Projection Kinescope

P4 – Aluminized Silicate Phosphor Screen
Electrostatic Focus Magnetic Deflection
Forced-Air Cooled
For Use with Reflective Optical Systems

ELECTRICAL

Heater Current at 6.3 volts	0.6 A
Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angle (Approx.)	50°
Direct Interelectrode Capacitances (Approx.):	
Grid No.1 to all other electrodes	8 pF
Cathode to all other electrodes	5 pF

OPTICAL

Faceplate, Spherical	Clear, Browning-Resistant Glass
Minimum Useful Screen Diameter	4.50"
Minimum Optical-Quality-Circle Diameter	4.25"
Refractive Index of Faceplate	1.519
Phosphor, Aluminized	P4 Silicate Type
C.I.E. Coordinates:	
x-coordinate	0.333
y-coordinate	0.347
Luminance	White
Persistence	Medium

MECHANICAL

Tube Dimensions:	
Overall Length	12.19" + 0.37" -0.38"
Greatest Diameter of Bulb	5.00" ± 0.12"
Base	Small-shell duodecal 7-pin, (JEDEC No.B7-51)
Anode Lead	Molded-on, Insulated Cable, 48" Long
Bulb	J4OH1
Operating Position	Any
Weight (Approx.)	1-1/2 lb

MAXIMUM AND MINIMUM RATINGS, Absolute-Maximum Values

Face Temperature	100 max. °C
Anode Voltage	42,000 max. V

Average Anode Power:

Without forced-air cooling of faceplate	9 max. W
With forced-air cooling of faceplate	12 max. W

Air Flow to Face, when Average Anode Power Exceeds 9 Watts:

An air-cooling system is required to cool the face of these tubes when they are operated with an average anode input in excess of 9 watts. The system consists of a suitable blower and an air duct, having an outlet diameter of about 2 inches, directed perpendicularly onto the face of the tube. The air flow must be adequate to limit the faceplate temperature to 100° C. The cooling air must not contain water, dust, or other foreign matter. The air-cooling system should be electrically interconnected with the anode power supply to prevent operation of the tube without cooling.

Cooling of the face by a tangential flow of air across the face is not recommended because the temperature gradient produced across the face may result in immediate or delayed cracking of the face.

Grid-No.3 (Focusing Electrode) Voltage	9000 max. V
Grid-No.2 Voltage	400 max. V
Grid-No.1 Voltage:	
Negative bias value	150 max. V
Positive bias value	0 max. V
Positive peak value	2 max. V
Peak Heater-Cathode Voltage:	
Heater negative with respect to cathode	175 max. V
Heater positive with respect to cathode	10 max. V
Heater Voltage (ac or dc): Under operating conditions[b]	6.9 max. V 5.7 min. V

RECOMMENDED OPERATING VALUES

Unless otherwise specified, values are positive with respect to cathode.

Anode Voltage	40,000 V[c]
Average Anode Current	300 μA
Grid-No.3 (Focusing Electrode) Voltage for an Anode Current of 300 microamperes	7400 to 9000 V

Grid-No.2 and Grid-No.1 Voltages for Visual Extinction of Focused Spot . . . . . See accompanying *Cutoff Design Chart*

TYPICAL PERFORMANCE DATA

At recommended operating values

Grid-No.3 Current (Total) . . . . . See accompanying *Typical Grid-No.3 Current Characteristic*

Grid-No.2 Current . . . . . ±15 μA

Equivalent Passband (N_e) 270

(For sine-wave response, see accompanying *Typical Sine-Wave Response)*

Center Resolution[d] . . . . . 900 TV Lines

Drive Characteristics . . . . . See accompanying *Typical Drive Characteristics*

Luminance at 300 μA . . . . . 1650 fL

Luminance Characteristics . . . . See accompanying *Typical Luminance Characteristic*

LIMITING CIRCUIT VALUES

*(*See accompanying *Schematic Diagram of Circuit Showing Protective Elements Employed to Prevent Tube Damage)*

HIGH-VOLTAGE CIRCUITS

In order to minimize the possibility of damage to the tubes caused by a momentary internal arc, it is recommended that the high-voltage power supply and the grid-No.3 power supply be of the limited-energy type.

