



5WP15

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FLYING-SPOT CATHODE-RAY TUBE

ALUMINIZED SCREEN

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

For use as scanner in flying-spot video-signal generators

DATA

General:

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. $0.6 \pm 10\%$ amp

Direct Interelectrode Capacitances:

Grid No.1 to all other electrodes. 8 μf Cathode to all other electrodes. 5 μf External conductive neck coating to ultor. $\begin{cases} 500 \text{ max.} \\ 100 \text{ min.} \end{cases}$ μf

Faceplate, Flat. Clear Glass

Phosphor (For curves, see front of this section) P15

Aluminized

Fluorescence—

Visible radiation. Green

Invisible radiation. Near Ultraviolet

Phosphorescence—

Persistence of visible radiation Short

Persistence of invisible radiation Very Short

Focusing Method. Electrostatic

Deflection Method. Magnetic

Deflection Angle (Approx.) 50°

Tube Dimensions:

Overall length $11-7/16" \pm 3/8"$ Greatest diameter of bulb. $5" \pm 1/8"$ Minimum Useful Screen Diameter $4-1/4"$ Weight (Approx.) $1-1/2$ lbs

Operating Position Any

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

Socket See Operating Considerations

Base Small-Shell Duodecal 7-Pin (JETEC No.B7-51)

Basing Designation for BOTTOM VIEW 12C

Pin 1—Heater

Pin 2—Grid No.1

Pin 6—Grid No.3

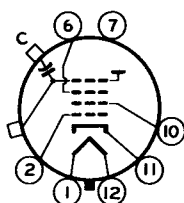
Pin 7—Internal

Connection—

Do Not Use

Pin 10—Grid No.2

Pin 11—Cathode



Pin 12—Heater

Cap—Ultor

(Grid No.4,
Collector)C—External
Conductive
Neck Coat-
ing

Maximum Ratings, Design-Center Values:

ULTOR VOLTAGE. 27000 max. volts

GRID-No.3 VOLTAGE. 6000 max. volts

GRID-No.2 VOLTAGE. 350 max. volts

← Indicates a change.

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GRID-NO.1 VOLTAGE:

Negative bias value.	150 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	150 max.	volts
Heater positive with respect to cathode.	150 max.	volts

Equipment Design Ranges:

For any ultor voltage (E_{c4}) between 15000* and 27000 volts

Grid-No.3 Voltage for focus with ultor current of 150 μ a or less.	15% to 19% of E_{c4}	volts
Grid-No.2 Voltage for visual extinction of undeflected focused spot when circuit design utilizes fixed grid-No.1 voltage	2 to 5 times E_{c1}	volts
Grid-No.1 Voltage for visual extinction of undeflected focused spot when circuit design utilizes fixed grid-No.2 voltage	-20% to -50% of E_{c2}	volts
Maximum Grid-No.3 Current for ultor current of 150 μ a . .	200	μ a
Grid-No.2 Current	-15 to +15	μ a

Examples of Use of Design Ranges:

For ultor voltage of	20000	27000	volts
Grid-No.3 Voltage for focus with ultor current as indicated	3000 to 3800	4000 to 5200	volts
Grid-No.2 Voltage for visual extinction of undeflected focused spot when circuit design utilizes fixed grid-No.1 voltage of -70 volts	140 to 350	140 to 350	volts
Grid-No.1 Voltage for visual extinction of undeflected focused spot when circuit design utilizes fixed grid-No.2 voltage of 200 volts	-40 to -100	-40 to -100	volts
Ultor Current	150	100	μ a

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	1.5 max.	megohms
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*: See next page.

→ Indicates a change.



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* Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 15,000 volts.

OPERATING CONSIDERATIONS

X-Ray Warning. X-ray radiation is produced at the face of the 5WP15 when it is operated at its normal ultor voltage. These rays can constitute a health hazard, unless the tube is adequately shielded for X-ray radiation. Although relatively simple shielding should prove adequate, make sure that it provides the required protection against personal injury.

The *base pins* of the 5WP15 fit the Duodecal 12-contact socket. The socket contacts corresponding to the vacant pin positions (pin positions 3, 4, 5, 8, and 9) should be removed in order to provide the maximum insulation for the high-voltage pins 6 and 7. The socket should be made of high-grade, arc-resistant, insulating material and should preferably be designed with baffles.

Resolution of better than 800 lines at the center of the reproduced picture can be produced by the 5WP15 when it is operated with 27,000 volts on the ultor. At lower ultor voltages, the resolution capability decreases. To obtain high resolution in the horizontal direction, it is necessary to use a video amplifier having a bandwidth of about 20 megacycles.

