DATA

General:
Heater, for Unipotential Cathode:
Voltage .................. 6.3 .................. ac or dc volts
Current .................. 0.6 ± 10% .................. amp
Direct Interelectrode Capacitances (Approx.):
  Grid No. 1 to all other electrodes .................. 8 μf
  Deflecting electrode DJ₁ to
deflecting electrode DJ₂ .................. 2.5 μf
  Deflecting electrode DJ₃ to
deflecting electrode DJ₄ .................. 2.5 μf
  DJ₁ to all other electrodes .................. 11 μf
  DJ₂ to all other electrodes .................. 8 μf
  DJ₃ to all other electrodes .................. 7 μf
  DJ₄ to all other electrodes .................. 8 μf
Faceplate .................. Clear Glass
Phosphor (For Curves, see front of this Section) ............... P₁
  Fluorescence .................. Green
  Phosphorescence ............... Green
  Persistence .................. Medium
Focusing Method ............... Electrostatic
Deflection Method ............... Electrostatic
Overall Length .................. 11-1/2" ± 1/4"
Greatest Diameter of Bulb ............... 3" ± 1/16"
Minimum Useful Screen Diameter ............... 2-3/4"
Weight (Approx.) ............... 9 oz
Mounting Position ............... Any
Base .................. Medium-Shell Magnal 11-Pin (JETEC No.B11-66)
  Basing Designation for BOTTOM VIEW ............... 11M

Pin 1 - Heater
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Grid No.3
Pin 5 - Deflecting Electrode DJ₁
Pin 6 - Deflecting Electrode DJ₃
Pin 7 - Ultron (Grid No.2, Grid No.4, Collector)
Pin 8 - Deflecting Electrode DJ₂
Pin 9 - Deflecting Electrode DJ₄
Pin 10 - Internal Connection—Do Not Use
Pin 11 - Heater

DJ₁ and DJ₂ are nearer the screen
DJ₃ and DJ₄ are nearer the base

→ indicates a change.

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OSCILLOGRAPH TUBE

With DJ1 positive with respect to DJ2, the spot is deflected toward pin 4. With DJ3 positive with respect to DJ4, the spot is deflected toward pin 1.

The plane through the tube axis and pin 1 may vary from the trace produced by DJ3 and DJ4 by ±10° (measured about the tube axis).

The angle between DJ1 - DJ2 trace and DJ3 - DJ4 trace is 90° ±3°.

**Maximum Ratings, Design-Center Values:**

ULTOR VOLTAGE ........................................ 2500 max. volts
ULTOR INPUT (AVERAGE) .................................. 6 max. watts
GRID-No.3 VOLTAGE .................................... 1000 max. volts
GRID-No.1 VOLTAGE:
- Negative bias value ..................................... 200 max. volts
- Positive bias value .................................... 0 max. volts
- Positive peak value ................................... 2 max. volts
PEAK VOLTAGE BETWEEN ULTOR AND ANY DEFLECTING ELECTRODE .................. 500 max. volts
PEAK HEATER-CATHODE VOLTAGE:
- Heater negative with respect to cathode . 125 max. volts
- Heater positive with respect to cathode . 125 max. volts

**Equipment Design Ranges:**

For any ultor voltage \(E_{c4}\) between recommended minimum* and 2500 volts

Grid-No.3 Voltage for Focus .................. 16% to 30% of \(E_{c4}\) volts
Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot .................. 1.9% to 4.5% of \(E_{c4}\) volts
Grid-No.3 Current for Any Operating Condition ........................................ -15 to +10 µamp

**Deflection Factors:**

\(DJ_1 \& DJ_2 \) .................................. 50 to 68 v dc/in./kv of \(E_{c4}\)
\(DJ_3 \& DJ_4 \) .................................. 38 to 52 v dc/in./kv of \(E_{c4}\)
Spot Position ................................... 

**Examples of Use of Design Ranges:**

For ultor voltage of

<table>
<thead>
<tr>
<th>Grid-No.3 Voltage</th>
<th>1000</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>for Focus ..........</td>
<td>160</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>320</td>
<td>600</td>
</tr>
</tbody>
</table>

* Brilliance and definition decrease with decreasing ultor voltage. Recommended minimum for the 3KPI 1 in general service is 1000 volts but a value as low as 500 volts may be used under conditions of low-velocity deflection and low ambient-light levels.

