



24AHP4

# 24AHP4 PICTURE TUBE

RECTANGULAR GLASS TYPE  
LOW-VOLTAGE FOCUS

ALUMINIZED SCREEN  
MAGNETIC DEFLECTION

### DATA

#### General:

Heater, for Unipotential Cathode:  
 Voltage . . . . . 6.3 . . . . . ac or dc volts  
 Current . . . . . 0.6 ± 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. . . . . {2500 max. μf  
 {2000 min. μf

Faceplate, Spherical. . . . . Filterglass  
 Light transmission (Approx.). . . . . 76%

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. . . . . 110°  
 Horizontal. . . . . 105°  
 Vertical. . . . . 87°

Electron Gun. . . . . Type Requiring No Ion-Trap Magnet

Tube Dimensions:  
 Overall length. . . . . 15-7/8" ± 5/16"  
 Greatest width. . . . . 22-11/16" ± 1/8"  
 Greatest height . . . . . 18-1/2" ± 1/8"  
 Diagonal. . . . . 24" ± 1/8"  
 Neck length . . . . . 5-7/16" ± 1/8"

Screen Dimensions (Minimum):  
 Greatest width. . . . . 21-7/16"  
 Greatest height . . . . . 16-7/8"  
 Diagonal. . . . . 22-13/16"  
 Projected area. . . . . 332 sq. in.

Weight (Approx.). . . . . 28 lbs

Mounting Position . . . . . Any

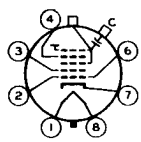
Cap . . . . . Recessed Small Cavity (JETEC No.J1-21)

Bulb. . . . . J192 (110°)

Base. . . . . Small-Button Eightar 7-Pin,  
 Arrangement 2, (JETEC No.B7-183)

Basing Designation for BOTTOM VIEW. . . . . 8HR

- Pin 1—Heater
  - Pin 2—Grid No.1
  - Pin 3—Grid No.2
  - Pin 4—Grid No.4
  - Pin 6—Grid No.1
  - Pin 7—Cathode
  - Pin 8—Heater
- Cap—Ultor  
 (Grid No.3,  
 Grid No.5,  
 Collector)
  - C—External  
 Conductive  
 Coating





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GRID-DRIVE<sup>▲</sup> SERVICE

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

## Maximum Ratings, Design-Center Values:

ULTOR VOLTAGE . . . . .	{ 20000 max. volts
GRID-No.4 VOLTAGE:	{ 12000 <sup>•</sup> min. volts
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 . . . . .	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 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 <sup>§</sup> . . . . .	-50 to +350	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	$\mu$ a
Grid-No.2 Current . . . . .	-15 to +15	$\mu$ a
Field Strength of Adjustable Centering Magnet* . . . . .	0 to 8	gausses

## Examples of Use of Design Ranges:

With ultor voltage of	14000	16000	volts
and grid-No.2 voltage of	300	400	volts

Grid-No.4 Voltage for Focus . . . . .	-50 to +350	-50 to +350	volts
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<sup>▲</sup> grid drive is the operating condition in which the video signal varies the grid-No.1 potential with respect to cathode.

<sup>§</sup>, <sup>\*</sup>: See next page.



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Grid-No.1 Voltage for Visual Extinction of Focused Raster . . . . . -28 to -72 -36 to -94 volts

Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value. . . . . 28 to 72 36 to 94 volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . . 1.5 max. megohms

CATHODE-DRIVE SERVICE

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

Maximum Ratings, Design-Center Values:

ULTOR-TO-GRID-No.1 VOLTAGE . . . . . {20000 max. volts {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 (Ec5g1) between 12000 and 20000 volts and grid-No.2-to-grid-No.1 voltage (Ec2g1) between 225 and 640 volts

Grid-No.4-to-Grid-No.1 Voltage for Focus§ . . . . . -50 to +350 volts

\* 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.

§ This value is a working design-center minimum. The equivalent absolute minimum ultor-or ultor-to-grid-No.1 voltage is 11000 volts, below which the serviceability of the 24AHP4 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 11000 volts.

