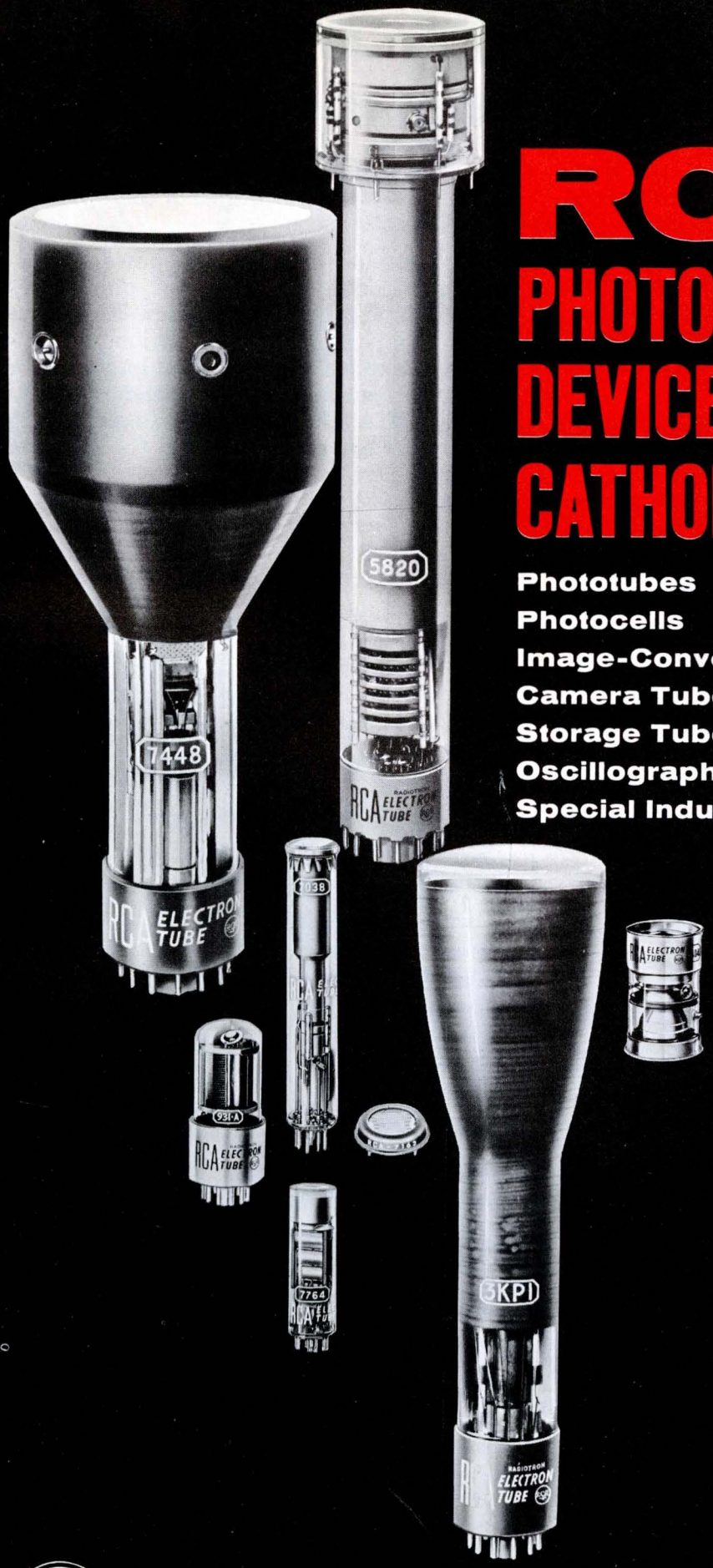
PRICE 50 CENTS



RCA PHOTOSENSITIVE DEVICES AND CATHODE-RAY TUBES

Phototubes
Photocells
Image-Converter Tubes
Camera Tubes
Storage Tubes
Oscillograph Tubes
Special Industrial Kinescopes

RADIO CORPORATION OF AMERICA
ELECTRON TUBE DIVISION
HARRISON, N. J.

CRPD-105B
Printed in U.S.A.

RCA Photosensitive Devices and Cathode-Ray Tubes

THIS CATALOG provides concise technical information on RCA Photosensitive Devices and Cathode-Ray Tubes.

Covered in this revised edition are data and descriptive material on new varieties of multiplier phototubes, new photojunction and photoconductive cells, new camera tubes, new storage tubes, and new cathode-ray tubes.

Also included for the first time are spectral-energy emission curves for the phosphors used in RCA Industrial Tubes. The section on fluorescent screens has been revised to cover the latest descriptions of their persistence characteristics.

The detailed information shown in this catalog for single- and twin-unit phototubes is suitable for design purposes. For other types, more complete information is available in the individual technical bulletins for each type on request to Commercial Engineering, RCA, Harrison, N. J. In requesting such bulletins, please specify the type in which you are interested.

CONTENTS

OTHER RCA PRODUCTS

In addition to the electron devices covered in this booklet, the ELECTRON TUBE DIVISION of the RADIO CORPORATION OF AMERICA offers the following:

RECEIVING TUBES FOR ENTERTAINMENT USE
Rectifiers, Diode Detectors, Converters, Voltage and Power Amplifiers, Oscillators, Mixers, and TV Picture Tubes.

POWER AND GAS TUBES
Vacuum Power Tubes, Rectifier Tubes, Thyratrons, and Ignitrons.

MICROWAVE TUBES
Magnetrons, Traveling-Wave Tubes, and Pencil Tubes.

TEST AND MEASURING EQUIPMENT
For AM, FM, and TV Servicing as well as for Laboratories and Industrial Use.

RECEIVING-TYPE INDUSTRIAL TUBES
"Special Red" Tubes, Premium Tubes, Nuvistor Tubes, Computer Tubes, Glow-Discharge Tubes, Small Thyratrons, Vacuum-Gauge Tubes, and other Special Types.

DRY BATTERIES
For Electron-Tube and Transistor Radios, Flashlights, and Industrial Applications.

AUDIO DEVICES AND TV ACCESSORIES
Magnetic Recording Sound Tape and Accessories, TV-Set Couplers and Lightning Arrestors.

SEMICONDUCTOR DEVICES
Transistors and Semiconductor Diodes.

For a complete listing of these RCA products, or for technical information on any of these items, see your RCA Tube Distributor, or write to Commercial Engineering, RCA, Harrison, New Jersey.

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INDEX TO TYPES

KEY TO BASE AND ENVELOPE CONNECTION DIAGRAMS

Diagrams show terminals viewed from the base end of the type

C = External Conductive Coating

C_b = Balancing Capacitance

CL = Collector

DJ = Deflecting Electrode

DY = Dynode

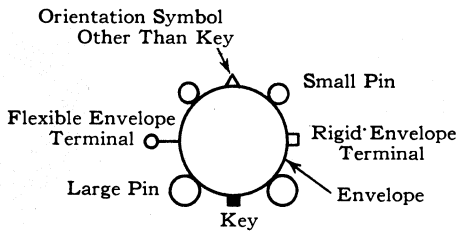
G = Grid

H = Heater

IC = Internal Connection —Do Not Use

K = Cathode

NC = No Connection



P = Anode

PC = Photocathode

PJ = Pattern Electrode

SHJ = Shading Electrode

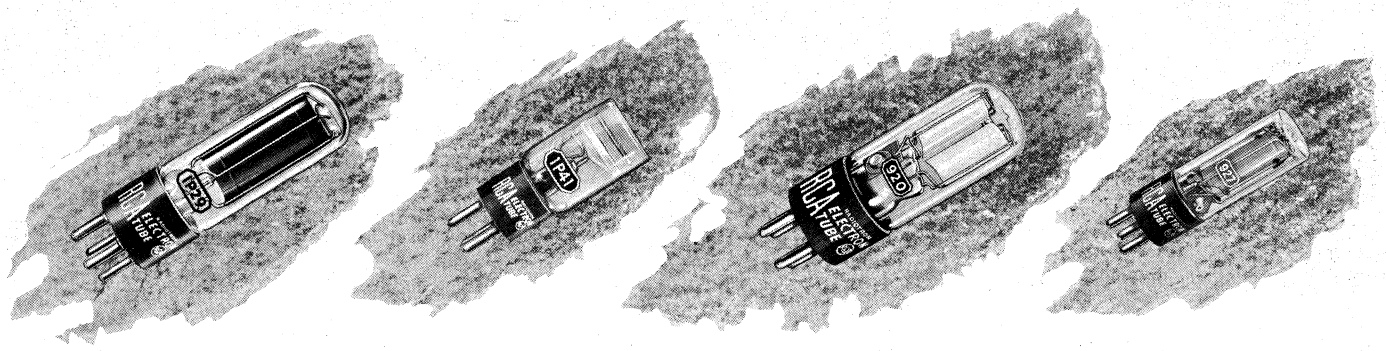
SJ = Signal Electrode

SS = Storage Surface

U = Unit

• = Gas-Type Tube

Lambda (λ) indicates that the primary characteristic of the element is designed to vary under the influence of light.



SINGLE- AND TWIN-UNIT TYPES—Gas Types

RCA Type	Description	Outline, Basing Diagram ♦	Spectral Response #	Wavelength of Max. Spectral Response angstroms	Maximum Ratings *				Characteristics						
					Anode Supply Voltage dc or peak ac volts	Average Cathode-Current Density● μa/sq.in.	Average Cathode Current● μa	Ambient Temperature °C	Anode Supply Voltage dc volts	SENSITIVITY: Radiant □ μa/μwatt	SENSITIVITY: Luminous ‡ μa/lumen 0 cps	SENSITIVITY: Luminous ‡ μa/lumen 5000 cps	SENSITIVITY: Luminous ‡ μa/lumen 10000 cps	Max. Gas Amplification Factor	Max. Anode Dark Current at 25°C μa
1P29	For colorimetric applications.	23	S-3	4200	100	25†	5†	100	90	0.011	40	35	31	9.0	0.1
1P37	For sound reproduction from a dye-image sound track.	23	S-4	4000	100	25†	5†	75	90	0.13	135	124	108	5.5	0.05
1P40	Similar to 930 except has non-hygroscopic base.●●	11	S-1	8000	90	30△	3△	100	90	0.013	135	111	101	10.0	0.005
1P41	End type (head-on operation). For relay applications.	5	S-1	8000	90	20△	1.5△	100	90	0.0084	90	77	67	8.5	0.1
868	For sound reproduction.	23	S-1	8000	100	25†	5†	100	90	0.0084	90	77	67	8.0	0.1
918	For sound reproduction.	23	S-1	8000	90	25△	5△	100	90	0.014	150	120	105	10.5	0.1
920	Twin type. For push-pull sound reproduction from a double sound track.✠	22	S-1	8000	90	15△	2△	100	90	0.0094	100	85	74	9.0	0.1
921	Cartridge type. For relay applications.	34	S-1	8000	90	30△	3△	100	90	0.013	135	119	108	10.0	0.01
923	For renewal use. In new equipment design, use 1P40 or 930.	21	S-1	8000	90	30△	3△	100	90	0.013	135	111	101	10.0	0.1
927	For 16-mm sound equipment.	6	S-1	8000	90	30△	2△	100	90	0.012	125	110	100	10.0	0.1
928	Non-directional type. For relay applications.	17	S-1	8000	90	30△	3△	100	90	0.0061	65	56	50	10.0	0.1
930	For sound reproduction and relay applications.	11	S-1	8000	90	30△	3△	100	90	0.013	135	111	101	10.0	0.1
5581	For sound reproduction involving a dye-image sound track in conjunction with an incandescent light source. ✠	11	S-4	4000	100	30†	3†	75	90	0.13	135	124	108	5.5	0.05
5582		33	S-4	4000	100	20†	2†	75	90	0.12	120	110	96	5.5	0.05
5583		6	S-4	4000	100	20†	2†	75	90	0.13	135	124	108	5.5	0.05
5584		22	S-4	4000	100	10†	2†	75	90	0.12	120	110	96	5.5	0.05
6405/ 1640	For industrial applications critical as to microphonics and sensitivity gradient.	29	S-1	8000	90	25△	5△	100	50	0.0033	35	30	26	2.5	0.1
6953	Unobstructed cathode area. For sound reproduction.	15	S-1	8000	90	30△	3△	100	90	0.019	200	165	150	10.0	0.1

♦ For Dimensional Outlines and Basing Diagrams, see pages 10 to 15.

\# For Spectral Sensitivity Curves, see page 18.

* Absolute values.

● Averaged over any interval of 30 seconds maximum.

□ At wavelength of maximum spectral response for each type.

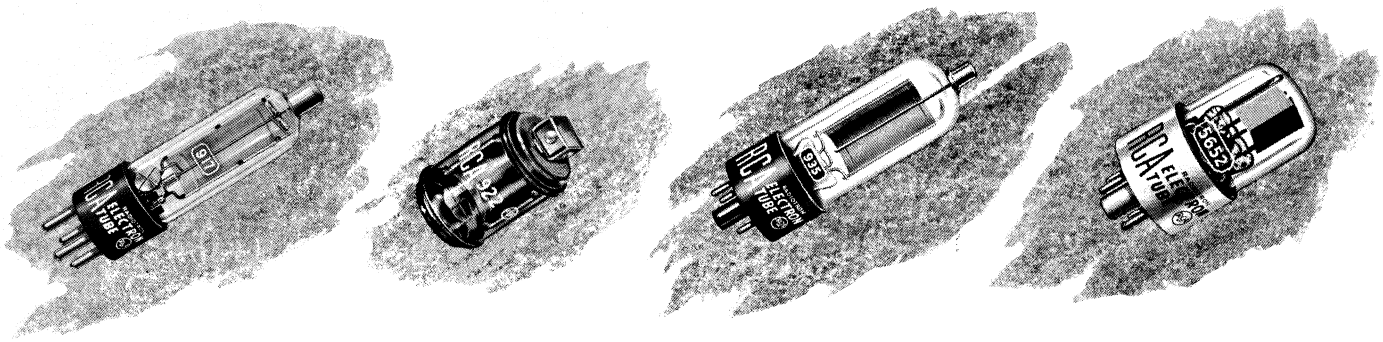
‡ On basis of tungsten-filament light source operated at 2870° K, dc anode supply voltage as indicated, and a 1-megohm load resistor.

† May be doubled when anode supply voltage is limited to 80 volts.

●● For applications critical as to leakage under high-humidity conditions.

△ May be doubled when anode supply voltage is limited to 70 volts.

✠ Values shown for this type are for each unit.



SINGLE- AND TWIN-UNIT TYPES—Vacuum Types

RCA Type	Description	Outline, Basing Diagram ♦	Spectral Response #	Wavelength of Max. Spectral Response angstroms	Maximum Ratings *				Characteristics			
					Anode Supply Voltage dc or peak ac volts	Average Cathode-Current Density● μa/sq.in.	Average Cathode Current● μa	Ambient Temperature °C	Anode Supply Voltage dc volts	SENSITIVITY Radiant□ μa/μwatt	SENSITIVITY Luminous‡ μa/lumen	Max. Anode Dark Current at 25°C μa
1P39	Similar to 929 except has non-hygroscopic base.●●	11	S-4	4000	250	25	5	75	250	0.044	45	0.005
1P42	Small, head-on type. For use where space is limited.	4	S-9	4800	180	25	0.4	75	180	0.025	37	0.005
917 **919**	Low-leakage types for light-measuring and relay applications.▲▲	28	S-1	8000	500	30	10	100	250	0.0019	20	0.005
922	Cartridge type. For relay applications.	33	S-1	8000	500	30	5	100	250	0.0019	20	0.005
925	Short-bulb type. For relay applications.	9	S-1	8000	250	30	5	100	250	0.0019	20	0.0125
926	Cartridge type. For colorimetric applications.	34	S-3	4200	500	30	5	100	250	0.0019	6.5	0.005
929	For light-measuring and relay applications.	11	S-4	4000	250	25	5	75	250	0.044	45	0.0125
934	For sound and facsimile equipment.	6	S-4	4000	250	30	4	75	250	0.029	30	0.005
935	For ultraviolet measurement applications.	27	S-5	3400	250	30	10	75	250	0.043	35	0.0005
5652	Composite anode - cathode type with balancing capacitance. For facsimile service.	10	S-4	4000	250	30★	4★	75	250	0.044	45	0.01
5653	For relay applications.	11	S-4	4000	250	25	5	75	250	0.044	45	0.25
6570	For industrial applications critical as to microphonics and sensitivity gradient.	29	S-1	8000	500	25	5	100	250	0.0028	30	0.013
7043	Non-directional type. For sound reproduction.	16	S-4	4000	250	25	5	75	250	0.044	45	0.0125

♦ For Dimensional Outlines and Basing Diagrams, see pages 10 to 15.

For Spectral Sensitivity Curves, see page 18.

* Absolute values.

● Averaged over any interval of 30 seconds maximum.

□ At wavelength of maximum spectral response for each type.

‡ On basis of tungsten-filament light source operated at 2870° K, dc anode supply voltage as indicated, and a 1-megohm load resistor.

●● For applications critical as to leakage under high-humidity conditions.

▲▲ The 917 and 919 are alike except that 917 has anode connected to top cap, whereas 919 has cathode connected to top cap.

★ For either electrode.

MULTIPLIER TYPES

RCA Type	Description	Outline, Basing Diagram ♦	Spectral Response #	Wavelength of Max. Spectral Response angstroms	Maximum Ratings *§ SUPPLY VOLTAGE E¢ dc or peak ac volts	Between Anode and Final Dynode dc or peak ac volts	Dynode No. 1 dc or peak ac volts	Average Anode Current● ma	Characteristics Supply Voltage (E) Between Anode and Cathode dc volts	SENSITIVITY Radiant□ μa/μwatt	Luminous ‡ amp/lumen	Current Amplification	Max. Equiv. Anode-Dark-Current Input ø lumen	Equiv. Noise Input ## lumen
1P21	9-stage type for specialized scientific applications involving extremely low light levels.	26	S-4	4000	1250	250	—	0.1	1000■	78000	80	2×10^6	5×10^{-10}	5×10^{-13}
1P22	9-stage type having response similar to that of eye. Especially useful in colorimetry.	26	S-8	3650	1250	250	—	1.0	1000■	750	1.0	3.3×10^5	3.75×10^{-7} ⊙	7.5×10^{-12}
1P28	9-stage type for applications involving very low ultraviolet radiation levels.	26	S-5	3400	1250	250	—	0.5	1000■	61800	50	1.25×10^6	1.25×10^{-9}	7.5×10^{-13}
931-A	9-stage type for use in light-operated relays, X-ray exposure control, and facsimile transmission.	26	S-4	4000	1250	250	—	1.0	1000■	24000	24	0.8×10^6	2.5×10^{-9}	9.5×10^{-13}
2020	10-stage, head-on, flat-face type similar to 6342-A but having low-resistivity photocathode.	14	S-11	4400	1500	250	400▲	2.0	1250†	4800	6	1.2×10^5	2.25×10^{-9}	7×10^{-12}
									1500†	22000	28	5.6×10^5	—	—
5819	10-stage, head-on type for scintillation counters and other low-level light sources.	18	S-11	4400	1250	250	300	0.75	1000†	20000	25	5×10^5	2×10^{-9}	7×10^{-12}
6199	10-stage, head-on, flat-face type having small size for use in portable scintillation counters.	20	S-11	4400	1250	250	300	0.75	1000†	22000	27	6×10^5	2.5×10^{-9}	4×10^{-12}
6217	10-stage type for color densitometers, spectrometers, and flying-spot signal generators.	18	S-10	4500	1250	250	—	0.75	1000†	12000	24	6×10^5	2.5×10^{-8}	4×10^{-11}
6328	Short, sturdy, 9-stage type for ac automobile-headlight-control service.	30	S-4	4000	1250	250	—	0.1	1000■	34000	35	—	—	—
6342-A	10-stage, head-on, flat-face type with focusing electrode. Especially useful for fast coincidence scintillation counting.	14	S-11	4400	1500	250	400▲	2.0	1250†	11000	14	1.75×10^5	2×10^{-9}	7×10^{-12}

♦ For Dimensional Outlines and Basing Diagrams, see pages 10 to 15.

For Spectral Sensitivity Curves, see page 18.

* Absolute values.

§ The maximum ambient-temperature rating of all multiplier types is 75° C except for type 1P22 which is limited to 50° C and types 7265 and 7326 which are limited to 85° C.

¢ Between anode and cathode.

● Averaged over any interval of 30 seconds maximum.

□ At wavelength of maximum spectral response for each type.

‡ On basis of tungsten-filament light source operated at 2870° K.

ø At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 20 amperes per lumen, except as noted.

Under conditions of 25° C tube temperature, tungsten-filament light source at 2870° K, and ac amplifier bandwidth of 1 cps.

⊙ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 0.4 ampere per lumen.

■ Supply voltage (E) across voltage divider providing 1/10 of E between cathode and dynode No. 1; 1/10 of E for each succeeding dynode stage; and 1/10 of E between dynode No. 9 and anode.

▲ This value is also the maximum focusing-electrode voltage.

† Supply voltage (E) across voltage divider providing 1/6 of E between cathode and dynode No. 1; 1/12 of E for each succeeding dynode stage; and 1/12 of E between dynode No. 10 and anode. If type has focusing electrode, it is connected to dynode No. 1 at socket.

MULTIPLIER TYPES—Cont'd

RCA Type	Description	Outline, Basing Diagram ♦	Spectral Response #	Wavelength of Max. Spectral Response angstroms	Maximum Ratings *§ SUPPLY VOLTAGE E¢ dc or peak ac volts	Between Anode and Final Dynode dc or peak ac volts	Dynode No. 1 dc or peak ac volts	Average Anode Current● ma	Characteristics: Supply Voltage (E) Between Anode and Cathode dc volts	SENSITIVITY Radiant□ μa/μwatt	SENSITIVITY Luminous‡ amp/lumen	Current Amplification	Max. Equiv. Anode-Dark-Current Input ø lumen	Equiv. Noise Input ## lumen
6472	Short, sturdy, 9-stage type with flexible leads for automobile headlight-control service.	31	S-4	4000	1250	250	—	0.1	1000■	34000	35	—	—	—
6655-A	10-stage, head-on, flat-face type with focusing electrode. For use in scintillation counters.	14	S-11	4400	1250	250	300▲	0.75	1000†	40000	50	9×10^5	2×10^{-9}	7×10^{-12}
6810-A	14-stage, head-on, flat-face type with focusing electrode. Especially useful for fast coincidence scintillation counting.	3	S-11	4400	2400π	400π	400▲π	2.0	2000	700000	875	12.5×10^6	2×10^{-9} ⊕	3.3×10^{-12}
6903	10-stage, head-on, flat-face type with focusing electrode. Especially useful for detection and measurement of ultraviolet radiation.	12	S-13	4400	1250	250	300▲	0.75	1000†	19000	24	4×10^5	3×10^{-9}	6.7×10^{-12}
7029	10-stage dormer-window type with extremely high cathode-sensitivity. Especially useful in low-contrast applications. ★	25	S-17	4900	1250	250	300	0.02	1000¶	27000	40	3.2×10^5	4×10^{-10} ♢	1.1×10^{-11}
7046	14-stage, head-on, flat-face type with $4\frac{7}{16}$"-diameter cathode and 2 focusing electrodes. Especially useful for gamma-ray spectrometry.	1	✠	4200	3400π	400π	—	2.0	2800	140000	180	3×10^6	1.2×10^{-8} △	1×10^{-11}
7102	10-stage, head-on, flat-face type. Especially useful for detection and measurement of red and near-infrared radiation.	20	S-1	8000	1500	250	400	0.01	1250†	420	4.5	1.5×10^5	5×10^{-6} @	1.5×10^{-10}
7117	Short, sturdy, 9-stage type for dc automobile-headlight-control service.	30	S-4	4000	1250π	250π	—	0.1	1000■	34000	35	—	—	—

♦ For Dimensional Outlines and Basing Diagrams, see pages 10 to 15.

For Spectral Sensitivity Curves, see page 18.

* Absolute values.

