

Vidicon

MAGNETIC FOCUS

1" Diameter

MAGNETIC DEFLECTION

For Live and Film Pickup With Color
or Black-and-White TV Cameras

General:

Heater, for Unipotential Cathode:

Voltage (AC or DC) $6.3 \pm 10\%$ volts

Current at heater volts = 6.3 0.6 amp

Direct Interelectrode Capacitance:^a

Target to all other electrodes. 4.6 pf

Spectral Response See Accompanying Curves

Photoconductive Layer:

Maximum useful diagonal of rectangular

image (4 x 3 aspect ratio)^b 0.62"

Focusing Method Magnetic

Deflection Method Magnetic

Overall Length $6.25" \pm 0.25"$ Greatest Diameter $1.125" \pm 0.010"$

Operating Position Any

Weight (Approx.) 2 oz

Bulb T8

Focusing Coil Cleveland Electronics^{c, d} No. VF-115-5,

or equivalent

Deflecting Yoke Cleveland Electronics^{c, d} No. VY-111-3,

or equivalent

Alignment Coil Cleveland Electronics^{c, d} No. VA-118,

or equivalent

Socket Cinch^e No. 54A18088, or equivalent

Base Small-Button Ditetra 8-Pin (JEDEC No. E8-11)

Basing Designation for BOTTOM VIEW 8HM

Pin 1 - Heater

Pin 2 - Grid No. 1

Pin 3 - Do Not Use

Pin 4 - Do Not Use

Pin 5 - Grid No. 2

Pin 6 - Grid No. 3

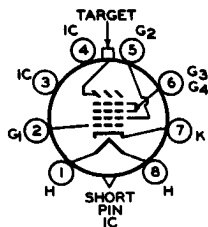
& No. 4

Pin 7 - Cathode

Pin 8 - Heater

Flange - Target

Short Pin - Do Not Use



DIRECTION OF LIGHT:
INTO FACE END OF TUBE

Maximum Ratings, Absolute-Maximum Values:

For scanned area of $1/2" \times 3/8"$

Grid-No. 3 & Grid-No. 4 Voltage 750 max. volts

Grid-No. 2 Voltage 750 max. volts

Grid-No. 1 Voltage:

Negative-bias value 125 max. volts

Positive-bias value 0 max. volts

← Indicates a change.



Peak Heater-Cathode Voltage:

Heater negative with respect to cathode.	125 max.	volts
Heater positive with respect to cathode.	10 max.	volts
Dark Current.	0.25 max.	μ a
Peak Target Current	0.55 max.	μ a
Faceplate:		
Illumination	1000 max.	fc
Temperature.	60 max.	$^{\circ}$ C

Typical Operation:

*For scanned area of 1/2" x 3/8" and
faceplate temperature of 30 $^{\circ}$ to 35 $^{\circ}$ C*

Grid-No.4 (Decelerator) & Grid-No.3 (Beam-Focus Electrode ^f) Voltage	250 ^g to 300	volts
Grid-No.2 (Accelerator) Voltage	300	volts
Grid-No.1 Voltage for picture cutoff ^h	-45 to -100	volts
Average "Gamma" of Transfer Charac- teristic for signal-output current between 0.02 μ a and 0.2 μ a.	0.65	
Visual Equivalent Signal-to-Noise Ratio (Approx.) ^j	300:1	
Minimum Peak-to-Peak Blanking Voltage:		
When applied to grid No.1	75	volts
When applied to cathode	20	volts
Field Strength at Center of Focusing Coil (Approx.)	40	gauss
Field Strength of Adjustable Alignment Coil ^k	0 to 4	gauss

Maximum-Sensitivity Operation for Live-Scene Pickup

Faceplate Illumination (Highlight).	2	fc
Maximum Target Voltage required to produce dark current of 0.2 μ a in any tube ^m	110	volts
Target Voltage ⁿ	60 to 100	volts
Dark Current ^p	0.2	μ a
Target Current (Highlight) ^q	0.4 to 0.5	μ a
Signal-Output Current: ^r		
Peak.	0.2 to 0.3	μ a
Average	0.08 to 0.1	μ a

Average-Sensitivity Operation for Live-Scene Pickup

Faceplate Illumination (Highlight).	15	fc
Maximum Target Voltage required to produce dark current of 0.02 μ a in any tube ^m	60	volts
Target Voltage ⁿ	30 to 50	volts
Dark Current.	0.02	μ a
Target Current (Highlight) ^q	0.3 to 0.4	μ a
Signal-Output Current: ^r		
Peak.	0.3 to 0.4	μ a
Average	0.1 to 0.2	μ a