The *screen* of the 5WP15 has radiation in the visible green region and in the invisible near-ultraviolet region. The frequency response of the ultraviolet radiation is substantially constant for a range of 3 megacycles and then decreases exponentially toward zero at approximately 100 megacycles.

The P15 screen is more sensitive to heat than other standard types of phosphors. It shows a decrease in efficiency with increase in temperature. Use of forced air from a small blower directed against the face of the tube is, therefore, suggested to counteract the heating effect of the electron beam if optimum efficiency of the screen is desired at maximum ultor current.

Care should be taken to avoid under-scanning over a protracted period because such an underscanned area will be burned and thus give diminished radiation when the raster is scanned to full size and be apparent in the reproduced picture. Furthermore, it is inadvisable to permit a modulated stationary pattern to remain more than a few minutes on the face of the tube. If it remains for a longer time, the face will be burned unevenly over the pattern area. When a modulated stationary pattern is used, it is recommended that the ultor current be limited to an instantaneous value of about 150 microamperes.

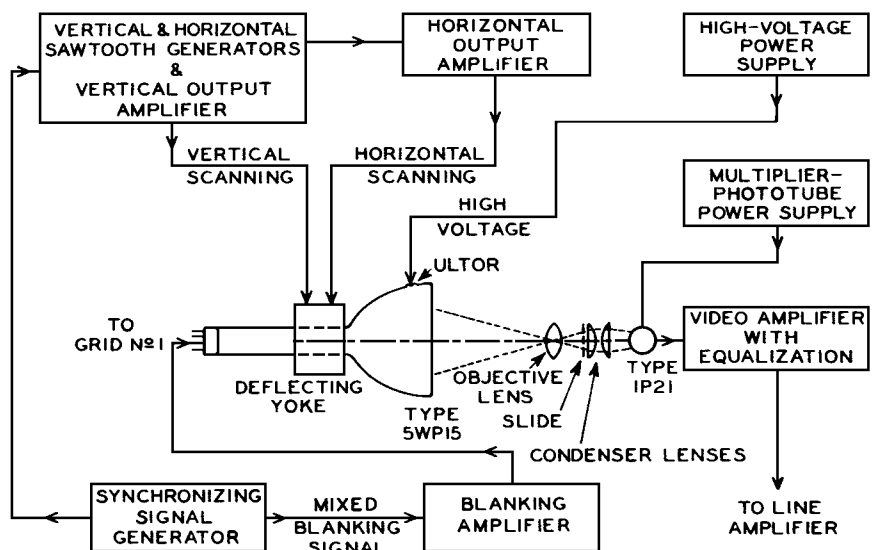
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Because of the high peak energy in the beam, the screen will be seriously damaged if the beam is allowed to remain stationary, even momentarily. Provision should be made to prevent such a possibility. Provision should also be made in equipment design to insure that the ultor voltage will drop as fast as the scanning current when the equipment is turned off; or to bias grid No.1 to beam-current cutoff when the equipment is turned off.

BLOCK DIAGRAM OF FLYING-SPOT VIDEO-SIGNAL GENERATOR SYSTEM FOR SLIDE TRANSPARENCIES



92CS-7597R2

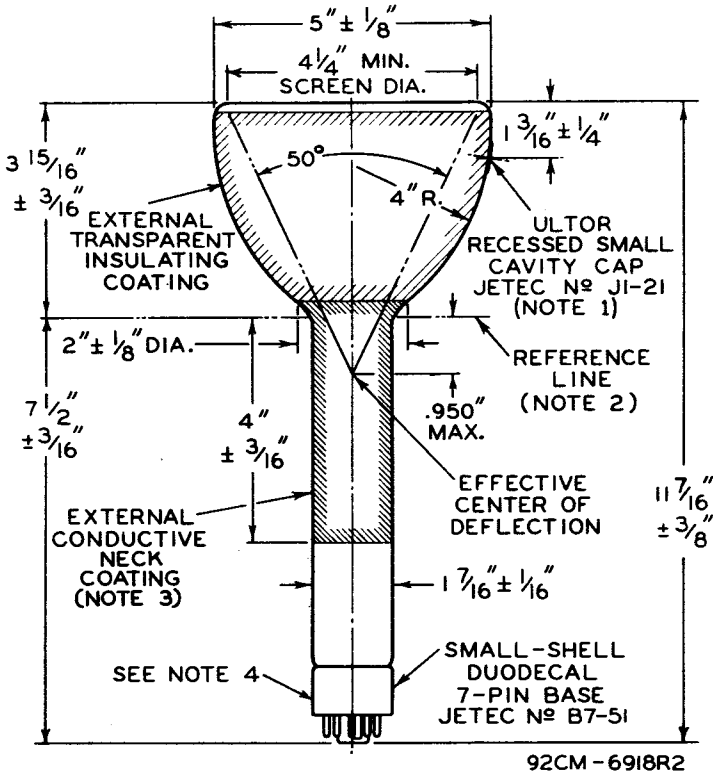
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5WPI5

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NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION 3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 10^\circ$. THE ULTOR TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION 3.

NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE $1.500" + 0.003" - 0.000"$ I.D. AND $2"$ LONG WILL REST ON BULB CONE.

NOTE 3: EXTERNAL CONDUCTIVE NECK COATING MUST BE GROUND.

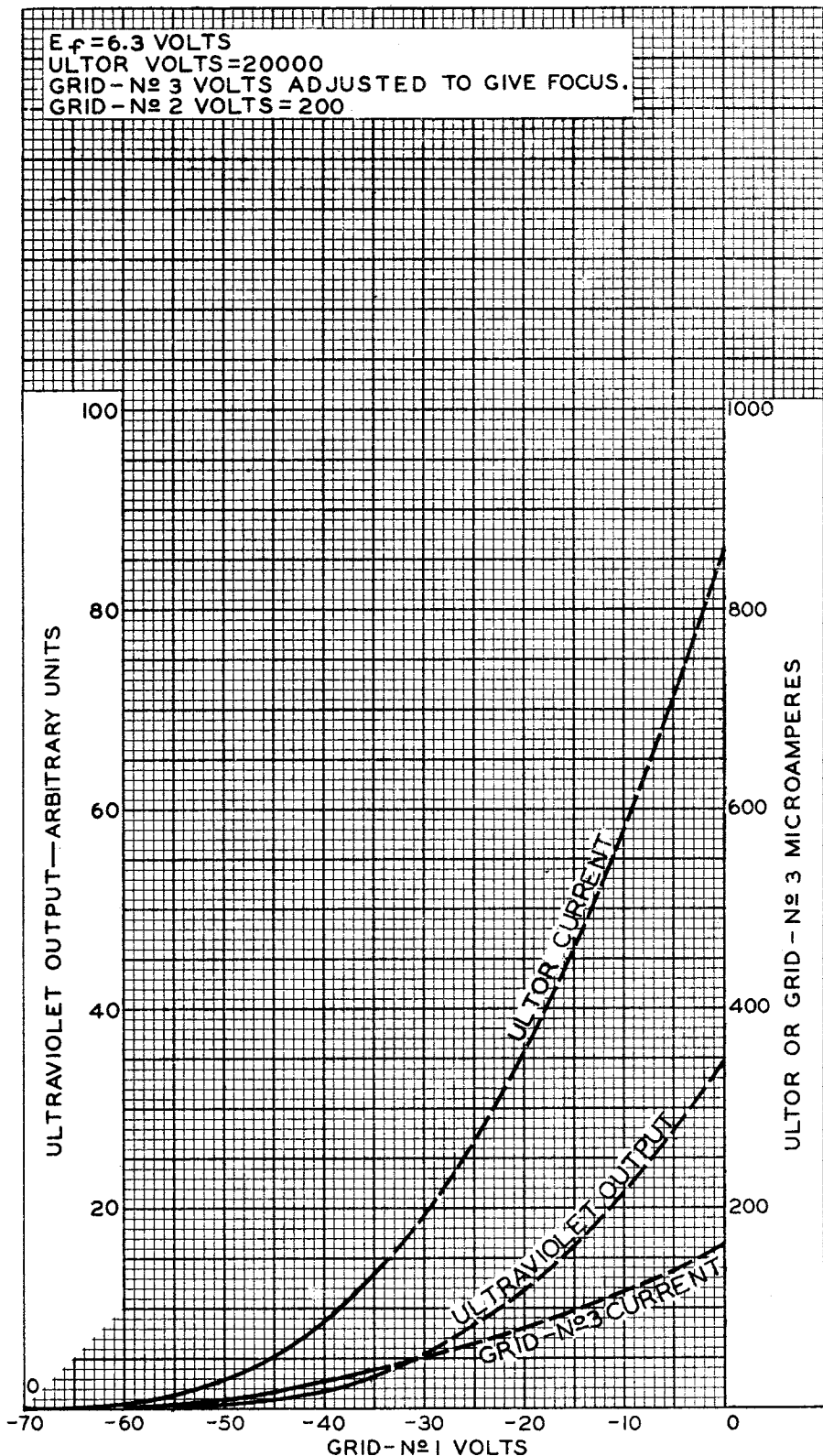
NOTE 4: $\angle$ OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

