



21DLP4

21DLP4 PICTURE TUBE

RECTANGULAR GLASS TYPE
LOW-VOLTAGE ELECTROSTATIC FOCUS

ALUMINIZED SCREEN
MAGNETIC DEFLECTION

DATA

General:

Heater, for Unipotential Cathode:

Voltage 6.3 ac or dc volts
Current $0.6 \pm 10\%$ amp

Direct Interelectrode Capacitances:

Grid No.1 to all other electrodes 6 μf
Cathode to all other electrodes 5 μf
External conductive coating to ultor. $\begin{cases} 2500 \text{ max.} \\ 2000 \text{ min.} \end{cases}$ μf

Faceplate, Spherical. Filterglass

Light transmission (Approx.). 74%

Phosphor (For curves, see front of this section). .P4—Sulfide Type
Aluminized

Fluorescence. White

Phosphorescence White

Persistence Short

Focusing Method Electrostatic

Deflection Method Magnetic

Deflection Angles (Approx.):

Diagonal. 90°

Horizontal. 85°

Vertical. 68°

Electron Gun. Type Requiring No Ion-Trap Magnet

Tube Dimensions:

Overall length. $17" \pm 3/8"$

Greatest width. $20-1/4" \pm 1/8"$

Greatest height $16-3/8" \pm 1/8"$

Diagonal. $21-3/8" \pm 1/8"$

Neck length $4-1/2" \pm 3/16"$

Screen Dimensions (Minimum):

Greatest width. $19-1/16"$

Greatest height $15-1/16"$

Diagonal. $20-1/4"$

Projected area. 262 sq. in.

Weight (Approx.). 24 lbs

Operating Position. Any

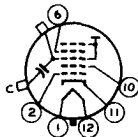
Cap. Recessed Small Cavity (JETEC No.J1-21)

Bulb. J171D2/E1

Base. Short Small-Shell Duodecal 6-Pin (JETEC Group 4,
No.B6-203), or Small-Shell Duodecal 6-Pin
(JETEC Group 4, No.B6-63)

Basing Designation for BOTTOM VIEW. 12L

Pin 1—Heater
Pin 2—Grid No.1
Pin 6—Grid No.4
Pin 10—Grid No.2
Pin 11—Cathode
Pin 12—Heater



Cap—Ultor
(Grid No.3,
Grid No.5,
Collector)
C—External
Conductive
Coating



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GRID-DRIVE[▲] SERVICE

Unless otherwise specified, voltage values are positive with respect to cathode

Maximum and Minimum Ratings, Design-Center Values:

ULTOR VOLTAGE.	{ 20000 max. volts 12000* min. volts
GRID-No.4 (FOCUSING) VOLTAGE:	
Positive value	1000 max. volts
Negative value	500 max. volts
GRID-No.2 VOLTAGE.	500 max. volts
GRID-No.1 VOLTAGE:	
Negative-peak value.	200 max. volts
Negative-bias value.	140 max. volts
Positive-bias value.	0 max. volts
Positive-peak value.	? max. volts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode:	
During equipment warm-up period	
not exceeding 15 seconds	410 max. volts
After equipment warm-up period . . .	180 max. volts
Heater positive with respect to cathode.	180 max. volts

Equipment Design Ranges:

With any ultor voltage (E_{c5k}) between 12000 and 20000 volts and grid-No.2 voltage (E_{c2k}) between 200 and 500 volts

Grid-No.4 Voltage for focus§	-50 to +400	volts
Grid-No.1 Voltage (E_{c1k}) for visual extinction of focused raster.	See Raster-Cutoff-Range Chart for Grid-Drive Service	
Grid-No.1 Video Drive from Raster Cutoff (Black Level):		
White-level value (Peak positive).	Same value as determined for E_{c1k} except video drive is a positive voltage	
Grid-No.4 Current.	-25 to +25	μ a
Grid-No.2 Current.	-15 to +15	μ a
Field Strength of Adjustable Centering Magnet* . .	0 to 8	gausses

Examples of Use of Design Ranges:

With ultor voltage of	16000	volts
and grid-No.2 voltage of	300	volts
Grid-No.4 Voltage for focus.	0 to 400	volts

[▲], [§], ^{*}: see next page.



