RCA TUBE HANDBOOK HB-3

CATHODE-RAY TUBE SECTION



This section pertains to RCA tubes for signal-to-image, image-to-signal, and image-to-image applications. It includes data on cathode-ray tubes for oscillographic and picture-reproduction use, camera tubes for television pickup, and monoscopes for testing the performance of television equipment.

For further Technical Information, write to Commercial Engineering, Tube Department, Radio Corporation of America, Harrison, N. J.



CLASSIFICATION CHART FOR TYPES IN CATHODE-RAY TUBE SECTION

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.

Approx. Envelope Diam. In.	Phos- phor∳	Max. HV Elec- trode Volts	Focus- ing Method	Deflec- tion Method	Min. Screén Size In.	TUBE TYPE
irect-Vie	wing	•		•		
3	P4	2500	S	s	2-3/4 Diam.	3KP
7	P4	8000	s	м	6 Diam.	7DF
7	P4	6000	s	S	6 Diam.	7JF
9	P4	7000	s	M	7-7/8 Diam.	9AF
10	P4	12000	м	- M	9-1/8 Diam.	10894-
10	P4	12000	M	M	9-1/8 Diam.	IOFP4-
12	P4	7000	s	М	10-3/4 Diam.	12AF
12	P4	12000	м	M	11-1/8 Diam.	12KP4-
12	P4	12000	м	м	11 Diam.	12LP4-
14	P4	14000	м	м	II-I/8 × 8-5/16	140
14	P4	14000	M	M	11-1/8 × 8-5/16	145
16	P4	14000	м	-м	14-3/8 Diam.	16AP4-
16	P4	15000	M	M	14-1/2 Diam.	16DP4-
16	P4.	14000	м	M	14-3/8 Diam.	16GF
16	P4	14000	M	м	14-3/8 Diam.	16GP4-
16	P4	14000	M	M	13-1/2 x 10-1/8	16KF
16	P4	14000	М	M	14-1/2 Diam.	16LP4-
16	P4	16000	М	М	13-1/2 × 10-1/8	16R
16	P4	14000	М	M	13-1/2 × 10-1/8	16TF
16	P4	16000	М	М	14-1/2 Diam.	16WP4-
17	P4	16000	М	м	14-1/4 × 10-3/4	17BP4-
17	P4	16000	М	М	14-3/8 × 10-11/16	17CF
17	P4	16000	S	М	14-3/8 x 10-11/16	17GF
17	P4	16000	S	М	14-1/4 x 10-3/4	17HF
17	P4	18000	M	М	14-1/4 × 10-3/4	17JF
17	P4	16000	S	М	14~1/4 x 10-3/4	17LF
17	P4	16000	М	М	14-1/4 x 10-3/4	17QF
17	P4	16000	s	М	14-3/8 x 10-11/16	177
19	P4	19000	м	М	17-1/4 Diam.	19AP4-
19	P4	19000	М	M	171/4 Diam.	19AP4-
20	P4	18000	м	М	17 x 12 - 3/4	20CF
20	P4	16000	s	М	17 x 12-3/4	20MF
21	P4	18000	м	М	18-1/8 × 13-11/16	21AF
21	P4	16000	s	М	18-1/8 × 13-11/16	21MF

NOV. 1, 1952



CLASSIFICATION CHART FOR TYPES IN CATHODE -RAY TUBE SECTION

KINESCOP	ES (co	nt'd)					
Approx. Envelope Diam.	Phos-		Focus- ing Method	Deflec- tion Method	Min. Screen Size In.		TUBE TYPE
Monitor							
7	P4	10000	М	! м	6 Diam.	1	7QP4
7	P4	12000	M S	м	6 Diam.		7TP4
10	P4	14000	s	м	9-1/8 Diam.		10SP4
Projection	a						
5	P4	27000	S	М	4-1/4 Diam.	- 1	5TP4
7	P4	80000	s	М	5 x 3-3/4º		7NP4
7	P4	80000	S S S	M	5 × 3-3/4 ¹²	İ	7WP4
View-Finde	er						
5	P4	8000	М	М	4-1/4 Diam.		5FP4-A
Transcribe	er						
5	PH	27000	S	M	4-1/4 Diam.	1	5WP11

CAMERA TUBES

Major Use	Focusing Method	Deflection Method	mage Size	TUBE TYPE	
l conoscopes					
Film Pickup	l s	М	4-3/4 × 3-9/16	1850-A	
Industrial & Laboratory	s	s	1.4 Diagonal	5527	
image Orthicons					
Outdoor Pickup	М	M	1.6 Diagonal	5820	
Studio Pickup	м	М	1.6 Diagonal	5826	
Vidicon					
Industrial	м	l M	0.62 Diagonal	6198	

S = Electrostatic

M = Electromagnetic

Quality circle diameter of faceplate. When used with typical reflective optical system, the 5TP4 provides 24 x 18 picture.

O quality rectangle of faceplate. When used with suitable reflective optical system, the TMPM provides 20° x 15° picture at a projection— throw distance of 60°.

Like O except 80'.

See sheet FEATURES OF FLUORESCENT SCREENS at the front of this Section.



CLASSIFICATION CHART FOR TYPES IN CATHODE - RAY TUBE SECTION

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.

Approx. Bulb	Max. HV Elec⊶		C1		TYPES by Phospho	or \$	
Diam. in-	trode Volts†	PI	P5	P7	PII	P12	P14
lectrost	atic Focus a	nd Deflect	ion				
1	500	913	-	-		-	_
2	600	902-A	-	-	-	-	-
2	1000	2API-A	i -	-	-	-	-
2	2500	2BPI	-	-	2BP11	-	-
3	1500	3API-A	908-A	-	- 1	-	-
3	2000	3BPI-A	-	-	-	-	_
3	2500	3KPI	-	-	3KP11	-	-
3	2500	3MPI	-	-	-	-	-
3	2500	3RPI	-	-	- 1	-	-
5	2000	905-A	_	-	-	-	-
5	2000	5BPI-A	-	-	-	-	-
5	2500	5UP1	-	5UP7	5UPII	-	-
5	15000	912	-	-	-	-	-
7	6000	7JPI	-	-	-	-	-
9	7000	914-A	-	-	-		-
Post-	Deflection A	cceleratos	r Types				
3	4000	3JPI	-	3JP7	-		-
5	4000	5CF I-A	-	5CP7-A	5CPI I-A	5CPI2	-
Magnetic	Focus and De	flection					
5	8000	-	-	5FP7-A	-	-	5FP14
7	8000	-	-	78P7-A	-		-
7	8000	-	-	7MP7	- 1	-	7MP14
10	10000	_	-	IOKP7	-		-
12	10000	-	-	12DP7-B	-	-	-
12	10000	-	-	12SP7	~	-	-
16	14000	_	-	16ADP7	-	-	-
Electros	tatic Focus,	Magnetic	Deflecti	on			
7	8000	7CPI	1 -	-	1 -	-	-



CLASSIFICATION CHART FOR TYPES IN

41 SCELLA	NEOUS				
Approx. Bulb Diam. In.	Phosphor∳	Max. High-Voltage Electrode Volts	Focus- ing Method	Deflec- tion Method	TUBE TYPE
Flying-Sp	ot Cathode-Ray Tul	bes		L-,	L
5 5	P15 P16	27000 27000	s s	M M	5WP15 5ZP16
Monoscope					
5	Resolution Chart	1500	s	м	2F21



PRICES¹ OF CATHODE-RAY TUBE TYPES

· · · · · · · · · · · · · · · · · · ·	Schedule D	Schedule		Schedule	Schedu
Type	D. W		Type	D. C.	<i>,</i>
2API -A4	-	\$ 10.55	12DP7-B	400 -0	\$ 72.5
28PI	•	9.60	12KP4-A4	\$39.50	-
2BP11	-	11.00	12LP4		•
2F21	-	105.00	12LP4-A	32.00	
3AP1-A4	-	15.75	128P7		47.4
3BPI -A	-	16.50	14CP4+	35.00	-
3JPI	-	19.00	14EP4	35.00	
3JP7	-	23.00	I 6ADP7		55.0
3KP1		14.50	16AP4-A	46.00	-
KP44	\$20.00	-	16DP4-A4	39.00	-
KP11	-	16.50	16GP4	46.00	-
MPI	-	14.75	16GP4-A		•
RPI	-	14.50	16GP4-B	46.00	
BP1-A4	-	22.50	16GP4-C		•
CPI-A	-	23.25	16KP4#	37.00	
CP7-A	-	27.25	16LP4-A4	40.00	-
CPI I -A	-	27.50	16RP4#	37.00	
CP12	-	27.00	16TP4#	37.00	:
FP4-A	-	41.75	16WP4-A+	40.00	-
FP7-A	-	30.25	17BP4-A	36.00	
5FP14		30.25	17CP4	35.00	-
5TP4	60.00	. =	17GP4	46.00	-
5UP1	-	17.75	17HP4	38.25	-
5UP7	-	20.25	17JP4	36.00	-
5UP11	-	22.00	17LP4	38.25	-
WP11	-	70.00	17QP4	36.00	-
WP15	-	70.00	17TP4	36.50	-
5ZP16	-	71-25	19AP4		•
7BP7-A	-	48.50	19AP4-A	59.00	_
7CP1		30.75	19AP4-B	59.00	
7DP4	31.50	-	19AP4-D		•
7JP1	-	23.50	20CP4	51.50	-
7JP4	26.00		20MP4	54.00	-
MP7	-	39.50	21AP4	55.00	-
7MP14	-	39.50	21MP4	57.00	
7NP4	-	600.00	902-A4	-	12.5
'QP4	-	39.50	905-A4	-	65.2
ŤP4	-	52.00	908-A 4	-	16.
YP1	-	25.00	912	-	155.
WP4	-	630.00	9134	-	15.
AP4	-	•	914-A	-	93.5
OBP4		•	1850-A	-	540.
OBP4-A	28.00	-	5527	-	49.
OFP4-A+···	35.00	-	5820	-	1200-
OKP7	-	50.00	5826	-	1300.
0SP4	-	54.00	6198	-	360.
2AP4*	-	•			
Discontinued purpose only.	type. Data	sheet has	been retained	in book for	referen

D, e, A, 4, *: see next page.

APRIL 1, 1953

TIME DEPARTMENT

CATHODE—RA



PRICES OF CATHODE-RAY TUBE TYPES

This price list applies only in the United States of America and is subject to change without notice. All prices are exclusive of all Federal, State and local excise, sales, and similar taxes.

 Schedule D shows list prices for tube types priced for distribution through dealer and service channels.

Schedule y shows list prices for tube types priced for distribution through other than dealer and service channels.

Mot recommended for new equipment design.

For data see 9AP4/1804-P4 and 12AP4/1803-P4, respectively.

INFORMATION ON PURCHASING ABOVE TYPES

information as to where RCA Cathode-Ray Tube Types can be purchased may be obtained from our regional office nearest you or from Tube Department, Radio Corporation of America, Narrison, J. J.

SABPI 31.00 SABP7 35.00

SABPU 35.75



FEATURES OF FLUORESCENT SCREENS

Fluorescent screens of the cathode-ray tubes covered in this Section are identified according to phosphor number, e.g., Pl. P4. P5. etc.

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

Phosphor P5 produces a highly actinic spot having bluish fluorescence and very short persistence. Types having this phosphor are especially useful in photographic applications involving film moving at very high speeds.

Phosphor P7 is a long-persistence, cascade (two-layer) screen. During excitation by the electron beam, this phosphor produces a bluish fluorescence of short persistence. After excitation, the screen exhibits a greenish-yellow 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 PII produces a brilliant actinic spot of bluish fluorescence and has sufficiently short persistence to permit its use in all moving film photographic applications without blurring except in those where film moves at a high speed. PII screens, because of their unusually high brightness characteristic, may also be used for visual observation of phenomena.

Phosphor P12 is a medium-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.

Phosphor PI4 is a medium—long-persistence cascade (two-layer) screen. During excitation by the electron beam, this phosphor exhibits purple fluorescence of short persistence. After excitation, it exhibits an 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 PI5 produces a spot of very short persistence and having both blue-green and near-ultraviolet fluorescence. The persistence of the latter is even shorter than that of the blue-green fluorescence, a feature which makes this phosphor particularly suitable for the high-speed scanning requirements of a flying-spot signal generator.

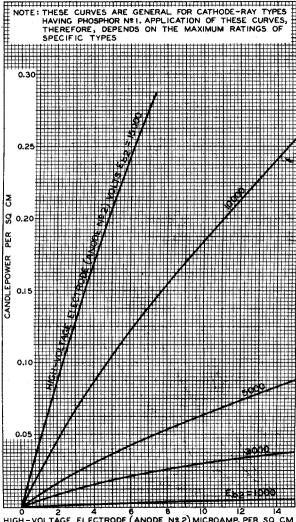


FEATURES OF FLUORESCENT SCREENS

Phosphor P16 produces a spot of extremely short persistence and has both violet and near-ultra violet fluorescence and phosphorescence. This phosphor is particularly useful for the high-speed scanning requirements of a flying-spot signal generator because it features a stable exponential decay characteristic.

Phosphor P22 is the designation for three separate phosphors used in combination in a tricolor picture tube. The separate phosphors are blue, green, and red, respectively. The persistence of the group phosphorescence is classified as medium.





HIGH-VOLTAGE ELECTRODE (ANODE Nº 2) MICROAMP. PER SQ CM

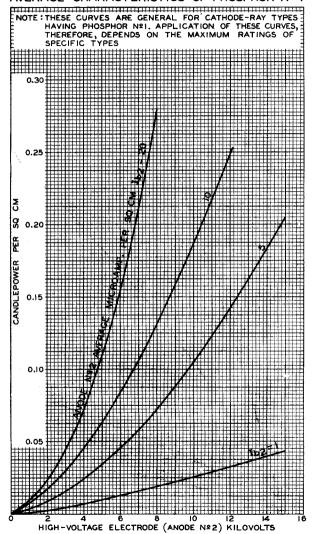
NOV. 23, 1938

RADIOTRON DIVISION

92C-6010



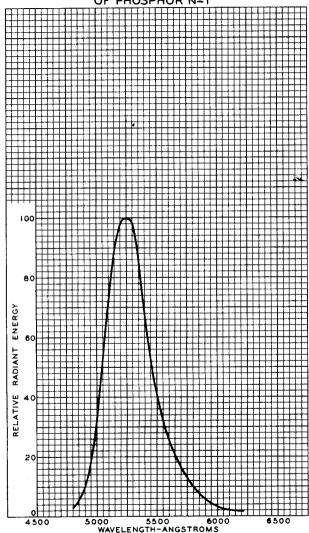
AVERAGE CHARACTERISTICS OF PHOSPHOR Nº I





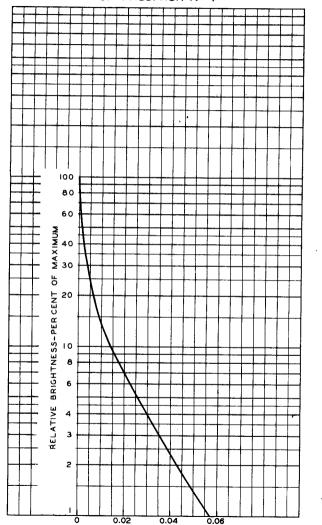


SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR Nº I





PERSISTENCE CHARACTERISTIC OF PHOSPHOR Nº 1

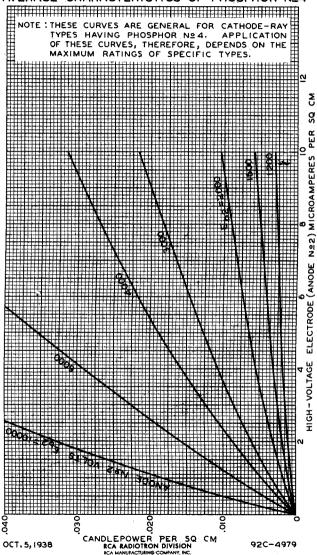


TIME AFTER EXCITATION IS REMOVED - SECONDS



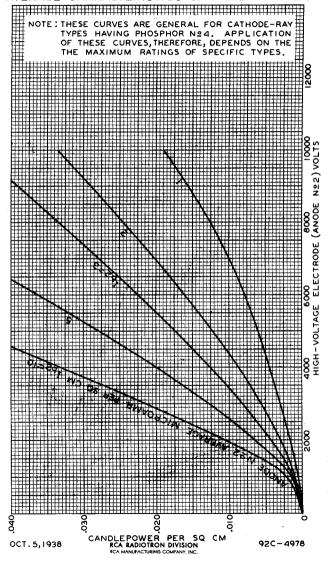


AVERAGE CHARACTERISTICS OF PHOSPHOR Nº4





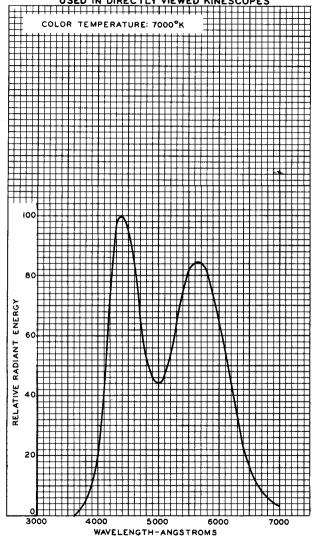
AVERAGE CHARACTERISTICS OF PHOSPHOR Nº4





SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR Nº4

USED IN DIRECTLY VIEWED KINESCOPES



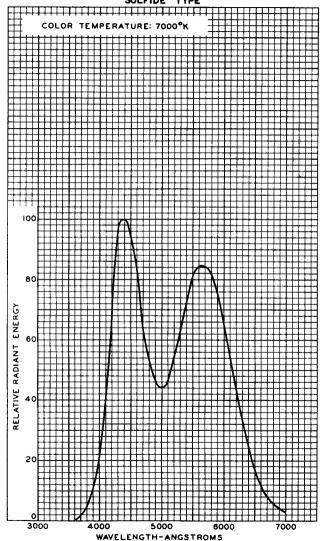
JULY 5,1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7311



SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR Nº4 SULFIDE TYPE



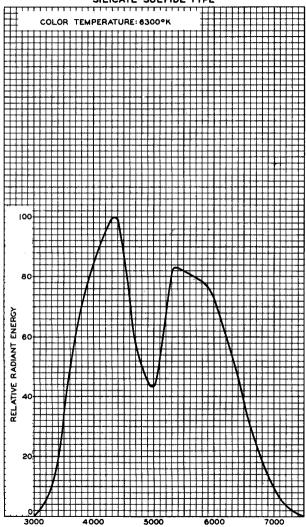


PERSISTENCE CHARACTERISTIC OF PHOSPOR Nº 4 SULFIDE TYPE

The persistence of the phosphorescence is such that its brightness does not exceed 7 per cent of the peak value in 33 milliseconds after excitation is removed.



SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR Nº4 SILICATE-SULFIDE TYPE



MARCH 6,1950

WAVELENGTH-ANGSTROMS
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7458



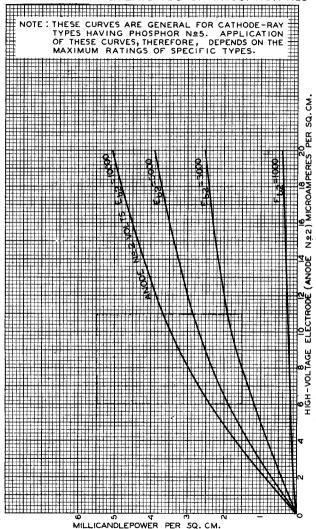
PERSISTENCE CHARACTERISTIC OF PHOSPOR Nº 4 SILICATE-SULFIDE TYPE

The persistence of the phosphorescence is such that its brightness does not exceed 7 per cent of the peak value in 33 milliseconds after excitation is removed.
·



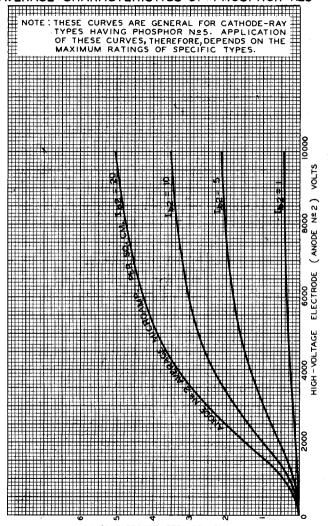


AVERAGE CHARACTERISTICS OF PHOSPHOR Nº5





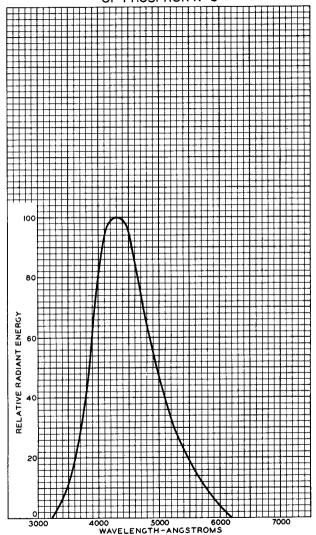
AVERAGE CHARACTERISTICS OF PHOSPHOR Nº5



MILLICANDLEPOWER PER SQ. CM

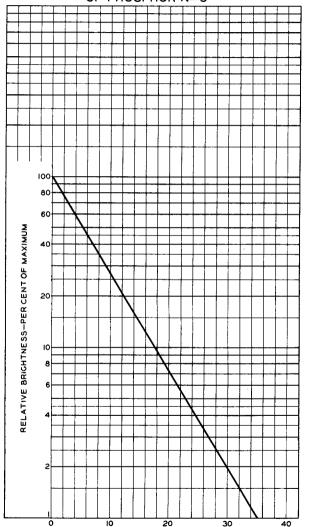
RCA

SPECTRAL-ENERGY EMISSION CHARACTERISTIC



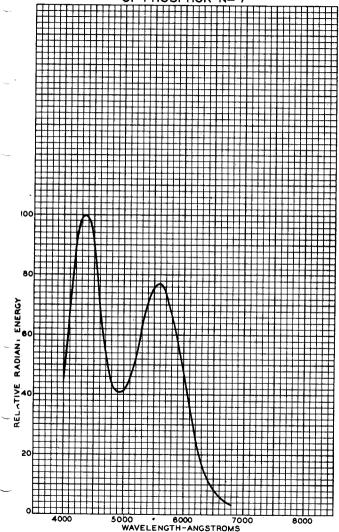


PERSISTENCE CHARACTERISTIC OF PHOSPHOR Nº 5





SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR № 7



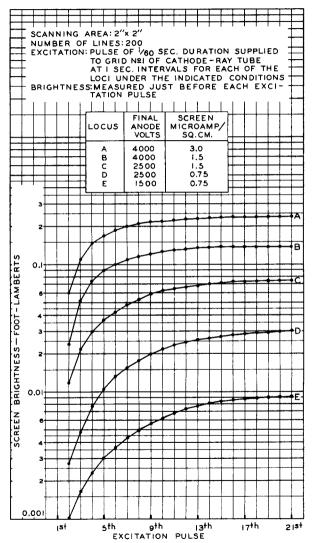
NOV. 27, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6809

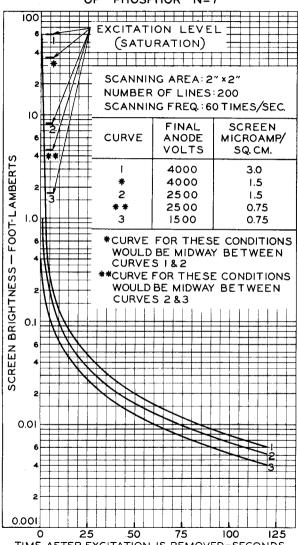


BUILDUP CHARACTERISTICS OF PHOSPHOR Nº7





PERSISTENCE CHARACTERISTICS OF **PHOSPHOR** Nº7

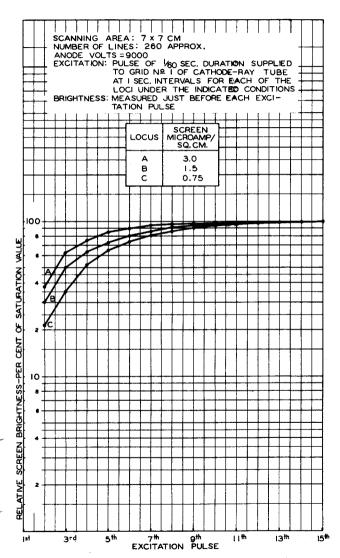


TIME AFTER EXCITATION IS REMOVED-SECONDS JAN.7.1949



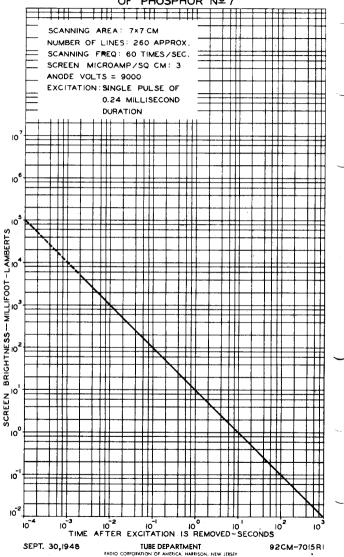


BUILDUP OF PHOSPHOR Nº 7



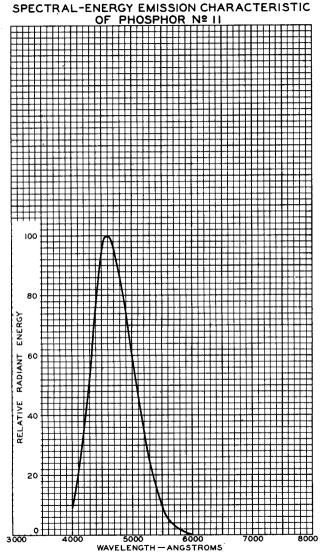


PERSISTENCE CHARACTERISTIC OF PHOSPHOR Nº 7



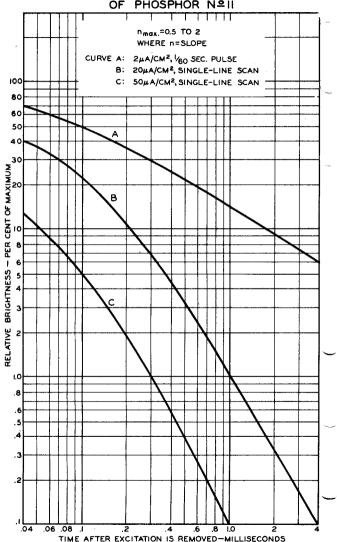








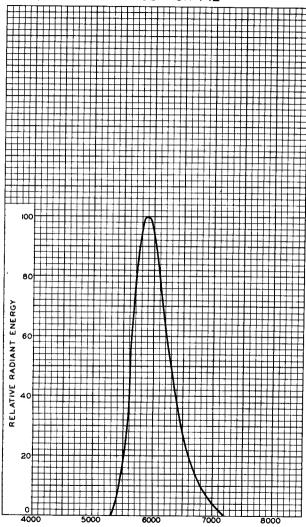
PERSISTENCE CHARACTERISTICS OF PHOSPHOR NºII







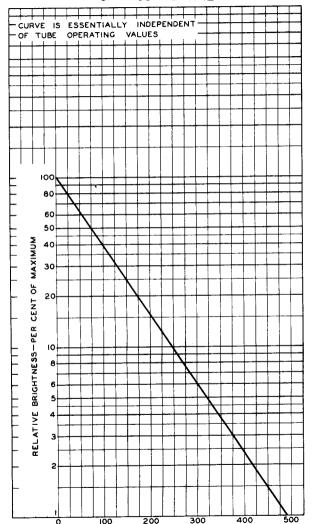
SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR PI2



WAVELENGTH-ANGSTROMS



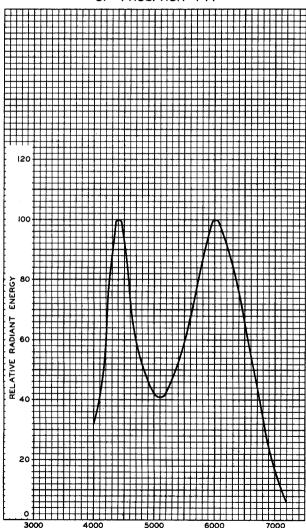
PERSISTENCE CHARACTERISTIC OF PHOSPHOR PI2



TIME AFTER EXCITATION IS REMOVED - MILLISECONDS



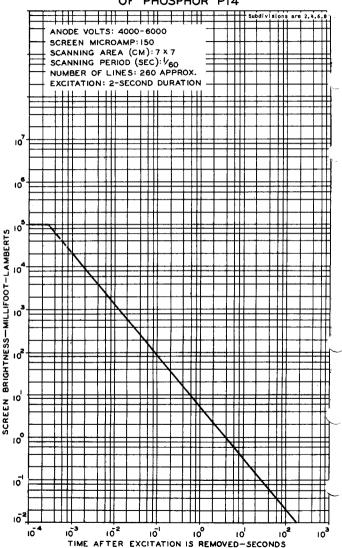
SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR PI4



WAVELENGTH - ANGSTROMS

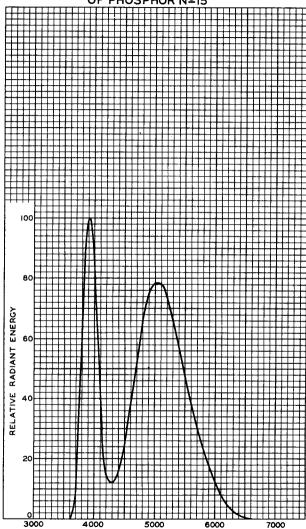


PERSISTENCE CHARACTERISTIC OF PHOSPHOR PI4



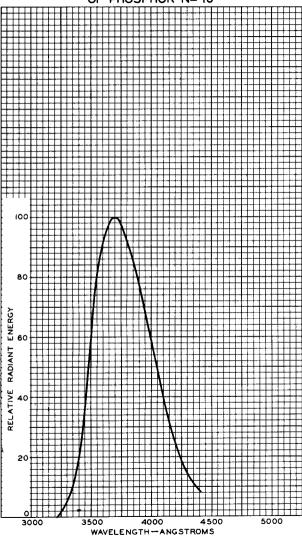


SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR Nº15





SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR Nº 16

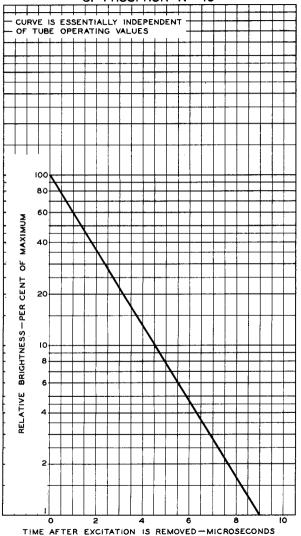


OCT. 30, 1950

TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY 92CM-7563

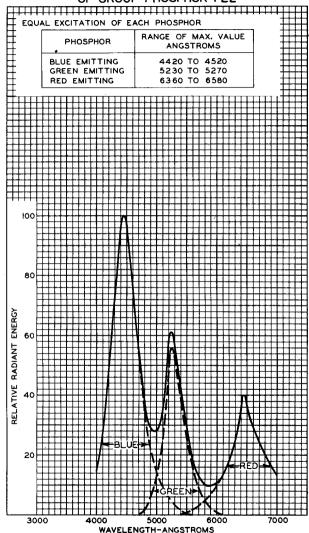


PERSISTENCE CHARACTERISTIC OF PHOSPHOR Nº 16





SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF GROUP PHOSPHOR P22





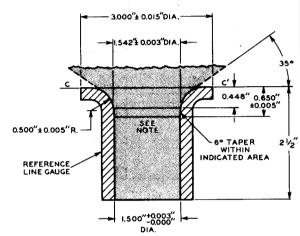
PERSISTENCE CHARACTERISTIC OF GROUP PHOSPHOR P22

The persistence of the group phosphorescence is such that its brightness does not exceed 7 per cent of the peak value in 33 milliseconds after excitation is removed.



REFERENCE-LINE GAUGE JETEC Nº 110

With Supplementary Information on Recommended Inside
Contour of Yoke to Provide Proper Location of
Yoke on Neck-Funnel Section.

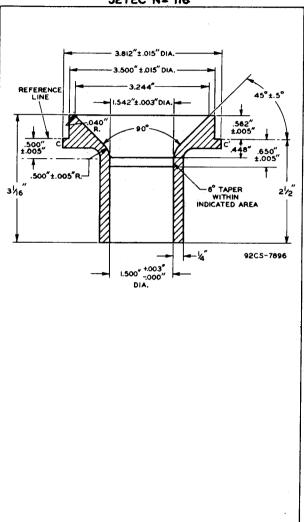


NOTE: INNER SURFACE OF YOKE MUST NOT EXTEND INTO SHADED REGION

9205-7391



REFERENCE-LINE GAUGE JETEC Nº 116



AUG. 1, 1953

CE-7896



X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES

WARNING

All types of cathode-ray tubes may be operated at voltages (where ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range.

Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.

REFERENCES

- "Medical X-ray Protection Up To Two Nillion Folts", National Bureau of Standards Handbook H41.
- "Safety Code for Industrial Use of X-rays", American Standards Association. ASA Code Z54. 1-1946.



HIGH-VACUUM CATHODE-RAY TUBE

Supersedes Type 2AP1

A STATE OF THE STA
General:
Heater, for Unipotential Cathode: Voltage
M_1 and M_2 are nearer the screen M_3 and M_4 are nearer the base
With DJ, positive with respect to DJ ₂ , the spot is de-

With DJ_1 positive with respect to DJ_2 , the spot is deflected toward pin 4. With DJ_3 positive with respect to DJ_4 , the spot is deflected toward pin 1.

The angle between the trace produced by DJ3 and DJ4 and its intersection with the plane through the tube axis and pin I does not exceed 10° .

The angle between the trace produced by DJ3 and DJ4 and the trace produced by DJ1 and DJ2 is $90^{\circ}\pm4^{\circ}$.



HIGH-VACUUM CATHODE-RAY TUBE

(continued from preceding page)
Maximum Ratings, Absolute Values:
ANODE-No.2 & GRID-No.2 VOLTAGE 1100 max. volts
ANODE-No.1 VOLTAGE 550 max. volts
GRID-No.1 (CONTROL ELECTRODE) VOLTAGE: Negative Value
Positive Value
PEAK VOLTAGE BETWEEN ANODE No. 2 AND
ANY DEFLECTING ELECTRODE 660 max. volts
PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode 125 max. volts
Heater positive with respect to cathode 10 max. volts
Typical Operation:
Anode-No.2 & Grid-No.2 Voltage* 500 1000 volts
Anode-No.1 Voltage for Focus
at 75% of Grid-No.1 Volt- age for Cutoff 125 250 volts
age for Cutoff $^{\bullet}$. 125 250 volts Grid-No.1 Volt. for Visual Cutoff * -30 -60 volts
Max. Anode-No.1 Current Range. Between -50 and +10 µamp.
Deflection Sensitivity:
DJ1 and DJ2 0.220 0.110 mm/v dc
DJ3 and DJ4 0.260 0.130 mm/v dc
DJ1 and DJ2
DJ3 and DJ4
1
★ Brilliance and definition decrease with decreasing anode-No.2 voltage. In general, anode-No.2 voltage should not be less than 500 volts.
In general, anode-No.2 voltage should not be less than 500 volts.
● Individual tubes may require between +20\$ and -45\$ of the values shown with grid-No.1 voltages between zero and cutoff.
\parallel Visual extinction of stationary focused spot. Supply should be adjustable to \pm 50% of these values.
▲ See curve for average values.
** Individual tubes may vary from these values by \pm 20%.
Spot Position:
The undeflected focused spot will fall within a 10-nm square
centered at the geometric center of the tube face and having
one side parallel to the trace produced by DJ and DJ2. Suit-
able test conditions are: anode-No.2 voltage, 1000 volts:
anode-No.1 voltage, adjusted for focus; deflecting-electrode
resistors, I megohy each, connected to anode No.2; the tube
shielded from all extraneous fields. To avoid damage to the tube, grid-No.l voltage should be near cutoff before applica-
tion of anode voltages.
Maximum Circuit Values:
Grid-No.1-Circuit Resistance 1.5 max. megohms
Impedance of Any Deflecting-Electrode
Circuit at Heater-Supply Frequency 1.0 max. megohm



HIGH-VACUUM CATHODE-RAY TURE

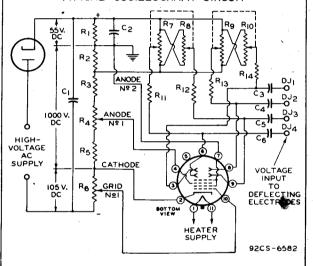
(continued from preceding page)

Resistance in Any Deflecting-

Electrode Circuit[▲] 5.0 max. meaohms

▲▲ It is recommended that all deflecting-electrode-circuit resistances be approximately equal.

TYPICAL OSCILLOGRAPH CIRCUIT



C1: 0.1 µf

C1: 0.1 µ; C2: 1.0 µf C3 C4 C5 C6: 0.05-µf Blocking Capacitor*

R3: 3.0 Megohms

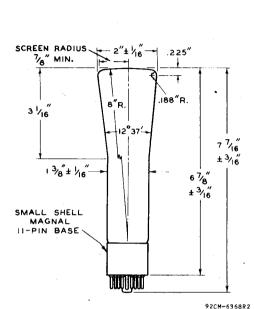
R4: 1.0-Megohm Potentiometer R5: 0.5 Megohm

NS: U.5 Megonm R6: 0.5-Megohm Potentiometer R7 R8: Dual 5-Megohm Potentiometer R9 R10: Dual 5-Megohm Potentiometer R11 R12 R13 R14: 2 Megohms

When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 be and the deflecting electrodes.

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.

2API-A HIGH-VACUUM CATHODE-RAY TUBE



92CM-6368R2

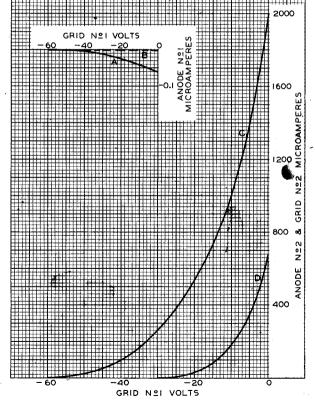
Ç OF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE

2AP1-A



AVERAGE CHARACTERISTICS

714001	ANOBE NET VOLIS ABSOSTED TO GIVE TOOSS			
	CURVE	ELECTRODE CURRENT	ANODE Nº2 & GRID Nº2 VOLTS	
	Α	ANODE Nº I	1000	
	В	ANODE Nº I	500	
	С	ANODE Nº 2	1000	
	D	ANODE Nº 2 & GRID Nº 2	500	





ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3
1

 ${\it DJ}_{1}$ and ${\it DJ}_{2}$ are nearer the screen ${\it DJ}_{3}$ and ${\it DJ}_{4}$ are nearer the base

With DJ1 positive with respect to DJ2, the spot is deflected toward pin 4. With DJ3 positive with respect to DJ4, the spot is deflected toward pin 1.

The plane through the tube axis and pin No.4 may vary from the trace produced by DJ1 and DJ2 by an angular tolerance (measured about the tube axis) of 10° .

The angle between DJ1 - DJ2 trace and DJ3 - DJ4 trace is 900 ± 30 .

- Indicates a change.

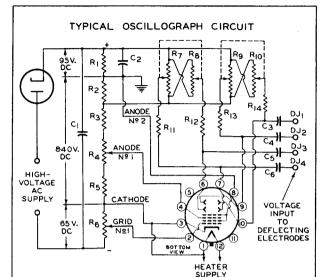
	Maximum Ratings, Design-Center Values:			
	ANODE-No.2 VOLTAGE 2500 max. volts			
	ANODE-No.1 VOLTAGE 1000 max. volts			
→	GRID-No.1 VOLTAGE:			
	Negative bias value			
	Positive bias value 0 max. volts Positive peak value 2 max. volts			
	PEAK VOLTAGE BETWEEN ANODE No.2 AND			
	ANY DEFLECTING ELECTRODE 500 max. volts			
	PEAK HEATER-CATHODE VOLTAGE:			
	Heater negative with respect to cathode. 125 max. volts			
ĺ	Heater positive with respect to cathode. 125 max. volts			
	Equipment Design Ranges:			
	For any anode-No.2 voltage (E_{b_2}) between 500* and 2500 volts			
	Anode-No.1 Voltage 15% to 28% of Eb ₂ volts			
→	Max. Grid-No.1 Voltage for Visual Cutoff 6.75% of Eb ₂ volts			
	for Visual Cutoff 6.75% of Eb ₂ volts Max. Anode-No.1			
	Current Range15 to +10 microamperes			
	Deflection Factors:			
	\mathbb{D}_1 & \mathbb{D}_2 115 to 155 v dc/in./kv of \mathbb{E}_{b2}			
	D_3 & D_4 74 to 100 v dc/in./kv of E_{b2}			
→	Spot Position •			
	Examples of Use of Design Ranges:			
	For anode-No. 2 voltage of 1000 2000 volts			
	Anode—No.1 Voltage 150 - 280 300 - 560 volts			
1	Max. Grid-No.1 Voltage for Visual Cutoff67.5 -135 volts			
	for Visual Cutoff67.5 -135 volts Deflection Factors:			
	DJ ₁ & DJ ₂ 115-155 230-310 volts dc/in.			
	DJ3 & DJ4			
	Maximum Circuit Values:			
	Grid-No.1-Circuit Resistance 1.5 max. megohms			
	Resistance in Any Deflecting-			
	Electrode Circuito 5.0 max. megohms			
	* Brilliance and definition decrease with decreasing anode-No.2 voltage.			
	* Brilliance and definition decrease with decreasing anode—No.2 voltage. A value as low as 500 volts is recommended only for low—velocity deflection and low room—light levels.			
[O It is recommended that the deflecting-electrode-circuit resistances be approximately equal.			
	be approximately equal.			
İ	 Anode No.2 and grid No.2 which are connected together within tube, are referred to herein as anode No.2. The product of anode—No.2 voltage and average anode—No.2 current should be limited to 6 watts. 			
	and average anode-No. 2 current should be limited to 6 watts. Description of the undeflected, focused spot will fall within a circle			
	The center of the undeflected, focused spot will fall within a circle having a 5.0-mm radius concentric with the center of the tube face.			
-				
-				
- 1				

DATA

→Indicates a change







92CM-6777RI

C1: 0.2 µf C2: 1.0 µf C3 C4 C5 C6: 0.05-µf Blocking Capacitors*

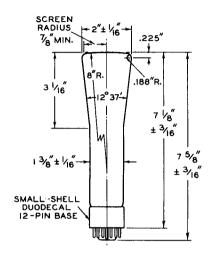
R4: 1.0-Megohm Potentiometer R5: 0.5 Megohm, 0.5 Watt R6: 0.35 Megohm, 0.5 Watt R7 R8: Dual 5-Megohm Potentiometer R9 R10: Dual 5-Megohm Potentiometer R11 R12 R13 R14: 2 Megohms, 0.5 Watt

When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.

RCA 2BP

OSCILLOGRAPH TUBE

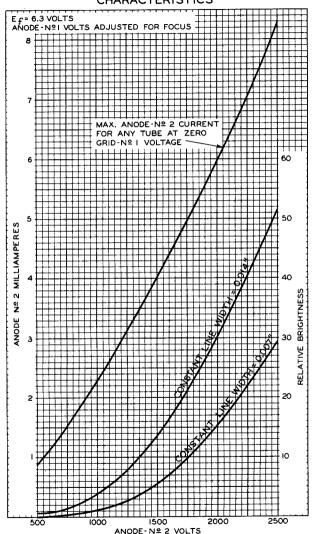


 \mathbb{Q} OF BULB WILL NOT DEVIATE MORE THAN 2^O IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.

9205-6689

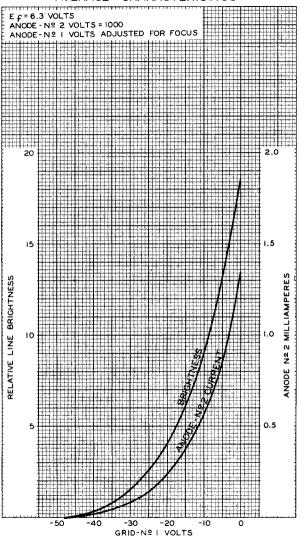


CHARACTERISTICS





AVERAGE CHARACTERISTICS





ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

The 2BP11 is the same as the 2BP1 except that it has a phosphor of the short-persistence, blue-fluorescence type designated P11. The blue radiation of the P11 screen is highly actinic and has sufficiently short persistence to permit use of the 2BP11 in all moving film photographic applications without blurring except in those where film moves at a high speed. The 2BP11 is also quite satisfactory for visual observation of phenomena because its phosphorhas unusually high brightness for a blue screen.

In general, operation of the 2BP11 at an anode-No.2 voltage less than 1000 volts is not recommended.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC and the PERSISTENCE CHARACTERISTIC of the P11 Phosphor are shown at the front of this Section



5-INCH MAGNETIC-DEFLECTION TYPE Supersedes Type 1899

Superscues 1)pt 10gg	
General:	
Heater, for Unipotential Cathode:	-
Voltage 6.3 ± 10% Current 0.6	ac or dc volts
Current 0-6	amp
Mirect Interelectrode Canacitances:	
Grid No. 1 to All Other Flectrodes	. 7 μμf
Grid No.1 to All Other Electrodes Pattern Electrode to Grid No.4	. 5 uuf
Pattern:	. ο μρ.
Type See illust	ration on next page
Dimensions (Approx.)	2_5/16" v 3_1/16"
Calibration	Un to 500 lines
Calibration	Flootroetatic
Doffertion Method	Electiostatic
Deflection Method	Magnetic
Maximum Solid Deflection Angle	400
Overall Length	/16" + 1/4" - //16"
Greatest Diameter of Bulb	5-1/16" max.
Caps (Two)	Recessed Small Ball
Mounting Position	Any
Base Long Basing Designation for BOTTOM VIEW	-Shell Medium 6-Pin
Basing Designation for BOTTOM VIEW	6BV
I Pin 1 Heater Di Pi	n 6 - Heater I
Pin 2-Grid No. 2 3 4 En	d Cap Pattern
Pin 3-Grid No.3	Electrode
Pin 4 - Grid No. 1 (2) ==== 15 Si	Electrode de Cap — Grid No.4
I Pin 5 - Cathode -V r- //	
C4	j
1 0 6	i
Maximum Ratings, Design-Center Values:	
PATTERN-ELECTRODE VOLTAGE	1500 max. volts
GRID-No.4 (COLLECTOR) VOLTAGE	1500 max. volts
GRID-No.3 (FOCUSING ELECTRODE) VOLTAGE .	600 max. volts
GRID-No. 2 (ACCELERATING ELECTRODE) VOLT.	1600 max. volts
GRID-No.1 (CONTROL ELECTRODE) VOLTAGE:	
Negative Bias Value	125 max. volts
Positive Bias Value	0 max. volts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode	125 max. volts
Heater positive with respect to cathode	125 max. volts
Typical Operation: 🕈	
Pattern-Electrode Voltage	1000 volts
Grid-No.4 Voltage	1050 voltsi
	1030 Voits
Grid-No.3 Voltage for Focus at	1030 Voits
Grid-No.3 Voltage for Focus at 0.5 µamp Grid-No.4 Current▲	300 approx. volts
0.5 µamp Grid-No.4 Current≜	
0.5 µamp Grid-No.4 Current ^a Grid-No.2 Voltage	300 approx. volts
0.5 µamp Grid-No.4 Current Grid-No.2 Voltage	300 approx. volts 1000 volts
0.5 µamp Grid-No.4 Current Grid-No.2 Voltage	300 approx. volts 1000 volts
0.5 µamp Grid-No.4 Current≜ Grid-No.2 Voltage	300 approx. volts 1000 volts -50 approx. volts
0.5 µamp Grid-No.4 Current≜ Grid-No.2 Voltage	300 approx. volts 1000 volts -50 approx. volts Greater than 1 meg.
0.5 µamp Grid-No.4 Current≜ Grid-No.2 Voltage	300 approx. volts 1000 volts -50 approx. volts
0.5 µamp Grid-No.4 Current≜ Grid-No.2 Voltage	300 approx. volts 1000 volts -50 approx. volts Greater than 1 meg.

252



Pattern-Electrode Signal Current (Peak-to-Peak) 0.5 ap

0.5 approx. μamp 500 . . lines

Resolution Capability**
Maximum Circuit Value:

Grid-No.1-Circuit Resistance 1.5 max. megohms

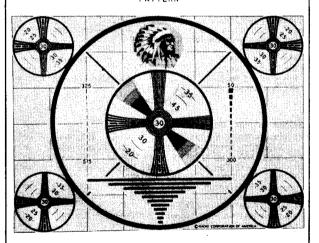
Individual tubes may require between + 20% and - 20% of these values.

Deflection must be maintained at all times. When scanned area does not cover entire pattern, the beam current should be reduced accordingly and time of operation limited to prevent damaging the pattern.

Supply should be adjustable between + 40% and - 80% of this value.

M with full scanning.