\*.§: See next page.

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Cathode-to-Grid-No.1  
Voltage ( $E_{k_1}$ ) for  
Visual Extinction  
of Focused Raster. . . . . See Raster-Cutoff-Range Chart  
for Cathode-Drive Service

Cathode-to-Grid-No.1  
Video Drive from Raster  
Cutoff (Black Level):  
White-level value  
(Peak negative). . . . . Same value as determined for  
 $E_{k_1}$  except video drive is a  
negative voltage

Grid-No.4 Current, . . . . . -25 to +25  $\mu$ a  
Grid-No.2 Current, . . . . . -15 to +15  $\mu$ a  
Field Strength of Adjust-  
able Centering Magnet\* . . . . . 0 to 8 gauss

Examples of Use of Design Ranges:

With ultor-to-grid-No.1  
voltage of 14000 16000 volts  
and grid-No.2-to-grid-No.1  
voltage of 300 400 volts

Grid-No.4-to-Grid-  
No.1 Voltage for Focus . . -50 to +350 -50 to +350 volts

Cathode-to-Grid-No.1  
Voltage for Visual  
Extinction of Focused  
Raster . . . . . 28 to 60 36 to 78 volts

Cathode-to-Grid-No.1  
Video Drive from  
Raster Cutoff  
(Black Level):  
White-level value. . . . . -28 to -60 -36 to -78 volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance. . . . . 1.5 max. megohms

\* 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.

§ 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.

For X-ray shielding considerations, see sheet  
X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES  
at front of this Section