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Grid-No.1 Voltage for visual extinction of focused raster	-28 to -72	volts
Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value.	28 to 72	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
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CATHODE-DRIVE[■] SERVICE

*Unless otherwise specified, voltage values are positive
with respect to grid No.1*

Maximum and Minimum Ratings, Design-Center Values:

ULTOR-TO-GRID-No.1 VOLTAGE	{20000 max. 12000* min.	volts
GRID-No.4-TO-GRID-No.1 VOLTAGE:		
Positive value	1000 max.	volts
Negative value	500 max.	volts
GRID-No.2-TO-GRID-No.1 VOLTAGE	640 max.	volts
GRID-No.2-TO-CATHODE VOLTAGE	500 max.	volts
CATHODE-TO-GRID-No.1 VOLTAGE:		
Positive-peak value.	200 max.	volts
Positive-bias value.	140 max.	volts
Negative-bias value.	0 max.	volts
Negative-peak value.	2 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode:		
During equipment warm-up period not exceeding 15 seconds	410 max.	volts
After equipment warm-up period . . .	180 max.	volts
Heater positive with respect to cathode.	180 max.	volts

Equipment Design Ranges:

*With any ultor-to-grid-No.1 voltage (E_{c5g1}) between 12000
and 20000 volts and grid-No.2-to-grid-No.1 voltage (E_{c2g1})
between 225 and 640 volts*

Grid-No.4-to-Grid-No.1 Voltage for focus [§]	0 to 450	volts
Cathode-to-Grid-No.1 Voltage (E_{kg1}) for visual extinction of focused raster.	See Raster-Cutoff-Range Chart for Cathode-Drive Service	

▲, ◆, §, *, ■: See next page.



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Cathode-to-Grid-No.1		
Video Drive from Raster		
Cutoff (Black Level):		
White-level value		
(Peak negative)	Same value as determined for	
	E _{kg1} except video drive is a	
	negative voltage	
Grid-No.4 Current	-25 to +25	μa
Grid-No.2 Current	-15 to +15	μa
Field Strength of Adjustable Centering Magnet*. . .	0 to 8	gausses

Examples of Use of Design Ranges:

<i>With ultor-to-grid-</i>		
<i>No.1 voltage of</i>		
<i>and grid-No.2-to-grid-</i>	16000	volts
<i>No.1 voltage of</i>	300	volts
Grid-No.4-to-Grid-No.1		
Voltage for focus	0 to 400	volts
Cathode-to-Grid-No.1		
Voltage for visual		
extinction of focused		
raster.		
	28 to 60	volts
Cathode-to-Grid-No.1		
Video Drive from		
Raster Cutoff		
(Black Level):		
White-level value	-28 to -60	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	1.5 max.	megohms
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▲ Grid drive is the operating condition in which the video signal varies the grid-No.1 potential with respect to cathode.

● This value is a working design-center minimum. The equivalent absolute minimum ultor- or ultor-to-grid-No.1 voltage is 11,000 volts, below which the serviceability of the 21DLP4 will be impaired. The equipment designer has the responsibility of determining a minimum design value such that under the worst probable operating conditions involving supply-voltage variation and equipment variation the absolute minimum ultor- or ultor-to-grid-No.1 voltage is never less than 11,000 volts.

§ The grid-No.4 voltage or grid-No.4-to-grid-No.1 voltage required for focus of any individual tube is independent of ultor current and will remain essentially constant for values of ultor voltage (or ultor-to-grid-No.1 voltage) or grid-No.2 voltage (or grid-No.2-to-grid-No.1 voltage) within design ranges shown for these items.

* Distance from Reference Line for suitable PM centering magnet should not exceed 2-1/4". Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 7/16-inch radius concentric with the center of the tube face. It is to be noted that the earth's magnetic field can cause as much as 1/2-inch deflection of the spot from the center of the tube face.

■ Cathode drive is the operating condition in which the video signal varies the cathode potential with respect to grid No.1 and the other electrodes.

For X-ray shielding considerations, see sheet

X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES

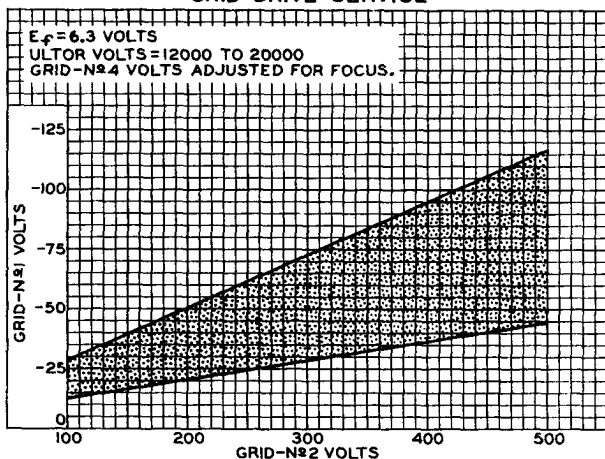
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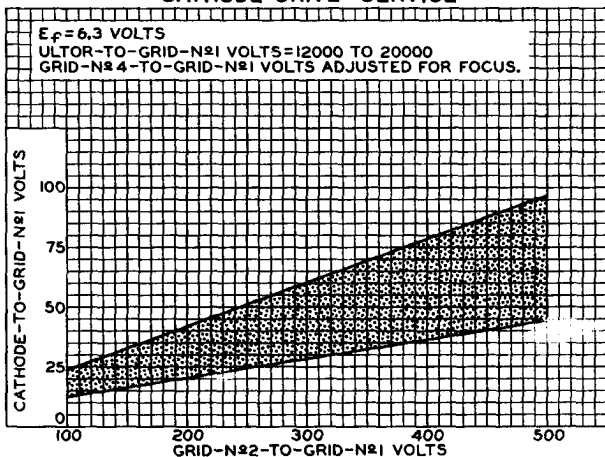
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RASTER-CUTOFF-RANGE CHARTS GRID-DRIVE SERVICE