§ The maximum ambient-temperature rating of all multiplier types is 75° C except for type 1P22 which is limited to 50° C and types 7265 and 7326 which are limited to 85° C.

¢ Between anode and cathode.

● Averaged over any interval of 30 seconds maximum.

□ At wavelength of maximum spectral response for each type.

‡ On basis of tungsten-filament light source operated at 2870° K.

Under conditions of 25° C tube temperature, tungsten-filament light source at 2870° K, and ac amplifier bandwidth of 1 cps.

■ Supply voltage (E) across voltage divider providing 1/10 of E between cathode and dynode No. 1; 1/10 of E for each succeeding dynode stage; and 1/10 of E between dynode No. 9 and anode.

▲ This value is also the maximum focusing-electrode voltage.

† Supply voltage (E) across voltage divider providing 1/6 of E between cathode and dynode No. 1; 1/12 of E for each succeeding dynode stage; and 1/12 of E between dynode No. 10 and anode. If type has focusing electrode, it is connected to dynode No. 1 at socket.

π DC only.

ø At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 20 amperes per lumen, except as noted.

⊕ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 2000 amperes per lumen.

★ Has altitude rating of 60,000 feet.

¶ Supply voltage (E) across voltage divider providing 1/11 of E per stage.

♢ Median value.

✠ Extended S-11 response covering range from about 2500 to 6500 angstroms.

△ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 500 amperes per lumen.

@ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 4 amperes per lumen.

MULTIPLIER TYPES—Cont'd

RCA Type	Description	Outline, Basing Diagram ♦	Spectral Response #	Wavelength of Max. Spectral Response angstroms	Maximum Ratings*§ SUPPLY VOLTAGE E¢ dc or peak ac volts	Between Anode and Final Dynode dc or peak ac volts	Dynode No. 1 dc or peak ac volts	Average Anode Current● ma	Characteristics Supply Voltage (E) Between Anode and Cathode dc volts	SENSITIVITY Radiant □ μa/μwatt	Luminous‡ amp/lumen	Current Amplification	Max. Equiv. Anode-Dark-Current Input lumen	Equiv. Noise Input ## lumen
7200	9-stage, side-on type. For detection and measurement of ultraviolet radiation.	19	S-19	3300	1250	250	—	0.5	1000■	65000	40	1×10^6	2×10^{-9} ø	7.5×10^{-13}
7264	14-stage, head-on type with spherical faceplate. Has focusing and accelerating electrodes. For detection and measurement of nuclear radiation.	2	S-11	4400	2400π	400π	400π▲	2	2000	700000	875	12.5×10^6	2×10^{-9} ⊕	3.3×10^{-12}
7265	14-stage, head-on, flat-face type. Especially useful in scintillation counters, flying-spot scanners, and photometers.	7	S-20	4200	3000π	500π	500π▲	1	2400	600000	1400	9.35×10^6	8×10^{-10} ¶	7.5×10^{-13}
7326	10-stage, head-on, flat-face type. Especially useful in scintillation counters, flying-spot scanners, and photometers.	8	S-20	4200	2400π	500π	500π▲	1	1800†	9600	22.5	1.5×10^5	1.4×10^{-9} ø	1.9×10^{-12}
7746	10-stage, head-on type with spherical faceplate. For use with Cerenkov and other nuclear radiation. Has typical pulse height resolution of 8.5 per cent.	13	S-11	4400	2500π	400π	600π▲	2	2000	960000	1200	16×10^6	9×10^{-10} ô	6×10^{-12}
7764	Very short, 6-stage, head-on type having max. diameter of only ¾" and overall length of about 2¾". Useful where space is very restricted.	32	S-11	4400	1500	300	400	0.5	1200⊙	240	0.3	5×10^3	3×10^{-8} ★	3×10^{-10}
7767	Small, ¾"-diameter, 10-stage, head-on type having flexible leads. For use in probes, in underground geological exploration, and biological tracer studies.	24	S-11	4400	1500	300	400	0.5	1250@	6000	7.5	1.25×10^5	5×10^{-9} ♂	3×10^{-12}

♦ For Dimensional Outlines and Basing Diagrams, see pages 10 to 15.

\# For Spectral Sensitivity Curves, see page 18.

* Absolute values.

§ The maximum ambient-temperature rating of all multiplier types is 75° C except for type 1P22 which is limited to 50° C and types 7265 and 7326 which are limited to 85° C.

¢ Between anode and cathode.

● Averaged over any interval of 30 seconds maximum.

□ At wavelength of maximum spectral response for each type.

‡ On basis of tungsten-filament light source operated at 2870° K.

ó At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 20 amperes per lumen.

Under conditions of 25° C tube temperature, tungsten-filament light source of 2870° K, and ac amplifier bandwidth of 1 cps.

■ Supply voltage (E) across voltage divider providing 1/10 of E between cathode and dynode No. 1; 1/10 of E for each succeeding dynode stage; and 1/10 of E between dynode No. 9 and anode.

π DC only.

▲ This value is also the maximum focusing-electrode voltage.

⊕ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 2000 amperes per lumen.

¶ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 1000 amperes per lumen.

ô Median value

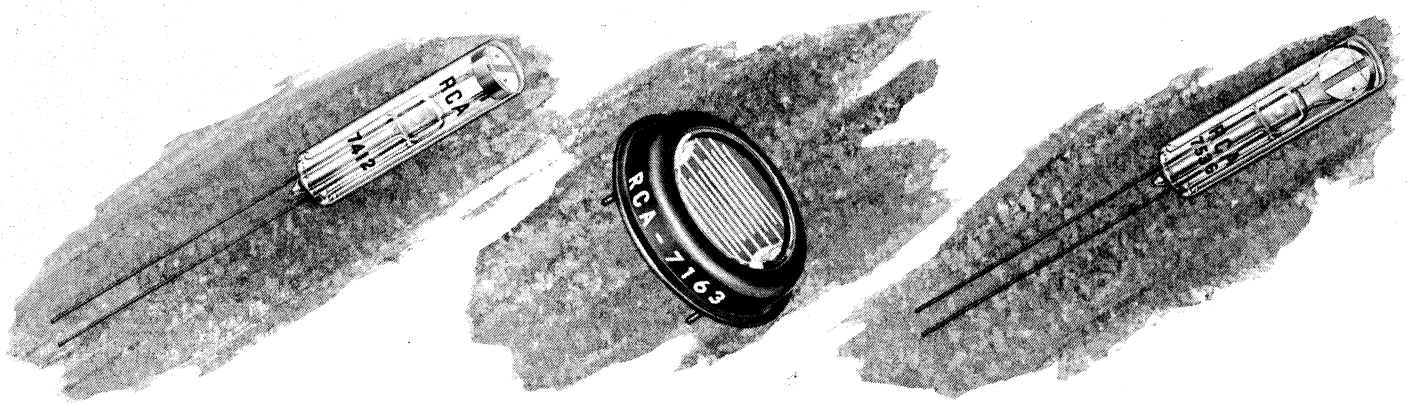
† Supply voltage (E) across voltage divider providing 1/6 of E between cathode and dynode No. 1; 1/8 of E between cathode and focusing electrode; 1/12 of E for each succeeding dynode stage; and 1/12 of E between dynode No. 10 and anode.

⊙ Supply voltage (E) across voltage divider providing 1/4 of E between cathode and dynode No. 1; 1/8 of E for each succeeding dynode stage; and 1/8 of E between dynode No. 6 and anode.

★ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 0.3 ampere per lumen.

@ Supply voltage (E) across voltage divider providing 1/6 of E between cathode and dynode No. 1; 1/12 of E for each succeeding dynode stage; and 1/12 of E between dynode No. 10 and anode.

♂ At 25° C and with supply voltage (E) adjusted to give luminous sensitivity of 7.5 amperes per lumen.



(Illustrations show actual sizes)

PHOTOCONDUCTIVE AND PHOTOJUNCTION TYPES

RCA Type	Description	Outline, Basing Diagram ♦	Spectral Response #	Wavelength of Max. Spectral Response angstroms	Maximum Ratings* Voltage Between Terminals dc volts	Power Dissipation watt	Ambient Temperature Range °C	Photocurrent ma	Characteristics at 25° C Voltage Between Terminals volts	Sensitivity Radiant μa/μwatt	Sensitivity Luminous‡ amp/lumen	Sensitivity Illumination‡ μa/fc	Max. Dark Current μa
6694-A	Tiny, cadmium-sulfide, head-on photoconductive type for relay, computer, and light-meter applications.	37	S-12	5000	π 150	0.030	0 to +70	—	§ 90	† 415	★ 1.0	4▲	0.1
6957	Cadmium-sulfide, head-on photoconductive type for street lighting control and other light-operated relay applications.	35	S-15	5800	π 250	0.5	−75 to +60	50	§ 50	□ 580	ø 1.64	4000△	20
7163	Compact, cadmium - sulfide, head-on photoconductive type for street lighting control and other light-operated relay applications.	36	S-15	5800	¶ 250	0.3	−75 to +60	50	⎈ 50	□ 290	0.82●	2000●	40◆
7223	Very tiny, head-on photojunction type. Germanium p-n alloy junction. For computer and sound-pickup-from-film applications. High near-infrared sensitivity.	41	S-14	15000	≈ 50	0.025	+50	—	≈ 2.5	⊕ 0.68	—	♈ 0.2	14
7412	Small, cadmium-sulfide, head-on photoconductive type. For industrial light-operated relay applications.	38	S-15	5800	¶ 200	0.05	+60	1	§ 12	♂ 1580	4.5@	300@	0.1
7467	Very small, side-on photojunction type. Germanium p-n alloy junction. For computer and sound-pickup-from-film applications. High near-infrared sensitivity.	40	S-14	15000	≈ 50	0.03	−40 to +50	—	≈ 45	0.52	0.014	♈ 0.7	35
7536	Small, cadmium-sulfide, side-on photoconductive type. For industrial light-operated relay applications.	39	S-15	5800	¶ 200	0.05	+60	1	§ 12	♂ 1580	4.5@	300@	0.1

♦ For Dimensional Outlines and Basing Diagrams, see pages 16 and 17.

For Spectral Sensitivity Curves, see page 19.

* Absolute values.

‡ On basis of tungsten-filament light source operated at 2870° K.

π May be applied without regard to polarity.

§ DC volts.

† For condition where the incident power is 0.2 μwatt.

★ Light flux of 100 microlumens used.

▲ Incident illumination 30 footcandles.

□ For condition where the incident power is 6.9 μwatts.

ø Light flux of 2.5 millilumens used.

△ Incident illumination 1 footcandle.

¶ Or peak ac volts. DC volts may be applied without regard to polarity.

⎈ AC rms volts.

◆ DC volts = 50

● Light flux is transmitted through a filter (Corning C.S. No. 1-62, Glass No. 5900 having an effective transmission of luminous flux of 12.5%) onto the sensitive surface. The value of illumination incident on the sensitive surface is 8 footcandles measured before positioning the filter between the light source and the cell.

≈ Polarity must be observed.

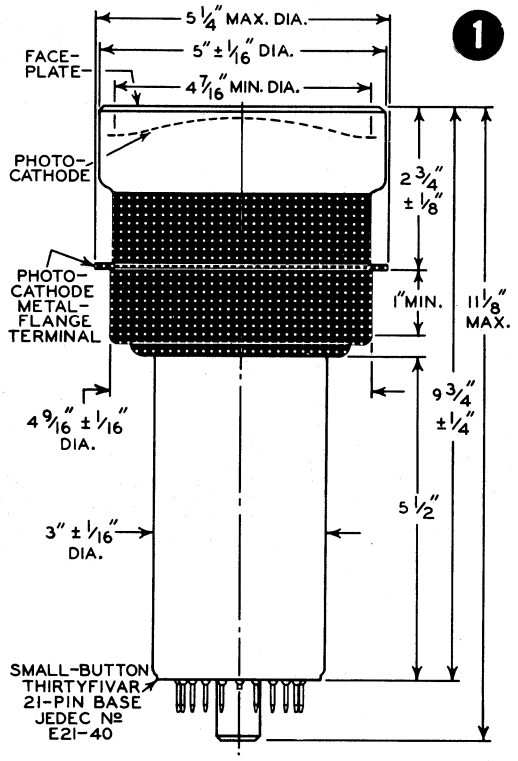
⊕ Radiant Intensity Sensitivity in μa/watt/meter².

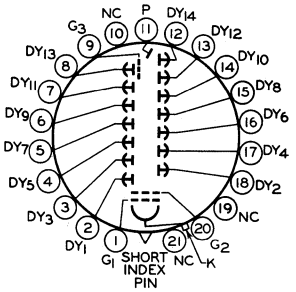
♂ For condition where incident power is 2×10^{-9} watt.

@ Incident illumination 0.01 footcandle.

♈ Incident illumination 73 footcandles.

1





See Note 1, page 17
7046

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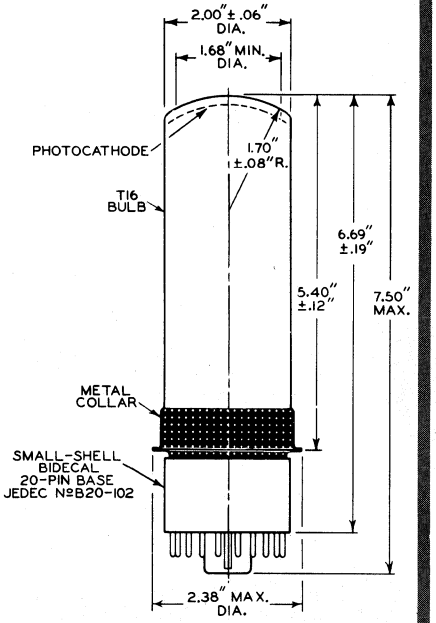

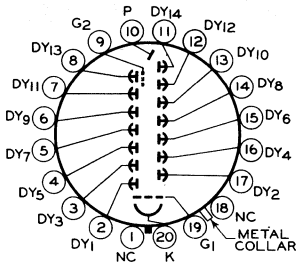

See Note 2, page 17
7264

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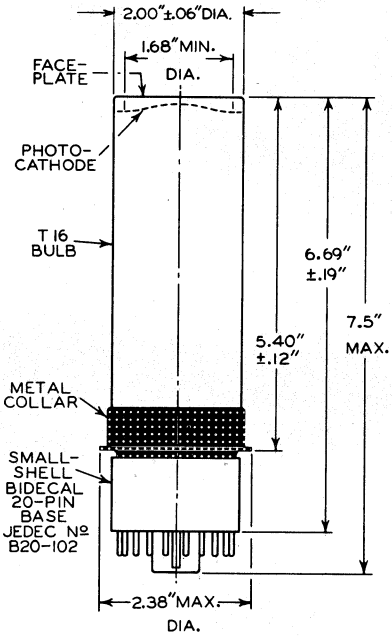

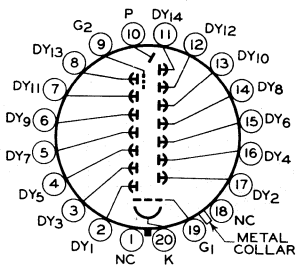

See Note 2, page 17
6810-A

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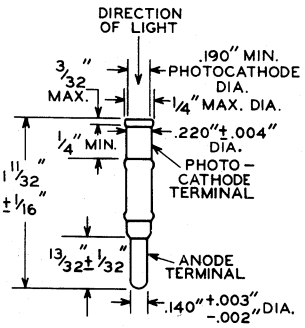

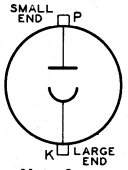

See Note 2, page 17
1P42

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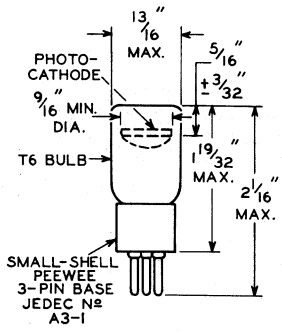

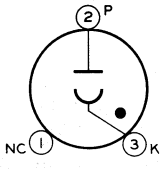

See Note 2, page 17
1P41

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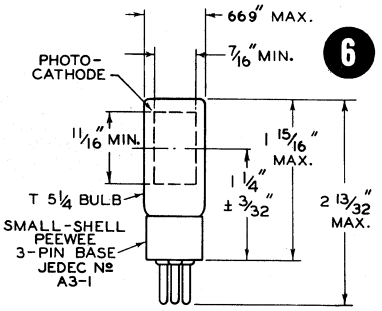

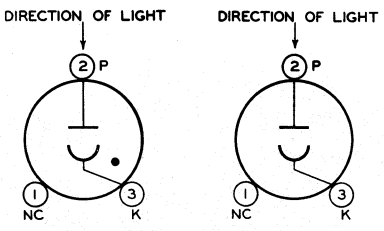

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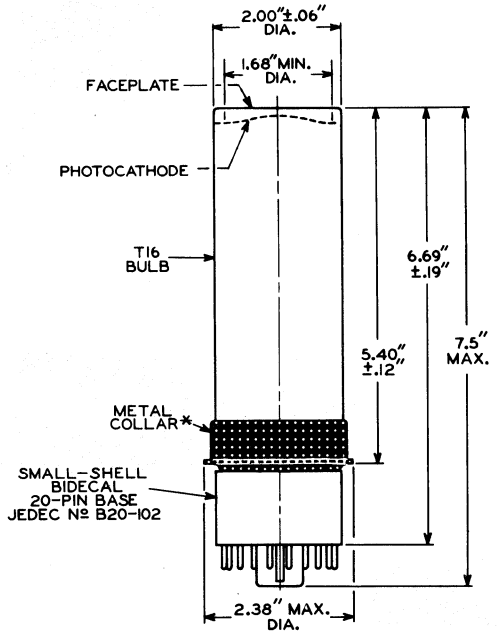
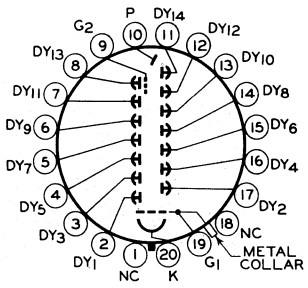


* MUST BE ADEQUATELY INSULATED.



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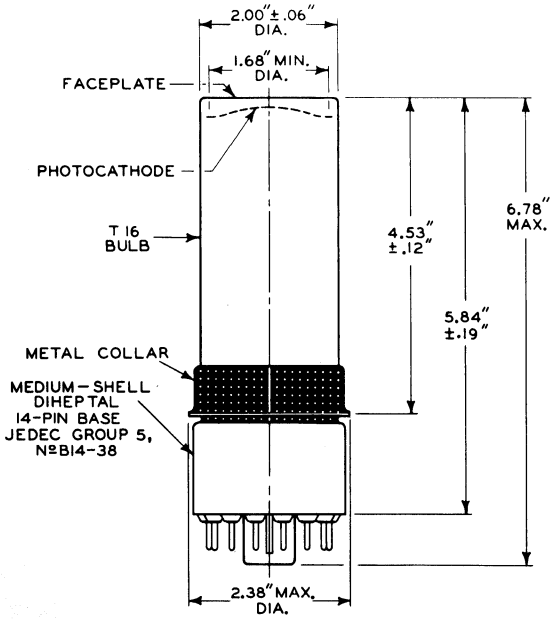

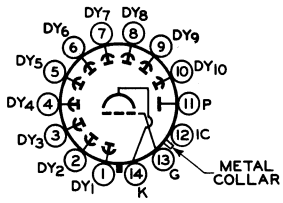

See Note 2, page 17

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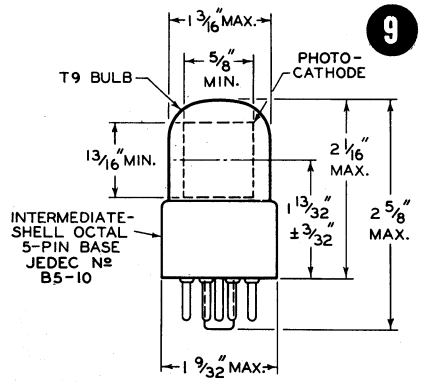

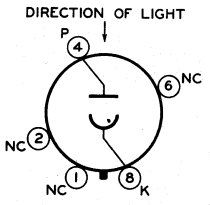

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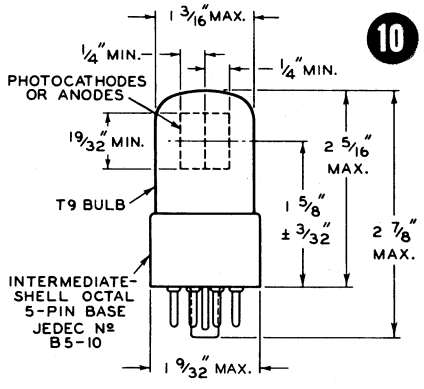

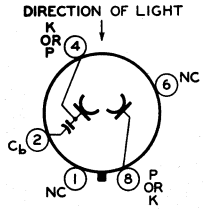

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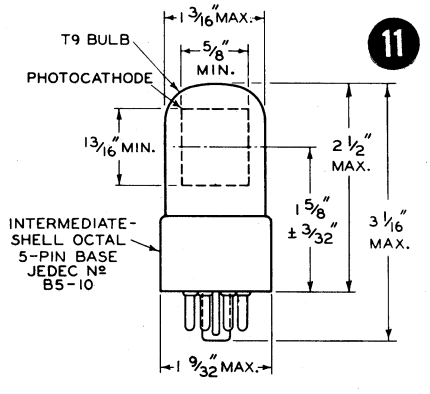

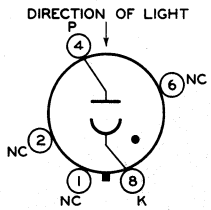

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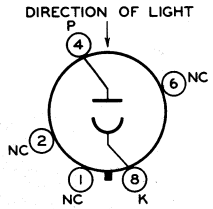

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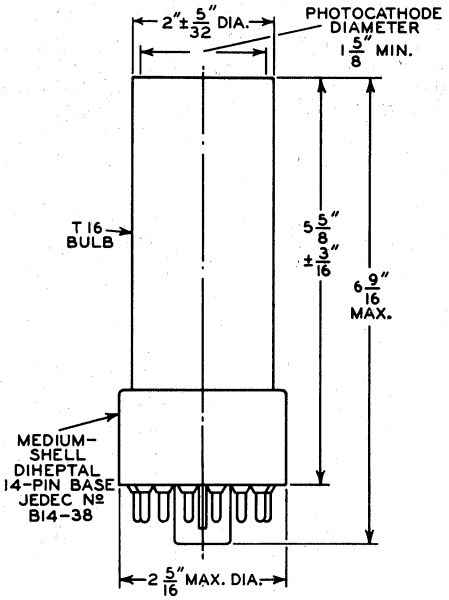

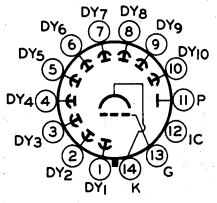

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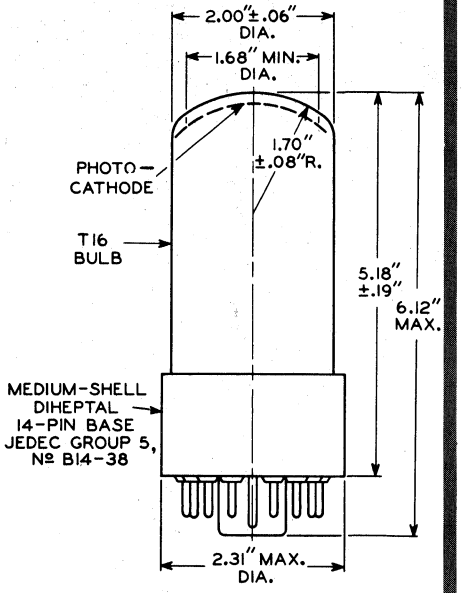

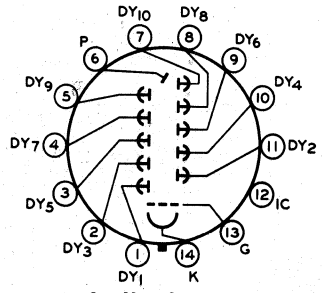

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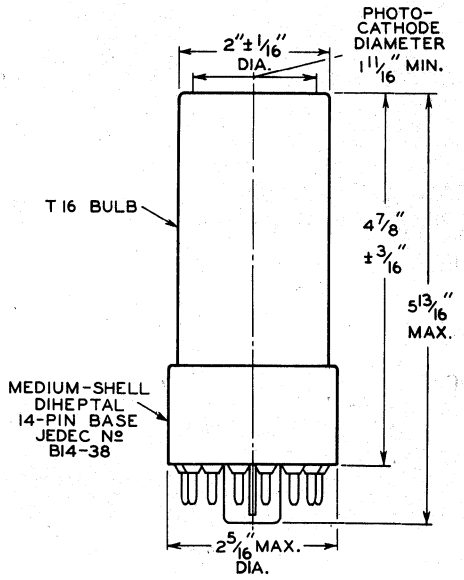

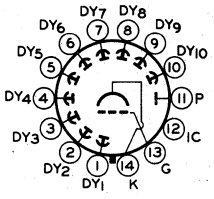

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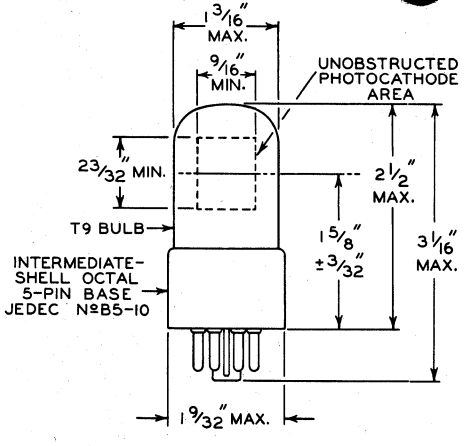
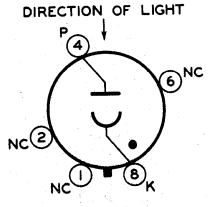
2020* 6342-A 6655-A

*Has cathode diameter of 1½" min.