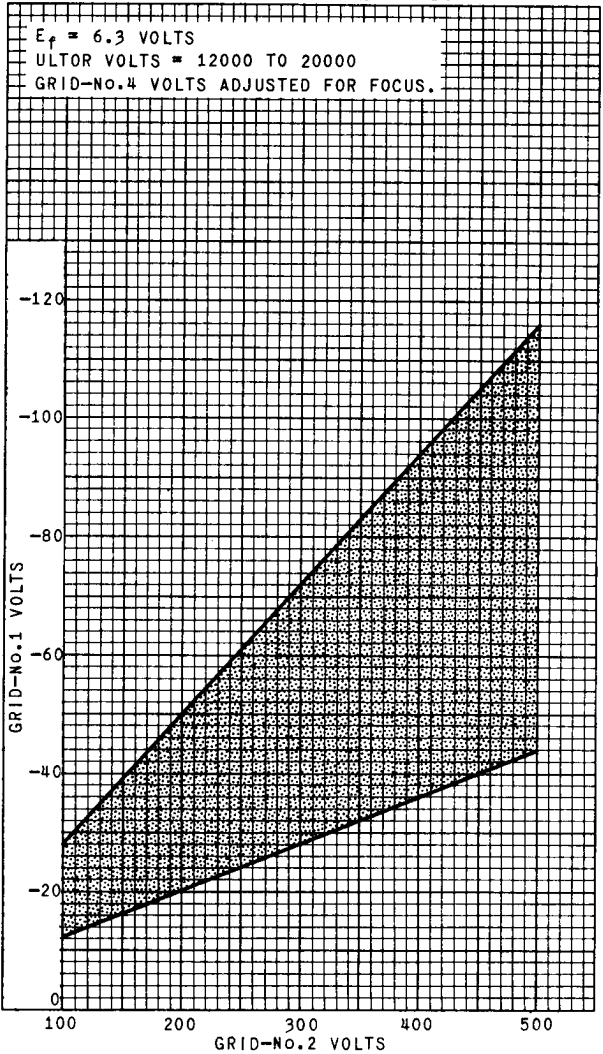


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# RASTER-CUTOFF-RANGE CHART

For Grid-Drive Service

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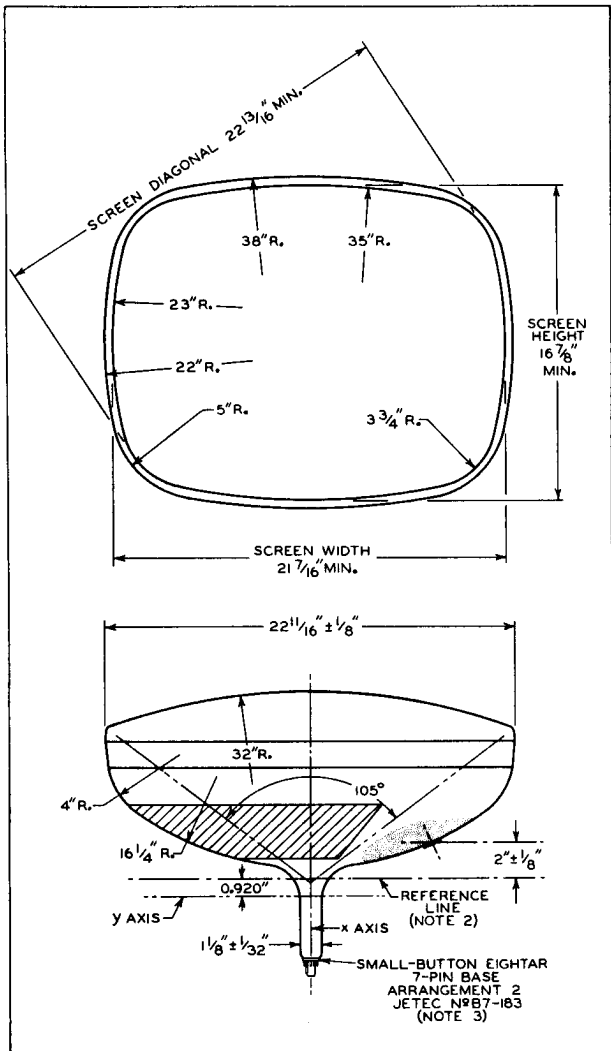


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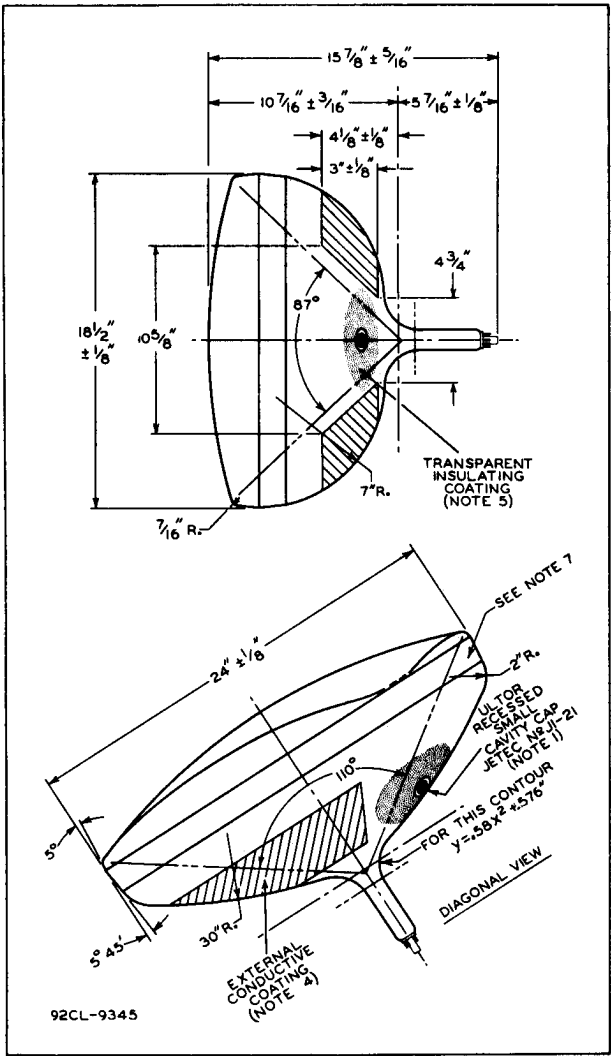




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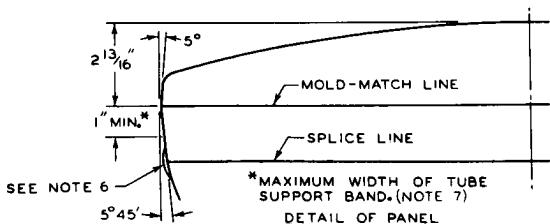


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**NOTE 1:** THE PLANE THROUGH THE TUBE AXIS AND PIN 4 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF  $\pm 30^\circ$ . ULTOR TERMINAL IS ON SAME SIDE AS PIN 4.

