



6326-A

VIDICON

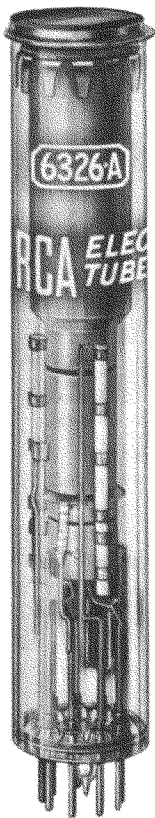
Magnetic Focus
Magnetic Deflection

For Film and Live Pickup
with Color or Black-and-White TV Cameras
600-Line Resolution

1"-Diameter Bulb
6-1/4" Length

TENTATIVE DATA

RCA-6326-A is a small camera tube intended primarily for use in compact color television cameras utilizing the method of simultaneous pickup of the film or live subjects to be televised. This method employs three 6326-A's—one for each channel—to produce the information necessary for the formation of a color-television image. The 6326-A is also suitable for use in black-and-white TV cameras for either film or live pickup. In either color or black-and-white service, the 6326-A can provide a picture of high quality for broadcasting or industrial television applications. Its resolution capability is about 600 television lines.



Utilizing a photoconductive layer as its light-sensitive element, the 6326-A has a sensitivity such that it requires illumination levels comparable to those required for motion-picture film cameras. The spectral response of the 6326-A covers the entire visible spectrum and enables the tube to translate color very accurately when operated in a color camera with appropriate color filters and optical arrangements.

Featured in the design of the 6326-A is a tipless structure which allows the use of a longer deflecting yoke than a side-tip structure. The longer yoke offers the advantages of less deflecting power, and a narrower deflecting angle which effectively reduces deflection distortion and improves the center-to-edge focus of the beam. In addition, the tipless structure simpli-

fies the layout of optical arrangements for light splitting in a color system.

The 6326-A is an improved version of the 6326 and is unilaterally interchangeable with it.

PRINCIPLES OF OPERATION

The structural arrangement of the 6326-A, shown in Fig. 1, consists of the signal electrode which is a transparent conducting film on the inner surface of the faceplate; a light-sensitive element consisting of a thin layer of photoconductive material deposited on the signal electrode; a fine mesh screen (grid No. 5) located adjacent to the photoconductive layer; a beam-focusing electrode (grid No. 4) connected to grid No. 5; a dynamic-focusing electrode (grid No. 3); and an electron gun for producing a beam of electrons.

Each element of the photoconductive layer is an insulator in the dark but becomes slightly conductive when it is illuminated and acts like a leaky capacitor having one plate at the fixed positive potential of the signal electrode and the other floating. When light from the film or live subject being televised is focused on the photoconductive-layer surface next to the faceplate, each illuminated layer element conducts slightly depending on the amount of illumination on the element and thus causes the potential of its opposite surface (on the gun side) to rise in less than the time of one frame toward that of the signal-electrode potential. Hence, there appears on the gun side of the entire layer surface a positive potential pattern, composed of the various element potentials, corresponding to the pattern of light from the film projector, or live subject, imaged on the layer.

The gun side of the photoconductive layer is scanned by a low-velocity electron beam produced by the electron gun. This gun contains a thermionic cathode, a control grid (grid No. 1), and an accelerating grid (grid No. 2). The beam is focused at the surface of the photoconductive layer by the combined action of the uniform magnetic field of an external coil and the electrostatic fields of grids No. 3 and No. 4. If desired, grid No. 3 may be operated separately to permit the use of circuitry to provide for the



feature of dynamic focusing. Grid No.5 serves to provide a uniform decelerating field between itself and the photoconductive layer so that the electron beam will approach the layer in a direction perpendicular to it—a condition necessary for driving the surface to cathode potential. The beam electrons approach the layer at low velocity because of the lower operating potential of the signal electrode.

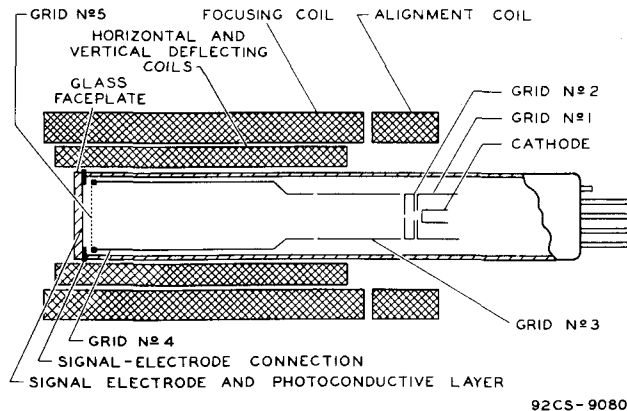


Fig. 1 - Schematic Arrangement of Type 6326-A.

When the gun side of the photoconductive layer with its positive potential pattern is scanned by the electron beam, electrons are deposited from the beam until the surface potential is reduced to that of the cathode, and thereafter are turned back to form a return beam which is not utilized. Deposition of electrons on the scanned surface of any particular element of the layer causes a change in the difference of potential between the two surfaces of the element. When the two surfaces of the element, which in effect is a charged capacitor, are connected through the external signal-electrode circuit and the scanning beam, a capacitive current is produced and constitutes the video signal. The magnitude of the current is proportional to the surface potential of the element being scanned and to the rate of scan. The video-signal current is then used to develop a signal output voltage across a load resistor. The signal polarity is such that for highlights in the film or live subject, the grid of the first video-amplifier tube swings in a negative direction.

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.

DATA

General:

Heater, for Unipotential Cathode:
Voltage (AC or DC) $6.3 \pm 10\%$ volts
Current 0.6 amp

Direct Interelectrode Capacitance:

Signal electrode to
all other electrodes 4.5 μf
Spectral Response See Curves in Fig. 10

Photoconductive Layer:

Maximum useful diagonal of
rectangular image (4×3
aspect ratio) 0.62 inch
Orientation of quality rectangle—Proper orientation 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 index pin. The masking is for orientation only and does not define the proper scanned area of the photoconductive layer.