15





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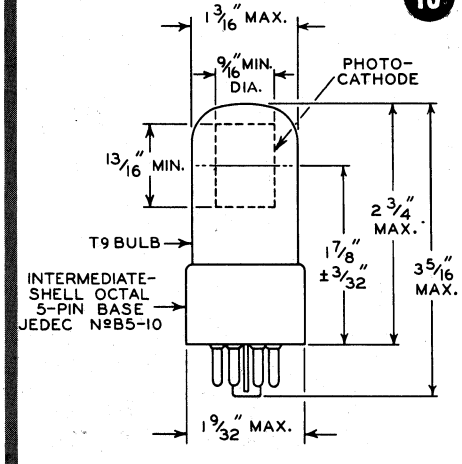

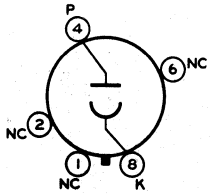

See Note 3, page 17

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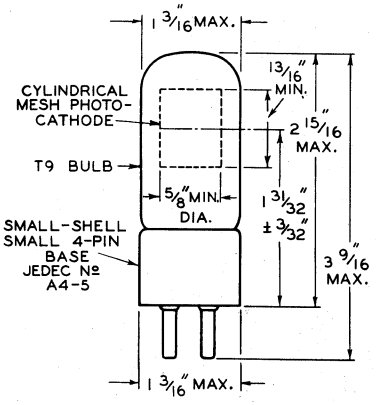

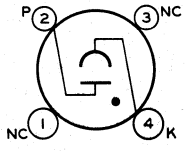

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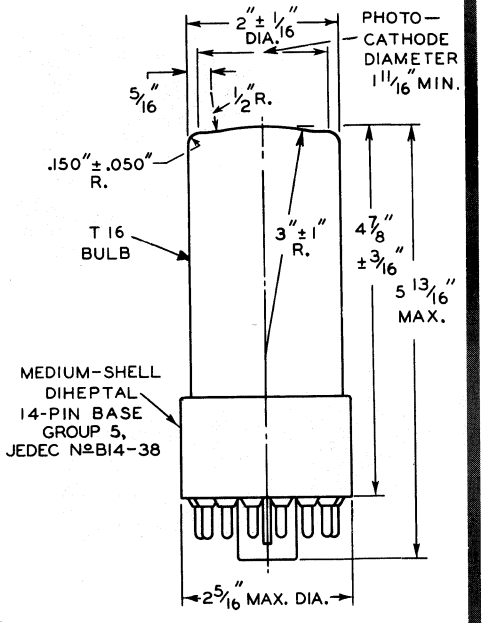

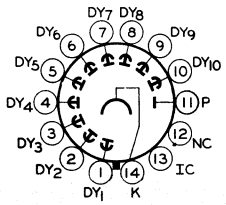

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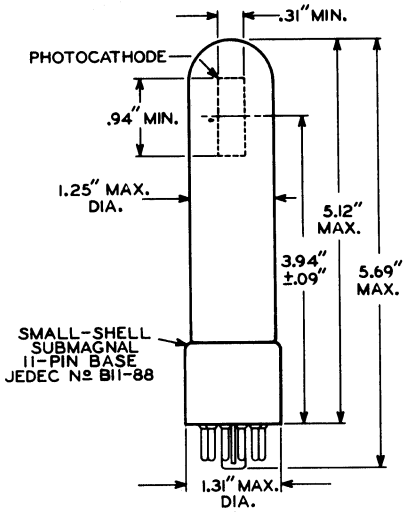

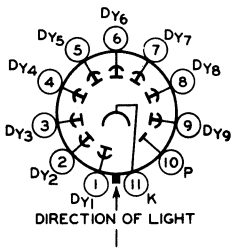

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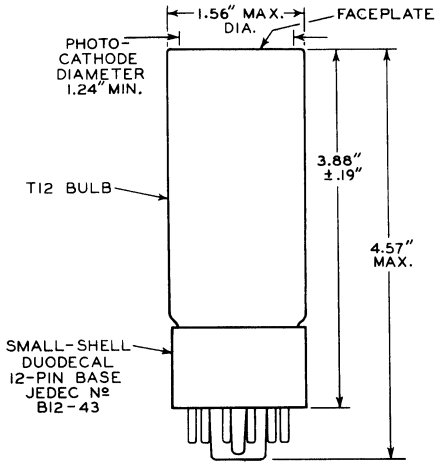

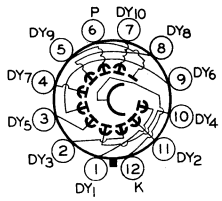

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See Note 1, page 17

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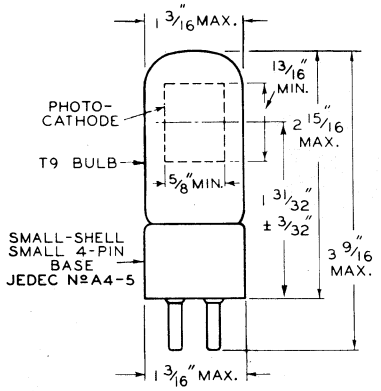

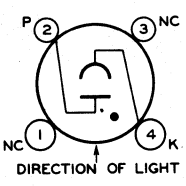

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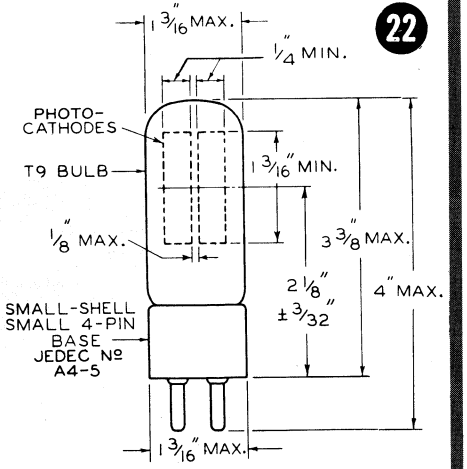

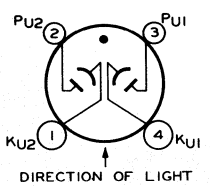

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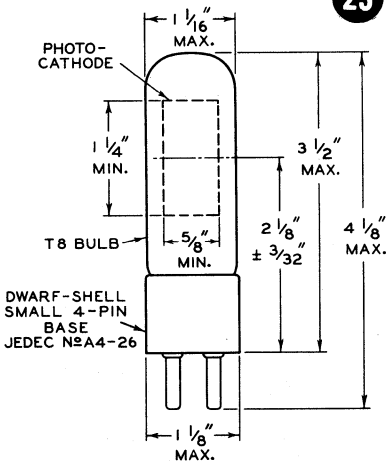

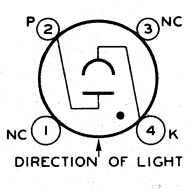

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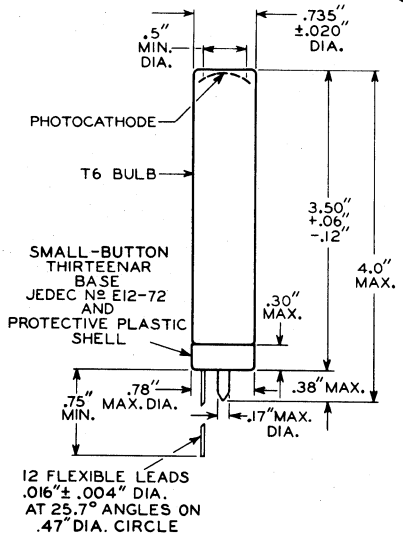

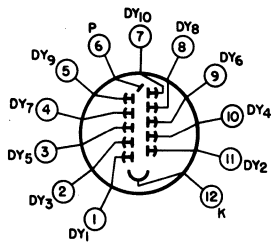

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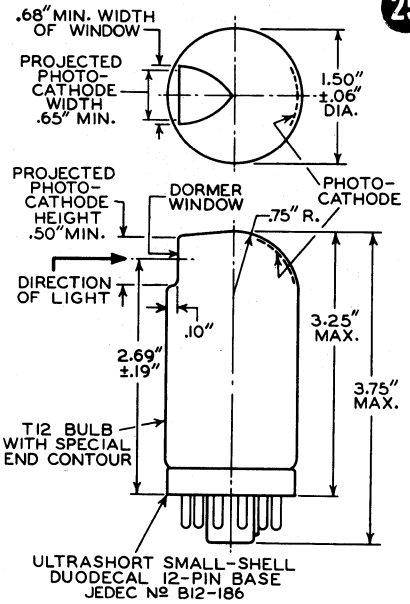

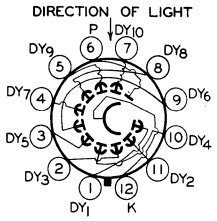

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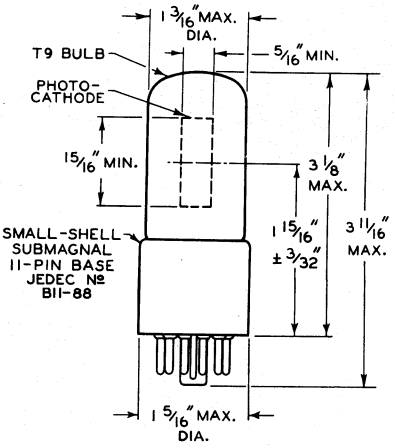

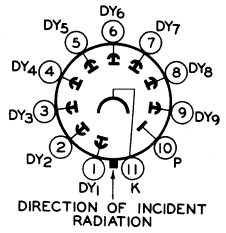

1P21 1P22 1P28 931-A

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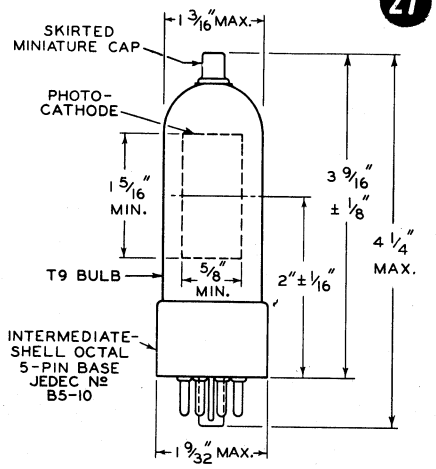

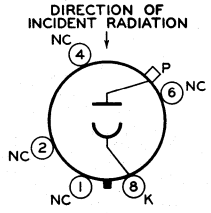

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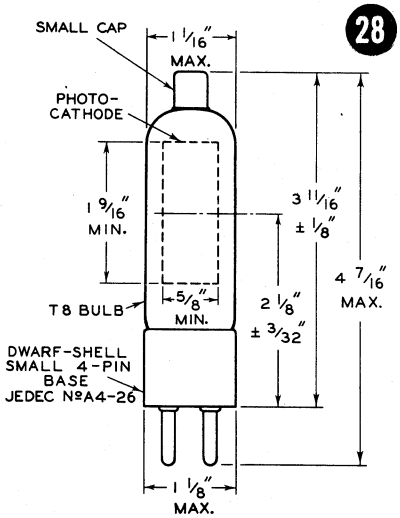

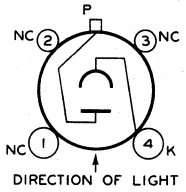

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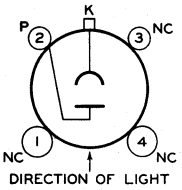

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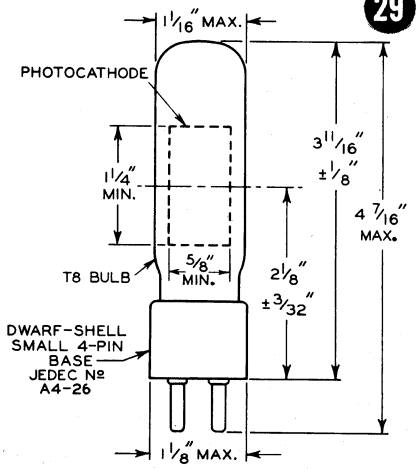
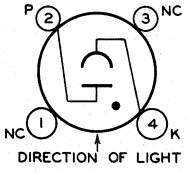
29





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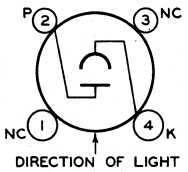

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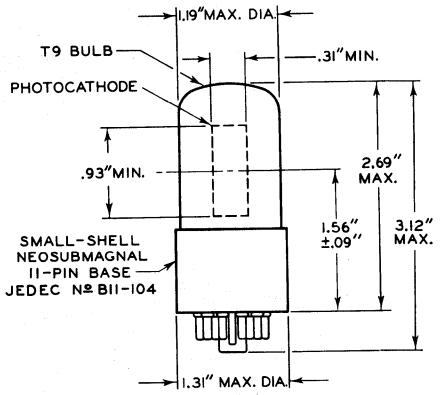
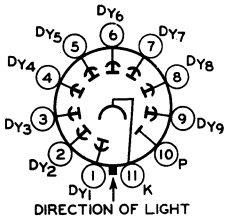
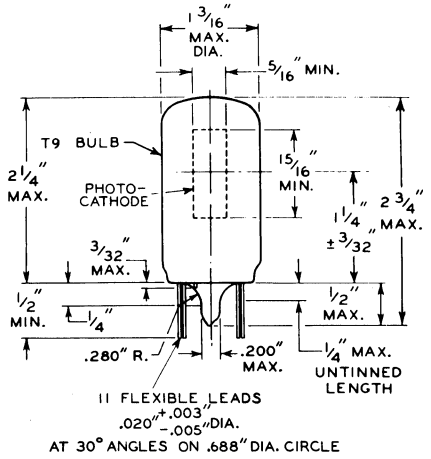
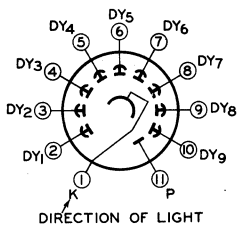




6328 7117

31





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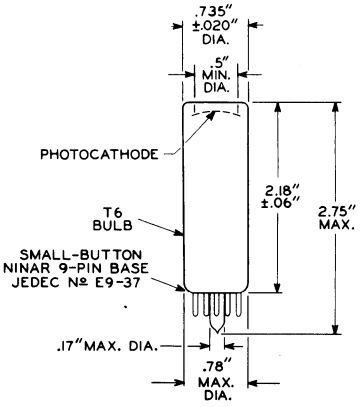
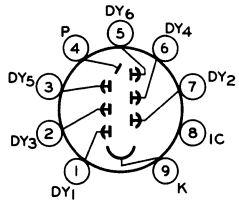
32

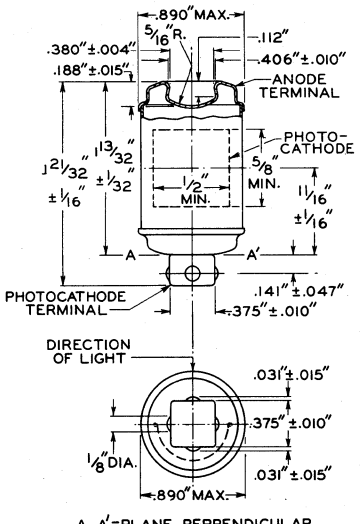




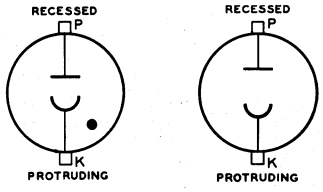
See Note 2, page 17

7764

33



A-A'=PLANE PERPENDICULAR TO AXIS OF TUBE



See Note 5, page 17

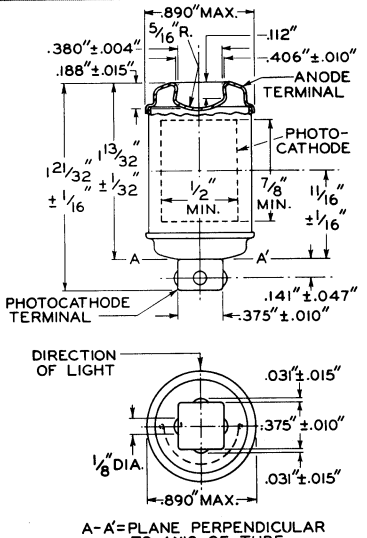
5582

See Note 5, page 17

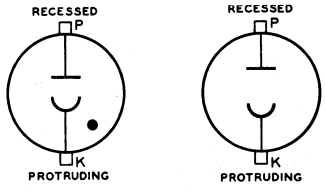
922*

*Has overall length of $1^{21}/_{32}" \pm {}^{1}/_{32}" - {}^{1}/_{16}"$

34



A-A'=PLANE PERPENDICULAR TO AXIS OF TUBE



See Note 5, page 17

921

See Note 5, page 17

926

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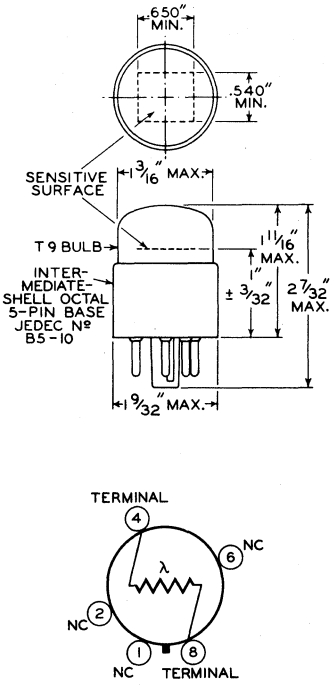

See Note 2, page 17
6957

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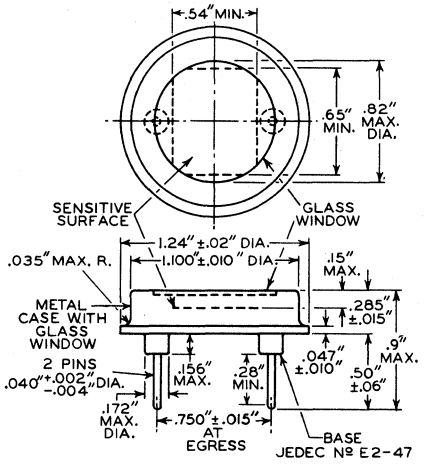
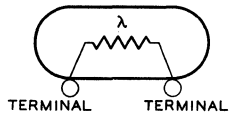
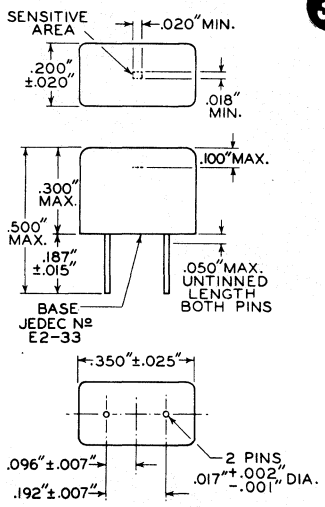
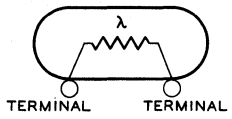




See Note 6, page 17
7163

37





See Note 6, page 17.
6694-A

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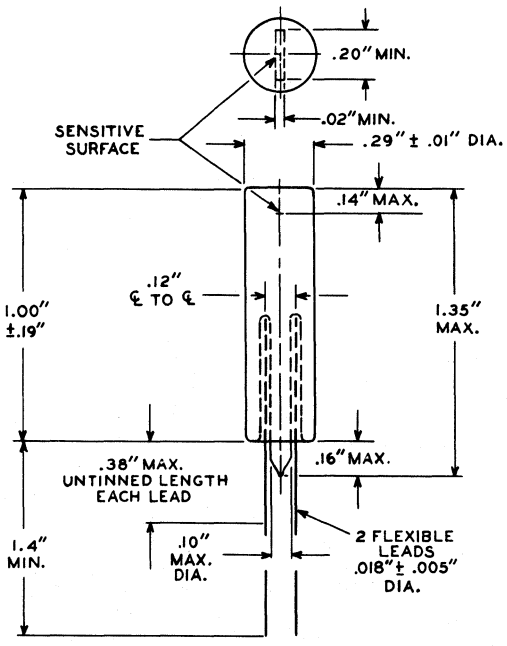
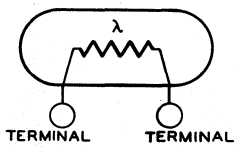
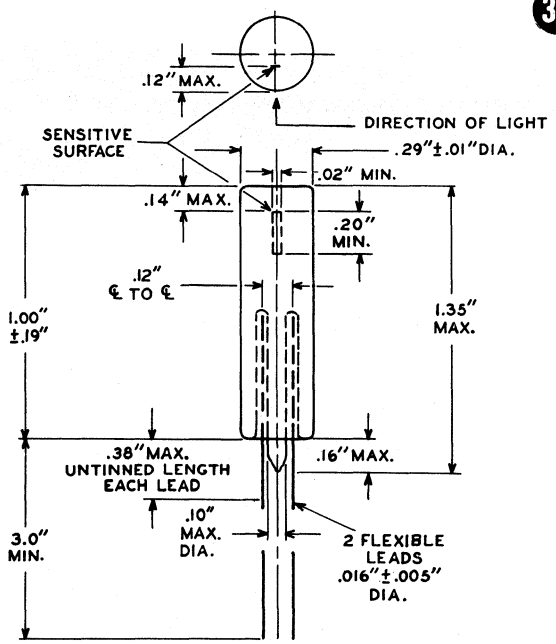
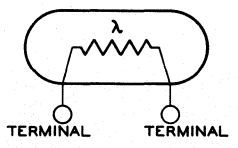




See Note 2, page 17
7412

39





7536

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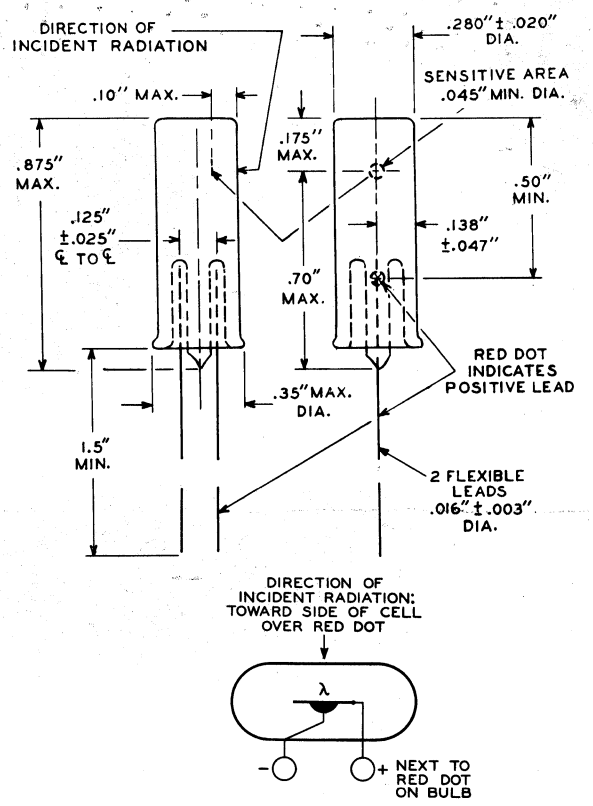
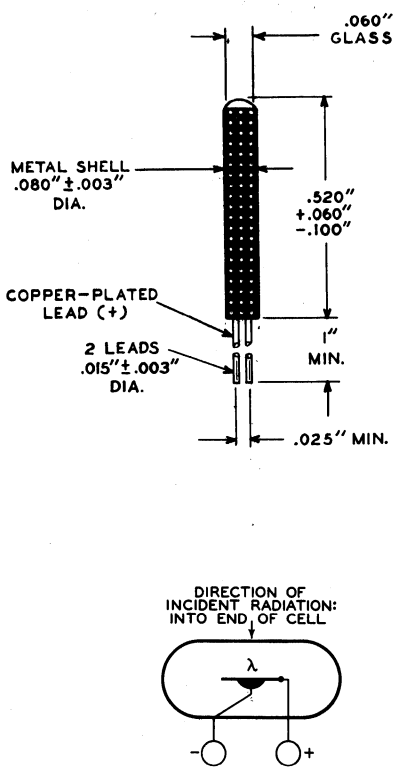


7467

41



7223

Note 1: Direction of radiation is into end of bulb.