**NOTE 2:** WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC No. 126 (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. THE DESIGN OF THE SOCKET SHOULD BE SUCH THAT THE CIRCUIT WIRING CANNOT IMPRESS LATERAL STRAINS THROUGH THE SOCKET CONTACTS ON THE BASE PINS. BOTTOM CIRCUMFERENCE OF BASE WAFER WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 1-3/4".

**NOTE 4:** EXTERNAL CONDUCTIVE COATING MUST BE GROUNDLED.

**NOTE 5:** TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINT-LESS 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.

**NOTE 7:** UNDISTURBED AREA BETWEEN MOLD-MATCH LINE AND SPLICE LINE IS 1" MINIMUM. THIS SHOULD BE THE MAXIMUM WIDTH OF TUBE SUPPORT BAND.

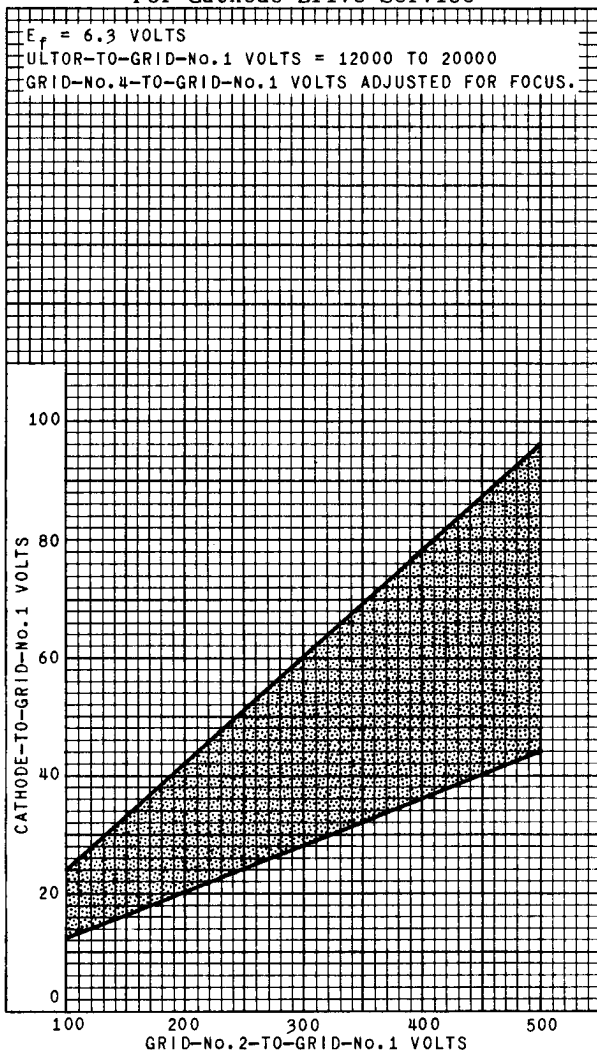




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# RASTER-CUTOFF-RANGE CHART For Cathode-Drive Service