PATTERN

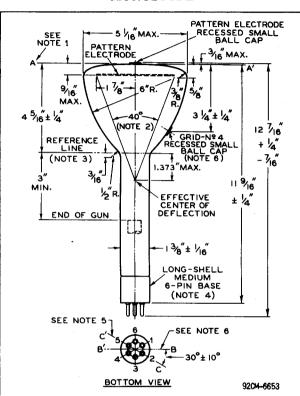


92CS-6665



2F2I MONOSCOPE





NOTE 1: LINE AA' IS PERPENDICULAR TO THE AXIS OF THE TUBE AND INTERSECTS THE FACE CONTOUR 1/2" FROM THE AXIS OF THE TUBE.

NOTE 2: DEFLECTION ANGLE BETWEEN DIAGONALLY OPPOSITE CORNERS OF PATTERN.

NOTE 3: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE 1.438" ± .003 1.D. AND 2" LONG WILL REST ON BULB CONE.

NOTE 4: C OF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

MOTE 5: MINOR AXIS OF PATTERN ELECTRODE MAY VARY FROM PLANE CC! THROUGH PIN 2 AND TUBE AXIS BY 10°. TOP EDGE OF PATTERN IS ON SAME SIDE OF TUBE AS PIN 5.

NOTE 6: BB' INDICATES PLANE THROUGH TUBE AXIS AND GRID-No.4 TERMINAL.





GENERAL DATA except for those on the phosphor as indicated below, MAXIMUM RATINGS, TYPICAL OPERATION, OUTLINES AVERAGE CHARACTERISTICS CURVES (Anode-No. 2 & Grid-No. 2 Microamperes vs Grid-No. 1 Volts) for the 3API-A are the same as those for Lype 908-A Phosphor (For Curves, see front of this Section) Fluorescence. . Green Persistence . Medium



HIGH-VACUUM CATHODE-RAY TUBE Supersedes Type 3BP1

Gener	al:	
Heate Voi Cur Direc Gri Cat DJ1 DJ3 DJ1 DJ2 DJ3 DJ4 Phosph Fluu Per- Focus Def lee Overa Greatin Minimu Hount Base Bas Pin Pin	r, for Unipotential Cathode: tage 6.3 ± 10% ac or dc rent 0.6 t Interelectrode Capacitances (Approx.): d No.1 to All Other Electrodes 8.5 hode to All Other Electrodes . 8.0 to DJ2	и и и и и и и и и и и и и и и и и и и
1	7 - Deflecting Electrod Electrode DJ3 DJ1 * 8 - Deflecting Pin 12 - No Conn.	e
	Electrode DJ4 Pin 14 - Heater	
	$D\!J_1$ and $D\!J_2$ are nearer the screen $D\!J_3$ and $D\!J_4$ are nearer the base $$	
flee DJ ₄ The	h DJ $_1$ positive with respect to DJ $_2$, the spot is cted toward pin 5. With DJ $_3$ positive with respect the spot is deflected toward pin 2. angle between the trace produced by DJ $_1$ and DJ $_2$	to and
its pin	intersection with the plane through the tube axis 5 does not exceed 10° .	and
the	angle between the trace produced by DJ $_3$ and DJ $_4$ trace produced by DJ $_1$ and DJ $_2$ is 90° \pm 3°.	and
1	um Ratings, Abolute Values:	
		volts volts
JULY		ATA 1



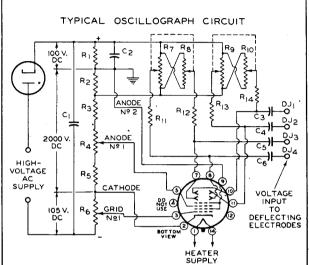
3BPI-A HIGH-VACUUM CATHODE-RAY TUBE

(continued from preceding page)

POSITIVE Value 0 max. PEAK VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE 550 max. PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode 125 max.	volts volts volts
Heater positive with respect to cathode 10 max. Typical Operation:	volts
A	vo1ts
age for Cutoff • . 430 575 Grid-No.1 Volt. for Visual Cutoff # -45 -60 Max. Anode-No.1 Current Range ▲ Between -50 and +10 Deflection Sensitivity:	volts volts wamp.
DJ3 and DJ4 0.229 0.172 mm Deflection Factor:** DJ1 and DJ2	ı∕v dç lc/in.
Brilliance and definition decrease with decreasing anode-No.2 voltage should not be less than 1500 vol Individual tubes may require between ±20% and -30% of the values with grid-No.1 voltages between zero and cutoff. # Visual extinction of stationary focused spot. Supply should be a able to ±50% of these values. A See curve for average values. **Individual tubes may vary from these values by ± 20%.	shown
Spot Position:	
The undeflected focused spot will fall within a 15-mm so centered at the geometric center of the tube face and him one side parallel to the trace produced by DJ1 and DJ2. sable test conditions are: anode-No.2 voltage, 1500 voltage, adjusted for focus; deflecting-electresistors, I megohm each, connected to anode No.2; the shielded from all extraneous fields. To avoid damage to tube, grid-No.1 voltage should be near cutoff before application of anode voltages.	aving Suit- olts; trode tube o the
Maximum Circuit Values:	
Impedance of Any Deflecting-Electrode Circuit at Heater-Supply Frequency 1.0 max. m Resistance in Any Deflecting-	gohms egohm gohms
A it is recommended that all deflecting-electrode-circuit resist be approximately equal.	ances
JULY 1, 1945 RCA VICTOR DIVISION	DATA 1



HIGH-VACUUM CATHODE-RAY TURE



92CS-6514

YBDI.A

C1: 0.1 µf C2: 1.0 µf C3 C4 C5 C6: 0.05-µf Blocking Capacitors* .

R1 R2: 2 Megohms R3: 5.5 Megohms

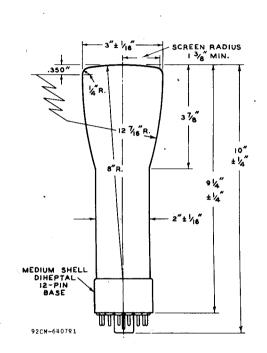
R4: 2-Megohm Potentiometer R5: 1.5 Megohms R6: 0.5-Megohm Potentiometer R7 R8: Dual 5-Megohm Potenti R7 R8: Dual 5-Megohm Potentiometer R9 R10: Dual 5-Megohm Potentiometer R11 R12 R13 R14: 2 Megohms

When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected, direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

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HIGH-VACUUM CATHODE-RAY TUBE



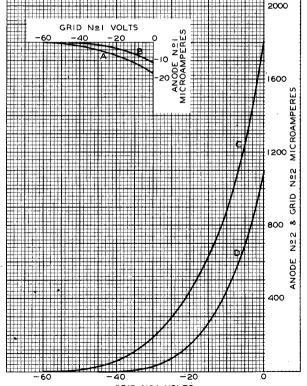
¢ OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM PERPENDICULAR ERECTED A∜ CENTER OF BOTTOM OF BASE



AVERAGE CHARACTERISTICS

ANODE NºI VOLTS ADJUSTED TO GIVE FOCUS

			1111
	CURVE	ELECTRODE CURRENT	ANODE Nº2 & GRID Nº2 VOLTS
	Α	ANODE Nº I	2000
+4,-1,-1,-1	В	ANODE Nº I	1500
	С	ANODE Nº 2 & GRID Nº 2	2000
	D	ANODE Nº 2 & GRID Nº 2	1500



GRID Nº I VOLTS



POST-DEFLECTION ACCELERATOR

ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

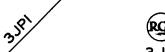
DATA

	•
General:	
Heater, for Unipotential Cathode: Voltage	8 <i>ր</i> արք 8 դարք 2.5 դարք
DJ3 to DJ4	8 μμf 7 μμf 7 μμf
DV4 to All Other Electrodes. Phosphor (For Curves, see front of this Fluorescence and Phosphorescence Persistence of Phosphorescence Focusing Method. Deflection Method. Overall Length Greatest Diameter of Bulb. Minimum Useful Screen Diameter Mounting Position. Cap Recessed Small Base Medium—Shell Diheptal 12— Basing Designation for BOTTOM VIEW.	Green Medium Electrostatic Electrostatic 10" ± 1/4" 3" ± 1/16" 2-3/4" Any Ball (JETEC No. J1-22) Pin (JETEC No. B12-37)
Pin 1 - Heater Pin 2 - Cathode Pin 3 - Grid No.1 Pin 4 - Internal Connection Do Not Use Pin 5 - Anode No.1 Pin 7 - Deflecting Electrode DJ3 Pin 8 - Deflecting Electrode DJ4	Pin 9-Anode No.2, Grid No.2 Pin 10-Deflecting Electrode DJ2 Pin 11-Deflecting Electrode DJ1 Pin 12-No Connection Pin 14-Heater Cap -Anode No.3
${\it DJ}_1$ and ${\it DJ}_2$ are nearer the ${\it DJ}_3$ and ${\it DJ}_4$ are nearer th	

With D_1 positive with respect to D_2 , the spot is deflected toward pin 5. With D_3 positive with respect to D_4 , the spot is deflected toward pin 2.

The plane through the tube axis and each of the following items may vary from the trace produced by DJ $_1$ and DJ $_2$ by the following angular tolerances measured about the tube axis: Pin 5, 10° ; Cap (on same side of tube as pin 5), 10° .

The angle between D1-D2'trace and D3-D4 trace is $90^{\circ}\pm3^{\circ}$.



OSCILLOCDAPH TURE

OSCILLOGRAPH TUBE		
Maximum Ratings, Design-Center Values:		
ANODE-No.3 VOLTAGE 4000 max.	volts	
ANODE-No.2 VOLTAGE 2000 max.	volts	
RATIO OF ANODE-No.3 VOLTAGE TO		
ANODE-No.2 VOLTAGE 2.3:1 max.		
ANODE-NO.1 TOETAGE	volts	
GRID-No.1 VOLTAGE:	1	
Megative bias value:	volts	
10516146 Blad Falad T T T T T T T T	volts volts	
1031Cive peak value:	VOILS	
PEAK VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE 500 max.	volts	
AND ANY DEFECTIVITY CONTINUES	voits	
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode. 125 max.	volts	
	volts	
neater positive with respect to cathode. 125 max.	•0	
Equipment Design Ranges:		
For any anode-No.3 voltage (Eb3) between 2000* and 4000	volts	
and any anode-No. 2 voltage (Eb ₂) between 1500** and 2000		
Anode-No.1 Voltage 20% to 34.5% of Eb2	volts	

Anode-No.1 Voltage 20% to 34.5% of Eb2 . . . volts Grid-No.1 Voltage† . . . 1.5% to 4.5% of Eb2 . . . volts Anode-No.1 Current for any

Operating Condition . . . -50 to +10 . . . μ amp

Deflection Factors:

- Anode No. 2 and grid No. 2, which are connected together within tube, and referred to herein as anode No. 2.
- At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode-No.2 input power to 6 watts.
- * It is recommended that anode-No.3 voltage be not less than 3000 volts for high-speed transients.
- ** Recommended minimum value of anode-No.2 voltage.
- # With heater voltage of 6.3 volts, anode-No.3 voltage of 3000 volts, anode-No.2 voltage of 1500 volts, anode-No.1 voltage adjusted for focus, grid-No.1 voltage adjusted to give spot that is just visible, each deflecting electrode connected through 1-megohm resistor to anode No.2, and tube shielded from all extraneous fields, the undeflected focus and tube will fall within a 15-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ1 and DJ2.

t: See next page.

AUG. 1, 1951





5.0 max, megohms

OSCILLOGRAPH TUBE

Examples of Use of I	esign Range)	s:		
For anode-No.3 voltage of and anode-No.2	2000	3000	4000	volts
voltage of	2000	1500	2000	volts
Anode-No.1 Volt. Grid-No.1 Volt.† Deflection Factors: DJ1 & DJ2 DJ3 & DJ4	-30 to -90 136 to 184	22.5 to -67.5 127 to 173		volts volts
Maximum Circuit Valu Grid-No.1-Circuit Re Resistance in Any			1.5 max.	megohms

For visual extinction of undeflected focused spot.

Deflecting-Electrode Circuit*...

- Volts dc/in.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

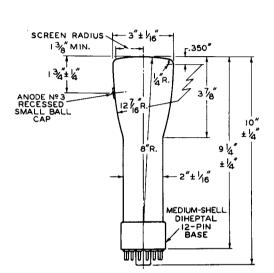
OPERATING NOTES

The 3JPI utilizes a medium-persistence screen having green fluorescence and phosphorescence. The screen has high visual efficiency and exceptionally good brightness contrast between the scanned line and the background. Under conditions of high ambient light, contrast may be maintained by the use of a green filter, such as Wratten No.58.

For high-speed scanning, it is recommended that the anode-No.3 (post-deflection accelerator) voltage be not less than 3000 volts, but for low- and medium-speed scanning, anode No.3 may be operated at a voltage as low as 2000 volts.

Because of its medium persistence, the 3JPI is particularly useful where either medium-speed non-recurring phenomena or medium- and high-speed recurring phenomena are to be observed. The persistence is such that the 3JPI can be operated with scanning frequencies as low as 20 cycles per second without excessive flicker.



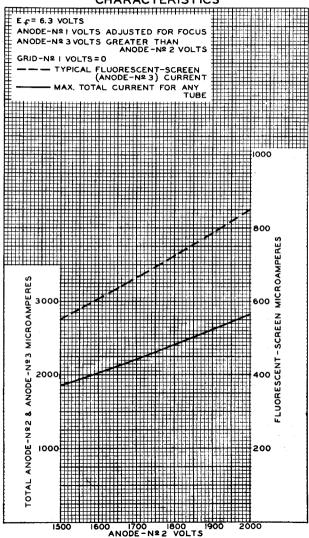


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CHARACTERISTICS



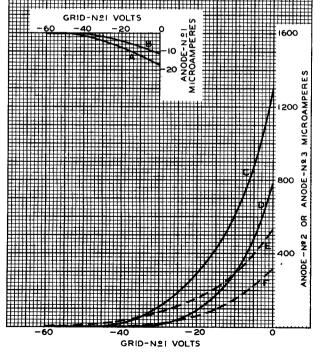




AVERAGE CHARACTERISTICS

E = 6.3 VOLTS

	CURVE	ELECTRODE CURRENT	ANODE-Nº2 VOLTS	ANODE-Nº3			
Ш	A	ANODE Nº I	2000	4000			
	В	ANODE Nº I	1500	3000			
	С	ANODE Nº 2	2000	4000			
	D	ANODE Nº 2	1500	3000			
	E	ANODE Nº 3	2000	4000			
₩	F	ANODE Nº 3	1500	3000			







POST-DEFLECTION ACCELERATOR ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

The 3JP7 is electrically and mechanically like the 3JP1 but utilizes a long-persistence, cascade (two-layer) screen which exhibits bluish fluorescence of short persistence and greenish-yellow phosphorescence which persists for several minutes under conditions of adequate excitation and low ambient light.

Because of its long persistence, the 3JP7 is particularly useful where either low-speed non-recurring phenomena or high-speed recurring phenomena are to be observed.

The persistence is such that the 3JP7 without filter can be operated with scanning frequencies as low as 30 cycles per second without excessive flicker. When used with a yellow filter, such as Wratten No.15 (G), the 3JP7 can be operated with much lower scanning frequencies.

GENERAL DATA, MAXIMUM RATINGS, AND EQUIPMENT
DESIGN RANGES

for the 3JP7 are identical with those for the 3JP1 except that Spot Position is defined as follows:

With heater voltage of 6.3 volts, anode-No.3 voltage of 4000 volts, anode-No.1 voltage of 2000 volts, anode-No.1 voltage adjusted for focus, grid-No.1 voltage adjusted to give spot that is just visible, each deflecting electrode connected through 1-megohm resistor to anode No.2, and tube shielded from all extraneous fields, the undeflected focused spot will fall within a 12-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by OJ1 and OJ2.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC,
BUILDUP CHARACTERISTICS,
and PERSISTENCE CHARACTERISTICS of
the P7 Phosphor are shown at the
front of this Section.



ELECTROSTATIC FOCUS

ELECTROSTATIC FOCUS	ELECTROSTATIC DEFLECTION
General:	DATA .
Current. Direct Interelectrode Capacit Grid No.1 to All Other Elec DJ1 to DJ2 DJ3 to DJ4 DJ1 to All Other Electrodes DJ2 to All Other Electrodes DJ3 to All Other Electrodes DJ4 to All Other Electrodes DJ4 to All Other Electrodes Phosphor (For Curves, see fro Fluorescence Persistence Focusing Method Deflection Method Overall Length Greatest Diameter of Bulb . Minimum Useful Screen Diamete Mounting Position Base	6.3
l D.I. and D.I. are	nearer the screen

 DJ_1 and DJ_2 are nearer the screen $D\hat{J}_2$ and $D\hat{J}_d$ are nearer the base

With DJ₁ positive with respect to DJ₂, the spot is deflected toward pin 4. With DJ3 positive with respect to DJ4, the spot is deflected toward pin 1.

The angle between the trace produced by DJ3 and DJ4 and its intersection with the plane through the tube axis and pin 1 does not exceed 10°.

The angle between the trace produced by DJ3 and DJ4 and the trace produced by DJ1 and DJ2 is 90° \pm 3°.

←Indicates a change.

RCH

OSCILLOGRAPH TUBE

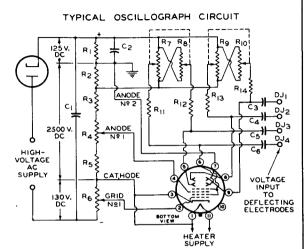
	Maximum Ratings, Design-Center Values:
1	ANODE-No.2 •
1	ANODE-No.1 VOLTAGE 1000 max. volts
1	GRID-No.1 VOLTAGE:
Ì	Negative bias value 200 max. volts
۱.	Positive bias value 0 max. volts
1	Positive peak value 2 max. volts
1	PEAK VOLTAGE BETWEEN ANODE No.2
ł	AND ANY DEFLECTING ELECTRODE 500 max. volts
ı	PEAK HEATER-CATHODE VOLTAGE:
	Heater negative with respect to cathode. 125 max. volts
ı	Heater positive with respect to cathode. 125 max. volts
ı	p
ı	Equipment Design Ranges:
١	For any anode-No. 2 voltage (Eb ₂) between
1	recommended minimum* and 2500 volts
1	Anode-No.1 Voltage 16% to 30% of Eb ₂ volts
	Max. Grid-No.1 Voltage
ļ	for Visual Cutoff 4.5% of Eb ₂ volts
١	Max. Anode-No.1
	Current Range15 to +10 μ amp
	Deflection Factors:
	DJ1 & DJ2 50 to 68 v dc/in./kv of Eb ₂
	DJ3 & DJ4 38 to 52 v dc/in./kv of Eb2
٠	Spot Position #
	Examples of Use of Design Ranges:
	For anode-No.2 voltage of 1000 2000 volts
	Anode-No.1 Voltage 160 - 300 320 - 600 volts
	Max. Grid-No.1 Voltage
	for Visual Cutoff -45 -90 volts
	Deflection Factors:
	DJ1 & DJ2 50 - 68 100 - 136 volts dc/in.
	$DJ_3 \& DJ_4 38 - 52 76 - 104 \text{ volts dc/in.}$
	Maximum Circuit Values:
	Grid-No.1-Circuit Resistance 1.5 max. megohms
	Resistance in Any Deflecting-Electrode
	Circuit ^a 5.0 max. megohms
	. Loods No. 2 and grid No. 2 which are connected together within the tube.
	 Anode No.2 and grid No.2, which are connected together within the tube, are referred to herein as anode No.2. The product of anode-No.2 voltage and average anode-No.2 current should be limited to 6 watts.
	age and average anode-No.2 current should be limited to 6 watts.
	* Brilliance and definition decrease with decreasing anode-No.2 voltage. Recommended minimum for the 3kPl in general service is 1000 volts but a value as low as 500 volts may be used under conditions of low-veloc- ity deflection and low ambient-light levels.
	Recommended minimum for the 3KM1 in general service is 1000 volts but a value as low as 500 volts may be used under conditions of low-veloc-
	ity deflection and low ambient-light levels.
	# The center of the undeflected, focused spot will fall within a circle having 7.5-mm radius concentric with the center of the tube face. # The center of the tube face. # The center of the tube face. # The center of the tube face. # The center of the undeflected, focused spot will fall within a circle. # The center of the undeflected, focused spot will fall within a circle. # The center of the undeflected, focused spot will fall within a circle. # The center of the undeflected, focused spot will fall within a circle. # The center of the undeflected, focused spot will fall within a circle. # The center of the undeflected spot will fall within a circle. # The center of the tube face. # The center of the center of the tube face. # The center of th
	It is recommended that the deflecting-electrode-circuit resistances be approximately equal.
	and an emander of a selection of a s
	i

➤ Indicates a change



REP

OSCILLOGRAPH TUBE



92CS-6690RI

C1: 0.1 µ

C1. C2: 1. 0.1 μ! 1.0 μf μ C5 C6: 0.05-μf Blocking Capacitors*

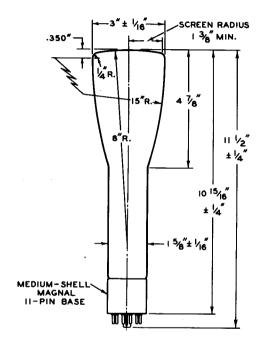
R1 R2: 2 Megohms R3: 6 Megohms

R4: 2-Megohm Potentiometer R5: 1.0 Megohm R6: 0.5-Megohm Potentiometer R7 R8: Dual 5-Megohm Potentiometer R9 R10: Dual 5-Megohm Potentiometer R11 R12 R13 R14: 2 Megohms

*When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should he connected firect to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.

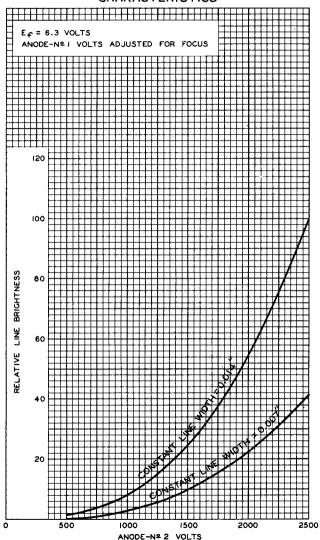




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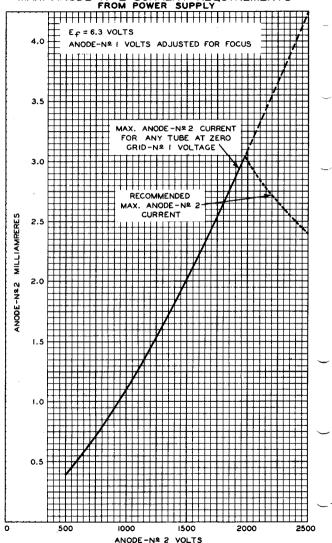






RCA

MAX. ANODE-Nº2 CURRENT REQUIREMENTS



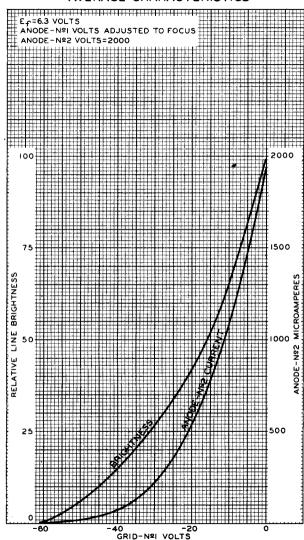
FEB. 24,1949

TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7192



AVERAGE CHARACTERISTICS



ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

DATA	
General:	
Heater, for Unipotential Cathode: Voltage. 6.3 Current. 0.6 Direct Interelectrode Capacitances (Ap	ac or dc volts
Grid No.1 to All Other Electrodes Cathode to All Other Electrodes D ₁ to D ₂	8 μμ.f 5 μμ.f
\mathbb{N}_3 to \mathbb{N}_4	. 2.5 μμτ
Dui to All Other Electrodes	
\mathbb{D}_2 to All Other Electrodes	
DJ3 to All Other Electrodes	
DU ₄ to All Other Electrodes	
Phosphor (For Curves, see front of thi Fluorescence and Phosphorescence . Persistence of Phosphorescence . Focusing Method	
Pin 1 - Heater Pin 2 - Grid No.1 Pin 3 - Cathode Pin 4 - Anode No.1 Pin 5 - Deflecting Electrode DJ3 Pin 6 - Deflecting	Pin 7-Anode No.2, Grid No.2 Pin 8-Deflecting Electrode DJ2 Pin 9-Deflecting Electrode DJ1 Pin 10-Internal Connection-
Electrode DJ ₄	Do Not Use Pin 11 - Heater

 DJ_1 and DJ_2 are nearer the screen DJ_{2} and DJ_{A} are nearer the base

With D₁ positive with respect to D₂, the spot is deflected toward pin 4. With DJ3 positive with respect to DJ4, the spot is deflected toward pin 1.

The angle between the trace produced by DJ3 and DJ4 and its intersection with the plane through the tube axis and pin 1 $^{\circ}$ does not exceed 100.

The angle between the trace produced by DJ $_3$ and DJ4 and the trace produced by DJ $_1$ and DJ2 is 90 $^{\rm o}$ $_2$ $^{\rm o}$.

31.2h



Maximum Ratings, Design-Center Values:
ANODE-No.2 VOLTAGE
ANODE-No.1 VOLTAGE 1000 max. volts GRID-No.1 (CONTROL ELECTRODE) VOLTAGE:
Negative bias value 200 max. volts
Positive bias value 0 max. volts Positive peak value 2 max. volts
PEAK VOLTAGE BETWEEN ANODE No. 2
AND ANY DEFLECTING ELECTRODE 500 max. volts PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode: 125 max. volts Heater positive with respect to cathode. 125 max. volts
Equipment Design Ranges:
For any anode-No.2 voltage (Eb ₂) between 1500* and 2500 volts
Anode-No.1 Voltage for Focus ^p 16% to 30% of E _{b2} volts
Grid-No.1 Voltage for Visual Cutoff 1.9% to 4.5% of E _{b2} volts
Anode-No.1 Current for Any Operating Condition -15 to $+10$ μ amp
Deflection Factors: DJ & DJ2 50 to 68 v dc/in./kv of Eb2 DJ3 & DJ4 38 to 52 v dc/in./kv of Eb2 Spot Position
Examples of Use of Design Ranges:
For anode-No. 2 voltage of 2000 volts
Anode-No.1 Voltage ⁰ 320 to 600 volts Grid-No.1 Voltage for Visual Cutoff -38 to -90 volts Deflection Factors:
DJ1 & DJ2
Maximum Circuit Values:
Grid-No.1-Circuit Resistance 1.5 max. megohms Resistance in Any Deflecting Electrode Circuit ^o 5 max. megohms
Minimum Circuit Values:
When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 amore, the effective resistance
in circuit between indicated electrode and the output capacitor should be as follows:

NOV. 15, 1948 TUBE DEPARTMENT TENTATIVE DATA 1 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY





The resistors should be capable of withstanding the applied voltage.

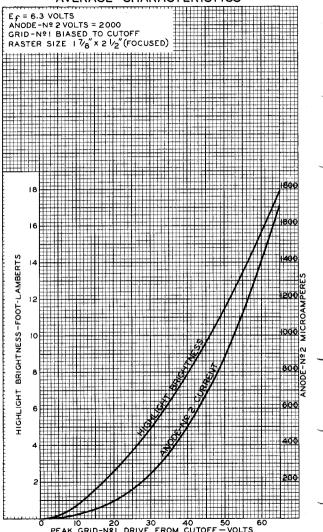
- Anode No. 2 and grid No. 2 which are connected together within tube are referred to herein as anode No. 2.
- Brilliance and definition decrease with decreasing anode—No. 2 voltage.
 With the combined grid—No. 1-bias voltage and video—signal voltage adjusted for a highlight brightness of 2 foot—lamberts on a 1-7/8*x2-1/2* picture area.
- With 1500 volts on anode No.2, grid-No.1 bias adjusted so that spot is just visible, and no deflection, the center of the spot will fall with-inacircle having 7.5-mm radius concentric with the center of the tube face.
- O It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

OUTLINE DIMENSIONS for Type 3 KP4 are the same as those shown for Type 3 KP1

3494



AVERAGE CHARACTERISTICS





ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

The 3KP11 is the same as the 3KP1 except that it has a phosphor of the short-persistence, blue-fluorescence type designated P11. The blue radiation of the P11 screen is highly actinic and has sufficiently short persistence to permit use of the 3KP11 in all moving-film photographic applications without blurring except in those where film moves at a high speed. The 3KP11 is also quite satisfactory for visual observation of phenomena because its phosphor has unusually high brightness for a blue screen.

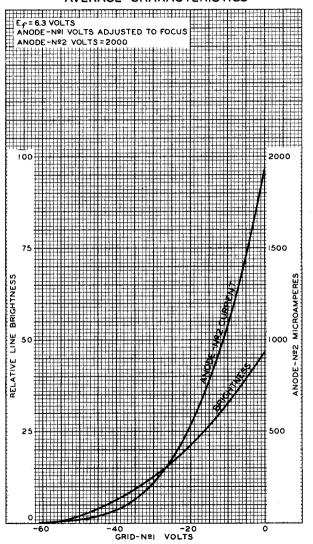
In general, operation of the 3KP11 at an anode-No.2 voltage less than 1500 volts is not recommended.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC and the PERSISTENCE CHARACTERISTIC of the P11 Phosphor are shown at the front of this Section

The curve showing MAXIMUM ANODE-No.2 CURRENT REQUIREMENTS FROM POWER SUPPLY for Type 3KP1 also applies to the 3KP11



AVERAGE CHARACTERISTICS





ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

	DATA
	General:
	Heater, for Unipotential Cathode: Voltage 6.3
۱	DJ_1 and DJ_2 are nearer the screen DJ_3 and DJ_A are nearer the base
	With DI_1 positive with respect to DI_2 , the spot is deflected toward pin 4. With DI_3 positive with respect to DI_4 , the spot is deflected toward pin 1.
	The plane through the tube axis and pin 4 may vary from the trace produced by Dl_1 and Dl_2 by an angular tolerance (measured about the tube axis) of 2 10°.

Maximum Ratings, Design-Center Values:

. 2500 max.

- Anode No.2 and grid No.2 which are connected together within tube, are referred to herein as anode No.2.
- The product of anode-No.2 voltage and average anode-No.2 current should be limited to 6 watts.

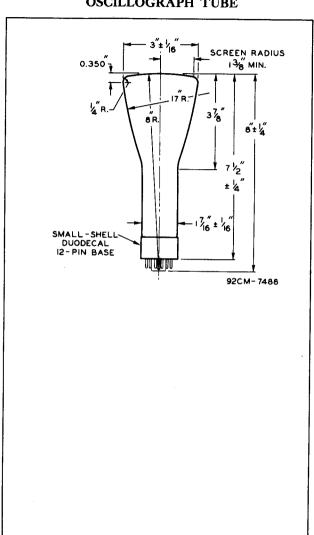




· ·	
ANODE-No.1 VOLTAGE 1000 max. volts	
GRID-No.1 VOLTAGE: Negative bias value 200 max. volts	
Positive bias value 0 max. volts	ł
Positive peak value	i i
PEAK VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE 500 max. volts	
PEAK HEATER-CATHODE VOLTAGE:	1
Heater negative with respect to cathode. 125 max. volts	ı
Heater positive with respect to cathode. 125 max. volts	ı
Heater positive with respect to cathode.	
Equipment Design Ranges:	1
	1
For any anode-\$0.2 voltage (\$b_2) between recommended minimum* and 2500 volts	ı
Anode-No.1 Voltage 20% to 35% of Eb ₂ volts Max. Grid-No.1 Voltage	
for Visual Cutoff. 6.3% of Eb2 Volls	1
Anode-No.1 Cur. for any Operating Condition. —15 to +10 microamperes	
Deflection Factors:	1
\mathcal{D}_1 & \mathcal{D}_2 115 to 145 vdc/in./kv of Eb2	
110 to 140 vdc/in./kv of Eb2	
0.3° & 0.7° 110 to 140 $\sqrt{\text{dc/in./kV}}$ of Eb2	1
Examples of Use of Design Ranges:	
For anode-No. 2 voltage of 1000 2000 volts	1
Anode-No.1 Voltage 200-350 400-700 volts	3
I Alloud Toll toll tage	•
Max. Grid-No.1 Voltage	
for Visual Cutoff0)	1
Deflection Factors:	1
$D_1 \& D_2 \dots 115-145$ 230-290 volts dc/in.	
$\frac{10-140}{10-140}$ 220-280 volts dc/in.	.
$0.03 & 0.04 \dots 110-140 220-280 $	1
Maximum Circuit Values:	1
1	.
Grid-No.1-Circuit Resistance 1.5 max. megohms	7
Resistance in Any Deflecting-	1
Electrode Circuit 5.0 max. megohms	S
Treetings officers	i
* Brilliance and definition decrease with decreasing anode—No. 2 voltage. Recommended minimum for the 3MP1 in general service is 1000 volts but a value aslow as 500 volts may be used under conditions of low-veloc- ity deflection and low ambient-light levels.	
ity deflection and low ambient—light levels.	1
It is recommended that the defrecting crossing	1
approximately equal.	1
	1
	1
1	1









DATA

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes 8
Grid No.1 to All Other Electrodes.
Pin 1 - Heater Pin 2 - Grid No. 1 Pin 3 - Cathode Pin 4 - Anode No. 1 Pin 5 - Internal Connection Do Not Use Pin 6 - Deflecting Electrode DJ3 Pin 7 - Deflecting Electrode DJ4 Pin 10 - Deflecting Electrode DJ1 Connection Do Not Use Pin 12 - Heater
 DJ_1 and DJ_2 are nearer the screen DJ_3 and DJ_4 are nearer the base
W:+b by

With \mathbb{W}_1 positive with respect to \mathbb{W}_2 , the spot is deflected toward pin 1. With \mathbb{W}_3 positive with respect to \mathbb{W}_4 , the spot is deflected toward pin 1.

The angle between the trace produced by M_3 and M_4 and its intersection with the plane through the tube axis and pin No.1 does not exceed 10° .

The angle between $\,\mathrm{D}_1$ - $\,\mathrm{D}_2$ trace and $\,\mathrm{D}_3$ - $\,\mathrm{D}_4$ trace is 90° $^{\circ}$

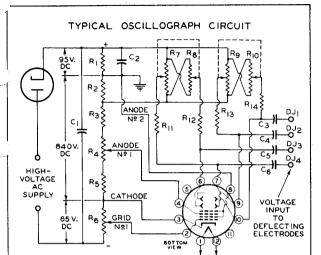


Maximum Ratings, Design-Center Values:	
ANODE-No.2 VOLTAGE*	volts
ANODE-No.1 VOLTAGE 1000 max.	voits
GRID-No.1 VOLTAGE:#	
Negative bias value 200 max.	volts
Positive bias value 0 max.	volts
Positive peak value 2 max.	volts
PEAK VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE 500 max.	volts
PEAK HEATER-CATHODE VOLTAGE:	1.
Heater negative with respect to cathode. 125 max.	volts
Heater positive with respect to cathode. 125 max.	volts
Equipment Design Ranges:	
For any ancde-No.2 voltage (Eb ₂) between 500* and 2500	volts
Anode-No.1 Voltage 16.5% to 31% of Eb ₂ Maximum Grid-No.1 Volt-	volts
age for Visual Cutoff. 6.75% of Eb ₂	velts
Operating Condition15 to +10 . microa	mperes
Deflection Factors: DJ & DJ 2 73 to 99 v dc/in./kv	of Ehr
DJ3 & DJ4 52 to 70 v dc/ir./kv	0. 202
Spot Position	
Examples of Use of Design Ranges:	
For anode-No. 2 voltage of 1000 2000	volts
Anode-No.1 Voltage 165 - 310 330 - 620	volts
Maximum Grid-No.1 Volt-	
age for Visual Cutoff67.5 -135	volts
Deflection Factors:	4-1:0
D1 & D2	
DJ3 & DJ4 52-70 104-140 volts	ac/ in
Maximum Circuit Values:	,
	egohms
Resistance in Any Deflecting-	
Electrode Circuit ^o 5.0 max. m	iegohiis,
• Anode No.2 and grid No.2 which are connected together within t referred to herein as anode No.2.	ubeare
referred to herein as anode No. 2.	thould:
he limited to 6 watts.	
* Brilliance and definition decrease with decreasing anode-No. 2	ltage.
* Brilliance and definition decrease with decreasing anode-No. 2 © A value as low as 500 volts is recommended only for low-veloi flection and low ambient light levels.	ıy a∈-
The center of the undeflected, focused spot will fall within a having 7.5-mm radius concentric with the center of the tue fa	ce.
It is recommended that the deflecting-electrode-circuit resstan	ces be
approximately equal.	

MAY 20, 1949

TENTATIVE DATA





92CS-6777

PA,

C1: 0.2 #f

C2: 1.0 µt C6: 0.05-µf Blocking Capacitors*

R1 R2: 2.5 Megohms, 0.5 R3: 2.5 Megohms, 1 Watt 0.5 Watt

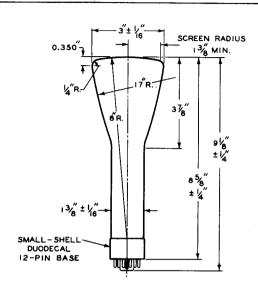
HEATER SUPPLY

R4: 1.0—Megohm Potentiometer R5: 0.5 Megohm, 0.5 Watt R6: 0.35 Megohm, 0.5 watt R7 R8: Dual 5—Megohm Potentiometer R9 R10: Dual 5—Megohm Potentiometer R11 R12 R13 R14: 2 Megohms, 0.5 watt

when cathode is grounded, capacitors should have high voltage rating; her do anode No.2 is grounded, they may have low voltage rating. For do amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.





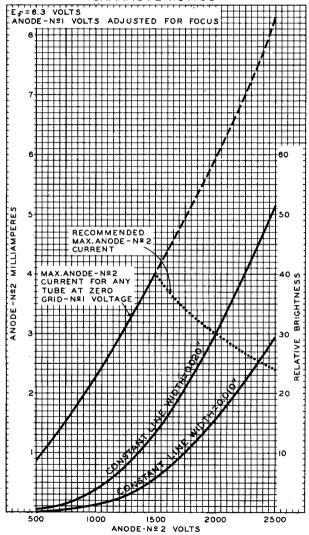
 $\mbox{\ensuremath{\xi}}$ OF BULB WILL NOT DEVIATE MORE THAN 2 $^{\rm O}$ IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE.

92CM-7119



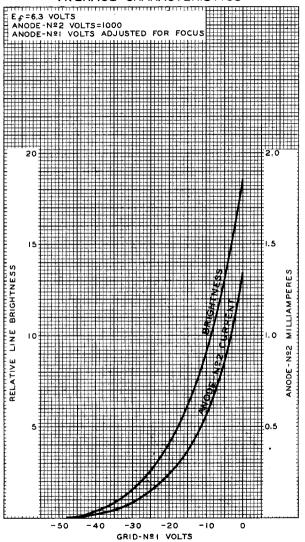
3RPI







AVERAGE CHARACTERISTICS



TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7141



POST-DEFLECTION ACCELERATOR

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3
Pin 1 - Heater Pin 2 - Cathode Pin 3 - Grid No.1 Pin 4 - No Connection Do Not Use Pin 5 - Grid No.3 Pin 7 - Deflecting Electrode DJ Pin 8 - Deflecting Electrode DJ Pin 8 - Deflecting Electrode DJ Pin 12 - No. Conn. Pin 14 - Heater Cap - Post-Ultor (Grid No.5, Collector) DJ, and DJ, are nearer the screen
DJ_3 and DJ_4 are nearer the base

With DJ $_1$ positive with respect to DJ $_2$, the spot is deflected toward pin 5. With DJ $_3$ positive with respect to DJ $_4$, the spot is deflected toward pin 2.

The plane through the tube axis and each of the following items may vary from the trace produced by DJ_1 and DJ_2 by



SABPI

5ABPI OSCILLOGRAPH TUBE

the following ang axis): Pin 5, 10° pin 5), 10° . Ang trace is 90° ± 1.	ular tolera ; side term le between 5°.	nces (measu inal (on sar DJ ₁ — DJ ₂ ti	red about th me side of t race and DJ ₃	ube as - DJ ₄
Maximum Ratings, De	sign-Center	Values:		
POST-ULTOR VOLTAGE ULTOR VOLTAGE RATIO OF POST-ULTOR			6000 max 2600 max	
TO GRID-No.3 VOLTAGE .	ULTOR VOLT		2.3:1 max 1000 max	
GRID-No.1 VOLTAGE: Negative bias val			200 max	
Positive bias val Positive peak val PEAK VOLTAGE BETWEE	ue		0 max 2 max	
	TING ELECTR		500 max	. volts
Heater negative w Heater positive w	ith respect	to cathode. to cathode.	125 max 125 max	
Equipment Design Ra	nges:			- 1
For any post-ultor and any ultor vol	voltage (Ec	5) between 2 between 1500	2000* and 60 0** and 2600	volts
Grid-No.3 Voltage f Grid-No.1 Voltage f Extinction of Und	or Focus . or Visual eflected	. 20% to 34.	5% of E _{C4}	volts
Focused Spot . Grid-No.3 Current f Operating Conditi Deflection Factors:	or Any on	. 2.6% to 4.7	,	volts μαπρ
	When Ec5	a r Fo		
DJ ₁ & DJ ₂ DJ ₃ & DJ ₄		. 26.5 to 3	6 v dc/in./ v dc/in./	
,	When Bos	= E _{C4}		
DJ ₁ & DJ ₂ · · · · · DJ ₃ & DJ ₄ · · · · · Spot Position		. 21.5 to 2 . 14.5 to 19 ##	9 v dc/in., .5 v dc/in.,	/kvof E _{C4} /kvof E _{C4}
Examples of Use of	Design Rang	es;		ŀ
For post-ultor				- (
voltage of and ultor	2000	3000	4000	volts
voltage of	2000	1500	2000	volts
Grid-No.3 Volt. for Focus		300 to 515		volts volts
Grid-No.1 Volt. [©]	-02 10-87	-39 to -65	-52 10-07	Voits
●, ♣, 0, *, **, #, ##, □: See	nevt name			- 1

JUNE 1, 1953

TENTATIVE DATA 1



SABDI

OSCILLOGRAPH TUBE

1		
Def	ection	Factors:#

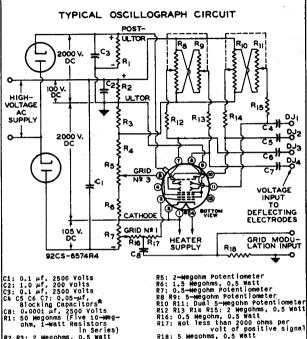
DJ1 & DJ2 DJ3 & DJ4 43 to 58 40 to 54 53 to 72 v dc/in. 29 to 39 27 to 36 36 to 48 v dc/in.

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . 1.5 max. megohns Resistance in Any Deflecting-Electrode Circuit 5.0 max. megohms

- The "post-ultor" in a cathode-ray tube 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. In the 5AB-types, the post-deflection acceleration function and the collector function are both performed by grid wo.5 which is conveniently referred to as "post-ultor".
- The "ultor" in a cathode-ray tube is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection. In the SAB-types, the ultor function is performed by grid No.4. Since grid No.4 and grid No.2 are connected together within the SAB-types, they are collectively referred to simply as "ultor" for convenience in presenting data and curves.
- At or near this rating, the effective resistance of the ultor supply should be adequate to limit the ultor input power to 6 watts.
- It is recommended that the post-ultor voltage be not less than 3000 volts for high-speed scanning.
- Recommended minimum value of ultor voltage.
 - The deflecting electrodes 93 and 93 are designed to have extra-high deflection sensitivity and consequently produce less than full-screen deflection. With post-deflection acceleration, the length of deflection may be limited to a inches; without post-deflection acceleration, deflection to full screen diameter will ordinarily be obtained. These electrodes are, therefore, more suitable for the signal voltage than for the time-base voltage.
- With heater voltage of 6.3 volts, post-ultor voltage of 4000 volts, ultor voltage of 2000 volts, grid-No.3 voltage adjusted to give focus, grid-No.1 voltage adjusted to give spot that is just visible, each deflecting electrode connected through a 1-megohm resistor to ultor, and tube shielded from all extraneous fields, the center of the undeflected, focused spot will fall within a circle having a 12.5-mm radius concentric with the center of the tube face.
- For visual cutoff of undeflected focused spot.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.





C1: 0.1 µf, 2500 Volts C2: 1.0 µf, 200 Volts C3: 0.1 µf, 2500 Volts C4: C5 C6 C7: 0.05-µf, Blocking Capacitors C8: 0.0001 µf, 2500 Volts C8: 0.0001 µf, 2500 Volts Ohm, 1-Watt Resistors

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watt

R2 R3: 2 Megohms, 0.5 Wa R4: 5.5 Megohms, 2 Watts

R18: 5 Megohms, 0.5 Watt

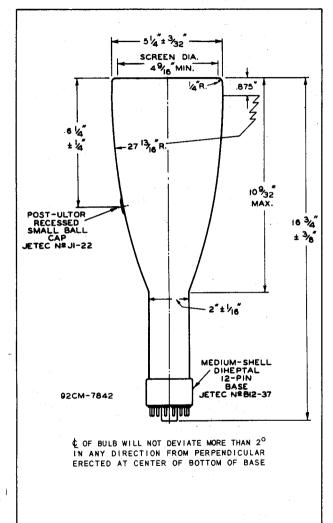
when cathode is grounded, capacitors should have high voltage rating (2500 volts); when ultor is grounded, they may have low voltage rating (200 volts). For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting—electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that ultor be returned to a point in the amplifier system which will give the lowest possible potential difference between ultor and the deflecting electrodes.

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OSCILLOGRAPH TUBE

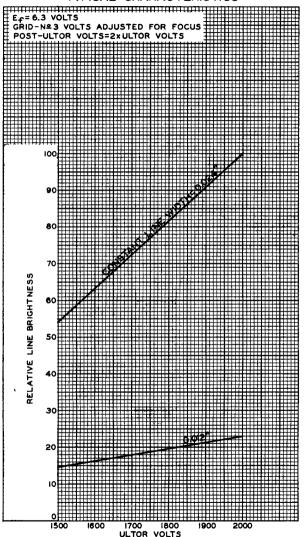


JUNE 1, 1953





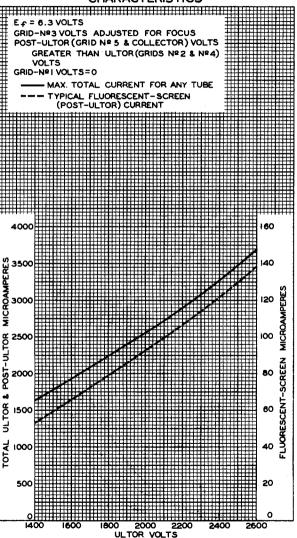
TYPICAL CHARACTERISTICS





5.78p

CHARACTERISTICS :



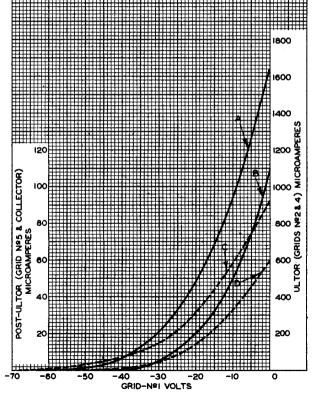




AVERAGE CHARACTERISTICS

E.f = 6.3 VOLTS GRID-N≥3 VOLTS ADJUSTED FOR FOCUS

Ш	Ш	, 1111111		111111111	
Н	#	CURVE	ELECTRODE		POST-ULTOR
Ŧ	#	001112	CURRENT	VOLTS	VOLTS
	₩	A	ULTOR	2000	4000
H	#	В	ULTOR	1500	3000
	#	С	POST-ULTOR	2000	4000
		, D	POST-ULTOR	1500	3000





5ABP7 OSCILLOGRAPH TUBE

POST-DEFLECTION ACCELERATOR

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

SABO,

The 5ABP7 is the same as the 5ABP1, except that it utilizes a long-persistence, cascade (two-layer) screen which exhibits bluish fluorescence of short persistence and greenish-yellow phosphorescence which persists for several minutes under conditions of adequate excitation and low ambient light.

Because of its long persistence, the 5ABP7 is particularly useful where either low-speed non-recurring phenomena or high-speed recurring phenomena are to be observed. Furthermore, two or more phenomena can be observed simultaneously on the screen by means of a suitable switching arrangement.

The persistence is such that the 5ABP7 without filter can be operated with scanning frequencies as low as 30 cycles per second without excessive flicker.

The SPECTRAL-ENERGY EMISSION CHARACTERISTIC, as well as PERSISTENCE CURVES of BUILDUP and DECAY of the P7 PHOSPHOR are shown at the front of this Section.



5ABPII OSCILLOGRAPH TUBE

POST-DEFLECTION ACCELERATOR
ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

The 5ABP11 is the same as the 5ABP1, except that it utilizes a short persistence screen which exhibits blue fluorescence and phosphorescence. The blue radiation of its fluorescent screen is highly actinic and has sufficiently short persistence to permit use of the 5ABP11 in all photographic applications without blurring except in those where film moves at a high speed.

