2048A

Vidicon

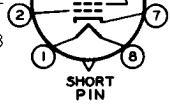
LOW-POWER (0.6-WATT) HEATER 600-TO-900-LINE RESOLUTION

For Use Under Severe Shock and Vibration, High Humidity, and at Altitudes up to 50,000 Feet

DATA

General:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.095	amp
Direct Interelectrode Capacitance:[a]		
Target to all other electrodes	3	μμf
Spectral Response		See *Curve*
Photoconductive Layer:		
Maximum useful diagonal of rectangular image (4 x 3 aspect ratio)		0.62"
Orientation of quality rectangle—Proper orientation is obtained when the horizontal scan is essentially parallel to the plane passing through the tube axis and short index pin.		
Focusing Method		Magnetic
Deflection Method		Magnetic
Overall Length	5.154" ± 0.06"	
Greatest Diameter (Excluding target-flange contact)	1.125" ± 0.010"	
Weight (Approx.)	2 oz	
Operating Position		Any
Bulb		T8
Socket	Cinch No.54A18088[b], or equivalent	
Base	Small-Button Ditetrar 8-Pin (JEDEC No.E8-11)	
Basing Designation for BOTTOM VIEW		8HM



Pin 1 - Heater
Pin 2 - Grid No.1
Pin 3 - Internal Connection—Do Not Use
Pin 4 - Same as Pin 3
Pin 5 - Grid No.2
Pin 6 - Grid No.4, Grid No.3

Pin 7 - Cathode
Pin 8 - Heater
Flange - Target
Short Pin - Same as Pin 3

DIRECTION OF LIGHT: INTO FACE END OF TUBE

Maximum Ratings, *Absolute-Maximum Values:*

For altitudes up to 50,000 feet and scanned area of 1/2" x 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
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	125 max.	volts
Heater positive with respect to cathode	10 max.	volts
TARGET VOLTAGE	100 max.	volts
DARK CURRENT	0.25 max.	μa
PEAK TARGET CURRENT[c]	0.55 max.	μa
FACEPLATE:		
Illumination	1000 max.	fc
Temperature	71 max.	°C

Typical Operation:

For scanned area of 1/2" x 3/8" and faceplate temperature of 30° to 35° C

Grid-No.4 (Decelerator) & Grid-No.3 (Beam-Focus-Electrode[d]) Voltage	250[e] to 300	volts
Grid-No.2 (Accelerator) Voltage	300	volts
Grid-No.1 Voltage for picture cutoff[f]	-45 to -100	volts
Average "Gamma" of Transfer Characteristic for signal-output current between 0.02 μa and 0.2 μa	0.57	
Visual Equivalent Signal-to-Noise Ratio (Approx.)[g]	300:1	
Lag (Per cent of initial value of signal-output current 1/20 second after illumination is removed) for initial signal-output current of 0.2 μa, dark current of 0.02 μa:		
Typical	15	%
Maximum	20	%
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	gausses
Field Strength of Adjustable Alignment Coil[h]	0 to 4	gausses

Maximum-sensitivity operation—0.1 footcandle on faceplate

Faceplate Illumination (Highlight)	0.1	fc
Target Voltage[j,k]	35 to 70	volts
Dark Current[m]	0.2	μa
Signal-Output Current:[n]		
Typical	0.14	μa

Intermediate-sensitivity operation—0.5 footcandle on faceplate

Faceplate Illumination (Highlight)	0.5	fc
Target Voltage[j,k]	30 to 60	volts
Dark Current[m]	0.1	μa
Signal-Output Current:[n]		
Typical	0.27	μa

Average-sensitivity operation—1 footcandle on faceplate

Faceplate Illumination (Highlight)	1	fc
Target Voltage[j,k]	20 to 40	volts
Dark Current[m]	0.02	μa
Signal-Output Current:[n]		
Typical	0.2	μa
Minimum	0.15	μa

[a] This capacitance, which effectively is the output impedance of the 2048A, is increased when the tube is mounted in the deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is in order of 100 megohms.

[b] Cinch Manufacturing Corporation, 1026 South Homan Avenue, Chicago 24, Illinois.

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

[d] Beam focus is obtained by combined effect of grid-No.3 voltage which should be adjustable over indicated range, and a focusing coil having and average field strength of 40 gausses.

[e] 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.

[f] With no blanking voltage on grid No.1.

[g] Measured with high-gain, low-noise, cascode-input-type amplifier having bandwidth of 5 Mc and a peak signal-output current of 0.35 microampere. 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 the highlight video-signal current to rms noise current, multiplied by a factor of 3.