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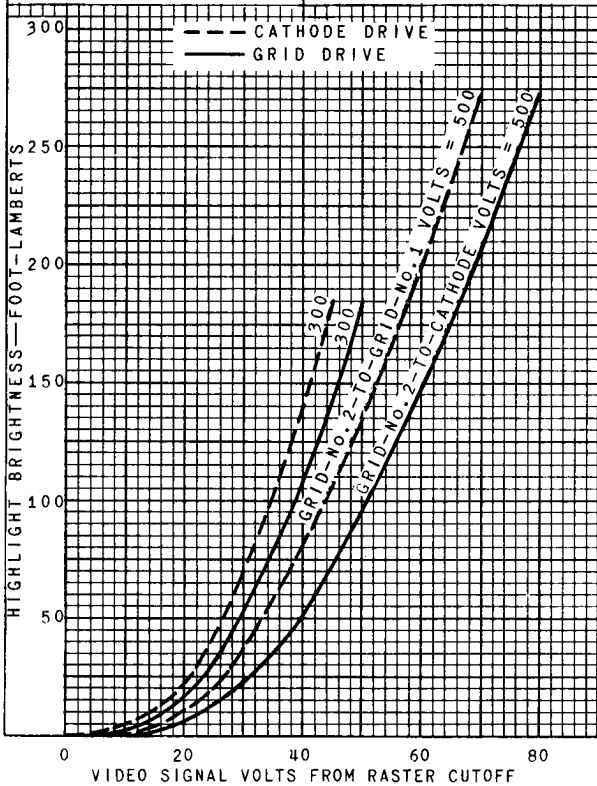


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# AVERAGE DRIVE CHARACTERISTICS

**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 = 21" x 16"

**GRID-DRIVE SERVICE**  
 $E_f = 6.3$  VOLTS  
 ULTOR VOLTS = 16000  
 GRID No.1 BIASED NEGA-  
 TIVE WITH RESPECT TO  
 CATHODE TO GIVE  
 FOCUSED RASTER CUTOFF.  
 RASTER FOCUSED  
 AT AVERAGE BRIGHTNESS.  
 RASTER SIZE = 21" x 16"



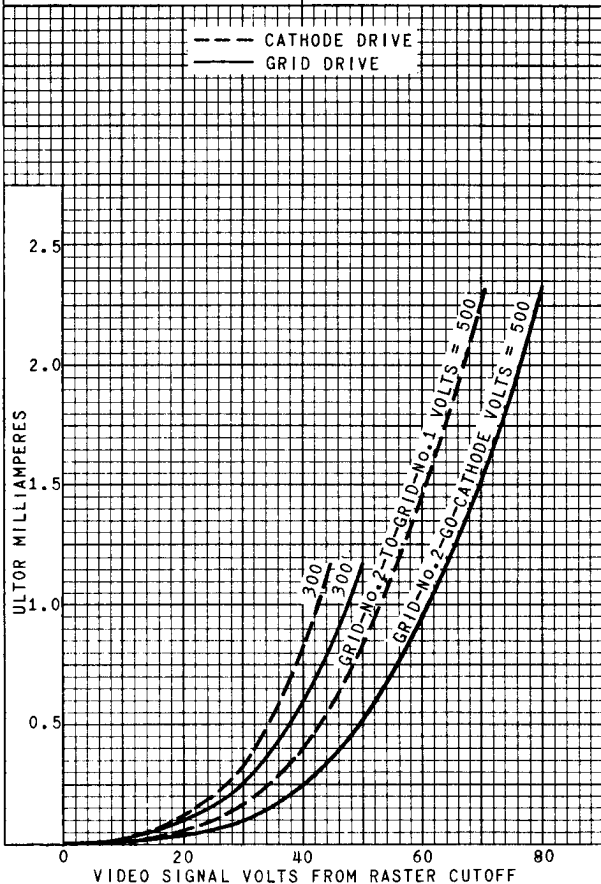


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# AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE	GRID-DRIVE SERVICE
$E_f = 6.3$ VOLTS	$E_f = 6.3$ VOLTS
ULTOR-TO-GRID-No.1 VOLTS = 12000 TO 20000	ULTOR VOLTS = 12000 TO 20000
CATHODE BIASED POSITIVE WITH RESPECT TO GRID No.1 TO GIVE FOCUSED RASTER CUTOFF.	GRID No.1 BIASED NEGATIVE WITH RESPECT TO CATHODE TO GIVE FOCUSED RASTER CUTOFF.



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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