The 5ABP11 is also quite satisfactory for visual observation of phenomena because it utilizes an improved phosphor having unusally high brightness for a blue screen. The brightness of the P11 screen is about one-half that of the P1 screen under the same conditions of excitation.

The SPECTRAL-ENERGY EMISSION CHARACTERISTIC, and the PERSISTENCE CHARACTERISTIC of the P11 PHOSPHOR are shown at the front of this Section. SABBIT



HIGH-VACUUM CATHODE-RAY TUBE

Supersedes Type 5BP1 General: Heater, for Unipotential Cathode: Voltage. 6.3 ± 10% ac or dc volts Current. . . 0.6 Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes. . . . 8.0 ццf uuf ццf μμf μμf DJ_1 to All Other Electrodes except DJ_2 . DJ_2 to All Other Electrodes except DJ_1 . 8.0 μμf 7.5 DJ3 to All Other Electrodes except DJ4 . 10.0' μμf DJ4 to All Other Electrodes except DJ3 . 7.5 μμf Phosphor (For Curves, see front of this Section). Fluorescence . . Green Persistence. Medium Electrostatic Focusing Method. . Deflection Method. Electrostatic Overall Length . . . 16-3/4" ± 3/8" 5-1/4" + 1/16" - 3/32" Greatest Diameter of Bulb. Minimum Useful Screen Diameter . . . 4-1/2" Mounting Position....... Any . . Medium Shell Magnal 11-Pin Basing Designation for BOTTOM VIEW . Pin 1-Heater Pin 2-No Connection 7 - Anode No. 2. Grid No.2 Pin 3-Deflecting Pin 8-Deflecting Electrode DJ1 Electr. DJ2 Pin 4 - Anode No.1 Pin 9-Deflecting Pin 5- Internal Con. Electr.DJ3 Do not use Pin 10 - Grid No. 1 Pin 6 - Deflecting Pin 11 - Heater. Electrode DJA Cathode

DJ_1 and DJ_2 are nearer the screen DJ_3 and DJ_4 are nearer the base

With DJ $_{\parallel}$ positive with respect to DJ $_{2}$, the spot is deflected toward pin .4. With DJ $_{3}$ positive with respect to DJ $_{4}$, the spot is deflected toward pin I.

The angle between the trace produced by ${\rm DJ}_3$ and ${\rm DJ}_4$ and its intersection with the plane through the tube axis and pin I does not exceed 10° .

The angle between the trace produced by DJ $_3$ and DJ $_4$ and the trace produced by DJ $_1$ and DJ $_2$ is 900 \pm 30.

SOR



5BPHA

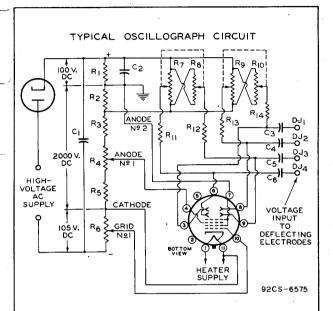
HIGH-VACUUM CATHODE-RAY TUBE

(continued from preceding page)
Maximum Ratings, Absolute Values:
ANODE-No.2 & GRID-No.2 VOLTAGE
Typical Operation:
Anode-No.2 & Grid-No.2 Voltage* . 1500 2000 volts Anode-No.1 Volt. for Focus at 75% of Grid-No.1 Volt. for Cutoff* . 337 450 volts Grid-No.1 Volt. for Visual Cutoff*30 -40 volts Max. Anode-No.1 Current Range*. Between -50 and +10 µamp. Deflection Sensitivity: DJ1 and DJ2 0.404 0.303 . mm/v dc DJ3 and DJ4
Spot Position:
The undeflected focused spot will fall within a 15-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ and DJ2. Suitable test conditions are: anode-No.2 voltage, 1500 volts; anode-No.1 voltage, adjusted for focus; deflecting-electrode resistors, I megohm each, connected to anode-No.2; the tube shielded from all extraneous fields. To avoid damage to the tube, grid-No.1 voltage should be near cutoff before application of anode voltages.
Maximum Circuit Values:
Grid-No.1-Circuit Resistance 1.5 max. megohms Impedance of Any Deflecting-Electrode Circuit at Heater-Supply Frequency 1.0 max. megohm Resistance in Any Deflecting- Electrode Circuit 5.0 max. megohms
It is recommended that all deflecting-electrode-circuit resistances be approximately equal.

JULY 1. 1945



SOR HIGH-VACUUM CATHODE-RAY TUBE



C1: 0.1 µf Č2: 1.0 μf

C3 C4 C5 C6: 0.05-uf Blocking Capacitors*

R1 R2: 2 Mego R3: 6 Megohms 2 Meachms

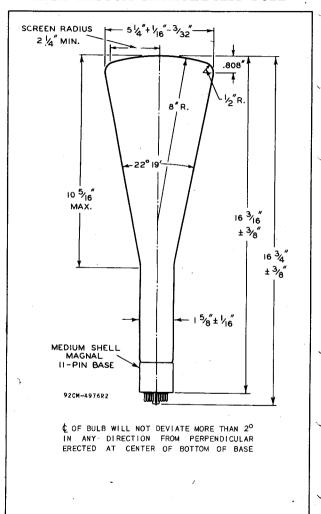
Ru: 2-Megohm Potentiometer R5: 1.0 Megohm R6: 0.5-Megohm Potentiometer R7 R8: Dual 5-Megohm Potentiometer R9 R10: Dual 5-Megohm Potentiometer R11 R12 R13 R14: 2 Megohms

When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 of returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.



HIGH-VACUUM CATHODE-RAY TUBE



JULY 1, 1945



AVERAGE CHARACTERISTICS

ШППП			
	3 VOLTS		
ANODE	NºI VOLTS ADJUSTED	TO GIVE FOCUS	
	CURVE ELECTRODE	ANODE Nº2 & GRID Nº2 VOLTS	
	A ANODE Nº	2000	
	B ANODE Nº I	1500	
	ANODE NO O	<u> </u>	
	C & GRID Nº 2	2000	
	D ANODE Nº 2	1500	
		'	
	 	· · · · · · · · · · · · · · · · · · ·	
# -40	-20 0	S TO THE STATE OF	
		_~	
		28	
		8₹ ####################################	1000
		ANODE	114
		⋖ ⋚ 	+#
			## 800 °C
			MICROAM PERES
			Δ Σ
		 	
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		++++++++ <i>X</i> +++	/
		++++++++ <i>}</i> ++++,	# : 8
		<i>-</i>	##400°
			2 8
		<u> </u>	01 2

-20 GRID N≗I VOLTS



POST-DEFLECTION ACCELERATOR

FLECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

	I_ DATA	
	General:	
	Heater, for Unipotential Cathode:	
1	Voltage 6.3 ac or dc	volts
1	Current 0.6	. amp
	Direct Interelectrode Capacitances (Approx.):	
	Grid No.1 to All Other Flectrodes 8 -	. µµf
ı	Cathode to All Other Electrodes 9	. μμf
	\mathbb{D}_1 to \mathbb{D}_2	. µµf
1	$\mathbb{N}_3^{\frac{1}{3}}$ to $\mathbb{N}_4^{\frac{1}{4}}$. uuf
ı	N ₁ to All Other Electrodes 9	. µµf
ı	I DJa to All Other Flectrodes 9	. μμf
ı	DJ ₃ to All Other Electrodes 7	. μμf
ı	DJ4 to All Other Electrodes 8	. µµf
ł	Phosphor (For Curves, see front of this Section)	. P1
1	Fluorescence and Phosphorescence	
ı	Persistence of Phosphorescence	Modium
ı	Procusing Method	_ 4 _ 4 .
١	Deflection Method Electro	etatic
ı	Overall Length	+ 3/8"
Į	Greatest Diameter of Bulb	_ 3/32"
1	Minimum Useful Screen Diameter	7/ 72 1-1/2"
ı	Mounting Position.	4-1/2
I	Mounting Position	11-22)
I	Base Medium-Shell Diheptal 12-Pin (JETEC No.B	12-371
I	Basing Designation for BOTTOM VIEW	14J ₁
ı	Pin 1 - Heater Pin 9 - Anode I	No 2
1	Pin 2 - Cathode Grid No	
ı	Pin 3 - Grid No.1 Pin 10 - Deflect	
l	Pin 4 - Internal Con. Electr.	
l	Do not use (Pin 11 ~ Deflect	lina
Į	Pin 5 - Anode No.1 Electr.	D1.
Ì	Pin 7 - Deflecting Pin 12 - No Con-	1
ŀ		tion
l	Pin 8 - Deflecting Pin 14 - Heater	. 1011
ı	Electrode DU ₄ Cap - Anode N	ln.3
ı	Sup Anode i	,
Ĺ	DI and DI Al	

DJ_1 and DJ_2 are nearer the screen DJ_3 and DJ_4 are nearer the base

With DJ_1 positive with respect to DJ_2 , the spot is deflected toward pin 5. With DJ_3 positive with respect to DJ_A , the spot is deflected toward pin 2.

The plane through the tube axis and each of the following items may vary from the trace produced by DJ1 and DJ2 by the following angular tolerances measured about the tube axis: Pin 5, 100; Cap (on same side of tube as pin 5), 10°.

The angle between the trace produced by D_1 and D_2 and the trace produced by DJ3 and DJ4 is 90° ± 3°.



5CPI-A OSCILLOGRAPH TUBE

Maximum Ratings, Design-Center V	alues:		-
ANODE-No.3 VOLTAGE		4000 max.	volts
ANODE-No.2* VOLTAGE			volts
ANUDE-NO. 2 VULTAGE		2000	, , , ,
RATIO OF ANODE-No.3 VOLTAGE TO		0 1	
ANODE-No.2 VOLTA	GŁ 2.	3:1	٠, ١
ANODE-No.1 VOLTAGE		1000 max.	volts
GRID-No. 1 VOLTAGE:			
Negative bias value		200 max.	volts
Negative bias value			volts
Positive bias value			volts
Positive peak value		Z max.	VUI (3
PEAK VOLTAGE BETWEEN ANODE No. 2	AND		٠,. ا
ANY DEFLECTING	ELECTRODE	5 0 0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect t	o cathode.	125 max.	volts
Heater positive with respect t	o cathode	125 max.	volts
Heater positive with respect t	o camoue.	120 maxi	,,,,,,
Equipment Design Ranges:			l
Equipment besign ranges.	hetween anna	* and 4000 U	olts
For any anoae-No. 3 vollage (103)		A and 2000 1	alte
For any anode-No.3 voltage (Eb_3) (and any anode-No.2 voltage (Eb_2)	vetween 1500	- unu 2000 0	****
Anode-No.1 Voltage 18.7 Grid-No.1 Voltage 1.5%	' to 34.5% of	Eb2	volts
Crid-No. 1 Voltage	to 4.5% of	Eb2	volts
Grid-No.1 Voitages 1.5x	,	-02	
Anode-No.1 Current of any	15 +0 +10		μ amp
operating	-15 to +10		HCBINP
Deflection Factors:			
When Eb ₃ =	o x Eha		
, 203		1.45	e c
D1 & D2	39 to 53 v	dc/in./kv d	T E02
N1 & N2	33 to 45 v	dc/in./kv c	T Eb2 [
			1
When Eb3=	E02		c =:
\square_1 å \square_2	31 to 42 v	dc/in./kv c	it Eb2
DIO & DIA	31 to 42 v 27 to 37 v	dc/in./kv d	f Eb2
DJ3 & DJ4	##		_
Examples of Use of Design Ranges	s :		
N. Control of the con			
For anode-No.3			
voltage of 2000	3000	4000	DOLLZ
and anode-No.2			
voltage of 2000	1500	2000	volts
275 4 200		375 to 690	volte
Anode-No.1 Volt. 375 to 690 Grid-No.1 Volt30 to -90 -2	200 10 313		
Grid-No.1 Volt.	22.5 to -6/.5	-30 to -90	VOITS
Deflection Factors:			
	59 to 80	78 to 106	U
DJ3 & DJ4 54 to 74	50 to 68	66 to 90	0
	20 .2 00		
Maximum Circuit Values:			
PIGATINUM VIICUIT TOTAL		1 5 may m	anohme
Grid-No.1-Circuit Resistance .		1.5 max. m	gonns
Designation of Any			
Deflecting-Electrode Circuit	•	5.0 max. m	egohms
befreeding creedings offer			
l		→ Indicates a	change-
*, •, **, •, ##, •, D: See next pa	ge.	- Indicates a	yu-

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5CPI-A OSCILLOGRAPH TUBE

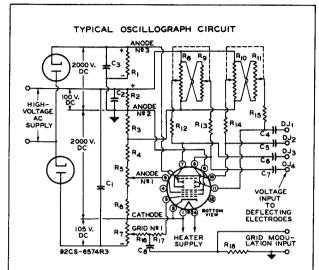


- Anode No. 2 and grid No. 2, which are connected together within tube, are referred to herein as anode No. 2.
- At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode-No. 2 input power to 6 watts.
- It is recommended that anode-No.3 voltage be not less than 3000 volts for high-speed scanning.
- Recommended minimum value of anode-No.2 voltage.
- For visual cutoff of undeflected focused spot.
- a Volts dc/in-
- ## With heater voltage of 6.3 volts, anode-No.3 voltage of #000 volts, anode-No.2 voltage of 2000 volts, anode-No.1 voltage adjusted to focus, grid-No.1 voltage adjusted to give spot that is just visible, each deflecting electrode connected through I-megohm resistor to anode No.2, and tube shielded from all extraneous fields, the center of the undeflected, focused spot will fall within a circle having a 12.5-mm radius concentric with the center of the tube face.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

3CP1-1

5CPI-A

OSCILLOGRAPH TUBE



2500 Volts 200 Volts 2500 Volts C2: C3:

C1: 0.1 \(\mu^\frac{1}{7}\), 2 C2: 1.0 \(\mu^\frac{1}{7}\), 2 C3: 0.1 \(\mu^\frac{1}{7}\), 2 C4 C5 C6 C7; 5 C6 C7: 0.05-μτ, Blocking Capacitors[★]

Blocking Capacitors 0.0001 \(\mu f\), 2500 Volts 50 Megohms (Five 10-Meg-ohm, 1-Watt Resistors in Series) C8: R1:

R2 R3: 2 Megohms, 0.5 Wa R4: 5.5 Megohms, 2 Watts 0.5 Watt

R5: 2-Megohm Potentiometer R6: 1.5 Megohms, 0.5 Watt R7: 0.5-Megohm Potentiometer R8 R9: Dual 5-Megohm Potentiometer R10 R11: Dual 5-Megohm Potentiometer R8 R9: Dual 5—Megonm voluntarions. R10 R11: Dual 5—Megonm Potentiometer R12 R13 R14 R15: 2 Megohms, 0.5 Watt R16: 0.5 Megohm, 0.5 Watt R17: Not less than 2000 ohms per volt of positive signal R18: 5 Megohms, 0.5 Watt

when cathode is grounded, capacitors should have high voltage rating (2500 volts); when anode No.2 is grounded, they may have low voltage rating (200 volts). For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

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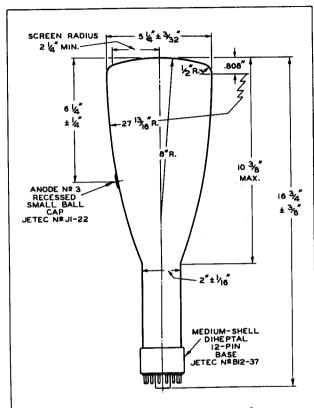
TUBE DEPARTMENT

CE-6574R3



5CPI-A OSCILLOGRAPH TUBE

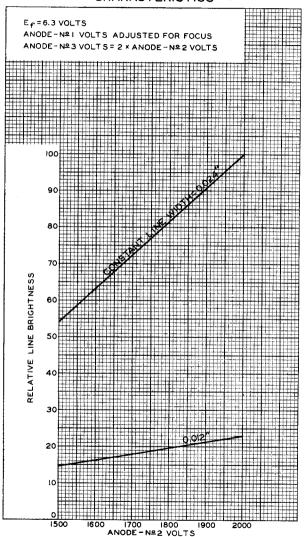




CE-6408R4



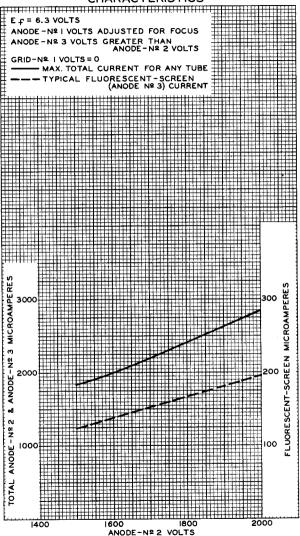






2CD/14

CHARACTERISTICS





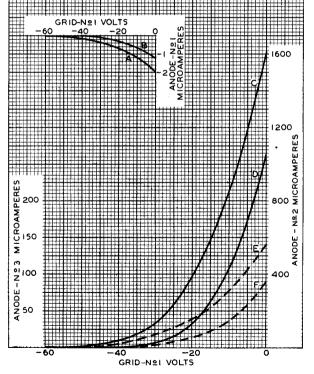


AVERAGE CHARACTERISTICS

E_= 6.3 VOLTS

ANODE-Nº I VOLTS ADJUSTED TO GIVE FOCUS

t					ш
	CURVE	ELECTRODE CURRENT	ANODE-Nº2 VOLTS	ANODE-Nº3 VOLTS	
	A	ANODE Nº I	2000	2000-4000	Ш
ļ	В	ANODE Nº 1	1500	1500-3000	ш
-	С	ANODE Nº 2	2000	4000	
	D	ANODE Nº 2	1500	3000	
f	E	ANODE Nº 3	2000	4000	
1	F	ANODE Nº 3	1500	3000	#



DEC. 26,1946



OSCILLOGRAPH TUBE
POST-DEFLECTION ACCELERATOR

ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

The 5CP7-A is the same as the 5CP1-A, except that it has a screen of the greenish-yellow, long-persistence type, designated P7.

The SPECTRAL-ENERGY EMISSION CHARACTERISTIC, as well as PERSISTENCE CURVES of BUILDUP and DECAY for the P7 PHOSPHOR are shown at the beginning of this Section.



5CPII-A OSCILLOGRAPH TUBE

POST-DEFLECTION ACCELERATOR ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

The 5CP11-A is the same as the 5CP1-A, except that it has a screen of the short-persistence, blue-fluorescence type designated P11. Its highly actinic fluorescent spot of unusually high brightness makes the 5CP11-A particularly useful for photographic recording. Because its improved phosphor has exceptional brightness for a blue screen, the 5CP11-A is also quite useful for visual observation of phenomena.

The SPECTRAL-ENERGY EMISSION CHARACTERISTIC, as well as the PERSISTENCE CHARACTERISTIC for the P11 PHOSPHOR are shown at the beginning of this Section.



POST-DEFLECTION ACCELERATOR

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

The 5CP12 is the same as the 5CP1-A except that it utilizes a medium-long-persistence screen which exhibits orange fluorescence and phosphorescence.

Because of its medium-long persistence, the 5CP12 is particularly useful where low—and medium-speed recurring phenomena are to be observed. However, it may also be used for observing low-and medium-speed, non-recurring phenomena but its efficiency is low. The persistence is such that the 5CP12 can be operated with scanning frequencies as low as 10 cycles per second without excessive flicker.

It will be noted that the phosphorescence decays exponentially with a time constant of about 120 milliseconds with the result that the low-level phosphorescence is of relatively short duration. Because of this characteristic, the 5CP12 provides high contrast between new and old information with change in target position. Therefore, the 5CP12 is suitable for short-range radar equipment involving medium-speed recurrent phenomena.

The P12 screen is more susceptible to burning than other phosphors. Therefore, the 5CP12 should be operated with the rated maximum anode—No.3 voltage and with the lowest anode—No.3 current which will give the desired brightness.

THE SPECTRAL—ENERGY EMISSION CHARACTERISTIC and the PERSISTENCE CHARACTERISTIC of the P12 Phosphor are shown at the front of this Section.



VIEW-FINDER KINESCOPE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

	DEFECTION
DATA	,
General:	
Heater, for Unipotential Cathode: Voltage 6.3 Current 0.6 Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes. Cathode to All Other Electrodes Phosphor(For Curves, see front of this Section). P Fluorescence and Phosphorescence Persistence of Phosphorescence Possistence of Phosphorescence Pocusing Method	Any
Maximum Ratings, Design-Center Values:	
	000 max. volts 110 max. volts
Negative bias value	125 max. volts 0 max. volts 2 max. volts 150 max. volts 150 max. volts
<u> </u>	LOC MAX. VOICS
Grid-No.2 Voltage	000 volts 250 volts
* The product of anode voltage and average anode current to 6 watts. ** Brilliance and definition decrease with decreasing general, the anode voltage should not be less than ##	
	dicates a change.



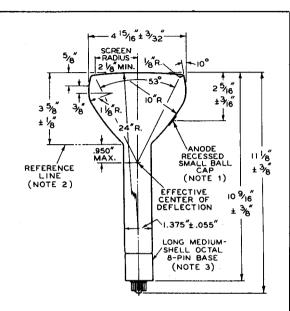


VIEW-FINDER KINESCOPE

• For specimen focusing coil similar to JETEC Focusing Coil No. 106 positioned with air gap toward kinescope screen, and center line of air gap 3-1/4* from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 10 foot-lamberts on a 3-7/8* x 2-7/8* picture area sharply focused at center of screen.

→ Indicates a change.

VIEW-FINDER KINESCOPE



NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN No.5
MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND
ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED
ABOUT THE TUBE AXIS) OF ± 10°. ANODE TERMINAL IS
ON SAME SIDE OF TUBE AS PIN No.5.

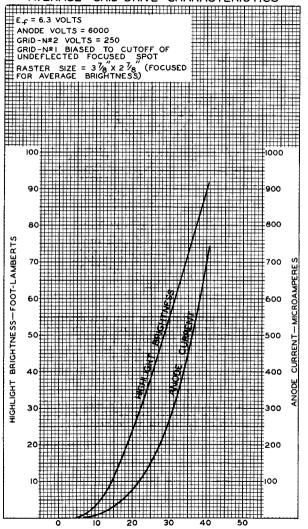
NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE I.430" + .003" -.000" I.D. AND 2" LONG WILL REST ON BULB COME.

NOTE 3: COF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

92CM-6362R4



AVERAGE GRID-DRIVE CHARACTERISTICS



VIDEO SIGNAL VOLTS FROM CUTOFF



MAGNETIC FOCUS

MAGNETIC DEFLECTION

MAGNETTE DEFECTION			
DATA			
General:			
1			
Connection ()*(8) Cap - Anode			
Maximum Ratings, Design-Center Values:			
ANODE VOLTAGE 8000 max. volts GRID-No.2 VOLTAGE 700 max. volts GRID-No.1 VOLTAGE:			
Negative bias value			
PEAK GRID-No.1 DRIVE FROM CUTOFF 65 max. volts PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode. 125 max. volts Heater positive with respect to cathode. 125 max. volts			
Typical Operation:			
Anode Voltage** 4000 7000 volts Grid-No.2 Voltage 250 250 volts			
At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts. *** Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4000 volts.			

← Indicates a change.



5FP7-A OSCILLOGRAPH TUBE

-	Grid-No.1 Voltage ⁰			volts μ_{amp}
->	Focusing-Coil Current (DC, approx.)#	96 ± 15% **	128 ± 15%	ma

Maximum Circuit Values:

5F87-A

Grid-No.1-Circuit Resistance 1.5 max. megohms

- O For visual extinction of undeflected focused spot.
- # For specimen focusing coil similar to JETEC Focusing Coil No.106 positioned with air gap toward face plate, and center line of airgap 2-3/4 inches from Reference Line (see Outline Drawing), and total anode current of 200 microamperes.
- ## The center of the undeflected, unfocused spot will fall within a circle having 9-mm radius concentric with center of tube face.

OPERATING NOTES

The 5FP7-A utilizes a long-persistence, cascade (two-layer) screen which exhibits bluish fluorescence of short persistence and greenish-yellow phosphorescence.

Because of its long persistence, the 5FP7-A is particularly useful where either low-speed non-recurring phenomena or high-speed recurring phenomena are to be observed. Furthermore, two or more phenomena can be observed simultaneously on the screen by means of a suitable switching arrangement.

The persistence is such that the 5FP7-A without filter can be operated with scanning frequencies as low as 30 cycles per second without excessive flicker. When used with yellow filter, such as Wratten No.15 (G), the 5FP7-A can be operated with much lower scanning frequencies.

In general, operation of the 5FP7-A at an anode voltage below 4000 volts will not give persistence of useable brightness.

OUTLINE DIMENSIONS for Type 5FP7-A are the same as those for Type 5FP4-A

AVERAGE CHARACTERISTIC CURVE for Type 5FP7-A is the same as that shown for Type 7BP7-A

→Indicates a change.



MAGNETIC FOCUS

MAGNETIC DEFLECTION

The 5FP14 is the same as the 5FP7-A except that it utilizes a medium-long-persistence, cascade (two-layer) screen which exhibits purple fluorescence of short persistence and orange phosphorescence which persists for a little over a minute under conditions of adequate excitation and low ambient light.

Because of its medium—long persistence, the 5FP14 is particularly useful where either low—and medium—speed non-recurring phenomena or high—speed recurring phenomena are to be observed. Furthermore, two or more phenomena can be observed simultaneously on the screen by means of a suitable switching arrangement.

The persistence is such that the 5FP14 without filter can be operated with scanning frequencies as low as 30 cycles per second without excessive flicker. When used with yellow filter, such as Wratten No.15 (G), the 5FP14 can be operated with much lower scanning frequencies.

In general, operation of the 5FP14 at an anode voltage below 4000 volts will not give persistence of useable brightness.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC and the PERSISTENCE CHARACTERISTIC of the P14 Phosphor are shown at the front of this Section.



HIGH-VACUUM CATHODE-RAY TUBE Supersedes Type 5BP1

The 5HP1-A is like the 5BP1-A except that the 5HP1-A is equipped with a Micanol base and, therefore, is less easily damaged by repeated base-pin flashovers which may occur when the tube is used at low atmospheric pressure.

JULY 1, 1945



PROJECTION KINESCOPE

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

DATA	ļ
General:	i
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc Current 0.6	. amp . µµf
Persistence of Phosphorescence Focusing Method. Deflection Method. Deflection Angle (Approx.) Overall Length	White Medium static gnetic 500 ± 3/8" ± 1/8" 4-1/2" 4-1/4" Any Cavity 7-Pin 12C
Pin 2-Grid No.1 Pin 6-Anode No.1 Pin 7-Internal ConP2 Do Not Use Maximum Ratings, Design-Center Values:	e
ANODE-No.2 VOLTAGE 27000 max.	volts
IANODE-No.1 VOLTAGE 6000 max	volts
GRID-No.2 VOLTAGE	volts
	,,,, <u>,</u>
Positive bias value 0 max.	volts
Destation of 1	volts-
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode: During equipment warm-up period not	
	volts
I Hankam aantati tal	volts
Typical Operation:	.5, 63
Anode-No.2 Voltage*	volts
when anode-No.2 current is 200 μa 4320 to 5400	
* See next page. ← Indicates a c	hange.



5TP4 PROJECTION KINESCOPE

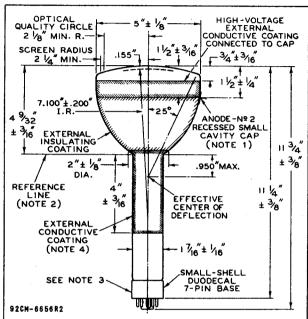
,	PROJECTION KINESCOPE
	Grid-No.2 Voltage**
	Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max.megohms
->	Minimum Circuit Values:
	When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:
	Grid-No.1-Circuit Resistance
	The resistors used should be capable of withstanding the voltages involved.
	Components:
	Deflection Yoke
	Horizontal Output Transformer (for use with two 6BG6-G's) RCA Type No.211T2 Vertical Output Transformer RCA Type No.204T2
	* Brilliance and definition decrease with decreasing anode voltages. In general, anode No.2 voltage should not be less than 20000 volts. ** Subject to variation of ±40\$ if it its desired to operate any tube at a grid-No.1 cutoff blas of -70 volts. O visual extinction of undeflected focused spot.

MAR. 15, 1948

→indicates a change.



5TP4 PROJECTION KINESCOPE

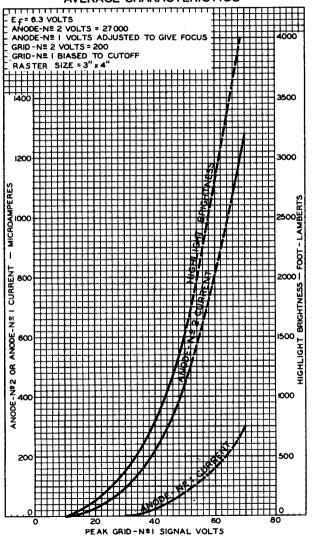


- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN PO-SITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE-No.2 TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE-No.2 TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" - .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY.
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.





AVERAGE CHARACTERISTICS



FEB. 7,1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6670

SUR

OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

ELEGINOSIM TO 70000
General:
Heater, for Unipotential Cathode:
Voltage 6.3 ± 10% ac or dc volts
Current 0.6
Direct Interelectrode Capacitances (Approx.):
Grid No.1 to All Other Electrodes 8.0 μμ1
DJ1 to DJ2 2.5
DJ3 to DJ4 2.5 μμ1
DJ ₁ to All Other Electrodes 11.0 μμ
DJ2 to All Other Electrodes 8.0 μμ
DJ3 to All Other Electrodes 7.0
DJ4 to All Other Electrodes 8.0
Phosphor (For Curves, see front of this Section) No.1
Prosphor (For Curves, see front of this Section) No. 1
Fluorescence
Persistence Medium
Focusing Method Electrostation
Deflection Method Electrostatic
Overall Length
Greatest Diameter of Bulb 5-1/4" ± 3/32"
Minimum Useful Screen Diameter
Mounting Position Any
Mounting Position
Basing Designation for BOTTOM VIEW
Pin 1 - Heater Pin 8 - Anode No. 2,
Pin 2 - Grid No. 2
Pin 3 - Cathode 9 Pin 9 - Deflecting
Pin 4 - Anode No.1 🐼 💢 🥎 Electrode DJ2
Pin 5 - Internal Con. A Pin 10- Deflecting
Do Not Use Dia Electrode DJ1
Pin 6 - Deflecting © Pin 11- Internal Con.
Electrode DJ3 KEY Do Not Use
Pin 7 - Deflecting Pin 12- Heater
Electrode DJ ₄
Lieutioue DOA
l

DJ_1 and DJ_2 are nearer the screen DJ_2 and DJ_d are nearer the base

With DJ $_1$ positive with respect to DJ $_2$, the spot is deflected toward pin 4. With DJ $_3$ positive with respect to DJ $_4$, the spot is deflected toward pin I.

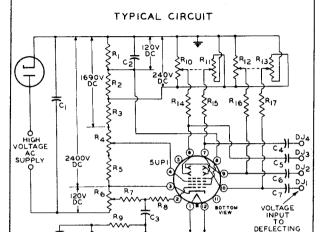
The angle between the trace produced by DJ $_{\rm I}$ and DJ $_{\rm 2}$ and its intersection with the plane through the tube axis and pin I does not exceed 10°.

The angle between the trace produced by DJ $_3$ and DJ $_4$ and the trace produced by DJ $_1$ and DJ $_2$ is 90° \pm 3°.



ANODE—No. 2 VOLTAGE			
ANODE—No.1 VOLTAGE	Maximum Ratings, Design-Center Values:		
Negative bias value	ANODE—No.1 VOLTAGE		
Peak positive value		max. vo	lts
PEAK VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE 500 max. volts PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode. 125 max. volts Heater positive with respect to cathode. 125 max. volts Equipment Design Ranges: For any anode-No.2 voltage (Eb ₂) between 1000* and 2500 volts Anode-No.1 Voltage 17% to 32% of Eb ₂ volts Max. Grid-No.1 Voltage for Visual Cutoff 4.5% of Eb ₂ volts Anode-No.1 Current for Any Operating Condition -15 to +10 microamp Deflection Factors: DJ1 & DJ2 28 to 38.5 v dc/in./kv of Eb ₂ DJ3 & DJ4 23 to 31 v dc/in./kv of Eb ₂ Examples of Use of Design Ranges: For anode-No.2 voltages of 1000 2000 volts Anode-No.1 Voltage 170-320 340-640 . volts Max. Grid-No.1 Voltage for Visual Cutoff -45 -90 . volts DJ1 & DJ2 28-38.5 56-77 volts dc/in. DJ3 & DJ4	TOSTETUC BIAS TATACE		
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode. Heater positive with respect to cathode. Heater positive with respect to cathode. Equipment Design Ranges: For any anode-No.2 voltage (Eb ₂) between 1000* and 2500 volts Max. Grid-No.1 Voltage 17% to 32% of Eb ₂ volts Max. Grid-No.1 Voltage for Visual Cutoff	PEAK VOLTAGE BETWEEN ANODE No. 2		
Equipment Design Ranges: For any anode-No.2 voltage (Eb ₂) between 1000* and 2500 volts Max. Grid-No.1 Voltage 17% to 32% of E _{b2} volts Max. Grid-No.1 Voltage	PEAK HEATER—CATHODE VOLTAGE: Heater negative with respect to cathode. 125		
For any anode-No.2 voltage (Eb ₂) between 1000* and 2500 volts Anode-No.1 Voltage 17% to 32% of Eb ₂ volts Max. Grid-No.1 Voltage for Visual Cutoff	Heater positive with respect to cathode. 125	max. vo	its
Anode-No.1 Voltage	, , -		
Max. Grid-No.1 Voltage for Visual Cutoff Anode-No.1 Current for Any Operating Condition Deflection Factors: D1 & D2 28 to 38.5 v dc/in./kv of Eb2 D3 & DJ4 23 to 31 v dc/in./kv of Eb2 Examples of Use of Design Ranges: For anode-No.2 voltages of 1000 2000 volts Max. Grid-No.1 Voltage 170-320 340-640 volts Max. Grid-No.1 Voltage for Visual Cutoff -45 -90 volts D1 & D2 28-38.5 56-77 volts dc/in. D23 & DJ4			
for Visual Cutoff Anode-No.1 Current for Any Operating Condition —15 to +10 microamp Deflection Factors: D1 & D2 28 to 38.5 v dc/in./kv of Eb D2 & D3 & DJ4 23 to 31 v dc/in./kv of Eb Examples of Use of Design Ranges: For anode-No.2 voltages of 1000 2000 volts Max. Grid-No.1 Voltage 170-320 340-640 volts Max. Grid-No.1 Voltage for Visual Cutoff —45 —90 volts D1 & D2 28-38.5 56-77 volts dc/in. D1 & D2 28-38.5 56-77 volts dc/in. D1 & D2 28-38.5 56-77 volts dc/in. Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max. megohms Resistance in Any Deflecting Electrode Circuit 5.0 max. megohms * Recommended minimum value. It is recommended that the deflecting-electrode-circuit resistances be anotoximately equal.			
Any Operating Condition —15 to +10 microamp Deflection Factors: DJ1 & DJ2	for Visual Cutoff 4.5% of E _{b2} .	vo	lts
DJ1 & DJ2	Any Operating Condition -15 to +10 .	. micro	amp
For anode-No.2 voltages of 1000 2000 volts Anode-No.1 Voltage . 170 - 320 340 - 640 . volts Max. Grid-No.1 Voltage for Visual Cutoff -45 -90 . volts Deflection Factors: DJ1 & DJ2 28 - 38.5 56 - 77 volts dc/in. DJ3 & DJ4 23 - 31 46 - 62 volts dc/in. Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max. megohms Resistance in Any Deflecting Electrode Circuit 5.0 max. megohms * Recommended minimum value. It is recommended that the deflecting-electrode-circuit resistances be anoreximately equal.	$DJ_1 \& DJ_2 \dots 28 \text{ to } 38.5 \text{ v dc/} i$	n./kv of n./kv of	Еb;
Anode-No.1 Voltage	Examples of Use of Design Ranges:		
Max. Grid-No.1 Voltage for Visual Cutoff -45 -90 . volts Deflection Factors: DJ1 & DJ2 28 - 38.5 56 - 77 volts dc/in. DJ3 & DJ4	• • • • • • • • • • • • • • • • • • • •		
for Visual Cutoff -45 -90 . volts Deflection Factors: DJ1 & DJ2 28 - 38.5 56 - 77 volts dc/in. DJ3 & DJ4 23 - 31 46 - 62 volts dc/in. Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max. megohms Resistance in Any Deflecting Electrode Circuit 5.0 max. meyohms * Recommended minimum value. It is recommended that the deflecting-electrode-circuit resistances the angrey squal.			
DJ1 & DJ2	for Visual Cutoff -45 -90 Deflection Factors:		
Grid-No.1-Circuit Resistance 1.5 max. megohms Resistance in Any Deflecting	$DJ_1 \& DJ_2 \dots 28 - 38.5 56 - 77 \text{ v}$		
* Recommended minimum value. It is recommended that the deflecting-electrode-circuit resistances be annotoximately equal.	Maximum Circuit Values:		
* Recommended minimum value. It is recommended that the deflecting-electrode-circuit resistances be anoroximately equal.	di tu-to. 1-cii cui c nesi stanto :	ax. mego	hms
It is recommended that the deflecting-electrode-circuit resistances be approximately equal.	Electrode Circuit 5.0 ma	ax. mego	hms
Anode No.2 and grid No.2, which are connected together within tube, are referred to herein as anode No.2.	It is recommended that the deflecting-electrode-circuit	resistar	nces
·	 Anode No.2 and grid No.2, which are connected together are referred to herein as anode No.2. 	within to	ube,





GRID MODULATION

INPUT

R1 R2: 2.5 Megohms, 0.5 Watt R3: 6 Megohms, 3 Watts R4: 2-Megohm Potentiometer R5: 1 Megohm, 0.5 Watt R6: 0.5-Megohm Potentiometer R7: 0.5-Megohm Potentiometer R7: 0.5-Megohm 20.5 Watt R8: MOI loss than 2000 Ohms per Volt

92CM-6819 R10 - R11, R12 - R13: Dual Poten-tiometers, R10, R11, R12, R13: 0.5 Megohm

HEATER

R14 R15 R16 R17; 2.2 Megohms, 0.5 Watt

ELECTRODES

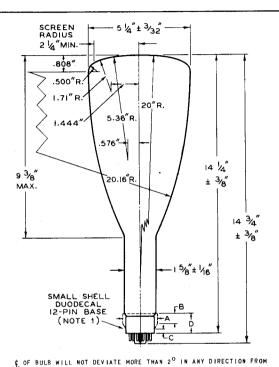
C1: 0.1 µf, 2500 Volts C2: 1 µf, 200 Volts C3: 0.0001 µf, 2500 Volts C4 C5 C6 C7: 0.1 µf, 600 Volts

The license extended to the purchaser of tubes appears in the License Notice accompanying them, information contain-ed herein is furnished without assuming any obligations.

5(0)

3181 · RQ

5UPI OSCILLOGRAPH TUBE



COF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.

NOTE I: THIS BASE MAY BE SUPERSEDED BY AN ALTERNATE BASE WHICH WILL FIT THE SAME SOCKET BUT WHICH WILL HAVE A FLARED SHELL INDICATED BY THE DASHED LINES AND DIMENSIONED APPROXIMATELY AS FOLLOWS:

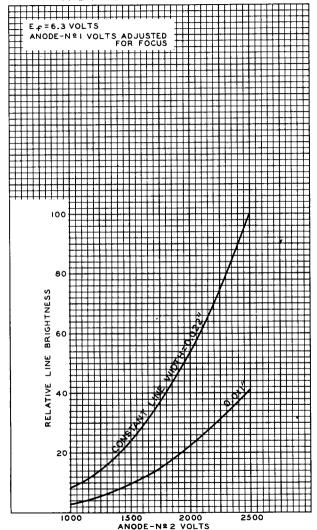
A = 1.85 MAX., B = 0.500 , C = 0.200 MIN., D = 0.925 .

92CM-6763

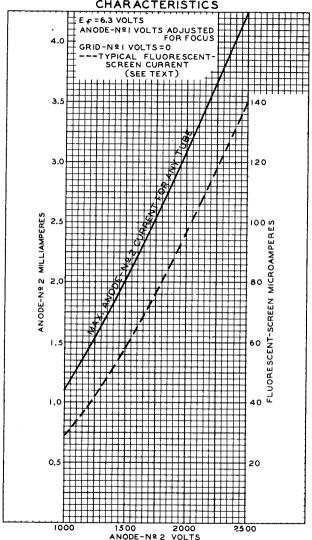


SUR

AVERAGE CHARACTERISTICS



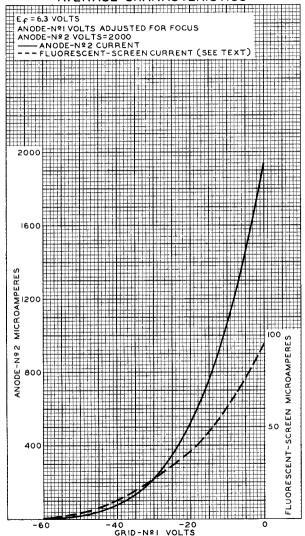






150k

AVERAGE CHARACTERISTICS





ELECTROSTATIC FOCUS

FLECTROSTATIC DEFLECTION

The 5UPT is the same as the 5UP1, except that it has a screen of the greenish-yellow, long-persistence type, designated P7. Persistence of useable brightness can be obtained with an anode-No.2 voltage of as low as 1500 volts.

The SPECTRAL-ENERGY EMISSION CHARACTERISTIC, as well as PERSISTENCE CURVES of BUILDUP and DECAY for the P7 PHOSPHOR are shown at the beginning of this section



ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

The 5UP11 is the same as the 5UP1, except that it has a screen of the short-persistence, blue-fluorescence type designated P11. Its highly actinic fluorescent spot of unusually high brightness makes the 5UP11 particularly useful for photographic recording. Because its improved phosphor has exceptional brightness for a blue screen, the 5UP11 is also quite useful for visual observation of phenomena. Radiation of useable intensity can be obtained with anode-No.2 voltages as low as 1500 volts.

The SPECTRAL-ENERGY EMISSION CHARACTERISTIC of the P11 PHOSPHOR is shown at the beginning of this section

TENTATIVE DATA



SHOP

TRANSCRIBER KINESCOPE

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

DATA	
General:	
Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 7.5 Cathode to All Other Electrodes 5 External Conductive Coating to Anode No.2 . \$500 max.	lts amp μμf μμf μμf μμf
Phosphor (For Curves, see front of this Section). Fluorescence BPersistence. Sh Focusing Method Electrosta Deflection Method Magne Deflection Angle (Approx.) Overall Length 11-7/16" ± 3 Greatest Diameter of Bulb 5" ± 1 Minimum Useful Screen Diameter 4-1 Raster Size (Approx.) 2-1/2" x 3-3 Mounting Position. Cap Recessed Small Cav Base Small-Shell Duodecal 7-	P11 lue to tic 500 /8" /4" /8" /Any Pin 12C
Maximum Ratings, Design-Center Values:	
ANODE-No.1 VOLTAGE 6000 max. vo	lts lts lts
Negative bias value	lts lts lts
After equipment warm-up period 125 max. vo	lts lts lts
Typical Operation:	
Anode-No.2 Voltage* 27000 vo	lts
*: See next page.	





TRANSCRIBER KINESCOPE

Anode—No.1 Voltage Range for Anode—No.2 Current of 20 μamp 4200		
Grid-No.2 Voltage**	to -98	volts volts
Anode-No.2 Current	20 25	μamp μamp
Grid-No.2 Current Range15	to +15	μ amp

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

Minimum Circuit Values:

When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous shortcircuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

	Grid-No.1-Circuit Resistance	. 180 min. ohms
	Grid-No.2-Circuit Resistance	
	Anode-No.1-Circuit Resistance	
	Anode-No.2-Circuit Resistance	
- 1	The resistors used should be canable of	

The resistors used should be capable of withstanding the voltages involved.

Components:

Foruse with single high-voltage tripler
supply employing 3 183-61/8016's... RCA Type No. 21172
Ver. Deflection Output Transformer . . . RCA Type No. 20472

Brilliance and definition decrease with decreasing anode voltages. In general, anode—No.2 voltage should not be less than 15000 volts.

Subject variation of ± 40% when grid—No.1 voltage cutoff is desired at -70 volts.

OPERATING NOTES

Soft x-rays are produced when the 5MPII is operated with an anode-No.2 voltage above approximately 20000 volts. These rays can constitute a health hazard unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

Resolution of better then 700 lines at the center of the reproduced picture can be produced by the 5WPII. To utilize such resolution capability in the horizontal direction with the standard scanning rate of 525 lines, it is necessary to use a video amplifier having a band-width of at least 10 megacycles.



TRANSCRIBER KINESCOPE

The screen of the 5WPII has highly actinic blue radiation, and is particularly effective for photography. The presistence of the radiation is sufficiently short to prevent "carry over" from one frame to the next. The persistence is dependent to some extent on the current density in the focused spot, and decreases with current density.

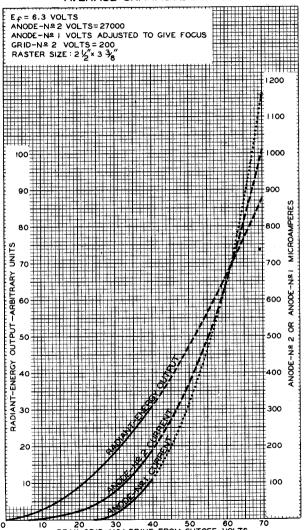
Operation of the 5WPII results in gradual browning or the face. The rate of browning increases markedly with increase in anode—No.2 voltage, is proportional to beam current, and is inversely proportional to the scanned area. The browning is most notice—able during initial operation; thereafter, a gradual increase in the amount of browning will be observed during the life of the tube.

OUTLINE DIMENSIONS for the 5WP11 are the same as those for the 5WP15





AVERAGE CHARACTERISTICS





5WPI5

FLYING-SPOT CATHODE-RAY TUBE

ELECTROSTATIC FOCUS MAGNETIC DEFLECTION
For use in Flying-Spot Video-Signal Generators

DATA
General:
Heater, for Unipotential Cathode: Voltage6.3
External conductive courting to Anode No. 2 1 100 min
Phosphor No.15 Fluorescence: Visible Radiation Blue-Green Invisible Radiation Near Ultraviolet
Phosphorescence: Persistence of Visible Radiation Very Short Persistence of Invisible Radiation Extremely Short Focusing Method
Maximum Ratings, Design-Center Values:
ANODE-No.2 VOLTAGE
Negative bias value
Heater negative with respect to cathode:
During equipment warm-up period not exceeding 15 seconds 410 max. volts After equipment warm-up period 125 max. volts
Heater positive with respect to cathode. 125 max. volts



SMPIS FLYING-SPOT CATHODE-RAY TUBE

Typical Operation:		[
Anode-No.2 Voltage*	20000	volts
Anode-No.1 Voltage Range for		- 1
Anode-No.2 Current of 150 μ amp	3000 to 3800	volts
Grid-No.2 Voltage**	200	volts
Grid-No.1 Voltage for Visual Cutoff ⁰ .	-42 to - 98	volts
Anode-No.2 Current	150	μamp
Max. Anode-No.1 Current	200	μ amp
Grid-No.2 Current Range	-15 to +15	μ amp
Maximum Circuit Values:		

Grid-No.1-Circuit Resistance . 1.5 max. megohms

Minimum Circuit Values:

When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous shortcircuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

l	Grid-No.1-Circuit Resistance	180 min.	ohms
	Grid-No.2-Circuit Resistance		ohms
	Anode-No.1-Circuit Resistance	6800 min.	ohms
	Anode-No.2-Circuit Resistance	30000 min.	ohms

The resistors used should be capable of withstanding the voltages involved.

Components:

RCA Type No. 201D11 Deflecting Yoke.

Brilliance and definition decrease with decreasing anode voltages. In general, anode—No. 2 voltage should not be less than 15000 volts.

Subject to variation of ± 40% when grid-No.1 voltage cutoff is desired at -70 volts.

visual extinction of undeflected focused spot.

OPERATING NOTES

Soft x-rays are produced when the 5WP15 is operated with an anode-No. 2 voltage above approximately 20000 volts. rays can constitute a health hazard unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

Resolution of better than 700 lines at the center of the reproduced picture can be produced by the 5WP15. To utilize such resolution capability in the horizontal direction with the standard scanning rate of 525 lines, it is necessary to use a video amplifier having a band-width of at least 10 megacycles.

The blue-green radiation decays hyperbolically to about 30 per cent of its initial value in 1.5 microseconds. The ultra-

TENTATIVE DATA



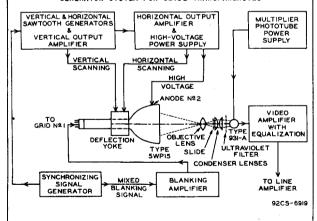
SHAIS 5WPI5 FLYING-SPOT CATHODE-RAY TUBE

violet radiation has an equivalent exponential decay with a time constant less than 0.05 microsecond. The frequency response of the ultraviolet radiation is substantially constant for a range of 3 megacycles and then decreases exponentially toward zero at approximately 100 megacycles.