92CS-9349V

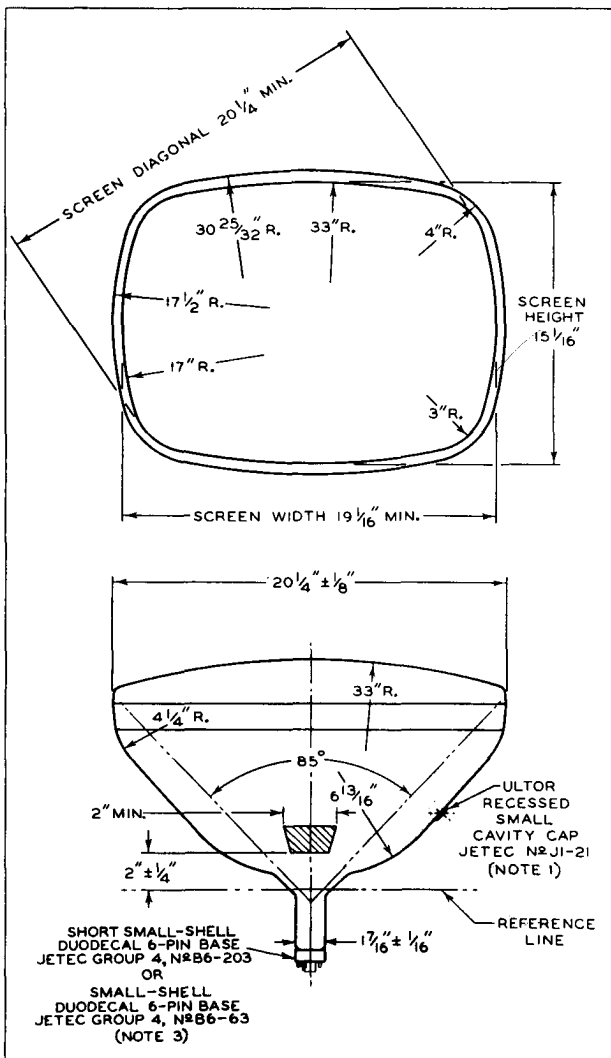
CATHODE-DRIVE SERVICE



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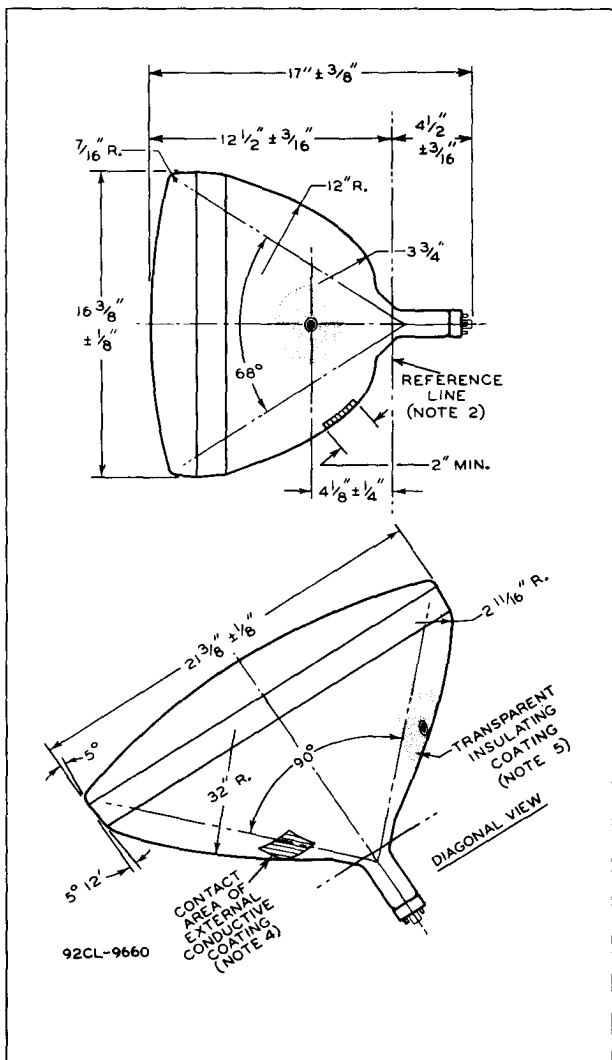
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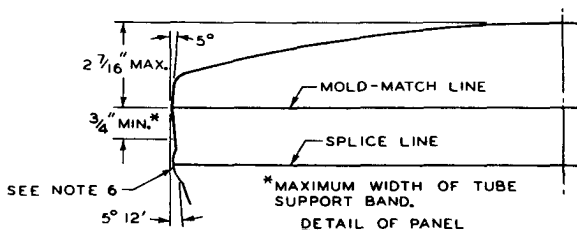
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NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN 6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 30^\circ$. ULTOR TERMINAL IS ON SAME SIDE AS PIN 6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC No. G-116 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".