Note 2: Direction of light is into end of bulb.

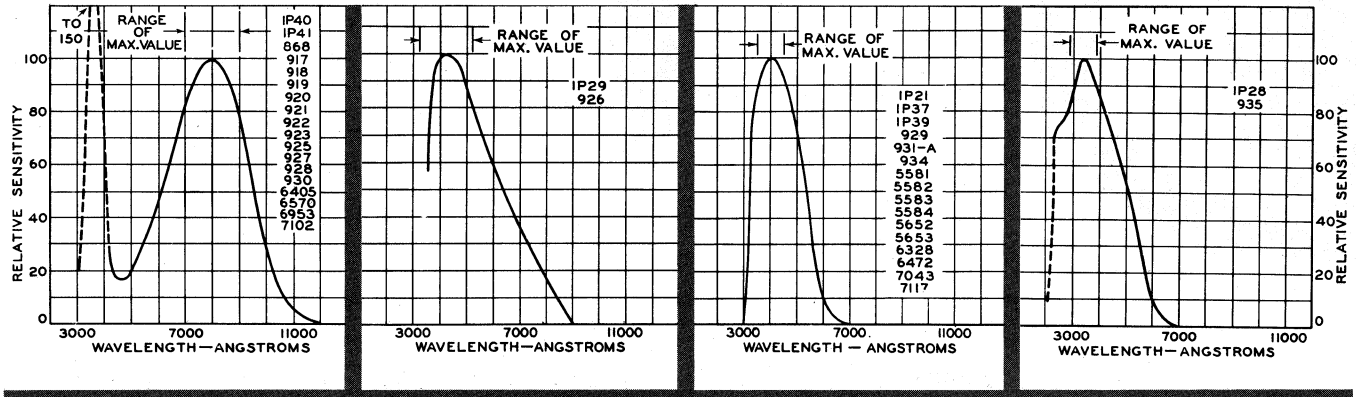
Note 3: Direction of light is perpendicular to axis of photocathode.

Note 4: Direction of light is into dormer window.

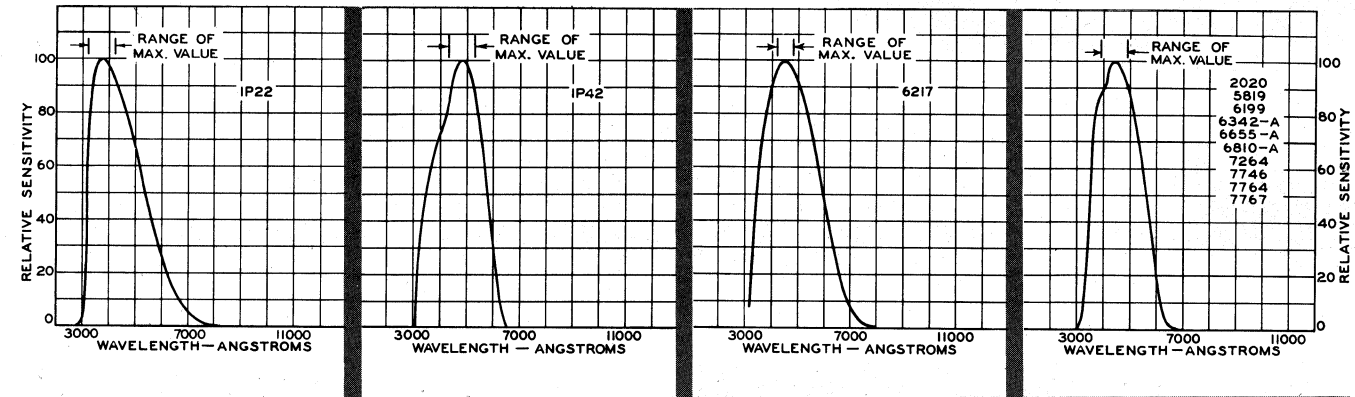
Note 5: Direction of light is into concave side of photocathode.

Note 6: Direction of light is into face of cell.

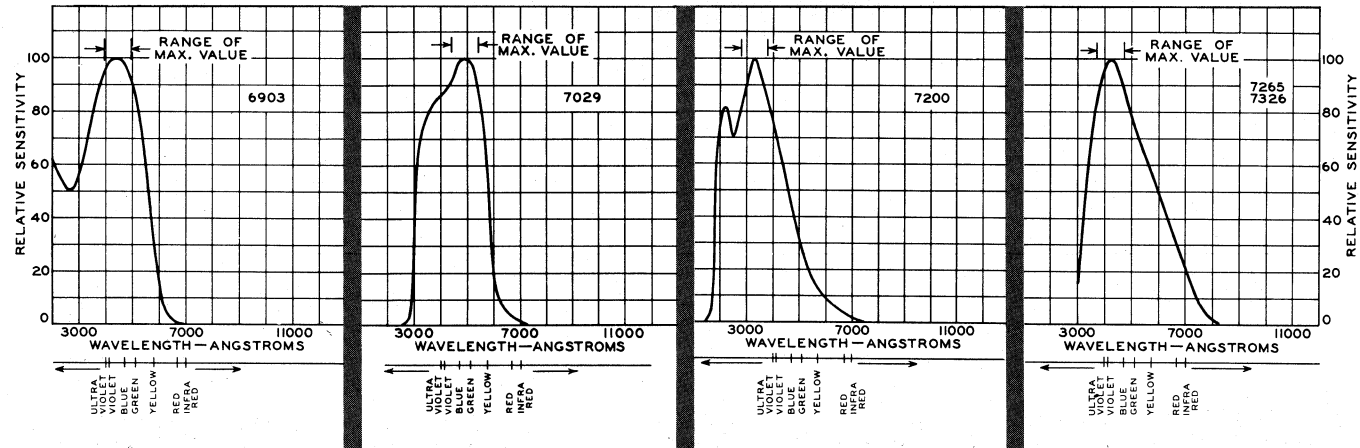
Phototubes



S-1 S-3 S-4 S-5



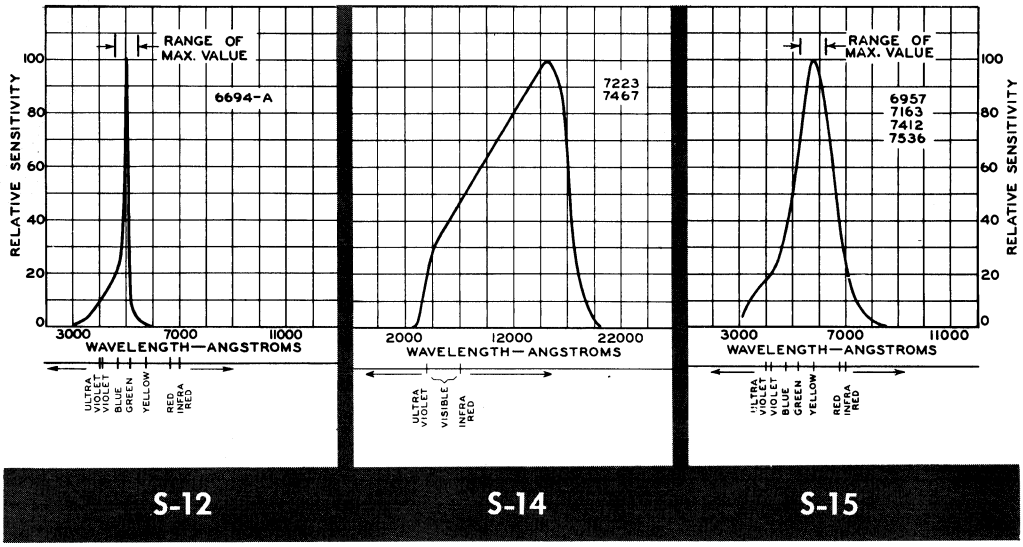
S-8 S-9 S-10 S-11



S-13 S-17 S-19 S-20

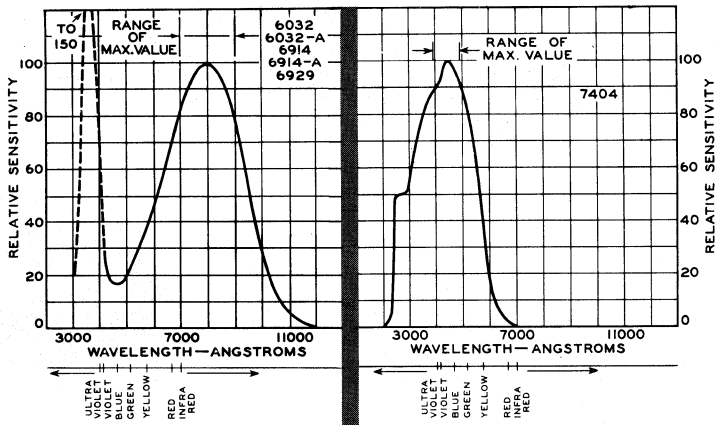
The spectral responses of photosensitive devices are ordinarily indicated by S-designations and are shown in the curves on these pages. These curves are for equal values of radiant flux at all wavelengths and generally give spectral sensitivity in relative units for the types listed on each curve. In order to compare the sensitivity of one type with that of another, the relative scale values should be converted to absolute values as follows; set the 100-unit value of the sensitivity scale equal to the radiant-sensitivity value (μamp/μwatt) which is obtained for each type to be compared from the page containing the data for the specific type. Other radiant-sensitivity values on the curve may then be determined by reading values on the relative scale as percentages of the 100-unit radiant value.

Photocells



S-12 S-14 S-15

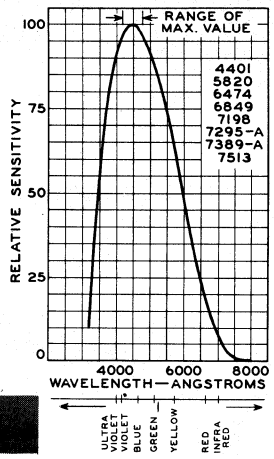
Image-Converter Tubes



S-1 S-21

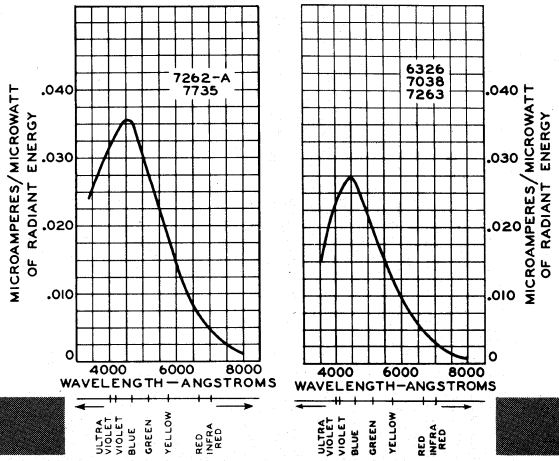
Camera Tubes

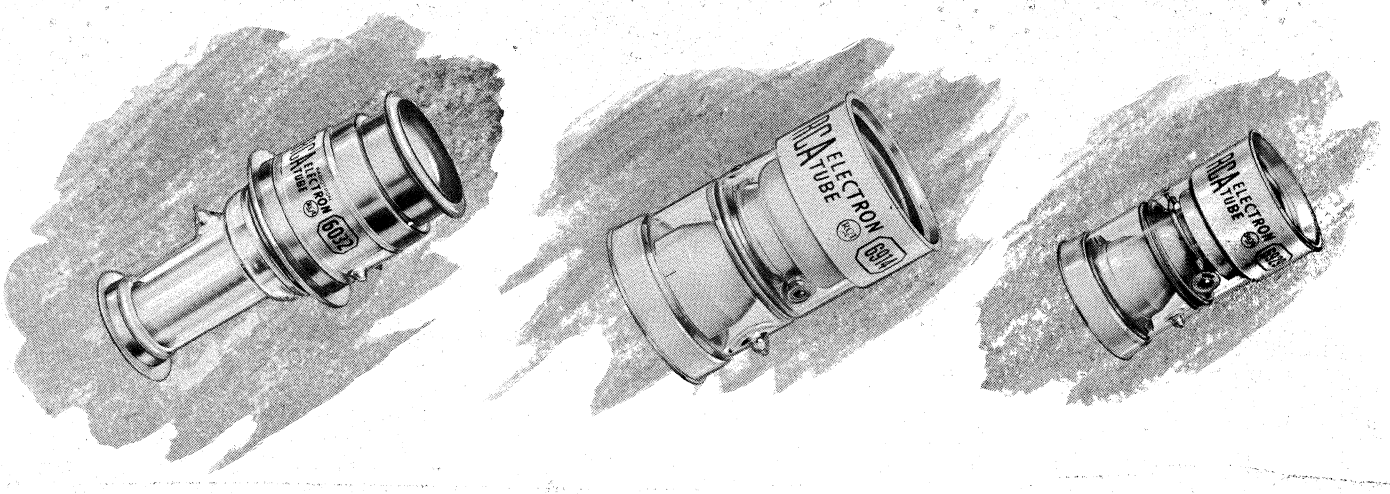
Image Orthicons



Camera Tubes

Vidicons





RCA Type	Description	Max. Ratings ★		Average Characteristics			Photo-Cathode Spectral Response ⊙	Screen Phosphor §
		High Voltage Supply volts	Average Photo-Current μa	Median Conversion Efficiency lumens/watt	Magnification Factor	Minimum Resolution line pairs/mm		
6032 6032-A	For use in combination with suitable optical systems in viewing a scene with near-infrared radiation. Electrostatic focus. The 6032-A, which is unilaterally interchangeable with the 6032, is controlled for threshold visibility. Max. length is $4\frac{17}{32}$″ and max. diameter is $2\frac{1}{8}$″.	20000	1	—	0.5	18	S-1	P20
6914 6914-A	Self-focusing, monovoltage types. For use with suitable optical systems for viewing scenes with near-infrared radiation. The 6914-A, which is unilaterally interchangeable with the 6914, is controlled for threshold visibility. Max. length is 2.97″ and max. diameter, excluding side tip, is 1.91″.	16500	0.35	—	0.76	25	S-1	P20
6929	Self-focusing, monovoltage type. For use with suitable optical systems for viewing scenes with near-infrared radiation. Max. length is 2.33″ and max. diameter, excluding side tip, is 1.38″.	12500	0.35	—	0.75	25	S-1	P20
7404	Self-focusing, monovoltage type. For use with suitable optical systems for viewing objects irradiated with near-ultraviolet radiation. Spectral response covers range from about 2350 to 6200 angstroms. Max. length is 2.33″ and max. diameter, excluding side tip, is 1.38″.	12500	0.35	6000	0.75	25	S-21	P20

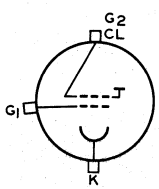
★ The maximum ambient-temperature rating of all image-converter tubes is 75° C.

⊙ For Spectral Sensitivity Curves, see page 19.

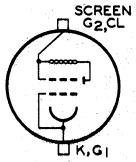
§ For information on fluorescent screens, see pages 27, 28, and 29.

Note 1: Direction of radiation is perpendicular to photocathode end of tube.

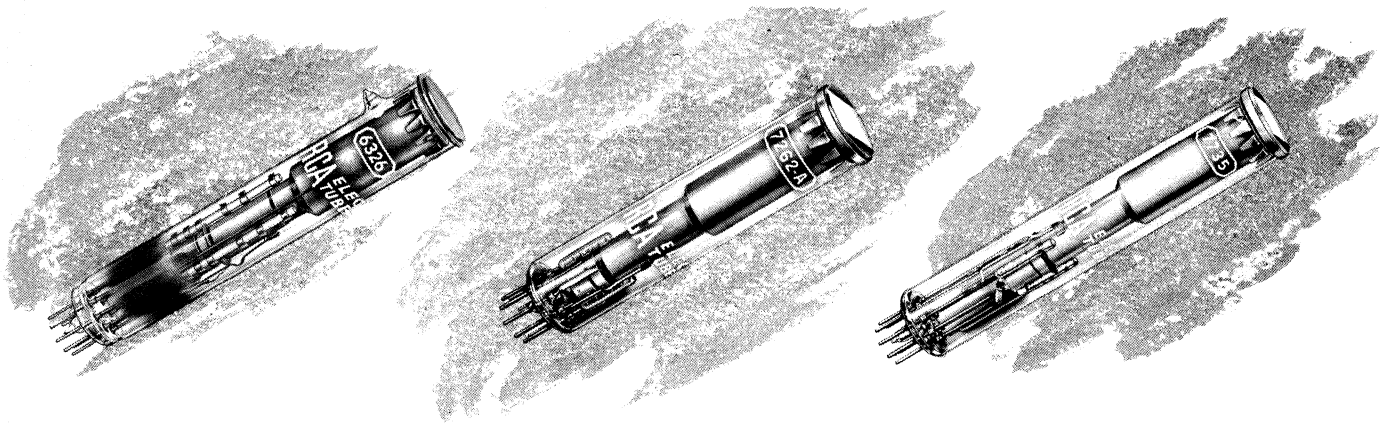
For Key to Base and Envelope Connection Diagrams, see page 3.



See Note 1
6032 6032-A



See Note 1
6914 6914-A 6929 7404

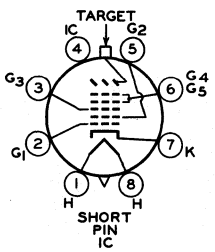


VIDICONS

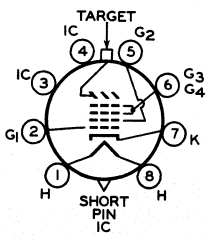
RCA Type	Description△	Max. Overall Length inches	Max. Diameter inches	Max. Image Diagonal inches	Max. High-Voltage Supply volts	Approx. Illumination footcandles	Resolution Capability TV lines●	Signal-to-Noise Ratio■ approx.
6326	Broadcast-quality type. For film pickup with color or black-and-white TV cameras. Utilizes magnetic focus and deflection. Requires spring-finger contact on target flange. Small-button ditetrar 8-pin base.	6.50	1.135‡	0.62	350	50 to 300★	600	300:1
7038	Broadcast-quality type. For live pickup with black-and-white TV cameras or with color TV cameras. Can also be used for film pickup. Has an extremely uniform photoconductive surface. Has no side tip. Employs magnetic focus and deflection. Requires spring-finger contact on flange. Small-button ditetrar 8-pin base.	6.50	1.135	0.62	350	1 to 3♂ 50 to 200★	600	300:1
7262-A	For industrial TV applications in small, compact, transistorized black-and-white or color TV cameras. Has extremely uniform and highly sensitive photoconductor. Utilizes low-power (0.6 watt) heater. Employs magnetic focus and deflection. Requires spring-finger contact on flange. Small-button ditetrar 8-pin base.◆	5.18	1.135	0.62	750	0.1♂ to 1	600 to 900	300:1
7263	For industrial or military applications where conditions of severe shock and vibration, altitude up to 50,000 feet, or high humidity may be encountered. Intended for black-and-white or color TV cameras. Has low-power (0.6 watt) heater. Employs magnetic focus and deflection. Requires spring-finger contact on flange. Small-button ditetrar 8-pin base.◆	5.18	1.135	0.62	350	1 to 3♂	600	300:1
7735	For industrial TV applications in black-and-white or color TV cameras. Has extremely uniform and highly sensitive photoconductor. Employs magnetic focus and deflection. Requires spring-finger contact on flange. Small-button ditetrar 8-pin base.	6.50	1.135	0.62	750	0.1♂ to 1	600 to 900	300:1

△ Heaters employed in these types have a rating of 6.3 volts and 0.6 ampere, except as noted.
● At center of picture.
◆ Heater rating: 6.3 volts, 0.095 ampere.
Note 1: Direction of light is into face end of tube.
■ Visual equivalent signal-to-noise ratio which is taken as ratio of highlight video-signal current to rms noise current, multiplied by a factor of 3. Measured with a peak signal output of 0.35 μa using an amplifier having a bandwidth of 5 Mc.
‡ Excluding side tip.
★ Average value of highlight illumination on face of tube for motion-picture film pickup.
♂ Constant highlight illumination on face of tube for pickup from live scene.

For Key to Base and Envelope Connection Diagrams, see page 3.