The P15 screen is more sensitive to heat than other standard types of phosphors. It shows a decrease in efficiency with Use of forced air from a small increase in temperature. blower directed against the face of the tube is, therefore, suggested to counteract the heating effect of the electron beam when optimum efficiency of the screen is desired at maximum anode-No. 2 current.

Operation of the 5WP15 results in gradual browning of the face. The rate of browning increases markedly with increase in anode-No. 2 voltage, is proportional to beam current, and is inversely proportional to the scanned area. The browning is most noticeable during initial operation; thereafter, a gradual increase in the amount of browning will be observed during the life of the tube.

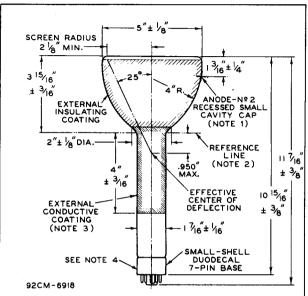
BLOCK DIAGRAM OF FLYING-SPOT VIDEO SIGNAL GENERATOR SYSTEM FOR SLIDE TRANSPARENCIES



Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.

5WP 15

SWPIS FLYING-SPOT CATHODE-RAY TUBE



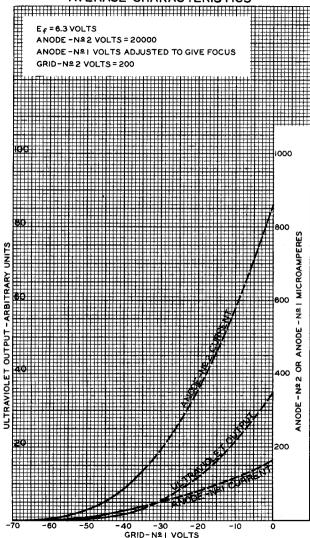
NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN PO-SITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE-No.2 TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 100. ANODE-No. 2 TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.3.

- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" - .000" AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.
- NOTE 4: C OF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DI-RECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.



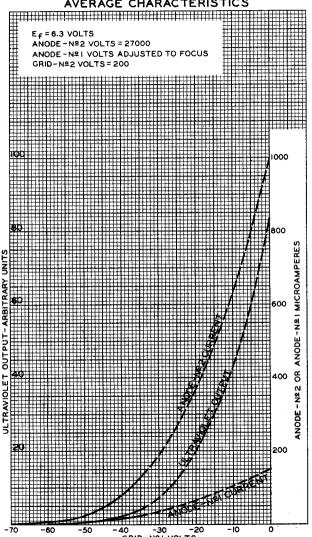
SHOS

AVERAGE CHARACTERISTICS





AVERAGE CHARACTERISTICS





5ZP16

FLYING-SPOT CATHODE-RAY TUBE

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

For use in Flying-Spot Video-Signal Generators
DATA
General:
Heater, for Unipotential Cathode: Voltage
$\mu \mu$
Phosphor (For Curves, see front of this Section) No.16 Fluorescence Violet and Near-Ultraviolet Phosphorescence Violet and Near-Ultraviolet Persistence Extremely Short Focusing Method Electrostatic Deflection Method Magnetic Deflection Angle (Approx.) 40° Overall Length 14-3/8" ± 3/8" Greatest Diameter of Bulb 5" ± 1/8" Minimum Useful Screen Diameter 4-1/4" Mounting Position Recessed Small Cavity (JETEC No.J1-21) Base Small-Shell Duodecal 7-Pin (JETEC No.B7-51)
Pin 1 - Heater Pin 11 - Cathode
Pin 2-Grid No.1 Pin 6-Grid No.3 Pin 7-Internal Con. Do Not Use Pin 10-Grid No.2 Pin 12-Heater Cap - Anode C - External Conductive Coating
SOCKET CONTACTS CORRESPONDING TO VACANT
PIN POSITIONS 3, 4, 5, 8, & 9 SHOULD BE REMOVED
Maximum Ratings, Design-Center Values:
ANODE VOLTAGE
Negative bias value 150 max. volts
Positive bias value
exceeding 15 seconds 410 max. volts
After equipment warm-up period 150 max. volts Heater positive with respect to cathode. 150 max. volts



FLYING-SPOT CATHODE-RAY TURE

Typical Operation:			
Anode Voltage*	20000	27000	volts
Grid-No.3 Voltage Range for	4700 . 40%		
Anode Current as Indicated .		6300 ± 12%	volts
Grid-No.2 Voltage**	200	200	volts
Grid-No.1 Voltage for Visual			
Extinction of Undeflected			
Focused Spot ⁰	-70	-70	volts
Anode Current	25	15	μ amp
Max. Grid-No.3 Current for			,
Anode Current as Indicated .	75	25	μ amp
Grid-No.2 Current Range	-15 to +15	-15 to +15	μ amp

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

- * Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 20000 volts.
- ** Subject to variation of ± 40% when grid-No.1 voltage cutoff is desired at the average cutoff value of -70 volts.
 - Subject to variation of \pm 40% when grid-Mo. 2 voltage is maintained at 200 volts.

OPERATING NOTES

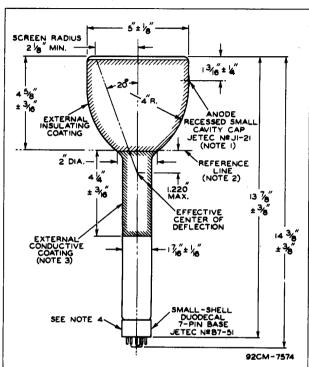
X-Ray Warning. X-ray radiation is produced at the face of the 5ZP16 when it is operated at its normal anode voltage. These rays can constitute a health hazard unless the tube is adequately shielded for x-ray radiation. Although relatively simple shielding should prove adequate, make sure that it provides the required protection against personal injury.

Resolution of better than 1000 lines at the center of the reproduced picture can be produced by the 5ZPI6 when it is operated with 27000 volts on the anode. At lower anode voltages, the resolution capability decreases. To obtain high resolution in the horizontal direction, it is necessary to use a video amplifier having a bandwidth of about 20 megacycles.

The ultraviolet output of the 5ZP16 is a linear function of the anode current. For any particular value of anode current, the ultraviolet output is approximately 50 per cent higher when the 5ZP16 is operated with 27000 volts on the anode than when operated with 20000 volts.



FLYING-SPOT CATHODE-RAY TUBE



NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN PO-SITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.3.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY INTERSECTION OF PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

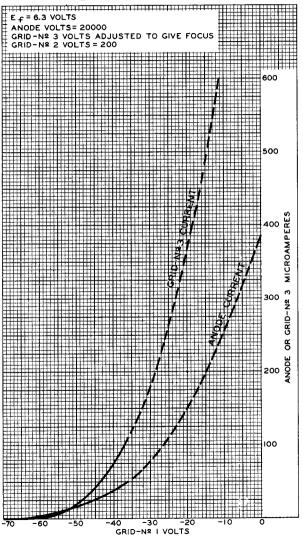
NOTE 3: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

NOTE 4: (LOF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.



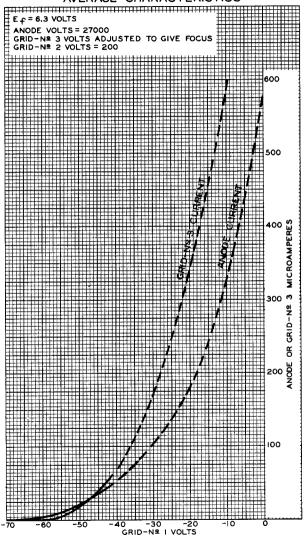


AVERAGE CHARACTERISTICS





AVERAGE CHARACTERISTICS





7BP7-A

OSCILLOGRAPH TUBE

MAGNETIC FOCUS MA

MAGNETIC DEFLECTION

<u></u>	- 1
General:	- 1
Heater, for Unipotential Cathode:	
Voltage 6.3 ac or dc	volts
Current 0.6	атр
Direct Interelectrode Capacitances (Approx.):	
Cold No. 4 to All Other Floatrades	5f
Grid No.1 to All Other Electrodes 8. Grid No.2 to All Other Electrodes	3 441
Cathode to All Other Electrodes	$5 \mu\mu$ T
Phosphor (For Curves, see front of this Section)	
Fluorescence	Blue
Phosphorescence Greenish-	(ellow
Persistence of Phosphorescence	Long
Focusing Method Mag	netic
Deflection Method Mag	inetic
Deflection Angle (Approx.)	
Overall Length	3/8"
Greatest Diameter of Bulb	1/0"
Maximum Useful Screen Diameter	
	1
Mounting Position	Any
Cap	Bail
Base Long Medium-Shell Octal	8-Pin
BOTTOM VIEW	
Pin 1 – No Pin 6 – No	. 1
Connection	tion
Pin 2 - Heater 3 E Pin 7 - Cathode	
Pin 3 - Grid No. 2 Pin 8 - Heater	
Pin 4 - No (2) 7	- 1
Connection Cap - Anode.	l l
Pin 5-Grid No.1	2
Pin 5-Grid No.1	' >
Maximum Ratings, Design-Center Values:	4
	volts
TAMORE TO ETAGE !	
	volts
GRID-No.1 VOLTAGE:	
Negative bias value 125 max.	volts
Positive bias value 0 max.	
Negative bias value	volts
PEAK GRID-No.1 DRIVE FROM CUTOFF 65 max.	volts
IPEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode. 125 max. Heater positive with respect to cathode. 125 max.	volts
Heater positive with respect to cathode. 125 max.	volts
The state of the s	
Typical Operation:	
Ippical Operation: Anode Voltage* 4000 7000 Grid-No.2 Voltage	volts
Grid-No.2 Voltage	volts
Crid No. 1 Voltage Pagge 25 to 70	volts
Grania Cail Command 75 to 100 -70 -25 to -70	401 r 2
Grid-No.2 Voltage 250 250 Grid-No.1 Voltage Range25 to -70 -25 to -70 Focusing-Coil Current 75 to 102 99 to 135 Spot Position * -	m ~ 1
	ma
Spot Position	ma
	ma
• , , , , , , see next page.	ma

1897-1

7BP7-A OSCILLOGRAPH TUBE

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

Minimum Circuit Values:

When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

Grid-No.1-Circuit Resistance 150 min. ohms Grid-No.2-Circuit Resistance 820 min. ohms Anode-Circuit Resistance 9100 min. ohms

The resistors used should be capable of withstanding the voltages involved.

Components:

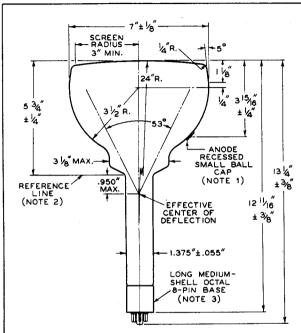
RCA Focusing Coil...... RCA Type No. 202D1

- Anode and grid No.3, which are connected together within tube, are referred to herein as anode.
- At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
- * Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4000 volts.
- O For visual extinction of undeflected focused spot.
- For JETEC Focusing Coil No. 106, or equivalent, with center line of air gap approximately 2-3/** from reference line (see Outline Drawing), and total anode current of 200 microamperes.
- # The center of the undeflected unfocused spot will fall within a circle having 12 mm radius concentric with the center of the tube face.



7BP7-A OSCILLOGRAPH TUBE

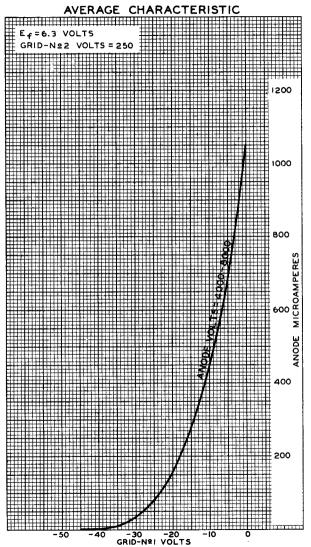




- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.5 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE OF TUBE AS PIN No.5.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE 1.430" + .003" - .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: ¢ OF BULB WILL NOT DEVIATE MORE THAN 2⁰ IN ANY DI-RECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

92CM-6367R3







OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS, MAGNETIC DEFLECTION

General:	
Heater, for Unipotential Cathode: Voltage 6.3 ± 10%	p ff1nmcco""1ynZ
Maximum Ratings, Design-Center Values:	١
ANODE—No.2 VOLTAGE	SSSS
Typical Operation:	
Anode-No.2 Voltage* 4000 7000 volt Anode-No.1 Voltage for Focus at 75% of Grid-No.1	
Voltage for Cutoff ⁰ · 780 1365 · . volt Grid-No.2 Voltage · 250 250 · . volt	
Grid-No.1 Voltage for Visual Cutoff**45 -45 volt	
*,O,**: See next page.	



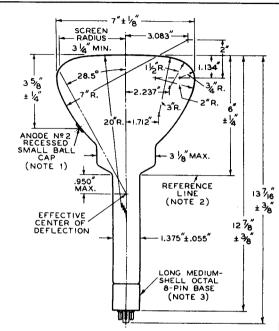
OSCILLOGRAPH TUBE

* 0 **	In Inc	ge liv :h	ner idu gri	al al	i, t	t he	es vo	nod- may	e-N re age	io. qu	2 v ire bet	olt be wee	ag tw	e s een zer	ha 1 -	uld 30% and	an Cu	t be d +; tof	1es 20%	of of	than the	400 valu	voltage 00 volts ues show	n
	jus	ita	b 1 e	t	o	į 5	0%	of	ir	id i	cat	ed	va	lue		500	٥,	•••	-		., .		ld be ad	
Max	cim	um	C	ir	cu	it	٧	a i	ue:	s :														
Gr	id	No	. 1-	-C	ir	cu	it	R	es	is	tar	nce	•				•	•	1.	5	max	•	megohms	š
1																								



7CPI

OSCILLOGRAPH TUBE



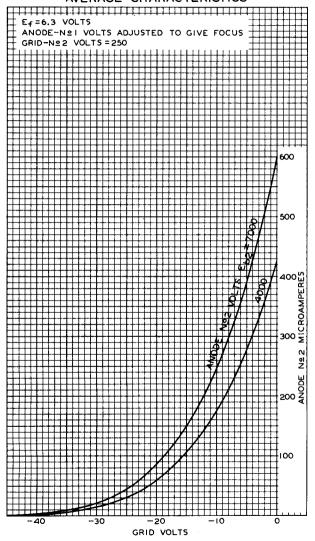
- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN No.2 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE No.2 TERMINAL BY AN ANGULAR TOLERANCE IMEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE No.2 TERMINAL IS ON SAME SIDE OF TUBE AS PIN No.2.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION
 WHERE GAUGE 1.430" + .003" .000" I.D. AND 2"
 LONG WILL REST ON BULB CONE.
- NOTE 3: ¢ OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

92CM-6364R2

162>



AVERAGE CHARACTERISTICS



AUG. 23,1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6424



KINESCOPE

DO

ELECTROSTATIC FOCUS MAGNETIC DEFLECTION

DATA	
General:	
Heater, for Unipotential Cathode: Voltage	5
External Conductive Coating to Anode No.2	1500 max. μμτ 400 minf
External Conductive Coating to Anode No. 2 Phosphor (For Curves, see front of this Sect Fluorescence and Phosphorescence Persistence of Phosphorescence Persistence of Phosphorescence Pocusing Method. Deflection Method. Deflection Angle (Approx.) Lon Trap External Coating Overall Length Greatest Diameter of Bulb. Minimum Useful Screen Diameter Raster Size (Approx.) Mounting Position. Cap. Recest Base Small-She	White Medium . Electrostatic 500 Magnetic Conductive 14–1/16" ± 3/8"
Pin 1 - Heater © Pir	n 10-Grid No.2
Pin 2-Grid No.1	n 11 - Cathode
Pin 7-Internal Con Cap	n 12- Heater - Anode No.2, Grid No.3
Maximum Ratings, Design-Center Values:	
ANODE-No.2 VOLTAGE	8000 max. volts 2400 max. volts 410 max. volts
Positive bias value	125 max. volts 0 max. volts 2 max. volts
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode: During equipment warm-up period not exceeding 15 seconds After equipment warm-up period Heater positive with respect to cathode.	410 max. volts 150 max. volts 150 max. volts
<pre> , •: See next page. ← Indicates a change.</pre>	

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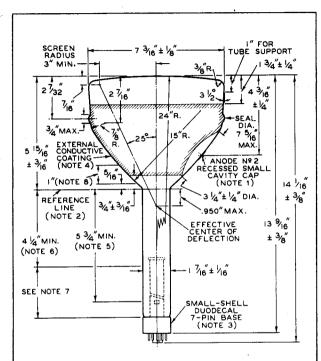


	KINESCOI E
	Typical Operation: Anode-No.2 Voltage* 6000 volts Anode-No.1 Voltage for Focus ⁰
	Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max.megohms
*	Minimum Circuit Values: The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 ma. If the supply permits the instantaneous short-circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:
	Grid-No.1-Circuit Resistance
>	Components: on-Trap Magnet [#] RCA Type No.203D1 Deflecting Yoke [★] RCA Type No.201D12
	Anode No. 2 and grid No. 3, which are connected together within tube, are referred to herein as anode No. 2. The product of anode-No. 2 voltage and average anode-No. 2 current should never exceed 6 watts. Brilliance and definition decrease with decreasing anode-No. 2 voltage. In general, anode-No. 2 voltage should not be less than 5000 volts. With the combined grid-No. 1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 12 foot-lamberts on a N° x 5-1/2° picture area. Visual extinction of undeflected focused spot. The decurrent required by this magnet is approx. 70 ma. for the typical operating conditions shown. The horizontal deflecting-coil current required by this yoke to produce 5-1/2° picture width is approx. No ma. peak-to-peak under the typical operating conditions shown. The current varies directly as the square root of the anode-No. 2 voltage.
,	

→ Indicates a change.







- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN PO-SITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE No. 2 TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 100. ANODE No.2 TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" - .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL FREELY. WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DI-AMETER OF 1-7/8".
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.
- NOTE 5: DISTANCE TO INTERNAL POLE PIECES. PLANE THROUGH

1024



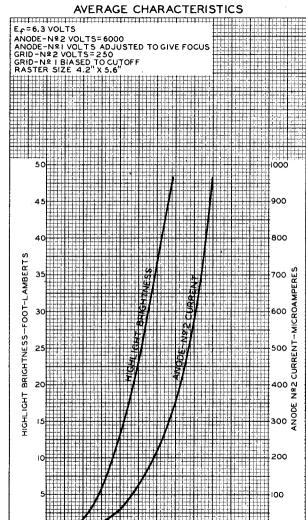
(continued from preceding page)

PIN NO.6 AND TUBE AXIS PASSES THROUGH LINE JOINING CENTERS OF POLE PIECES. DIRECTION OF PRINCIPAL FIELD OF IONTRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO PIN NO.6 AND SOUTH POLE TO PIN NO.12.

- NOTE 6: LOCATION OF DEFLECTING YOKE MUST BE WITHIN THIS SPACE.
- NOTE 7: KEEP THIS SPACE CLEAR FOR ION-TRAP MAGNET.
- NOTE 8: FOR TUBE SUPPORT WHICH MUST NOT COVER SPECIFIED CLEAR AREA AROUND ANODE CAP.

92CM-6664R1





PEAK GRID-NºI SIGNAL VOLTS



T. P.

OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

	DATA							
ŀ	General:							İ
	General: Heater, for Unipotential Cathode: Voltage 6.3 Current 0.6 Direct Interelectrode Capacitances (Approduce of Card No.1 to All Other Electrodes	She Pir): 	63299777EECOUT	lecclect lectlent nod rid efl	tro ttro e D 2" 7" al No ect		mufimuf mufimu
-		Ρi	n 11	L – D E	e fl			
	DJ3 Pin 8-Deflecting Electrode		n 12 n 14	C D	onr o 1	lec'	tio	
	DJ_4 DJ_1 and DJ_2 are nearer the		_		iea	rei		

 DJ_1 and DJ_2 are nearer the screen DJ_3 and DJ_4 are nearer the base

With DJ $_1$ positive with respect to DJ2, the spot is deflected toward pin 5. With DJ3 positive with respect to DJ4, the spot is deflected toward pin 2.

The plane through the tube axis and pin 5 may vary from the trace produced by DJ₁ and DJ₂ by an angular tolerance (measured about the tube axis) of 10° . Angle between DJ₁ - DJ₂ trace and DJ₃ - DJ₄ trace is $90^{\circ} \pm 3^{\circ}$.

RCA

OSCILLOGRAPH TUBE

Maximum Ratings, Design-Center Values:	
ANODE-No.2 VOLTAGED 6000 max. vo	olts
	olts
GRID-No.1 VOLTAGE:	
	olts
	lts
Positive peak value 2 max. vo	ilts
PEAK VOLTAGE BETWEEN ANODE No.2 AND	
ANY DEFLECTING ELECTRODE 750 max. vo	olts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode. 125 max. vo	olts
Heater positive with respect to cathode. 125 max. vo	olts
Equipment Design Ranges:	
For any anode-No.2 voltage (E_{b_2}) between 1000* and 6000 vo	lts
	olts
Max. Grid-No.1 Voltage	
	olts
Anode-No.1 Current for any	
Operating Condition15 to +10 micro	bamp
Deflection Factors:	
DJ1 & DJ2 31 to 41 v dc/in./kv of	Eb2
DJ3 & DJ4	Eb2
Spot Position #	
Examples of Use of Design Ranges:	
10, 2,000 ,012 00,000 4000	olts
Anode-No.1 Voltage 540-800 1080-1600 vo	olts
Max. Grid-No.1 Voltage	
101 110441 041011	olts
Deflection Factors:	
DJ ₁ & DJ ₂ 62-82 124-164 volts dc	
DJ3 & DJ4 50-68 100-136 volts dc	/in.
Maximum Circuit Values:	
Grid-No.1-Circuit Resistance 1.5 max. meg	nhms
Resistance in Any Deflecting-	J
Electrode Circuit ^o 5.0 max. meg	ohms
Minimum Circuit Values:	
The power supply should be of the limited-energy type	with
inherent regulation to limit the continuous short-cir	cuit
current to 5 milliamperes. If the supply permits	the
instantaneous short-circuit current to exceed 1 ampere	, or
is capable of storing more than 250 microcoulombs,	LIIE rode
effective resistance in circuit between indicated elect and the output capacitor should be as follows:	ı out
Grid-No.1-Circuit Resistance 220 min. o	nms

JAN. 1, 1951

□,*,#,o: See next page.

TENTATIVE DATA



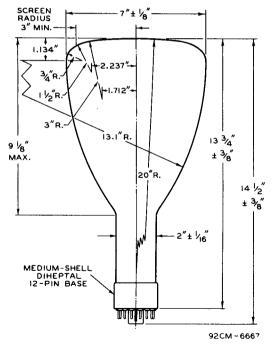
20

OSCILLOGRAPH TUBE

Anode-No.1-Circuit Resistance. 3000 min. ohms
Anode-No.2-Circuit Resistance. 6800 min. ohms
The resistors used should be capable of withstanding the

The resistors used should be capable of withstanding the applied voltage.

- Anode No. 2 and grid No. 2, which are connected together within tube, are referred to herein as anode No. 2.
- For operation at or near 0 volts on grid No.1 and with 4000 to 6000 volts on anode No.2, it is essential that the effective resistance of the anode-No.2 supply be adequate to limit the anode-No.2 input power to 6 watts.
- * Brilliance and definition decrease with decreasing anode—No. 2 voltage. A value as low as 1000 volts is recommended only for low—velocity deflection and low ambient—light levels.
- # The center of the undeflected, focused spot will fall within a circle having a 10-mm radius concentric with the center of the tube face.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

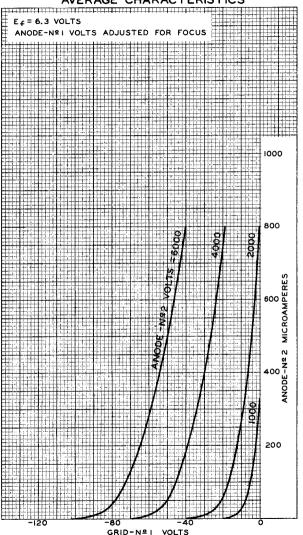


¢ OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.





AVERAGE CHARACTERISTICS



AUGUST 4, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-752I



7JP4 KINESCOPE

128×

ELECTROSTATIC FOCUS--ELECTROSTATIC DEFLECTION Supersedes Type 7GP4*

Supersedes Type 7	101.4
General: Heater, for Unipotential Cathode: Voltage. 6.3 ± 106 Current. 0.6 Direct Interelectrode Capacitances (Al Grid No.1 to All Other Electrodes. Cathode to All Other Electrodes. DJ1 to DJ2 DJ3 to DJ4 DJ1 to All Other Electrodes. DJ2 to All Other Electrodes. DJ2 to All Other Electrodes. DJ3 to All Other Electrodes. DJ4 to All Other Electrodes. DJ4 to All Other Electrodes. Phosphor (For Curves, see front of th Fluorescence Persistence. Focusing Method. Deflection Method. Overall Length Greatest Diameter of Bulb. Minimum Useful Screen Diameter Raster Size. Mounting Position. Base Media Basing Designation for BOTTOM VIEW	pprox.):
Pin 1 - Heater Pin 2 - Cathode Pin 3 - Grid No.1 Pin 4 - No Connection Pin 5 - Anode No.1 Pin 7 - Deflecting Electrode DJ3 Pin 8 - Deflecting Electrode DJ4 DJ, and DJ, are nearer	Pin 9 - Anode No.2, Grid No.2 Pin 10 - Deflecting Electrode DJ2 Pin 11 - Deflecting Electrode DJ1 Pin 12 - Internal Connection Do Not Use Pin 14 - Heater
$\begin{array}{c} DJ_3 \text{ and } DJ_4 \text{ are nearer} \\ DJ_3 \text{ and } DJ_4 \text{ are nearer} \\ \\ \text{With DJ_1 positive with respect to} \\ \text{flected toward pin 5.} \\ \text{With DJ_2 po} \\ DJ_4 \text{, the spot is deflected toward p} \\ \text{The plane through the tube axis an} \\ \end{array}$	the base DJ ₂ , the spot is describing the sitive with respect to in 2.

The plane through the tube axis and pin 5 may vary from the trace produced by DJ_1 and DJ_2 by an angular tolerance (measured about the tube axis) of 10° .

The angle between the trace produced by $\rm DJ_1$ and $\rm DJ_2$ and the trace produced by $\rm DJ_3$ and $\rm DJ_4$ is $90^{\circ}\pm3^{\circ}$

The 7JP4 replaces the 7GP4 provided no connections are made to the 7GP4 socket contacts for pins 4 and 12.

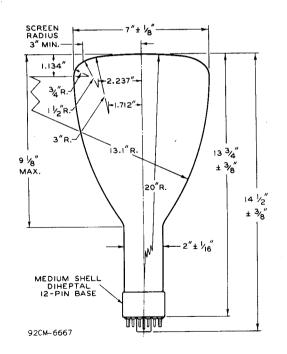
7JP4 KINESCOPE

Maximum Ratings, Design-Center Values:	٦
ANODE-No.2 & GRID-No.2 VOLTAGE 6000 max. voltaNODE-No.1 VOLTAGE 2800 max. voltaGRID-No.1 (CONTROL ELECTRODE) VOLTAGE:	
Negative bias value 200 max. volt	ts
Positive bias value# 0 max. vol	ts
Positive peak value 2 max. volt	ts
PEAK VOLTAGE BETWEEN ANODE No.2 AND ANY DEFLECTING ELECTRODE 750 max. vol PEAK HEATER-CATHODE VOLTAGE:	ts
Heater negative with respect to cathode: During equipment warm-up period not	
exceeding 15 seconds 410 max. vol	
After equipment warm-up period 125 max. vol	
Heater positive with respect to cathode. 125 max. vol	t s
Equipment Design Ranges: For any anode-No.2 voltage (Eb ₂) between $3000*$ and 6000 volt	t s
Anode-No.1 Voltage for Focus 27% to 40% of Eb2 vol	ts
Grid-No.1 Voltage for Visual Cutoff 1.2% to 2.8% of E _{b2} vol	ts
Anode-No.1 Current for Any	
Operating Condition -15 to $+10$ μ ar	ıιρ
Deflection Factors: $DJ_1 \& DJ_2 \dots \qquad 31 \text{ to } 41 \text{ v dc/in./kv of E}_1$ $DJ_3 \& DJ_4 & \dots \qquad 25 \text{ to } 34 \text{ v dc/in./kv of E}_2$	b2 b2
Examples of Use of Design Ranges: For anode-No.2 voltage of 6000 volts	
	+ e
Anode-No.1 Voltage 1620 to 2400 vol Grid-No.1 Voltage for Visual Cutoff -72 to -168 vol Deflection Factors:	ts
	n.
DJ ₁ & DJ ₂ 186 to 246 volts dc/i DJ ₃ & DJ ₄ 150 to 204 volts dc/i	
Maximum Circuit Values:	
Grid-No.1-Circuit Resistance 1.5 max. megohn	iiS
Resistance in Any Deflecting Electrode Circuit ^o . 5.0 max. megohm	กร
Minimum Circuit Values:	1
	٠
When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inheren	٦t
regulation of the power supply permits the instantaneoushort-circuit current to exceed 1 ampere, the effective re	ıs
short-circuit current to exceed 1 ampere, the effective re	9—
sistance in circuit between indicated electrode and the out	t-
put capacitor should be as follows:	1
Grid-No.1-Circuit Resistance 220 min. ohr	
Anode-No.1-Circuit Resistance 3000 min. ohr Anode-No.2-Circuit Resistance 6800 min. ohr	
* * * * * * *	
* See next page.	- 1





- At or near this rating, with 4000 to 6000 volts on anode No.2, the ef-fective resistance of the anode-No.2 supply should be adequate to limit the anode-No.2 input power to 6 watts.
- Brilliance and definition decrease with decreasing anode-No.2 voltage.
- With the combined grid-No.1 bias voltage and video-signal voltage adjusted for a highlight brightness of 12 foot-lamberts on a 4° x 5-1/2° picture area.
- It is recommended that the deflecting-electrode-circuit resistances be approximately equal.
- The 7.JPM is designed to be used in television circuits with horizontal deflection applied to deflecting electrodes DJ3 and DJ4, and should be so used to obtain maximum picture width. When the 7.JPM is operated in this way, the deflecting voltage required to produce the vertical height is approximately the same as that required to produce the horizontal width of a television picture of standard proportions.

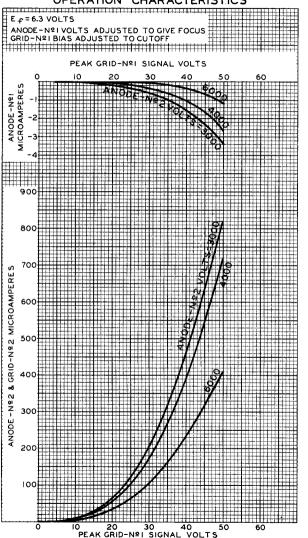


C OF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DI-RECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.





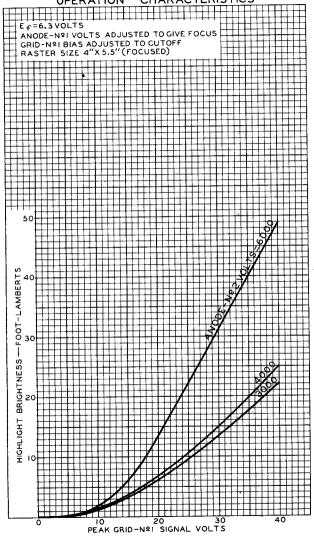
OPERATION CHARACTERISTICS







OPERATION CHARACTERISTICS





OSCILLOGRAPH TUBE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

DATA	
General:	
Heater, for Unipotential Cathode: Voltage	volts amp
Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes 6	μμf
Cathode to All Other Electrodes 5	μμf
Phosphor (For Curves, see front of this Section) Fluorescence	P7 Blue
Phosphorescence Greenish-Y	ellow Long
	netic
	netic
Deflection Angle (Approx.)	500
Overall Length 12-3/4" ±	
Greatest Diameter of Bulb	1/8"
Minimum Useful Screen Diameter	6"
Mounting Position	Any
Cap Recessed Small Cavity (JETEC No.)	1-21)
Base Small-Shell Duodecal 5-Pin (JETEC No.B BOTTOM VIEW	5–57)
Pin 1-Heater Pin 2-Grid No.1 Pin 11-Cathode Pin 12-Heater	,
Pin 10-Grid No. 2 Cap - Grid No	.3,
© Collection Collection	tor
Maximum Ratings, Design-Center Values:	
GRID-No. 2 VOLTAGE:	volts
	volts
GRID-No.1 VOLTAGE:	volts
	volts
	volts
	volts
PEAK HEATER-CATHODE VOLTAGE:	
	volts
Heater positive with respect to cathode. 125 max.	volts
In the 7M-types, grid No.3 which has the ultor function, and coll are connected together within the tube and are conveniently ref to collectively as "ultor". The "ultor" in a cathode-ray tube i electrode, or the electrode in combination with one or more addit electrodes connected within the tube to it, to which is applie highest dc voltage for accelerating the electrons in the beam pri	ector
to collectively as "ultor". The "ultor" in a cathode-ray tube i	s the
electrode, or the electrode in combination with one or more addit electrodes connected within the tube to it, to which is annive	ional d
# At or near this rating, the effective resistance of the ultor s	
* At or near this rating, the effective resistance of the ultor should be adequate to limit the ultor input power to 6 watts.	upply



7MP7 OSCILLOGRAPH TUBE

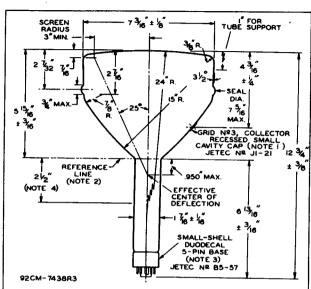
Турі	cal Oper	ation:			· · · · · · · · · · · · · · · · · · ·	
li) to	r Voltag	e*		4000	7000	volts
		ltage		250	250	volts
		ltage ° .		-27 to -63	-27 to -63	volts
	-No.2 Cu		• • •	-15 to +15	-15 to +15	µamp
		1 Current		20 10 120	-0	
rocu	700 4	pprox.)**		64 ± 15%	85 ± 15%	ma
۰	Positio			04 1 10%	##	
				_		
		uit Value			1.5 max.	megohms
Grid * _	-No.1-CI	rcuit Res	istance	aca with decr		
ge ge	neral, th	and derinit e ultor vol	tage show	ild not be les	easing ultor volts s than 4000 volts	•
O F0	or visual	extinction	of undef	lected, focuse	d spot.	
					Focusing Coil No ter line of air ga and ultor curren	
## T!	e center	of the under	lected,	unfocused spot	will fall within er of the tube fa	n a circle
na	aving 12-m	m radius co	Meentito	WILL CHE CONT		

→ Indicates a change



7MP7 OSCILLOGRAPH TUBE

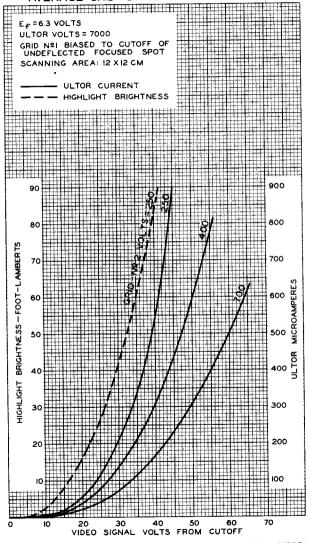




- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°. BULB TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No.112) 1.500 + .003"~ .000" 1. D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED: IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-778".
- NOTE 4: LOCATION OF DEFLECTING YOKE MUST BE WITHIN THIS SPACE.



AVERAGE GRID-DRIVE CHARACTERISTICS





7MPI4 OSCILLOGRAPH TUBE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

The 7MP14 is the same as the 7MP7 except that it utilizes a medimum—long—persistence, cascade (two-layer) screen which exhibits purple fluorescence of short persistence and orange phosphorescence which persists for a little over aminute under conditions of adequate excitation and ambient light.

Because of its medium—long—persistence, the 7MP14 is particularly useful where either low— and medium—speed non—recurring phenomena or high—speed recurring phenomena are to be observed. Furthermore, two or more phenomena can be observed simultaneously on the screen by means of a suitable switching arrangement.

The persistence is such that the 7MP14 without filter can be operated with scanning frequencies as low as 30 cycles per second without excessive flicker. When used with yellow filter, such as Wratten No.15 (G), the 7MP14 can be operated with much lower scanning frequencies.

In general, operation of the 7MP14 at an ultor voltage below 4000 volts will not give persistence of useable brightness.

THE SPECTRAL-ENERGY EMISSION CHARACTERISTIC and the PERSISTENCE CHARACTERISTIC of the P14 Phosphor are shown at the front of this Section



METAL-BACKED FLUORESCENT SCREEN FORCED-AIR COOLED

DATA

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

DATA	
General:	•
Heater, for Unipotential Cathode:	
Voltage 6.6	ac or dc volts
Current 0.62	amp
Direct Interelectrode Capacitances (Approx	
Grid No.1 to All Other Electrodes	
Cathode to All Other Electrodes	. 6 μμ.f
Phosphor (For Curves, see front	
of this Section) No.4—Si	
Fluorescence and Phosphorescence	White
Persistence of Phosphorescence	Medium
Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angle (Approx.)	35°
Overall Length	19-1/2" ± 5/8"
Greatest Diameter of Bulb (Excluding Side	Cap) . $7" \pm 3/16"$
Maximum Radius of Tube (Including Side Cap	01 4-11/32"
Quality Rectangle of Face Plate	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
(See Outline Drawing)	5" x 3-3/4"
•	Medium
	Any
Mounting Position	Any
Base Plastic-Filled, Small-Sh	
Basing Designation For BOTTOM VIEW	14N
Pin 1 - Heater 20 Pi	in 9-Grid No.3
	in 10 - No Conn.
	in 11 - No Conn.
	n 12 - No Conn.
	in 13 - Int. Conn
Pin 6 - No Conn.	Do Not Use
	in 14 - Heater
Pin 8 – No Conn.	Cap - Anode
Fin 8 - No Conn.	Cap - Anode
NOTE: Socket contacts for pins No.5, 6	, 7, 8, 10, 11,
12, and 13 should be removed so	
insulation is provided for	
Air Flow to Face	. 40 cfm
All riow to race	
The specified air flow should be delivered pe nozzle having a diameter of about 2 inches onto while it is in operation. The blower should have provide for a total system pressure drop including	the face of the tube
while it is in operation. The blower should have	adequate capacity to
provide for a total system pressure drop including	
Face Temperature	100 max. OC
CATHODE-DRIVE* SERVICE	E
Unless otherwise specified, voltage val	luae ara bositiva
with respect to grid No.	
with respect to grid no.	
Maximum Ratings, Absolute Values:	
ANODE-to-GRID-No.1 VOLTAGEO	. 80000 max. volts
l	
*,0: See next page	← Indicates a change
UINE 1 1953	TENTATIVE DATA 1



GRID-No.3-to-GRID-No.1 VOLTAGE 20000 max.	
	volts
GRID-No.2-to-GRID-No.1 VOLTAGE 850 max.	volts
GRID-No.2-to-CATHODE VOLTAGE 600 max.	volts
CATHODE-to-GRID-No.1 VOLTAGE:	VUILS
Positive bias value 250 max.	volts
Negative bias value	volts
Peak negative value 2 max.	volts
AVERAGE ANODE CURRENT 2 max.	voits ma
PEAK HEATER-CATHODE VOLTAGE:	III a
Heater negative with respect to cathode:	
During equipment warm-up period	
not exceeding 15 seconds 410 max.	volts
After equipment warm-up period 150 max.	volts
Heater positive with respect to cathode. 150 max.	volts
nearer positive with respect to cathode. 130 max.	VUILS
Typical Operation:	
Anode-to-Grid-No.1 Voltage# 75000	volts
Grid-No.3-to-Grid-No.1 Voltage 16000 - 18000	volts
Grid-No.2-to-Grid-No.1 Voltage	10/15
for Pattern Cutoff 400 - 600	volts
Cathode-to-Grid-No.1 Voltage 125	volts
Cathode-to-Grid-No.1 Video Voltage:	¥01 L3
Peak positive value (Black level) 0	volts
Peak negative value (White Level) 125	volts
Max. Grid-No.3 Current	μатр
Max. Grid-No.2 Current Range15 to +15	<i>µ</i> атр
GRID-DRIVE** SERVICE	
Unless otherwise specified, voltage values are posit	
	1710
	ive
with respect to cathode	ive
with respect to cathode Maximum Ratings, Absolute Values:	, .
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO 80000 max. GRID-No.3 VOLTAGE 20000 max.	volts volts
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO 80000 max. GRID-No.3 VOLTAGE 20000 max. GRID-No.2 VOLTAGE 600 max.	volts
### respect to cathode Maximum Ratings, Absolute Falues:	volts volts volts
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO 80000 max. GRID-No.3 VOLTAGE. 20000 max. GRID-No.1 VOLTAGE: 600 max. GRID-No.1 VOLTAGE: 250 max.	volts volts volts
with respect to cathode Maximum Ratings, Absolute Values: 80000 max. ANODE VOLTAGEO 80000 max. GRID-No.3 VOLTAGE. 20000 max. GRID-No.1 VOLTAGE. 600 max. GRID-No.1 VOLTAGE: 250 max. Positive bias value. 0 max.	volts volts volts volts
### respect to cathode Maximum Ratings, Absolute Values:	volts volts volts volts volts
### respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO 80000 max. GRID-No.3 VOLTAGE. 20000 max. GRID-No.1 VOLTAGE. 600 max. GRID-No.1 VOLTAGE: 250 max. Positive bias value. 250 max. Positive bias value. 2 max. Peak positive value. 2 max. AVERAGE ANODE CURRENT. 2 max. PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode:	volts volts volts volts volts
with respect to cathode Maximum Ratings, Absolute Values: ANODE VOLTAGEO . 80000 max. GRID-No.3 VOLTAGE. 20000 max. GRID-No.1 VOLTAGE. 600 max. GRID-No.1 VOLTAGE: 250 max. Positive bias value. 250 max. Peak positive value. 2 max. AVERAGE ANODE CURRENT. 2 max. PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode: During equipment warm-up period	volts volts volts volts volts ma
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts volts volts
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts wolts volts
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts volts volts volts
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts volts volts volts volts volts
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts volts volts volts volts volts
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts volts volts volts volts volts
Maximum Ratings, Absolute Values: ANODE VOLTAGEO	volts volts volts volts volts volts volts volts volts volts

JUNE 1, 1953



Typical Operation:		
Anode Voltage#	75000	volts
Grid-No.3 Voltage	16000 - 18000	volts
Grid-No.2 Voltage for Pattern Cutoff .	400 - 600	volts
Grid-No.1 Voltage	-155	volts
Grid-No.1 Video Voltage:		
Peak negative value (Black level)	0	volts
Peak positive value (White level)	155	volts
Max. Grid-No.3 Current	15	μ amp
Max. Grid-No.2 Current Range	-15 to +15	μ amp
Mariana Airenth Melanes		

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

Brilliance and definition decrease with decreasing anode-to-grid-No.1 voltage or anode voltage. In general, the anode-to-grid-No.1 voltage or the anode voltage should not be less than 70000 volts.

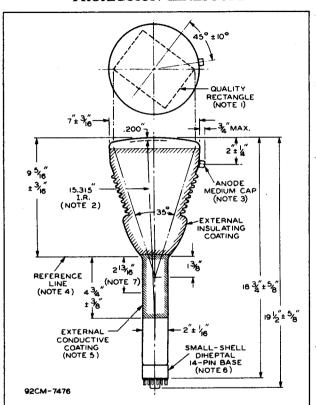
OPERATING NOTES

X-ray radiation is produced at the face of the 7NP4 when it is operated at its normal anode voltage. These rays can constitute a health hazard unless the tube is adequately shielded. Make sure that the shielding provides the required protection against personal injury.

The air-cooling system required to cool the face of the 7NP4 consists of a blower and an air duct, having an outlet diameter of about 2 inches, directed perpendicularly onto the face of the tube. An air flow of 40 cubic feet per minute at the tube face is required to provide adequate cooling. In a typical system with air filter, the total system static pressure is approximately 0.25 inch of water. The cooling air must not contain water, dust, or other foreign matter. The air-cooling system should be electrically interconnected with the anode power supply to prevent operation of the tube without cooling.

Darkening of face occurs during normal operation of the 7NP4 with resulting decrease in the light transmitted by the face. The rate of darkening increases rapidly with increase in anode voltage, is proportional to the beam current, and is inversely proportional to the scanned area. The darkening develops rapidly during initial operation; thereafter, a gradual increase in the amount of darkening will be observed during the life of the tube. The darkening, however, can be decreased periodically throughout the life of the tube by bleaching the face as prescribed in the 7NPA bulletin.





- NOTE 1: WHEN VIEWED FROM THE FACE OF THE TUBE, THE MINOR AXIS OF THE 5" × 3-3/4" QUALITY RECTANGLE IS LOCATED 45° ± 10° in a counter-clockwise direction from a plane through the anode terminal and the Tube axis.
- NOTE 2: INSIDE SURFACE OF FACE PLATE WITHIN THE QUALITY RECTANGLE MAY VARY ± 0.006" FROM THE SPHERICAL SURFACE HAVING A 15.315" RADIUS.
- NOTE 3: THE PLANE THROUGH BASE PIN NO.9 AND THE TUBE AXIS MAY VARY FROM THE PLANE THROUGH THE ANODE TERMINAL AND THE TUBE AXIS BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. THE ANODE TERMINAL IS ON SAME SIDE AS PIN NO.9.

THPA



TRA

PROJECTION KINESCOPE

NOTE 4: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE 2.100" ± .001" I.D. AND 3" LONG WILL REST ON BULB CONE.

NOTE 5: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

NOTE 6: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. SOCKET CONTACTS FOR PINS 5, 6, 7, 8, 10, 11, 12, AND 13 SHOULD BE REMOVED IN ORDER TO PROVIDE MAXIMUM INSULATION FOR PIN NO.9.

NOTE 7: EFFECTIVE DEFLECTING FIELD MUST BE WITHIN THIS SPACE.



AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

E c = 6.6 VOLTS

ANODE - TO - GRID- Nº I VOLTS=

70000-80000 GRID-Nº 3 -TO-GRID-Nº I VOLTS ADJUSTED TO GIVE FOCUS GRID-Nº 2-TO-GRID-NºI VOLTS

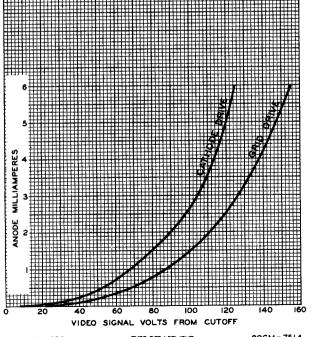
ADJUSTED TO PATTERN CUTOFF CATHODE BIASED POSITIVE RESPECT TO GRID Nº 1 (VOLTS) = 125 GRID-DRIVE SERVICE

Er=6.6 VOLTS

ANODE VOLTS = 70000-80000 GRID Nº3 VOLTS ADJUSTED

TO GIVE FOCUS GRID Nº2 VOLTS ADJUSTED

TO PATTERN CUTOFF GRID-NºI BIAS VOLTS = - 155





7NP4

AVERAGE DRIVE CHARACTERISTICS

CATHODE - DRIVE SERVICE

E = 6.6 VOLTS

ANODE-TO-GRID-NºI VOLTS = 75000

GRID-Nº3-TO-GRID-NºI VOLTS

ADJUSTED TO GIVE FOCUS

GRID-Nº2-TO-GRID-NºI VOLTS

ADJUSTED TO PATTERN CUTOFF

CATHODE BIASED POSITIVE

WITH RESPECT TO GRID

Nº1 (VOLTS) = 125

RASTER SIZE: 5"x 3³/₄"

GRID-DRIVE SERVICE

E f = 6.6 VOLTS

ANODE VOLTS = 75000

GRID-Nº 3 VOLTS ADJUSTED

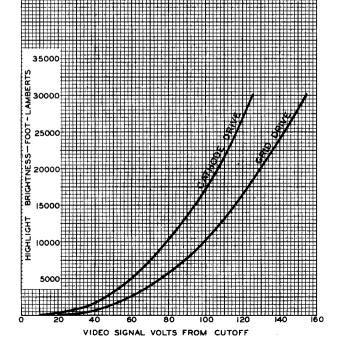
TO GIVE FOCUS

GRID-Nº 2 VOLTS ADJUSTED

TO PATTERN CUTOFF

GRID-Nº 1 BIAS VOLTS = -155

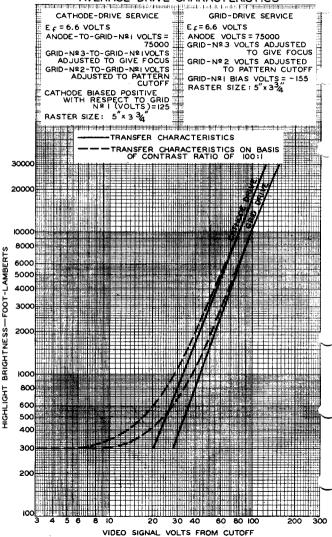
RASTER SIZE: 5" x 3³/₄"







AVERAGE DRIVE CHARACTERISTICS





MAGNETIC FOCUS MAGNETIC DEFLECTION

DATA			
General:			
Heater, for Unipotential Cathode: Voltage			
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Cap - Anode			
Maximum Ratings, Design-Center Values: ANODE VOLTAGE*			
Typical Operation: Anode Voltage**			





Grid-No.2 Voltage	volts
Grid-No.1 Voltage for Visual Extinc- tion of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC, approx.) # 80	volts ma
Field Strength of Single-Field ion-Trap Magnet ^o	gausses
Maximum Circuit Values:	

Grid-No.1-Circuit Resistance 1.5 max. megohms

Minimum Circuit Values:

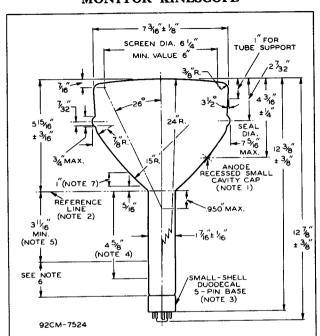
The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 milliamperes. If the supply permits the instantaneous short-circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance incircuit between indicated electrode and the output capacitor should be as follows:

The resistors used should be capable of withstanding the applied voltage.