Focusing Method Magnetic
Deflection Method Magnetic
Overall Length $6\frac{1}{4}'' \pm 1\frac{1}{4}''$
Greatest Diameter $1.125'' \pm 0.010''$
Bulb T-8
Base Small-Button Ditetra 8-Pin (JETEC No. E8-11)
Operating Position Approx. horizontal, or faceplate up
Weight (Approx.) 2 oz

Maximum Ratings, Absolute Values:

SIGNAL-ELECTRODE VOLTAGE	100 max.	volts
GRID-No.5 & GRID-No.4 VOLTAGE	350 max.	volts
GRID-No.3 VOLTAGE	350 max.	volts
GRID-No.2 VOLTAGE	350 max.	volts
GRID-No.1 VOLTAGE:		
Negative bias value	125 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

FACEPLATE:

Illumination	1000 max.	ft-c
Temperature	60 max.	$^{\circ}\text{C}$

Typical Operation with Static Focusing:

Grid No.3 connected to grids No.4 and No.5;
scanned area of $1\frac{1}{2}'' \times 3\frac{3}{8}''$

Faceplate Illumination:

Average highlight [▲] , for pickup from film	50 to 300	ft-c
Constant highlight, for pickup from limited-motion live scenes	20	ft-c

Signal-Electrode Voltage:

For pickup from film	20 to 40	volts
For pickup from limited-motion live scenes	40 to 70	volts

Grid-No.5 (Decelerator) and

Grids-No.4 & No.3 (Beam-Focus Electrodes) Voltage	200 to 300	volts
Grid-No.2 (Accelerator) Voltage	300	volts

Grid-No.1 Voltage for Picture Cutoff [●]	-45 to -100	volts
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Highlight Signal-Electrode Current	0.3 to 0.4	μamp
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Average Signal-Output Current [#]	0.1 to 0.2	μamp
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Peak Signal-Output Current	0.3 to 0.4	μamp
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Maximum Dark Current:

For pickup from film	0.004	μamp
For pickup from limited-motion live scenes	0.02	μamp

Average "Gamma" of Transfer Characteristic for signal-output current between 0.02 μamp and 0.2 μamp 0.65

Visual Equivalent Signal-to-Noise Ratio (Approx.)[○] 300:1

Minimum Peak-to-Peak Blanking Voltage:

When applied to grid No.1	40	volts
When applied to cathode	10	volts

Field Strength of Adjustable

Alignment Coil	0 to 4	gausses
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Typical Operation with Dynamic Focusing:

Grid No.3 used separately as Dynamic Focusing Electrode;
scanned area of $1/2" \times 3/8"$

Values are the same as shown above for Typical Operation with Static Focusing except as follows:

Grid-No.5 (Decelerator) and Grid-No.4
(Beam-Focus Electrode**) Voltage . . . 200 to 300 volts

Grid-No.3 (Dynamic-Focus
Electrode**) Voltage:

DC value 140 to 240 volts

Peak-to-peak value (Approx.) 60 volts

- ♣ This capacitance, which effectively is the output impedance of the 6326-A, is increased by about $3 \mu\text{f}$ 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.
- ▲ Averaged over the time of one TV frame.
- * Beam focus is obtained by combined effect of grids-No.4 & No.3 voltage which should be adjustable over indicated range, and a focusing coil having an average field strength of 40 gauss.
- With no blanking voltage on grid No.1.
- # Defined as the component of the signal-electrode current after the dark-current component has been subtracted.
- For amplifier system shown in Fig.5 (b). 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.
- ** Static beam focus is obtained by combined effect of grid-No.4 voltage which should be adjustable over indicated range, and a focusing coil having an average field strength of 40 gauss. Dynamic beam focus to give improved edge focus is supplementary to static beam focus and is accomplished by adjusting the dc grid-No.3 voltage to a value about 60 volts lower than that of grid No.4 and by applying to grid No.3 an ac voltage having parabolic waveform. (For circuit, see Fig.3.)

OPERATING CONSIDERATIONS

The *maximum ratings* shown for the 6326-A are limiting values above which its serviceability may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these maximum ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by an amount such that the absolute values will never be exceeded under any usual conditions of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

In the *handling* of the 6326-A, precautions should be taken to keep the tube in a vertical position with the faceplate up. This procedure will prevent any loose particles in the tube from causing possible damage to the photoconductive layer.

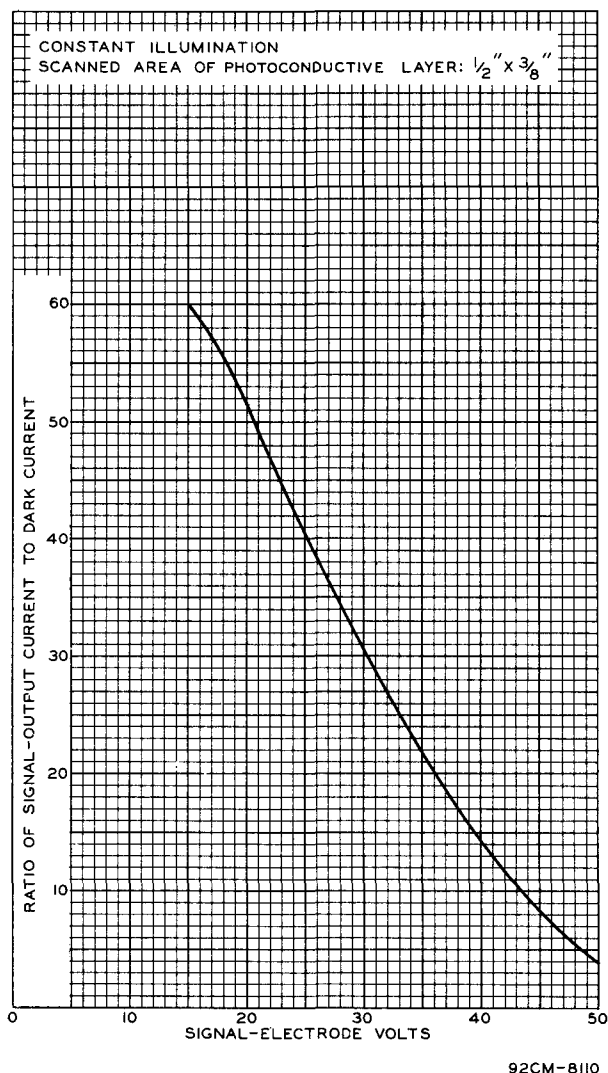
The *base pins* of the 6326-A fit the ditettr 8-contact connector, such as Cinch No.54A18088, or equivalent.

The *signal-electrode connection* is made by a suitable spring contact bearing against the edge of the metal flange at the face end of the tube. This spring contact may conveniently be provided as part of the focusing-coil design.

Support for the 6326-A is provided by a suitable spring-finger suspension at the face end of the tube and by a clamping mechanism near the

base end. Orientation of the 6326-A in its support should be such that 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 index pin.

The *optical system* associated with the 6326-A should be of high quality and provide depth of focus sufficient to focus a sharp image on the photoconductive layer.



92CM-8110

Fig. 2 - Typical Characteristic of Type 6326-A.

The *deflecting yoke and focusing coil*, designed to fit around the tipless structure of the 6326-A, should extend $1/4$ to $1/2$ inch beyond the faceplate of the tube, as shown in Fig.1. A long yoke, in comparison with a short yoke, not only requires less deflecting power but also deflects the beam through a narrower angle which effectively gives better center-to-edge focus and reduces geometric distortion of the image. Freedom



from such distortion is particularly important in color cameras utilizing the method of simultaneous pickup in which three images must be identical for proper registration of the three video signals.