NOTE 4: THE DRAWING SHOWS THE MINIMUM SIZE AND LOCATION OF THE CONTACT AREA OF THE EXTERNAL CONDUCTIVE COATING. THE ACTUAL AREA OF THIS COATING WILL BE GREATER THAN THE CONTACT AREA SO AS TO PROVIDE THE REQUIRED CAPACITANCE. EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINTLESS CLOTH.

NOTE 6: BULGE AT SPLICE-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN 1/8", BUT AT ANY POINT AROUND THE SEAL, THE BULGE WILL NOT PROTRUDE MORE THAN 1/16" BEYOND THE ENVELOPE SURFACE AT THE MOLD-MATCH LINE.



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AVERAGE DRIVE CHARACTERISTICS

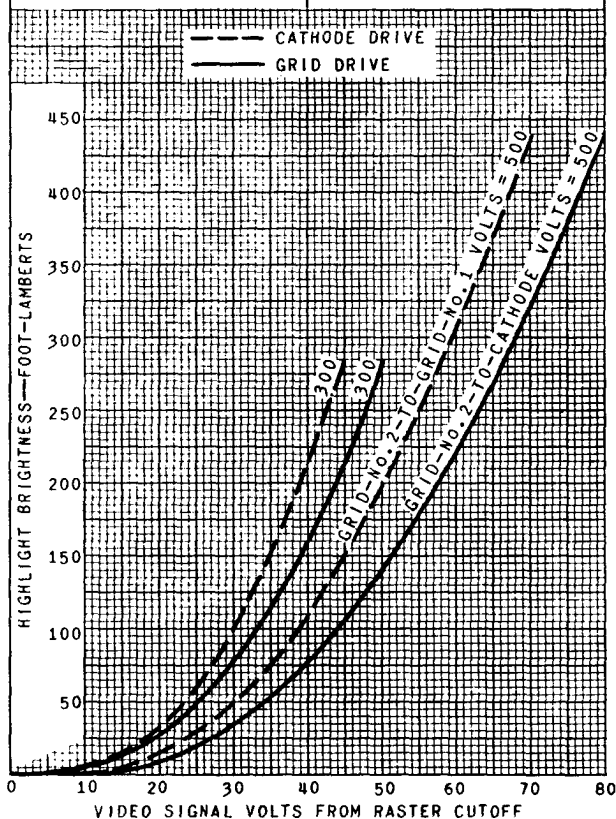
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CATHODE-DRIVE SERVICE

$E_f = 6.3$ VOLTS
ULTOR-TO-GRID-No.1
VOLTS = 16000
CATHODE BIASED POSITIVE
WITH RESPECT TO GRID
No.1 TO GIVE FOCUSED
RASTER CUTOFF.
RASTER FOCUSED AT AVERAGE
BRIGHTNESS.
RASTER SIZE = $18 \times 13\frac{1}{2}$ "

GRID-DRIVE SERVICE

$E_f = 6.3$ VOLTS
ULTOR VOLTS = 16000
GRID No.1 BIASED NEGATIVE
WITH RESPECT TO CATHODE
TO GIVE FOCUSED RASTER
CUTOFF.
RASTER FOCUSED AT
AVERAGE BRIGHTNESS.
RASTER SIZE = $18 \times 13\frac{1}{2}$ "



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CS-9143R1



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AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

 $E_f = 6.3$ VOLTS

ULTOR-TO-GRID-No.1

VOLTS = 12000 TO 20000

CATHODE BIASED POSITIVE
WITH RESPECT TO GRID No.1
TO GIVE FOCUSED RASTER
CUTOFF.

GRID-DRIVE SERVICE

 $E_f = 6.3$ VOLTS

ULTOR VOLTS =

12000 TO 20000

GRID No.1 BIASED NEGATIVE
WITH RESPECT TO CATHODE
TO GIVE FOCUSED RASTER
CUTOFF.

--- CATHODE DRIVE
— GRID DRIVE