[h] 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.

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

[k] The target voltage for each 2048A must be adjusted to that value which gives the desired operating dark current.

[m] 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.

[n] Defined as the component of the highlight target current after the dark-current component has been subtracted.

SPECIAL PERFORMANCE DATA

In connection with the following tests, sample 2048A's will maintain resolution as determined with a RETMA Resolution Chart, or equivalent.

Vibration Tests:

These tests are performed under conditions for *Average-Sensitivity Operation* on a sample lot of tubes from each production run. Tubes and their associated components[p] are vibrated on apparatus providing dynamic conditions similar to those described in MIL-E-5272B[r], paragraph 4.7.1.

Resonance. Tubes and associated components[p] are vibrated (per the method of MIL-E-5272B[r], paragraph 4.7.1) for 1 hour at +25° C, for 15 minutes at 0° C, and for 15 minutes at +55° C.

Cycling. Tubes and associated components[p] are vibrated (per the method of MIL-E-5272B[r], paragraph 4.7.1.2 pertaining

to specimen without vibration isolators) for 1 hour at +25° C, for 15 minutes at 0° C, and for 15 minutes at +55° C.

Temperature-Pressure (Altitude) Tests:

Tubes and associated components[p] are subjected (per the method of MIL-E-5400[s], paragraph 3.2.20, 3.2.20.1, and 3.2.20.1.1) to the separate and combined effects of varying temperature 0° to +55° C and varying barometric pressure 30 to 3.4 inches of mercury. The pressures correspond to sea level and to an altitude of 50,000 feet, respectively.

Shock Tests:

These tests are performed with no voltages applied and on a sample lot of tubes from each production run. Tubes and their associated components[p] are subjected in these tests (per MIL-E-5400[s], paragraph 3.2.21.2.1) to 18 impact shocks of 15 g consisting of 3 shocks in opposite directions along each of three mutually perpendicular axes of the tube. Each shock impulse has a duration of 11 ± 1 milliseconds with a maximum impact acceleration occurring at approximately 5.5 milliseconds. Tube mounting accessories assure the rigid fastening of the tube to the shock-test apparatus.

Temperature-Humidity Tests:

These tests are performed with no voltages applied to the 2048A. The 2048A and associated components[p] are subjected (per the method of MIL-E-5400[s], paragraph 3.2.20.2B) to relative humidities up to and including 95 per cent at temperatures up to and including +50° C.

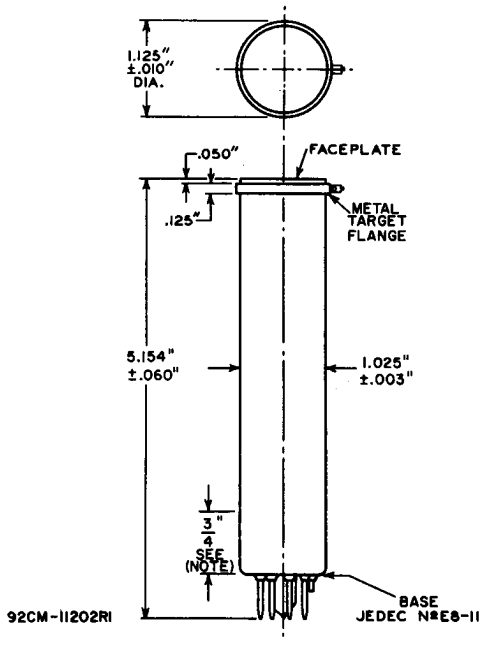
[p] Tube socket such as Cinch No.54A18088 and RCA Assembly No.8447880, or equivalent, which consists of the deflecting coils, focusing coil, alignment coil, shield, and target connector. This assembly is available from RCA Defense Electronic Products, Equipment Maintenance and Support, Building 7-5, Camden, New Jersey.

[r] 5 June 1957, Procedure I of Military Specifications.

[s] 1 January 1956.

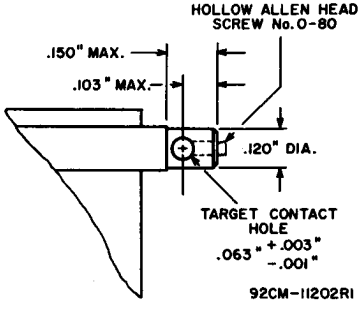
OPERATING CONSIDERATIONS

Support for the 2048A should be provided such that, under vibration and shock, the tube will not be displaced with respect to the focusing, deflecting, and alignment fields. Suitable support is provided for the tube and its socket in the RCA Deflection Assembly 8447880, or equivalent. Orientation of the 2048A in its support should be such that the horizontal scan is essentially parallel to the plane passing through the tube axis and short index pin.