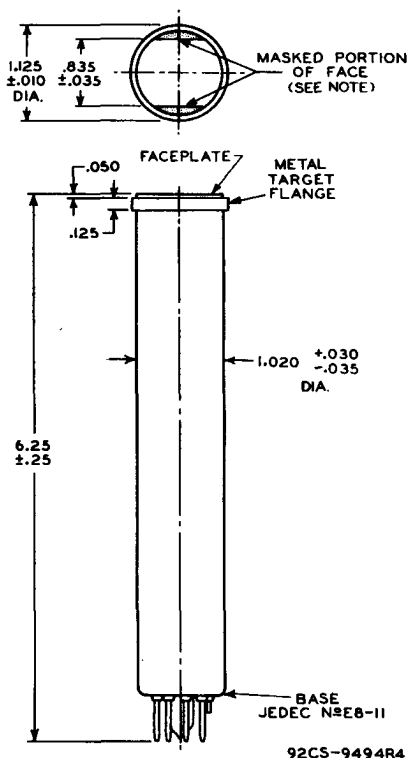


Minimum-Lag Operation for Film Pickup

Faceplate Illumination (Highlight)	100	fc
Maximum Target Voltage required to produce dark current of 0.004 μ a in any tube ^m	30	volts
Target Voltage ⁿ	15 to 25	volts
Dark Current	0.004	μ a
Target Current (Highlight) ^q	0.3 to 0.4	μ a
Signal-Output Current: ^r		
Peak	0.3 to 0.4	μ a
Average	0.1 to 0.2	μ a

- ^a This capacitance, which effectively is the output impedance of the 7038, is increased when the tube is mounted in the deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is in the order of 100 megohms.
- ^b Proper orientation of quality rectangle is obtained when the horizontal scan is essentially parallel to the straight sides of the masked portions of the faceplate. The straight sides are parallel to the plane passing through the tube axis and short pin. The masking is for orientation only and does not define the proper scanned area of photoconductive layer.
- ^c Cleveland Electronics Inc., 1974 East 61st St., Cleveland, Ohio.
- ^d These components are chosen to provide tube operation with minimum beam-landing error.
- ^e Cinch Manufacturing Corp., 1026 South Homan Avenue, Chicago 24, Ill.
- ^f Beam focus is obtained by combined effect of grid-No.3 voltage which should be adjustable over indicated range, and a focusing coil having an average field strength of 40 gauss.
- ^g Definition, focus uniformity, and picture quality decrease with decreasing grid-No.4 and grid-No.3 voltage. In general, grid No.4 and grid No.3 should be operated above 250 volts.
- ^h With no blanking voltage on grid No.1.
- ^j Measured with high-gain, low-noise, cascode-input-type amplifier having bandwidth of 5 Mc. Because the noise in such a system is predominately of the high-frequency type, the visual equivalent signal-to-noise ratio is taken as the ratio of highlight video-signal current to rms noise current, multiplied by a factor of 3.
- ^k The alignment coil should be located on the tube so that its center is at a distance of 3-11/16 inches from the face of the tube, and be positioned so that its axis is coincident with the axis of the tube, the deflecting yoke, and the focusing coil.
- ^m The target voltage for each 7038 must be adjusted to that value which gives the desired operating dark current.
- ⁿ Indicated range for each type of service serves only to illustrate the operating target-voltage range normally encountered.
- ^p The deflecting circuits must provide extremely linear scanning for good black-level reproduction. Dark-current signal is proportional to the scanning velocity. Any change in scanning velocity produces a black-level error in direct proportion to the change in scanning velocity.
- ^q Video amplifiers must be designed properly to handle target currents of this magnitude to avoid amplifier overload or picture distortion.
- ^r Defined as the component of the target current after the dark-current component has been subtracted.





DIMENSIONS IN INCHES

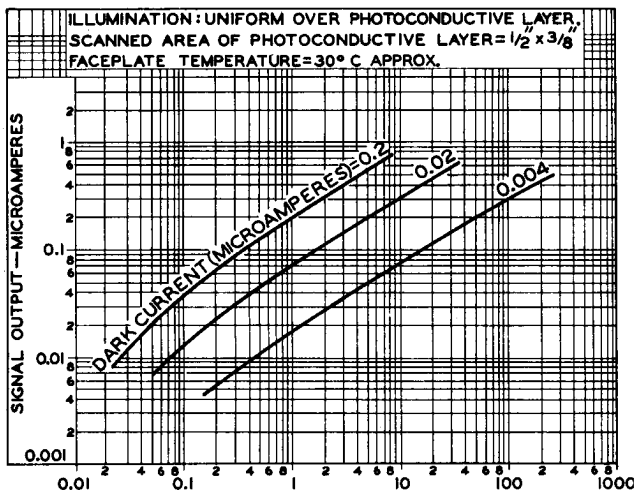
Note: Straight sides of masked portions are parallel to the plate passing through tube axis and short pin.