**# #** The center of the undeflected focused spot will fall within a circle having 7.5-mm radius concentric with the center of the tube face.

---

4-56 TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
For voltage of 1000 and 2000 volts

Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot:
-19 to -45 volts
-38 to -90 volts

Deflection Factors:
DJ1 & DJ2: 50 to 68 volts dc/in.
DJ3 & DJ4: 38 to 52 volts dc/in.
100 to 136 volts dc/in.

Maximum Circuit Values:
Grid-No.1-Circuit Resistance: 1.5 max. megohms
Resistance in Any Deflecting Electrode Circuit: 5 max. megohms

It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

Dimensions:
- SCREEN DIA: 3" ± 1/16"
- MAX: 2 3/4" MIN.
- 11 1/2" ± 1/4
- 1 5/8" ± 0.0625"
- 5" MAX.
- L/8 R.
- 1 5/8" ± 1/16"
- 8" R.
- 15" R.
- 1/4 R.
- 0.350"

MEDIUM-SHELL MEDIUM-SHELL MAGNAL MAGNAL 11-PIN BASE 11-PIN BASE JETEC No. BII-66 JETEC No. BII-66 92CM-6599R 92CM-6599R

°C OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE.

- Indicates a change.

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When cathode is grounded, capacitors should have high voltage rating (3000 volts); when ultor is grounded, they may have lowvoltage rating (200 volts). For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that ultor be returned to a point in the amplifier system which will give the lowest possible potential difference between ultor and the deflecting electrodes.
CHARACTERISTICS

$E_f = 6.3$ VOLTS
GRID-$N^33$ VOLTS ADJUSTED FOR FOCUS
GRID-$N^31$ VOLTS ADJUSTED TO GIVE ULTOR-
CURRENT VALUE REQUIRED TO MAINTAIN
CONSTANT LINE WIDTH AT DIFFERENT
ULTOR VOLTAGES. FOR A GIVEN ULTOR
VOLTAGE, LINE WIDTH AND RELATIVE LINE
BRIGHTNESS INCREASE WITH INCREASE IN
ULTOR CURRENT

**ULTOR VOLTS**

**RELATIVE LINE BRIGHTNESS**

**TUBE DIVISION**

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7191R2
MAXIMUM ULTOR-CURRENT REQUIREMENTS
FROM POWER SUPPLY

$E_f = 6.3$ VOLTS
GRID-N°3 VOLTS ADJUSTED FOR FOCUS

MAX. ULTOR CURRENT
FOR ANY TUBE AT ZERO
GRID-N°1 VOLTAGE

RECOMMENDED
MAX. ULTOR
CURRENT

ULTOR MILLIAMPERES

ULTOR VOLTS

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7192RI
Average Characteristic

$E_g = 6.3$ Volts
Grid-No. 3 Volts Adjusted to Focus
Ultor Volts = 2000
### 3KP4 Oscillograph Tube

**Electrostatic Focus**

<table>
<thead>
<tr>
<th>Electrostatic Deflection</th>
</tr>
</thead>
</table>

The 3KP4 is the same as the 3KP1 except for the following items:

**General:**

- Phosphor (for curves, see front of this section): P4—Sulfide Type
  - Fluorescence: White
  - Persistence: Medium-Short

In general, operation of the 3KP4 at an ultraviolet voltage less than 1500 volts is not recommended.

**The Persistence Characteristics**

of the P4-sulfide phosphor are the same as those shown for the P11 phosphor at the front of this section.

### 3KP7 Oscillograph Tube

**Electrostatic Focus**

<table>
<thead>
<tr>
<th>Electrostatic Deflection</th>
</tr>
</thead>
</table>

The 3KP7 is the same as the 3KP1 except for the following items:

**General:**

- Phosphor (For Curves, see front of this Section): P7
  - Fluorescence: Purplish-Blue
  - Persistence: Medium-Short
  - Phosphorescence: Yellowish-Green
  - Persistence: Very Long

In general, operation of the 3KP7 at an ultraviolet voltage less than 1500 volts is not recommended.