O Measured at center of field with General Electric Gauss Meter, Cat.
No. 409X51.

For specimen focusing coil similar to JETEC Focusing Coil No.109, positioned with air gap toward kinescope screen, and center line of air gap 3 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bis voltage and video-signal voltage adjusted to produce a highlight brightness of 40 foot-lamberts on a 5-3/8" x 4" picture area sharply focused at center of screen.





- NOTE I: THE PLANE THROUGH THE TUBE 'AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" ~ .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".
- NOTE 4: DISTANCE FROM REFERENCE LINE FOR LOCATING CENTER OF ION-TRAP MAGNETIC FIELD. DIRECTION OF FIELD OF THE ION-TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO VACANT PIN POSITION NO.8 AND SOUTH POLE TO PIN NO.2.



NOTE 5: LOCATION OF DEFLECTING YOKE MUST BE WITHIN THIS SPACE.

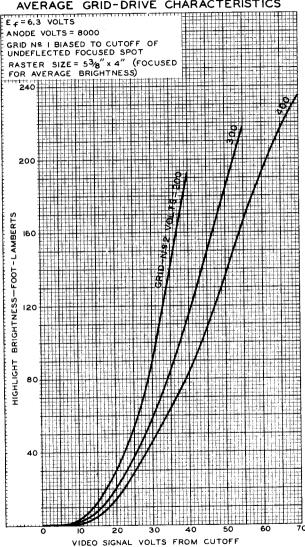
NOTE 6: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, LON-TRAP MAGNET.

NOTE 7: FOR TUBE SUPPORT WHICH MUST BE KEPT AT LEAST 2"
AWAY FROM ANODE CAVITY CAP.

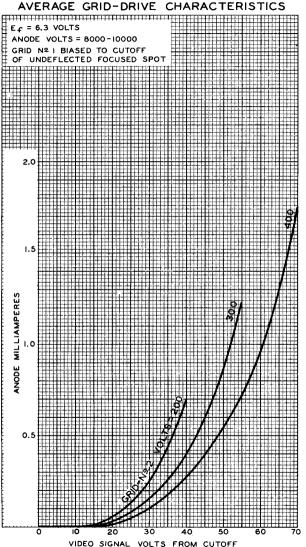
JAN. 1, 1951



AVERAGE GRID-DRIVE CHARACTERISTICS









METAL-BACKED SCREEN

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

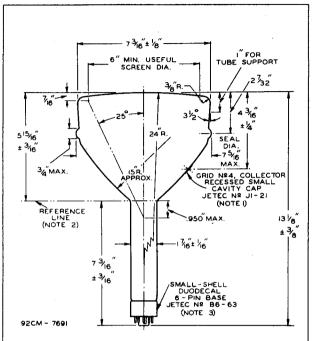
DATA			
General:			
Heater, for Unipotential Cathode: Voltage 6.3			
Maximum Ratings, Design-Center Values: ULITOR® VOLTAGE			
GRID-No.3 VOLTAGE			
Negative bias value			
For curves, see front of this Section. In the TPP4, grid No.4 which has the ultor function, and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.			

7 T P 4 MONITOR KINESCOPE

PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode: During equipment warm-up period not exceeding 15 seconds After equipment warm-up period 180 max. Heater positive with respect to cathode. 180 max.	volts
Equipment Design Ranges:	
For any ultor voltage (E_u) between 10000* and 12000 and grid-No.2 voltage (E_{C2}) between 150 and 410 vo	volts olts
Grid-No.3 Voltage for Focus with Ultor Current of 100 µamp 11.6% to 15.8% of E Grid-No.1 Voltage for Visual	u volts
Extinction of Undeflected Focused Spot	volts
Grid-No.2 Current15 to +15	μ amp
Field Strength of Adjustable Centering Magnet 0 to 8	gausses
Examples of Use of Design Ranges:	
For ultor voltage of 10000	volts
and grid-No.2 voltage of 200	volts
Grid-No.3 Voltage for Focus with Ultor Current of 100 µamp	volts
Extinction of Undeflected Focused Spot22 to -52	volts
Maximum Circuit Values:	
Grid-No.1-Circuit Resistance 1.5 max.	megohms
* Brilliance and definition decrease with decreasing ultor vol general, the ultor voltage should not be less than 10000 vol ***Grid—No.3 Current increases as the ultor voltage is decreased.	tage. In
	1



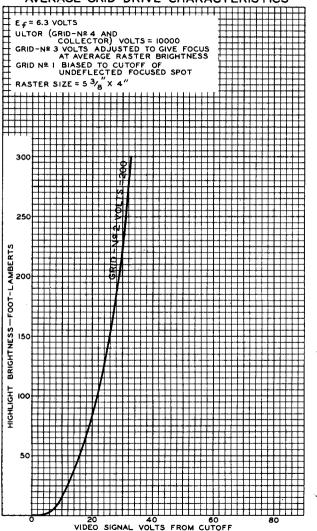




- THE PLANE THROUGH THE TUBE AXIS AND PIN No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMI-NAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS OF ± 100. BULB TERMINAL IS ON SAME SIDE AS PIN No.6.
- REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No. 112) 1.500" + 0.003" - 0.000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIA-METER OF 1-7/8".



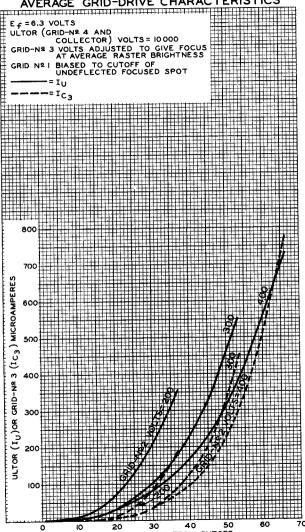
AVERAGE GRID-DRIVE CHARACTERISTICS



178ª



AVERAGE GRID-DRIVE CHARACTERISTICS





7VPI

OSCILLOGRAPH TUBE
ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

DATA General: Heater, for Unipotential Cathode: Current . . 0.6 Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes . . щf DJ1 to DJ2 щf DJ3 to DJ4 μμf DJ1 to All Other Electrodes . шцf DJ2 to All Other Electrodes . . шŦ DJ3 to All Other Electrodes $\mu\mu f$ DJ4 to All Other Electrodes . . μμf Clear Glass

Fluorescence and Phosphorescence Green
Persistence of Phosphorescence Medium
Focusing Method Electrostatic
Deflection Method Electrostatic
Overall Length 14-1/2" ± 3/8"
Greatest Diameter of Bulb 7"± 1/8"
Minimum Useful Screen Diameter 6"

Phosphor (For Curves, see front of this Section)

ase Medium-Shell Diheptal 12-Pin (JETEC No.B12-3° BOTTOM VIEW Pin 1-Heater Pin 9-Ultor•

Pin 2 - Cathode
Pin 3 - Grid No.1
Pin 4 - No
Connection

Pin 5-Grid No.3 Pin 7-Deflecting Electrode

DJ3 Pin 8-Deflecting Electrode DJ4

(Grid No.2, Grid No.4, Collector) Pin 10 - Deflecting

Elect. DJ2 Pin 11 - Deflecting Elect. DJ₁

Pin 12 - Internal Connection-Do Not Use

Do Not U: Pin 14 - Heater

 DJ_1 and DJ_2 are nearer the screen DJ_2 and DJ_A are nearer the base

With DJ₁ positive with respect to DJ₂, the spot is deflected toward pin 5. With DJ₃ positive with respect to DJ₄, the spot is deflected toward pin 2.

The plane through the tube axis and pin 5 may vary from the trace produced by DJ₁ and DJ₂ by an angular tolerance (measured about the tube axis) of $\pm 10^{\circ}$. Angle between DJ₁ -DJ₂ trace and DJ₃ -DJ₄ trace is $90^{\circ} \pm 3^{\circ}$.

e: See next page.



OSCILLOGRAPH TUBE

Maximum Ratings, Design-Center	Values*	1.
• ' •		
ULTOR® VOLTAGE	4000 max.	
GRID-No.1 VOLTAGE:		
Negative bias value	200 max.	
Positive bias value*	0 max.	
Positive peak value	2 max.	. volts
PEAK VOLTAGE BETWEEN ULTOR AND ANY DEFLECTING ELECTRODE		volts
PEAK HEATER-CATHODE VOLTAGE:		. VOICS
Heater negative with respect	to cathode . 125 max.	. volts
Heater positive with respect	to cathode . 125 max.	. volts
Equipment Design Ranges:		ĺ
For any ultor voltage (Eu)	between 1000# and 4000 r	volts
Grid-No.3 Voltage for Focus 2	7% to 40% of Eu	volts
Maximum Grid-No.1 Voltage		
for Visual Extinction of	0.0% -£ E	val+a
Undeflected Focused Spot Grid-No.3 Current	2.8% of E _u -15 to +10	volts µamp
Deflection Factors:	-15 to 110	الاستمار
DJ1 & DJ2	31 to 41 v dc/in./	kv of Eu
DJ3 & DJ4	25 to 34 v dc/in./	kv of Eu
Spot Position	##	
Examples of Use of Design Rang	es:	
For ultor voltage of 1	500 3000	volts
Grid-No.3 Voltage		_
	to 600 800 to 1200	volts
Maximum Grid-No.1 Volt- age for Visual Extinc-		
tion of Undeflected		
	-42 -84	volts
Deflection Factors:		
D ₁ & D ₂ 47	to 62 93 to 123 volt to 51 75 to 102 volt	ts dc/in.
	10 01 /3 to 102 voi	13 40/1111
Maximum Circuit Values:		
Grid No.1-Circuit Resistance .	1.5 max.	megohms
Resistance in Any Deflecting- Electrode Cir	cuit ^o 5.0 max.	meanhms
Liectiode Cit	cure o.o max.	cgc
In the 7VP1, grid No.4 which has t	he ultor function, grid No.2	, and col-
In the 7VP1, grid No.4 which has t lector are connected together with ferred to collectively as "ultor. is the electrode, or the electr- additional electrodes connected	nin the tube and are conveni " The "ultor" in a cathode:	ently re- -ray tube
is the electrode, or the electro	ode in combination with one within the tube to it. to	which is
applied the highest dc voltage for beam prior to its deflection.	or accelerating the electron	ns in the
* At or near this rating, the effections should be adequate to limit the ul	tive resistance of the ult	or supply
should be adequate to limit the ul	tor input power to 6 watts.	
#,##, ^O : See next page.		

NOV. 1, 1952

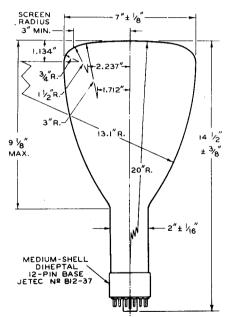


OSCILLOGRAPH TUBE



- # Brilllance and definition decrease with decreasing ultor voltage. A value as low as 1000 volts is recommended only for low-velocity defiection and low ambient-light levels.
- ## with ultor voltage of 1500 volts, the center of the undeflected focused spot will fall within a circle having a 10-mm radius concentric with the center of the tube face.
- O It is recommended that the deflecting—electrode—circuit resistances be approximately equal.

The TVP1 can be used as a direct replacement for the TJP1 in all equipment where the high-voltage supply does not provide more than 4000 volts.



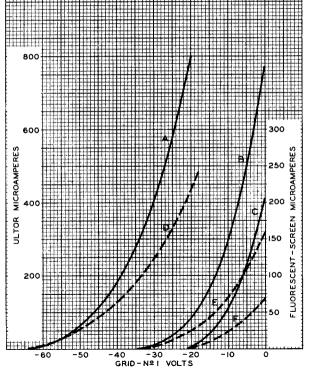
92CM-6667RI



AVERAGE CHARACTERISTICS

	VOLTS	ADJUSTED			
CURVE	cur	RENT	NO.	TOR LTS	

CURVE	CURRENT	VOLTS
Α	ULTOR	3000
В	ULTOR	1500
С	ULTOR	1000
D	FLUORESCENT SCREEN	3000
Ε	FLUORESCENT SCREEN	1500
F	FLUORESCENT SCREEN	1000





THO W

PROJECTION KINESCOPE

METAL-BACKED FLUORESCENT SCREEN

FORCED-AIR COOLED
FLECTROSTATIC FOCUS MAGNETIC DEFLECTION

ELECTROSTATIC FOCUS MAGNETIC DEFLEC	TION
DATA	
General:	
Heater, for Unipotential Cathode:	i
Voltage 6.6 ± 5% ac or	dc volts
Current 0.62	amp
Direct Interelectrode Capacitances (Approx.):	اء
Grid No.1 to All Other Electrodes 12 Cathode to All Other Electrodes 6	μμ.f
Cathode to All Other Electrodes 6 Phosphor (For Curves, see front	$\mu\mu$ f
of this Section) . P4—Silicate—Sul	fide Type
Fluorescence and Phosphorescence	. White
Persistence of Phosphorescence	 Medium
	ctrostatic
Deflection Method	Magnetic
Deflection Angle (Approx.)	35°
Overall Length	7/16"±5/8"
Maximum Radius of Tube (Including Side Cap)	4-11/32"
IOuality Rectangle of Faceplate	4-11/ /2
	5" x 3-3/4"
Refractive Index for Faceplate Glass	1.469
Cap Medium (JETE	C No.C1-5)
Mounting Position	• • Any
Base Plastic-Filled, Small-Shell Dihep	tal 14-Pin
	No.B14-45)
BOTTOM VIEW	^
Pin 1 - Heater Pin 10 - No	
Pin 2 - Cathode Pin 3 - Grid No.1 Pin 12 - No	
Pin 4 - Grid No.2 Pin 13 - Int	
	Not Use
Pin 6 - No Conn. 3\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ter
Pin 7 - No Conn. Cap - Ult	
1111 0 - 110 001111	id No.4
Pin 9-Grid No.3	llector)
NOTE: Socket Contacts for pins No.5, 6, 7, 8, 1	0, 11,
12, and 13 should be removed so that ma	ximum
insulation is provided for pin No.9	1
Air Flow to Face 40	cfm
The specified air flow should be delivered perpendicular	ly from a
nozzle having a diameter of about 2 inches onto the face of	the tube
The specified air flow should be delivered perpendicular nozzle having a diameter of about 2 inches onto the face of while it is in operation. The blower should have adequate to provide for a total system pressure drop including tha	t of the
air filter.	
Face Temperature 100 ma	x. °C
•	
1	

THPA



PROJECTION KINESCOPE

CATHODE-DRIVE* SERVICE

Unless otherwise specified, voltage values are positive with respect to grid No.1

Maximum Ratings, Absolute Values:

ULTOR to-GRID-No.1 VOLTAGE	80000 max. volts	ı
GRID-No.2-to-GRID-No.1 VOLTAGE		
GRID-No.2-to-CATHODE VOLTAGE	600 max. volts	ı
CATHODE-to-GRID-No.1 VOLTAGE:		ı
Positive bias value	250 max. volts	
Negative bias value	0 max. volts	
Peak negative value	2 max. volts	
AVERAGE ULTOR CURRENT	2 max. ma	1
PEAK HEATER-CATHODE VOLTAGE:		

Heater negative with respect to cathode:

During equipment warm-up period

not exceeding 15 seconds . 410 max. volts
After equipment warm-up period . . . 150 max. volts
Heater positive with respect to cathode. 150 max. volts

Typical Operation:

17) 104. 000. 41.0	
Ultor-to-Grid-No.1 Voltage# 75000	volts
Grid-No.3-to-Grid-No.1 Voltage 16000 - 18000) volts
Grid-No.2-to-Grid-No.1 Voltage	
for Pattern Cutoff 400 - 600	volts
Cathode-to-Grid-No.1 Voltage 125	volts
Cathode-to-Grid-No.1 Video Voltage:	
Peak positive value (Black level) 0	volts
Peak negative value (White level) 125	volts
Max. Grid-No.3 Current	μ amp
Max. Grid-No.2 Current Range15 to +15	μ amp

GRID-DRIVE** SERVICE

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

Maximum Ratings, Absolute Values:

ULTOR® VOLTAGE® 80000 max, volts

- In the 7WP4, grid No.4 which has the ultor function and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highest devoltage for accelerating the electrons in the beam prior to its deflection.
 - Cathode drive is the operating condition in which the video signal varies the cathode potential.
- ** Grid drive is the operating condition in which the video signal varies the grid-No.1 potential.
- O The product of ultor-to-grid-No.1 voltage, or ultor voltage, and average ultor current should be limited to 160 watts.
- # See next page.

JULY 1, 1952 TUBE DEPARTMENT



- 1		
	GRID-No.3 VOLTAGE	volts
-1	GRID-No.2 VOLTAGE 600 max. GRID-No.1 VOLTAGE:	volts
١		• .
1	Negative bias value	
١	Positive bias value 0 max.	
1	Peak positive value 2 max.	
	AVERAGE ULTOR CURRENT 2 max.	ma
J	PEAK HEATER-CATHODE VOLTAGE:	
ı	Heater negative with respect to cathode:	
1	During equipment warm-up period	_
1	not exceeding 15 seconds . 410 max.	
İ	After equipment warm-up period 150 max.	
1	Heater positive with respect to cathode . 150 max.	volts
	Typical Operation:	
t	lltor Voltage#	volts
К	Grid-No.3 Voltage	volts
K	Grid-No.2 Voltage for Pattern Cutoff . 400 - 600	volts
ľ	Grid-No.1 Voltage155	volts
K	Grid-No.1 Video Voltage:	
ı	Peak negative value (Black level) 0	volts
ı	Peak positive value (White level) 155	volts
١	Max. Grid-No.3 Current	µamp
٨	Max. Grid-No.2 Current Range15 to +15	μamp
l.	4	· · ·
	Maximum Circuit Values:	
K	Grid-No.1-Circuit Resistance 1.5 max. m	negohms
1.		_
¥	Brilliance and definition decrease with decreasing ultor-to-a	rid-un al

Brilliance and definition decrease with decreasing ultor—to—grid—No.1 voltage or ultor voltage. In general, the ultor—to—grid—No.1 voltage or the ultor voltage should not be less than 70000 volts.

OPERATING NOTES

X-ray radiation is produced at the face of the 7WP4 when it is operated at its normal ultor voltage. For x-ray shielding considerations, see sheet X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section.

The air-cooling system required to cool the face of the TWP4 consists of a blower and an air duct, having an outlet diameter of about 2 inches, directed perpendicularly onto the face of the tube. An air flow of 40 cubic feet per minute at the tube face is required to provide adequate cooling. In a typical system with air filter, the total system static pressure is approximately 0.25 inch of water. The cooling air must not contain water, dust, or other foreign matter. The air-cooling system should be electrically interconnected with the ultor power supply to prevent operation of the tube without cooling.

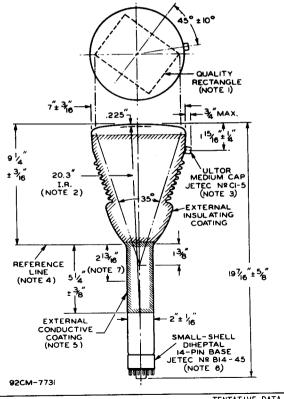


TWPA

PROJECTION KINESCOPE

OPERATING NOTES (Cont'd)

Darkening of face occurs during normal operation of the 7WP4 with resulting decrease in the light transmitted by the face. The rate of darkening increases rapidly with increase in ultor voltage, is proportional to the beam current, and is inversely proportional to the scanned area. The darkening develops rapidly during initial operation; thereafter, a gradual increase in the amount of darkening will be observed during the life of the tube. The darkening, however, can be decreased periodically throughout the life of the tube by bleaching the face as prescribed in the bulletin.



JULY 1, 1952

TUBE DEPARTMENT TENTATIVE DATA 2



THO

PROJECTION KINESCOPE

- NOTE I: WHEN VIEWED FROM THE FACE OF THE TUBE, THE MINOR AXIS OF THE 5" x 3-3/4" QUALITY RECTANGLE IS LOCATED 45° ± 10° IN A COUNTER-CLOCKWISE DIRECTION FROM A PLANE THROUGH THE ULTOR TERMINAL AND THE TUBE AXIS.
- NOTE 2: INSIDE SURFACE OF FACEPLATE WITHIN THE QUALITY RECTANGLE MAY VARY ± 0.006" FROM THE SPHERICAL SURFACE HAVING A 20.3" RADIUS.
- NOTE 3: THE PLANE THROUGH BASE PIN No.9 AND THE TUBE AXIS MAY VARY FROM THE PLANE THROUGH THE ULTOR TERMINAL AND THE TUBE AXIS BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. THE ULTOR TERMINAL IS ON SAME SIDE AS PIN No.9.
- NOTE 4: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE 2.100" ± 0.001" i.D. AND 3" LONG WILL REST ON BULB CONE.
- MOTE 5: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.
- NOTE 6: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. SOCKET CONTACTS FOR PINS 6, 7, 8, 10, 11, 12, AND 13 SHOULD BE REMOVED IN ORDER TO PROVIDE MAXIMUM INSULATION FOR PIN No.9.
- NOTE 7: EFFECTIVE DEFLECTING FIELD MUST BE WITHIN THIS SPACE.



AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

E f=6.6 VOLTS

ULTOR-TO-GRID-N2 | VOLTS=
70000-80000

GRID-N2 3-TO-GRID-N2 | VOLTS
ADJUSTED TO GIVE FOCUS
GRID-N2 2-TO-GRID-N2 | VOLTS
ADJUSTED TO PATTERN CUTOFF
CATHODE BIASED POSITIVE
WITH RESPECT TO GRID
N2 | (VOLTS) = 125

TMPA

GRID-DRIVE SERVICE

E = 6.6 VOLTS

ULTOR VOLTS=70000-80000

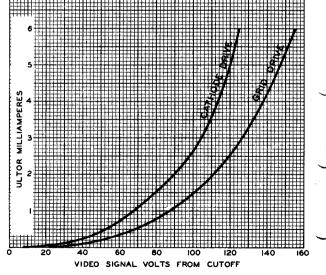
GRID Nº3 VOLTS ADJUSTED

TO GIVE FOCUS

GRID Nº2 VOLTS ADJUSTED

TO PATTERN CUTOFF

GRID-Nº1 BIAS VOLTS=-155



JULY 26, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM - 7514



TARR

AVERAGE DRIVE CHARACTERISTICS

CATHODE - DRIVE SERVICE

E = 6.6 VOLTS

ULTOR -TO - GRID - Nº 1 VOLTS = 75000

GRID - Nº 3 - TO - GRID - Nº 1 VOLTS = ADJUSTED TO GIVE FOCUS

GRID - Nº 2 - TO - GRID - Nº 1 VOLTS = ADJUSTED TO PATTERN CUTOFF

CATHODE BIASED POSITIVE

WITH RESPECT TO GRID

Nº 1 (VOLTS) = 125

RASTER SIZE: 5"x 3 3".

GRID-DRIVE SERVICE

E = 6.6 VOLTS

ULTOR VOLTS = 75000

GRID-Nº3 VOLTS ADJUSTED

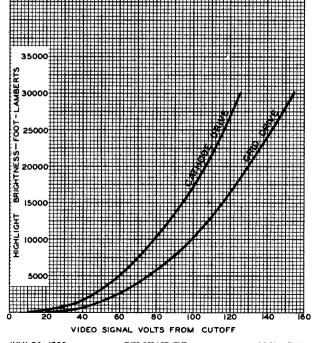
TO GIVE FOCUS

GRID-Nº2 VOLTS ADJUSTED

TO PATTERN CUTOFF

GRID-Nº1 BIAS VOLTS = 155

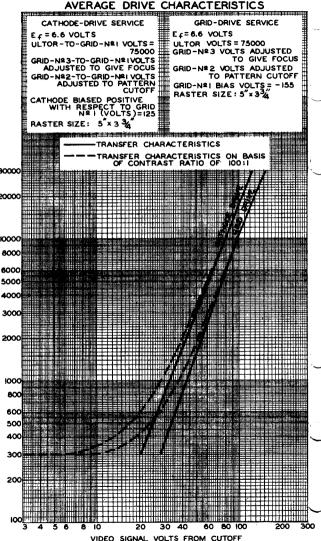
RASTER SIZE: 5" x 33/4"

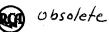




Mirk

AVERAGE DRIVE CHARACTERISTICS





9JPI/1809-Pt

HIGH-VACUUM CATHODE-RAY TUBE

Heater Coated Unipotentia	
Voltage 2.5	a-c or d-c volts
Current 2.1	amp.
Focusing Method	Electrostatic
	lectrostatic and Magnetic
Deflection Method	lectrostatic and magnetic
Electrode DJ ₁ is on same side of	tube as base pin 2
Electrode DJ ₂ is on same side of	tube as base pin b
Phosphor	NO.1
Fluorescence	Green
Persistence	Medium
Direct Interelectrode Capacitances:	
Control Electrode to All Other Electrod	
Deflecting Electrode DJ to Deflecting	
Either Deflecting Electrode DJ or DJ2	to All Other
Electrodes	3.6 µµf
Cathode to All Other Electrodes	8 µµf
Overall Length	15–11/16" ± 3/8"
Bulb Diameter at Screen End	9" ± 1/8"
Minimum Diameter of Screen	- 8"
Bulb Side Terminals	Snap Connectors
- 11	Wafer Octal 8-Pin, Sleeve
Duoc	water octal out in, orceve
Deflection Yoke:	El L (at Doll Defended
	Flush with Bulb Reference
; Line	e (see OUTLINE DRAWING)
Working Length for 55° Angle Defl	ection 2" max.
Maximum Ratings Are Desig	on-Center Values
MAXIMUM RATINGS and TYPICAL (OPERATING CONDITIONS
Anode No.2 (High-Voltage Electrode)	
Anode No.2 (High-Voltage Electrode) Voltage	5000 max. volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol	5000 max. volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage	5000 max. volts tage 2000 max. volts Never positive
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and	5000 max. volts tage 2000 max. volts Never positive
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode	5000 max. volts 2000 max. volts Never positive 3000 max. volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode	5000 max. volts 2000 max. volts Never positive 3000 max. volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation:	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage #	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Feak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.1 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)*	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ##	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity:	1
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes D1 and D12	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes D1 and D2 Deflection Factor:	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C.
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes D1 and D12	1
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes D1 and D2 Deflection Factor: Electrodes D1 and D2	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts D.C./in.
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes DJ1 and DJ2 Deflection Factor: Electrodes DJ1 and DJ2 NOTE 1: The d-c potential of each	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts DC./in. deflecting electrode is
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes D1 and D2 Deflection Factor: Electrodes D1 and D2 NOTE I: The d-c potential of each	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts D.C./in. deflecting electrode is alent to that of anode No.2
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes DJ ₁ and DJ ₂ Deflection Factor: Electrodes DJ ₁ and DJ ₂ NOTE I: The d-c potential of each maintained essentially equiva by connecting resistors having	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts D.C./in. deflecting electrode is alent to that of anode No.2
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes DJ1 and DJ2 Deflection Factor: Electrodes DJ1 and DJ2 NOTE I: The d-c potential of each maintained essentially equiva by connecting resistors havin in megohms between each defle	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts D.C./in. deflecting electrode is alent to that of anode No.2 meg values not greater than ecting electrode and anode
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes DJ1 and DJ2 Deflection Factor: Electrodes DJ1 and DJ2 NOTE I: The d-c potential of each maintained essentially equiva by connecting resistors havin in megohms between each defle	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts D.C./in. deflecting electrode is alent to that of anode No. 2
Anode No.2 (High-Voltage Electrode) Voltage Anode No.1 (Focusing Electrode) Vol Grid (Control Electrode) Voltage Peak Voltage Between Anode No.2 and Either Deflecting Electrode D-C Heater-to-Cathode Potential Grid-Circuit Resistance Typical Operation: Anode No.2 Voltage # Anode No.1 Voltage for Focus at 75% of Grid Voltage for Cut-Off (Approx.)* Grid Voltage for Cut-Off** ## Deflection Sensitivity: Electrodes DJ1 and DJ2 Deflection Factor: Electrodes DJ1 and DJ2 NOTE I: The d-c potential of each maintained essentially equiva by connecting resistors havin in megohms between each defle	5000 max. volts 2000 max. volts Never positive 3000 max. volts 125 max. volts 1.5 max. megohms 2500 5000 volts 785 1570 volts -45 -90 volts 0.272 0.136 mm/volt D.C. 93.8 187 volts D.C./in. deflecting electrode is alent to that of anode No. 2 go values not greater than eaching electrode and anode uitable choice of resistor



HIGH-VACUUM CATHODE-RAY TURE

(continued from preceding page)

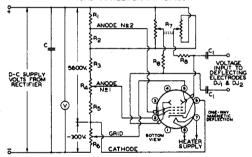
values minimizes pattern distortion and pattern drift resulting from unbalanced potentials on the deflecting The smaller the resistor values, the less electrodes. the distortion for a given beam current.

Brilliance and definition decrease with decreasing anode Mo.2 voltvolts.

Volts. Supply should be adjustable to ± 20 of this value. Supply should be adjustable to ± 50 of this value. Visual extinction of a stationary focused spot.

Characteristic Curves of phosphor No.1 are shown at the beginning of this section.

TYPICAL OSCILLOGRAPH CIRCUIT



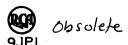
C = FILTER CONDENSER, 0.5 TO 2.0 μf C = SEE NOTE 2 R_1 , R_2 = 0.4 MEGOHM R_S = 0.5 MEGOHM POTENTIONETER R_S = 0.15-MEGOHM POTENTIONETER 7 = 1.5-MEGOHM (EACH SECTION) DUAL POTENTIONETER FOR BEAM CENTERING R_S = POTENTIAL EQUALIZING RESISTORS, SEE MOTES 1 8 2

= 1.2 MEGOHMS = 0.5-MEGOHM POTENTIOMETER

: When the cathode or the negative end of the cathode-ray high-voltage supply is grounded, blocking condensers C, should have high voltage rating. When anode No. 2 is grounded, condensers C, NOTE 2: may be low-voltage condensers.

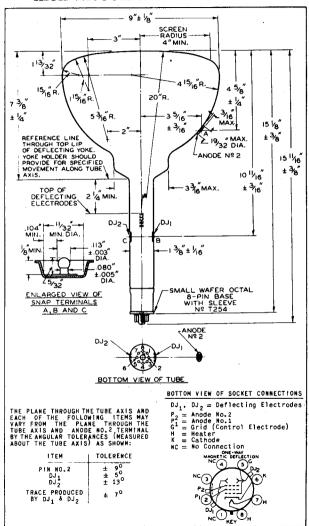
For d-c amplifier service, the deflecting electrodes should be coupled direct to the output of the amplifier by omitting the blocking condensers. In addition, it will usually be preferable to remove the associated deflecting electrode resistor in order to minimize the loading effect of the resistor on the d-c amplifier. With the resistor removed, it is essential, in order to minimize the spot defocusing, that anded No.2 be returned to some point in the d-c amplifier circuit such that the potential difference between anode No.2 and the average voltage across the deflecting electrodes will be as low as possible.

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.



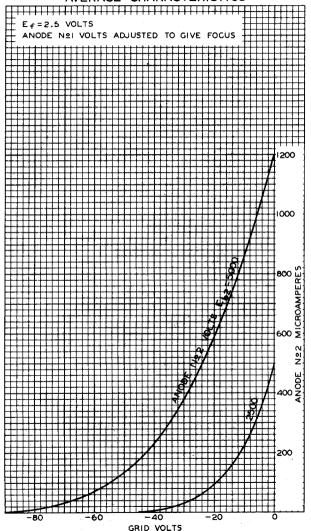
27.

HIGH-VACUUM CATHODE-RAY TUBE





AVERAGE CHARACTERISTICS



APRIL 20, 1942

RCA RADIOTRON DIVISION RCA MANUFACTURING COMPANY, INC.

92C-6390



KINESCOPE

KINESCOPE
MAGNETIC FOCUS MAGNETIC DEFLECTION
DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp
Disease Internal antennal Connected annual Manager 11
Grid No.1 to All Other Electrodes 6.5
Phosphor (For Curves, see front of this Section) No.4
Fluorescence and Phosphorescence White Persistence of Phosphorescence Medium
Focusing Method Magnetic Deflection Method
Deflection Angle (Approx.)
Ion Trap
Overall Length
Pactor Size Monroy I
Mounting Position
Base
Pin 1 - Heater
Pin 2- Grid No.1 Pin 6- No Connection Pin 12- Heater
Pin 7 - No Connection Cap - Anode, Grid No.3
Grid No. 5
Maximum Ratings, Design-Center Values:
ANODE VOLTAGE 10000 max. volts GRID-No.2 VOLTAGE 410 max. volts GRID-No.1 (CONTROL ELECTRODE) VOLTAGE:
Negative bias value
Positive peak value 2 max. volts PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode:
exceeding 15 seconds 410 max. volts
exceeding 15 seconds 410 max. volts After equipment warm-up period 125 max. volts Heater positive with respect to cathode 125 max. volts
See next page.

-Indicates a change.

10874



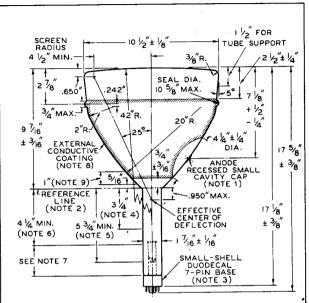
>	Typical Operation:
	Anode Voltage*
	Maximum Circuit Values:
	Grid-No.1-Circuit Resistance 1.5 max.megohms
>	Minimum Circuit Values:
	When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short—circuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:
	Grid-No.1-Circuit Resistance
	ages involved.
	Components: Ion-Trap Magnet [#] RCA Type No.203D1 Deflection Yoke A RCA Type No.201D1 Focusing Coil** RCA Type No.202D1
	The anode and grid No.3 which are connected together within tube are referred to herein as anode.
	8 rilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 8000 volts.
	The dc current required by this magnet is approx. 109 ma. for the typical
Ì	operating conditions shown. The horizontal deflecting-coil current required by this yoke to produce
	The horizontal deflecting-coil current required by this yoke to produce 8° picture width is approx. NTO ma. peak-to-peak under the typical operating conditions shown. The current varies directly as the square root of the anode voltage.
	** The dc current required by this coil is approx. 115 ma. for the typical operating conditions shown and using combined grid-Mo.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 20 foot-lamberts on a 8 x 8 picture area. Distance from reference line (see outline Drawing) to center line of air gap is approx. 9-1/4*.
-	

MAR. 15, 1948

→indicates a change.







- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BERIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DI-AMETER OF 1-7/8".
- NOTE 4: APPROX. DISTANCE TO CENTER OF FOCUSING-COIL AIR GAP.
- NOTE 5: DISTANCE TO INTERNAL POLE PIECES. PLANE THROUGH PIN NO.6 AND TUBE AXIS PASSES THROUGH LINE JOINING CENTERS OF POLE PIECES. DIRECTION OF PRINCIPAL FIELD OF ION-TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO PIN NO.6 AND SOUTH POLE TO PIN NO.12.





(continued from preceding page)

NOTE 6: LOCATION OF DEFLECTING YOKE AND FOCUSING-COIL AIR GAP MUST BE WITHIN THIS SPACE.

NOTE 7: KEEP THIS SPACE CLEAR FOR LON-TRAP MAGNET.

NOTE 8: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

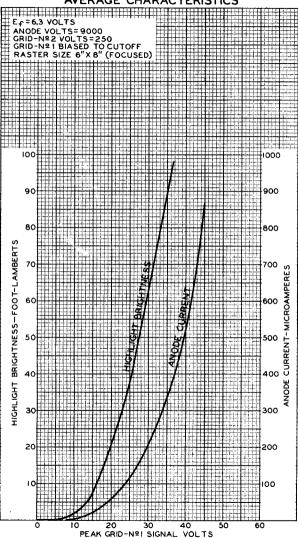
NOTE 9: FOR TUBE SUPPORT WHICH MUST NOT COVER SPECIFIED AREA AROUND ANODE CAP.

92CM-6663R2



OBR

AVERAGE CHARACTERISTICS





MAGNETIC FOCUS

MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode:
Voltage 6.3 ac or dc volts Current. 0.6 amp Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes 6 μμf Cathode to All Other Electrodes 5 μμf
External Conductive Coating to Anode \$\begin{cases} 2000 \text{ max.} & \mu \mu \mu \mathre{f} \\ Face Plate (Transmission of about 65%) . RCA "Filterglass" \\ Phosphor (For Curves, see front of this Section) \\ Phosphor (For Curves, see front of this Section) \\ Phosphor (For Curves, see front of this Section) \\ Phosphor (For Curves, see front of this Section) \\ No.4-Sulfide Type \\ White \\ Persistence of Phosphorescence . \\ Medium \\ Focusing Method . \\ Deflection Method . \\ Deflection Method . \\ Deflection Angle (Approx.) . \\ Deflection Angle (Approx.) . \\ Deflection Interpolation . \\ Deflection Interpolation . \\ Coverall Length . \\ Coverall Length . \\ Coverall Length . \\ Coverall Length . \\ Deflection Interpolation . \\ Deflection Method . \\ Deflection Interpolation . \\ Deflection Int
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Cap -Anode, Grid No.3
Maximum Ratings, Design-Center Values:
ANODEOVOLTAGE 12000 max. volts GRID-No.2 VOLTAGE. 410 max. volts GRID-No.1 VOLTAGE: 410 max. volts GRID-No.1 VOLTAGE: 125 max. volts Positive bias value. 125 max. volts Positive bias value. 2 max. volts Positive peak value. 2 max. volts PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode:
During equipment warm—up period not exceeding 15 seconds 410 max. volts After equipment warm—up period 150 max. volts Heater positive with respect to cathode. 150 max. volts Onder and grid No.3, which are connected together within tube, are referred to herein as anode.
The product of anode voltage and average anode current should be limited to 6 watts.

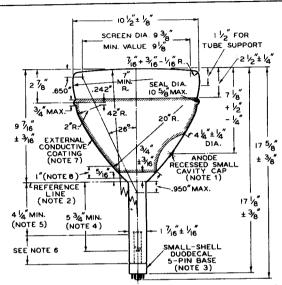
JOSP A. A



Grid-No.2 Voltage 250 250 volts Grid-No.1 Voltage for Visual Extinction of Undeflected				
Grid-No.2 Voltage for Visual Extinction of Undeflected Focused Spot27 to -63 -27 to -63 volts Focusing-Coil Current (DC, Approx.)† . 115 125 ma Ion-Trap-Magnet Current (DC, Approx.)* . 155 180 ma Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max. megohms Minimum Circuit Values: The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 ma. If the supply permits the instantaneous short-circuit current to 5 ma. If the supply permits the instantaneous short-circuit current to should be as follows: Grid-No.1-Circuit Resistance or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows: Grid-No.1-Circuit Resistance	Typical Operation:			
Focusing—Coil Current (DC, Approx.)†. 115 125 ma Ion—Trap—Magnet Current (DC, Approx.)*. 155 180 ma Maximum Circuit Values: Grid—No.1—Circuit Resistance	Grid-No.2 Voltage Grid-No.1 Voltage for Visual Extinction of Undeflected	250	250	volts volts
Ion—Trap—Magnet Current (DC, Approx.)# . 155 180 ma Maximum Circuit Values: Grid—No.1—Circuit Resistance . 1.5 max. megohms Minimum Circuit Values: The power supply should be of the limited—energy type with inherent regulation to limit the continuous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to exceed 1 ampere, or is capable of storing, more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows: Grid—No.1—Circuit Resistance . 150 min. ohms Grid—No.1—Circuit Resistance . 1500 min. ohms Grid—No.2—Circuit Resistance . 15000 min. ohms The resistors used should be capable of withstanding the applied voltage. Components: Horizontal—Deflection—Output & High—Voltage Transformer: For use with pulse—operated high-voltage supply giving 10000—12000 volts . RCA—207R1 Width Control . RCA—207R1 Width Control . RCA—207R1 Width Control . RCA—207R1 Width Control . RCA—207B1 Deflecting Yoke RCA—205D3 Focusing Coil vo.106, or equivalent, positioned with center line of air gan approximately 3—1/4 inches from Reference Line (See outling Drawing) . The indicated currents are for the condition with the promoted grid—No.106, or equivalent, positioned with center line of air gan approximately 3—1/4 inches from Reference Line (See outling Drawing) . The indicated currents are for the condition with the produced grid—No.106, or equivalent, positioned with center line of air gan approximately 3—1/4 inches from Reference Line (See outling Drawing) . The indicated currents are for the condition with the produced grid—No.106, or equivalent, positioned with main cole pieces longitudinally opposite internal pole pieces, and rotated to give maximum brightness.	Focusing-Coil Current		- 27 to - 63	volts
Maximum Circuit Values: Grid—No.1—Circuit Resistance	(DC, Approx.)†	115	125	ma
Minimum Circuit Values: The power supply should be of the limited—energy type with inherent regulation to limit the continuous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows: Grid—No.1—Circuit Resistance . 150 min. ohms Grid—No.2—Circuit Resistance . 470 min. ohms Anode—Circuit Resistance . 15000 min. ohms The resistors used should be capable of withstanding the applied voltage. Components: Horizontal—Deflection—Output & High—Voltage Transformer: For use with pulse—operated high—voltage supply giving 10000—12000 volts . RCA—207T1 Horizontal Linearity Control . RCA—207R1 Wertical—Deflection Output Transformer . RCA—208T1 Vertical—Deflection Output Transformer . RCA—205D1 1on—Trap Magnet (Permanent—Magnet Type) . RCA—203D1 Focusing Coiloo . RCA—202D1 **Filliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 8000 volts. * **For JETEC focusing coil wo.106, or equivalent, positioned with center line of air gap approximately 3—1/4 inches from Reference Line (See Outline Drawing). The indicated currents are for the condition with the combined grid—No.1 bias voltage and video—signal voltage adjusted to produce a highlight brightness of 25 foot—lamberts for 11000 volts, on an 8*x 6* picture area. **For JETEC ion—Trap Magnet No.108, or equivalent, positioned with main cole pieces longitudinally opposite internal pole pieces, and rotated to give maximum brightness.	(DC, Approx.)#	155	180	ma
Minimum Circuit Values: The power supply should be of the limited—energy type with inherent regulation to limit the continuous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows: Grid—No.1—Circuit Resistance . 150 min. ohms Grid—No.2—Circuit Resistance . 470 min. ohms Anode—Circuit Resistance . 15000 min. ohms The resistors used should be capable of withstanding the applied voltage. Components: Horizontal—Deflection—Output & High—Voltage Transformer: For use with pulse—operated high—voltage supply giving 10000—12000 volts . RCA—207T1 Horizontal Linearity Control . RCA—206R1 Vertical—Deflection Output Transformer . RCA—206R1 Vertical—Deflection Output Transformer . RCA—206R1 Vertical—Deflection Output Transformer . RCA—205D1 Ion—Trap Magnet (Permanent—Magnet Type) . RCA—202D1 Focusing Coiloo . RCA—202D1 Focusing Coiloo . RCA—202D1 Focusing Coiloo . RCA—202D1 Focusing Coiloo . RCA—202D1 . Refliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 8000 volts . For JETEC focusing coil wo.106, or equivalent, positioned with center line of air gap approximately 3—1/4 inches from Reference Line (See Outline Drawing) . The indicated currents are for the condition with the combined grid—No.1 bias voltage and video—signal voltage adjusted to produce a highlight brightness of 25 foot—lamberts for 9000 volts , or 30 foot—lamberts for 1100 volts, on an 8 x 6 picture area. **For JETEC Ion—Tran Magnet No.108, or equivalent, located with main cole pieces longitudinally opposite internal pole pieces, and rotated to give maximum brightness.	1 -			}
The power supply should be of the limited—energy type with inherent regulation to limit the continuous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows: Grid—No.1—Circuit Resistance . 150 min. ohms Grid—No.2—Circuit Resistance . 470 min. ohms Anode—Circuit Resistance . 15000 min. ohms The resistors used should be capable of withstanding the applied voltage. Components: Horizontal—Deflection—Output & High—Voltage Transformer: For use with pulse—operated high—voltage supply giving 10000—12000 volts . RCA—207T1 Horizontal Linearity Control . RCA—206R1 Vertical—Deflection Output Transformer . RCA—206R1 Vertical—Deflection Output Transformer . RCA—206R1 Vertical—Deflection Output Transformer . RCA—205D1 Ion—Trap Magnet (Permanent—Magnet Type) . RCA—202D1 Focusing Coiloo . RCA—202D1 Focusing Coiloo . RCA—202D1 Focusing Coiloo . RCA—202D1 Focusing Coiloo . RCA—202D1 hierof air gap approximately 3—1/4 inches from Reference Line (See Outline Drawing). The indicated currents are for the condition with the combined grid—No.1 bias voltage and video—signal voltage adjusted to produce a highlight brighness of 25 foot—lamberts for 1000 volts, on an 8*x 6* picture area. * For JETEC Ion—Trap Magnet No.108, or equivalent, postioned with main cole pieces longitudinally opposite internal pole pieces, and rotated to give maximum brighness.	Grid-No.1-Circuit Resistance .		. 1.5 max.	megohms
Inherent regulation to limit the continuous short—circuit current to 5 ma. If the supply permits the instantaneous short—circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows: Grid—No.1—Circuit Resistance	1			
Components: Horizontal—Deflection—Output & High—Voltage Transformer: For use with pulse—operated high-voltage supply giving 10000—12000 volts	Inherent regulation to limit trent to 5 ma. If the supply circuit current to exceed 1 am more than 250 microcoulombs, touit between indicated electrishould be as follows: Grid-No.1-Circuit Resistance Grid-No.2-Circuit Resistance .	he continuou ermits the pere, or is he effective ode and th	us short—circuinstantaneous capable of e resistance he output ca	uit cur— s short— storing in cir— upacitor ohms ohms
Horizontal-Deflection-Output & High-Voltage Transformer: For use with pulse-operated high-voltage supply giving 10000-12000 volts	The resistors used should be c plied voltage.	apable of v	withstanding	the ap-
For use with pulse-operated high-voltage supply giving 10000-12000 volts	Components:			
l l	For use with pulse-operated giving 10000-12000 volts. Horizontal Linearity Control Width Control. Vertical-Deflection Output Train Deflecting Yoke. Ion-Trap Magnet (Permanent-Magnet (Permanent-Magnet) Permanent-Magnet (Permanent-Magnet) Permanent (Permanent) Per	nsformer se with decrea foot be less or equivalent 1/4 inches fourrents are ge and video of 25 foots t, on an 8* t, on an 8*	Supply RC RC RC RC RC RC RC RC RC RC RC RC RC	A-217T1 A-207R1 A-206R1 A-204T9 A-205D1 A-203D3 A-202D1 age. In h center ine (See ion with adjusted







92CM-6663R3

- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BERIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE MORE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-778".
- NOTE 4: DISTANCE TO INTERNAL POLE PIECES. PLANE THROUGH VACANT PIN POSITION NO.6 AND TUBE AXIS PASSES THROUGH LINE JOINING CENTERS OF POLE PIECES. DIRECTION OF PRINCIPAL FIELD OF ION—TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO VACANT PIN POSITION NO.6 AND SOUTH POLE TO PIN NO.12.
- NOTE 5: LOCATION OF DEFLECTING YOKE AND FOCUSING-COIL MUST BE WITHIN THIS SPACE.

10874-6



NOTE 6: KEEP THIS SPACE CLEAR FOR ION-TRAP MAGNET.

NOTE 7: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

NOTE 8: FOR TUBE SUPPORT WHICH MUST NOT COVER SPECIFIED CLEAR AREA AROUND ANODE CAP.