See Note 1
6326



See Note 1
7038 7262-A 7263 7735

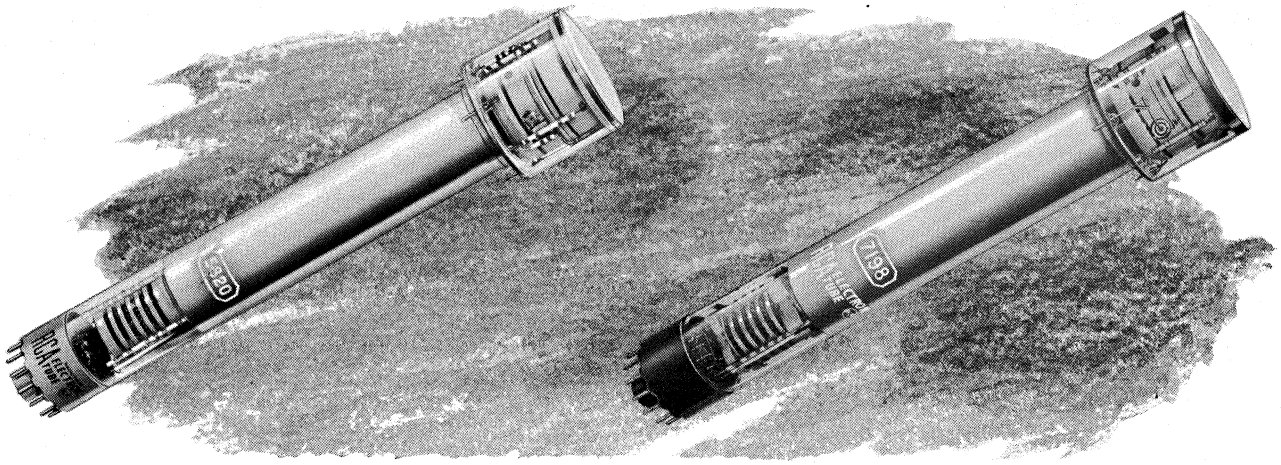


IMAGE ORTHICONS

RCA Type	Description△	Max. Overall Length inches	Max. Diameter inches	Max. Image Diagonal inches	Max. High-Voltage Supply volts	Approx. Illumination on Faceplate⌂ footcandles	Average Limiting Resolution Capability TV lines●	Signal-to-Noise Ratio■ approx.
4401	For outdoor or studio color pickup. Very high sensitivity. Especially useful for prolonged outdoor pickup where light levels change from full daylight to nighttime conditions and in studios equipped with only black-and-white lighting facilities. Utilizes magnetic focus and deflection. Jumbo annular 7-pin shoulder base and small-shell diheptal 14-pin end base.	15.45	3.06	1.8	1500	7×10^{-3}	700	45:1
5820	For outdoor and studio pickup. Very stable in performance at all incident light levels. Has exceptionally high sensitivity. Utilizes magnetic focus and deflection. Jumbo annular 7-pin shoulder base and small-shell diheptal 14-pin end base.	15.45	3.06	1.8	1350	1×10^{-2}	700	40:1
6474	For outdoor and studio color TV cameras. Capable of producing a picture having natural tone value and accurate detail. Employs magnetic focus and deflection. Jumbo annular 7-pin shoulder base and small-shell diheptal 14-pin end base.	15.45	3.06	1.8	1350	2×10^{-2}	700	60:1
6849	For industrial and scientific-research applications involving extremely low light levels. Employs magnetic focus and deflection. Jumbo annular 7-pin shoulder base and small-shell diheptal 14-pin end base.	15.45	3.06	1.8	1350	3×10^{-2} 4×10^{-5}	500 75	— —
7198	For industrial and military applications where adverse environmental conditions may be encountered. Is capable of withstanding severe shock and vibration, altitude up to 60,000 feet, wide temperature range, and high humidity. Has high sensitivity. Employs magnetic focus and deflection. Jumbo annular 7-pin shoulder base and small-shell diheptal 14-pin end base.	15.45	3.06	1.8	1850	3×10^{-3} 3×10^{-4} 3×10^{-5}	550 350 115	28:1 14:1 4:1

△ Heaters employed in these types have a rating of 6.3 volts and 0.6 ampere.

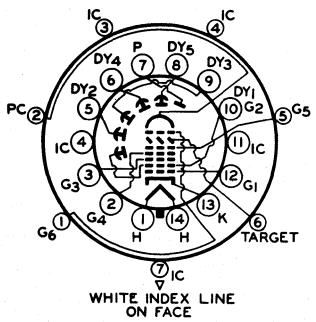
⌂ Constant highlight illumination on face of tube for pickup from live scene.

■ Ratio of peak-to-peak highlight video-signal current to rms noise current using an amplifier having a bandwidth of 4.5 Mc.

● At center of picture and indicated light levels.

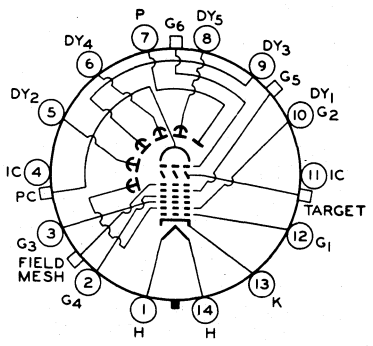
Note 1: Direction of light is perpendicular to large end of tube.

For Key to Base and Envelope Connection Diagrams, see page 3.



See Note 1

4401 5820 6474 6849 7198



See Note 1

7295-A 7389-A

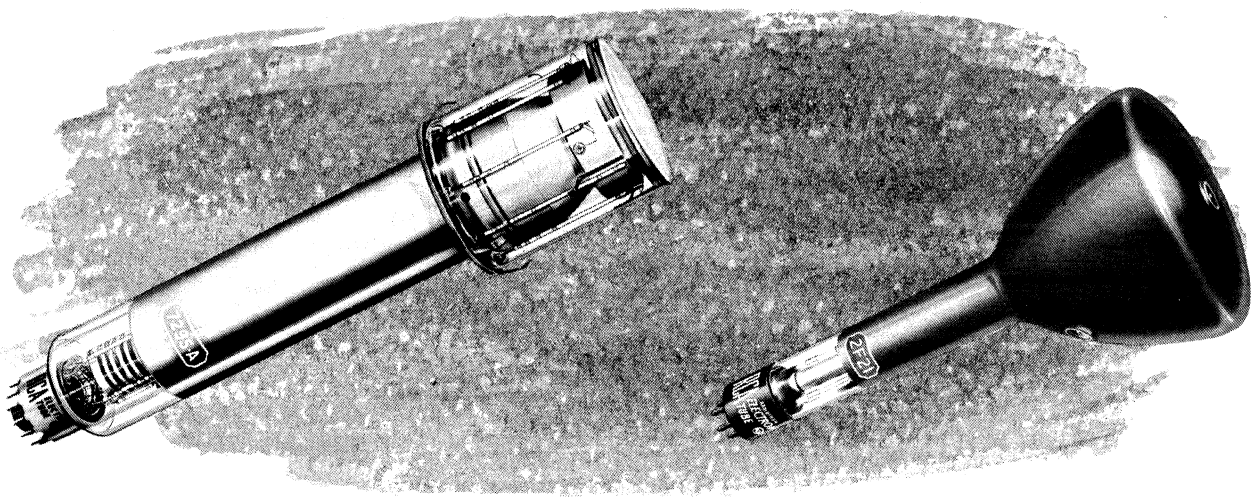


IMAGE ORTHICONS—Cont'd

Type	Description△	Max. Overall Length inches	Max. Diameter inches	Max. Image Diagonal inches	Max. High-Voltage Supply volts	Approx. Illumination on Faceplate ⍥ footcandles	Average Limiting Resolution Capability TV lines●	Signal-to-Noise Ratio■ approx.
7295-A	For outdoor and studio pickup in high-quality black-and-white TV cameras. Has large target area but uses same optical system as conventional 3-inch types. Employs magnetic focus and deflection. Special shoulder terminals and small-shell diheptal 14-pin end base.	19.685	4.594	1.6	1650	4×10^{-2}	800	65:1
7389-A	For high-quality black-and-white studio TV cameras. Has exceptionally high signal-to-noise ratio and excellent resolution capability. Uses same optical system as conventional 3-inch tubes, but has larger target area. Employs magnetic focus and deflection. Special shoulder terminals and small-shell diheptal 14-pin end base.	19.685	4.594	1.6	1650	7.5×10^{-2}	800	95:1
7513	For high-quality color or black-and-white TV cameras. Uses precision construction throughout for improved registration in color cameras and high uniformity of characteristics from tube to tube. Employs magnetic focus and deflection. Jumbo annular 7-pin shoulder base and small-shell diheptal 14-pin end base.	15.45	3.06	1.8	1350	2.8×10^{-2}	700	55:1
MONOSCOPES								
2F21	5″ electrostatic-focus, magnetic-deflection type with Indian Head Pattern. For supplying signal to test video performance of television transmitters and receivers. Pattern-electrode signal current (peak-to-peak), 0.3 to 0.7 μamp. Two recessed small ball caps. Long medium-shell small 6-pin base.	$12\frac{11}{16}$	$5\frac{1}{16}$	$2\frac{5}{16} \times 3\frac{1}{16}$*	1500♦	—	500	—
1699	Custom-built type like the 2F21 except that its pattern is individually styled to customer requirements.	For additional data, refer to type 2F21.						

△ Heaters employed in these types have a rating of 6.3 volts and 0.6 ampere.

⍥ Constant highlight illumination on face of tube for pickup from live scene.

● At center of picture and indicated light levels.

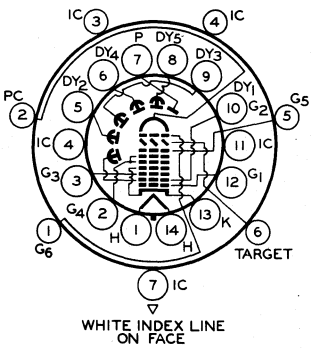
■ Ratio of peak-to-peak highlight video-signal current to rms noise current using an amplifier having a bandwidth of 4.5 Mc.

* Pattern size, approximate.

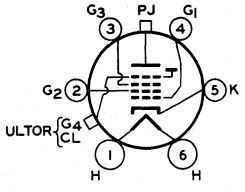
♦ Ultor volts. The "ultor" is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

Note 1: Direction of light is perpendicular to large end of tube.

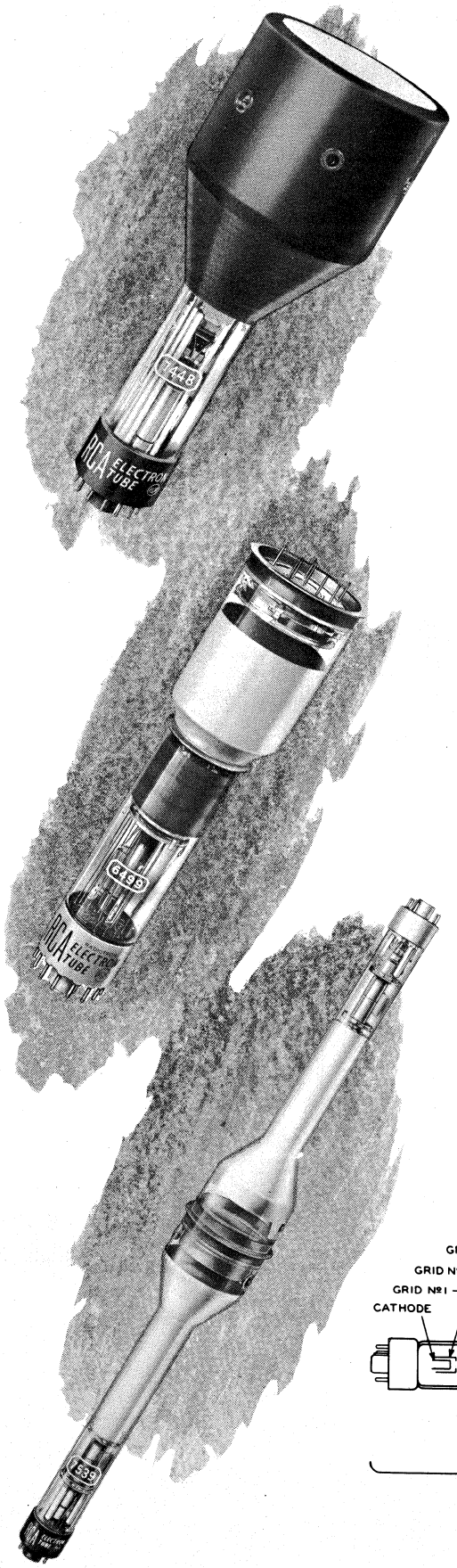
For Key to Base and Envelope Connection Diagrams, see page 3.

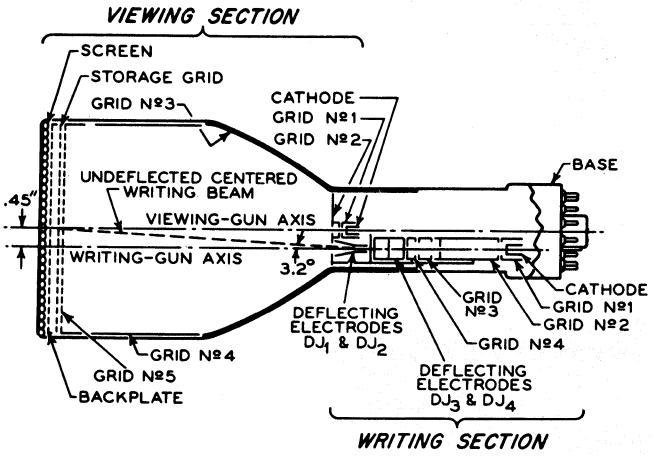


See Note 1
7513

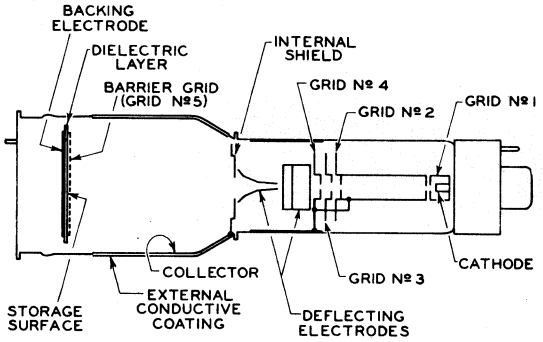


2F21 1699

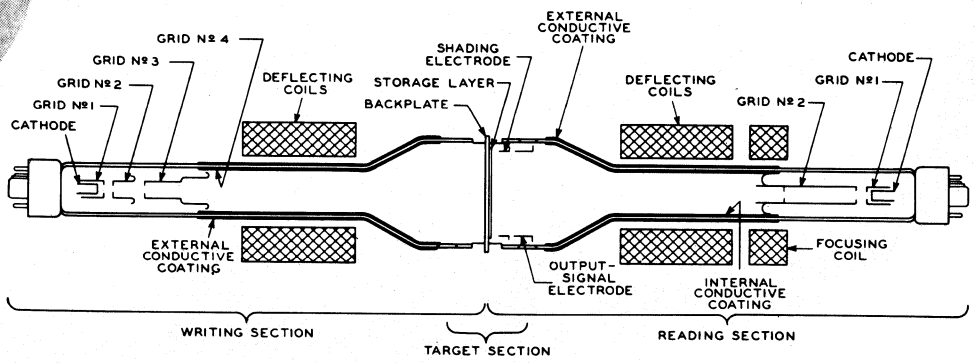




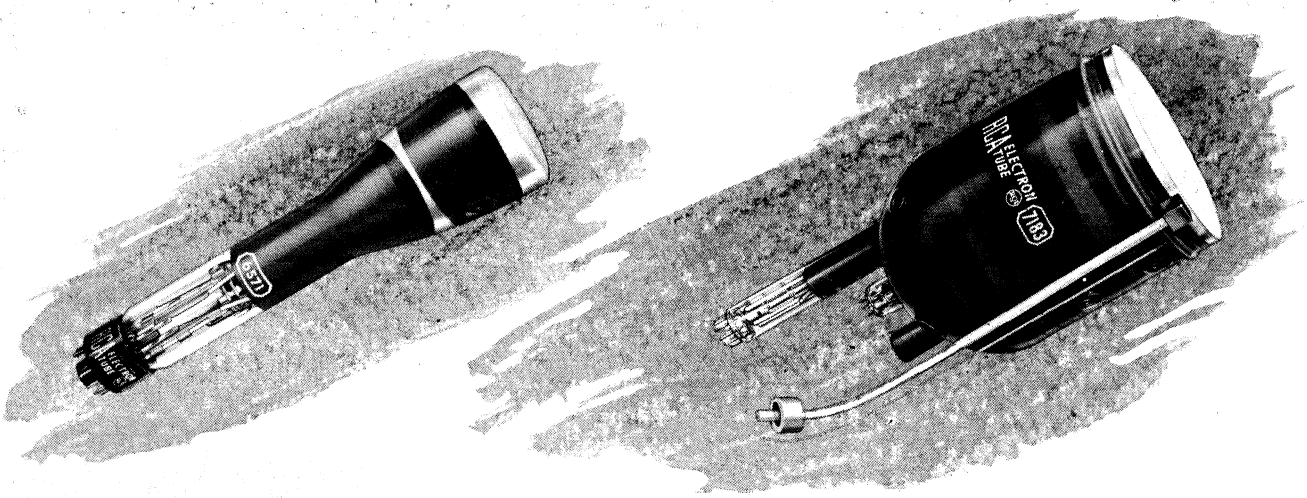
Schematic Arrangement of Type 7448



Schematic Arrangement of Type 6499



Schematic Arrangement of Type 7539



Type	Description△	Maximum Dimensions: Overall Length, inches	Maximum Dimensions: Envelope Diam., inches	Max. High Voltage Electrode, volts	Number of Beams	Operational Information
COMPUTER STORAGE TUBE—Primary-Current-Modulation Type						
6571	3″ electrostatic-focus-and-deflection type. Intended primarily for use in binary-digital computer systems. Single-beam type has storage surface on the inner surface of the faceplate, and requires an external signal-output electrode. Recessed small cavity cap. Small-shell duodecal 10-pin base.	11¾	3 1/16	2500●	1	Employs redistribution writing and capacitance-discharge reading. Storage surface has uniform secondary emission. Focused beam has exceptionally small effective area.
DISPLAY STORAGE TUBES—Direct-View Types						
6866	5″ direct-view type. Intended for use in applications requiring a bright, non-flickering display of stored information for about 60 seconds after writing has ceased. Writing gun is electrostatic-focus-and-deflection type. Viewing gun floods screen, controls storage function, and brightness of display. Insulated flexible lead for screen and 2 recessed small cavity caps. Thirtyfivar 31-pin base. Viewing screen employs P20 phosphor.*	15½	5 1/16	11000†	2	At 10,000 volts on screen produces full 4″-diameter display having brightness of 2500 footlamberts, good resolution in half-tone displays. Writing speed of about 300,000 in/sec "freezes" μsec. transients.
7183	5″ direct-view type. Intended for use in applications requiring a bright, non-flickering display of stored information for 20 or more seconds after writing has ceased. Writing gun is electrostatic-focus, magnetic-deflection type. Viewing gun floods screen, controls storage function, and brightness of display. Insulated flexible leads for screen and backplate. Small-button neoditetrar 8-pin writing-gun base, small miniature 7-pin viewing-gun base. Viewing screen employs P20 phosphor.*	11.62	5.06	10000†	2	At 8500 volts on screen produces full 4″-diameter display having brightness of 1500 footlamberts, good resolution in half-tone displays.

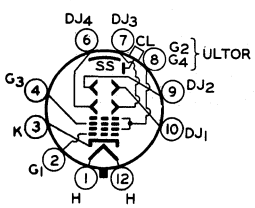
△ Heaters employed in these types have a rating of 6.3 volts and 0.6 amp.

* For information on fluorescent screens, see pages 27, 28, and 29.

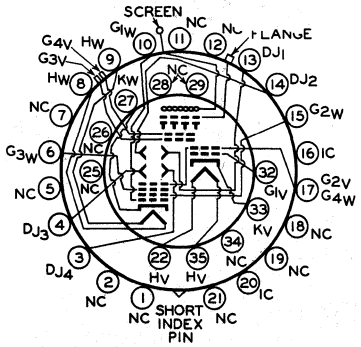
● Design-center value.

† Absolute value.

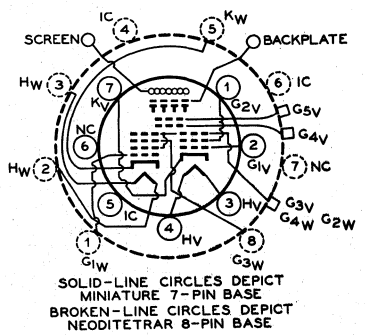
For Key to Base and Envelope Connection Diagrams, see page 3.



6571



6866



7183

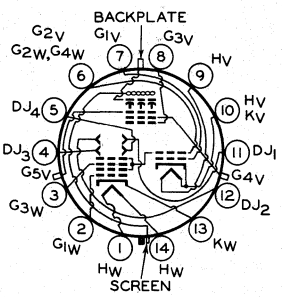
Type	Description△	Maximum Dimensions: Overall Length inches	Maximum Dimensions: Envelope Diam. inches	Max. High Voltage Electrode† volts	Number of Beams	Operational Information
DISPLAY STORAGE TUBES—Direct-View Types — Cont'd						
7315	5″ direct-view type. Intended for use in applications requiring a bright, non-flickering display of stored information for about 40 seconds after writing has ceased. Writing gun is electrostatic-focus-and-deflection type. Viewing gun floods screen, controls storage function, and brightness of display. Medium-shell diheptal 14-pin base. Viewing screen employs P20 phosphor.*	13.64	5.31	11000	2	At 10,000 volts on screen produces full 3.8″-diameter display having brightness of 2500 footlamberts, good resolution in half-tone displays. Writing speed of 3000 in/sec takes full advantage of integrating and half-tone capabilities of the tube.
7448	5″ direct-view type. Intended for use in applications requiring a bright, non-flickering display of stored information for about 40 seconds after writing has ceased. Writing gun is electrostatic-focus-and-deflection type. Viewing gun floods screen, controls storage function, and brightness of display. Medium-shell diheptal 14-pin base. Viewing screen employs P20 phosphor.*	13.64	5.31	11000	2	At 10,000 volts on screen produces full 3.8″-diameter display having brightness of 2500 footlamberts, good resolution in half-tone displays. Writing speed of about 300,000 in/sec "freezes" μsec. transients.
RADECHON—Single-Beam, Barrier-Grid Type						
6499	Charge storage tube of barrier-grid, single-beam type intended for information-processing systems. Non-equilibrium writing and capacitance-discharge reading. Electron gun is of the electrostatic-focus-and-deflection type. Base on large end of tube is small-button twentyninar 8-pin. Base on small end of tube is small-shell diheptal 14-pin.	12 7/32	3.35	1500	1	Information in digital or analog form may be introduced to the active elements of the tube, stored (time controllable from μsec. to minutes), and then extracted at a rate the same as or different from the writing rate.
GRAPHECHON—Scan-Conversion Type						
7539	Sturdy charge-storage tube for use in data processing applications where information is to be continuously transformed from one time base or scanning presentation to another. Writing gun is electrostatic-focus, magnetic-deflection type. Reading gun is magnetic-focus-and-deflection type. Employs two small-shell duodecal bases.	26	3.40	11000	2	Has resolution capability of 150 range rings per display radius with a response of at least 50 per cent. Permits bright displays having continuous range of half-tone information when viewed on suitable TV monitors.

△ Heaters employed in these types have a rating of 6.3 volts and 0.6 amp.

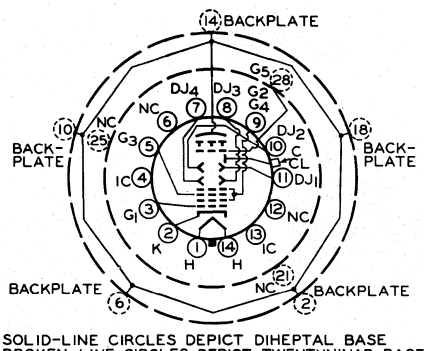
† Absolute values.

* For information on fluorescent screens, see pages 27, 28, and 29.

For Key to Base and Envelope Connection Diagrams, see page 3.

