DISPLAY STORAGE TUBE
DIRECT-VIEW TYPE
4"-DIAMETER DISPLAY
NON-EQUILIBRIUM WRITING  GRID-CONTROL READING (VIEWING)

DATA

General:

<table>
<thead>
<tr>
<th>Writing Section</th>
<th>Viewing Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater, for Unipotential Cathode:</td>
<td></td>
</tr>
<tr>
<td>Voltage (AC or DC)</td>
<td>6.3 volts</td>
</tr>
<tr>
<td>Current</td>
<td>0.6 amp</td>
</tr>
<tr>
<td>Minimum Cathode Heating Time before other electrode voltages are applied</td>
<td>30 sec</td>
</tr>
<tr>
<td>Direct Interelectrode Capacitances (Approx.):</td>
<td></td>
</tr>
<tr>
<td>Grid No. 1 to all other tube electrodes</td>
<td>6 18 μf</td>
</tr>
<tr>
<td>Cathode to all other tube electrodes</td>
<td>4.2 6.5 μf</td>
</tr>
<tr>
<td>Deflecting electrode DJ 1 to deflecting electrode DJ 2</td>
<td>1.8</td>
</tr>
<tr>
<td>Deflecting electrode DJ 2 to deflecting electrode DJ 3</td>
<td>1.8</td>
</tr>
<tr>
<td>DJ 3 to all other tube electrodes</td>
<td>7.5</td>
</tr>
<tr>
<td>DJ 4 to all other tube electrodes</td>
<td>8</td>
</tr>
<tr>
<td>DJ 5 to all other tube electrodes</td>
<td>6</td>
</tr>
<tr>
<td>DJ 6 to all other tube electrodes</td>
<td>7.5</td>
</tr>
<tr>
<td>Focusing Method</td>
<td>Electrostatic</td>
</tr>
<tr>
<td>Deflection Method</td>
<td>Electrostatic</td>
</tr>
<tr>
<td>Deflecting-Electrode Arrangement</td>
<td>See Dimensional Outline</td>
</tr>
</tbody>
</table>

Phosphor: | High-Visual-Efficiency Type, Aluminized |
| Fluorescence | Yellow |
| Phosphorescence | Yellow |
| Minimum Useful Screen Diameter | 4" |
| Maximum Overall Length | 15-1/2" |
| Seated Length | 14" ± 3/8" |
| Maximum Tube Radius | 5-1/8" ± 1/16" |
| Greatest Bulb Diameter | 5" ± 1/16" |
| Bulb Terminals: | |
| Caps (Two) | Receded Small Cavity (JETEC No.J1-21) |
| Flexible cable | See Dimensional Outline |
| Ambient-Temperature Range | -65° to +100 °C |
| Mounting Position | Any |
| Weight (Approx.) | 2 lbs |
| Socket | Alten Part No.43559BA, or equivalent |
| Base | Small-Button Thirtyfivevar 31-Pin (JETEC No.E31-36) |

° Without external shield.
DISPLAY STORAGE TUBE

**Maximum Ratings, Absolute Values:**

**Writing Section**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCREEN VOLTAGE</td>
<td>11000 max. volts</td>
</tr>
<tr>
<td>PEAK BACKING-ELECTRODE</td>
<td>20 max volts</td>
</tr>
</tbody>
</table>

**Viewing Section**

**Notes:** Pins 23 and 31 are not shown because they are trimmed to the same dimension as the short index pin and are not to be used.