7038

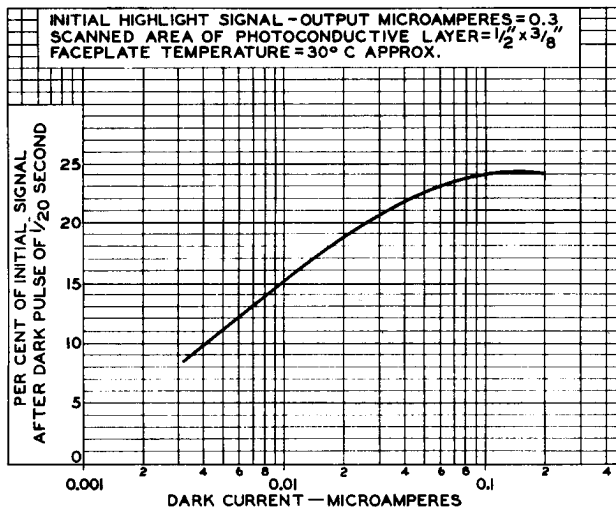
7038

TYPICAL LIGHT-TRANSFER CHARACTERISTICS



2870° K TUNGSTEN ILLUMINATION ON TUBE FACE — FOOT - CANDLES
92CS-9495

TYPICAL PERSISTENCE CHARACTERISTIC



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

92CS-9504

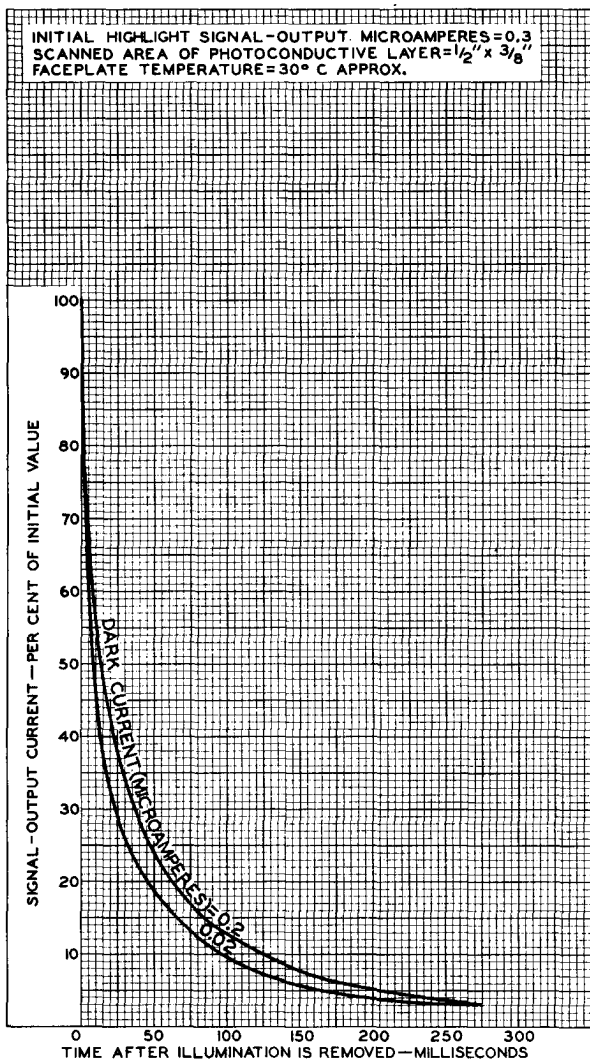
7038



7038

TYPICAL PERSISTENCE CHARACTERISTICS

INITIAL HIGHLIGHT SIGNAL-OUTPUT MICROAMPERES=0.3
SCANNED AREA OF PHOTOCONDUCTIVE LAYER= $1/2'' \times 3/8''$
FACEPLATE TEMPERATURE= 30°C APPROX.



Vidicon

MAGNETIC FOCUS

1" Diameter

MAGNETIC DEFLECTION

For Live and Film Pickup With Color
or Black-and-White TV Cameras

General:

Heater, for Unipotential Cathode:

Voltage (AC or DC) $6.3 \pm 10\%$ volts

Current at heater volts = 6.3 0.6 amp

Direct Interelectrode Capacitance:^a

Target to all other electrodes 4.6 pf

Spectral Response See Accompanying Curves

Photoconductive Layer:

Maximum useful diagonal of rectangular

image (4 x 3 aspect ratio)^b 0.62"