Anode-Circuit Resistance (unbypassed)	0.5 min.	MΩ
Grid-No.3 Circuit Resistance (unbypassed)	0.1	MΩ

LOW-VOLTAGE CIRCUITS

Grid-No.2 Circuit Resistance (bypassed)	10	kΩ
Grid-No.1 Circuit Resistance (unbypassed)	1	kΩ
Effective Grid-No.1-to-Cathode Circuit Resistance	1.5 max.	MΩ
Cathode Circuit Resistance (unbypassed)	1	kΩ
Heater Circuit Resistance (bypassed) to one side of heater	10	kΩ

[b] For maximum cathode life, it is recommended that the heater supply be regulated at 6.3 volts.

[c] Brilliance and definition may change with decreasing anode voltage. In general, the anode voltage should not be less than 30,000 volts.

[d] Determined for a 3-inch high TV resolution test pattern with tube operating at an average screen current of 300 microamperes.

HIGH-VOLTAGE PRECAUTIONS

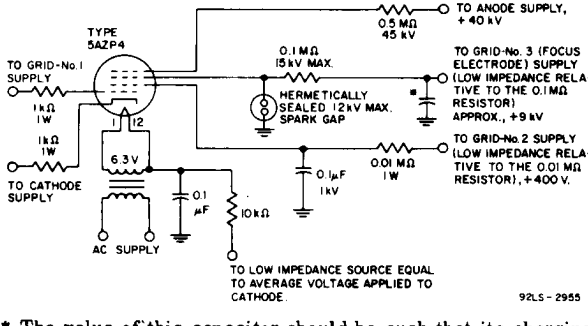
The high voltages at which this type is operated may be very dangerous. Great care should be taken in the design of apparatus to prevent the operator from coming in contact with the high voltages. Precautions include the enclosing of high-potential terminals and the use of interlocking switches to break the primary circuit of the power supply when access to the equipment is required.

X-RADIATION WARNING

X-radiation is produced at the face of this tube when it is operated at normal anode voltage.

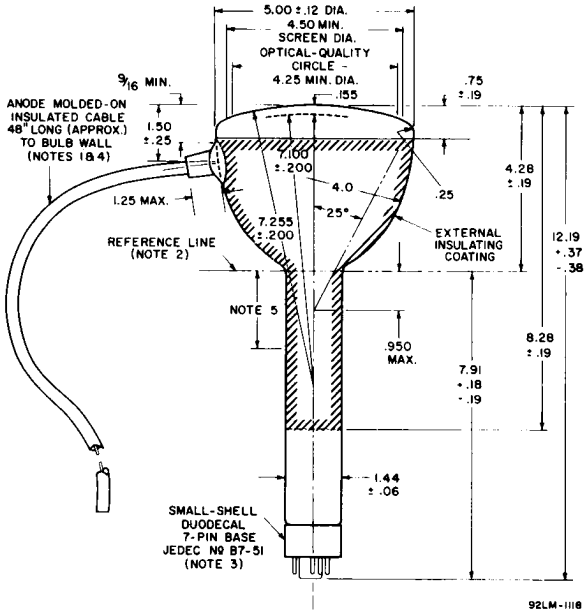
These rays can constitute a health hazard unless the tube is adequately shielded. Make sure that the shielding provides the required protection against personal injury.

SCHEMATIC DIAGRAM OF CIRCUIT SHOWING PROTECTIVE ELEMENTS EMPLOYED TO PREVENT TUBE DAMAGE



* The value of this capacitor should be such that its charging time constant is at least five times greater than the firing time of the spark gap..

DIMENSIONAL OUTLINE – Dimensions In Inches



Note 1: The plane through the tube axis and vacant pin position No.3 may vary from the plane through the tube axis and anode-cable connection at bulb wall by angular tolerance (measured about the tube axis) of ± 20°. Anode-cable connection is on same side as vacant pin position No.3

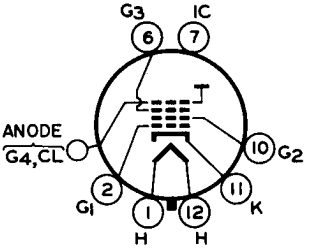
Note 2: Reference line is determined by position where gauge 1.500" + 0.003" – 0.000" I.D. and 2" long will rest on bulb cone.

Note 3: Socket for this base should not be rigidly mounted; it should have flexible leads and be allowed to move freely. Socket contacts corresponding to vacant pin positions No.3, 4, 5, 8 and 9 should be removed in order to provide maximum insulation for pins No.6 and 7.