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AVERAGE CHARACTERISTICS





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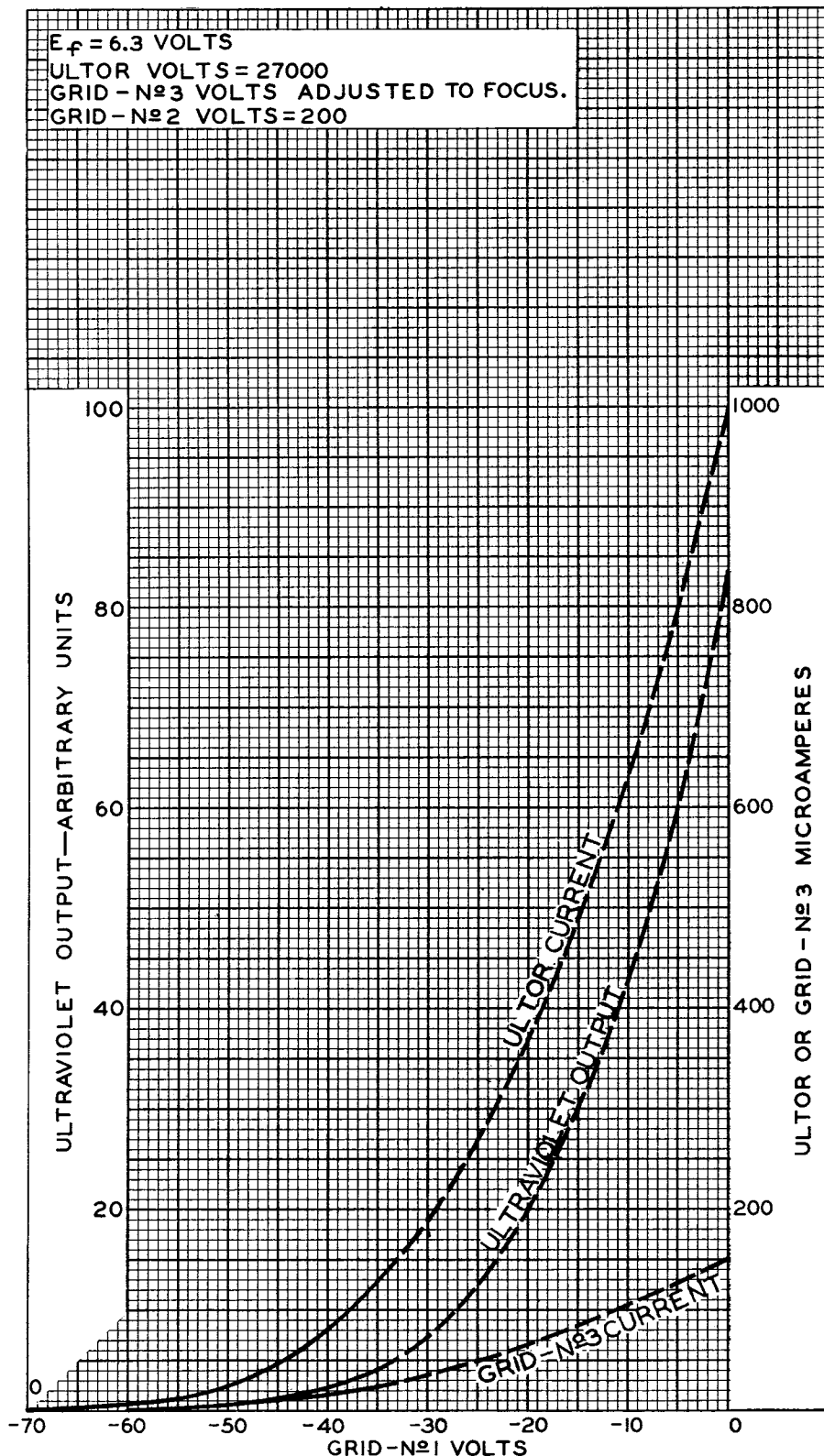
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$E_f = 6.3$ VOLTS

ULTOR VOLTS = 27000

GRID - N^o3 VOLTS ADJUSTED TO FOCUS.

GRID - N^o2 VOLTS = 200



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6917R1