Focusing Method Magnetic

Deflection Method Magnetic

Overall Length $6.25" \pm 0.25"$ Greatest Diameter $1.125" \pm 0.010"$

Operating Position Any

Weight (Approx.) 2 oz

Bulb T8

Focusing Coil Cleveland Electronics^{c,d} No. VF-115-5,

or equivalent

Deflecting Yoke Cleveland Electronics^{c,d} No. VY-111-3,

or equivalent

Alignment Coil Cleveland Electronics^{c,d} No. VA-118,

or equivalent

Socket Cinch^e No. 54A18088, or equivalent

Base Small-Button Ditetra 8-Pin (JEDEC No. EB-11)

Basing Designation for BOTTOM VIEW 8HM

Pin 1 - Heater

Pin 2 - Grid No. 1

Pin 3 - Do Not Use

Pin 4 - Do Not Use

Pin 5 - Grid No. 2

Pin 6 - Grid No. 3

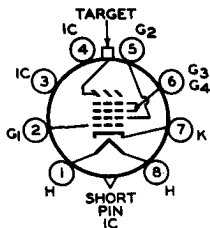
& No. 4

Pin 7 - Cathode

Pin 8 - Heater

Flange - Target

Short Pin - Do Not Use



DIRECTION OF LIGHT:
INTO FACE END OF TUBE

Maximum Ratings, Absolute-Maximum Values:

For scanned area of $1/2" \times 3/8"$

Grid-No. 3 & Grid-No. 4 Voltage 750 max. volts

Grid-No. 2 Voltage 750 max. volts

Grid-No. 1 Voltage:

Negative-bias value 300 max. volts ←

Positive-bias value 0 max. volts

← Indicates a change.



Peak Heater-Cathode Voltage:

Heater negative with respect to cathode.	125 max.	volts
Heater positive with respect to cathode.	10 max.	volts
Dark Current.	0.25 max.	μ a
Peak Target Current	0.55 max.	μ a
Faceplate:		
Illumination	1000 max.	fc
Temperature.	71 max.	$^{\circ}$ C

Typical Operation:

*For scanned area of 1/2" x 3/8" and
faceplate temperature of 30 $^{\circ}$ to 35 $^{\circ}$ C*

Grid-No.4 (Decelerator) & Grid-No.3 (Beam-Focus Electrode ^f) Voltage	250 ^g to 300	volts
Grid-No.2 (Accelerator) Voltage	300	volts
Grid-No.1 Voltage for picture cutoff ^h	-45 to -100	volts
Average "Gamma" of Transfer Charac- teristic for signal-output current between 0.02 μ a and 0.2 μ a.	0.65	
Visual Equivalent Signal-to-Noise Ratio (Approx.) ^j	300:1	
Minimum Peak-to-Peak Blanking Voltage:		
When applied to grid No.1	75	volts
When applied to cathode	20	volts
Field Strength at Center of Focusing Coil (Approx.)	40	gauss
Field Strength of Adjustable Alignment Coil ^k	0 to 4	gauss

Maximum-Sensitivity Operation for Live-Scene Pickup

Faceplate Illumination (Highlight).	2	fc
Maximum Target Voltage required to produce dark current of 0.2 μ a in any tube ^m	110	volts
Target Voltage ⁿ	60 to 100	volts
Dark Current ^p	0.2	μ a
Target Current (Highlight) ^q	0.4 to 0.5	μ a
Signal-Output Current: ^r		
Peak.	0.2 to 0.3	μ a
Average	0.08 to 0.1	μ a

Average-Sensitivity Operation for Live-Scene Pickup

Faceplate Illumination (Highlight).	15	fc
Maximum Target Voltage required to produce dark current of 0.02 μ a in any tube ^m	60	volts
Target Voltage ⁿ	30 to 50	volts
Dark Current.	0.02	μ a
Target Current (Highlight) ^q	0.3 to 0.4	μ a
Signal-Output Current: ^r		
Peak.	0.3 to 0.4	μ a
Average	0.1 to 0.2	μ a

→ Indicates a change.

Minimum-Lag Operation for Film Pickup

Faceplate Illumination (Highlight)	100	fc
Maximum Target Voltage required to produce dark current of 0.004 μ a in any tube ^a	30	volts
Target Voltage ⁿ	15 to 25	volts
Dark Current	0.004	μ a
Target Current (Highlight) ^q	0.3 to 0.4	μ a
Signal-Output Current: ^r		
Peak	0.3 to 0.4	μ a
Average	0.1 to 0.2	μ a

^a This capacitance, which effectively is the output impedance of the 7038, is increased when the tube is mounted in the deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is in the order of 100 megohms.

^b Proper orientation of quality rectangle is obtained when the horizontal scan is essentially parallel to the straight sides of the masked portions of the faceplate. The straight sides are parallel to the plane passing through the tube axis and short pin. The masking is for orientation only and does not define the proper scanned area of photoconductive layer.

^c Cleveland Electronics Inc., 1974 East 61st St., Cleveland, Ohio.

^d These components are chosen to provide tube operation with minimum beam-landing error.