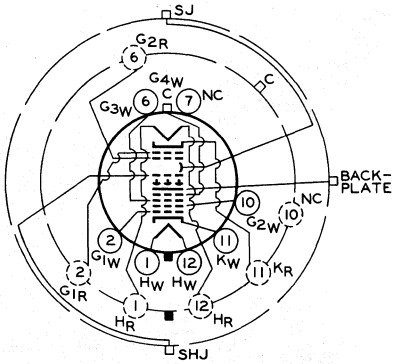


7315 7448

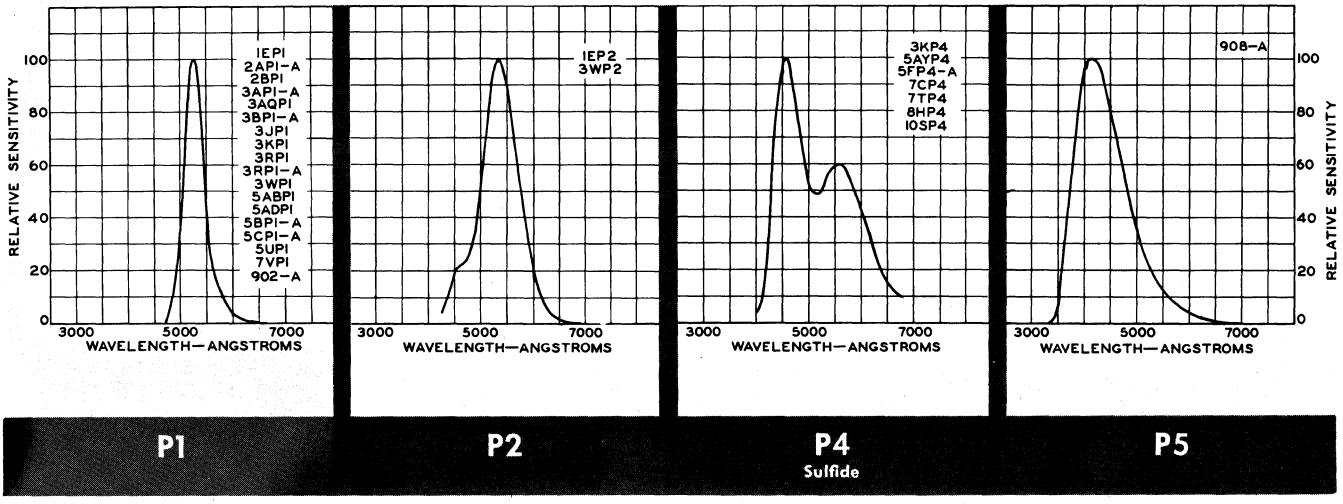


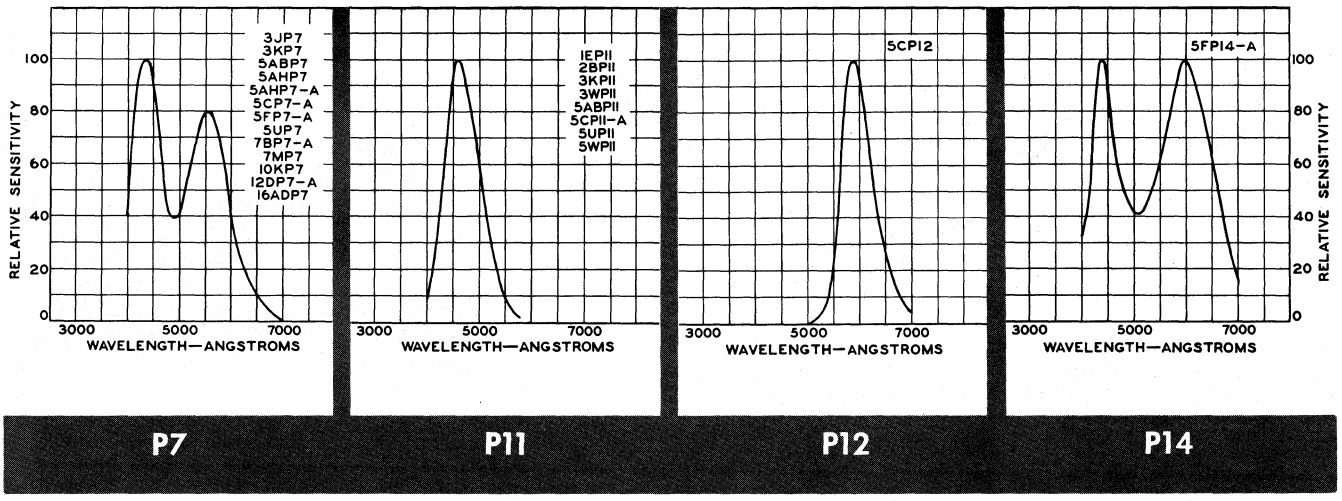
SOLID-LINE CIRCLES DEPICT DIHEPTAL BASE
BROKEN-LINE CIRCLES DEPICT TWENTYNINAR BASE

6499



7539


RELATIVE SENSITIVITY
100
80
60
40
20
0
3000
5000
7000
WAVELENGTH—ANGSTROMS
1EP1
2API-A
2BP1
3API-A
3AQP1
3BP1-A
3JP1
3KP1
3RP1
3RP1-A
3WP1
5ABP1
5ADP1
5BP1-A
5CP1-A
5UP1
7VP1
902-A
1EP2
3WP2
3KP4
5AYP4
5FP4-A
7CP4
7TP4
8HP4
10SP4
908-A
P1
P2
P4
Sulfide
P5


RELATIVE SENSITIVITY
100
80
60
40
20
0
3000
5000
7000
WAVELENGTH—ANGSTROMS
3JP7
3KP7
5ABP7
5AHP7
5AHP7-A
5CP7-A
5FP7-A
5UP7
7BP7-A
7MP7
10KP7
12DP7-A
16ADP7
1EP11
2BP11
3KP11
3WP11
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5CP11-A
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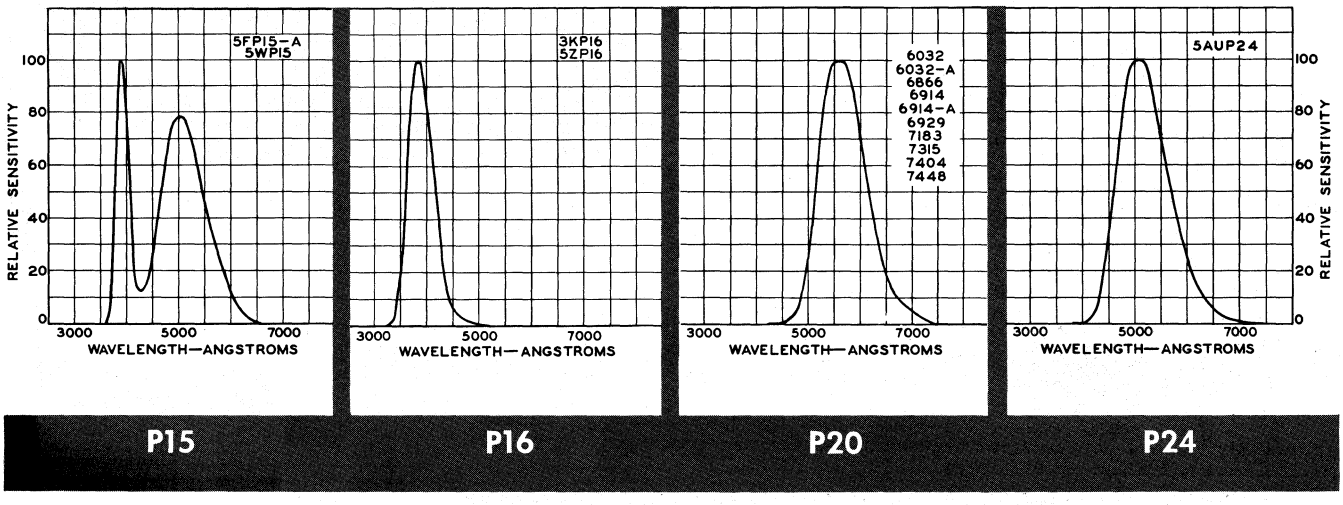
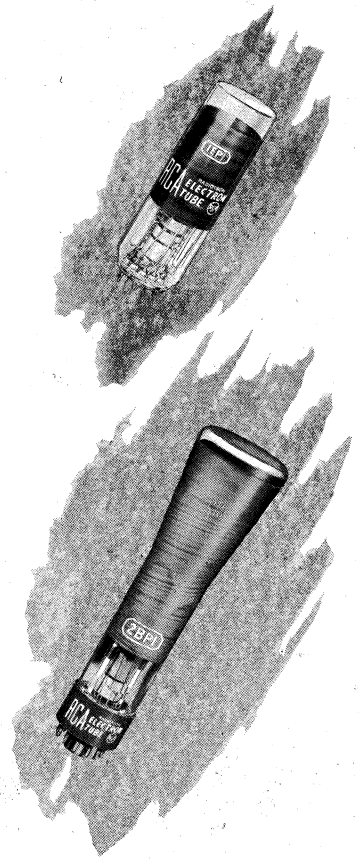
5WP11
5CP12
5FP14-A
P7
P11
P12
P14


RELATIVE SENSITIVITY
100
80
60
40
20
0
3000
5000
7000
WAVELENGTH—ANGSTROMS
5FP15-A
5WP15
3KP16
5ZP16
6032
6032-A
6866
6914
6914-A
6929
7183
7315
7404
7448
5AUP24
P15
P16
P20
P24



RCA Type	Description△
OSCILLOGRAPH TYPES	
1EP1	1″ electrostatic-focus-and-deflection type especially suited for general oscillographic applications and continuous monitoring. The 1EP1 features a medium-persistence screen, a flat face, and compact overall design. Small unidekar 11-pin base.
1EP2 **1EP11**	1″ types same as 1EP1 except: 1EP2 is for medium-persistence images; the 1EP11 is for photographic use.
2AP1-A	For renewal use. For new equipment design, use the 2BP1.
2BP1 **2BP11**	2″ types a little less than 8″ long. The 2BP1 is for general oscillographic use; the 2BP11 is for photographic use. Small-shell duodecal 10-pin base.
3AP1-A	For renewal use.# For new equipment design, use the 3KP1 or 3R-type.
3AQP1	3″ type about 9⅛″ long. High deflection sensitivity. Spherical faceplate. Small-shell duodecal 12-pin base.
3BP1-A	3″ type about 10″ long. Medium-shell diheptal 12-pin base for high-altitude operation.
3JP1 **3JP7**	3″ types about 10″ long with post-deflection acceleration for high brightness. The 3JP1 is for general oscillographic use; the 3JP7 is for long-persistence images and for pulse-modulated applications, such as radar indicator service. Recessed small ball cap. Medium-shell diheptal 12-pin base.
3KP1	3″ type having high deflection sensitivity. For general oscillographic applications. Medium-shell magnal 11-pin base.
3KP4 **3KP7** **3KP11**	3″ types same as 3KP1 except: 3KP4 is for white-trace oscillographic applications; 3KP7 is for long-persistence images and for pulse-modulated applications; the 3KP11 is for photographic use.
3RP1 **3RP1-A**	3″ types with good brightness at relatively low voltage. For general oscillographic use. The 3RP1-A features a flat faceplate. Small-shell duodecal 10-pin base.

△ Unless otherwise specified all of these types have electrostatic focus and deflection and a heater rating of 6.3 volts and 0.6 amp.

Heater rating: 2.5 volts, 2.1 amp.

● The "post-ultor" is the electrode to which is applied a dc voltage higher than the ultor voltage for accelerating the electrons in the beam after its deflection.

FLUORESCENT SCREENS

The fluorescent screens of the cathode-ray tubes listed on this and the following pages are identified according to phosphor number, e.g., P1, P2, P4, P5, P7, etc.

Phosphor P1 produces a brilliant spot having yellowish-green fluorescence and medium persistence. Types having this phosphor are particularly useful for general oscillographic applications in which recurrent wave phenomena are to be observed visually.

Phosphor P2 is a medium-persistence screen which exhibits yellowish-green fluorescence and phosphorescence. The phosphorescence may have useful persistence for over a minute under conditions of adequate excitation and low-ambient illumination. Types utilizing this phosphor are particularly useful for observing either low- or medium-speed non-recurring phenomena.

Phosphor P4 is a highly efficient screen having white fluorescence and medium-short persistence. Types having this phosphor are of particular interest for television picture tubes.

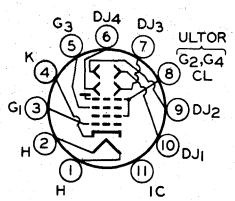
Phosphor P5 emits highly actinic blue fluorescence and has medium-short persistence. Types having this phosphor are especially useful in photographic applications involving film moving at very high speeds.

Phosphor P7 is a very long-persistence, cascade (two-layer) screen. During excitation by the electron beam, this phosphor produces a white fluorescence. After excitation, the screen exhibits a yellowish-green phosphorescence which persists for several minutes. Types having this phosphor are particularly useful where either extremely low-speed recurrent phenomena or medium-speed non-recurrent phenomena are to be observed.

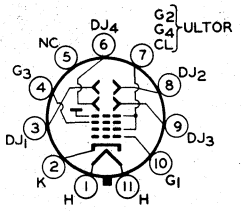
Phosphor P11 emits high intensity actinic blue fluorescence and has medium-short persistence to permit its use in all photographic applications except those in which film moves at high speed. P11 screens, because of their unusually high brightness characteristic, may also be used for visual observation of phenomena.

Phosphor P12 is a long-persistence phosphor which exhibits both orange fluorescence and phosphorescence. Types utilizing this phosphor are particularly useful for observing low- and medium-speed recurring phenomena.

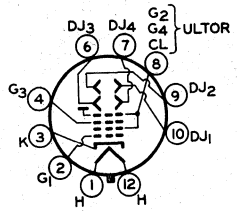
For Key to Base and Envelope Connection Diagrams, see page 3.



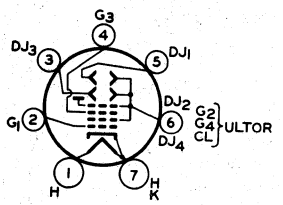
1EP1 1EP2 1EP11



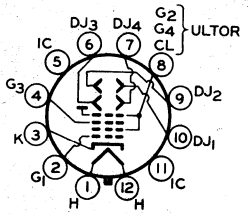
2AP1-A



2BP1 2BP11



3AP1-A



3AQP1

Maximum Dimensions		Min. Useful Screen Diam.	Maximum Ratings ♦♦					Operating Conditions						Type
			Final High-Voltage Electrode									Deflection Factors volts dc/in.		
Overall Length inches	Envelope Diam. inches	inches	Post-Ultor● Volts	Ultor■ Volts	Grid-No. 3 Volts	Grid-No. 2 Volts	Grid-No. 1 Bias volts†	Final High-Voltage Electrode Volts♦	Grid-No. 3 Voltage for Focus approx.	Grid-No. 2 Volts	Maximum Grid-No. 1 Volts for Visual Cutoff¢	DJ1 & DJ2♂	DJ3 & DJ4	
OSCILLOGRAPH TYPES														
4 1/16	1 5/16	1 1/16	—	1500	1200	1500	−200	1000 500	100 to 300 50 to 150	1000 500	−42 −21	210 to 310 105 to 155	240 to 350 120 to 175	**1EP1**
4 1/16	1 5/16	1 1/16	—	1500	1200	1500	−200	1000 750	100 to 300 75 to 225	1000 750	−42 −39	210 to 310 157 to 233	240 to 350 180 to 263	**1EP2** **1EP11**
7 5/8	2 1/16	1 3/4	—	1000	500	1000	−125	1000	140 to 300	1000	−90	195 to 265	167 to 225	**2AP1-A**
7 13/16	2 1/16	1 3/4	—	2500	1000	2500	−200	2000 1000	300 to 560 150 to 280	2000 1000	−135 −67.5	230 to 310 115 to 155	148 to 200 74 to 100	**2BP1** **2BP11**
11 7/8	3 1/16	2 3/4	—	1500	1000	1500	−125	1500	300 to 515	1500	−75	91 to 137	87 to 131	**3AP1-A**
9 3/8	3 1/16	2 3/4	—	2750	1100	2750	−200	1000	165 to 310	1000	−67.5	73 to 99	26 to 35	**3AQP1**
10 1/4	3 1/16	2 3/4	—	2000	1000	2000	−200	2000 1500	400 to 690 300 to 515	2000 1500	−90 −67.5	170 to 230 127 to 173	125 to 170 94 to 128	**3BP1-A**
10 1/4	3 1/16	2 3/4	4000	2000	1000	2000	−200	4000 3000 2000 π	400 to 690 300 to 515 400 to 690	2000* 1500* 2000*	−90 −67.5 −90	170 to 230 127 to 173 136 to 184	125 to 170 94 to 128 100 to 136	**3JP1** **3JP7**
11 3/4	3 1/16	2 3/4	—	2500	1000	2500	−200	2000 1000	320 to 600 160 to 300	2000 1000	−90 −45	100 to 136 50 to 68	76 to 104 38 to 52	**3KP1**
11 3/4	3 1/16	2 3/4	—	2500	1000	2500	−200	2000	320 to 600	2000	−90	100 to 136	76 to 104	**3KP4** **3KP7** **3KP11**
9 3/8	3 1/16	2 3/4	—	2500	1000	2500	−200	2000 1000	330 to 620 165 to 310	2000 1000	−135 −67.5	146 to 198 73 to 99	104 to 140 52 to 70	**3RP1** **3RP1-A**

■ The "ultor" is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

* And grid-No. 4 volts.

♦♦ Design-center values.

♦ Post-ultor voltage for types having a post-ultor electrode; otherwise, ultor volts.

¢ For visual cutoff of undeflected focused spot.

† Positive bias value = 0 volts, positive peak value = 2 volts.

π It is recommended that the post-ultor voltage be not less than 3000 volts for high-speed scanning.

♂ DJ1 and DJ2 are deflecting electrodes nearer screen.

Phosphor P14 is a medium-persistence cascade (two-layer) screen. During excitation by the electron beam, this phosphor exhibits purplish-blue fluorescence. After excitation, it exhibits a yellowish-orange phosphorescence which persists for a little over a minute. Types utilizing this phosphor are particularly useful for observing either low- and medium-speed non-recurring phenomena or high-speed recurring phenomena.

Phosphor P15 emits radiation in the visible green region and in the invisible near-ultraviolet region. The ultraviolet radiation has very-short persistence which is appreciably shorter than that of the visible radiation. This phosphor finds application in flying-spot cathode-ray tubes.

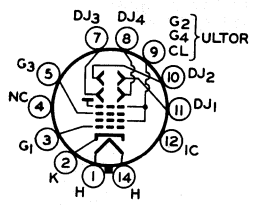
Phosphor P16 has violet as well as near-ultraviolet fluorescence and phosphorescence with very-short persistence. This phosphor has a stable, exponential decay characteristic and is particularly useful for the high-speed scanning requirements of a flying-spot video-signal generator.

Phosphor P20 has high luminous efficiency, yellow-green fluorescence and medium to medium-short persistence. The screen may be used in applications requiring relatively short persistence and good visual efficiency.

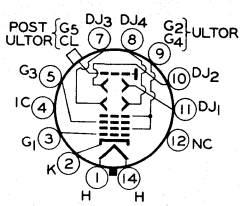
Phosphor P24 is a short-persistence phosphor with green fluorescence and phosphorescence. Its spectral-energy emission characteristic has sufficient range to provide useable energy over the visible spectrum required for generating color signals from color transparencies.

Description of Persistence	Time to decay to 10% of initial brightness
Very long	1 second and over
Long	100 millisec to 1 sec
Medium	1 millisec to 100 millisec
Medium short	10 microsec to 1 millisec
Short	1 microsec to 10 microsec
Very short	Less than 1 microsec

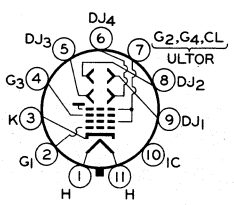
For Key to Base and Envelope Connection Diagrams, see page 3



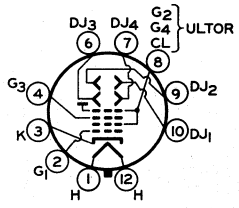
3BP1-A



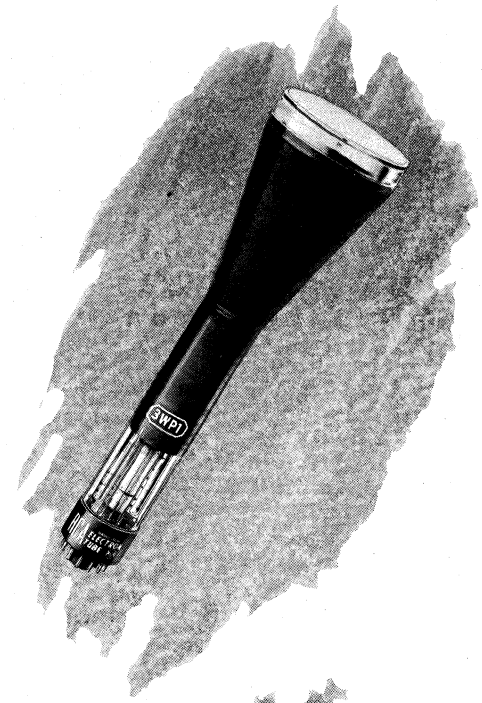
3JP1 3JP7



3KP1 3KP4 3KP7 3KP11



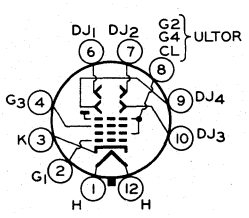
3RP1 3RP1-A



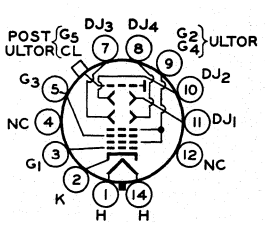
RCA Type	Description△
OSCILLOGRAPH TYPES—Cont'd	
3WP1 3WP2 3WP11	3″ types with flat face and extremely high deflection sensitivity. The 3WP1 is for general oscillographic applications; the 3WP2 is for long-persistence images; the 3WP11 is for photographic use. Small-shell duodecal 10-pin base.
5ABP1 5ABP7 5ABP11	5″ types with post-deflection acceleration, flat face, very high deflection sensitivity. Especially suitable for wide-band amplifiers. The 5ABP1 is for general oscillographic use; the 5ABP7 is for long-persistence images and for pulse-modulated applications, such as radar indicator service; the 5ABP11 is for photographic use. Recessed small ball cap. Medium-shell diheptal 12-pin base.
5ADP1	5″ type with post-deflection acceleration, flat face, and very high deflection sensitivity. Particularly suitable for wide-band amplifiers. Medium-shell diheptal 12-pin base.
5AHP7 5AHP7-A	5″ types for radar applications requiring a long-persistence screen. Electrostatic focus and magnetic deflection. The 5AHP7-A is identical to the 5AHP7 except that it has an aluminized screen. Recessed small ball cap; medium-shell octal 8-pin base.
5BP1-A	For renewal use. For new equipment design, use the 5UP1.
5CP1-A 5CP7-A 5CP11-A 5CP12	5″ types featuring post-deflection acceleration for high brightness. The 5CP1-A is for general oscillographic use; the 5CP7-A is for long-persistence images and for pulse-modulated applications, such as radar indicator service; the 5CP11-A is for photographic use; the 5CP12 has similar application as 5CP7-A except for having medium-long persistence. Recessed small ball cap. Medium-shell diheptal 12-pin base.
5FP7-A	5″ magnetic-focus-and-deflection type. For low-frequency pulse-modulated applications. Recessed small ball cap. Long medium-shell octal 8-pin base.
5FP14-A 5FP15-A	5″ magnetic-focus-and-deflection types capable of producing spot having diameter less than 0.009″. The 5FP14-A is for high-frequency pulse-modulated applications. The 5FP15-A is for photographic use. Recessed small ball cap. Long medium-shell octal 8-pin base.
5UP1	5″ type having high deflection sensitivity and resolution. For general oscillographic applications. Small-shell duodecal 10-pin base.
5UP7 5UP11	5″ types same as 5UP1 except: the 5UP7 is for long-persistence images; the 5UP11 is for photographic applications.
7BP7-A	For renewal use. For new equipment design, use the 7MP7.
7MP7	7″ magnetic-focus-and-deflection type. For low-frequency pulse-modulated service. Recessed small cavity cap. Small-shell duodecal 5-pin base.

△ Unless otherwise specified, all of these types have electrostatic focus and deflection and a heater rating of 6.3 volts and 0.6 amp.

