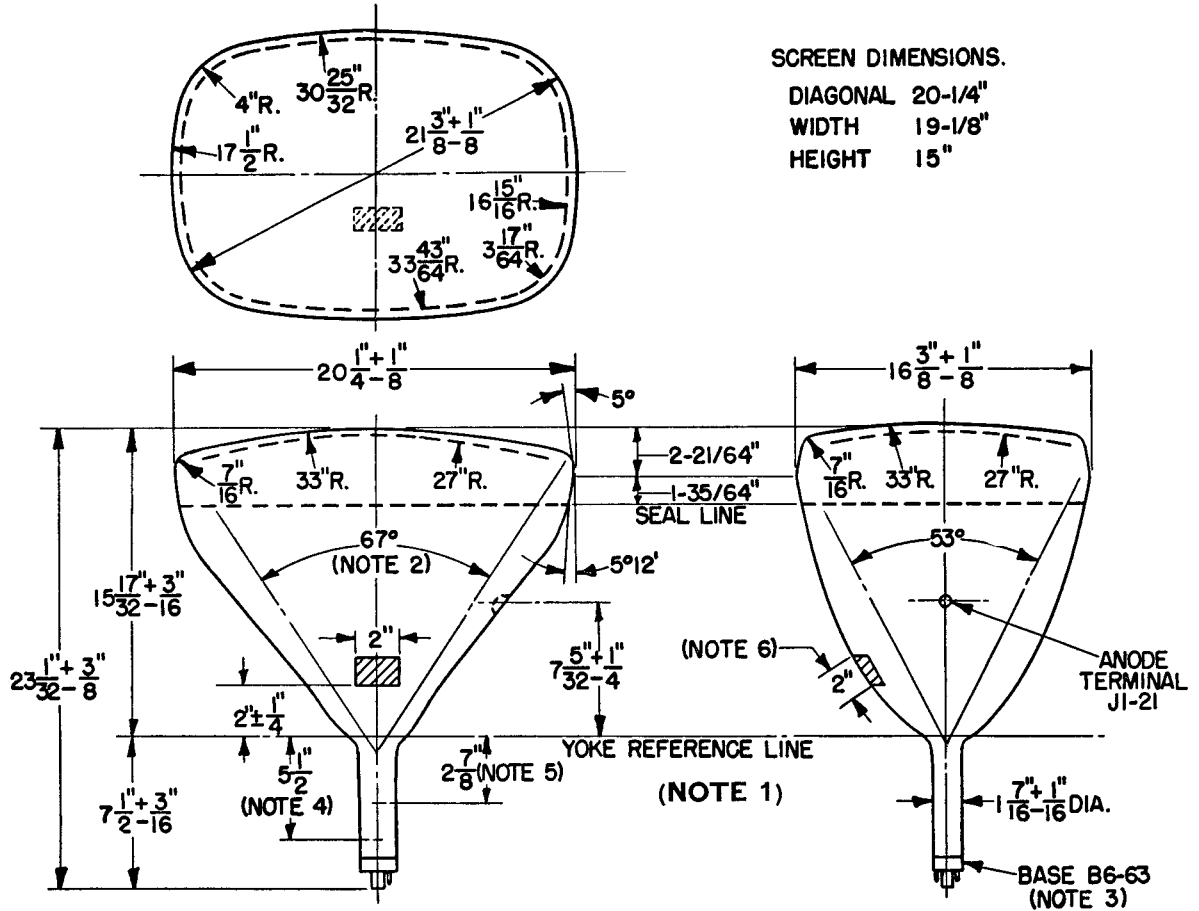
▲ Single-field ion-trap magnet adjusted to optimum position, equivalent to 40 milliamperes through JETEC ion-trap magnet No. 117.

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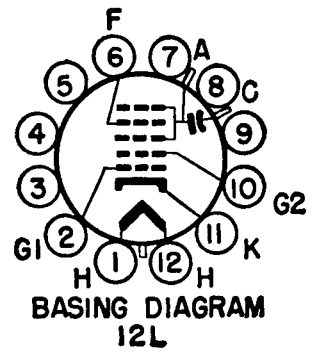


### SCREEN DIMENSIONS.

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 REFERENCE-LINE GAGE (RETMA NO. 110) WHEN THE GAGE IS RESTING ON THE CONE.
2. DEFLECTION ANGLE ON DIAGONAL IS 72 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



Schenectady 5, N. Y.