^e Cinch Manufacturing Corp., 1026 South Homan Avenue, Chicago 24, Ill.

^f Beam focus is obtained by combined effect of grid-No.3 voltage which should be adjustable over indicated range, and a focusing coil having an average field strength of 40 gauss.

^g Definition, focus uniformity, and picture quality decrease with decreasing grid-No.4 and grid-No.3 voltage. In general, grid No.4 and grid No.3 should be operated above 250 volts.

^h With no blanking voltage on grid No.1.

^j Measured with high-gain, low-noise, cascode-input-type amplifier having bandwidth of 5 Mc. Because the noise in such a system is predominately of the high-frequency type, the visual equivalent signal-to-noise ratio is taken as the ratio of highlight video-signal current to rms noise current, multiplied by a factor of 3.

^k The alignment coil should be located on the tube so that its center is at a distance of 3-11/16 inches from the face of the tube, and be positioned so that its axis is coincident with the axis of the tube, the deflecting yoke, and the focusing coil.

^m The target voltage for each 7038 must be adjusted to that value which gives the desired operating dark current.

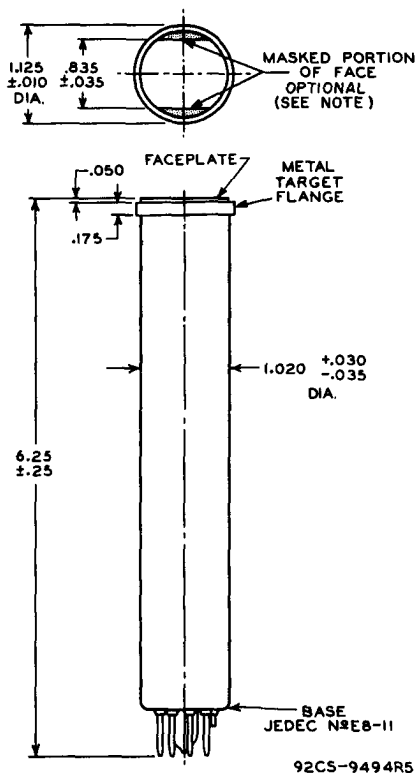
ⁿ Indicated range for each type of service serves only to illustrate the operating target-voltage range normally encountered.

^p The deflecting circuits must provide extremely linear scanning for good black-level reproduction. Dark-current signal is proportional to the scanning velocity. Any change in scanning velocity produces a black-level error in direct proportion to the change in scanning velocity.

^q Video amplifiers must be designed properly to handle target currents of this magnitude to avoid amplifier overload or picture distortion.

^r Defined as the component of the target current after the dark-current component has been subtracted.



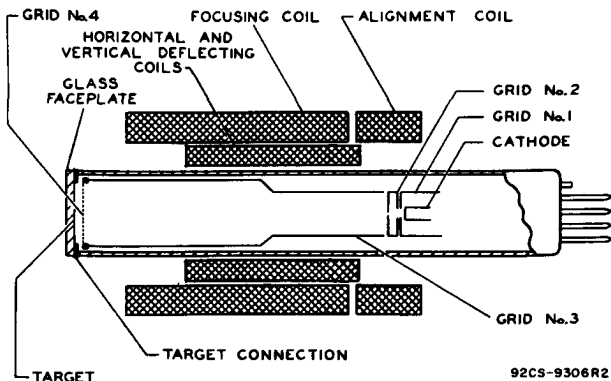


DIMENSIONS IN INCHES

Note: Straight sides of masked portions are parallel to the plate passing through tube axis and short pin.

→ Indicates a change.

SCHEMATIC ARRANGEMENT

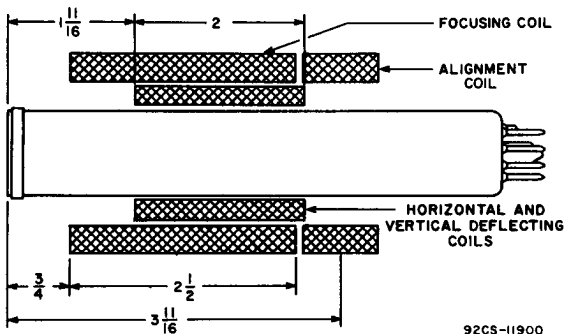


Alignment of the beam is accomplished by a transverse magnetic field produced by external coils located at the base end of the focusing coil.

Deflection of the beam is accomplished by transverse magnetic fields produced by external deflecting coils.