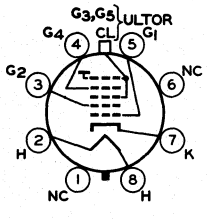
For Key to Base and Envelope Connection Diagrams, see page 3



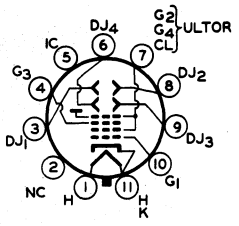
3WP1 3WP2 3WP11



5ABP1 5ABP7 5ABP11 5ADP1



5AHP7 5AHP7-A



5BP1-A

Maximum Dimensions		Min. Useful Screen Diam.	Maximum Ratings♦♦					Operating Conditions						RCA Type
			Final High-Voltage Electrode									Deflection Factors volts dc/in.		
Overall Length inches	Envelope Diam. inches	inches	Post-Ultor● Volts	Ultor■ Volts	Grid-No. 3 Volts	Grid-No. 2 Volts	Grid-No. 1 Bias Volts†	Final High-Voltage Electrode Volts♦	Grid-No. 3 Voltage for Focus approx.	Grid-No. 2 Volts	Maximum Grid-No. 1 Volts for Visual Cutoff¢	DJ1 & DJ2ϑ	DJ3 & DJ4	
OSCILLOGRAPH TYPES—Cont'd														
11 5/8	3 1/16	2 3/4	—	2500	1000	2500	−200‡	2000 1500 1000	330 to 620 247 to 465 165 to 310	2000 1500 1000	−100 −75 −50	83 to 101 62.3 to 75.8 41.5 to 50.5	57 to 70 42.8 to 52.5 28.5 to 35	**3WP1 3WP2 3WP11**
17 1/8	5 11/32	4 9/16	6000	2600	1000	2600	−200	4000 3000 2000π	400 to 690 300 to 515 400 to 690	2000* 1500* 2000*	−87 −65 −87	53 to 72 40 to 54 43 to 58	36 to 48 27 to 36 29 to 39	**5ABP1 5ABP7 5ABP11**
16 15/16	5 11/32	4 1/2	6000	2600	1000	2600	−200	4000 3000 2000π	400 to 690 300 to 515 400 to 690	2000* 1500* 2000*	−75 −56 −75	53.4 to 66.6 40 to 50 43 to 53	40.6 to 50 30.5 to 37.5 32 to 40	**5ADP1**
11 3/8	5 1/32	4 1/4	—	10000	1000§	700	−180‡	7000	0 to 250◆	300	−77	Deflection Angle, 53° approx.		**5AHP7 5AHP7-A**
17 1/8	5 5/16	4 1/2	—	2000	1000	2000	−125	2000 1500	340 to 560 255 to 420	2000 1500	−60 −45	70 to 96 53 to 72	64 to 88 48 to 66	**5BP1-A**
17 1/8	5 11/32	4 1/2	4000	2000	1000	2000	−200	4000 3000 2000π	375 to 690 280 to 515 375 to 690	2000* 1500* 2000*	−90 −67.5 −90	78 to 106 59 to 80 62 to 84	66 to 90 50 to 68 54 to 74	**5CP1-A 5CP7-A 5CP11-A 5CP12**
11 1/2	5 1/32	4 1/4	—	8000	—	700	−180	7000 4000ø	— —	250 250	−70 −70	Deflection Angle, 53° approx.		**5FP7-A**
11 1/2	5 1/32	4 1/4	—	8000	—	700	−180	5000 4000	— —	250 250	−70 −70	Deflection Angle, 53° approx.		**5FP14-A 5FP15-A**
15 1/8	5 11/32	4 1/2	—	2500	1000	2500	−200	2000 1000	340 to 640 170 to 320	2000 1000	−90 −45	56 to 77 28 to 39	46 to 62 23 to 31	**5UP1**
15 1/8	5 11/32	4 1/2	—	2500	1000	2500	−200	2000 1500ø	340 to 640 255 to 480	2000 1500	−90 −67.5	56 to 77 42 to 58	46 to 62 35 to 47	**5UP7 5UP11**
13 5/8	7 1/8	6	—	8000	—	700	−180	7000 4000ø	— —	250 250	−70 −70	Deflection Angle, 53° approx.		**7BP7-A**
13 1/8	7 5/16	6	—	8000	—	+700 −180	−180	7000 4000ø	— —	250 250	−63 −63	Deflection Angle, 50° approx.		**7MP7**

♦♦ Design-center values.

● The "post-ultor" is the electrode to which is applied a dc voltage higher than the ultor voltage for accelerating the electrons in the beam after its deflection.

■ The "ultor" is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

† Positive bias value = 0 volts, positive peak value = 2 volts, except as noted.

♦ Post-ultor voltage for types having a post-ultor electrode; otherwise, ultor volts.

¢ For visual cutoff of undeflected focused spot.

ϑ DJ1 and DJ2 are deflecting electrodes nearer screen.

‡ Positive-bias and positive-peak value = 0 volts.

π It is recommended that the post-ultor voltage be not less than 3000 volts for high-speed scanning.

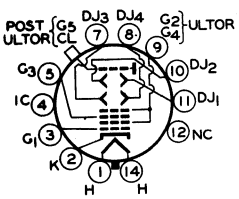
* And grid-No. 4 volts.

§ Grid-No. 4 volts.

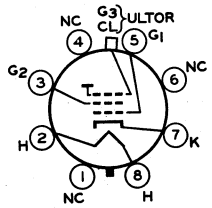
◆ Grid-No. 4 volts. For ultor current of 100 μamp.

ø Recommended minimum voltage.

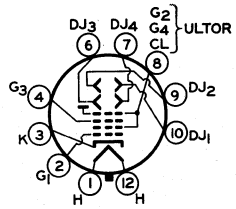
For Key to Base and Envelope Connection Diagrams, see page 3.



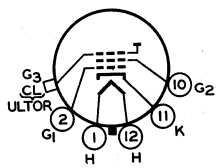
5CP1-A 5CP7-A 5CP11-A 5CP12



5FP7-A 5FP14-A 5FP15-A 7BP7-A



5UP1 5UP7 5UP11



7MP7

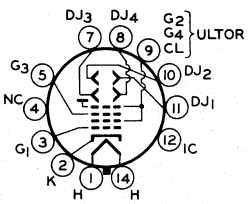
RCA Type	Description△
OSCILLOGRAPH TYPES—Cont'd	
7VP1	7″ type having short overall length and good deflection sensitivity. For general oscillographic applications. Medium-shell diheptal 12-pin base.
10KP7	10″ magnetic-focus-and-deflection type for use in pulse-modulated applications such as radar indicator service. Filterglass faceplate. Recessed small cavity cap. Small-shell duodecal 5-pin base.
12DP7-A	12″ magnetic-focus-and-deflection type for pulse-modulated applications. Medium cap, Filterglass faceplate. Long medium-shell octal 8-pin base.
16ADP7	16″ metal-shell type having magnetic focus and deflection. For use in pulse-modulated applications such as radar indicator service. Features high resolution at high beam currents and a Filterglass faceplate. Small-shell duodecal 7-pin base.
902-A	For renewal use. For new equipment design, use the 2BP1.
908-A	3″ type with P5 phosphor. For photographic applications involving film moving at high speeds. Medium-shell medium 7-pin base.#
TRANSCRIBER KINESCOPE ⊕	
5WP11	5″ electrostatic-focus and magnetic-deflection type having a flat aluminized screen and external conductive coating. For use in kinescope film recording. Recessed small cavity cap. Small-shell duodecal 7-pin base.
VIEW-FINDER KINESCOPES ⊕	
5AYP4	5″ electrostatic-focus, magnetic-deflection type. For use as an electronic viewfinder in portable television cameras. Features high resolution, flat face, aluminized screen and external conductive coating. Recessed small ball cap. Long medium-shell octal 8-pin base.
5FP4-A	5″ magnetic-focus-and-deflection type. For use as an electronic viewfinder in television cameras. Recessed small ball cap. Long medium-shell octal 8-pin base.
MONITOR KINESCOPES ⊕	
7CP4	For renewal use. For new equipment design, use the 7TP4.
7TP4	7″ directly viewed, electrostatic-focus, magnetic-deflection type. Requires no ion-trap magnet. Has high resolution and an aluminized screen. Recessed small cavity cap. Small-shell duodecal 6-pin base.

△ Unless otherwise specified, all of these types have electrostatic focus and deflection and a heater rating of 6.3 volts and 0.6 amp.

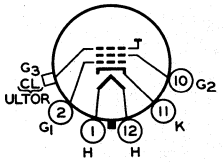
⊕ For information on picture tubes used in television broadcast receivers, see RCA booklet 1275-J (RCA Receiving Tubes and Picture Tubes).

Heater rating: 2.5 volts, 2.1 amp.

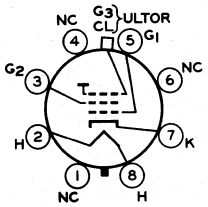
For Key to Base and Envelope Connection Diagrams, see page 3.



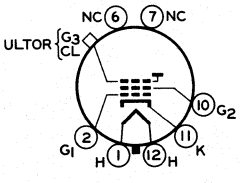
7VP1



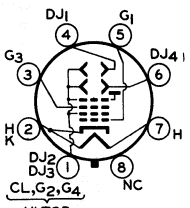
10KP7



5FP4-A 12DP7-A



16ADP7



902-A

Maximum Dimensions		Min. Useful Screen Diam.	Maximum Ratings♦♦					Operating Conditions						RCA Type
			Final High-Voltage Electrode									Deflection Factors volts dc/in.		
Overall Length inches	Envelope Diam. inches	inches	Post-Ultor● Volts	Ultor■ Volts	Grid-No. 3 Volts	Grid-No. 2 Volts	Grid-No. 1 Bias Volts†	Final High-Voltage Electrode Volts♦	Grid-No. 3 Voltage for Focus approx.	Grid-No. 2 Volts	Maximum Grid-No. 1 Volts for Visual Cutoff¢	DJ1 & DJ2ϑ	DJ3 & DJ4	
OSCILLOGRAPH TYPES—Cont'd														
14⅞	7⅛	6	—	4000	2000	4000	−200	3000 1500	800 to 1200 400 to 600	3000 1500	−84 −42	93 to 123 47 to 62	75 to 102 38 to 51	**7VP1**
18	10⅝	9	—	10000	—	+700 −180	−180	9000 7000	— —	250 250	−63 −63	Deflection Angle, 50° approx.		**10KP7**
20⅛	12 3/16	10	—	10000	—	+700 −180	−180	7000 4000ø	— —	250 250	−70 −70	Deflection Angle, 50° approx.		**12DP7-A**
22	16	14⅜	—	14000	—	+410 −180	−180	12000	—	250	−63	Deflection Angle, 53° approx.		**16ADP7**
7⅝	2 1/16	1¾	—	600	300	600	−125	600 400	85 to 180 57 to 120	600 400	−90 −60	110 to 166 73 to 111	96 to 141 64 to 94	**902-A**
11⅞	3 1/16	2½	—	1500	1000	1500	−125	1500	300 to 515	1500	−75	91 to 137	87 to 131	**908-A**
TRANSCRIBER KINESCOPE⊕														
11 13/16	5⅛	4¼	—	27000	6000	350	−150	27000	4200 to 5400‡	200	−98	Deflection Angle, 50° approx.		**5WP11**
VIEW-FINDER KINESCOPES⊕														
11 15/16	5 1/32	4¼	—	10000	1500	410	−125	10000 7000	980 to 1410* 680 to 990*	300 200	−71✠ −47✠	Deflection Angle, 53° approx.		**5AYP4**
11½	5 1/32	4¼	—	8000	—	410	−125	6000	—	250	−70	Deflection Angle, 53° approx.		**5FP4-A**
MONITOR KINESCOPES⊕														
13 13/16	7⅛	6½	—	8000	2400	300	−125	6000	912 to 1368	250	−67.5	Deflection Angle, 57° approx.		**7CP4**
13½	7 5/16	6	—	12000	2000	410	−125	10000	1170 to 1590*	200	−48✠	Deflection Angle, 50° approx.		**7TP4**

♦♦ Design-center values.

● The "post-ultor" is the electrode to which is applied a dc voltage higher than the ultor voltage for accelerating the electrons in the beam after its deflection.

■ The "ultor" is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

† Positive bias value = 0 volts, positive peak value = 2 volts.

♦ Ultor volts.

¢ For visual cutoff of undeflected focused spot except as noted.

ϑ DJ1 and DJ2 are deflecting electrodes nearer screen.

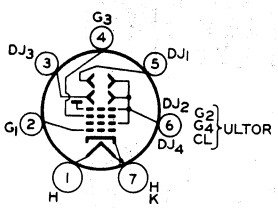
ø Recommended minimum voltage.

‡ For ultor current of 20 μamp.

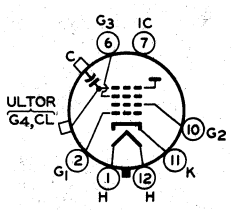
* For ultor current of 100 μamp.

✠ For raster cutoff.

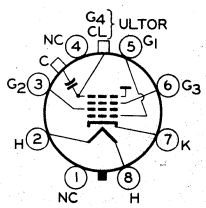
For Key to Base and Envelope Connection Diagrams, see page 3



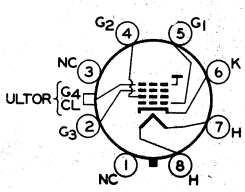
908-A



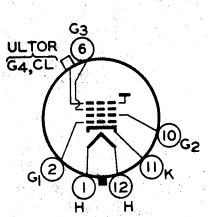
5WP11



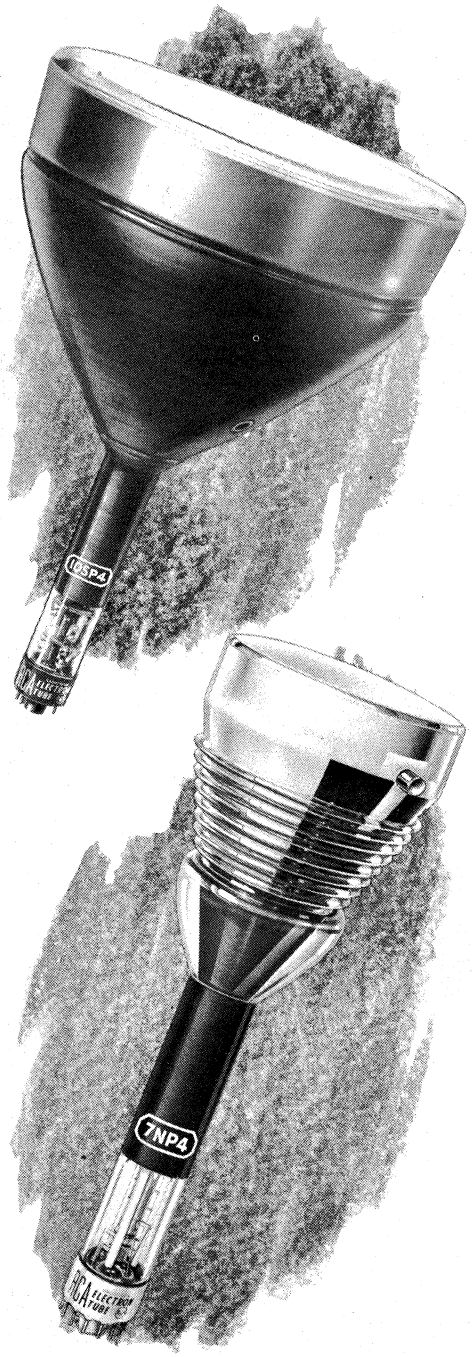
5AYP4



7CP4



7TP4



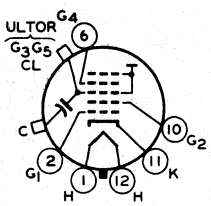
Type	Description△
MONITOR KINESCOPES—Cont'd⊕	
8HP4	Small, compact, 8-inch, directly-viewed rectangular kinescope. Electrostatic-focus, magnetic-deflection. Requires no ion-trap magnet. Recessed small cavity cap. Small-shell duodecal 6-pin base.
10SP4	10″ directly-viewed, electrostatic-focus, magnetic-deflection type. Requires no ion-trap magnet. Has high resolution, a Filterglass faceplate and an aluminized screen. Recessed small cavity cap. Small-shell duodecal 6-pin base.
FLYING-SPOT CATHODE-RAY TUBES	
3KP16	3″ electrostatic-focus, electrostatic-deflection type. Features clear glass faceplate, very-short persistence. Medium-shell magnal 11-pin base.
5AUP24	5″ electrostatic-focus, magnetic-deflection type. Intended primarily for use as a scanner in a color video-signal generator. Features useable radiant energy output over the visible spectrum, extremely short persistence, high resolution, aluminized screen, and external conductive coating. Recessed small cavity cap. Small-shell duodecal 7-pin base.
5WP15	5″ electrostatic-focus, magnetic-deflection type. Intended primarily for use as a scanner in a video-signal generator. Features aluminized screen, extremely short persistence, and external conductive coating. Recessed small cavity cap. Small-shell duodecal 7-pin base.
5ZP16	5″ electrostatic-focus, magnetic-deflection type. Intended primarily for use as a scanner in a high-quality video-signal generator. Features extremely short persistence, high resolution, aluminized screen, and external conductive coating. Recessed small cavity cap. Small-shell duodecal 7-pin base.
PROJECTION KINESCOPES ⊕	
5AZP4	5″ electrostatic-focus, magnetic-deflection type. Provides an 8′ by 6′ picture. Integral flexible ultor lead. Small-shell duodecal 7-pin base.
7NP4	Similar to 7WP4 except provides a 20′ by 15′ picture at a projection-throw distance of about 60′.@
7WP4	7″ electrostatic-focus, magnetic-deflection type. Intended for theater-television use. Provides a 20′ by 15′ picture at a projection-throw distance of about 80′. Medium cap. Small-shell diheptal 14-pin base.@

△ Unless otherwise specified, all of these types have electrostatic focus and deflection and a heater rating of 6.3 volts and 0.6 amp.

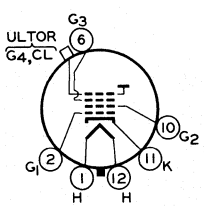
@ Heater rating: 6.6 volts, 0.62 amp.

⊕ For information on picture tubes used in television broadcast receivers, see RCA booklet 1275-J (RCA Receiving Tubes and Picture Tubes).

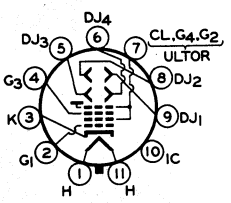
For Key to Base and Envelope Connection Diagrams, see page 3.



8HP4



10SP4



3KP16

Maximum Dimensions		Min. Useful Screen Diam.	Maximum Ratings♦♦					Operating Conditions					RCA Type
			Final High-Voltage Electrode										
Overall Length inches	Envelope Diam. inches	inches	Post-Ultor● Volts	Ultor■ Volts	Grid-No. 3 Volts	Grid-No. 2 Volts	Grid-No. 1 Bias Volts†	Final High-Voltage Electrode Volts♦	Grid-No. 3 Voltage for Focus approx.	Grid-No. 2 Volts	Maximum Grid-No. 1 Volts for Visual Cutoff¢	Deflection Factors volts dc/in. DJ1 & DJ2 ♉	Deflection Factors volts dc/in. DJ3 & DJ4	
MONITOR KINESCOPES—Cont'd⊕														
10¼	8½◆	7¹³⁄₁₆◆	—	14000*	+1100*π −550*π	550*	−155*	11000#	0 to 300π¶	300	−72	Deflection Angle, 90° approx.◆		8HP4
17	10⁹⁄₁₆	9⅛	—	20000	3000	410	−125	14000	1640 to 2225¶	200	−48⌖	Deflection Angle, 50° approx.		10SP4
								12000	1400 to 1900¶	200	−48⌖			
FLYING-SPOT CATHODE-RAY TUBES														
11¾	3¹⁄₁₆	2¾	—	2500	1000	—	−200	2000	320 to 600	—	−90	—		3KP16
12⅞	5⅛	4¼	—	27000	6000	350	−150	27000	4600 to 5800	200	−100	Deflection Angle, 40° approx.		5AUP24
11¹³⁄₁₆	5⅛	4¼	—	27000	6000	350	−150	27000	4000 to 5200	200	−100	Deflection Angle, 50° approx.		5WP15
								20000	3000 to 3800	200	−100			
14¾	5⅛	4¼	—	27000	7000	350	−150	27000	5500 to 7100	200	−100	Deflection Angle, 40° approx.		5ZP16
								20000	4100 to 5300	200	−100			
PROJECTION KINESCOPES⊕														
12⁹⁄₁₆	5⅛	4½	—	40000*	9000*	400*	−150*	36000	6650 to 8100	200	−93⌖	Deflection Angle, 50° approx.		5AZP4
20⅛	7³⁄₁₆▲	5 x 3¾ø	—	80000*	20000*	600*	−250*	75000	15000 to 17000	400 to 600⌖	−155§	Deflection Angle, 35° approx.		7NP4
20¹⁄₁₆	7³⁄₁₆▲	5 x 3¾ø	—	80000*	20000*	600*	−250*	75000	15000 to 17000	400 to 600⌖	−155§	Deflection Angle, 35° approx.		7WP4

♦♦ Design-center values, except as noted.

● The "post-ultor" is the electrode to which is applied a dc voltage higher than the ultor voltage for accelerating the electrons in the beam after its deflection.

■ The "ultor" is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

† Positive bias value = 0 volts, positive peak value = 2 volts.

♦ Ultor volts.

¢ For visual cutoff of undeflected focused spot, except as noted.

♉ DJ1 and DJ2 are deflecting electrodes nearer screen.

◆ Diagonal.

* Absolute value.

π Grid-No. 4 volts.

And grid-No. 3 volts.

¶ For ultor current of 100 μamp.

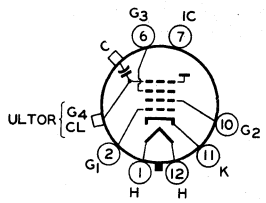
⌖ For raster cutoff.

▲ Excluding side cap.

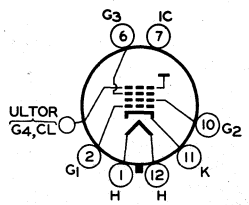
ø Quality rectangle. Max. faceplate temperature = 100° C. Tube requires 40 cfm air flow to faceplate.

§ Recommended operating value.

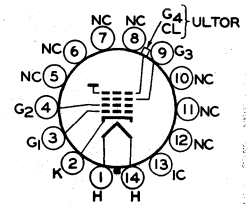
For Key to Base and Envelope Connection Diagrams, see page 3.



5AUP24 5WP15 5ZP16



5AZP4



7NP4 7WP4

TECHNICAL PUBLICATIONS

ELECTRON TUBES —

• **RCA ELECTRON TUBE HANDBOOK**—HB-3 (7⅜" x 5⅝"). Five deluxe 2¼-inch-capacity black binders imprinted in gold. The "bible" of the industry — contains over 4200 pages of loose-leaf data and curves on RCA receiving tubes, transmitting tubes, cathode-ray tubes, picture tubes, photocells, phototubes, camera tubes, ignitrons, vacuum and gas rectifiers, magnetrons, traveling-wave tubes, premium tubes, pencil tubes, and other miscellaneous types for special applications. Available on subscription basis. Price $20.00 including service for first year. Also available with RCA Semiconductor Products Handbook HB-10 at special combination price of $22.50.* Write to Commercial Engineering for descriptive flyer and order form.