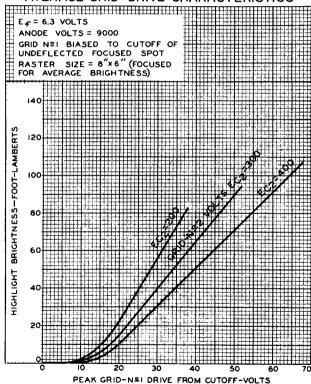
MAY 1, 1950



CURVES

The following Grid-Drive Characteristics Curves are for the condition with grid No.1 biased to give visual extinction of the undeflected, focused spot. Inviewing television pictures, it will be found that the actual cutoff voltage corresponding to black in the picture is approximately 5 volts less negative than shown on the curves; similarly, the grid-No.1 drive to obtain a given anode current or light output is also about 5 volts less.

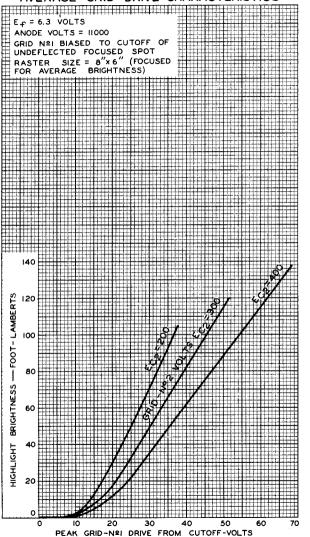
AVERAGE GRID-DRIVE CHARACTERISTICS



92CM-7448

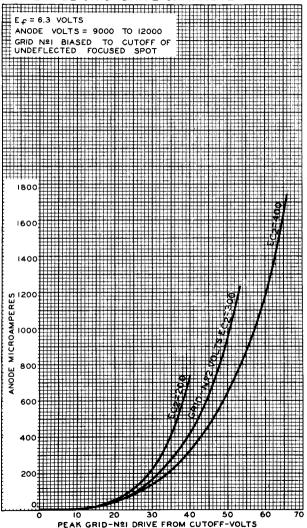


AVERAGE GRID-DRIVE CHARACTERISTICS





AVERAGE GRID-DRIVE CHARACTERISTICS





MAGNETIC FOCUS

KINESCOPE METAL-BACKED FLUORESCENT SCREEN

MAGNETIC DEFLECTION

MAGNET TO TOOOS MAGNE	TIC DEFECTI	1011
DATA General:		
Heater, for Unipotential Cathode: Voltage 6.3 Current 0.6 Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes Cathode to All Other Electrodes External Conductive Coating to Anode	6 5	. amp <i>щ</i> f <i>щ</i> f
Face Plate (With about 66% light transmission). Phosphor (For Curves, see front of this Section) Fluorescence and Phosphorescence Persistence of Phosphorescence Focusing Method. Deflection Method. Deflection Angle (Approx.) Overall Length Greatest Diameter of Bulb. Minimum Useful Screen Diameter Mounting Position. Cap Recessed Small Cavi Base Small-Shell Duodecal 5-P BOTTOM VIEW	P4—Sulfi P4—Sulfi M M M 17–5/8" 10–1/2" 10–1/2" ty (JETEC No.	erglass de Type White Short agnetic 500 ± 3/8" ± 1/8" 9-1/8" Any
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode	n 12 – Heater Cap – Anode C – Externa Conduc Coat	ctive
Maximum Ratings, Design-Center Values:		
ANODE VOLTAGE	12000 max. 410 max.	volts volts
Negative bias value	125 max. 0 max. 2 max.	volts
not exceeding 15 seconds After equipment warm—up period Heater positive with respect to cathode.	140 max.	

OFPA:A



Typical Operation:		
Anode Voltage*	11000 250	volts volts
Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot. Focusing-Coil Current (DC, approx.) Spot Position.	-27 to -63	volts ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

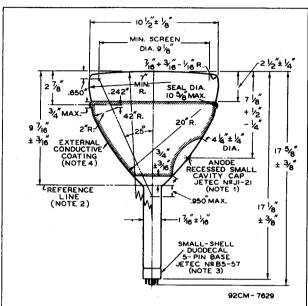
- * Brilliance and definition decrease with decreasing anode voltage. In general, the anode-voltage should not be less than 8000 volts.
- For specimen focusing coil similar to JETEC Focusing Coil No. 106 positioned with air gap toward kinescope screen and center line of air gap 3-1/4 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No. 10 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 50 foot-lamberts on an 8 * x 6 * picture area sharply focused at center of screen.
- # The center of the undeflected, unfocused spot will fall within a circle having 16-mm radius concentric with the center of the tube face.

OPERATING NOTES

X-Ray Warning. When operated at or below the maximum ratings shown in the tabulated data, the IOFP4-A does not produce any harmful x-ray radiation. All types of picture tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.





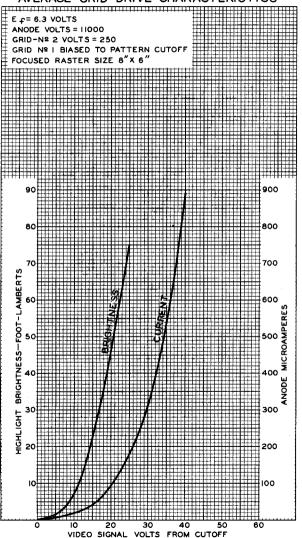


- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE JETEC REFERENCE-LINE GAUGE NO.112 (1.500" + .003" -.000" I.D. AND 2" LONG) WILL REST ON BULB COME.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY.
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.





AVERAGE GRID-DRIVE CHARACTERISTICS





IOKP7 OSCILLOGRAPH TUBE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

DATA	
General:	. [
Heater, for Unipotential Cathode: Voltage 6.3	amp 5 µµf 5 µµf No.7 Blue Long gnetic 500 £ 3/8" £ 1/8"
Pin 1-Heater Pin 2-Grid No.1 Pin 6-No Connection Pin 7-No Connection Connecti	de
Maximum Ratings, Design-Center Values:	
ANODE® VOLTAGE	volts volts volts volts volts volts volts volts volts
Typical Operation:	١,, ١
Anode Voltage* 7000 9000 Grid-No.2 Voltage 250 250 Grid-No.1 Voltage Range ^o 27 to -63 -27 to -63 Focusing Coil Cur. (Approx.)* 93 105 Spot Position *	volts volts volts ma
• D * O A #: See next page.	





Maximum Circuit Values:

1.5 max. megohms Grid-No.1-Circuit Resistance .

Minimum Circuit Values:

When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous shortcircuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

Grid-No.1-Circuit Resistance	200 min.	ohms
Grid-No.2-Circuit Resistance	820 min.	ohms
Anode-Circuit Resistance	11000 min.	ohms

The resistors used should be capable of withstanding the voltages involved.

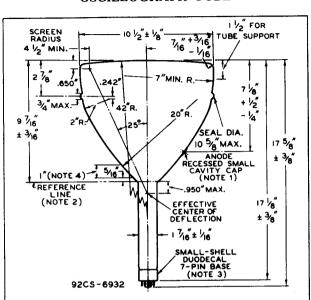
Components:

RCA Focusing Coil. . RCA Type No. 202D1

- Anode and grid No.3, which are connected together within tube, are referred to herein as anode.
- At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
- * Brilliance and definition decrease with decreasing anode voltage. general, the anode voltage should not be less than 7000 volts.
- For visual extinction of undeflected, focused spot.
- For JETEC Focusing Coil No.106, or equivalent, with center-line of air gap approximately 3-3/a* from reference line (see Outline Drawing), and total amode current of 200 microamperes.
- # The center of the undeflected, unfocused spot will fall within a circle having 18 mm radius concentric with the center of the tube face.



10KP7 OSCILLOGRAPH TUBE



NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 100. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.3.

NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" - .000" I.D. AND 2" LONG WILL REST ON BULB CONE.

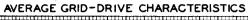
NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITH-IN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".

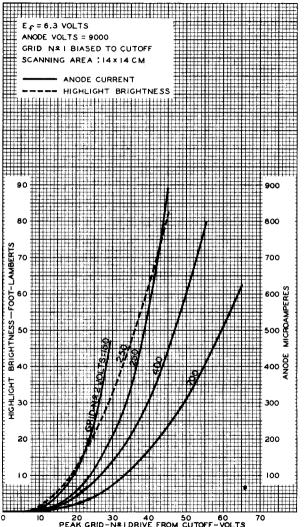
NOTE 4: FOR TUBE SUPPORT WHICH MUST BE KEPT AT LEAST 2" AWAY FROM ANODE CAP.





IOKP7





SEPT. 28,1948



OS A

MONITOR KINESCOPE

METAL-BACKED SCREEN

ELECTROSTATIC FOCUS

MAGNETIC DEFLECTION

	DATA
	General:
	Heater, for Unipotential Cathode: Voltage 6,3 amp Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes
7	Pin 11 - Cathode ①*② Maximum Ratings, Design-Center, Values:
ı	ULTOR® VOLTAGE
-1	Positive peak value 2 max. volts
	For curves, see front of this Section. In the 10SP4,grid No.4 which has the ultor function, and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.



MONITOR KINESCOPE

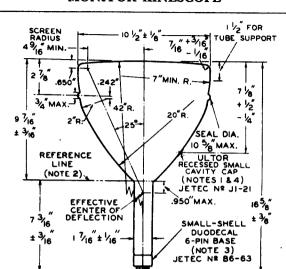
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to catho During equipment warm-up period not exceeding 15 secon After equipment warm-up period Heater positive with respect to catho	nds . 410 max. 180 max.	volts
Equipment Design Ranges:		
Grid-No.1 Voltage for Visual Extinction of 8" x 6" Raster 9% Max. Grid-No.3 Current**		olts
Examples of Use of Design Ranges:		
For ultor voltage of 12000 and grid-No.2 voltage of 200 Grid-No.3 Voltage for	14000 200	volts volts
Focus with Ultor Current of 100 µamp . 1400 to 1900 Grid-No.1 Voltage for Visual Extinction of		volts
8" x 6" Raster18 to -48 Maximum Circuit Values:	-18 to -48	VOILS
Grid-No.1-Circuit Resistance	. 1.5 max.	megohms
Brilliance and definition decrease with decr	reasing ultor vol ss than 10000 volt	tage. In s.

For x-ray shielding considerations, see sheet X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section

Grid-No.3 Current increases as the ultor voltage is decreased.



MONITOR KINESCOPE



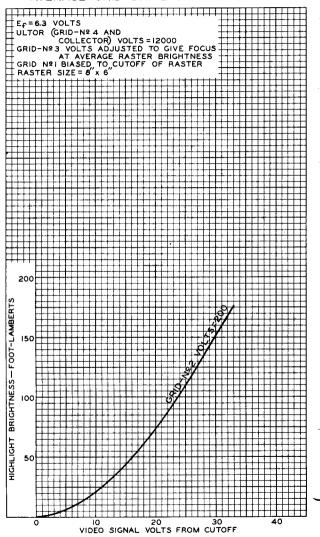
92CM - 7729

(OS)

- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND PIN No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ±10°. BULB TERMINAL IS ON SAME SIDE AS PIN No.6.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No.112) 1.500" + 0.003" 0.000" 1.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED: IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".
- NOTE 4: TUBE SUPPORT MUST BE KEPT AT LEAST 2" AWAY FROM BULB TERMINAL.

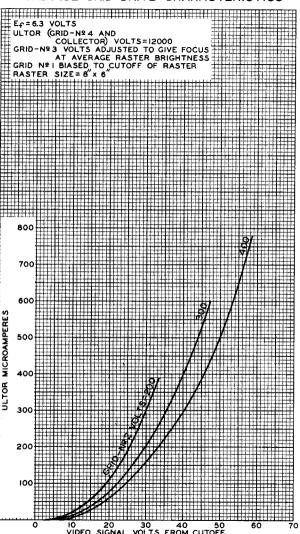


AVERAGE GRID-DRIVE CHARACTERISTIC



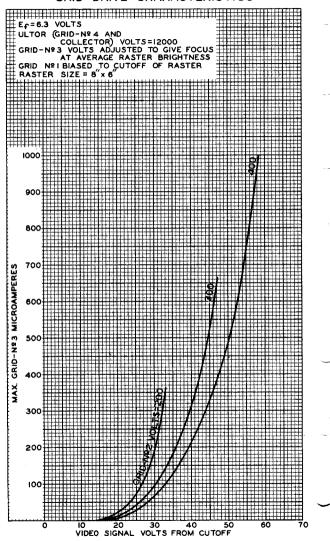


AVERAGE GRID-DRIVE CHARACTERISTICS





GRID-DRIVE CHARACTERISTICS





12DP7-A OSCILLOGRAPH TUBE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

DATA	
General:	
General: Heater, for Unipotential Cathode: Voltage 6.3	ffffewgcco""
Minimum Useful Screen Diameter	
Pin 1 - No Connection Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Connection Pin 5 - Grid No. 1 Pin 6 - No Connection Pin 7 - Cathode Pin 8 - Heater Cap - Anode, Grid No. 3	
Maximum Ratings, Design-Center Values: ANODE® VOLTAGE	is is is is
Typical Operation: Anode Voltage*	ts

2087-1



I2DP7-A OSCILLOGRAPH TUBE

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

Minimum Circuit Values:

When the output capacitor of the power supply is capable of storing more than 250 microcoulombs, and when the inherent regulation of the power supply permits the instantaneous short-circuit current to exceed 1 ampere, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

The resistors used should be capable of withstanding the volt-

Components:

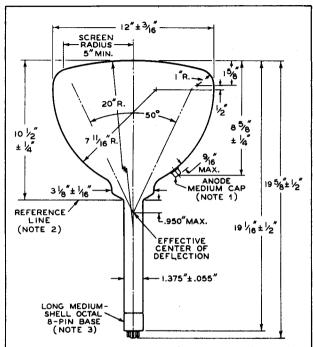
RCA Focusing Coil...... RCA Type No. 202D1

- Anode and grid No. 3, which are connected together within tube, are referred to herein as anode.
- At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
- * Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than #000 volts.
- O For visual extinction of undeflected focused spot.
- For JETEC Focusing Coil No.106, or equivalent, with center line of air gap approximately 4-1/8" from reference line (see Outline Drawing), and total anode current of 200 microamperes.
- # The center of the undeflected, unfocused spot will fall within a circle having 20 mm radius concentric with the center of the tube face.



12DP7-A OSCILLOGRAPH TUBE



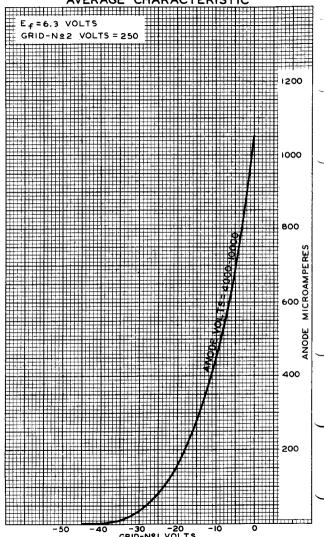


- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.5 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE OF TUBE AS PIN NO.5.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE 1.430" + .003" - .000" I.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: COF BULB WILL NOT DEVIATE MORE THAN 20 IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

92CM-6375R3



AVERAGE CHARACTERISTIC





12DP7-B

OSCILLOGRAPH TUBE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

ROPLE

Supersedes Type 12DP7-A

General:
Heater, for Unipotential Cathode:
Voltage 6.3 ac or dc volts
Current 0.6 amp
Direct Interelectrode Capacitances (Approx.):
Grid No.1 to All Other Electrodes 9 μμ
Cathode to All Other Electrodes 6
Faceplate (with about 66% light transmission) Filterglass
Phosphor (For Curves, see front of this Section) Pr
l =-
Fluorescence
Persistence Long
Focusing Method Magnetic
Deflection Method Magnetic
Deflection Angle (Approx.)
Overall Length 19-5/8" ± 1/2"
Greatest Diameter
Minimum Useful Screen Diameter 10
Weight (Approx.) 8 lbs
Mounting Position Any
Cap Medium (JETEC No.C1-5,
Bulb
Base Long Medium-Shell Octal 8-Pin (JETEC No.B8-65)
BOTTOM VIEW
Pin 1 – No Pin 6 – No
Connection 4 03 Connection
Connection
Pin 2 - Heater (3) - (6) Pin 7 - Cathode
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 8 - Heater
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Pin 4 - No Pin 5 - Cathode Pin 8 - Heater Cap - Ultor
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Connection One of the connection One of the
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Pin 4 - No Pin 5 - Cathode Pin 8 - Heater Cap - Ultor
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Connection Pin 5 - Grid No. 1 Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No. 3, Collector)
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Connection Pin 5 - Grid No. 1 Maximum Ratings, Design-Center Values:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. GRID-No.2 VOLTAGE: Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE.
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE: Positive value (DC or Peak AC) 700 max. volts
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC) 700 max. volt: Negative value (DC or Peak AC) 180 max. volt:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Regative value (DC or Peak AC). Regative value (DC or Peak AC). Regative VOLTAGE: Regative VOLTAGE: Regative VOLTAGE: Regative VOLTAGE: Regative VOLTAGE:
Pin 2 - Heater Pin 3 - Grid No. 2 Pin 4 - No Connection Pin 5 - Grid No. 1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Negative bias value. Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No. 3, Collector) 10000 max. volts 180 max. volts 180 max. volts 180 max. volts
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE: Positive value (DC or Peak AC). Negative value (DC or Peak AC). Negative bias value Negative bias value 180 max. volt: Repositive bias value 180 max. volt: Repositive bias value 0 max. volt: Repositive bias value 180 max. volt: Repositive bias value 0 max. volt: Repositive bias value 0 max. volt: Repositive bias value 0 max. volt: Repositive bias value 0 max. volt: Repositive bias value
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive peak value 180 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Para Brid No.2 Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) 10000 max. volt: 10000 max. volt: 180 max. volt: 0 max. volt: Positive peak value 2 max. volt:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive peak value 180 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Para Brid No.2 Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) 10000 max. volt: 10000 max. volt: 180 max. volt: 0 max. volt: Positive peak value 2 max. volt:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive peak value 180 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Para Brid No.2 Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) 10000 max. volt: 10000 max. volt: 180 max. volt: 0 max. volt: Positive peak value 2 max. volt:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive peak value 180 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Para Brid No.2 Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) 10000 max. volt: 10000 max. volt: 180 max. volt: 0 max. volt: Positive peak value 2 max. volt:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive peak value 180 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Positive peak value 2 max. volt: Para Brid No.2 Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) 10000 max. volt: 10000 max. volt: 180 max. volt: 0 max. volt: Positive peak value 2 max. volt:
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Negative value (DC or Peak AC). Negative bias value Positive bias value Positive bias value In the 12DP7-B, grid No.3 which has the ultor function and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highes devotage for accelerating the electrons in the beam prior to its design to the prior to the prior to
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive bias value Positive peak AC) Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) Nax. volt: Positive peak AC) Positive pea
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Negative value (DC or Peak AC). Regative bias value Positive bias value Positive bias value Positive peak AC) Pin 7 - Cathode Pin 8 - Heater Cap - Ultor (Grid No.3, Collector) Nax. volt: Positive peak AC) Positive pea
Pin 2 - Heater Pin 3 - Grid No.2 Pin 4 - No Connection Pin 5 - Grid No.1 Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE. Positive value (DC or Peak AC). Negative value (DC or Peak AC). Negative value (DC or Peak AC). Negative bias value Positive bias value Positive bias value In the 12DP7-B, grid No.3 which has the ultor function and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highes devotage for accelerating the electrons in the beam prior to its design to the prior to the prior to



12DP7-B

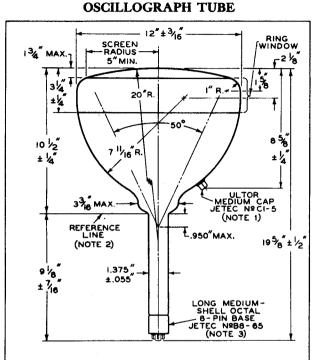
OSCILLOGRAPH TUBE

Obolin Logical II Tobe	
PEAK HEATER-CATHODE VOLTAGE:	max. volts
Heater negative with respect to cathode . 125 Heater positive with respect to cathode . 125	max. volts
Equipment Design Ranges:	
For any ultor voltage $(E_{ m u})$ between 4000* and 10 and grid-No.2 voltage $(E_{ m C_2})$ between 150 and γ	7000 volts
Grid-No.1 Voltage for Visual Extinction of Undeflected	
Focused Spot 10% to 28% of E _c	
Grid-No.2 Current15 to +15	μamp
Focusing-Coil Current (DC) ^{OO} $\left[\sqrt{\frac{E_u}{4000}} \times 88.5\right] \pm 19$	5% ma
Spot Position *#	
Examples of Use of Design Ranges:	
For ultor voltage of 4000 7000 and grid-No.2 voltage of 250 250	
Grid-No.1 Voltage for Visual Extinction of Undeflected	
Focused Spot -25 to -70 -25 to Focusing-Coil Current (DC) . $88.5 \pm 15\%$ 117 \pm 1	–70 volts L5% ma
Maximum Circuit Values:	
Grid-No.1-Circuit Resistance 1.5 m	ax. megohms
Brilliance and definition decrease with decreasing ulto general, the ultor voltage should not be less than 4000	r voltage. Ir volts.
OF For specimen focusing coil similar to JETEC Focusin positioned with air gap toward faceplate and center it u-1/8" from Reference Line (see Outline Drawing) and ul 200 microamperes.	g Coil No.106 ne of air gap tor current of
## The center of the undeflected, unfocused spot will fall a having a 20-mm radius concentric with the center of the	vithin a circle tube face.



12DP**7-B**





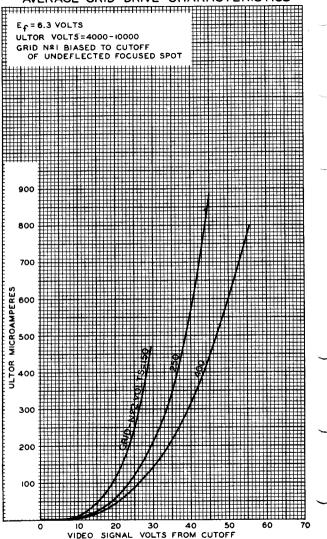
- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.5 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 10°. ULTOR TERMINAL IS ON SAME SIDE OF TUBE AS PIN NO.5.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE GAUGE
 1.430" + .003" -.000" 1.D. AND 2" LONG WILL REST ON BULB
 CONE.
- NOTE 3: & OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF THE BOTTOM OF THE BASE.

92CM-6375R5

2012-1-8

RCA 12DP7-B

AVERAGE GRID-DRIVE CHARACTERISTICS



APRIL 9, 1952

TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6943RI



PHO LA

METAL-BACKED FLUORESCENT SCREEN

MAGNETIC FOCUS MAGNETIC DEFLECTION

I	DATA			
ŀ	General:			
I	Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6 Cathode to All Other Electrodes 5 External Conductive Coating to Anode 2500 max.	amp uµuf uµuf uµuf		
	Pace Plate (With about 66% light transmission) . Filtergl. Phosphor (For Curves, see front of this Section) P4—Sulfide Ty Fluorescence and Phosphorescence	ype ite ort tic 540 /8" /8"		
İ	Pin 1-Heater Pin 12-Heater			
	Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Cap - Anode C - External Conductive Coating	,		
۱	Maximum Ratings, Design-Center Values:			
(ANODE VOLTAGE			
	Negative bias value	ts		
	Heater negative with respect to cathode: During equipment warm-up period not exceeding 15 seconds 410 max. vol After equipment warm-up period 140 max. vol Heater positive with respect to cathode: 140 max. vol	ts		





KINESCOPE

Typical Operation:		
Anode Voltage*	11000	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage for Visual		, l
Extinction of Undeflected Focused Spot.		volts
Focusing-Coil Current (DC, approx.).	135	ma
Spot Position	#	- 1

Maximum Circuit Values:

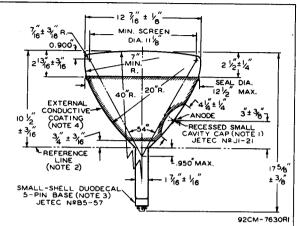
Grid-No.1-Circuit Resistance 1.5 max. megohms

- Brilliance and definition decrease with decreasing anode voltage. In deneral, the anode voltage should not be less than 9000 volts.
- For specimen focusing coil similar to JETEC Focusing Coil No.106 positioned with air gap toward kinescope screen and center line of air gap 3-1/4 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 35 foot-lamberts on a 10 " x 7-1/2" picture area sharply focused at center of screen.
- # The center of the undeflected, unfocused spot will fall within a circle having 20-mm radius concentric with the center of the tube face.

OPERATING NOTES

X-Ray Warning. When operated at or below the maximum ratings shown in the tabulated data, the IZKP4-A does not produce any harmful x-ray radiation. All types of picture tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.



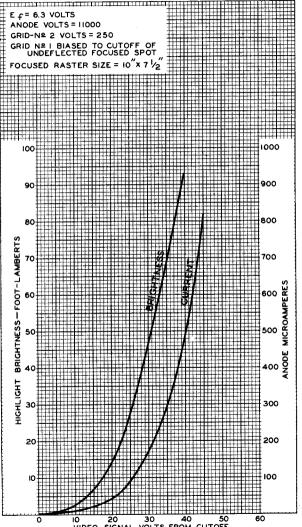


- <code>WOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm~10^\circ$. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.</code>
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE JETEC REFERENCE-LINE GAUGE No.112 (1.500" + .003" .000" 1.D. AND 2" LONG) WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY.
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



12KP4-A







I2LP4

KINESCOPE

MAGNETIC FOCUS MAGNETIC DEFLECTION

		DATA		
G	eneral:			
	eater, for Unipotential Cat Voltage Current	6.3	fox.):	or dc volts amp μμ μμ
	External Conductive Coating		. {3000 ma	ax. $\mu\mu$ f
For Del Del Del Del Del Del Del Del Del Del	hosphor (For Curves, see from Fluorescence	ont of this s	Recessed S—Shell Duck	in. No.4 White White Medium Magnetic 570 ield Magnet 2-7/16 ± 1/8" 11-3/8" 7-1/2" × 10" Any Small Cavity odecal 7-Pin
	Pin 7-No Connection			-Heater -Anode, Grid No.3
AN GR GR	Aximum Ratings, Design—Center AND—No.2 VOLTAGE. AND—No.1 (CONTROL ELECTRODE) AND—No.1 (CONTROL ELECTRODE) AND—No.1 (CONTROL ELECTRODE) AND AND AND AND AND AND AND AND AND AND	VOLTAGE: t to cathode period not seconds	. 0 : 2 :	max. volts max. volts max. volts max. volts max. volts max. volts
•	Anode and grid No.3, which are referred to herein as anode.	connected toge	ther within:	tube,are re-





Typical Operation:			
Anode Voltage*	9000	11000	volts
Grid-No.2 Voltage	250	250	volts
Grid-No.1 Voltage for Visual			
Extinction of Undeflected			
Focused Spot	–27 to <i>–</i> 63	-27 to -63	volts
Focusing-Coil Current			
(DC, Approx.)**.	115	125	ma
lon-Trap Magnet Current (DC)#.	155	180	ma
l.,, ., ., .			

Maximum Circuit Values:

Grid-No.1 - Circuit Resistance. 1.5 max. megohms

Minimum Circuit Values:

The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 milliamperes. If the supply permits the instantaneous short-circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

The resistors should be capable of withstanding the applied voltages.

* Brilliance and definition decrease with decreasing anode voltage.In general, the anode voltage should not be less than 9000 volts.

For JETEC Focusing Coil No.106, or equivalent, positioned with center line of air gap approximately 3-1/4" from Reference Line (See Outline Drawing). The indicated currents are for the condition with the combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 25 foot-lamberts for 9000 volts, or 30 foot-lamberts for 11000 volts, on a 7-1/2" x 10" picture area.

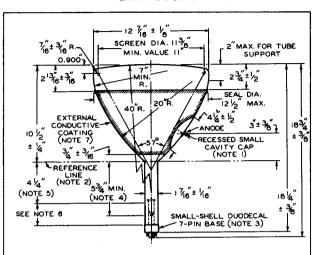
For JETEC lon-Trap Magnet No.109, or equivalent, located with main pole pieces longitudinally opposite internal pole pieces, and rotated to give good line focus with maximum brightness.

CURVES

The following Grid-Drive Characteristics Curves are for the condition with grid No.1 biased to give visual extinction of the undeflected, focused spot. In viewing television pictures, it will be found that the actual cutoff voltage corresponding to black in the picture is approximately 5 volts less negative than shown on the curves; similarly, the grid-No.1 drive to obtain a given anode current or light output is also about 5 volts less negative.







NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.

NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" - .000" 1.D. AND 2" LONG WILL REST ON BULB CONE.

NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILLFALL WITH-IN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".

NOTE 4: DISTANCE OF INTERNAL POLE PIECES. PLANE THROUGH PIN No.6 AND TUBE AXIS PASSES THROUGH LINE JOINING CENTERS OF POLE PIECES. DIRECTION OF PRINCIPAL FIELD OF ICN-TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO PIN No.6 AND SOUTH POLE TO PIN No.12.

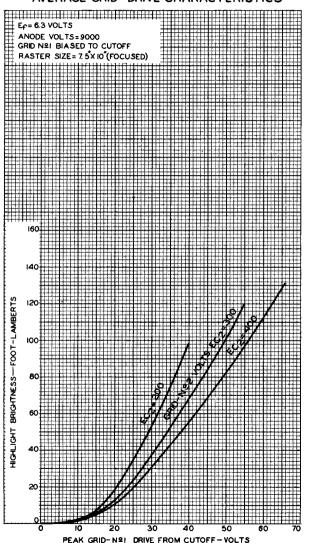
NOTE 5: LOCATION OF DEFLECTING YOKE AND FOCUSING-COIL MUST BE WITHIN THIS SPACE.

NOTE 6: KEEP THIS SPACE CLEAR FOR ION-TRAP MAGNET.

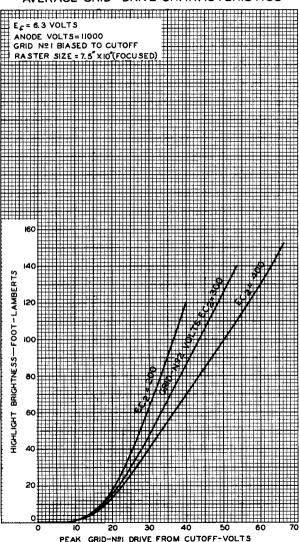
NOTE 7: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

92CM-7276

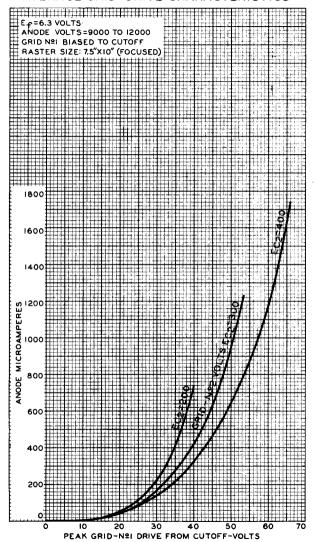














PIA. KINESCOPE

MAGNETIC FOCUS MAGNETIC DEFLECTION	
DATA	
General:	
Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes 6 — — — — — — — — — — — — — — — — — —	mp uf uf
External Conductive Coating to Anode . $\begin{cases} 2000 \text{ max. } \mu \mu \\ 750 \text{ min. } \mu \end{cases}$	
Face Plate (Transmission of about 65%). RCA "Filterglass Phosphor (For Curves, see front of this Section) No.4—Sulfide Tyr Fluorescence and Phosphorescence . Whit Persistence of Phosphorescence . Medic Focusing Method . Magnet Deflection Method . Magnet Deflection Angle (Approx.)	s" pee micco et" " " yy
Pin 1-Heater Pin 12-Heater	
Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Cap -Anode, Grid No.3	
Maximum Ratings, Design-Center Values:	
ANODE OLTAGE*. 12000 max. volt GRID-No.2 VOLTAGE. 410 max. volt GRID-No.1 VOLTAGE:	
Negative bias value	ts ts
Heater positive with respect to cathode. 150 max. volt	
Anode and grid No.3, which are connected together within tube, are referred to herein as anode.	;-

The product of anode voltage and average anode current should be limited to 6 watts.

21.74.6



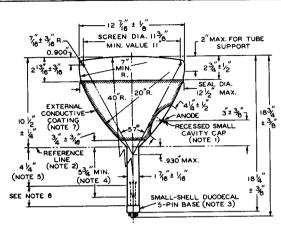
KINESCOPE

Typical Operation:			
Anode Voltage*	9000 250	11000 250	volts volts
Focused Spot Focusing-Coil Current		ŕ	volts
(DC, Approx.)**. Ion-Trap Magnet Current (DC)#	115 155	125 180	ma ma
Maximum Circuit Values:			
Grid-No.1 - Circuit Resistance.		1.5 max.	megohms
Minimum Circuit Values:			
inherent regulation to limit the rent to 5 milliamperes. If the neous short-circuit current to of storing more than 250 micretance in circuit between indicapacitor should be as follows Grid-No.1-Circuit Resistance. Grid-No.2-Circuit Resistance The resistors should be capab voltages.	e supply exceed 1 occulombs cated elec	permits the ir ampere, or is the effective ctrode and the 150 min. 470 min. 15000 min.	nstanta— capable resis— output ohms ohms ohms
Components:			
Horizontal-Deflection-Output & For use with pulse-operated giving 10000-12000 volts. Horizontal Linearity Control. Width Control Vertical-Deflection Output Traideflecting Yoke	higȟ—volta	age supply RC RC RC RC RC RC RC	CA-217T1 CA-207R1 CA-206R1 CA-204T9 CA-205D1 CA-203D3 CA-202D1
* Brilliance and definition decrease general, the anode voltage should the state of air gap approximately 3—Drawing). The indicated current bined grid-No.1 bias voltage a produce a highlight brightness of 20 foot-lamberts for 11000 volts.	or equivaler 1/4" from Re s are for the nd video—s f 17 foot—la , on a 10" x	nt, positioned with eference Line (Sene ne condition with ignal voltage ad amberts for 9000 v 7-1/2" picture an	th center e Outline the com- justed to volts, or rea.
 For JETEC Ion-Trap Magnet No.108, pieces longitudinally opposite in give maximum brightness. Renewal Sales item only. 	nternal pol	e pieces, and rot	tated to





KINESCOPE



92CM-7276R2

- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" .000" 1.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BERIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".
- NOTE 4: DISTANCE TO INTERNAL POLE PIECES. PLANE THROUGH VACANT PIN POSITION No.6 AND TUBE AXIS PASSES THROUGH LINE JOINING CENTERS OF POLE PIECES. DIRECTION OF PRINCIPAL FIELD OF ION—TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO VACANT PIN POSITION No.6 AND SOUTH POLE TO PIN No.12.
- NOTE 5: LOCATION OF DEFLECTING YOKE AND FOCUSING-COIL MUST BE WITHIN THIS SPACE.
- NOTE 6: KEEP THIS SPACE CLEAR FOR ION-TRAP MAGNET.
- NOTE 7: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

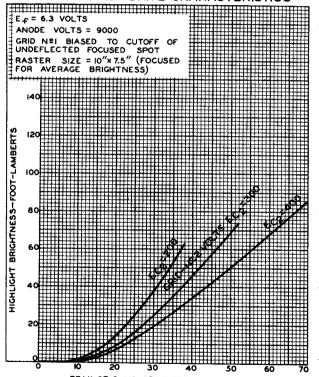




CURVES

The following Grid-Drive Characteristics Curves are for the condition with grid No.1 biased to give visual extinction of the undeflected, focused spot. Inviewing television pictures, it will be found that the actual cutoff voltage corresponding to black in the picture is approximately 5 volts less negative than shown on the curves; similarly, the grid-No.1 drive to obtain a given anode current or light output is also about 5 volts less.

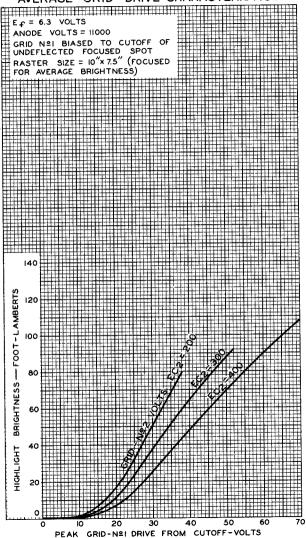
AVERAGE GRID-DRIVE CHARACTERISTICS



PEAK GRID-NºI DRIVE FROM CUTOFF-VOLTS

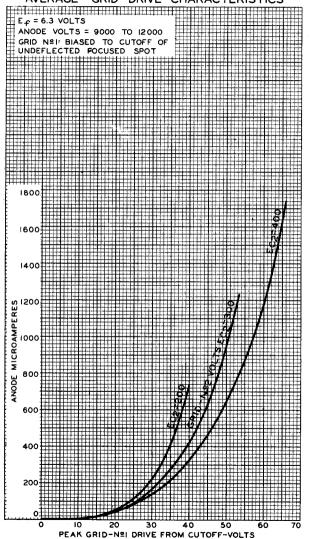
92CM-7452















ELECTROSTATIC FOCUS

1882

MAGNETIC DEFLECTION

ELECTROSTATIC FOCUS	WAGNETIC DEFECTION
DATA	
General:	
Heater, for Unipotential Cathode: Voltage 6.3 Current 0.6 Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes. Cathode to All Other Electrodes. Phosphor	
Fluorescence. Phosphorescence. Persistence. Focusing Method	Blue Greenish-Yellow Long
Deflection Method. Deflection Angle (Approx.) Overall Length Greatest Diameter of Bulb. Minimum Useful Screen Diameter Mounting Position. Cap Recessed Small	Magnetic 540
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2	Pin 11 - Cathode Pin 12 - Heater Cap - Anode
Maximum Ratings, Design-Center Values	
ANODE VOLTAGE	10000 max, volts
Positive value (DC or Peak AC) Negative value (DC or Peak AC) GRID-No.1 VOLTAGE:	
Negative bias value	180 max. volts 0 max. volts 2 max. volts
PEAK GRID-No.1 DRIVE FROM CUTOFF PEAK HEATER-CATHODE VOLTAGE:	65 max. volts
Heater negative with respect to cat Heater positive with respect to cat	
Typical Operation:	
Anode Voltage*	9000 volts 250 volts
# At or near this rating, the effective re should be adequate to limit the anode in	
* Brilliance and definition decrease with general, the anode voltage should not be	decreasing anode voltage. In less than 8000 volts.





OSCILLOGRAPH TUBE

Grid-No.1 Voltage for Visual Extinction		
of Undeflected Focused Spot	-27 to -63	volts
Grid-No.2 Current	-15 to +15	μ amp
Focusing-Coil Current (DC)**	107 ± 10%	ma
Snot Position	##	

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . 1.5 max. megohms

** For specimen focusing coil similar to JETEC No.106 with airgap toward tube face, center line of air gap 3-1/4" from Reference Line (see Outline Drawing), and total anode current of 200 microamperes.

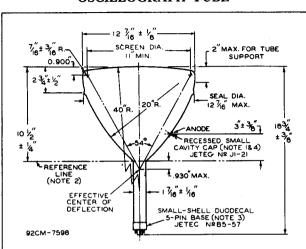
The center of the undeflected, unfocused spot will fall within acircle having 18-mm radius concentric with the center of the tube face.

OPERATING NOTES

K-Ray Warning. When operated at or below the maximum ratings shown in the tabulated data, the 125P7 does not produce any harmful x-ray radiation. All types of cathoderay tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.



OSCILLOGRAPH TUBE

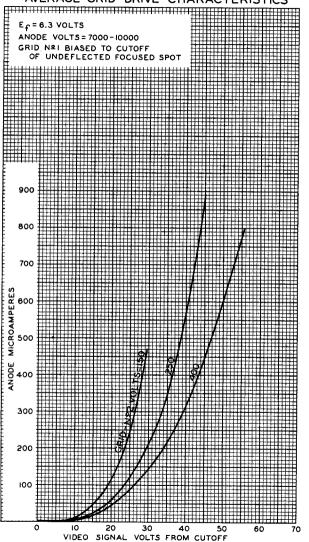


- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.
- NOTE 2: REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No.112) 1.500" + .003" -.000" 1.D. AND 2" LONG WILL REST ON BULB CONE.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".
- NOTE 4: TUBE SUPPORT MUST BE KEPT AT LEAST 2" AWAY FROM ANODE CAP.



12SP7

AVERAGE GRID-DRIVE CHARACTERISTICS



MAR. 20, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7615



MAGNETIC FOCUS

KINESCOPE

RECTANGULAR GLASS TYPE MAGNETIC DEFLECTION

AC.

DATA	
General:	ĺ
Heater, for Unipotential Cathode; Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6	
Face Plate (With about 66% light transmission) . Filterglass Phosphor (For Curves, see front of this Section) P4—Sulfide Type Fluorescence and Phosphorescence . White Persistence of Phosphorescence . Short Focusing Method Magnetic Deflection Method Magnetic Deflection Angles (Approx.): Diagonal	
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Cap - Anode C - External Conductive Coating	
Maximum Ratings, Design-Center Values:	1
ANODE VOLTAGE	s s
During equipment warm-up period not exceeding 15 seconds . 410 max. volt After equipment warm-up period 150 max. volt Heater positive with respect to cathode 150 max. volt	ts





KINESCOPE

Typical Operation:		
Anode Voltage*	12000 300	volts volts
Extinction of Undeflected Focused Spot. Focusing-Coil Current (DC, approx.) Field Strength of Single-Field	-33 to -77 92	volts ma
Ion-Trap Magnet (Approx.)#	35	gausses

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max, megohms

- * Brilliance and definition decrease with decreasing anode voltage. I general, the anode voltage should not be less than 10000 volts.
- For specimen focusing coil similar to JETEC Focusing Coil No. 109 positioned with airgap toward kinescope screen and center line of air gap 3 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No. 1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 35 foot-lamberts on an 11-3/8" x 8-1/2" picture area sharply focused at center of screen.
- # Measured at center of field with General Electric Gauss Meter, Cat. No.409X51.

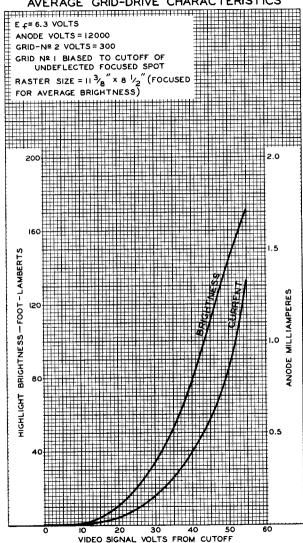
OPERATING NOTES

I-Ray Warning. When operated at or below the maximum ratings shown in the tabulated data, the 14CP4 does not produce any harmful x-ray radiation. All types of picture tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.



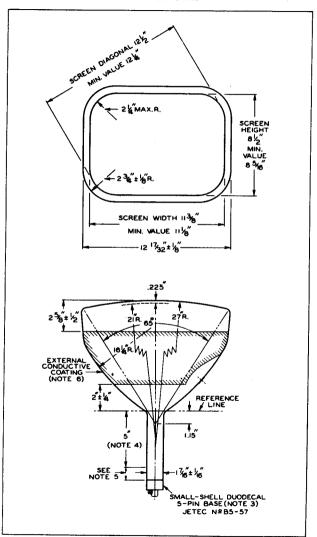
ACSA



ACPA



KINESCOPE



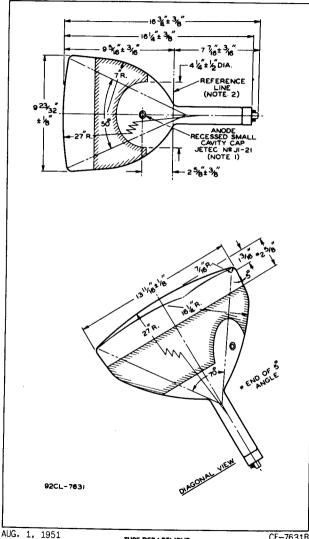
AUG. 1, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7631A



KINESCOPE



ACPA



- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 1 30°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE—LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-1/2".
- NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.
- NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET.
- NOTE 6: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



YED Y

KINESCOPE RECTANGULAR GLASS TYPE

MAGNETIC FOCUS

MAGNETIC FOCUS	MAGNETIC DEFLECTION
DATA	1,
General:	
Heater, for Unipotential Cathode: Voltage 6.3 . Current 0.6 Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes. Cathode to All Other Electrodes. External Conductive Coating to Anom	5 μμτ _{de} ∫2000 max μμτ
	[/50 min μμf]
Face Plate (With about 66% light transmiss Phosphor (For Curves, see front of this Se Fluorescence and Phosphorescence Persistence of Phosphorescence . Focusing Method. Deflection Method. Deflection Angles (Approx.): Diagonal	ction). No.4—Sulfide Type
Pin 1-Heater C	Pin 12-Heater
Pin 2-Grid No.1	Cap - Anode
Pin 10 - Grid No. 2	C - External
Pin 11 - Cathode	Conductive
	Coating
Maximum Ratings, Design-Center Values	
ANODE VOLTAGE	14000 max. volts
Negative bias value	
PEAK HEATER—CATHODE VOLTAGE: Heater negative with respect to catl	2 max. volts
During equipment warm-up period	İ
not exceeding 15 seconds After equipment warm-up period	
Heater positive with respect to cat	180 max. volts





KINESCOPE

Typical Operation:		
Anode Voltage*	12000	volts
Grid-No.2 Voltage	300	volts
Grid-No.1 Voltage for Visual Extinction.		
of Undeflected Focused Spot	–33to <i>–</i> 77	volts
Focusing-Coil Current (DC)	96 ± 6%	ma
Field Strength of Single-Field		
lon=Trap Magnet (Approx.)#	45	gausses
Ion-Trap Magnet Current (DC, approx.) • .	70	та

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max.megohms

- * Brilliance and definition decrease with decreasing anode voltage.
 In general, the anode voltage should not be less than 10000 volts.
- For specimen focusing coil similar to JETEC Focusing Coil No.109
 positioned with air gap toward kinescope screen, and center line of air gap 3 inches from Reference line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a high-light brightness of 30 foot-lamberts on a 11-1/8" x 8-5/16" picture area sharply focused at center of screen.
- # Measured at center of field with General Electric Gauss Meter, Cat. No. 409X51.
- For specimen ion-trap magnet similar to JETEC Ion-Trap Magnet No.111, located in optimum position and rotated to give maximum brightness.



ALOA

KINESCOPE

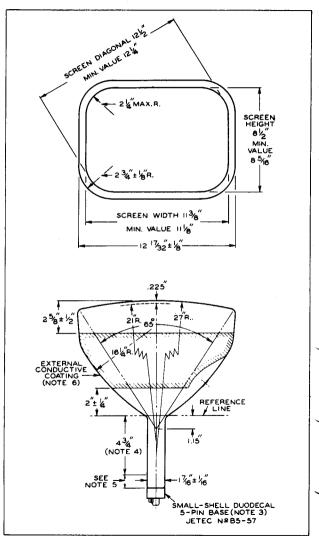
OPERATING NOTES

When operated at or below the maximum ratings shown in the tabulated data, the I4EP4 does not produce any harmful x-ray radiation. All types of picture tubes may be operated at voltages (if ratings permit) up to I6 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above I6 kilovolts, special shielding precautions for x-ray radiation may be necessary.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

AEPA

RCA) 14EP4 KINESCOPE

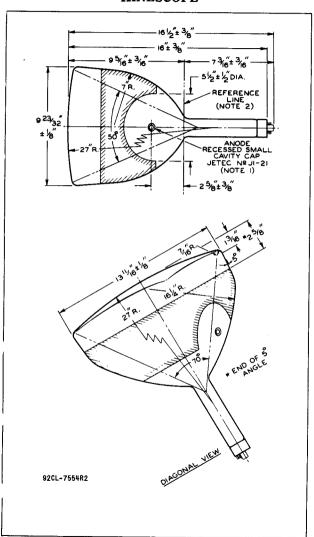


MARCH 1, 1951

TUBE DEPARTMENT CE-7554R2A







MARCH 1, 1951

AEPA /



KINESCOPE

NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ±30°. ANODE TERMINAL ISON SAME SIDE AS VACANT PIN POSITION NO.6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

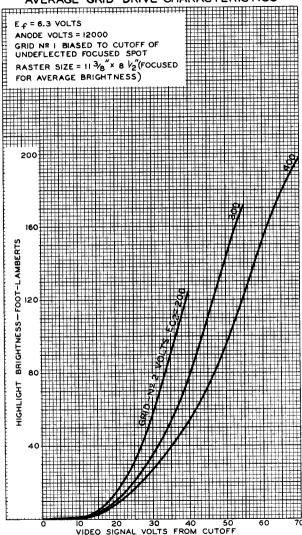
NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-1/2".

NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.

NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET.

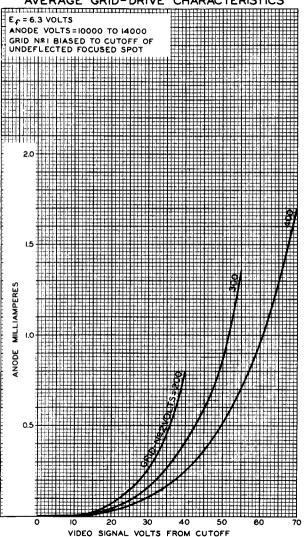
NOTE 6: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.