RECOMMENDED LOCATION AND LENGTH OF DEFLECTING, FOCUSING, AND ALIGNMENT COMPONENTS

For Minimum Beam-Landing Error



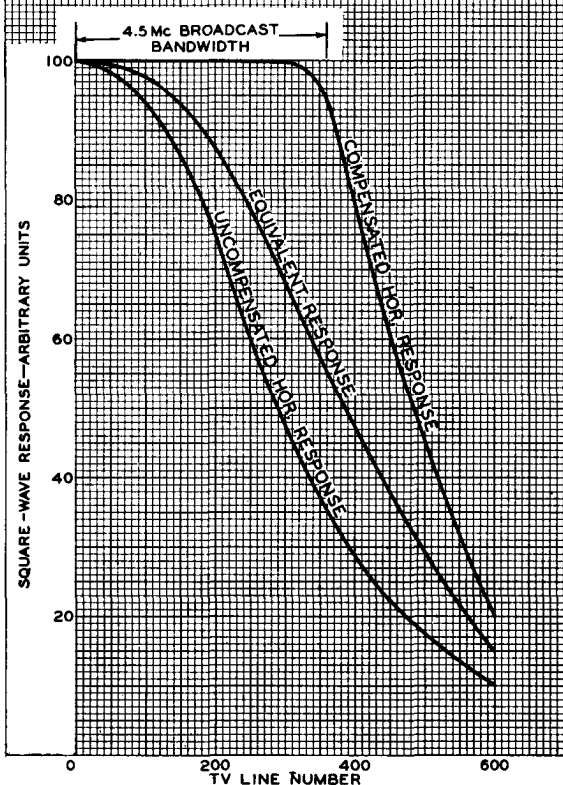
DIMENSIONS IN INCHES

The deflecting yoke and focusing coil used with the 7038 are designed to cause the scanning beam to land perpendicularly to the target at all points of the scanned area with minimum beam-landing error and resultant superior uniformity of sensitivity and focus over the scanned area.



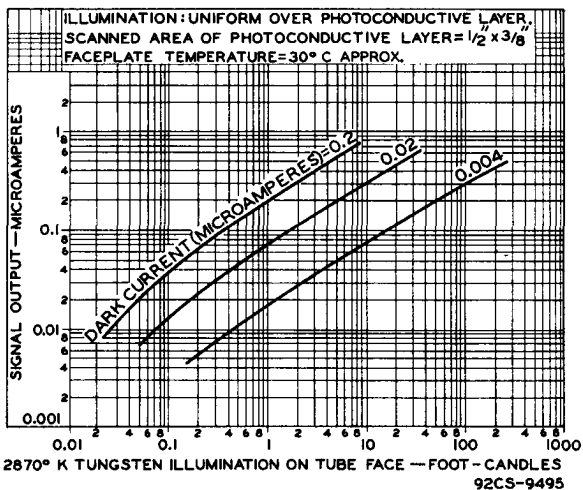
HORIZONTAL & EQUIVALENT SQUARE-WAVE RESPONSE CHARACTERISTICS

HIGHLIGHT TARGET MICROAMPERES=0.35
 DARK CURRENT (MICROAMPERES)=0.02
 TEST PATTERN: TRANSPARENT SQUARE-
 WAVE RESOLUTION WEDGE
 1 Mc = 80 TV LINES (APPROX.)