The yoke should be positioned so that the end of the deflecting coils toward the base of the tube will not extend more than 3-1/2 inches from the faceplate.

Electrostatic shielding of the signal electrode from external fields is required to prevent interference effects in the picture. Effective shielding from the fields produced by the deflecting components is ordinarily provided by grounding a shield on the inside of the faceplate end of the focusing coil and by grounding a shield on the inside of the deflecting yoke.

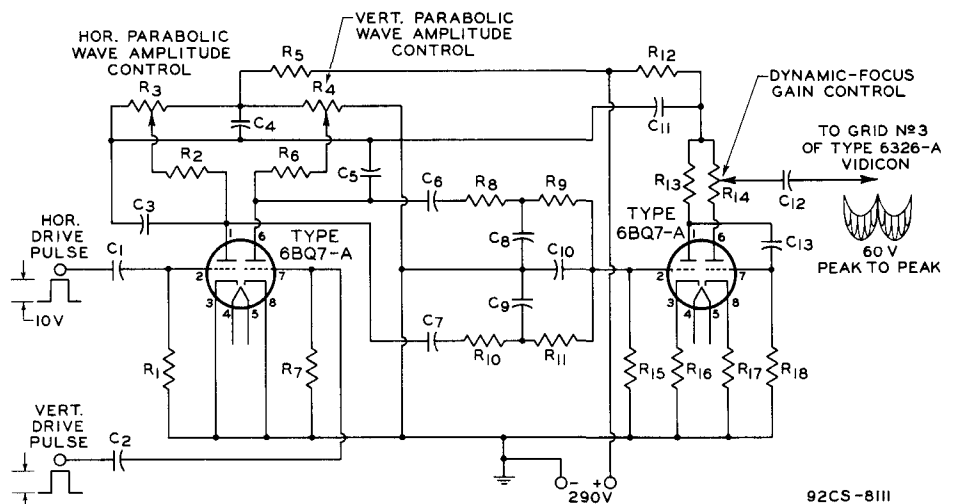
The temperature of the faceplate should not exceed 60°C (140°F), either during operation or storage of the 6326-A. Operation with a faceplate temperature in the range from about 25° to 35°C (77° to 99°F) is recommended. The temperature of the faceplate is determined by the combined heating effects of the incident illumination on the faceplate, the associated components, and the tube itself. To reduce these heating effects in film-pickup cameras and permit operation in the preferred temperature range with a high value of illumination, the use of an infrared filter between the projector and faceplate as well as a blast of cooling air directed across the faceplate from a blower is recommended.

Signal-output current and dark current both increase with increasing faceplate temperature for a given signal-electrode voltage and illumination. Since the dark current increases the more rapidly of the two, it is necessary to reduce the signal-electrode voltage in an effort to restore the ratio of signal-output current to dark current. Operation at higher faceplate temperatures causes some sacrifice in performance because the sensitivity at a given signal-output-to-dark-current ratio (or the signal-output-to-dark-current ratio at a given sensitivity) is somewhat reduced. Operation at the higher temperatures, however, does not adversely affect the performance of the

tube when it is subsequently operated at a lower temperature.

The **signal-electrode voltage** should be obtained from an adjustable dc source. As the signal-electrode voltage is increased, the signal-output-to-dark-current ratio decreases, as shown in Fig. 2. When the 6326-A is used for pickup from film, the signal-electrode voltage should be set at a value where the dark-current background is absolutely flat or uniform. This same value is also suitable for pickup from limited-motion live scenes when sufficient light is available on the face of the tube. For proper adjustment of the signal-electrode voltage on each 6326-A, see *sequence of adjustments* on page 9.

The signal-electrode voltage required for a given sensitivity and dark current may change



All capacitor voltages are working values

C1: 0.002 μ f, 200 volts	C4 C11: 10 μ f, 300 volts	C7: 0.01 μ f, 300 volts
C2: 0.25 μ f, 200 volts	C5: 0.1 μ f, 300 volts	C8: 0.03 μ f, 300 volts
C3 C9: 0.004 μ f, 300 volts	C6 C12 C13: 0.25 μ f, 300 volts	C10: 0.005 μ f, 300 volts

All resistors are of the carbon-composition type

R1 R7 R18: 500000 ohms, 1/2 watt	R6: 240000 ohms, 1/2 watt	R13: 4000 ohms, 1/2 watt
R2: 55000 ohms, 1/2 watt	R8 R9: 750000 ohms, 1/2 watt	R14: 10000-ohm potentiometer, 2 watts
R3 R4: 250000-ohm potentiometer, 2 watts	R10 R11: 6800 ohms, 1/2 watt	R15: 1 megohm, 1/2 watt
R5: 10000 ohms, 1 watt	R12: 2500 ohms, 1/2 watt	R16 R17: 300 ohms, 1/2 watt

Fig. 3 - Typical Circuit for Supplying Dynamic Focusing Voltage to Type 6326-A.

gradually during the life of the tube. By making the signal-electrode voltage supply adjustable, the equipment designer can provide means to compensate for these changes.

The **grid-No. 4** and the **grid-No. 3** voltage (dc) should be obtained from a common source. When the 6326-A is used without dynamic focusing, grid No. 3 should be connected to grids No. 4 and No. 5, and the voltage source should be adjustable over a range from 200 to 300 volts. Static focusing is obtained by the combined effect of the adjustable grid-No. 3-and-grid-No. 4 voltage and the

magnetic field of a focusing coil capable of providing a fixed strength of 40 gauss at its center.

When advantage is taken of the feature of the 6326-A which permits the use of dynamic focusing to provide improved edge focus, grid No.3 is operated separately as the dynamic-focusing electrode. In this case, the voltage source for grid No.4 should be adjustable over a range from 200 to 300 volts, and grid No.3 is supplied with a dc voltage having a value about 60 volts lower than that applied to grid No.4. In addition, grid No.3 is supplied with an ac voltage obtained from a circuit as shown in Fig.3. In this circuit, the wave-shape of the horizontal and vertical scanning voltages is modified so that a resultant voltage having parabolic waveform is applied to grid No.3.

The *grid-No.1 voltage* should be adjustable from 0 to -110 volts.

The *dc voltages* required by the 6326-A when operating with static focusing can be provided by the circuit shown in Fig.4(a); and when operated with dynamic focusing, by the circuit shown in Fig.4(b).

A *blanking signal* should be supplied to grid No.1 or to the cathode to prevent the electron beam from striking the photoconductive layer during the return portions of the horizontal and vertical deflecting cycles. Unless this is done, the camera-tube return lines will appear in the reproduced picture. The blanking signal is a series of negative voltage pulses when it is applied to grid No.1, or a series of positive voltage pulses when it is applied to the cathode.