Note 4: Anode cable should not be sharply bent within 3" of bulb wall.

Note 5: The windings of the deflecting yoke should not extend more than 2" from the reference line toward the base. They should be insulated to withstand 20 kV and be spaced at least 1/10" from the tube neck.

TERMINAL DIAGRAM (Bottom View)



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

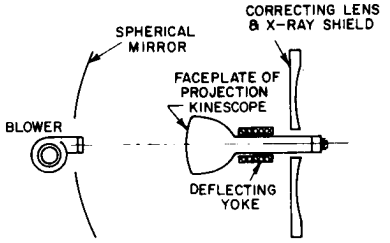
Pin 12: Heater

Flexible Cable: Anode (Grid No.4, Collector)

Note: Socket contacts for vacant pin positions No.3, 4, 5, 8, and 9 should be removed so that maximum insulation is provided for pins No.6 and 7.

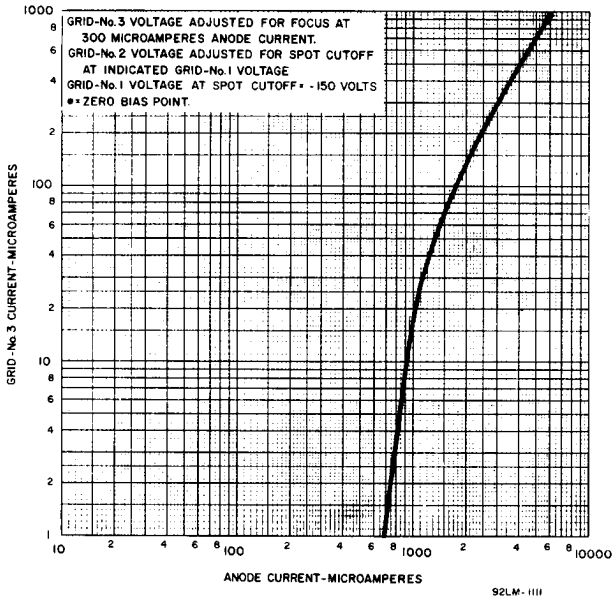
REFLECTIVE OPTICAL SYSTEM

Arrangement of Typical Optical System and Air-Cooling System for Television Projector Using Reflective Optical Principles.