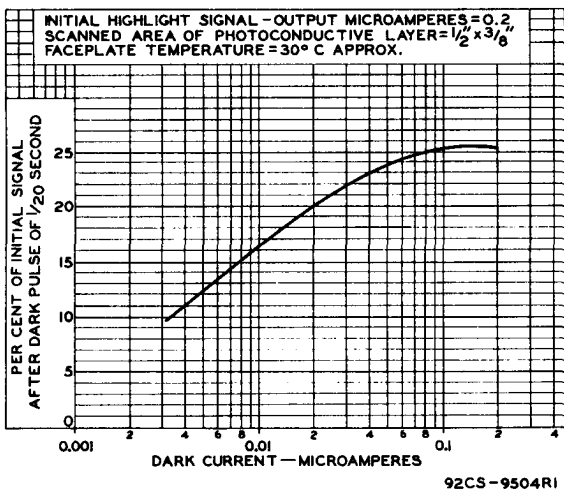


92CM-8117R1

TYPICAL LIGHT-TRANSFER CHARACTERISTICS

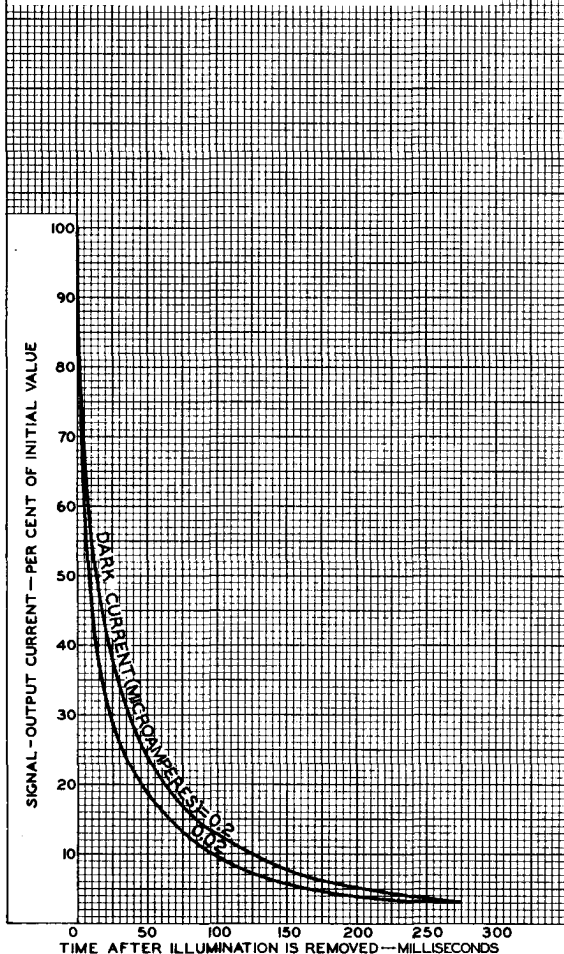


TYPICAL PERSISTENCE CHARACTERISTIC



TYPICAL PERSISTENCE CHARACTERISTICS

INITIAL HIGHLIGHT SIGNAL-OUTPUT MICROAMPERES=0.2
SCANNED AREA OF PHOTOCONDUCTIVE LAYER= $\frac{1}{2}$ " x $\frac{3}{8}$ "
FACEPLATE TEMPERATURE=30° C APPROX.



92CM-9505RI





7038

7038

SPECTRAL-SENSITIVITY CHARACTERISTICS

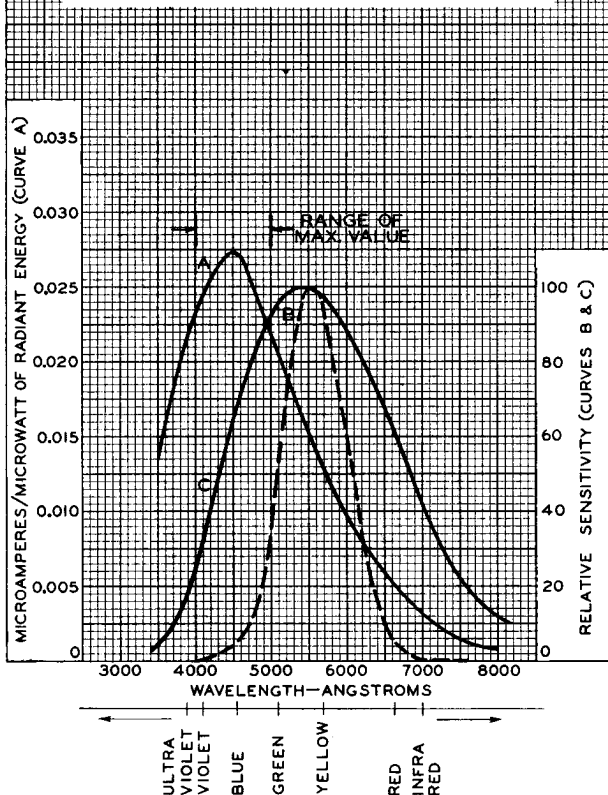
CURVE A: FOR EQUAL VALUES OF SIGNAL-
OUTPUT CURRENT AT ALL WAVELENGTHS.

SIGNAL-OUTPUT MICROAMPERES FROM
SCANNED AREA OF $\frac{1}{2}'' \times \frac{3}{8}'' = 0.02$

DARK CURRENT (MICROAMPERES) = 0.02

CURVE B: SPECTRAL CHARACTERISTIC OF
AVERAGE HUMAN EYE.

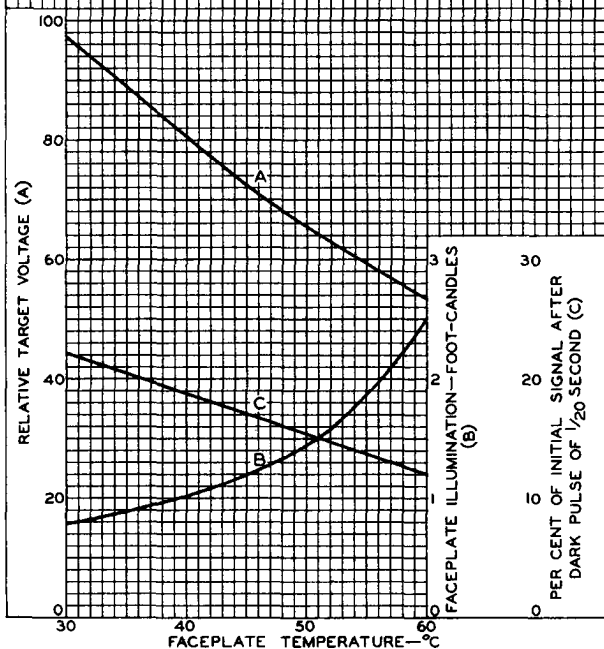
CURVE C: FOR EQUAL VALUES OF SIGNAL-
OUTPUT CURRENT WITH RADIANT
FLUX FROM TUNGSTEN SOURCE
AT 2870° K.