Beam intensity is controlled by the amount of negative voltage on grid No.1. The beam must have adequate intensity to drive the highlight elements of the photoconductive-layer surface to cathode potential on each scan. When the beam has an intensity sufficient only to drive the lowlight elements to cathode potential, the highlight elements are not returned to cathode potential. As a result, the picture highlights all have the same brightness and show no detail. Also, when the beam has insufficient intensity, the photoconductive-layer surface which normally rises in potential by only a small fraction of the signal-electrode potential during each scan, gradually rises in potential to a value approaching nearly the full signal-electrode potential in the highlights. Under this condition, many

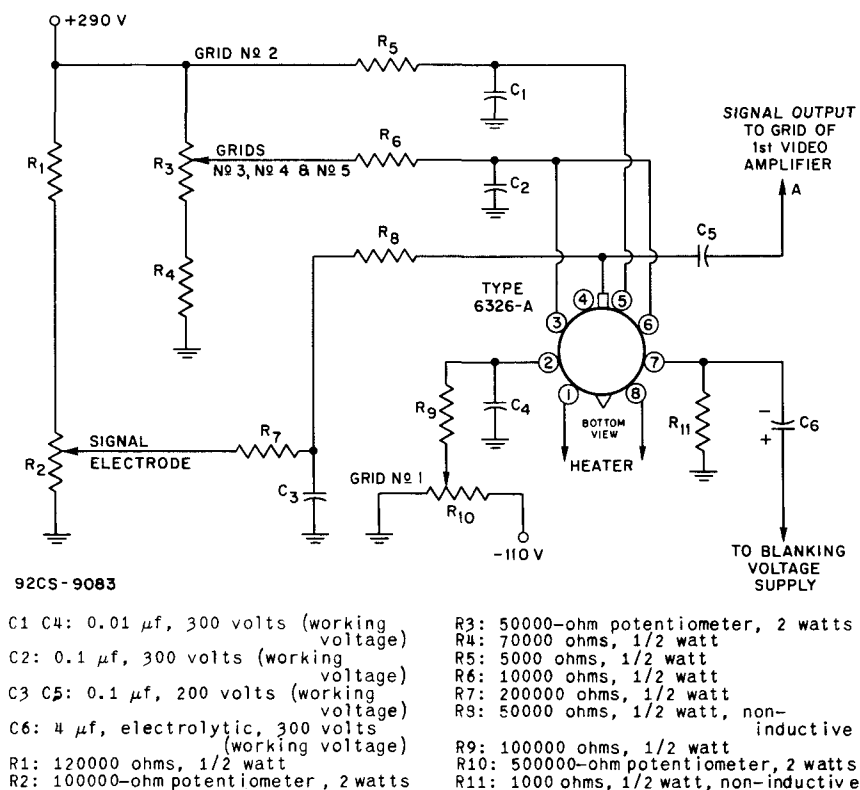


Fig. 4(a) - Typical Voltage Dividers for Supplying DC Electrode Voltages to Type 6326-A when Operated with Grid No.3 Connected to Grids No.4 & No.5.

scans are required to drive to cathode potential any element which has changed from a highlight to a lowlight because of movement of the image on the film. As a result, the highlights tend to "stick". The loss of highlight detail and sticking of the highlights is referred to as "bloom".

On the other hand, a beam with excessively high intensity should not generally be used because the size of the scanning spot increases with resultant decrease in resolution.

The *video amplifier system* should be designed to handle peak ac voltages corresponding to a highlight signal-electrode current of 0.4 micro-ampere through the signal-electrode load resistor. Such a system is shown by the block diagram in Fig.5 (a). This system employs a low-noise, cascode preamplifier having an 8-Mc bandwidth as shown in Fig.5 (b). This type of amplifier insures a signal-to-noise ratio which is adequate for use in the phase-and-aperture-correction circuit illustrated in Fig.5 (c).

Aperture correction compensates for the aperturing effect of the scanning beam in the 6326-A. This effect produces a horizontal amplitude response shown by the "uncompensated" curve in Fig.6. When this effect is compensated by the circuit in Fig.5 (c), the horizontal amplitude



response of the video system is raised to approximately 100 per cent over the entire broadcast bandwidth of 4.5 Mc, and is shown by the "com-

For direct pickup, a good picture can be obtained with a constant highlight illumination of not less than 10 foot-candles, or its equivalent

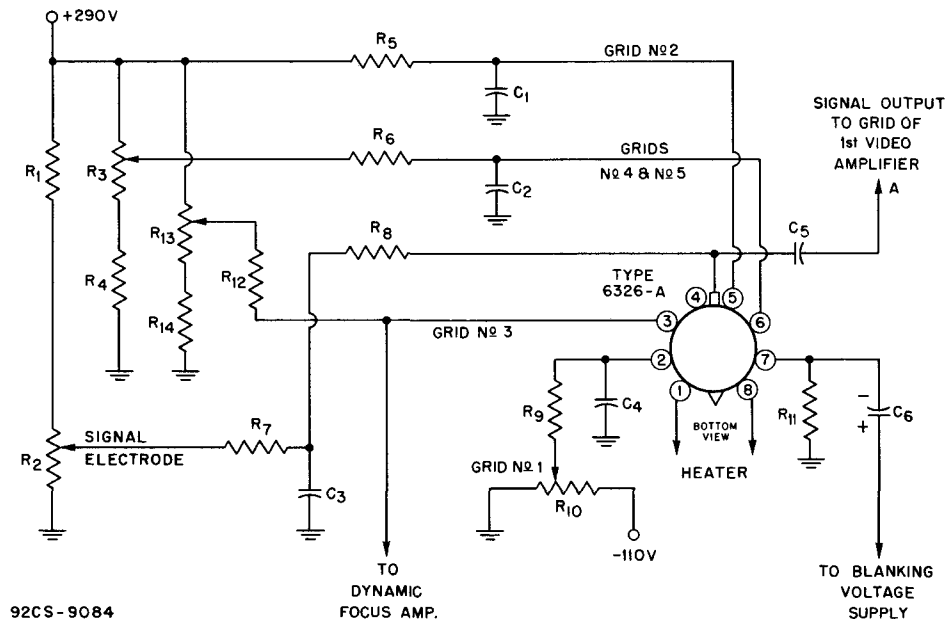
when color filters are used, on the faceplate of the 6326-A. At 10 foot-candles, the signal-electrode voltage will range between 40 and 70 volts. With the relatively low light levels encountered in direct pickup, the lag will be greater than and the black-level uniformity will be inferior to the lag and uniformity obtained under the higher light levels and lower signal-electrode voltages used in film pickup.

In all cases, the illumination level and/or signal-electrode voltage must be limited or adjusted so that the peak signal-output current does not exceed a value of 0.3 to 0.4 microampere. In order that the signal-output current will be known at all times, it is recommended that the camera be provided with a suitable microammeter in the signal-electrode

circuit of each 6326-A to read average current, or that a calibration pulse of the proper magnitude be fed into the input of the video pre-amplifier to indicate peak signal current.

