### 17CFP4 PICTURE TUBE

**DATA**

**RECTANGULAR GLASS TYPE**
**LOW-VOLTAGE ELECTROSTATIC FOCUS**
**ALUMINIZED SCREEN**
**MAGNETIC DEFLECTION**

#### General:
- **Heater, for Unipotential Cathode:**
  - Voltage (AC or DC) .............. 6.3 volts
  - Current ................................ 0.6 ± 10% amp
- **Direct Interelectode Capacitances:**
  - Grid No.1 to all other electrodes .......... 6 μμf
  - Cathode to all other electrodes .......... 5 μμf
  - External conductive coating to ultor {1500 max. μμf
  {1200 min. μμf
- **Faceplate, Spherical** ................................ Filterglass
- **Light transmission (Approx.)** .................. 79%
- **Phosphor (For curves, see front of this Section)** P4—Sulfide Type
  - Aluminized White
- **Fluorescence** ........................................ White
- **Phosphorescence** ..................................... White
- **Persistence** ........................................... Medium-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** ....................... 15" ± 3/8"
- **Greatest width** ......................... 15-5/8" ± 1/8"
- **Greatest height** ......................... 12-3/4" ± 1/8"
- **Diagonal** ...................................... 16-9/16" ± 1/8"
- **Neck length** ................................. 5-1/2" ± 3/16"
- **Radius of curvature of faceplate (External surface)** 20-3/4"

#### Screen Dimensions (Minimum):
- **Greatest width** .......................... 14-3/4"
- **Greatest height** ......................... 11-11/16"
- **Diagonal** ...................................... 15-3/4"
- **Projected area** ............................. 155 sq. in.
- **Weight (Approx.)** ....................... 10 lbs
- **Operating Position** ..................... Any
- **Cap.** .............................................. Recessed Small Cavity (JEDEC No. J1-21)
- **Bulb** .............................................. J132-1/2 C1/D1
- **Base** .............................................. Short Small-Shell Duodecal 6-Pin
  (JEDEC Group 4, No. B6-203)

#### 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, Collector)
- C—External Conductive Coating

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**10-59**
**ELECTRON TUBE DIVISION**
**RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY**

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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:

<table>
<thead>
<tr>
<th>Ultimate Voltage</th>
<th>16000 max. volts</th>
<th>12000 min. volts</th>
</tr>
</thead>
</table>

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: 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 ultimate voltage \( E_{C_{1k}} \) between 12000* and 16000 volts and grid-No.2 voltage \( E_{C_{2k}} \) between 200 and 500 volts:

- Grid-No.4 Voltage for focus: -50 to +350 volts
- Grid-No.1 Voltage 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 \( E_{C_{1k}} \) 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 gauss

Examples of Use of Design Ranges:

- With ultimate voltage of 16000 volts and grid-No.2 voltage of 300 volts

- Grid-No.4 Voltage for focus: -50 to +350 volts
- 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

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 .......... \( \frac{16000}{12000} \) max. 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 \( (E_{c2g1}) \) between 12000* and 16000 volts and grid-No.2-to-grid-No.1 voltage \( (E_{c2g1}) \) between 220 and 640 volts

Grid-No.4-to-Grid-No.1
  Voltage for focus:.............. 0 to 400 volts

Cathode-to-Grid-No.1
  Voltage \( (E_{kg1}) \) 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 \( E_{kg1} \) except video drive is a negative voltage

Grid-No.4 Current............... -25 to +25 \( \mu \)a
Grid-No.2 Current. ......... -15 to +15 μA
Field Strength of Adjust-
able Centering Magnet* .... 0 to 8 gausses

Examples of Use of Design Ranges:
With ultor-to-grid-
No.1 voltage of. .... 16000 volts
and grid-No.2-to-grid-
No.1 voltage of. .... 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

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 10,800 volts, below which the serviceability of the 17CFP4 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 10,800 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 2-1/2*. Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 5/16-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 at front of this Section

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JEDEC 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. THE DESIGN OF THE SOCKET SHOULD BE SUCH THAT THE CIRCUITRY 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 2-3/4".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

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

NOTE 6: MEASURED 2-9/32" ± 1/32" FROM THE PLANE TANGENT TO THE SURFACE OF THE FACEPLATE AT THE TUBE AXIS.

NOTE 7: BULGE AT SPlice-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN 1/4", BUT AT ANY POINT AROUND THE SEAL, THE BULGE WILL NOT PROTRUDE MORE THAN 1/8" BEYOND THE ENVELOPE SURFACE AT THE LOCATION SPECIFIED FOR DIMENSIONING THE ENVELOPE WIDTH, DIAGONAL, AND HEIGHT.

NOTE 8: THE TUBE SHOULD BE SUPPORTED ON BOTH SIDES OF THE BULGE. THE MECHANISM USED SHOULD PROVIDE CLEARANCE FOR THE MAXIMUM DIMENSIONS OF THE BULGE.
### Average Drive Characteristics

<table>
<thead>
<tr>
<th>Cathode-Drive Service</th>
<th>Grid-Drive Service</th>
</tr>
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<tbody>
<tr>
<td>$E_f = 6.3 \text{ Volts}$</td>
<td>$E_f = 6.3 \text{ Volts}$</td>
</tr>
<tr>
<td>ULTOR-TO-GRID-$N^1$ Volts = 16000</td>
<td>ULTOR Volts = 16000</td>
</tr>
<tr>
<td>Cathode biased positive with respect to Grid $N^1$ to give focused raster cutoff.</td>
<td>Grid $N^1$ biased negative with respect to cathode to give focused raster cutoff.</td>
</tr>
<tr>
<td>Raster focused at average brightness.</td>
<td>Raster focused at average brightness.</td>
</tr>
<tr>
<td>Raster size = 14&quot; x 10 1/2&quot;</td>
<td>Raster size = 14&quot; x 10 1/2&quot;</td>
</tr>
</tbody>
</table>

I.C.I. Coordinates of Screen: X = 0.270, Y = 0.300

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**Graph:**

- **Axes:**
  - X-axis: Video signal volts from raster cutoff
  - Y-axis: Highlight brightness—Footlamberts

- **Lines:**
  - Cathode Drive
  - Grid Drive

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92CM-9241RI
AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE
E_f = 6.3 VOLTS
ULTOR-TO-GRID-N®1 VOLTS = 12000 TO 16000
CATHODE BIASED POSITIVE WITH RESPECT TO GRID N®1 TO GIVE FOCUSED RASTER CUTOFF.

GRID-DRIVE SERVICE
E_f = 6.3 VOLTS
ULTOR VOLTS = 12000 TO 16000
GRID N®1 BIASED NEGATIVE WITH RESPECT TO CATHODE TO GIVE FOCUSED RASTER CUTOFF.

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GRID-DRIVE CHARACTERISTIC CURVES

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