### 3KP11 Oscillograph Tube

**Electrostatic Focus**

<table>
<thead>
<tr>
<th>Electrostatic Deflection</th>
</tr>
</thead>
</table>

The 3KP11 is the same as the 3KP1 except for the following items:

**General:**

- Phosphor (For Curves, see front of this Section): P11
  - Fluorescence: Blue
  - Phosphorescence: Blue
  - Persistence: Medium-Short

In general, operation of the 3KP11 at an ultraviolet voltage less than 1500 volts is not recommended.
The 3KP16 is the same as the 3KP1 except for the following items:

**General:**
Phosphor (For Curves, see front of this Section) . . . . . P16
- Fluorescence
  - Visible radiation . . . . . . . . . . Violet
  - Invisible radiation . . . . . . Near-Ultraviolet
- Phosphorescence
  - Persistence of visible radiation . . . Very Short
  - Persistence of invisible radiation . . . Very Short

In general, operation of the 3KP16 at an ultor voltage less than 1500 volts is not recommended.
**3KP4**

**KINESCOPE**

**ELECTROSTATIC FOCUS**

**ELECTROSTATIC DEFLECTION**

**General:**

Heater, for Unipotential Cathode:
- Voltage: 6.3 ac or dc volts
- Current: 0.6 amp

Direct Interelectrode Capacitances (Approx.):
- Grid No.1 to All Other Electrodes: 8 \( \mu F \)
- Cathode to All Other Electrodes: 5 \( \mu F \)
- \( DJ_1 \) to \( DJ_2 \): 2.5 \( \mu F \)
- \( DJ_3 \) to \( DJ_4 \): 2.5 \( \mu F \)
- \( DJ_1 \) to All Other Electrodes: 11 \( \mu F \)
- \( DJ_2 \) to All Other Electrodes: 8 \( \mu F \)
- \( DJ_3 \) to All Other Electrodes: 7 \( \mu F \)
- \( DJ_4 \) to All Other Electrodes: 8 \( \mu F \)

Phosphor (for Curves, see front of this Section): No.4 White

Persistence of Phosphorescence: Medium

Focusing Method: Electrostatic

Deflection Method: Electrostatic

Overall Length: 11-1/2" \( \pm \) 1/4"

Greatest Diameter of Bulb: 3" \( \pm \) 1/16"

Minimum Useful Screen Diameter: 2-3/4"

Raster Size (Approx.): 1-7/8" \( \times \) 2-1/2"

Mounting Position: Any

Base: Medium-Shell Magnal 11-Pin

Basing Designation for BOTTOM VIEW: 11M

---

**Pin Layout Diagram**

- Pin 1 - Heater
- Pin 2 - Grid No.1
- Pin 3 - Cathode
- Pin 4 - Anode No.1
- Pin 5 - Deflecting Electrode
  - \( DJ_3 \)
- Pin 6 - Deflecting Electrode
  - \( DJ_4 \)
- Pin 7 - Anode No.2, Grid No.2
- Pin 8 - Deflecting Electrode
  - \( DJ_2 \)
- Pin 9 - Deflecting Electrode
  - \( DJ_1 \)
- Pin 10 - Internal Connection—Do Not Use
- Pin 11 - Heater

**Notes:**

- \( DJ_1 \) and \( DJ_2 \) are nearer the screen
- \( DJ_3 \) and \( DJ_4 \) are nearer the base

With \( DJ_1 \) positive with respect to \( DJ_2 \), the spot is deflected toward pin 4. With \( DJ_3 \) positive with respect to \( DJ_4 \), the spot is deflected toward pin 1.

The angle between the trace produced by \( DJ_3 \) and \( DJ_4 \) and its intersection with the plane through the tube axis and pin 1 does not exceed 10°.

The angle between the trace produced by \( DJ_3 \) and \( DJ_4 \) and the trace produced by \( DJ_1 \) and \( DJ_2 \) is 90° \( \pm \) 3°.
Maximum Ratings, Design-Center Values:
ANODE-No.2 VOLTAGE... 2500 max. volts
ANODE-No.1 VOLTAGE... 1000 max. volts
GRID-No.1 (CONTROL ELECTRODE) VOLTAGE:
  Negative bias value... 200 max. volts
  Positive bias value... 0 max. volts
  Positive peak value... 2 max. volts
PEAK VOLTAGE BETWEEN ANODE No.2
  AND ANY DEFLECTING ELECTRODE... 500 max. volts
PEAK HEATER-CATHODE VOLTAGE:
  Heater negative with respect to cathode: 125 max. volts
  Heater positive with respect to cathode: 125 max. volts

Equipment Design Ranges:
For any anode-No.2 voltage (Eb2) between 1500* and 2500 volts
Anode-No.1 Voltage for Focus... 16% to 30% of Eb2... volts
Grid-No.1 Voltage for Visual Cutoff... 1.9% to 4.5% of Eb2... volts
Anode-No.1 Current for Any Operating Condition... -15 to +10... μamp
Deflection Factors:
  DJ1 & DJ2... 50 to 68 v dc/in./kv of Eb2
  DJ3 & DJ4... 38 to 52 v dc/in./kv of Eb2
Spot Position...

Examples of Use of Design Ranges:
For anode-No.2 voltage of 2000 volts
Anode-No.1 Voltage... 320 to 600... volts
Grid-No.1 Voltage for Visual Cutoff... -38 to -90... volts
Deflection Factors:
  DJ1 & DJ2... 100 to 136 volts dc/in.
  DJ3 & DJ4... 76 to 104 volts dc/in.

Maximum Circuit Values:
Grid-No.1-Circuit Resistance... 1.5 max. megohms
Resistance in Any Deflecting Electrode Circuit... 5 max. megohms

Minimum Circuit Values:
When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:
Grid-No.1-Circuit Resistance... 220 min. ohms
Anode-No.1-Circuit Resistance... 1100 min. ohms
Anode-No.2-Circuit Resistance... 3000 min. ohms

*...  see next page.
The resistors should be capable of withstanding the applied voltage.

- Anode No. 2 and grid No. 2 which are connected together within tube are referred to herein as anode No. 2.
- Brilliance and definition decrease with decreasing anode-No. 2 voltage.
- With the combined grid-No. 1-bias voltage and video-signal voltage adjusted for a highlight brightness of 2 foot-lamberts on a 1-7/8" x 2-1/2" picture area.
- With 1500 volts on anode No. 2, grid-No. 1 bias adjusted so that spot is just visible, and no deflection, the center of the spot will fall within a circle having 1.5-mm radius concentric with the center of the tube face.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

OUTLINE DIMENSIONS for Type 3KP4 are the same as those shown for Type 3KP1
AVERAGE CHARACTERISTICS

$E_p = 6.3$ VOLTS
ANODE-$N^0 2$ VOLTS $= 2000$
GRID-$N^0 1$ BIASED TO CUTOFF
RASTER SIZE $1\frac{7}{8}'' \times 2\frac{1}{2}''$ (FOCUSED)

DEC. 13, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
The 3KP11 is the same as the 3KP1 except that it has a phosphor of the short-persistence, blue-fluorescence type designated P11. The blue radiation of the P11 screen is highly actinic and has sufficiently short persistence to permit use of the 3KP11 in all moving-film photographic applications without blurring except in those where film moves at a high speed. The 3KP11 is also quite satisfactory for visual observation of phenomena because its phosphor has unusually high brightness for a blue screen.

In general, operation of the 3KP11 at an anode-No.2 voltage less than 1500 volts is not recommended.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC and the PERSISTENCE CHARACTERISTIC of the P11 Phosphor are shown at the front of this Section

The curve showing MAXIMUM ANODE-No.2 CURRENT REQUIREMENTS FROM POWER SUPPLY for Type 3KP1 also applies to the 3KP11
$E_r = 6.3 \text{ VOLTS}$

ANODE - N°1 VOLTS ADJUSTED TO FOCUS
ANODE - N°2 VOLTS = 2000

RELATIVE LINE BRIGHTNESS

GRID - N°1 VOLTS

ANODE - N°2 CURRENT

FEB. 25, 1949