The maximum amount of illumination on the photoconductive layer is limited primarily by the temperature of the faceplate which should never exceed 60°C and should preferably be maintained within the operating range from 25°C to 35°C for most satisfactory performance.

Signal Output and Light Transfer Characteristics. Typical signal output as a function of uniform 2870°K tungsten illumination on the photoconductive layer for different signal-electrode voltages is shown in Fig. 8. It is to be noted that these curves are for a typical 6326-A under the conditions indicated. Because the signal-electrode voltage needed to give maximum sensitivity at a maximum dark current of 0.02 microampere may range between 20 and 100 volts, it is essential that the best operating signal-electrode voltage be determined for each 6326-A. From these curves, it will also be noted that the illumination must be increased about 30 times to produce an increase of 10 times in signal-output current for any given signal-electrode voltage.



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Circuit parts are the same as those shown in Fig. 4(a) with the following additions:
R12: 100000 ohms, 1/2 watt, non-inductive R13: 600000-ohm potentiometer, 2 watts
R14: 50000 ohms, 1/2 watt

Fig. 4(b) - Typical Voltage Dividers for Supplying DC Electrode Voltages to Type 6326-A when Operated with Grid No. 3 Used as Dynamic Focusing Electrode.

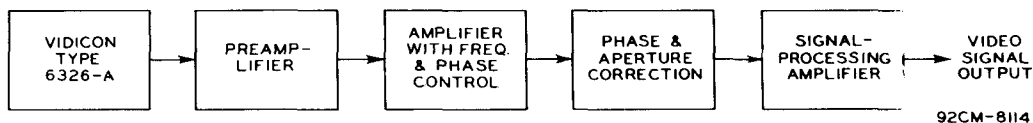
compensated" curve in Fig. 6. This compensation, however, does not affect the vertical resolution. Combining the compensated horizontal resolution and the uncorrected vertical resolution yields the equivalent amplitude response which is shown in Fig. 6 and is expressed by the equation

$$\text{Equiv. Amplitude Response} = \sqrt{R_v \times R_h}$$

where R_v and R_h are the vertical amplitude response and the horizontal amplitude response, respectively.

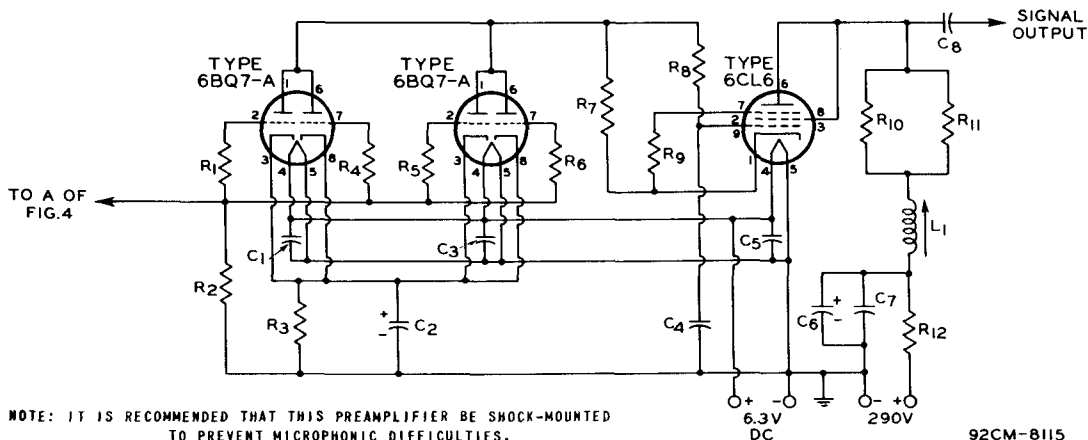
The illumination incident on the faceplate will range from relatively high values for film pickup to relatively low values for direct pickup. For satisfactory operation of the 6326-A at these extremely different light levels, it is essential that the signal-electrode voltage be properly adjusted with reference to the curves in Figs. 2, 7, and 9. For proper adjustment of the signal-electrode voltage, see sequence of adjustments on page 9.

For film pickup, an average highlight illumination of 50 to 300 foot-candles is required on the faceplate of the 6326-A for minimum lag and best black-level uniformity. For this range of illumination, the signal-electrode voltage will range between 20 to 40 volts.



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Fig.5(a) - Block Diagram of Video System.



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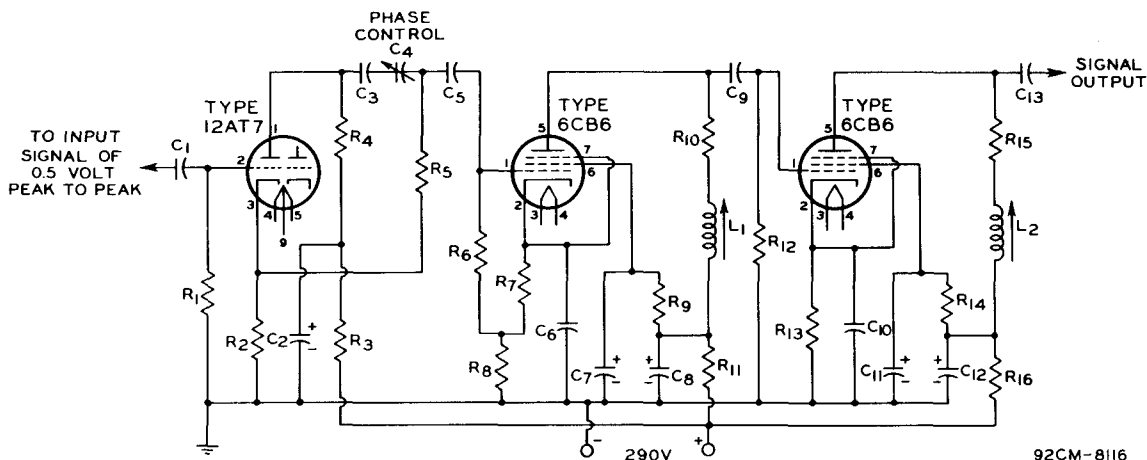
All capacitor voltages are working values

C1 C3 C5: 0.01 μ f, 100 volts
 C2: 2000 μ f, electrolytic, 3 volts
 C4: 0.01 μ f, 350 volts
 C6: 90 μ f, electrolytic, 350 volts
 C7: 0.1 μ f, 350 volts
 C8: 0.1 μ f, 300 volts
 L1: 12 μ h peaking coil, adjustable core to cover range from 9 to 15 μ h

All resistors are of the carbon-composition type

R1 R4 R5 R6: 100 ohms, 1/2 watt
 R2: 500000 ohms, 1/2 watt
 R3: 15 ohms, 1/2 watt
 R7: 12 ohms, 1/2 watt
 R8: 100000 ohms, 1/2 watt
 R9: 1 megohm, 1/2 watt
 R10 R11: 1800 ohms, 2 watts
 R12: 470 ohms, 2 watts

Fig.5(b) - Low-Noise Cascode Preamplifier Having 8-Mc Bandwidth.