• **RCA RECEIVING TUBE MANUAL**—RC-20 (8¼" x 5⅜") — 432 pages. Revised and expanded. Contains technical data on more than 760 receiving types and 170 picture-tube types. Features tube theory written for the layman, application information and a circuit section. Features lie-flat binding. Price $1.00.*

• **RADIOTRON DESIGNER'S HANDBOOK**—4th Edition (8¾" x 5½")—1500 pages. Comprehensive reference thoroughly covering the design of radio and audio circuits and equipment. Written for the design engineer, student, and experimenter. Contains 1000 illustrations, 2500 references, and cross-referenced index of 7000 entries. Edited by F. Langford-Smith of Amalgamated Wireless Valve Company Pty. Ltd. in Australia. Price $7.00.*

• **RCA TRANSMITTING TUBES** — TT-4 (8⅜" x 5⅜")—256 pages. Contains basic information on generic tube types, on tube parts and materials, and on tube installation and application. Includes technical data and curves for power tubes having plate-input ratings up to 4 kilowatts, and data for associated rectifier tubes. Contains sections on transmitter-design considerations, rectifier circuits and filters, and circuit diagrams for transmitting and industrial applications. Features lie-flat binding. Price $1.00.*

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• **RCA RECEIVING-TYPE TUBES FOR INDUSTRY AND COMMUNICATIONS**—RIT-104B (10⅞" x 8⅜")—32 pages. Technical data on over 190 RCA "special red" tubes, premium tubes, nuvistors, computer tubes, pencil tubes, glow-discharge tubes, small thyratrons, low-microphonic amplifier tubes, traveling-wave tubes, and other special types. Price 30 cents.*

• **RCA RECEIVING TUBES AND PICTURE TUBES**—1275J (10⅞" x 8⅜")—48 pages. New, enlarged, and up-to-date booklet contains classification chart, characteristics chart, and base and envelope connection diagrams on more than 900 entertainment receiving tubes and picture tubes. Price 35 cents.*

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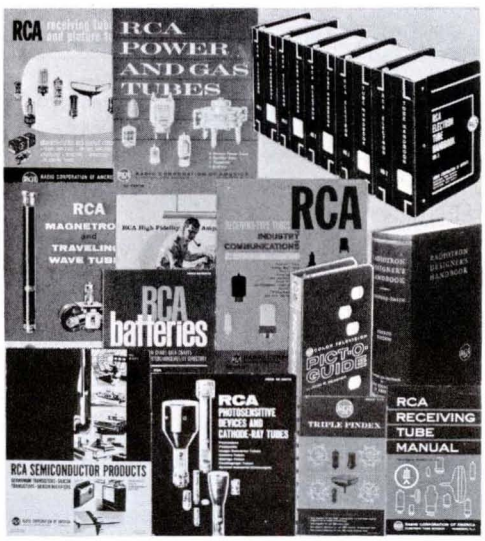
• **RCA MAGNETRONS AND TRAVELING-WAVE TUBES**—MT-301A (10⅞" x 8⅜")—48 pages. Operating theory for magnetrons and traveling-wave tubes, application considerations, and techniques for measurement of electrical parameters. Price 60 cents.*

• **RCA PENCIL TUBES**—1CE-219 (10⅞" x 8⅜")—28 pages. Contains operating theory for pencil tubes, electrical and mechanical circuit-design considerations, environmental considerations, application considerations, and data for commercial types. Price 50 cents.*



• **RCA TRIPLE PINDEX**—PINDEX-109 (8¼" x 5¼")—240 pages. Gives base diagrams for more than 2000 JEDEC-registered receiving types including picture tubes. Base diagrams of over 1500 receiving types are presented in triplicate to provide the user with any three base diagrams at any one time. More than 200 small industrial-receiving types and more than 200 foreign receiving types are cross-referenced to the receiving-tube section for base diagrams. Price $1.75.*

• **RCA INTERCHANGEABILITY DIRECTORY OF FOREIGN vs U.S.A. RECEIVING-TYPE ELECTRON TUBES**—1CE-197A (8⅜" x 10⅞")—4 pages. Covers approximately 500 foreign tube types used principally in AM and FM radios, TV receivers, and audio amplifiers. Indicates U.S.A. direct replacement type or similar type if available. Single copy free on request.

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• **TV SERVICING, SUPPLEMENT 1.** — TVS-1031 (10⅞" x 8⅜")—12-page booklet by John R. Meagher on solving trouble-shooting problems in those hard-to-service TV receivers known to service technicians as "tough" sets or "dogs". Price 15 cents.*

• **PRACTICAL COLOR TELEVISION**—Revised Edition (11" x 8½")—84 pages. Black-and-white and color illustrations. Comprehensive information on color principles, color signal, color camera, and color picture tubes. Covers commercial receiver circuit using the RCA-15GP22 color picture tube, as well as installation and service of color receivers. Provides detailed description of color-test equipment. Price $2.00.*

• **PRACTICAL COLOR TELEVISION, SUPPLEMENT 1.** —(11" x 8½")—36 pages. Describes theory, operation and servicing of large-screen color TV receiver using RCA-21AXP22. Has 55 black-and-white and color illustrations, wave-forms, and explanations of color circuits and adjustments. Price 75 cents.*

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*Prices shown apply in U.S.A. and are subject to change without notice.

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ELECTRON TUBES
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From RCA, Commercial Engineering, Electron Tube Division, Harrison, New Jersey

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CAMERA TUBES
STORAGE TUBES
CATHODE-RAY TUBES

- **Developmental Types**
- **Recently Announced Types**
- **Other Suggested Types**

For further information or application assistance on the devices described in this folder please call your RCA Field Representative at our office nearest you.

FOR NEW-EQUIPMENT DESIGN

RADIO CORPORATION of AMERICA
ELECTRON TUBE DIVISION HARRISON, N. J.

1CE-210C 4-62
Supersedes - 1CE-210B 9/61
Printed in U.S.A.

IMAGE ORTHICONS

Type Number[a]	Description	Maximum Dimensions: Overall Length inches	Maximum Dimensions: Diameter inches	Maximum Photocathode Image Diagonal inches
4401	For color pickup where available scene illumination is approximately 50 to 200 footcandles. Supplied as set of three tubes having matched characteristics.	15.45	3.06	1.8
4401/V1	For black-and-white pickup where scene illumination is extremely low or limited. Has slightly higher sensitivity and signal output than 5820A.	15.45	3.06	1.8
4415, 4416	For color pickup where scene illumination is approximately 50 to 200 footcandles. Types supplied as a set and feature precision construction and field mesh for superior registration of color images. Types 4415 are used in red and green channels; type 4416 is used in blue channel.	15.45	3.06	1.8
5820A	General purpose type having high sensitivity. For outdoor or studio use.	15.45	3.06	1.8
7198	Designed primarily for military and industrial applications requiring good tube performance under extreme environmental conditions.	15.45	3.06	1.8
7293A	Similar to 5820A but has field mesh and "anti-ghost" electron-optical design. Field mesh improves picture geometry and signal uniformity: "anti-ghost" image section suppresses highlight flare.	15.45	3.06	1.8
7295A	For high-quality black-and-white pickup. Features high resolution capability, high signal-to-noise ratio, and superior half-tone signal reproduction. Uses same optics required by 3-inch types.	19.685	4.594	1.6
7389A	Similar to 7295A but employs very close target-to-mesh spacing. Has higher signal-to-noise ratio and better half-tone signal reproduction than 7295A.	19.685	4.594	1.6
7513	For high-quality color and black-and-white pickup. Has very close target-to-mesh spacing and precision construction. High signal-to-noise ratio.	15.45	3.06	1.8
7513/V1	Same as 7513 but supplied as a set of three tubes having matched characteristics.	15.45	3.06	1.8
8093A	Similar to 7293A but has higher target-to-mesh capacitance and improved signal-to-noise ratio.	15.45	3.06	1.8
C74034	For applications requiring good resolution at extremely low light levels. For scientific applications.	15.45	3.06	1.8
C74056	Similar to C74034 and C74092 but has intermediate sensitivity and performance characteristics. Intended for special closed-circuit TV applications.	15.45	3.06	1.8
C74092	Similar to C74034 but has higher target-to-mesh capacitance and improved signal-to-noise ratio.	15.45	3.06	1.8
C74093A	Image-intensifier orthicon for scene pickup in virtual darkness.	22.7	4.2	2.0

VIDICONS

Type Number[a]	Description	Maximum Dimensions: Overall Length inches	Maximum Dimensions: Diameter inches	Image Size inches
4427	Very small 1/2" diameter tube designed for ultra-compact cameras.	3.40	0.58	0.24x0.18
7038	General purpose type having high effective sensitivity and very uniform photoconductive surface. For live or film pickup in black-and-white or color cameras.	6.50	1.135	1/2x3/8

For footnotes, see *page 8*.

IMAGE ORTHICONS

Typical Sensitivity			Typical Resolution at Operating Light Level		Typical Signal-to-Noise Ratio Bandwidth 4.5 mc[b]		Components				Type Number[a]
Operating Point (Lens Stop Relative to Knee) ① B & W ② Color	Illumination on Tube Face for Operating Point footcandle	Nearest ASA Exposure Index for Operating Light Level	Amplitude Response at 400 TV Lines per cent	Limiting Resolution TV lines	Target Setup: 2 Volts	Target Setup: 3 Volts	Alignment Coil	Focusing Coil	Deflecting Yoke	Socket	
② 0	0.7×10^{-2}	2×10^{4}	50	625	40:1	-	A	A	A	B	4401
① 1 to 2	1.4×10^{-2}	1×10^{4}	50	625	40:1	-	A	A	A	B	4401VI
② 0	1×10^{-2}[c]	1.6×10^{4}	40	675	37:1	-	A	A	A	B	4415 4416
① 1 to 2	2×10^{-2}	8000	50	625	40:1	-	A	A	A	B	5820A
No definite knee	1×10^{-2} 3×10^{-3} 3×10^{-4} 3×10^{-5}	1.6×10^{4} - - 5×10^{6}	- - - -	625 550 350 115	30:1 23:1 9:1 3:1	- - - -	A	A	A	B	7198
① 1 to 2	2.4×10^{-2}	6500	40	675	37:1	-	A	A	A	B	7293A
① 1	6×10^{-2}	2500	60	800	-	65:1	-	-	-	B	7295A
① 1/2	9×10^{-2}	1600	60	800	-	90:1	-	-	-	B	7389A
② 0	3×10^{-2}	5000	45	675	55:1	-	A	A	A	B	7513
② 0	3×10^{-2}	5000	45	675	55:1	-	A	A	A	B	7513/VI
① 1 to 2	4×10^{-2}	4000	50	675	45:1	-	A	A	A	B	8093A
No definite knee	1×10^{-5} 1×10^{-6}	1.6×10^{7} 1.6×10^{8}	- -	650 350	3:1 1:1	- -	A	A	A	B	C74034
No definite knee	1×10^{-4} 1×10^{-5}	1.6×10^{6} 1.6×10^{7}	- -	700 500	4:1 1.5:1	- -	A	A	A	B	C74056
① 1	5×10^{-3}	3×10^{4}	65	700	25:1	-	A	A	A	B	C74092
No definite knee	6×10^{-6} 8×10^{-8}	3×10^{7} 2.5×10^{9}	- -	400 250	4:1 -	- -	A	A	A	B	C74093A

VIDICONS

Mode of Operation	Dark Current microamperes	Illumination on Tube Face[d] footcandles	Signal Output Current[e] microamperes	Typical Resolution: Amplitude Response at 400 TV Lines per cent	Typical Resolution: Limiting Resolution TV lines	Nearest ASA Exposure Index[f]	Components: Alignment Coil	Components: Focusing Coil	Components: Deflecting Yoke	Components: Socket	Type Number[a]
Max. Sens.	0.05	0.4	0.08	5	400	400	None	C	C	C	4427
Max. Sens.	0.2	2	0.25	-	700	-	D	D	D	D	7038
Av. Sens.	0.02	15	0.20	30	750	10					
Min. Lag	0.004	100	0.20	-	750	-					

For footnotes and component information, see *page 8*.

VIDICONS — Cont'd

Type Number[a]	Description	Maximum Dimensions: Overall Length inches	Maximum Dimensions: Diameter inches	Image Size inches
7262A	Short, sturdy tube having low heater-power (0.6 watt) requirements. For small, compact cameras. Other characteristics similar to those of 7735A.	5.18	1.135	1/2x3/8
7263A	Similar to 7262A but designed to withstand severe shock, vibration, and humidity.	5.18	1.135	1/2x3/8
7697	Similar to 7735A but designed for optimum operation at lower target voltages.	6.313	1.135	1/2x3/8
7735A	Similar to 7038 but has much higher effective sensitivity, higher "red" response, and a lower "gamma" value.	6.50	1.135	1/2x3/8
8051	A 1-1/2" diameter type having very high resolution capability. For general broadcast service, film pickup, or data transmission applications.	8.0	1.60	3/5x4/5
8134	Features electrostatic focus, magnetic deflection. (Formerly C74015)	6.35	1.135	1/2x3/8
C73439	For UV applications. Sensitive to radiation as low as 2300 angstroms. Has fused-silica faceplate.	6.50	1.135	1/2x3/8
C74016	Features electrostatic focus, electrostatic deflection.	6.50	1.05	1/2x3/8

DISPLAY STORAGE TUBES

Type Number[aj]	Description	Maximum Dimensions: Overall Length inches	Maximum Dimensions: Diameter inches	Deflection Method[k]
2053	Direct-view type having integral magnetic shield. Has one writing gun capable of fast writing speed and one viewing gun. Electrically similar to type 7448.	13.64	5.5[r]	Electrostatic
4412	Direct-view type having 8-inch useful viewing diameter and integral magnetic shield. Designed to withstand severe environmental conditions of temperature, humidity, altitude, vibration, and shock.	20.75	10.88[r]	Electrostatic
7315	Direct-view type featuring slow writing speed to take full advantage of integrating and half-tone capabilities of tube. Has one writing gun, and one viewing gun.	13.64	5.31	Electrostatic
7448	Direct-view type featuring high writing speed sufficient to "freeze" microsecond transients. Has one writing gun, and one viewing gun.	13.64	5.31	Electrostatic
C73788	Direct-view type featuring increased display area. Has one writing gun and one viewing gun.	18.25	7	Electrostatic
C73904	Direct-view type featuring two writing guns for simultaneous writing of two independent signals and one viewing gun.	13.64	5.31	Electrostatic
C73922	Direct-view type having increased display area. Has one writing gun, one viewing gun, and one selective-erasing gun which permits erasure of specific parts of stored signal without erasing other portions.	18.25	7	Electrostatic
C73931	Direct-view type having increased display area. Has two writing guns for simultaneous writing of two independent signals and one viewing gun.	18.25	7	Electrostatic
C73938	Direct-view type having one writing gun, one viewing gun, and one selective-erasing gun which permits erasure of specific parts of stored signal without erasing other portions.	13.64	5.31	Electrostatic
C73959	Direct-view type having high-resolution capability, and slow writing speed. Has one writing gun and one viewing gun.	13.64	5.31	Electrostatic
C73983	Direct-view type featuring increased display area and P4 phosphor screen. Has integral magnetic shield and Filterglass faceplate. Has one writing gun featuring slow writing speed, one selective-erasing gun, and one viewing gun.	18.25	7.44[r]	Electrostatic

For footnotes, see *page 8*.

VIDICONS — Cont'd

Mode of Operation	Dark Current microamperes	Illumination on Tube Face[d] foot-candles	Signal Output Current[e] microamperes	Typical Resolution: Amplitude Response at 400 TV Lines per cent	Typical Resolution: Limiting Resolution TV lines	Nearest ASA Exposure Index[f]	Components: Alignment Coil	Components: Focusing Coil	Components: Deflecting Yoke	Components: Socket	Type Number[a]
Max. Sens.	0.2	0.1	0.14	-	700[g]	-	D	D	D	D	7262A
Av. Sens.	0.02	0.5	0.27	30	750	320					
Min. Lag	0.004	1.0	0.20	-	750	-					
Max. Sens.	0.2	0.1	0.14	-	700[g]	-	D	D	D	D	7263A
Av. Sens.	0.02	0.5	0.27	30	750	320					
Min. Lag	0.004	1.0	0.20	-	750	-					
Av. Sens.	0.1	0.5	0.35	30	750	320	D	D	D	D	7697
Max. Sens.	0.2	0.1	0.14	-	700[g]	-	D	D	D	D	7735A
Av. Sens.	0.02	0.5	0.27	30	750	320					
Min. Lag	0.004	1.0	0.20	-	750	-					
Av. Sens.	0.02	6	0.20	60	1200	25	E	E	E	E	8051
Min. Lag	0.005	40	0.20	60	1200	-					
High Sens.	0.1	0.1	0.10	20	600	1600	D[h]	None	D[h]	F	8134
Max. Sens.	0.02	1 to 4	0.10	-	700	50	D	D	D	D	C73439
Av. Sens.	0.1	0.1	0.10	10	500	1600	None	None	None	G	C74016

DISPLAY STORAGE TUBES

Writing Speed inches/second	Minimum Useful Viewing Diameter[m] inches	Maximum Erasing-Uniformity Factor[n]	Typical Brightness[p] footlamberts	Typical Resolution[q] lines/inch	Type Number[aj]
300000	3.8	0.4	1700	50	2053
		0.45	2500		
30000	8.0[s]	0.4	200	44	4412
3000	3.8	0.4	1700	50	7315
		0.45	2500		
300000	3.8	0.4	1700	50	7448
		0.45	2500		
50000	5.2	0.5	750	45	C73788
75000[t]	3.8	0.4	1700	50	C73904
		0.45	2500		
8000	5.2	0.5	750	45	C73922
50000[t]	5.2	0.5	750	45	C73931
12000	3.8	0.4	1700	50	C73938
		0.45	2500		
3000	3.8	0.4	200	110	C73959
2000[t]	5.2	0.5	250	50	C73983

For footnotes and component information, see *page 8*.

DISPLAY STORAGE TUBES — Cont'd

Type Number[aj]	Description	Maximum Dimensions		Deflection Method[k]
		Overall Length inches	Diameter inches	
C73994	Direct-view type featuring magnetic deflection. Has integral magnetic shield, one newly designed writing gun for increased video control, and one viewing gun.	10.62	5.88[r]	Magnetic
C74318	Direct-view type having 8-inch useful viewing diameter and integral magnetic shield. Has two writing guns and one viewing gun.	20.88	10.82[r]	Electrostatic
C74367	Direct-view type designed to withstand severe environmental conditions of shock, temperature, altitude, and humidity. Has one writing gun and one viewing gun.	7.86	3.00	Magnetic
C74375	Direct-view type featuring magnetic deflection. Has one writing gun and one viewing gun.	11.62	5.19	Magnetic
C74381	Direct-view type featuring improved display uniformity. Has one writing gun and one viewing gun.	13.64	5.31	Electrostatic

GRAPHECHON — Scan-Conversion Tube

Type Number[a]	Description	Maximum Dimensions	
		Overall Length inches	Diameter inches
7539	Sturdy charge-storage tube for use in data processing applications where information is to be continuously transformed from one time base or scanning presentation to another. It permits bright displays having a continuous range of half-tone information when viewed on suitable TV monitors. Has coaxial construction, one reading gun, and one writing gun.	26	3.4

MONITOR KINESCOPES

Type Number[a]	Description	Maximum Dimensions		Minimum Screen Diagonal inches	Phosphor
		Overall Length inches	Envelope Diagonal inches		
8HP4	Small, 8-inch, rectangular glass monitor kinescope. Has aluminized screen. For compact equipment.	10-1/4	9	7-13/16	P4
C73681	Rectangular, 14-inch, glass monitor kinescope. Has aluminized screen, high resolution.	17-1/8	13-13/16	12-1/2	P4

For footnotes, see *page 8*.

DISPLAY STORAGE TUBES — Cont'd

Writing Speed inches/second	Minimum Useful Viewing Diameter[m] inches	Maximum Erasing-Uniformity Factor[n]	Typical Brightness[p] footlamberts	Typical Resolution[q] lines/inch	Type Number[aj]
50000	3.8	0.4	1500	50	C73994
30000[t]	8.0	0.4	200	35	C74318
3000	2.0	0.4	30	200	C74367
u	4.0	0.4	1500	50	C74375
v	3.8	0.3	1700	50	C74381

GRAPHECHON — Scan-Conversion Tube

Deflection Method		Focusing Method		Minimum Number of Discernible Output-Signal Levels[w]	Resolution Capability at 50% Response range rings/display radius	Type Number[a]
Writing Gun	Reading Gun	Writing Gun	Reading Gun			
Magnetic	Magnetic	Electrostatic	Magnetic	4	150	7539

MONITOR KINESCOPES

Deflection Method	Focusing Method	Maximum Final High-Voltage Electrode (Ultor)[x] volts	Performance Characteristics			Type Number[a]
			Final High-Voltage Electrode (Ultor)[x] volts	Limiting Resolution TV lines	Brightness footlamberts	
Magnetic	Electrostatic	14000	11000	600 to 1000	80	8HP4
Magnetic	Magnetic	18000	18000	2000 to 3000	20 to 30	C73681

For footnotes, see *page 8*.

FOOTNOTES

[a] Type numbers with prefix C are developmental types. Each of these C numbers identifies a particular laboratory tube design but the number and the identifying data are subject to change. No obligations are assumed as to future manufacture unless otherwise arranged.

[b] Ratio of peak-to-peak highlight video-signal current to rms noise current for indicated bandwidth. Signal-to-noise ratio is inversely proportional to the square root of the bandwidth employed.

[c] Illumination on face of 4415 at 2870° K required to reach "knee" of light transfer characteristic.

[d] Indicated values of illumination are those required to obtain maximum signal from the tube. Values of illumination 1/10 of those indicated will still produce a picture of usable quality.

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

[f] The equivalent ASA exposure index given for vidicons is based upon light-level value required to operate type in the average sensitivity or "normal" operating mode except as noted.

[g] The limiting resolution capability of this type may be increased to 1000 or more TV lines by operating tube with up to 750 volts on grid No. 3 and by increasing focusing-coil current and deflecting-coil power.

[h] These components provide proper tube operation but are not designed for minimum weight applications.

[j] Variants of these types, having different features or characteristics to meet the needs of specific applications, can often be supplied.

[k] The viewing gun produces an undeflected stream of electrons.

[m] Minimum useful viewing area may be eccentric with respect to tube face.

[n] Determined as follows: With no erasing pulse, overscan the storage surface with writing beam to obtain maximum pattern brightness. Then cut off writing beam. Apply rectangular erasing pulses having an amplitude of between 8 to 10 volts and adjust duty cycle to obtain complete erasure in approximately 10 seconds. Measure time (t_1) from start of erasing to the instant at which any area within the minimum useful viewing diameter is reduced to background-brightness level, and time (t_2) from start of erasing to the instant at which the entire area within the minimum useful viewing diameter area is reduced to background-brightness level. The erasing-uniformity factor is defined as $(t_2 - t_1)/t_2$.

[p] Measured with entire storage grid written to produce saturated brightness and with screen at indicated voltage.

[q] Measured by shrinking-raster method at center of tube face with a display brightness of 50 per cent of saturated brightness.

[r] Including integral magnetic shield, but excluding any mounting lugs or encapsulated leads.

[s] Tube face is painted opaque except for centered 5.6" x 6.4" rectangle.

[t] Each writing gun.

[u] Appropriate for airborne weather radar sector-scan displays.

[v] Can write 0.3 microsecond pulses to 50% of saturated brightness with 30 volts drive at writing speeds of 30,000 inches per second.

[w] Defined as minimum number of output-signal levels, each related to a different input signal, which can be distinguished from each other regardless of their relative location on the storage surface.

[x] The ultor is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

COMPONENTS

[A] Alignment Coil, Cleveland Electronics No. OA-3, or equivalent. Focusing Coil, Cleveland Electronics No. OF-2, or equivalent. Deflecting Yoke, Cleveland Electronics No. OY-1, or equivalent.

[B] Alden No. 214FCC, Cinch No. 3M14, Loranger No. 2114, or equivalent. Special shoulder sockets are integral parts of the deflecting-yoke assembly.

[C] Focusing Coil, Cleveland Electronics No. VF-225X, or equivalent. Deflecting Yoke, Cleveland Electronics No. VY-224X, or equivalent. Socket, Alden No. 207VIC, or equivalent.

[D] Alignment Coil, Cleveland Electronics No. VA-118, or equivalent. Focusing Coil, Cleveland Electronics No. VF-136-3, or equivalent. Deflecting Yoke, Cleveland Electronics No. VY-111-3, or equivalent. Socket, Cinch No. 54A18088, or equivalent.

[E] Focusing-Alignment Assembly, Cleveland Electronics No. 15-VFA-259, or equivalent. Deflecting Yoke, Cleveland Electronics No. 15-VY-258, or equivalent. Socket, Cinch No. 133-98-11-049, or equivalent.

[F] Socket, Cinch No. 133-98-11-015, or equivalent.

[G] Socket, Burroughs No. SK106 (must be modified), or equivalent.

Cleveland Electronics Inc., 1974 East 61st St., Cleveland, Ohio
Alden Products Company, 9140 North Main St., Brockton 64, Mass.
Cinch Manufacturing Co., 1026 S. Homan Ave., Chicago 24, Illinois.
Loranger Manufacturing Corp., 36 Clark St., Warren, Penna.
Burroughs Corp., Electronic Tube Div., Plainfield, N.J.