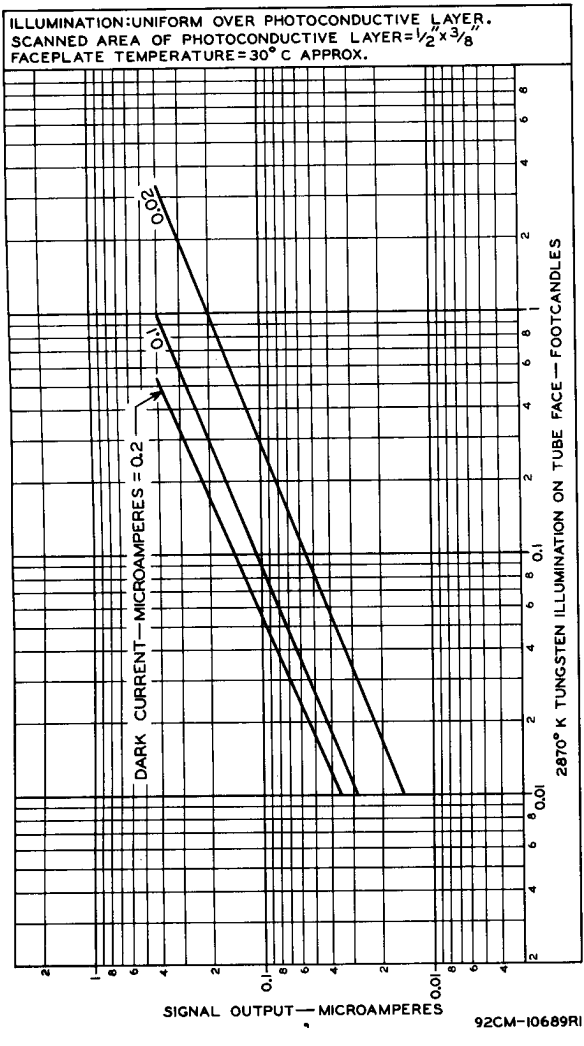


NOTE: WITHIN THIS DISTANCE, DIAMETER OF BULB IS 1.025" + 0.010" − 0.030".

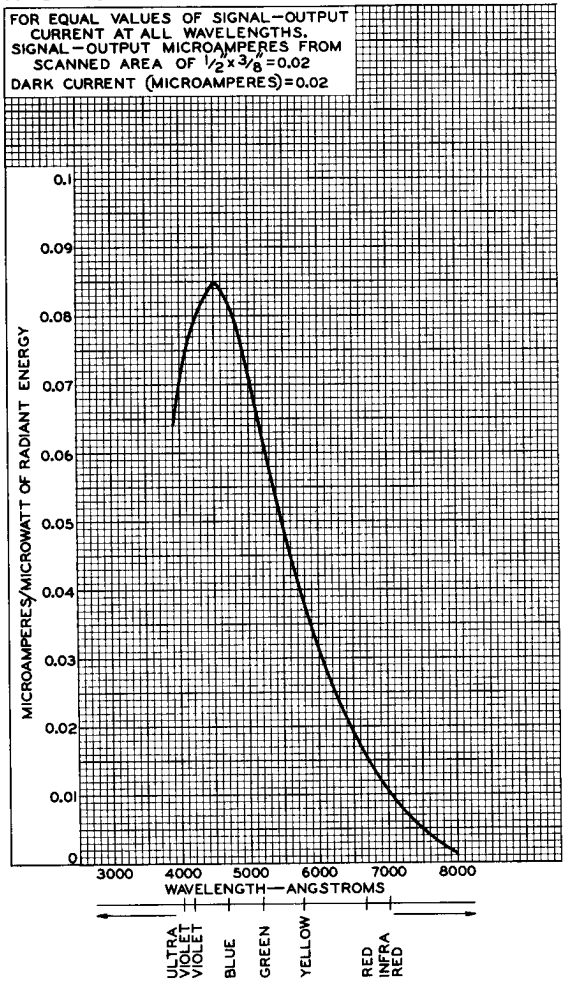
DETAIL OF TARGET-FLANGE CONTACT



TYPICAL LIGHT-TRANSFER CHARACTERISTICS



TYPICAL SPECTRAL-SENSITIVITY CHARACTERISTIC



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