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All capacitor voltages are working values

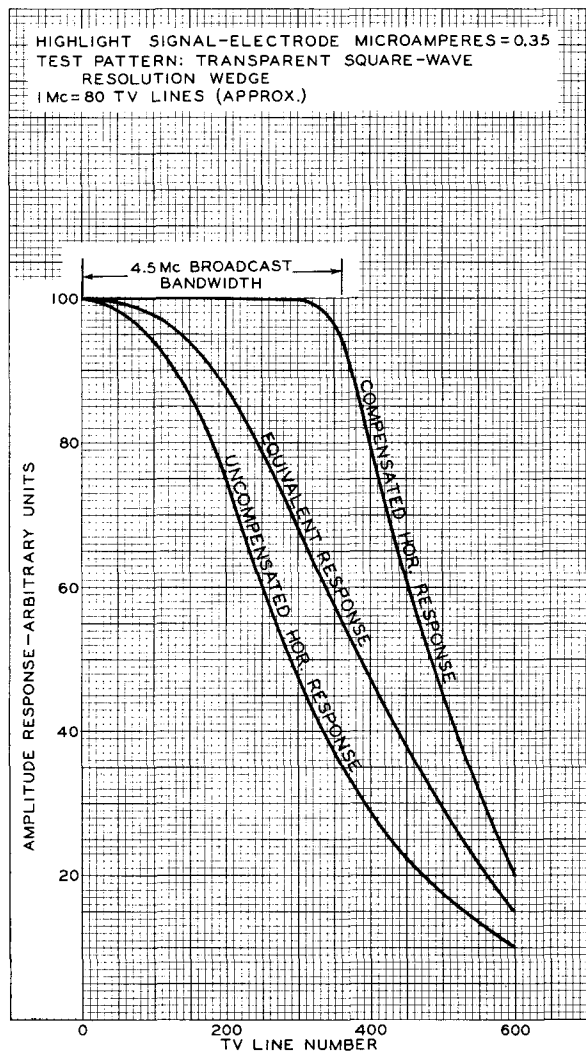
C1: 0.25 μ f, 300 volts
 C2 C7 C8 C11 C12: 10 μ f, electrolytic 350 volts
 C3: 0.001 μ f, 600 volts
 C4: 0-100 μ f, adjustable, 600 volts
 C5: 0.25 μ f, 200 volts
 C6: 200 μ f, 600 volts
 C9 C13: 0.1 μ f, 300 volts
 C10: 75 μ f, 600 volts
 L1 L2: 15 μ h peaking coil, adjustable core to cover range from 10 to 25 μ h

All resistors are of the carbon-composition type

R1 R6: 330000 ohms, 1/2 watt
 R2 R4: 100 ohms, 1/2 watt
 R3 R11 R16: 8200 ohms, 2 watts
 R5: 680 ohms, 1/2 watt
 R7: 120 ohms, 1/2 watt
 R8: 300 ohms, 1/2 watt
 R9 R14: 62000 ohms, 1/2 watt
 R10 R15: 1500 ohms, 1/2 watt
 R12: 250000 ohms, 1/2 watt
 R13: 220 ohms, 1/2 watt

Fig.5(c) - Phase- and Aperture-Correction Circuit.

The average "gamma", or slope, of the light transfer characteristic curves shown in Fig. 8 is approximately 0.65. This value is relatively constant over an adjustment range of 3 to 1 in signal-electrode voltage for a signal-output current range between 0.01 and 0.3 microampere.

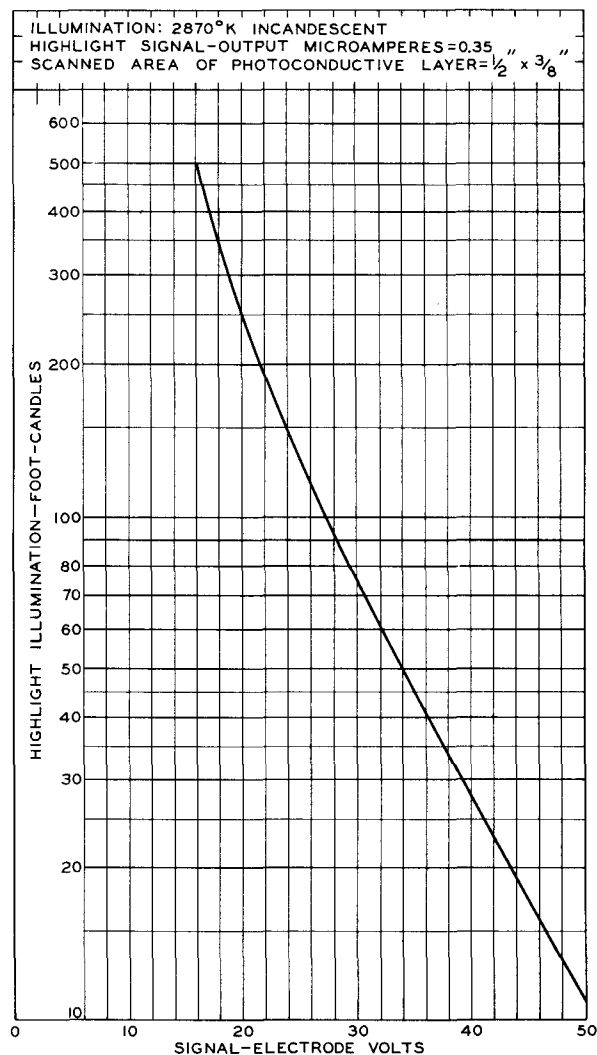


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Fig. 6 - Characteristics of the Video System Showing Uncompensated Horizontal Amplitude Response, Compensated Horizontal Amplitude Response, and Equivalent Amplitude Response.

Close uniformity in the value of gamma between individual 6326-A's is maintained to insure satisfactory operation of color cameras in which the signal-output currents of the three 6326-A's must match closely over a wide range of scene illumination. Because its transfer characteristic is approximately the complement of the transfer characteristic of a kinescope, the 6326-A can produce a picture having proper tone rendition.

Persistence or lag of the photoconductive layer as a function of signal-electrode voltage is given by the curve in Fig. 9. This curve shows decreasing lag with decreasing signal-electrode voltage, and a small value of lag for the low signal-electrode voltages recommended for film pickup.



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Fig. 7 - Typical Characteristic of Type 6326-A.

The spectral response of the 6326-A is shown by curves A and C in Fig. 10. Curve A is on the basis of equal values of signal-output current at all wavelengths, whereas curve C is on the basis of equal values of signal-output current with radiant flux from a tungsten source at 2870°K. For comparison purposes, the response of the eye is shown in curve B.

Full-size scanning of the 1/2" x 3/8" area of the photoconductive layer should always be used. This condition can be assured by first adjusting the deflection circuits to overscan the photoconductive layer sufficiently so that



the edges of the sensitive area can be seen on the monitor. Then, after centering the image on the tube face just inside the edges of the sensitive area (see Fig. 11), reduce scanning until

grid-No. 1 bias to just bring out the highlight details of the picture on the monitor. Adjust Beam-Focus Voltage Control and the optical focus to obtain the best picture. Reduce horizontal and vertical scanning so that the edges of the image extend just outside the scanned area on the monitor.

With no illumination on the tube face, increase the signal-electrode voltage until a dark-current value of approximately 0.005 microampere is measured. If a microammeter is not available or if an available microammeter is not sufficiently sensitive, note the setting of the Signal-

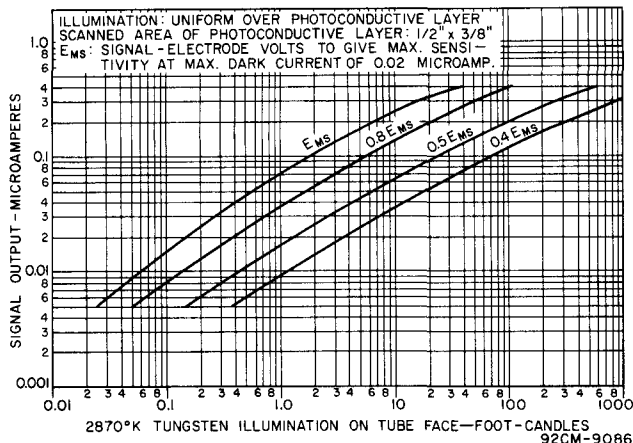


Fig. 8 - Light Transfer Characteristics of a Typical 6326-A Vidicon.

the edges just disappear. In this way, the maximum signal-to-noise ratio and maximum resolution can be obtained. It should be noted that over-scanning the photoconductive layer produces a smaller-than-normal picture on the monitor.

Underscanning of the photoconductive layer, i.e., scanning an area of the layer less than its useful quality area, should never be permitted. This condition which produces a larger-than-normal picture on the monitor, not only causes sacrifice in signal-to-noise ratio and resolution, but also may cause permanent change in sensitivity and dark current of the underscanned area. An underscanned area showing such a change will be visible in the picture when full-size scanning is restored.

Failure of scanning even for a few minutes may permanently damage the photoconductive layer. The damaged area shows up as a spot or line in the picture during subsequent operation. To avoid damaging the 6326-A during scanning failure, it is necessary to prevent the scanning beam from reaching the layer. The scanning beam can conveniently be prevented from reaching the layer by increasing the grid-No. 1 voltage to cutoff.

The *sequence of adjustments* in operating the 6326-A for film pickup is as follows: With the Grid-No. 1 Voltage Control set for minimum bias, Signal-Electrode Voltage Control set for minimum voltage, and Deflection Controls set for maximum overscan, apply other voltages to the 6326-A as indicated under *Typical Operation*.

Next, with the projector operating and with a suitable test strip of film in the gate, focus and center the image from the projector on the face of the tube as shown in Fig. 11. Increase

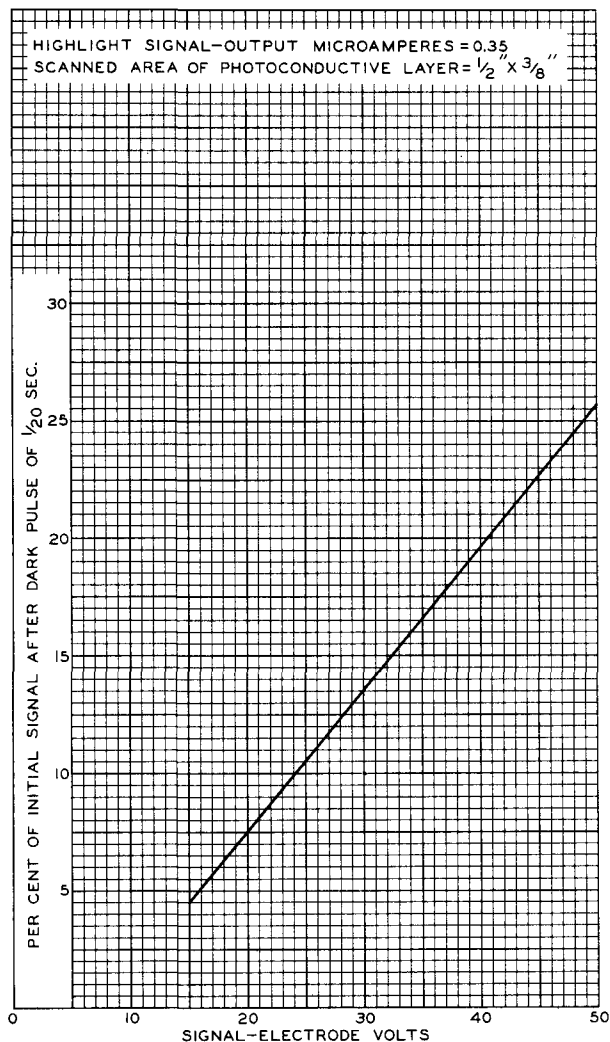


Fig. 9 - Persistence Characteristic of Type 6326-A.

Electrode Voltage Control at which flare becomes objectionable or the dark-current value reaches 0.02 microampere, and then adjust this control to give approximately one half of the voltage determined in this manner.

Next, adjust the alignment field so that the center of the picture does not move as the beam-focus voltage is varied. Some readjustment of horizontal and vertical centering may be necessary after alignment. Now, with the projector operating and no film in the gate, adjust the illumination on the faceplate of the 6326-A so as to obtain a dc signal-electrode current of 0.35 to 0.40 microampere. A value greater than this is not desirable because resolution is sacrificed. Readjust the grid-No.1 voltage to bring out the details in the highlights of the picture.

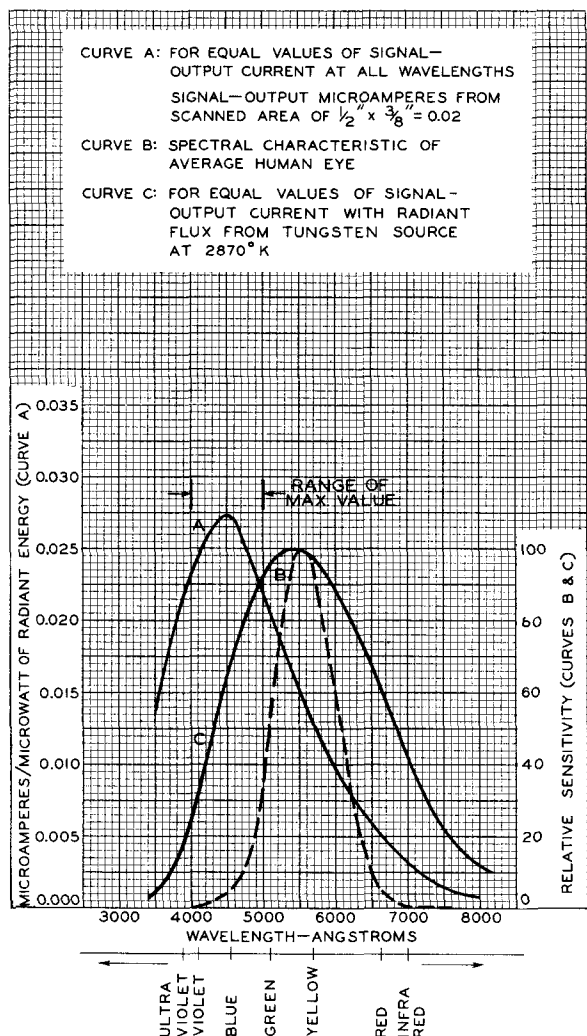


Fig. 10 - Spectral Sensitivity Characteristics of Type 6326-A.

When dynamic focusing is used, and after making the preceding adjustments, adjust the Dynamic-Focus Gain Control to provide the best overall focus.

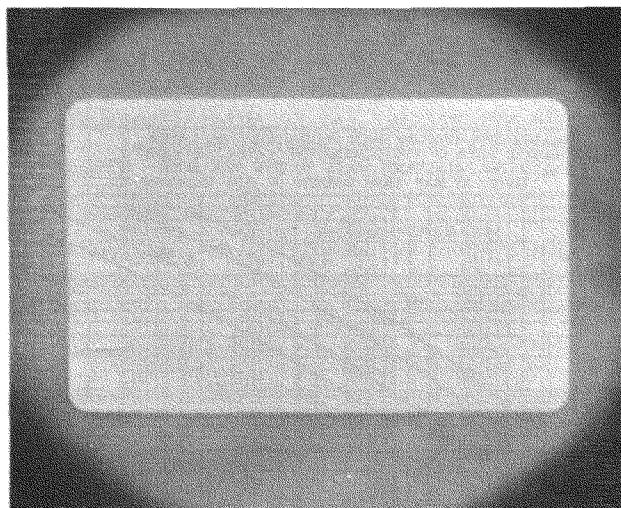


Fig. 11 - Photograph Showing Proper Positioning of Image from Projector on the Face of the Vidicon.

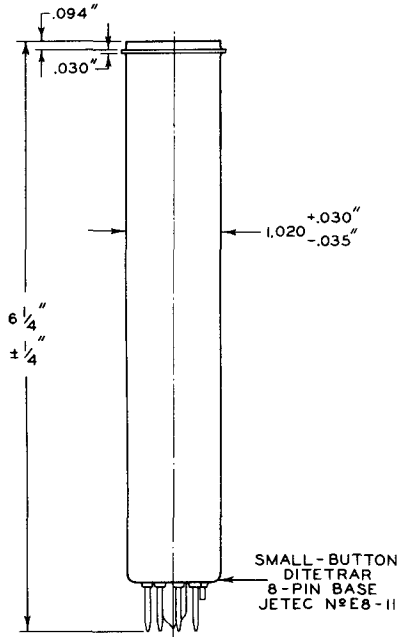
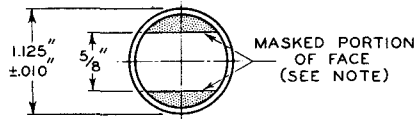
The adjustments in operating the 6326-A for pickup from limited-motion live scenes are similar to those for film pickup except that the signal-electrode voltage is adjusted, with no illumination on the tube face, to the highest value which will permit obtaining a uniform or flat dark-current output. With the signal-electrode voltage thus adjusted, maximum sensitivity for direct pickup is obtained but at a cost of increased lag. In setting up three 6326-A's in a color camera, particular attention must be given to proper alignment, best obtainable focus, and identical centering of scanning areas on the photoconductive layers. Observation of these operating conditions will assure good registration of the three separate video signals.

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DIMENSIONAL OUTLINE

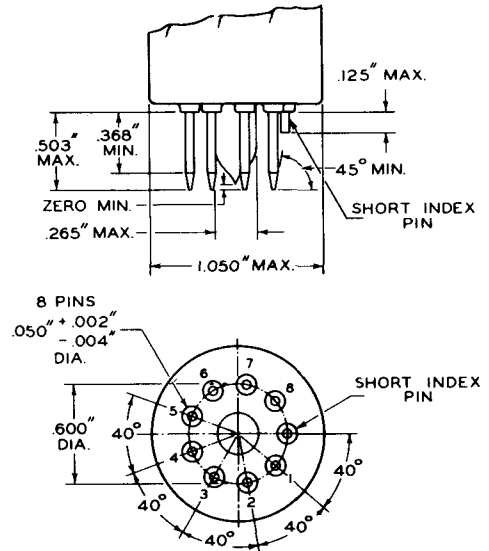


92CS-908I

NOTE: STRAIGHT SIDES OF MASKED PORTIONS ARE PARALLEL TO THE PLANE PASSING THROUGH TUBE AXIS AND SHORT INDEX PIN.

BASE DRAWING

SMALL-BUTTON DITETRAR 8-PIN BASE JETEC N°E8-II



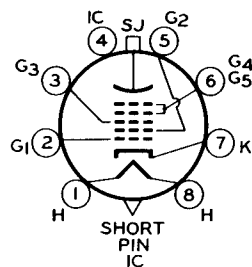
92CS-7765

Base-pin positions are held to tolerances such that pins will fit a flat-plate gauge having thickness of 1/4" and 9 holes $0.0700" \pm 0.0005"$ so located on a $0.6000" \pm 0.0005"$ diameter circle that the distance along the chord between any two adjacent hole centers is $0.2052" \pm 0.0005"$. Gauge is provided with center hole having diameter of $0.300" \pm 0.001"$ and same center as the pin circle.

SOCKET CONNECTIONS

Bottom View

- PIN 1: HEATER
- PIN 2: GRID No.1
- PIN 3: GRID No.3
- PIN 4: INTERNAL CONNECTION-- DO NOT USE
- PIN 5: GRID No.2
- PIN 6: GRIDS No.4 and No.5



- PIN 7: CATHODE
- PIN 8: HEATER
- FLANGE: SIGNAL ELECTRODE (SJ)
- SHORT INDEX PIN: INTERNAL CONNECTION-- MAKE NO CONNECTION

DIRECTION OF LIGHT: INTO FACE END OF TUBE

8HL

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