****: See next page.
DISPLAY STORAGE TUBE

Writing Section           Viewing Section* *

Equivalent Values

GRID-No.4 VOLTAGE . . . . 2900 max.* 150 max.** 300 max. volts
GRID-No.3 VOLTAGE . . . . 1000 max.* - 300 max. volts
GRID-No.2 VOLTAGE . . . . 2750 max.* - 150 max. volts
CATHODE VOLTAGE . . . . . - -2900 max.** - volts
GRID-No.1 VOLTAGE:
    Negative bias value . . 200 max.* 100 max. volts
    Positive bias value . . 0 max.* 0 max. volts
    Positive peak value . . 2 max.* 0 max. volts

PEAK VOLTAGE BETWEEN
GRID No.4 AND ANY
DEFLECTING ELECTRODE . . 500 max. - volts

PEAK HEATER-CATHODE
VOLTAGE:
    Heater negative with
    respect to cathode . . 125 max.* 125 max. volts
    Heater positive with
    respect to cathode . . 125 max.* 125 max. volts

VIEWING SECTION* *

Operating Values and Typical Performance Characteristics:

Screen Voltage . . . . . 5000 10000 10000 volts
DC Backing-Electrode
    Voltage . . . . . . . . . 5 5 5 volts
GRID-No.4 Voltage . . . . . 150 210 150 volts
GRID-No.3 Voltage# . . . . . 25 to 125 50 to 150 25 to 125 volts
GRID-No.2 Voltage†. . . . . . 50 to 75 70 to 105 50 to 75 volts
GRID-No.1 Voltage‡ . . . . . 0 to -50 0 to -75 0 to -50 volts
Maximum Screen Current . . . . . 350 600 350 \(\mu\)amp
Maximum Peak Backing-
    Electrode Current . . . . . 1.5 2 1.5 ma
Maximum Grid-No.4 Current‡ . . . . . 2 3 2 ma
Maximum Grid-No.3 Current‡ . . . . . 1.5 2 1.5 ma
Maximum Cathode Current‡. . . . . . 3 4 3 ma
Writing Speed† † † 300000 300000 300000 in./sec
Number of Half-Tone Steps‡ † † 5 5 5
Viewing Duration . . . . . . . 40 20 40 sec
Maximum Erasing-Uniformity
    Factor. . . . . . . . . . . 0.5 0.5 0.5
Resolution‡ † † † 50 50 50 lines/in.
Brightness † † † † . . . . . . . 275 2750 1500 fl

** Voltages are shown with respect to cathode of Viewing Gun.
* Adjusted for brightest, most uniform pattern.
# Grid No.2 of the Viewing Gun is connected internally to grid No.4 of
† The Writing Gun.
‡ For conditions with combined adjustment of grid-No.1 voltage, grid-
† † † † † † See next page.
† † † † † † † Indicates a change.

6-57 ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
TENTATIVE DATA 2
## DISPLAY STORAGE TUBE

### WRITING SECTION*

**Range Values for Equipment Design:**

*With any grid-No.2 voltage ($E_{c2}$) between 500 and 2750 volts*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid-No.4 Voltage ($E_{c4}$)</td>
<td>95% to 105% of $E_{c2}$ volts</td>
</tr>
<tr>
<td>Grid-No.3 Voltage for Focus</td>
<td>14% to 28% of $E_{c2}$ volts</td>
</tr>
<tr>
<td>Maximum Grid-No.1 Voltage for Cutoff of Undelected Focused Spot</td>
<td>$-4.6%$ of $E_{c2}$ volts</td>
</tr>
<tr>
<td>Maximum Grid-No.3 Current</td>
<td>$-15$ to $+10^5$ $\mu$amp</td>
</tr>
<tr>
<td>Maximum Cathode Current</td>
<td>See Curve</td>
</tr>
<tr>
<td>Deflection Factors: DJ₁ and DJ₂</td>
<td>28 to 38 v dc/in./kv of $E_{c4}$</td>
</tr>
<tr>
<td>DJ₃ and DJ₄</td>
<td>28 to 38 v dc/in./kv of $E_{c4}$</td>
</tr>
<tr>
<td>Focused Beam Position</td>
<td>See Curve</td>
</tr>
</tbody>
</table>

**Examples of Use of Design Ranges:**

*With grid-No.2 voltage of 1500 to 2500 volts*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid-No.4 Voltage ($E_{c4}$)</td>
<td>1425 to 1575 volts</td>
</tr>
<tr>
<td>Grid-No.3 Voltage for Focus</td>
<td>210 to 420 volts</td>
</tr>
<tr>
<td>Maximum Grid-No.1 Voltage for Cutoff of Undelected Focused Spot</td>
<td>$-69$ volts</td>
</tr>
<tr>
<td>Deflection Factors when $E_{c4} = E_{c2}$: DJ₁ and DJ₂</td>
<td>42 to 57 v dc/in.</td>
</tr>
<tr>
<td>DJ₃ and DJ₄</td>
<td>42 to 57 v dc/in.</td>
</tr>
</tbody>
</table>

**Equivalent Values for Examples of Writing-Gun Voltages Referred to Cathode of Viewing Gun:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode Voltage</td>
<td>$-1450$ to $-1395$ volts</td>
</tr>
<tr>
<td>Grid-No.2 Voltage</td>
<td>$-25$ to $+180$ volts</td>
</tr>
<tr>
<td>Grid-No.3 Voltage for Focus</td>
<td>$-1240$ to $-975$ volts</td>
</tr>
<tr>
<td>Grid-No.4 Voltage</td>
<td>$50$ to $105$ volts</td>
</tr>
</tbody>
</table>

### VIEWING SECTION and WRITING SECTION

**Circuit Values:**

- Grid-No.1-Circuit Resistance (Either gun) | 1.0 max. megohm
- Resistance in Any Deflecting-Electrode Circuit | 0.1 max. megohm
- Backing-Electrode-Circuit Resistance | 0.005 max. megohm
- Series Current-Limiting Resistance in Screen Circuit | 1.0 min. megohm

* Voltages are shown with respect to cathode of Writing Gun.
† Measured under conditions of writing from just zero brightness (viewing-beam cutoff) to maximum brightness with grid No.1 of Writing Gun at $-10$ volts with respect to cathode of Writing Gun, and grids No.2 and No.4 of Writing Gun at 2500 volts with respect to cathode of Writing Gun.
○ Observed with an RCA-2F21 Monoscope display.

**Note:** See next page.
DISPLAY STORAGE TUBE

1. Expressed in terms of the time required for the brightness of the un-
   written background to rise from just zero brightness (viewing-beam
cutoff) to 10% of the maximum brightness.

2. Defined as \( \frac{t_2 - t_1}{t_2} \), where
   - \( t_1 \): time measured from start of erasing to instant at which any
     screen area is reduced to zero brightness.
   - \( t_2 \): time measured from start of erasing to instant at which en-
     tire screen area is reduced to zero brightness.

3. Measured by shrinking-raster method at a display brightness of 50% of
   saturated brightness and with grids No. 2 and No. 4 of Writing Gun at
   +2500 volts with respect to cathode of Writing Gun.

4. Measured with entire storage grid written to produce maximum bright-
   ness and with screen at indicated voltage.

- The cathode of the writing Gun is operated at about -2500 volts with
  respect to the cathode of the viewing Gun which is usually operated at
  ground potential.

## OPERATING CONSIDERATIONS

**Magnetic shielding** must be provided to prevent external fields from interfering with the required accurate con-
rol of the low-velocity viewing beam. A cylindrical shield of properly annealed high-permeability material a-
bout 1/16-inch thick is usually satisfactory. The screen cable should be placed outside the shield.

The **metal flange** at the face end of the tube requires the use of a spring-contact ring bearing against the edge of the flange.

To prevent possible damage to the tube, allow the viewing-
gun beam current to reach normal operating value before
turning on the writing-gun beam current, and keep the view-
ing beam on until the writing beam is turned off.
CENTER LINE OF BULB WILL NOT DEVIATE MORE THAN 30° IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF FACEPLATE.

THE PLANE THROUGH TUBE AXIS AND EACH OF THE FOLLOWING ITEMS MAY VARY FROM THE DEFLECTION PATH PRODUCED BY DJ1 AND DJ2 BY THE FOLLOWING ANGULAR TOLERANCES (MEASURED ABOUT THE TUBE AXIS): PIN 27, ± 100; EACH CAVITY CAP ON SAME SIDE AS PIN 271, ± 170; ENCAPSULATED JUNCTION, ± 100. ANGLE BETWEEN DJ1 - DJ2 DEFLECTION PATH AND DJ3 - DJ4 DEFLECTION PATH IS 900 ± 30°.
AVerAGE CHARACTERISTIC

VIEWING SECTION

Eₐ = 6.3 VOLTS
BACKING-ELECTRODE VOLTS* = 5
GRID-N° 4 VOLTS* = 210
GRID-N° 2 VOLTS* = 85
GRID-N° 3 VOLTS* ADJUSTED FOR BRIGHTEST,
GRID-N° 1 VOLTS* MOST UNIFORM DISPLAY.
*REFERRED TO CATHODE OF VIEWING GUN.

NORMAL OPERATION

Saturated Screen Brightness—Foot-Lamberts

Screen Kilovolts

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
AVERAGE CHARACTERISTICS

VIEWING SECTION

$E_f = 6.3$ VOLTS
SCREEN KILOVOLTS $\times 5$ TO 10
BACKING-ELECTRODE VOLTS $\times 5$
GRID-N$\#2$ VOLTS $\times 0.85$
GRID-N$\#3$ VOLTS $\times 1$ ADJUSTED FOR BRIGHTEST,
GRID-N$\#1$ VOLTS $\times 1$ MOST UNIFORM DISPLAY
*REFERRED TO CATHODE OF VIEWING GUN

WRITING SECTION
NORMAL OPERATION

*FOR EXPLANATION, SEE TABULATED DATA

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Diagram:
- Grid-N$\#2$ 4 (Viewing Section) Volts on the x-axis.
- Brightness on the left y-axis.
- Duration on the right y-axis.
- Relative Brightness—Percent of Saturated Brightness on the bottom y-axis.

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TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9044
TYPICAL ERASURE CHARACTERISTICS

VIEWING SECTION

$E_t = 6.3$ VOLTS
GRID-N2 4 VOLTS $\ast = 210$
GRID-N2 3 VOLTS $\ast$ ADJUSTED FOR BRIGHTEST,
GRID-N2 1 VOLTS $\ast$ MOST UNIFORM DISPLAY

$\ast$ REFERRED TO CATHODE OF VIEWING GUN

<table>
<thead>
<tr>
<th>CURVE</th>
<th>BACKING-ELECTRODE VOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DC</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
</tr>
</tbody>
</table>

ERASURE IS PRODUCED BY POSITIVE RECTANGULAR PULSE APPLIED TO BACKING-ELECTRODE. INDICATED DURATION IS SUM OF DURATIONS OF NUMBER OF PULSES OR ELAPSED TIME AFTER START OF PULSE.
CURRENT CHARACTERISTIC FOR WRITING GUN

WRITING SECTION

$E_f = 6.3$ VOLTS
GRID-N2 4 VOLTS* = GRID-N0.2 VOLTS
GRID-N2 3 VOLTS* = ADJUSTED FOR FOCUS
GRID-N2 1 VOLTS* = 0

*REFERRED TO CATHODE OF WRITING GUN

VIEWING SECTION

NORMAL OPERATION

MAXIMUM PEAK CATHODE OR GRID-N2 MILLIAMPERES

GRID-N2 VOLTS

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9046
TYPICAL DRIVE CHARACTERISTIC FOR WRITING GUN

WRITING SECTION

$E_f = 6.3$ VOLTS
GRID-N° 4 VOLTS* = 2500
GRID-N° 3 VOLTS* = ADJUSTED FOR FOCUS
GRID-N° 2 VOLTS* = 2500
GRID-N° 1* BIASED TO SPOT CUTOFF
*REFERRED TO CATHODE OF WRITING GUN

VIEWING SECTION

NORMAL OPERATION

WRITING-BEAM MICROAMPERES AT GRID-N° 4 OF VIEWING SECTION

PEAK GRID-N° 1 DRIVE FROM SPOT CUTOFF — VOLTS