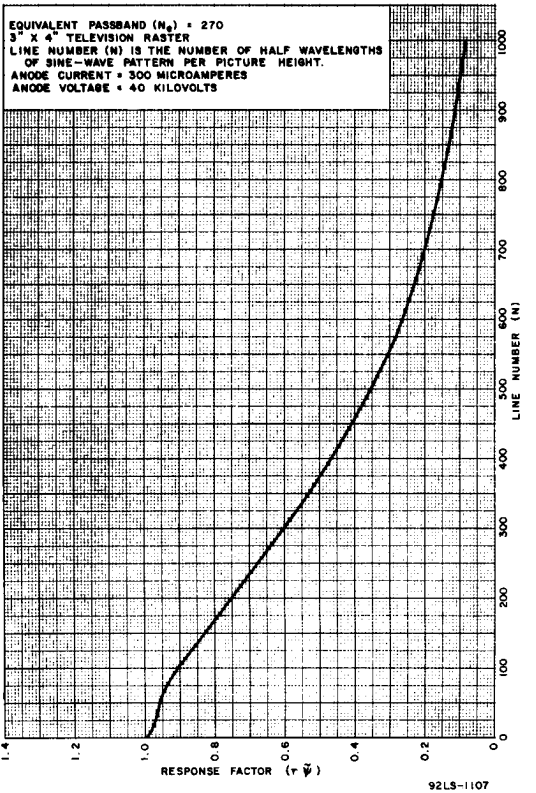


92LS – 2952

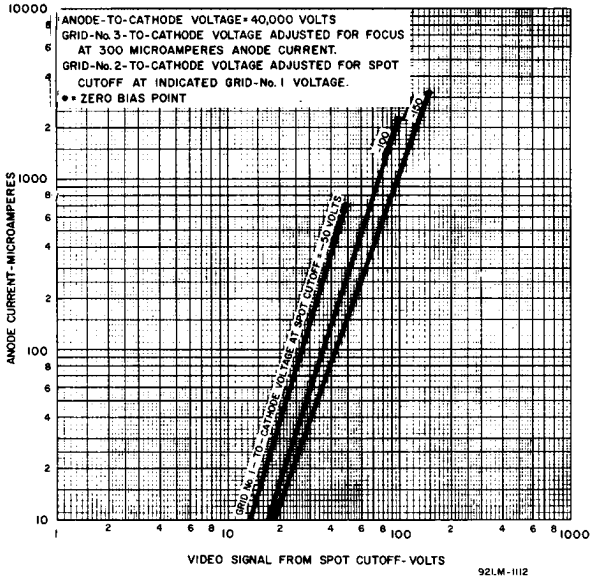
TYPICAL GRID-No.3 CURRENT CHARACTERISTIC



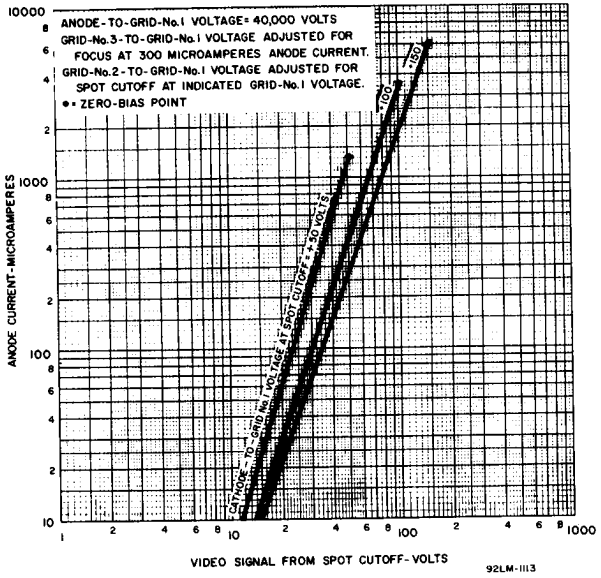
TYPICAL SINE-WAVE RESPONSE



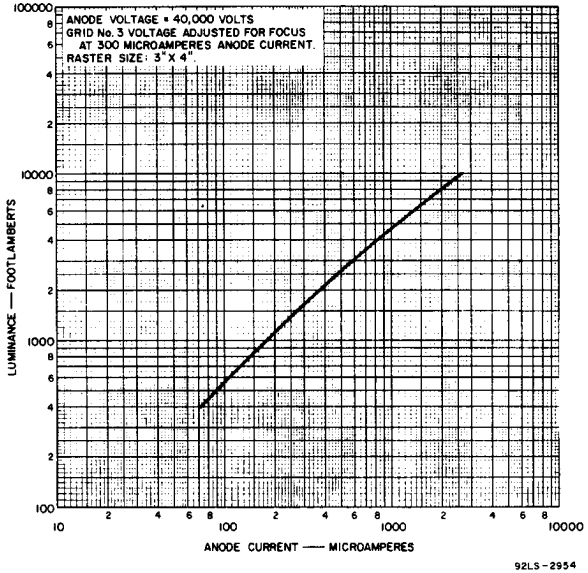
TYPICAL DRIVE CHARACTERISTICS
GRID-DRIVE SERVICE



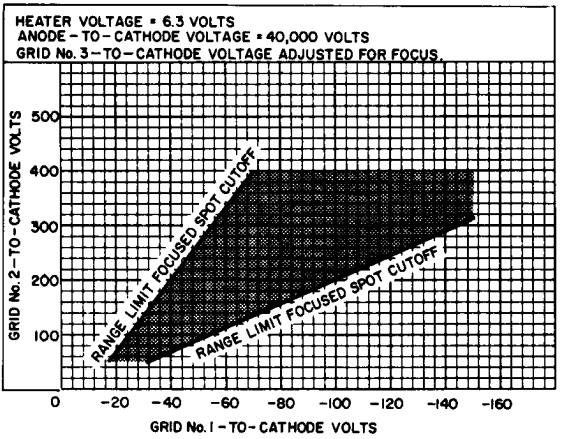
TYPICAL DRIVE CHARACTERISTICS
CATHODE-DRIVE SERVICE



TYPICAL LUMINANCE CHARACTERISTIC



CUTOFF DESIGN CHART



92LS-2953