TYPICAL CHARACTERISTICS

HIGHLIGHT SIGNAL - OUTPUT MICROAMPERES = 0.2
 DARK CURRENT (MICROAMPERES) = 0.2
 SCANNED AREA OF PHOTOCONDUCTIVE LAYER = $\frac{1}{2} \times \frac{3}{8}$ "
 CURVE A: RELATIVE TARGET VOLTAGE REQUIRED
 TO MAINTAIN DARK CURRENT OF $0.2 \mu\text{A}$.
 CURVE B: 2870° K INCANDESCENT ILLUMINATION
 REQUIRED TO PRODUCE SIGNAL - OUTPUT
 CURRENT OF $0.2 \mu\text{A}$.
 CURVE C: PERSISTENCE (LAG) CHARACTERISTIC
 FOR AN INITIAL SIGNAL-OUTPUT CURRENT
 OF $0.2 \mu\text{A}$.

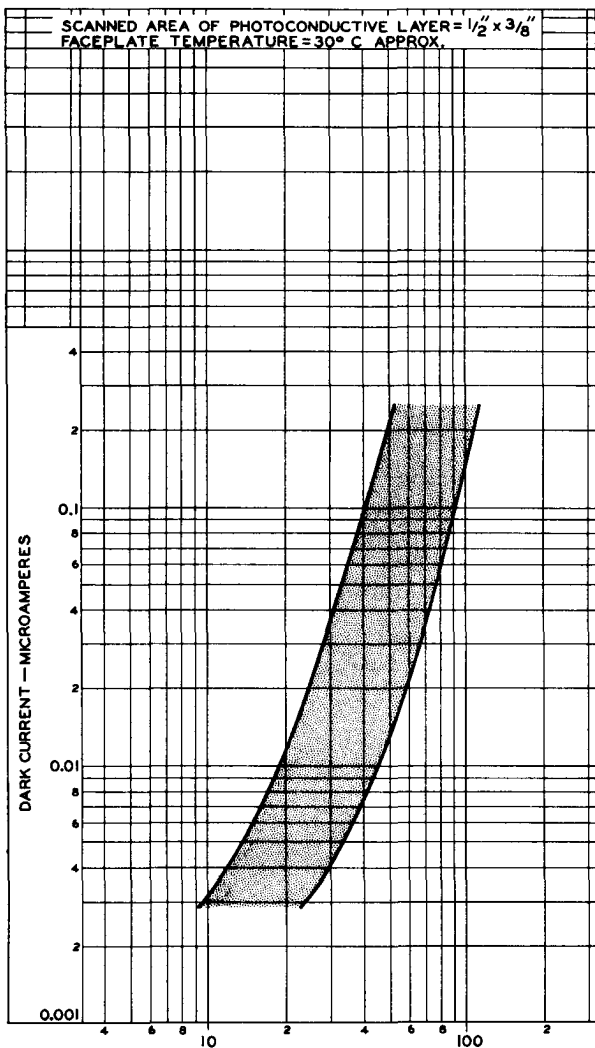




7038

7038

DARK-CURRENT RANGE

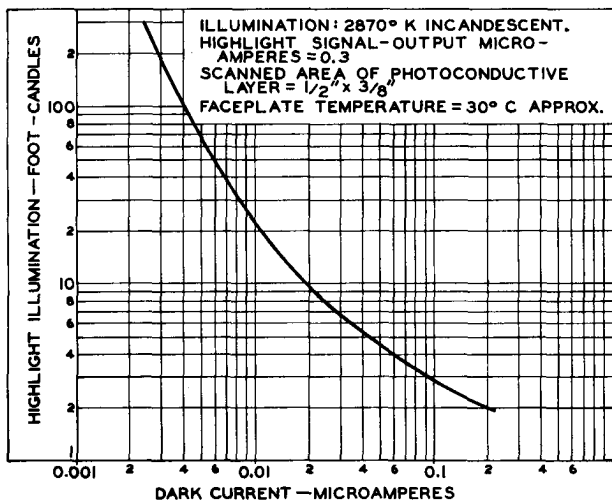


7038



7038

TYPICAL CHARACTERISTIC



92CS-9493

ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY