MEDIUM-MU DUAL TRIODE
With Dissimilar Units
9-PIN MINIATURE TYPE
Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:
Heater, for Unipotential Cathodes:
Voltage .................. 6.3 ................ ac or dc volts
Current .................. 0.6 ................ amp
Warm-up time (Average) 11 ................ sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Inter-electrode Capacitances (Approx.):°

<table>
<thead>
<tr>
<th></th>
<th>Unit No. 1</th>
<th>Unit No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid to plate</td>
<td>3.8</td>
<td>3</td>
</tr>
<tr>
<td>Grid to cathode and heater</td>
<td>2</td>
<td>3.5</td>
</tr>
<tr>
<td>Plate to cathode and heater</td>
<td>0.5</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Characteristics, Class A Amplifier:

<table>
<thead>
<tr>
<th></th>
<th>Unit No. 1</th>
<th>Unit No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>Grid Voltage</td>
<td>-7</td>
<td>-8</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>11000</td>
<td>4100</td>
</tr>
<tr>
<td>Transconductance</td>
<td>2000</td>
<td>4400</td>
</tr>
<tr>
<td>Plate Current</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Plate Current for grid\n voltage of -10 volts</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Grid Voltage (Approx.)\n for plate current of 10 microamperes</td>
<td>-14</td>
<td>–</td>
</tr>
</tbody>
</table>

Mechanical:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Position</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>Maximum Overall Length</td>
<td>2-5/8&quot;</td>
<td></td>
</tr>
<tr>
<td>Maximum Seated Length</td>
<td>2-3/8&quot;</td>
<td></td>
</tr>
<tr>
<td>Length, Base Seat to Bulb Top (Excluding tip)</td>
<td>2&quot; ± 3/32&quot;</td>
<td></td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>7/8&quot;</td>
<td></td>
</tr>
<tr>
<td>Dimensional Outline</td>
<td>See General Section</td>
<td></td>
</tr>
<tr>
<td>Bulb</td>
<td>T-6-1/2</td>
<td></td>
</tr>
</tbody>
</table>

° Without external shield.
MEDIUM-MU DUAL TRIODE
With Dissimilar Units

| Base . Small-Button Noval 9-Pin (JETEC No.E9-1) | Pin 1 - Plate of Unit No.2 |
| Pin 2 - No Connection |
| Pin 3 - Cathode of Unit No.1 |
| Pin 4 - Heater |
| Pin 5 - Heater |
| Pin 6 - Plate of Unit No.1 |
| Pin 7 - Grid of Unit No.1 |
| Pin 8 - Grid of Unit No.2 |
| Pin 9 - Cathode of Unit No.2 |

VERTICAL DEFLECTION OSCILLATOR
Values are for Unit No.1

Maximum Ratings, Design-Center Values:
For operation in a 525-line, 30-frame system:

| DC PLATE VOLTAGE | 500 max. volts |
| PEAK NEGATIVE-PULSE GRID VOLTAGE | 200 max. volts |

CATHODE CURRENT:
- Peak: 70 max. ma
- Average: 15 max. ma

PLATE DISSIPATION: 1.25 max. watts

PEAK HEATER-CATHODE VOLTAGE:
- Heater negative with respect to cathode: 200 max. volts
- Heater positive with respect to cathode: 200 max. volts

Maximum Circuit Values:
Grid-Circuit Resistance:
- For fixed-bias, grid-resistor bias, or cathode-bias operation: 2.2 max. megohms

VERTICAL DEFLECTION AMPLIFIER
Values are for Unit No.2

Maximum Ratings, Design-Center Values Except as Noted:
For operation in a 525-line, 30-frame system:

| DC PLATE VOLTAGE | 500 max. volts |
| PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum) | 2200 max. volts |

CATHODE CURRENT:
- Peak: 70 max. ma
- Average: 20 max. ma

PLATE DISSIPATION: 5.5 max. watts

PEAK HEATER-CATHODE VOLTAGE:
- Heater negative with respect to cathode: 200 max. volts
- Heater positive with respect to cathode: 200 max. volts

▲ The dc component must not exceed 100 volts.

▲, ▼: See next page.

JULY 1, 1955 TUBE DIVISION TENTATIVE DATA 1
Maximum Circuit Values:

Grid–Circuit Resistance:
- For fixed-bias operation . . . . . . . . . . 1.0 max. megohm
- For cathode-bias operation . . . . . . . . . . 2.5 max. megohms

As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

* This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

** Under no circumstances should this absolute value be exceeded.
6CM7

AVERAGE PLATE CHARACTERISTICS
UNIT N°1

$E_f = 6.3$ VOLTS
UNIT N°2 GROUNDED

PLATE MILLIAMPERES

PLATE VOLTS

MAY 17, 1955
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8617
AVERAGE PLATE CHARACTERISTICS
UNIT № 2

Eπ = 6.3 VOLTS
UNIT № 1 GROUNDED
Medium-Mu Dual Triode
With Dissimilar Units

9-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

GENERAL DATA

**Electrical:**
Heater, for Unipotential Cathodes:
- Voltage (AC or DC) .................. 6.3 volts
- Current ........................... 0.6 ± 6% amp
- Warm-up time (Average) ....... 11 sec

Direct Interelectrode Capacitances (Approx.):

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<td>3.8 µf</td>
<td>3 µf</td>
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<tr>
<td>Grid to cathode and heater</td>
<td>2 µf</td>
<td>3.5 µf</td>
</tr>
<tr>
<td>Plate to cathode and heater</td>
<td>0.5 µf</td>
<td>0.4 µf</td>
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**Characteristics, Class A Amplifier:**

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<td>Plate Voltage</td>
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<td>-7 volts</td>
<td>-8 volts</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Plate Resistance</td>
<td>10500 ohms</td>
<td>4100 ohms</td>
</tr>
<tr>
<td>Transconductance</td>
<td>2000 µmhos</td>
<td>4400 µmhos</td>
</tr>
<tr>
<td>Plate Current</td>
<td>5 ma</td>
<td>20 ma</td>
</tr>
<tr>
<td>Plate Current for grid volts = -10</td>
<td>-1 ma</td>
<td>- ma</td>
</tr>
<tr>
<td>Grid Voltage (Approx.) for plate μa = 10</td>
<td>-14 volts</td>
<td>- volts</td>
</tr>
</tbody>
</table>

**Mechanical:**
Operating Position: Any
Maximum Overall Length: 2-5/8"
Maximum Seated Length: 2-3/8"
Length, Base Seat to Bulb Top (Excluding tip): 2" ± 3/32"
Diameter: 0.750" to 0.875"

**Basing Designation for BOTTOM VIEW:** 9ES

Pin 1 - Plate of Unit No.2
Pin 2 - No Connection
Pin 3 - Cathode of Unit No.1
Pin 4 - Heater
Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Grid of Unit No.2
Pin 9 - Cathode of Unit No.2

*Indicates a change.*
VERTICAL-DEFLECTION OSCILLATOR
Values are for Unit No. 1

Maximum Ratings, Design-Maximum Values:

For operation in a 525-line, 30-frame systemb

DC PLATE VOLTAGE. . . . . . . . . . . . 550 max. volts
PEAK NEGATIVE-PULSE GRID VOLTAGE. . . . . 220 max. volts
CATHODE CURRENT:
Peak. . . . . . . . . . . . . . . . . . . 77 max. ma
Average . . . . . . . . . . . . . . . . 17 max. ma
PLATE DISSIPATION . . . . . . . . . . . . 1.45 max. watts
PEAK HEATER-CATHODE VOLTAGE:
Heater negative with
respect to cathode. . . . . . . . . . . . 200 max. volts
Heater positive with
respect to cathode. . . . . . . . . . . . 200c max. volts

Maximum Circuit Values:

Grid-Circuit Resistance:
For fixed-bias, grid-resistor-bias, or
cathode-bias operation. . . . . . . . . . 2.2 max. megohms

VERTICAL-DEFLECTION AMPLIFIER
Values are for Unit No. 2

Maximum Ratings, Design-Maximum Values:

For operation in a 525-line, 30-frame systemb

DC PLATE VOLTAGE. . . . . . . . . . . . 550 max. volts
PEAK POSITIVE-PULSE PLATE VOLTAGEd. . . . . 2200 max. volts
PEAK NEGATIVE-PULSE GRID VOLTAGE. . . . . 220 max. volts
CATHODE CURRENT:
Peak. . . . . . . . . . . . . . . . . . . 77 max. ma
Average . . . . . . . . . . . . . . . . 22 max. ma
PLATE DISSIPATION . . . . . . . . . . . . 6 max. watts
PEAK HEATER-CATHODE VOLTAGE:
Heater negative with
respect to cathode. . . . . . . . . . . . 200 max. volts
Heater positive with
respect to cathode. . . . . . . . . . . . 200c max. volts

Maximum Circuit Values:

Grid-Circuit Resistance:
For fixed-bias operation. . . . . . . . . . 1 max. megohm
For cathode-bias operation. . . . . . . . . 2.5 max. megohms

a Without external shield.
b As described in "Standards of Good Engineering Practice Concerning
Television Broadcast Stations," Federal Communications Commission.
c The dc component must not exceed 100 volts.
d This rating is applicable where the duration of the voltage pulse does
not exceed 15 per cent of one vertical scanning cycle. In a 525-line,
30-frame system, 15 per cent of one vertical scanning cycle is 2.5
milliseconds.

Indicates a change.
AVERAGE PLATE CHARACTERISTICS
Unit No.1

$E_T = 6.3$ VOLTS
UNIT N° 2 GROUNDED.

92CM-8617
AVERAGE CHARACTERISTICS
Unit No.1

$E_f = 6.3$ VOLTS
UNIT No.2 GROUNDED.

AMPLIFICATION FACTOR ($A$)

TRANSCONDUCTANCE ($g_m$) — MICROMOHS

PLATE RESISTANCE ($r_p$) — MEGOHMS

GRID VOLTS

0 0.02 0.04 0.06 0.08

1000 2000 3000 4000 5000

400 500 600 700 800 900 1000

92CM-8616RI

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.
AVERAGE PLATE CHARACTERISTICS
Unit No.2

E_f=6.3 VOLTS
UNIT No.1 GROUNDED.
AVERAGE CHARACTERISTICS
Unit No.2

$E_p = 6.3$ VOLTS
UNIT No.1 GROUNDED.

AMPLIFICATION FACTOR (m)

PLATE VOLTS $E_p$ 300 200 100

PLATE RESISTANCE ($r_p$) MEGOHMS

GRID VOLTS

TRANSCONDUCTANCE ($g_m$) MICROHMS

92CM-8613RI

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.