DEC. 12, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7353R2



15GP22 TRICOLOR KINESCOPE

THREE-GUN SHADOW-MASK TYPE ELECTROSTATIC CONVERGENCE

ELECTROSTATIC FOCUS MAGNETIC DEFLECTION

DATA	
General:	
Electron Guns, Three	:d
Voltage (AC or DC) 6.3 volt Current	_
of the Other Two Guns 7.5 μμ Cathode of Blue Gun + Cathode of Green Gun + Cathode of Red Gun	:f
to All Other Electrodes 17.5 μμ Grid No.3 (Of Each Gun Tied within Tube to No.3 Grids of Other Two	ıf.
Guns) to All Other Electrodes 12 μμ Grid No.4 (Common to the Three	ıf
Guns) to All Other Electrodes 7	
External Conductive Coating to Ultor	
Faceplate, Spherical Clear Glas	\$
Type Metal-Backed, Tricolor, Phosphor-Do Plate Filterglas Light Transmission (Approx.)	S %
Outline) 11-1/2" × 8-5/8 Area	2
Separate Phosphors, respectively Blue, Green, Re Persistence of Group Phosphorescence Mediu Dot Arrangement Approx. 195,000 triangular groups each consisting of blue dot, green do and red dot (total of 585,000 dots	im it,
Focusing Method Electrostati Convergence Method	c c
Deflection Angles (Approx.): Horizontal	ᅦ
Maximum Overall Length	"
	- 1

to Bay

(RCA) 15GP22

TRICOLOR KINESCOPE

Pin 1: Heater Pin 2: Cathode Of Red Gun Pin 4: Grid No.2 Of Red Gun Pin 5: No Connection Pin 6: Grids No.3 Pin 7: Cathode Of Green Gun Pin 8: Grid No.1 Of Red Gun Pin 6: Grids No.3 Pin 7: Cathode Of Green Gun Pin 8: Grid No.1 Of Green Gun Pin 8: Grid No.1 Of Green Gun Pin 8: Grid No.1 Of Green Gun Pin 8: Grid No.1 Of Green Gun Pin 8: Grid No.1 Of Green Gun Pin 9: Grid No.2 Of Blue G Pin 13: Grid No.2 Of Blue G Pin 19: Cathode of Blue Gun Pin 20: Heater Metal Flange: Ulto (Grid No. Grid No. Collecto	J126 -103) Gun un un 5,
of Green duit	
Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE	volts volts volts volts volts volts volts volts volts volts
Equipment Design Ranges:	
For ultor voltage (E _{C5}) of 18000 to 20000 volts Grid-No.4 (Converging	volts volts
The "ultor" in a cathode-ray tube is the electrode to which is the highest dc voltage for accelerating the electrons in the beat to its deflection. In the 15GP22, the ultor function is performed by the second of the second second with the second gether within the tube, they are collectively referred to similarly for convenience in presenting data and curves. This value is the product of ultor voltage and average current mat the ultor terminal with a dc ammeter.	applied um prio rmed by ited to mply a neasure

MARCH 1, 1954

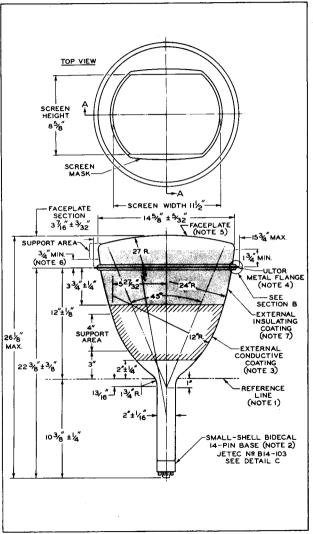


TRICÓLOR KINESCOPE

Grid-No.2 Voltage (Each Gun) when circuit design uti- lizes grid-No.1 Voltage (E _{C1}) at fixed value for raster cutoff (each gun) 2 to 4.5 times E _{C1} Grid-No.1 Voltage for Visual Extinction of Fo- cused Raster (Each Gun) when circuit design uti- lizes grid-No.2 voltage	volts		
(E _{C2}) at fixed value (each gun)	volts		
Grid-No.4 Current5 to +5	μ amp		
Maximum Grid-No.3 Current 300	μатр		
Grid-No.2 Current15 to +15 Beam-Current Ratio to	μатр		
Produce Illuminant—C White:			
Red Gun to Green Gun 4:1 to 1:1			
Blue Gun to Green Gun 1.5:1 to 0.5:1	ŀ		
Maximum Raster Shift in Any Direction from	l		
Screen Center 1-1/4	inches		
Examples of Use of Design Ranges:			
For ultor voltage of 20000 volts	1		
Grid-No.4 (Converging	- 1		
Electrode) Voltaget 8500 to 10200	volts		
Grid-No.3 (Focusing Electrode)	1		
Voltage 2400 to 3800	volts		
Grid-No.2 Voltage (Each Gun) when circuit design utilizes grid-No.1 voltage of -70 volts for raster cutoff (each gun) . 140 to 315 Grid-No.1 Voltage for Visual Extinction of Focused Raster (Each Gun) when circuit design utilizes grid-No.2 voltage of 200 volts (each gun)45 to -100	volts volts		
Circuit Values:			
Grid-No.1-Circuit Resistance (Each Gun). 1.5 max. Dynamic Converging Voltage (Approx.)** 900 Dynamic Focusing Voltage (Approx.)** 225	megohms volts volts		
† This range does not include the dc component of the dynamic converging			
I voltage.			
Centering of the raster on the screen is accomplished by passing direct current of the required value through each pair of deflecting colls to compensate for the raster shift resulting from optimum adjustments for convergence, color purity, and concentricity.			
** Peak-to-peak value. This ac voltage having essentially parabolic wave- form is synchronized with scanning and does not include any voltage developed during the blanking time.			

150822

15GP22 TRICOLOR KINESCOPE



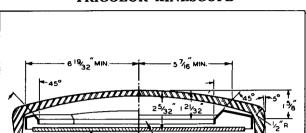
MARCH 1, 1954

CE-8072R1A



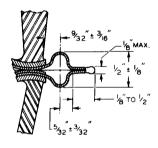
15GP22

TRICOLOR KINESCOPE

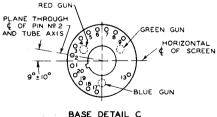


ENLARGED SECTION A-A

SCREEN



ENLARGED SECTION B



BASE DETAIL C BOTTOM VIEW

92CL - 8072RI

SCO 22

RCA 15GP 2

TRICOLOR KINESCOPE

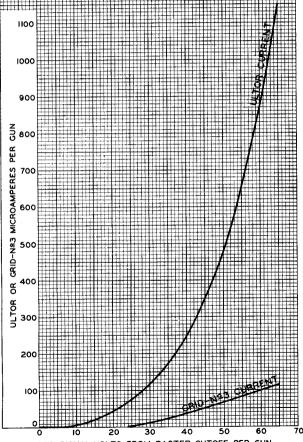
- NOTE 1: REFERENCE LINE IS DETERMINED BY POSITION WHERE A CYLINDRICAL GAUGE 2.400" ± 0.001" 1.D. WHICH IS HELD CONCENTRIC WITH TUBE NECK AXIS WILL REST ON FUNNEL.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH FACEPLATE-SECTION AXIS AND HAVING A DIAMETER OF 3".
- NOTE 3: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.
- NOTE 4: METAL FLANGE OPERATES AT HIGH VOLTAGE. ADEQUATE INSULATION MUST BE PROVIDED BETWEEN THE FLANGE AND ANY GROUNDED ELEMENT IN THE RECEIVER TO PREVENT THE POSSIBILITY OF ELECTRICAL LEAKAGE INCLUDING CORONA.
- NOTE 5: MASK MATERIAL BEARING ON THE FACEPLATE MUST HAVE INSULATING QUALITIES ADEQUATE FOR ONE HALF THE APPLIED ULTOR VOLTAGE TO MINIMIZE SURFACE LEAKAGE BETWEEN METAL FLANGE AND MASK.
- NOTE 6: TUBE SHOULD NOT BE SUPPORTED IN THIS AREA.
- NOTE 7: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINT-LESS CLOTH.



SCP.22

TYPICAL DRIVE CHARACTERISTIC

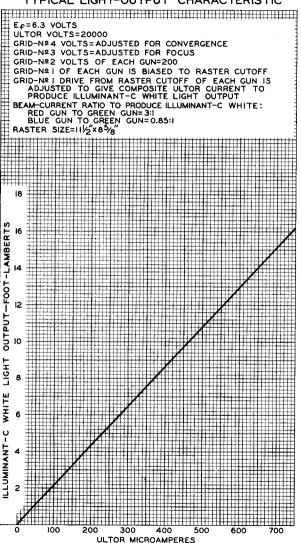
E_F = 6.3 VOLTS
ULTOR (GRIDS-Nº5 & Nº6 AND COLLECTOR) VOLTS=20000
GRID-Nº4 VOLTS=ADJUSTED FOR CONVERGENCE
GRID-Nº3 VOLTS=ADJUSTED FOR FOCUS
GRID-Nº2 VOLTS OF EACH GUN=200
GRID-Nº1 OF EACH GUN IS BIASED TO RASTER CUTOFF
RASTER SIZE II½×85%



VIDEO SIGNAL VOLTS FROM RASTER CUTOFF PER GUN



TYPICAL LIGHT-OUTPUT CHARACTERISTIC



JAN. 13, 1954

TUBE DEPARTMENT

CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8073R1



OSCILLOGRAPH TUBE

(840p)

METAL-SHELL ENVELOPE

MAGNETIC FOCUS MAGNETIC DEFLECTION

DATA	ļ
General:	
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes 6 Cathode to All Other Electrodes 5 Filterglass Light Transmission (Approx.) 669 Phosphor (For Curves, see front of this Section) Pr Fluorescence Short Phosphorescence Greenish-Yellow Persistence Control Magnetic Persistence Control Magnetic Persistence Control Magnetic Deflection Method Magnetic Deflection Angle (Approx.) 530 Maximum Overall Length 15-7/8" + 1/8 Greatest Diameter at Lip 15-7/8" + 1/8 Minimum Useful Screen Diameter 14-3/8 Ultor Terminal Metal-Shell Lip Mounting Position Small-Shell Duodecal 7-Pin (JETEC No.87-51) BOTTOM VIEW	7 et w 9 c c c " " " p
Pin 1 - Heater Pin 2 - Grid No. 1 Pin 6 - No Connection Pin 7 - No Connection	
Maximum Ratings, Design-Center Values:	
ULTOR® VOLTAGE	S
GRID-No.1 VOLTAGE: Negative bias value	ts ts
In the 16ADP7, grid No.3 which has the ultor function, and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode incombination with one or more additional electrodes connected within the tube to it, to which is applied the highest devoltage for acceleration the electrons in the beam prior to its deflection.	1 e o

φ At or near this rating, the effective resistance of the ultor supply. should be adequate to limit the ultor input power to 6 watts.

FEB. 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA



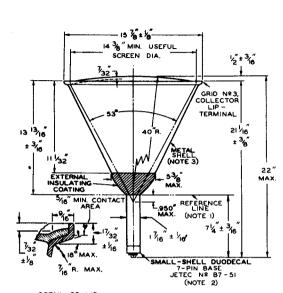
· · · · · · · · · · · · · · · · · · ·	
PEAK HEATER—CATHODE VOLTAGE: Heater negative with respect to cathode . 125 max. Heater positive with respect to cathode . 125 max.	volts volts
Typical Operation: 12000 Jitor Voltage*	volts volts volts μamp ma
Spot Position ** Maximum Circuit Values:	
	egohms
Brilliance and definition decrease with decreasing ultor voltage general, the ultor voltage should not be less than 8000 volts. Por specimen focusing coil similar to JETEC Focusing Coil No.1 sitioned with air gap toward faceplate and center line of a 3-1/4" from Reference Line (see Outline Drawing) and ultor curr 200 microamperes.	
The center of the undeflected, unfocused spot will fall within a having 25-mm radius concentric with the center of the tube face	circle

FEB. 1, 1952

16ADP1

(640p)

OSCILLOGRAPH TUBE



DETAIL OF LIP

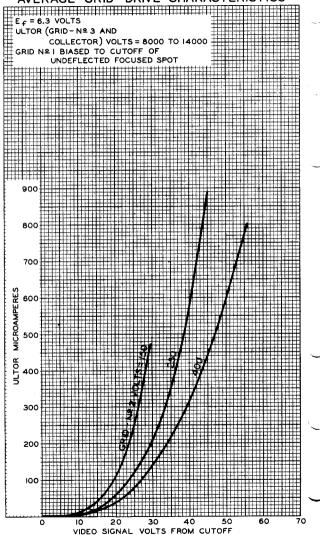
92CM - 7690

- NOTE : REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No. 112) 1.500" + 0.003" 0.000" 1.D. AND 2" LONG WILL REST ON FUNNEL.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH METAL—SHELL AXIS AND HAVING DIAMETER OF 3".
- NOTE 3: METAL SHELL AND GLASS FACE OPERATE ATHIGH VOLTAGE.

 ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST BE INSULATED TO WITHSTAND THE MAXIMUM APPLIED ULTOR VOLTAGE.



AVERAGE GRID-DRIVE CHARACTERISTICS





KINESCOPE



MAGNETIC DEFLECTION

Supersedes Type 16AP4

DATA

General:		
Heater, for Unipotential Cathode: Voltage. 6.3 ac. Current. 0.6 Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes. 6 Cathode to All Other Electrodes. 7 Face Plate (Transmission of about 65%). RCA Phosphor (For Curves, see front of this Section) No.4—S Fluorescence and Phosphorescence. Persistence of Phosphorescence. Persistence of Phosphorescence. Persistence of Phosphorescence. Persistence of Phosphorescence. Focusing Method. Deflection Method. Deflection Angle (Approx.) Ion—Trap Gun. Requires External Double—F Maximum Overall Length. Greatest Diameter of Bulb. 15 Screen Diameter. Mounting Position. Anode Terminal Met Base. Small—Shell Duc Basing Designation for BOTTOM VIEW.	µµf µµf ilterglass" ulfide Type White Medium Magnetic Magnetic 22-5/16' ield Magnet 22-5/16' 14-5/8' 14-5/8' al-Cone Ligdecal 5-Pidecal 5-Pidecal	200
Pin 1-Heater Pin 12-		
Pin 2-Grid No.1 Metal-Co	Anode.	
Pin 10 - Grid No.2 Pin 11 - Cathode	Grid No.3	
Maximum Ratings, Design-Center Values:		1
GRID-NO.2 VOLINGE.	max. volt	- 1
	max. volt	
Positive bias value 0	max. volt	
Positive peak value	max. voit	١,
Heater negative with respect to cathode: During equipment warm-up period not		
exceeding 15 seconds 410	max. volt	
Heater positive with respect to cathode. 150	max. volt	s
Anode and grid No.3, which are connected together within ferred to herein as anode.		- 1
O The product of anode voltage and average anode current sh to 6 watts.	outo de Tribite	ľ

OAPA-A



Typical Operation:			
Anode Voltage*	9000 300	12000 300	volts volts
	-33 to -177 75 155	-33 to -77 90 200	volts ma ma
Maximum Circuit Values: Grid-No.1 - Circuit Resistance.		. 1.5 max.	. megohms
Minimum Circuit Values: The power supply should be of inherent regulation to limit the rent to 5 ma. If the supply procircuit current to exceed 1 ammore than 250 microcoulombs, the cuit between indicated electroshould be as follows: Grid-No.1-Circuit Resistance. Grid-No.2-Circuit Resistance. Anode-Circuit Resistance. The resistors used should be capited voltage.	e continuo ermits the pere, or i he effecti ode and	us short—circo instantaneous s capable of ve resistance the output co . 150 min . 470 min . 16000 min	uit cur—s short—storing in cir—apacitor ohms ohms
Components:			
Horizontal—Deflection—Output a For use with pulse—operated l giving 11500—13500 volts . Horizontal Linearity Control . Width Control .	high—volta 	ge supply RC.	rmer: A- 211T5 A- 201R5 A- 201R4

| Ion-Trap Magnet (Permanent-Magnet Type).
| Focusing Coil (Permanent-Magnet Type). Brilliance and definition decrease with decreasing anode voltage. general, the anode voltage should not be less than 9000 volts.

Vertical-Deflection Output Transformer Deflecting Yoke.

For JETEC ion-Tran Magnet No.108, or equivalent, located with main pole pieces longitudinally opposite internal pole pieces, and rotated to give maximum brightness.

∞ Renewal Sales item only.

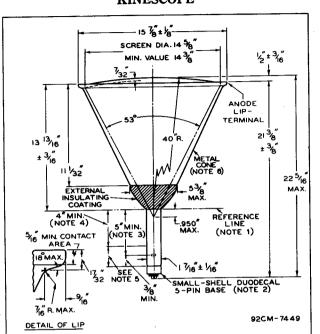
RCA- 204T9

RCA-201D12

RCA- 203D3 RCA- 202D2

For JETEC Focusing Coil No.109, or equivalent, positioned with air gap toward kinescope screen, and center line of air gap about 3 inches from Reference Line (see Outline Drawing). The indicated currents are for the condition with the combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 19-1/4* x 10° picture area.





NOTE 1: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" - .000" I.D. AND 2" LONG

NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH CONE AXIS AND HAVING DIAMETER OF 3".

NOTE 3: DISTANCE TO INTERNAL POLE PIECES. PLANE THROUGH VACANT PIN POSITION No.6 AND TUBE AXIS PASSES THROUGH LINE JOINING CENTERS OF POLE PIECES. DIRECTION OF PRINCIPAL FIELD OF ION—TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO VACANT PIN POSITION No.6 AND SOUTH POLE TO PIN No.12.

NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING-COIL MUST BE WITHIN THIS SPACE.

WILL REST ON CONE.

GAPA-A



NOTE 5: KEEP THIS SPACE CLEAR FOR ION-TRAP MAGNET.

NOTE 6: METAL CONE AND GLASS FACE OPERATE AT HIGH VOLTAGE.

ANY MATERIAL IN CONTACT WITH THE CONE OR THE FACE

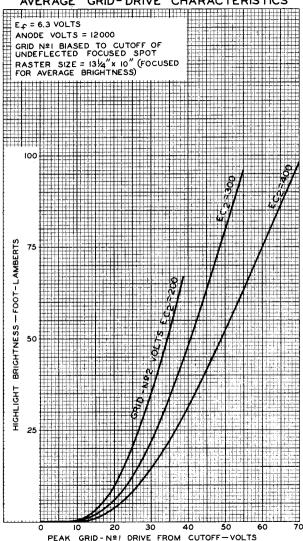
MUST HAVE INSULATING PROPERTIES ADEQUATE FOR 15500 VOLTS.

CURVES

The following Grid-Drive Characteristics Curves are for the condition with grid No.1 biased to give visual extinction of the undeflected, focused spot. In viewing television pictures, it will be found that the actual cutoff voltage corresponding to black in the picture is approximately 5 volts less negative than shown on the curves; similarly, the grid-No.1 drive to obtain a given anode current or light output is also about 5 volts less.



AVERAGE GRID-DRIVE CHARACTERISTICS

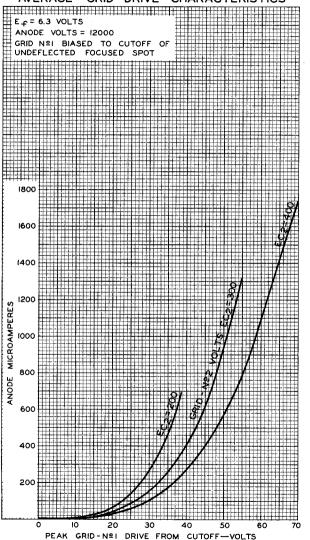


PEAK

GRID - NºI DRIVE FROM



AVERAGE GRID-DRIVE CHARACTERISTICS



MAR. 25, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM - 6999RI



ODRA.

ROUND GLASS TYPE

MAGNET	IÇ	FOCUS
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MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3
Maximum Ratings, Design-Center Values: ANODE VOLTAGE
GRID-No.1 VOLTAGE: Negative bias value
exceeding 15 seconds 410 max. volts After equipment warm-up period 125 max. volts Heater positive with respect to cathode. 125 max. volts
Typical Operation:
Anode Voltage* 12000 volts
*Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 9000 volts.



Grid-No.2 Voltage	250	volts
Grid-No.1 VoltageO	-27 to -63	volts
Focusing-Coil Current (DC, Approx.) †	115	ma
Ion-Trap-Magnet Current (DC, Approx.)# .	110	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

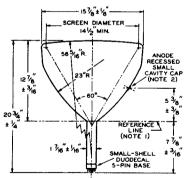
P For visual extinction of undeflected, focused spot.

For specimen focusing coil similar to JETEC Focusing Coil No.109 positioned with air gap toward kinescope screen and center line of air gap 3-1/4 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and videosignal voltage adjusted to produce a highlight brightness of 20 footlamberts on a 14-1/2 x 10-1/4 picture area sharply focused at center of screen.

For specimen ion-trap magnet similar to JETEC Ion-Trap Magnet No. 108 located in optimum position and rotated to give maximum brightness.

OPERATING NOTES

X-Ray Warning. When operated at anode voltages up to 16 kilovolts, the 16DP4-A does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at voltages as high as 16.5 kilovolts (absolute value), shielding of the 16DP4-A for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.



NOTE |: REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC NO.112) 1.500" + 0.003" - 0.000" I.D. AND 2" LONG WILL REST ON BULB CONE.

NOTE 2: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANDDE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.

FEB. 1. 1952

TENTATIVE DATA





KINESCOPE

METAL-CONE ENVELOPE MAGNETIC DEFLECTION

MAGNETIC FOCUS

DATA					
General:					
Heater, for Unipotential Cathode: Voltage 6.3					
Base Small-Shell Duodecal 5-Pin BOTTOM VIEW					
Pin 1- Heater Pin 12 - Heater					
Pin 2-Grid No.1 (Fig. Metal-Cone Lip:					
Pin 10 - Grid No. 2					
Pin 11 - Cathode ② Grid No.3					
Maximum Ratings, Design-Center Values:					
ANODEO VOLTAGE*					
Negative bias value 125 max. volts Positive bias value 0 max. volts					
Positive peak value 2 max. volts PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode:					
During equipment warm-up period not exceeding 15 seconds 410 max. volts					
exceeding 15 seconds 410 max. volts After equipment warm-up period 150 max. volts					
Heater positive with respect to cathode. 150 max. volts					
O Anode and grid No.3, which are connected together with tube, are referred					
to herein as anode. * The product of anode voltage and average anode current should be limited to 6 watts.					
Has transmission factor of about 65%.					



KINESCOPE

			KII	IESC	OFE				
Anode Grid—N Grid—N Focusi Field Ion— Maximu Grid—N The price circui more t cuit—N Grid—N Focon proce # Meaximu	ent regulto 5 ma t curre han 250 between be as lo.1—Cir O.2—Cir Circuit sistors voltage JETEC Fo screen outline pined grif bure a hi ure area	** tage tage for curren h of Si gnet# cuit Re it Valu cuit Re pply sh lation If t nt to e microc indica follows cuit Re cuit Re cuit Re cuit Re cuit Re cuit Re cuit Re cuit Re cuit Re cuit Re cuit Re dhe brawing ddwo bghlight l ghlight l	r Visua used Sp t (DC, ngle-Po es: sistanc es: nould to limi he supp xceed 1 oulombs ted ele: sistanc ance sistanc ance the line	be of t the amper, the ectrod e be caffindicate of all indicates of 31 section 5 se	the lincontin mits tre, or effect e and r gap 3 red curry d video of foot-1	mited uous uous ive the the with inche; signa' ambert	12000 300 3 to -77 100 45 1.5 max. I-energy short-cistantane apable o esistance output 150 min. shotandii	y v v v gau meg type rcuit ous sh f store in capac	cur- ort- oring cir- itor ohms ohms ohms eap- kine- with ed to
cuit should Grid-N Grid-N Anode- The re plied con scop (see comm	between be as lo.1-Cir o.2-Cir Circuit sistors voltage JETEC Fooe screen outline fuce a hi ture area sured at	indica follows cuit Re cuit Re Resist used . cusing Cc. prawing d-Mo.1 b glight 1 . center of	ted elections is tance sistance ance ance should be shou	ectrod e be car po position of air indicat age analysis of 30 with	e and tioned r gap 3 ed curr d video- o foot-1 General	with inchester in signal ambert	air gap to so for con voltage to an a 1	capac	ohms ohms ohms ohms chms ohms chine line with ed to

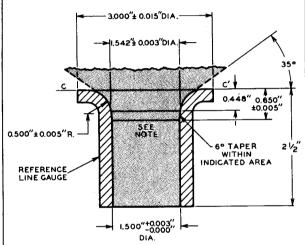
-> Indicates a change





REFERENCE-LINE GAUGE

Reference-Line Gauge with Supplementary Information on Recommended Inside Contour of Yoke to Provide Proper Location of Yoke on Neck-Cone Section

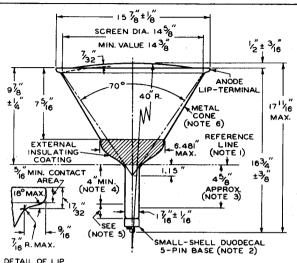


NOTE: INNER SURFACE OF YOKE MUST NOT EXTEND INTO SHADED REGION

9205-7391

16GPA

16GP4 KINESCOPE



DETAIL OF LIP

NOTE 1: WITH TUBE NECK INSERTED THROUGH FLARED END OF GAUGE SHOWN ON PRECEDING PAGE AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC! OF THE GAUGE WITH THE GLASS CONE.

NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH CONE AXIS AND HAVING A DIAMETER OF 2-1/2".

NOTE 3: DISTANCE FROM REFERENCE LINE FOR LOCATING CENTER OF ION-TRAP MAGNETIC FIELD. DIRECTION OF FIELD OF THE ION-TRAP MAGNET SHOULD BE SUCH THAT NORTH POLE IS ADJACENT TO VACANT PIN POSITION No.8 AND SOUTH POLE TO PIN No.2.

NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING COIL MUST BE WITHIN THIS SPACE.

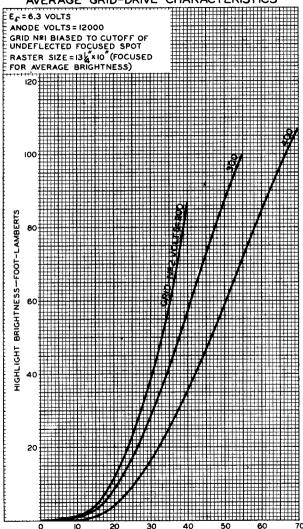
NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET.

NOTE 6: METAL CONE AND GLASS FACE OPERATE AT HIGH VOLTAGE. ANY MATERIAL IN CONTACT WITH THE CONE OR THE FACE MUST HAVE INSULATING PROPERTIES ADEQUATE FOR 15500 VOLTS.

92CM-7374



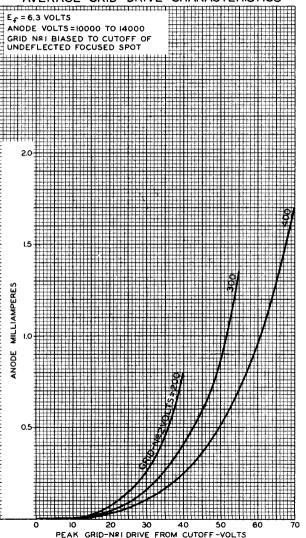
AVERAGE GRID-DRIVE CHARACTERISTICS







AVERAGE GRID-DRIVE CHARACTERISTICS







The 16GP4-A is like the 16GP4 except that it has a face plate made of unfrosted, clear glass. As a result, the light output is about 30 per cent greater than shown by the curves under Type 16GP4.

16GP4-B KINESCOPE

The 16GP4—B is like the 16GP4 except that it has a *frosted Filterglass* face plate. Frosting of the face diffuses reflections of bright objects in the room which might otherwise be objectionable. The light output is essentially the same as that of the 16GP4.

16GP4-C KINESCOPE

The 16GP4-C is like the 16GP4 except that it has a face plate made of *frosted*, *clear glass*. Frosting of the face diffuses reflections of bright objects in the room which might otherwise be objectionable. The light output is about 30 per cent greater than shown by the curves under Type 16GP4.

As soon as feasible, the 16GP4-B will supersede the 16GP4, 16GP4-A, and 16GP4-C.

16X PA



KINESCOPE

The 16KP4 is like the 16RP4 except that the distance from the Reference Line (see Outline Drawing) to the near edge of the external conductive coating is $2" \pm 3/16"$; and the distance from the center of the face to the coating is $3" \pm 1/2"$.



KINESCOPE

ROUND GLASS TYPE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

OI PAIS

DATA	
General:	
Heater, for Unipotential Cathode: Voltage	. 6 μμf
Faceplate, Spherical	Filterglass 68% 68% White Short Magnetic 520 Double-Field Magnet 22-1/4" ± 3/8" .15-7/8" ± 1/8" Any y (JETEC No. J1-21)
Pin 2 - Grid No.1	in 12 - Heater Cap - Anode C - External Conduct. Coating
Maximum Ratings, Design-Center Values: ANODE VOLTAGE	14000 max. volts
GRID-No.2 VOLTAGE	125 max. volts 0 max. volts 2 max. volts
During equipment warm—up period not exceeding 15 seconds After equipment warm—up period Heater positive with respect to cathode	410 max. volts 125 max. volts 125 max. volts
Typical Operation: Anode Voltage	12000 volts



ì			· · ·
	Grid-No.2 Voltage	300	volts
	Grid-No.1 Voltage ⁰ 33	to -77	volts
	Focusing-Coil Current (DC, Approx.).	110	ma
	Ion-Trap-Magnet Current (DC, Approx.)# .	120	ma

Maximum Circuit Values:

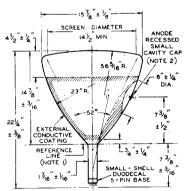
6LPA-A

1.5 max. megohms Grid-No.1-Circuit Resistance

- For visual extinction of undeflected focused spot.
 - For specimen focusing coil similiar to JETEC Focusing coil No.106 positioned with air gap toward kinescope screen, and center line of air gap about 3-1/4" inches from Reference Line (see Outline Drawing). The indicated current is for the condition with the combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a high-light brightness of 20 foot-lamberts on a 14-1/2" x 10-1/4" picture area sharply focused at center of screen.
- For specimen ion—trap magnet similiar to JETEC fon—Trap Magnet No.108 located in optimum position and rotated to give maximum brightness.

OPERATING NOTES

X-Ray Warning. When operated at or below the maximum anode-voltage rating shown in the tabulated data, the I6LP4-A does not produce any harmful x-ray radiation. All types of picture tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.



NOTE 1: REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No.112) 1.500" + 0.003" - 0.000" I.D. AND 2" LONG WILL REST ON BULB CORE.

NOTE 2: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 10^{\circ}$. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.

FEB. 1, 1952

TENTATIVE DATA



16RP4

(CPOX

KINESCOPE

RECTANGULAR GLASS TYPE
MAGNETIC FOCUS
MAGNETIC DEFLECTION

	WAGNETIC DEFLECTION	
	General:	
	Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volt: Current 0.6 amplified Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6	p
	Cathode to All Other Electrodes 5	f
	Face Plate (With about 66% light transmission). Filterglass Phosphor (For Curves, see front of this Section). P4—Sulfide Type Fluorescence and Phosphorescence . White Persistence of Phosphorescence . Short Focusing Method	f s e t
	Diagonal	
	Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode BOTTOM VIEW Pin 12-Heater Cap - Anode C - External Conductive Coating	
(maximum Ratings, Design-Center Values: NODE VOLTAGE	
	RID-No.1 VOLTAGE: Negative bias value	ı
	not exceeding 15 seconds 410 max. volts After equipment warm-up period 150 max. volts Heater positive with respect to cathode. 150 max. volts	





Typical Operation:			
Anode Voltage*	12000	14000	volts
Grid-No.2 Voltage	300	300	volts
Grid-No.1 Voltage for Visual			
Extinction of Undeflected			
Focused Spot	–33 to –77	-33 to -77	volts
Focusing-Coil Current			
(DC, approx.)°	100 ± 20%	108 ± 20%	ma
Field Strength of			
Single-Field Ion-Trap		50	
Magnet (Approx.)	45	50	gausses
t .			

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max.megohms

AUG. 1, 1951

TENTATIVE DATA

^{*} Brilliance and definition decrease with decreasing anode voltage. I general, the anode voltage should not be less than 12000 volts.

general, the anoue vortage should not be less than 1000 vortage.

For specimen focusing coil similar to JETEC Focusing Coil No. 109 positioned with airgap toward kinescope screen and center line of airgap 3-1/2 inches from Reference Line (see Outline prawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 13-1/2 x 10-1/8 picture area sharply focused at center of screen.





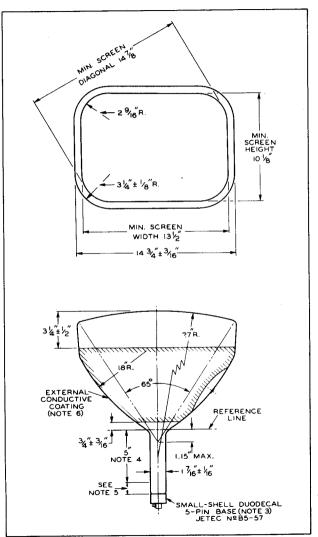
OPERATING NOTES

A-Ray Warning. When operated at anode voltages up to 16 kilovolts, the 16RP4 does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at anode voltages as high as 17.6 kilovolts (absolute value), shielding of the 16RP4 for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

16RPA





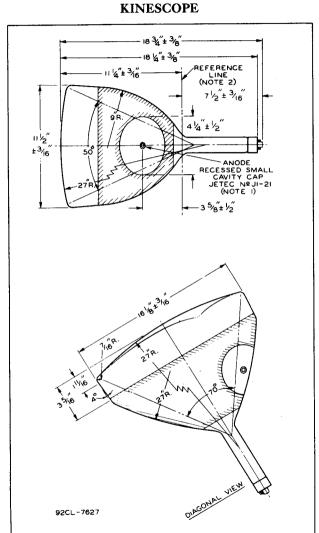
AUG. 1, 1951

TUBE DEPARTMENT

CE-7627A







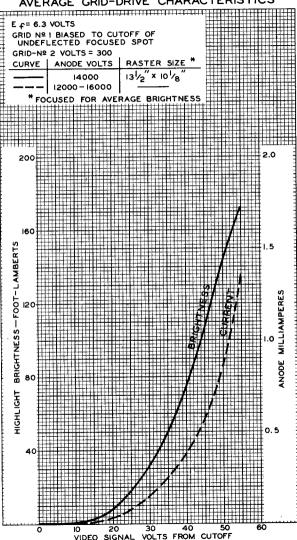
16824



- NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 30°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FINNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY.
- NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.
- NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET.
- NOTE 6: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



AVERAGE GRID-DRIVE CHARACTERISTICS



VIDEO SIGNAL

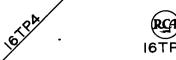


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RECTANGULAR GLASS TYPE

MAGNETIC FOCUS		MAGNETIC	DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6
Face Plate (With about 66% light transmission) Filterglass Phosphor (For Curves, see front of this Section) P4—Sulfide Type Fluorescence and Phosphorescence White Persistence of Phosphorescence Short Focusing Method Magnetic Deflection Method
Diagonal
Pin 1 - Heater c. Pin 12 - Heater
Pin 2-Grid No.1 X
Pin 10 - Grid No.2 Pin 11 - Cathode C - External Conductive Coating
Maximum Ratings, Design-Center Values:
ANODE VOLTAGE
Negative bias value
During equipment warm-up period not exceeding 15 seconds 410 max. volts After equipment warm-up period 150 max. volts Heater positive with respect to cathode. 150 max. volts



KINESCOPE

Typical Operation:			
Anode Voltage*	12000	14000	volts
Grid-No.2 Voltage	300	300	volts
Grid-No.1 Voltage for Visual Extinction of Undeflected			
Focused Spot	–33 to –77	-33 to -77	volts
Focusing-Coil Current			
(DC, approx.)°.	100	108	ma
Field Strength of Single-Field Ion-Trap			
Magnet (Approx.)	45	50	gausses

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

⁸ Brilliance and definition decrease with decreasing anode voltage. I general, the anode voltage should not be less than 12000 volts.

general, the anoue voltage should not be less than 1000 voltage should not be less than 1000 voltage positioned with air gap toward kinescope screen and center line of air gap 3 inches from Reference Line (see Gutline Drawing). The indicated current is for condition with combined grid-No. 1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 13-1/2* x 10-1/8* picture area sharply focused at center of screen.





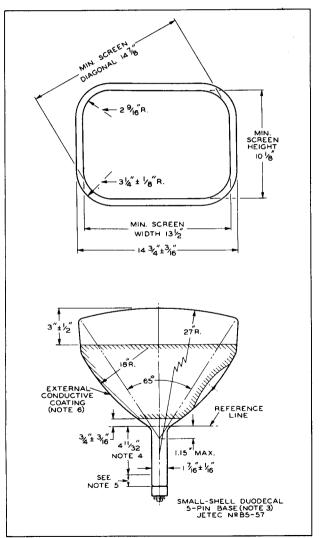
OPERATING NOTES

X-Ray Warning. When operated at or below the maximum ratings shown in the tabulated data, the 16TP4 does not produce any harmful x-ray radiation. All types of picture tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

167PA

(RCA) 16TP4 KINESCOPE



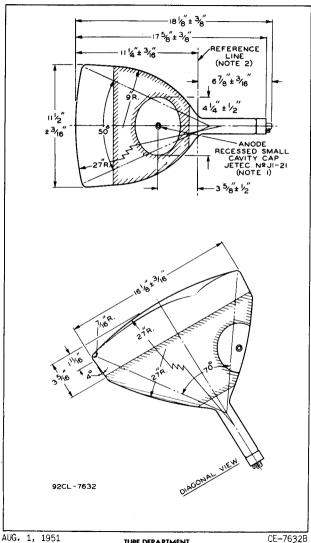
AUG. 1, 1951

TUBE DEPARTMENT

CE-7632A







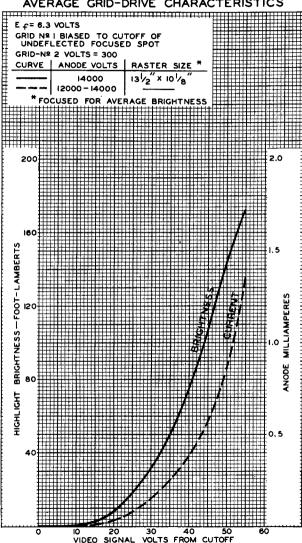
167PA



- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 30°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO. 3.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 3".
- NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.
- NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE—FIELD, ION—TRAP MAGNET.
- NOTE 6: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



AVERAGE GRID-DRIVE CHARACTERISTICS





CMP4 14

ROUND GLASS TYPE

MAGNETIC FOCUS		GNETIC DEFLECTION	ON
General:	DATA		
Heater, for Unipotential Voltage	6.3	ac or do	
Cathode to All Other E External Conductive Co.	lectrodes ating to Anode	5 ∫1500 max. √750 min.	$\mu\mu$ †
Faceplate, Spherical Light Transmission Phosphor (For Curves, see fr Fluorescence and Phosp Persistence of Phospho Focusing Method	ont of this Section horescence rescence	P4-Sulfic Ma Ma al Double-Field 17-3/4" 15-7/8" vity (JETEC No.	erglass. 66% White Short spnetic gnetic 70° Magnet ± 3/8" ± 1/8" . Any J1-21)
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode		Pin 12 - Heate Cap - Anode C - Exter Conc Coa	9
Maximum Ratings, <i>Design</i> -			
ANODE VOLTAGE		16000 max 410 max.	volts
Negative bias value Positive bias value POSitive peak value PEAK HEATER-CATHODE VOLT Heater negative with r	AGE: respect to catho	2 max. de:	
After equipment warm Heater positive with r	g 15 seconds . ⊢up period	410 max 125 max.	volts
Typical Operation Anode Voltage Grid-No.2 Voltage		12000 250	volt volt
FEB. 1, 1952		TENTAT	





Grid-No.1 Voltage for Visual Extinction		
of Undeflected Focused Spot	-27 to 63	volts
Focusing-Coil Current (DC, Approx.)	100	ma
Ion-Trap Current (Approx.) †	120	ma

Maximum Circuit Values:

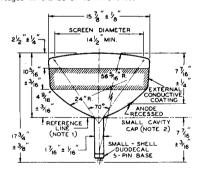
Grid-No.1-Circuit Resistance 1.5 max. megohms

For specimen focusing coil similar to JETEC Focusing Coil No.106 positioned with air gap toward kinescope screen and center line of air gap 3-1/4 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 20 foot-lamberts on a 14-1/2" x 10-1/4" picture area sharply focused at center of screen.

For specimen ion—trap magnet similar to JETEC Ion—Trap Magnet No.108 located in optimum position and rotated to give maximum brightness.

OPERATING NOTES

X-Ray Warning. When operated at anode voltages up to 16 kilovolts, the IGWP4-A does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at anode voltages as high as 17.6 kilovolts (absolute value), shielding of the IGWP4-A for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.



NOTE 1: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO. 110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CCT OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 2: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 10°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.3.



TOPA

KINESCOPE

RECTANGULAR GLASS TYPE

MAGNETIC FOCUS MAGNETIC DEFLECTION
DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6
Face Plate (With about 66% light transmission)
Deflection Angles (Approx.): Diagonal
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Cap - Anode C - External Conductive Coating
Maximum Ratings, Design-Center Values: ANODE VOLTAGE. 16000 max. volts GRID-No.2 VOLTAGE. 410 max. volts GRID-No.1 VOLTAGE: 125 max. volts Negative bias value. 0 max. volts Positive bias value. 0 max. volts
Positive peak value 2 max. volts





Heater negative with respect During equipment warm-up p not exceeding 15 seconds After equipment warm-up pe Heater positive with respect	eriod S eriod	410 max. 150 max. 150 max.	volts
Typical Operation:			
Anode Voltage*	12000 300	14000 300	volts volts
Focused Spot Focusing-Coil Current (DC). Field Strength of Single-	-33 to -77 92 ± 10%	-33 to -77 99 ± 10%	volts ma
Field !on-Trap Magnet#	45	50 *	gausses
(DC, Approx.)	70	· _	ma
Maximum Circuit Values:			

Maximum Circuit Values:

PEAK HEATER-CATHODE VOLTAGE:

Grid-No.1-Circuit Resistance 1.5 max. megohms

- * Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 12000 volts.
- For specimen focusing coil similar to JETEC Focusing Coil No.109 positioned with air gap toward kinescope screen, and center line of air gap 3 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 14-1/4" x 10-3/4" picture area sharply focused at center of screen.
- # Measured at center of field with General Electric Gauss Meter, Cat. No. 409X51.
- O For specimen ion-trap magnet similar to JETEC Ion-Trap Magnet No.111 located in optimum position and rotated to give maximum brightness.

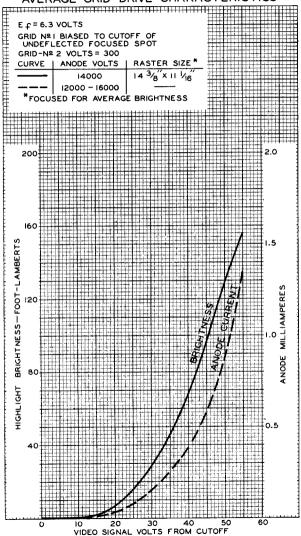
OPERATING NOTES

When operated at anode voltages up to 16 kilovolts, the 17BP4-A does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at anode voltages as high as 17.6 kilovolts (absolute value), shielding of the 17BP4-A for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

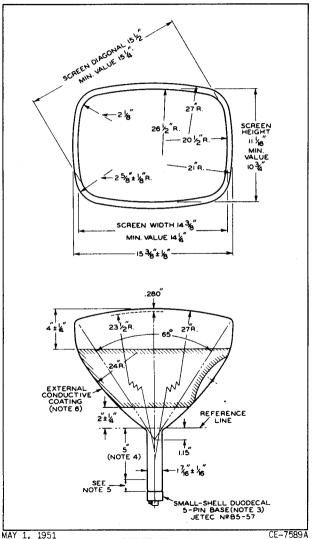


AVERAGE GRID-DRIVE CHARACTERISTICS



TBPATA

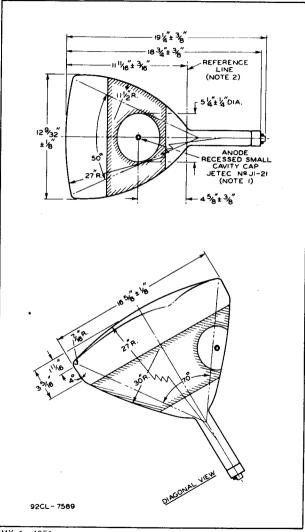
17BP4-A KINESCOPE



TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY CE-7589A







MAY 1, 1951

1884.A



- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 30°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO. 110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CCT OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".
- NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.
- NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET.
- NOTE 6: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



RECTANGULAR METAL-SHELL TYPE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

DATA .
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes 6
Deflection Angles (Approx.): Diagonal
Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Metal-Shell Lip: Anode
Maximum Ratings, Design-Center Values: ANODE VOLTAGEO
to 6 watts.





Typical Operation:			ł
Anode Voltage*	12000	14000	volts
Grid-No.2 Voltage	300	300	volts
Grid-No.1 Voltage for Visual			i
Extinction of Undeflected			
Focused Spot	33 to77	-33 to - 77	volts
Focusing Coil Current (DC) .	96 ± 6%	104 ± 6%	ma
Field Strength of Single-Field			1
lon-Trap Magnet§	45	50	gausses
lon-Trap Magnet Current			- 1
(DC, approx.)#	70		ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

Minimum Circuit Values:

The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 ma. If the supply permits the instantaneous short-circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

The resistors used should be capable of withstanding the ap-

- * Brilliance and definition decrease with decreasing anode voltage. It general, the anode voltage should not be less than 12000 volts.
 - For specimen focusing coil similiar to JETE Focusing Coil No.109, positioned with air gap toward kinescope screen, and center line of air gap about 3 inches from Reference Line (see Outline Drawing). The indicated currents are for the condition with the combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 14-3/8" x 10-11/16" picture area sharply focused at center of screen.
- Measured at center of field with General Electric Gauss Meter, Cat. No. 409X51.
- # For specimen ion-trap magnet similiar to JETEC Ion-Trap Magnet No.111, located in optimum position and rotated to give maximum brightness.

OPERATING NOTES

When operated at anode voltages up to 16 kilovolts, the I7CP4 does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at anode voltages as high as I7.6 kilovolts (absolute value), shielding of the I7CP4 for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

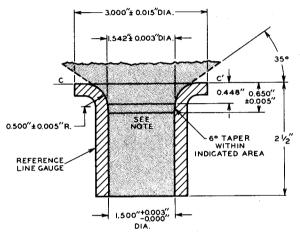
JAN. 1, 1951





REFERENCE-LINE GAUGE

Reference-Line Gauge (JETEC No. 110) with Supplementary Information on Recommended Inside Contour of Yoke to Provide Proper Location of Yoke on Neck-Funnel Section

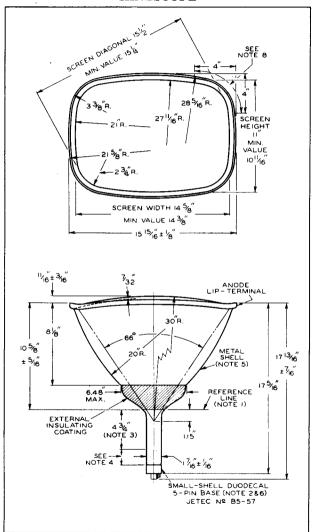


NOTE: INNER SURFACE OF YOKE MUST NOT EXTEND INTO SHADED REGION

9205-7391

RCA 17CP4

KINESCOPE

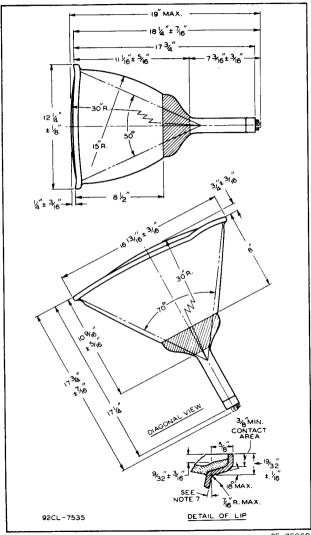


JAN. 1, 1951

7CPA

TUBE DEPARTMENT CE-7535A





JAN. 1, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7535B

10PA



NOTE I: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE (JETEC NO.110) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTER-SECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH METAL SHELL AXIS AND HAVING A DIAMETER OF 2-3/4".

NOTE 3: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.

NOTE 4: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET. DIRECTION OF THE FIELD OF THE ION-TRAP MAGNET SHOULD BE SUCH THAT THE NORTH POLE IS ADJACENT TO VACANT PIN POSITION No. 8 AND THE SOUTH POLE TO PIN No. 2.

NOTE 5: METAL SHELL AND GLASS FACE OPERATE AT HIGH VOLTAGE. ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST HAVE INSULATING PROPERTIES ADEQUATE TO WITHSTAND THE APPLIED ANODE VOLTAGE PLUS 10%.

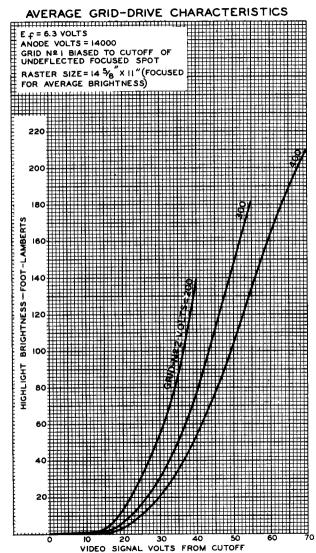
NOTE 6: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE MAJOR AXIS OF THE GLASS FACE BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 10°.

NOTE 7: IN THIS REGION THE ANGULAR VARIATION AROUND PERIPHERY OF SHELL IS 0° TO 18°.

NOTE 8: SUPPORT TUBE BY LIP ONLY AT CORNERS WITHIN THIS SPACE.



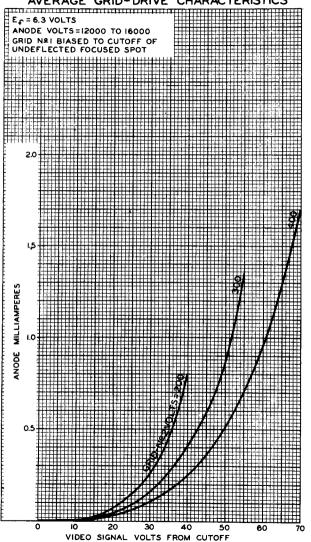
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AVERAGE GRID-DRIVE CHARACTERISTICS



OCT. 3, 1950

TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7548



120p

KINESCOPE

RECTANGULAR METAL-SHELL TYPE
ELECTROSTATIC FOCUS MAGNETIC DEFLECTION

ELECTROSTATIC FOCUS MAGNET	IC DEFL	ECTIO	<u> </u>
DATA			
General:			
[· - · - · - · · · · · · · · · · ·			
Heater, for Unipotential Cathode: Voltage 6.3 Current 0.6	ac	or do	volts
Current 0.6			amo
Direct Interelectrode Capacitances:		•	
Grid No.1 to All Other Electrodes	. 6		μμf
Grid No.1 to All Other Electrodes Cathode to All Other Electrodes	. 5		$\mu\mu f$
Face Plate (With about 66% light transmission)	rosted	Filte	rglass
Phosphor	No.4-9	Sulfid	e Type
Fluorescence and Phosphorescence			
Persistence of Phosphorescence			Short
Focusing Method	E	ectro	static
Deflection Angles (Approx.):		. Ma	gnetic
Diagonal			70°
Diagonal		• •	660
Vertical			50°
Vertical	Single-	ield	Magnet
Maximum Overall Length		. 19	-5/16"
Greatest Diagonal of Tube at Lip	16-13/	'16" ±	3/16"
IGreatest Width of Tube at Lip	. 15-15	5/ 16"	± 1/8"
Greatest Height of Tube at Lip	. 12-1	./4" :	± 1/8"
Screen Size	14	1-5/8"	× 11"
Mounting Position.	· · · ·	.1 Sha	Anyı
Ultor Terminal	in / IETS	I - ONE	Be-e3)
BOTTOM VIEW	in (ocit		00-07/
6)			
	Pin 12-		
Pin 2-Grid No.1	Metal-Sh	nell L	.ip
Pin 6-Grid No.4		Grid	۷O. غ,
Pin 10 - Grid No. 2 Pin 11 - Cathode		Colle	
PIN 11 - Cathode		COTTE	
U i a Datina David Ca ta Walana			
Maximum Ratings, Design-Center Values:			٠,,
ULTOR® VOLTAGE	16000		volts
GRID-No.4 VOLTAGE	5000	max.	volts
GRID-No.1 VOLTAGE:	200	max.	VUILS
Negative bias value	125	max.	volts
Positive bias value		max.	volts
Positive peak value	2	max.	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode:			
During equipment warm-up period			_ ,
not exceeding 15 seconds .	410		volts
After equipment warm-up period	180	max.	volts
Heater positive with respect to cathode.	180	max.	volts
•: See next page.			

1GPA



any ultor voltage (E.) between 12000* and 16000 volts

Faul	inmont	Noc i	an	Ranges:
E au	IDMent	Desi	an	kanoes:

Field Strength of Adjustable

	and grid-No. 2 voltage (E_{C_2})		
	Grid-No.4 Voltage for Ultor	40 40 4 05 00 6 5	1.4
	Current of 100 μamp	19.1% to 25.9% of Eu	voits
	Grid-No.1 Voltage for Visual		
	Extinction of Undeflected		
	Focused Spot	11% to 25.7% of E _{C2}	volts
į	Grid-No.4 Current	-15 to +25	μ amp
	Grid-No.2 Current	-15 to +15	μ amp
	Field Strength of Single-Field	r	
	lon-Trap Magnet (Approx.)	$\sqrt{\frac{E_u}{12000}} \times 35$	gausses
	Trial Community of Additional Community	1 12000 ·	•

Examples of Use of Design Ranges:		
For ultor voltage of 12000	14000	volts
and grid-No.2 voltage of. 300	300	volts
Grid-No.4 Voltage for		
Ultor Current of		
100 μamp 2290 to 3100	2670 to 3620	
Grid-No.1 Voltaget33 to -77	-33 to -77	volts
Ion-Trap Magnet	40	
(Rated Strength) 35	40	gausses
1		

0 to 8

qausses

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

- In the 17GP4, grid No.5 which has the ultor function, grid No.3, and collector are connected together within the tube and are conveniently referred to collectively as "ultor". The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.
- * Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 12000 volts.
- † For visual extinction of undeflected focused spot.





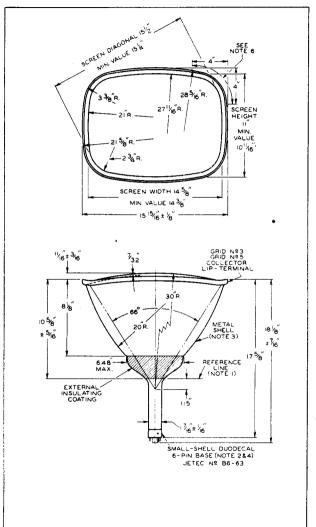
OPERATING NOTES

 $\it X-Ray\ Warning.$ When operated at ultor voltages up to 16 kilovolts, the 17GP4 does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at voltages as high as 17.6 kilovolts (absolute value), shielding of the 17GP4 for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

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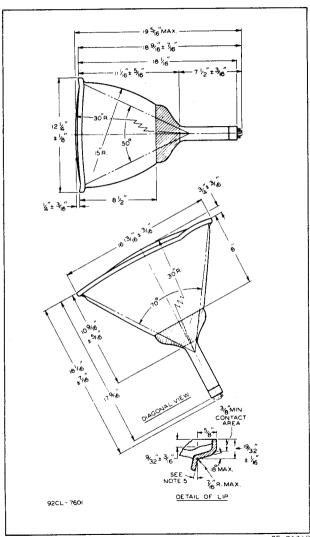




MAY 1, 1951







MAY 1, 1951

TUBE DEPARTMENT
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CE-76018

7GPA



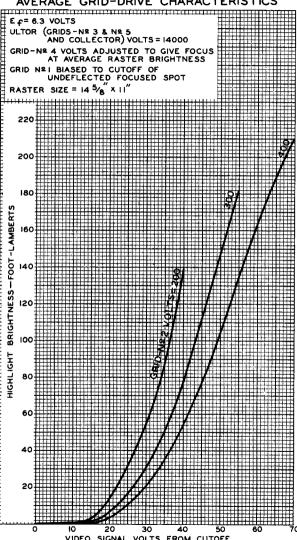
- NOTE 1: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CCT OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH METAL-SHELL AXIS AND HAVING A DIAMETER OF 2-3/4".
- NOTE 3: METAL SHELL AND GLASS FACE OPERATE AT HIGH VOLTAGE.

 ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST

 BE INSULATED TO WITHSTAND THE MAXIMUM APPLIED ULTOR VOLTAGE.
- NOTE 4: THE PLANE THROUGH THE TUBE AXIS AND PIN No.6 MAY VARY FROM THE HORIZONTAL AXIS OF THE GLASS FACE BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°.
- NOTE 5: IN THIS REGION THE ANGULAR VARIATION AROUND PERI-PHERY OF METAL SHELL IS 0° TO 18°.
- NOTE 6: SUPPORT TUBE BY LIP ONLY AT CORNERS WITHIN THIS SPACE.



AVERAGE GRID-DRIVE CHARACTERISTICS

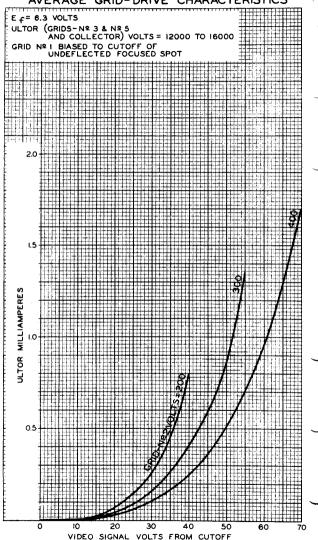






17GP4

AVERAGE GRID-DRIVE CHARACTERISTICS



FEB. 8, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7607



RECTANGULAR GLASS TYPE

MAGNETIC DEFLECTION LOW-VOLTAGE FOCUS

THO

LOW-VOLTAGE FOCUS MAGNETTO DEFLET	311011
DATA General:	
Heater, for Unipotential Cathode: Voltage 6.3 ac or Current 0.6 Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6 Cathode to All Other Electrodes	amp μμf
External Conductive Coating to Ultor . { 750 m	ax. μμτ in. μμτ
Cathode to All Other Electrodes. External Conductive Coating to Ultor Faceplate, Spherical Light Transmission (Approx.) Phosphor (For Curves, see front of this section) Fluorescence and Phosphorescence Persistence of Phosphorescence Focusing Method Deflection Method Deflection Angles (Approx.): Diagonal Horizontal	lfide Type White Short ctrostatic Magnetic
Horizontal Vertical Ion-Trap Gun Requires External, Single-Fi Overall Length 19-3/ Greatest Diagonal of Tube 16-5 Greatest Width of Tube 15-3 Greatest Height of Tube 12-9/ Screen Size 14-3/8" Mounting Position Recessed Small Cavity (JETEC Base Small-Shell Duodecal 6-Pin (JETEC BOTTOM VIEW	509 ield Magnet /16" ± 3/8" 5/8" ± 1/8" 3/8" ± 1/8" /32" ± 1/8" x 11-1/16"
Pin 6 - Grid No.2 Pin 10 - Grid No.2 Pin 11 - Cathode Col	id No. 5, llector
Maximum Ratings, Design-Center Values:	
ULTOR® VOLTAGE . 16000 ma GRID=No.4 VOLTAGE: Positive value . 1000 ma Negative value . 500 ma GRID=No.2 VOLTAGE . 500 ma GRID=No.1 VOLTAGE . 125 ma Positive bias value . 125 ma Positive bias value . 0 ma Positive peak value . 2 ma	ax. volts ax. volts ax. volts ax. volts ax. volts
• A See next page.	





PEAK HEATER-CATHODE VOLTAGE: Heater negative with resper During equipment warm-up not exceedi After equipment warm-up p Heater positive with respec	period ng 15 second period	ds. 410 max	. volts
Equipment Design Ranges:			
For any ultor voltage (Eu) and grid-No.2 voltage (Ec Grid-No.4 Voltage for Ultor			
Current of 100 µamp Grid-No.1 Voltage for Visual Extinction of Undeflected	-0.4% to 2	2.2% of E _u	volts
Focused Spot Grid-No.4 Current Grid-No.2 Current Field Strength of Single-Field Ion-Trap Magnet	−25 t −15 t	o +15	volts μαπρ μαπρ
(Approx.) Field Strength of Adjust-	$\sqrt{\frac{L_0}{12000}}$	× 42	gausses
able Centering Magnet	0 t	0 8	gausses
Examples of Use of Design Ran	ges:		
For ultor voltage of		16000	volts
and grid-No.2 voltage of Grid-No.4 Voltage for Ultor Current of	300	300	volts
100 μamp Grid-No.1 Voltage† Ion-Trap Magnet	55 to +300 -33 to -77	-65 to +350 -33 to -77	volts volts
(Rated Strength)	45	50	gausses
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance		. 1.5 max.	megohms
• In the 17HPB, grid No.5 which collector are connected togethe referred to collectively as * tube is the electrode, or the more additional electrodes conis applied the highest dc volt the beam prior to its deflectic Brilliance and definition decregeneral, the ultor voltage show for visual extinction of undefl This value has been specified to voltage is provided for dynamic	ase with decr ld not be les ected focus e d	easing ultor vo s than 12000 vo spot.	ltage. In lts.



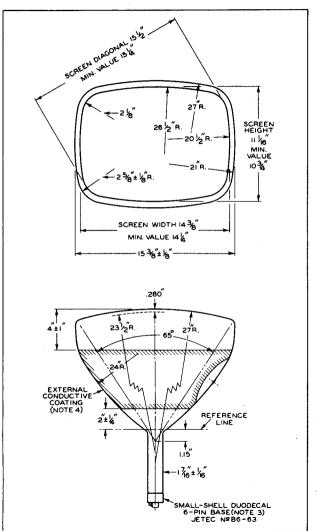


OPERATING NOTES

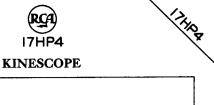
I-Ray Warning. When operated at ultor voltages up to 16 kilovolts, the I7HP4 does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at voltages as high as 17.6 kilovolts (absolute value), shielding of the 17HP4 for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

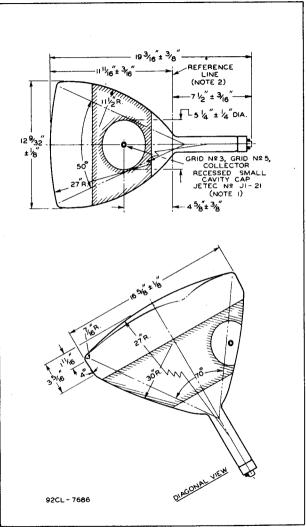
THPA

RCA 17HP4 KINESCOPE



FEB. 1, 1952





FEB. 1, 1952

TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY CE-7686B

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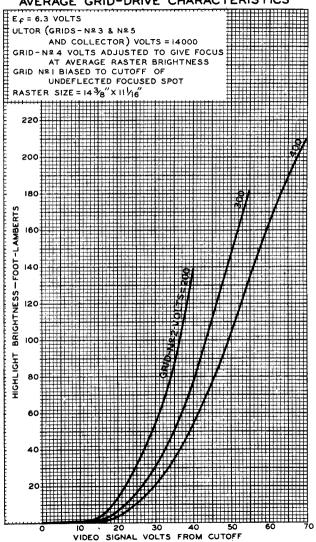


KINESCOPE

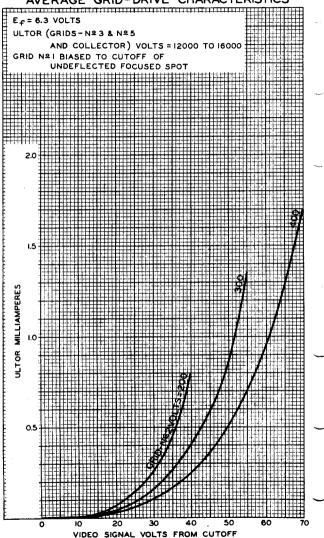
- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMINAL BY ANGULAR TOLFRANCE (MEASURED ABOUT THE TUBE AXIS) OF + 30°. BULB TERMINAL IS ON SAME SIDE AS PIN No.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFER-ENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC! OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



AVERAGE GRID-DRIVE CHARACTERISTICS









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RECTANGULAR GLASS TYPE MAGNETIC DEFLECTION MAGNETIC FOCUS

1	DATA	l
	General:	l
	Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes	
	External Conductive Coating to Ultor 500 min.	
	Faceplate, Spherical	200
	Diagonal	
	Tube Dimensions: 19-3/16" ± 3/8" Overall Length 16-5/8" ± 1/8" Greatest Diagonal 16-5/8" ± 1/8" Greatest Width 15-3/8" ± 1/8" Greatest Height 12-9/32" + 1/8" -7/32"	"
	Minimum Screen Dimensions: Greatest Width	s y
_	Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Pin 12-Heater Cap-Ultor (Grid No.3, Collector) C-External Conductive Coating	
	Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE 18000 max. volt:	1
_	In the 17JP4, grid No.3 which has the ultor function and collector ar- connected together within the tube and are conveniently referred; collectively as "ultor". The ultor in a cathode-ray tube is the electrode, or the electrode in combination with one or more addition electrodes connected within the tube to it, to which is applied the highest de voltage for accelerating the electrons in the beam prio to its deflection.	e o e r
	TENTATIVE DAT	٠.

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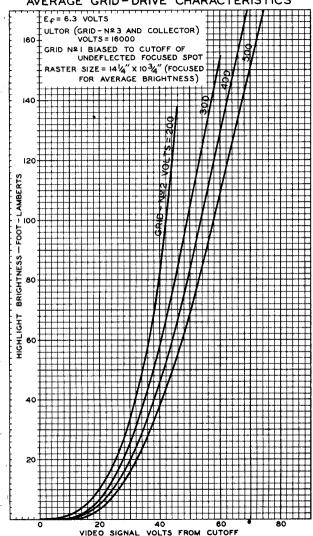


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GRID-No.2 VOLTAGE GRID-No.1 VOLTAGE:		410 max.	volts
Negative bias value		125 max.	volts
Positive bias value		0 max.	volts
Positive peak value		2 max.	volts
PEAK HEATER-CATHODE VOLTAGE:			1
Heater negative with respect			i
During equipment warm-up per not exceeding 15 second		410 max.	volts
		150 max.	
After equipment warm-up per Heater positive with respect		150 max.	
1	to cathode .	150 1181.	V0113
Equipment Design Ranges:			
For any ultor voltage (E_u) be and grid-No.2 voltage (E_{c2})	tween 12000* between 150	and 18000 and 410 vo	lts.
Grid-No.1 Voltage for Visual Extinction of Undeflected			
Focused Spot	11% to 25.	7% of E _{c2}	volts
Grid-No.2 Current	−15 te	_	μamp
Focusing-Coil Current (DC)00	1200		% ma
Field Strength of Single-Field Ion-Trap Magnet (Approx.)**.	√ <u>Eu</u>	- × 42	gausses
Field Strength of Adjustable Centering Magnet	0	, to 8	gausses
Examples of Use of Design Range	s:		
For ultor voltage of	14000	16000	volts
and grid-No.2 voltage of	300	300	volts
Grid-No.1 Voltage for Visual Extinction of Undeflected			
		-33 to -77	volts
Focusing-Coil Current (DC)	104 ± 10%	110 ± 10%	ma
Ion-Trap Magnet		50	
(Rated Strength)	45	50	gausses
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance .		1.5 max.	megohms
# Brilliance and definition decrease general, the ultor voltage should	with decreasi not be less th	ng ultor volt an 12000 volt	age. In
For specimen focusing coil simi	lar to JETEC F	ocusing Coi	No.109
For specimen focusing coil simi positioned with air gap toward ki air gap 3 inches from Reference L dicated current is for condition w and video-signal voltage adjusted of 30 foot-lamberts on a 14-1/4*x1	ine (see Outli: vith combined g to produce a .0-3/4" picture	ne Drawing), rid-No.1 bias highlight br area sharp)	The in- s voltage ightness r focused
** With a specimen ion-trap magnet s 111 located in optimum position and the ion-trap magnet current is 82 tage is 14000 volts and grid-No.2	imilar to JETE I rotated to giv milliamperes d voltage is 300	Clon-Trap Ma e maximum bri cwhen the ul volts.	gnet No. ghtness, tor vol-
For x-ray shielding considence PRECAUTIONS FOR CATHODE-RAY TU	erations, see s	heet X-RAY	İ

JULY 1, 1952

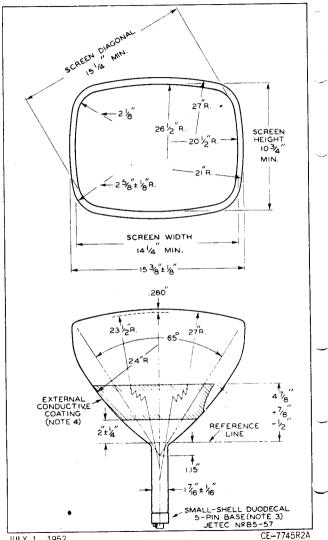




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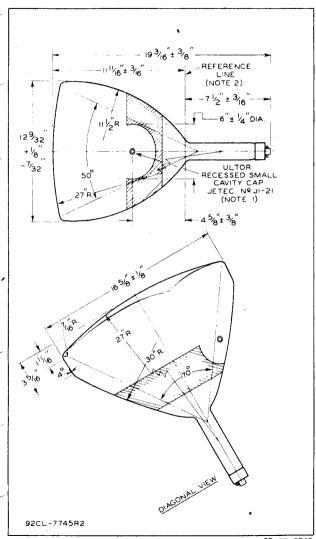


JULY 1, 1952

TUBE DEPARTMENT







JULY 1. 1952

TUBE DEPARTMENT RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY CE-7745R2B



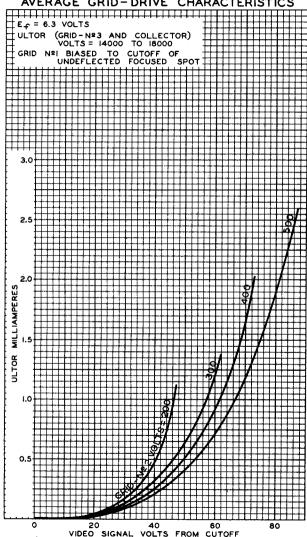
- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSI-TION No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 30°. ULTOR TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.IIO (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



17JP4

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RECTANGULAR GLASS TYPE

	LOW-VOLTAGE FOCUS MAGNETIC DEFLECTION
-	DATA
	General:
	Heater, for Unipotential Cathode:
	Voltage 6.3 ac or dc volts Current amp
	Direct Interelectrode Capacitances:
	Grid No.1 to All Other Electrodes 6 μμf
	Cathode to All Other Electrodes 5 \mu f
	External Conductive Coating to Ultor \bigg\{\bigg\{1500 max. \muf \infty} \end{array}
	Faceplate, Cylindrical with
	Toric Inner Surfacet Filterglass
	Light Transmission (Approx.)
	Phosphor (For Curves, see front of this Section). P4—Sulfide Type Fluorescence and Phosphorescence White
	Persistence of Phosphorescence Short
	Focusing Method Electrostatic
	Deflection Method Magnetic
	Deflection Angles (Approx.): Diagonal
	Horizontal
	Vertical
	Ion-Trap Gun Requires External, Single-Field Magnet
	Tube Dimensions: Overall Length
	Greatest Diagonal
	Greatest Width 15-3/8" ± 1/8"
	Greatest Height
	Minimum Screen Dimensions: Greatest Width
	Greatest Height 10-3/4"
	Diagonal
	Weight (Approx.)

Pin 1 - Heater

Mounting Position

Cap .

Base

2-Grid No.1 Pin 6-Grid No.4

Pin 10-Grid No.2

Pin 11 - Cathode

Pin 12 - Heater

BOTTOM VIEW

Cap - Ultor (Grid No.3, Grid No.5,

Recessed Small Cavity (JETEC No.J1-21)

Small-Shell Duodecal 6-Pin (JETEC No.B6-63)

Collector) C-External Conductive Coating

The toric surface in the 17LP4 is described by a segment of a circle having a radius of about 60° rotated about a straight line which is (1) parallel to the axis of the outer cylindrical surface, (2) positioned in a plane passing through the axis of the cylindrical surface and the center element thereof, and (3) spaced approximately 24° from the cylindrical surface.

See next page.





Maximum Ratings, Design-Center Values:	
ULTOR® VOLTAGE 16000 max	. volts
GRID-No.4 VOLTAGE: Positive value	
Negative value* 500 max	
GRID—No.2 VOLTAGE	
Negative bias value 125 max	
Positive bias value 0 max	
Positive peak value 2 max PEAK HEATER—CATHODE VOLTAGE:	. voits
Heater negative with respect to cathode:	
During equipment warm-up period	, ,
not exceeding 15 seconds. 410 max	
After equipment warm-up period 180 max	
Heater positive with respect to cathode. 180 max	. Voits
Equipment Design Ranges:	, nolts
For any ultor voltage (E_u) between 12000* and 16000 and grid-No.2 voltage (E_{C_2}) between 150 and 500 u	olts
Grid-No.4 Voltage for Focus	
with Ultor Current	
of 100 µamp0.4% to +2.2% of E _u Grid-No.1 Voltage for	volts
Visual Extinction of Undeflected Focused Spot. 11% to 25.7% of Ec2	volts
Grid-No.4 Current25 to +25	μ amp
Grid-No.2 Current15 to +15 Field Strength of Single-	μ amp
Field Ion-Trap Magnet (Approx.)	gausses
Field Strength of Adjustable	
Centering Magnet 0 to 8	gausses
Examples of Use of Design Ranges:	
For ultor voltage of 14000 16000	volts
and grid-No.2 voltage of 300 300 Grid-No.4 Voltage for Focus	volts
with Ultor Current	
of 100 μ amp55 to +300 -65 to +350	volts
Grid-No.1 Voltage for	
Visual Extinction of Un- deflected Focus Spot33 to -77 -33 to -77	volts
Ion-Trap Magnet (Rated Strength) 45 50	gausses
Maximum Circuit Values:	
Grid-No.1-Circuit Resistance 1.5 max.	megohms
•,*,#: See next page.	

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TENTATIVE DATA 1





In the 17LP4, grid No.5 which has the ultor function, grid No.3, and collector are connected together within the tube and are conveniently referred to collectively as "ultor." In a "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection.

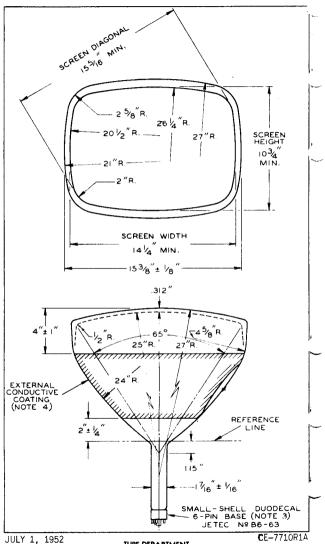
This value has been specified to take care of the condition where an ac voltage is provided for dynamic focusing.

Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 12000 volts.

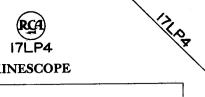
For x-ray shielding considerations, see sheet X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section

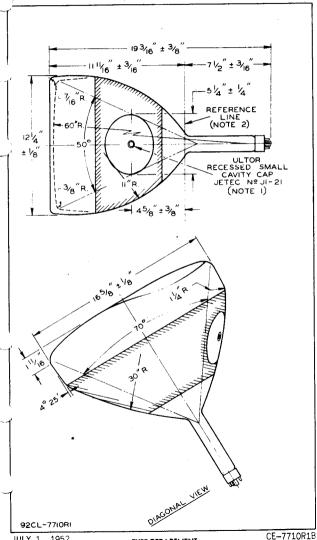
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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY





JULY 1, 1952

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NOTE I: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 30°. BULB TERMINAL IS ON SAME SIDE AS PIN NO.6.

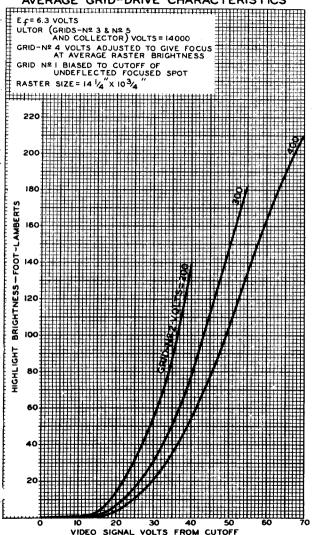
NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

JULY 1, 1952

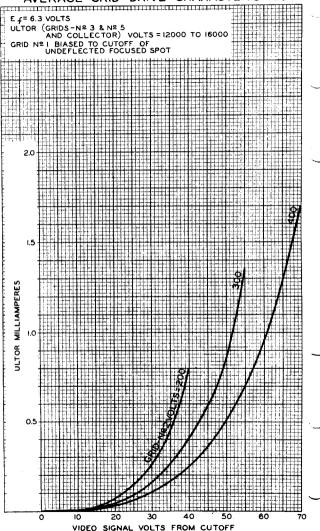




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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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RECTANGULAR GLASS TYPE

	MAGNETIC FOCUS MAGNETIC DEFLECTION
ſ	DATA
k	General:
	Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6
-	External Conductive Costing to Ultrant (1500 max. uuf
1	750 min. $\mu\mu$ f
	Faceplate, Cylindrical With Toric Inner Surfacet
E	Fluorescence and Phosphorescence
	Diagonal 70° Horizontal 65° Vertical 50° Ion-Trap Gun Requires External, Single-Field Magnet
	Overall Length
	Greatest Width 14-1/4" Greatest Height 10-3/4" Diagonal 15-5/16" Veight (Approx.) 19 lbs Nounting Position Any
8	Ap Recessed Small Cavity (JETEC No. J1-21) Aase Small-Shell Duodecal 5-Pin (JETEC No. B5-57)
	Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11- Cathode Pin 12-Heater Cap-Ultor (Grid No.3, Collector) C-External Conductive Coating
+	The toric surface in the 170P4 is described by a segment of a circle having a radius of about 60° rotated about a straight line which is (1) parallel to the axis of the outer cylindrical surface, (2) positioned in a plane passing through the axis of the cylindrical surface and the center element thereof, and (3) spaced approximately 25° from the cylindrical surface.
	; See next page.





laximum Ratings, Design-Center Values:		
ILTOR® VOLTAGE	16000 max.	volts
	410 max.	
GRID-No.2 VOLTAGE	410 max*	***
GRID-No.1 VOLTAGE:	125	volts
Negative bias value	125 max.	
Positive bias value	0 max.	
Positive peak value	2 max.	volts
FAK HEATER-CATHODE VOLTAGE:		į.
Heater negative with respect to cathode:		- 1
During equipment warm-up period		1
not exceeding 15 seconds.	410 max.	volts
After equipment warm-up period	150 max.	volts
Heater positive with respect to cathode.	150 max.	volts
		ŀ
quipment Design Ranges:		
For any ultor voltage (Eu) between 12000	ana 10000	00113
and grid-No.2 voltage (Ec2) between 150	ana 410 v	,,,,
Grid-No.1 Voltage for Visual		Į
Extinction of Undeflected		
Focused Spot 11% to 25.7%	of Eco	volts
Grid-No.2 Current	15	μamp
Tiu-no.2 carrene.	٦	
Focusing—Coil Current (DC) $^{\circ\circ}$ [$\sqrt{12000}$ $^{ imes}$	96] ±6%	ma
Field Strength of Single-		j
Field Ion-Trap Magnet		
(Approx.)**	42 .	gausses
V 12000		
Field Strength of Adjustable		gausses
Centering Magnet 0 to 8		gausses
Examples of Use of Design Ranges:		
For ultor voltage of 12000	14000	volts
and grid-No.2 voltage of 300	300	volts
	<i>3</i>	
Grid-No.1 Voltage for Visual		
Extinction of Undeflected	00 1 77	1+-
	–33 to –77	volts
Tocused oper		
Tocused oper	104 ± 6%	ma
Focusing—Coil Current (DC) . 96 ± 6%	104 ± 6%	, ma
Focusing-Coil Current (DC) 96 ± 6% Ion-Trap Magnet		
Focusing-Coil Current (DC) . 96 ± 6%	104 ± 6%	, ma
Focusing-Coil Current (DC) . 96 ± 6% Ion-Trap Magnet (Rated Strength) 40 Maximum Circuit Values:	104 ± 6% 45	gausses
Focusing-Coil Current (DC) . 96 ± 6% Ion-Trap Magnet (Rated Strength) 40	104 ± 6%	, ma
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength) 40 Maximum Circuit Values: Grid—No.1—Circuit Resistance	104 ± 6% 45 1.5 max.	gausses
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength) 40 Maximum Circuit Values: Grid—No.1—Circuit Resistance	104 ± 6% 45 1.5 max.	gausses
Focusing—Coil Current (DC) . 96 ± 6% ion—Trap Magnet (Rated Strength) 40 Maximum Circuit Values: Grid—No.1—Circuit Resistance	104 ± 6% 45 1.5 max.	gausses
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength) 40 Maximum Circuit Values: Grid—No.1—Circuit Resistance	104 ± 6% 45 1.5 max.	gausses
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength) 40 Maximum Circuit Values: Grid—No.1—Circuit Resistance	104 ± 6% 45 1.5 max.	gausses
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength)	104 ± 6% 45 1.5 max.	gausses
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength)	104 ± 6% 45 1.5 max. ction and col nathode-ray to one or more owhich is a one in the bea	ma gausses megohms lector are eferred to be is the additional policed the m prior to
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength)	104 ± 6% 45 1.5 max. ction and col nathode-ray to one or more owhich is a one in the bea	ma gausses megohms lector are eferred to be is the additional policed the m prior to
Focusing—Coil Current (DC) . 96 ± 6% Ion—Trap Magnet (Rated Strength)	104 ± 6% 45 1.5 max. ction and col nathode-ray to one or more owhich is a one in the bea	ma gausses megohms lector are eferred to be is the additional policed the m prior to

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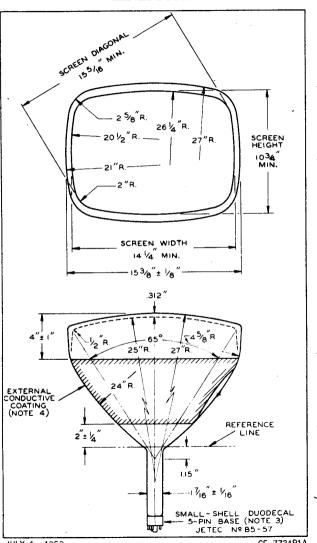


OF or specimen focusing coil similar to JETEC Focusing Coil No. 109 positioned with air gap toward kinescope screen, and center line of air gap 3 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 14-1/4" x 10-3/4" picture area sharply focused at center of screen.

With a specimen ion-trap magnet similar to JETEC Ion-Trap Magnet No.111 located in optimum position and rotated to give maximum brightness, the ion-trap magnet current is 70 milliamperes dc when the ultor voltage is 12000 volts and grid-No.2 voltage of 300 volts.

For x-ray shielding considerations, see sheet
X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES
at front of this Section

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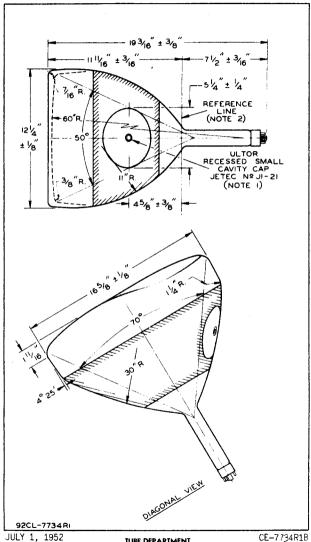


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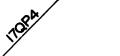
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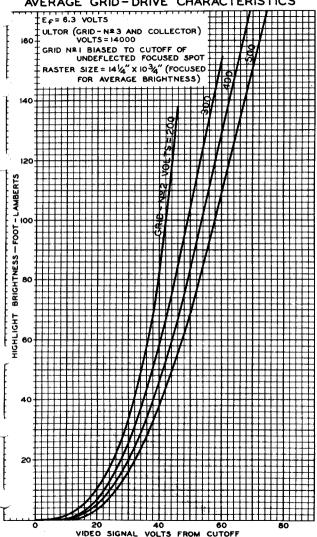
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NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFER-ENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

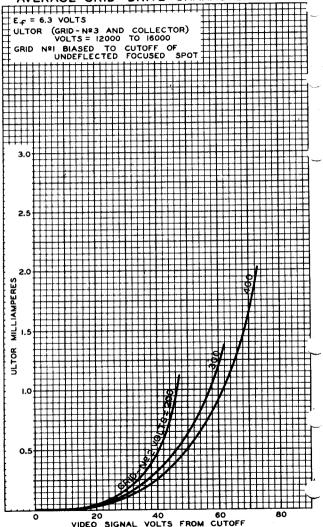
NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-374".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.











(2)

DECTANGILAR METAL-SHELL TYPE

RECI ANGUEAN ME	INE ONELL IN -
LOW-VOLTAGE FOCUS	MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances:
Grid No.1 to All Other Electrodes. Grahode to All Other Electrodes. 5 Face Plate (With about 66% light transmission) Frosted lterglass Phosphor (For Curves, see front of this Section) Phosphor (For Curves, see front of this Section) Frosted lterglass Phosphor (For Curves, see front of this Section) Frosted lterglass Phosphor (For Curves, see front of this Section) No.4— ulfide Type Fluorescence and Phosphorescence Short Focusing Method. Electrostatic Deflection Method. Deflection Angles (Approx.): Diagonal . Horizontal . Vertical .
Pin 1-Heater, Pin 2-Grid No.1 Pin 6-Grid No.4 Pin 10-Grid No.2 Pin 11-Cathode BOTTOM VIEW Pin 12-Heater Metal-Shell Lip- Grid No.3, Grid No.3, Grid No.5, Collector
Maximum Ratings, Design-Center Values:
ULTOR® VOLTAGE
GRID-No.1 VOLTAGE: Negative bias value
PEAK HEATER—CATHODE VOLTAGE: Heater negative with respect to cathode: During equipment warm—up period not exceeding 15 seconds





For any ultor voltage (Eu) between 12000*	and 16000	no. l + n
and arid-No a valtage (Fact terms	una 10000	voits
and grid-No.2 voltage (Ec2) between 150 Grid-No.4 Voltage for Focus	and 500 v	olts
With Ultor Current of 100 μ amp 0% to 2	E0 -6 E	14
Grid—No.1 Voltage for Visual	5% OT Eu	volt
Extinction of Undeflected		
Focused Spot 11% to 25	794 of E	volt
Grid—No.4 Current —25 t	o +25	μaπ
	0 +15	μап μап
Field Strength of Single-Field	0 .13	μωπ
Ion-Trap Magnet (Approx.)** 1/Eu	× 33	gausse
Field Strength of Adjustable 12000	^ //	3
	o 8	gausse
Examples of Use of Design Ranges:		•
	16000	volt
For ultor voltage of 14000 and grid-No.2 voltage of. 300	300	volt
and grid-No.2 voltage of. 300 Grid-No.4 Voltage for Focus	300	0000
With Ultor Current of		
	0 to 400	volt
	-33 to -77	volt
Ion-Trap Magnet	• •	
(Rated Strength) 35	40	gausse
Maximum Circuit Values:	1.5 max.	megohm
Grid-No.1-Circuit Resistance	1.5 110/1	
in the 17TDH arid to E which her the witch		
in the 17174, gill No.5 which has the ultor lune	and are conv	enientl
collector are connected together within the tube		hode-ra
referred to collectively as "ultro". The "ult tube is the electrode or the electrode in combin	or" in a cat	A AF MAF
collector are connected together within the tube referred to collectively as "ultor". The "ult tube is the electrode, or the electrode in combin additional electrodes connected within the tub	or" in a cat ation with or e to it, to	e or more
In the 17TP4, grid No.5 which has the ultor func collector are connected together within the tube referred to collectively as "ultor". The "ult tube is the electrode, or the electrode in combin additional electrodes connected within the tub applied the highest dc voltage for accelerating beam prior to its deflection.	or" in a cat ation with or e to it, to the electron	which is in the
_ seam prior to its dericetions		
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less th	ng ultor volt an 12000 volt	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less th	ng ultor volt an 12000 volt	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less th with a specimen ion-trap magnet similar to JETE(iii located in optimum position and rotated to giv the ion-trap magnet current iss5 milliammeres do:	ng ultor volt an 12000 volt	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to give the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
* grilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located inoptimum position and rotated togive the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to give the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
* Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to give the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
* Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to give the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to given the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to give the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I
Brilliance and definition decrease with decreasi general, the ultor voltage should not be less the with a specimen ion-trap magnet similar to JETE(111 located in optimum position and rotated to give the ion-trap magnet current is 65 milliamperes do is 14000 volts.	ng ultor volt an 12000 volt C lon—Trap Ma e maximum bri when the ulto	age. I



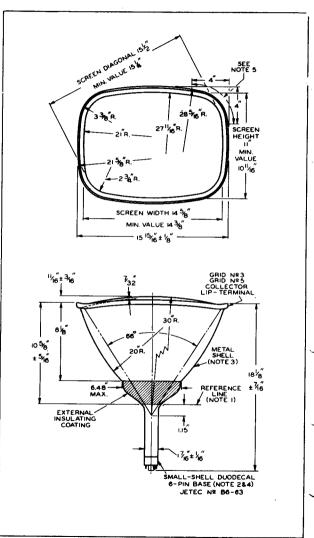


OPFRATING NOTES

 $\it{X-Ray}$ Warning. When operated at ultor voltages up to 16 kilovolts, the 17TP4 does not produce any harmful x-ray radiation, However, because the rating of the tube permits operation at voltages as high as 17.6 kilovolts (absolute value), shielding of the 17TP4 for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

Direction of the field of the ion trap magnet should be such that the north pole is adjacent to vacant pin position No. 8 and the south pole to pin No. 2.

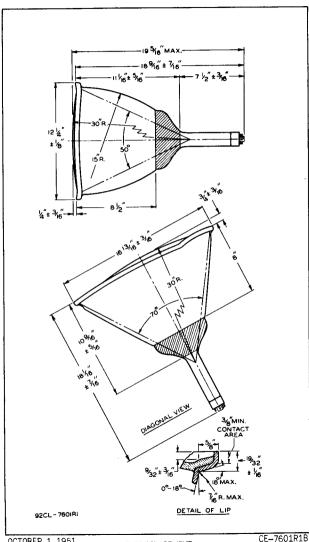
IT TP4 KINESCOPE



OCTOBER 1,1951







OCTOBER 1,1951

TUBE DEPARTMENT

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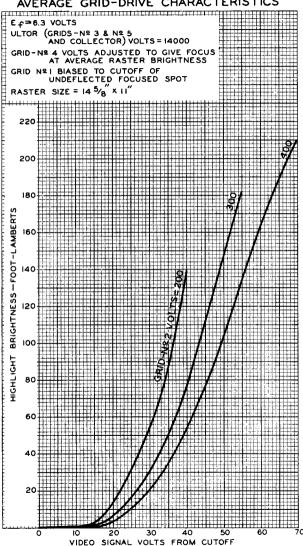
- NOTE 1: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH METAL—SHELL AXIS AND HAVING A DIAMETER OF 2-3/4".
- NOTE 3: METAL SHELL AND GLASS FACE OPERATE AT HIGH VOLTAGE.

 ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST
 BE INSULATED TO WITHSTAND THE MAXIMUM APPLIED ULTOR
 VOLTAGE.
- NOTE 4: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.6 MAY VARY FROM THE HORIZONTAL AXIS OF THE GLASS FACE BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°.
- NOTE 5: SUPPORT TUBE BY LIP ONLY AT CORNERS WITHIN THIS SPACE.

OCTOBER 1.1951

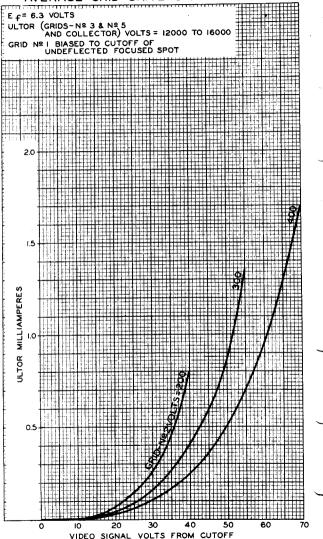
CE-7601R1C















The 19AP4 is like the 19AP4-B except that it has a face plate made of unfrosted, clear glass. As a result, the light output is about 30% greater than shown by the curves under Type 19AP4-B.

19AP4-A KINESCOPE

The 19AP4-A is like the 19AP4-B except that it has an unfrosted Filterglass face plate. The light output is essentially the same as that of the Type 19AP4-B.

As soon as feasible, the 19AP4-B will supersede the 19AP4 and 19AP4-A.



METAL-CONE ENVELOPE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

19 AVA.

Supersedes Type 19AP4-A
DATA

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Metal-Cone Lip: Anode, Grid No.3
Maximum Ratings, Design-Center Values:
ANODED VOLTAGE
Negative bias value
exceeding 15 seconds 410 max. volts After equipment warm-up period 150 max. volts Heater positive with respect to cathode. 150 max. volts
Anode and grid No.3, which are connected together within tube, are referred to herein as anode.
The product of anode voltage and average anode current should be limited to 6 watts.
Has transmission of about 65%.





Typical Operation:			
Anode Voltage*	12000	14000	volts
Grid-No.2 Voltage	300	300	volts
Grid-No.1 Voltage for Visual			
Extinction of Undeflected			
Focused Spot	-33 to -77	33 to77	volts
Focusing-Coil Current			
(DC, Approx.)	140	150	ma
lon-Trap Magnet Current			
(DC, Approx.)#	75	80	ma
Field Strength of Single-Field			
	45	50	gausses

Maximum Circuit Values:

Grid-No.1 - Circuit Resistance. 1.5 max. megohms

Minimum Circuit Values:

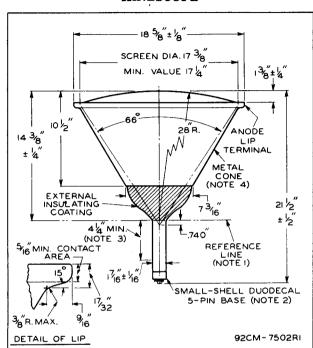
The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 ma. If the supply permits the instantaneous short-circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output capacitor should be as follows:

The resistors used should be capable of withstanding the applied voltage.

- * Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 12000 volts.
- For JETEC Focusing Coil No. 106, or equivalent, positioned with air gap toward kinescope screen, and center line of air gap about 3 inches from Reference Line (see Outline Drawing). The indicated currents are for the condition with the combined grid-No. 1 pias voltage and video-signal voltage adjusted to produce a highlight brightness of 18 foot-lamberts of 12000 volts, or 22 foot-lamberts for 14000 volts, on a 18-5/8* x 11-3/4* picture area.
- # For JETEC Jon-Trap Magnet No.111, or equivalent, located in optimum position and rotated to give maximum brightness.
- † Measured at center of field with General Electric Gauss Meter, Cat. No.409X51.



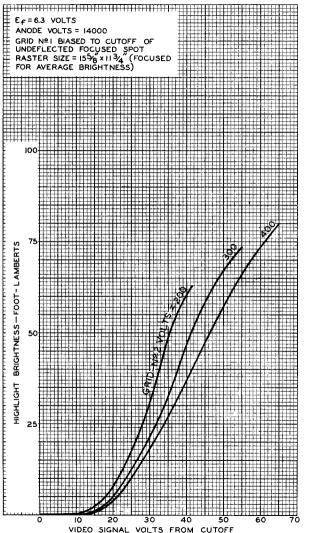




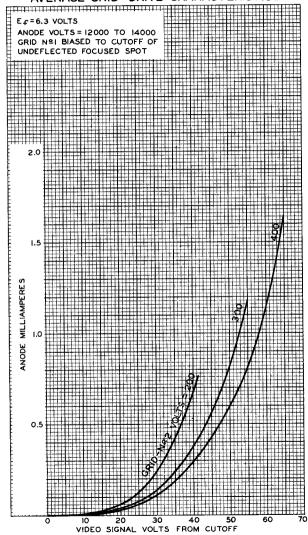
- NOTE I: REFERENCE LINE IS DETERMINED BY POSITION WHERE HINGED GAUGE 1.500" + .003" .000" I.D. AND 2" LONG WILL REST ON CONE.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH CONE AXIS AND HAVING DIAMETER OF 3".
- NOTE 3: LOCATION OF DEFLECTING YOKE AND FOCUSING COIL MUST BE WITHIN THIS SPACE.
- NOTE 4: METAL CONE AND GLASS FACE OPERATE ATHIGH VOLTAGE. ANY MATERIAL IN CONTACT WITH THE CONE OR THE FACE MUST HAVE INSULATING PROPERTIES ADEQUATE TO WITHSTAND THE APPLIED ANODE VOLTAGE PLUS 10%.

19AP4-E

AVERAGE GRID-DRIVE CHARACTERISTICS







SADA.





The 19AP4-D is like the 19AP4-B except that it has a face plate made of frosted, clear glass. As a result, the light output is about 30% greater than shown by the curves under Type 19AP4-B.

As soon as feasible, the 19AP4-B will supersede the 19AP4-D.



POCOP

RECTANGULAR GLASS TYPE

MAGNETIC FOCUS	MAGNETIC DEFLECTION

DATA		
General:		
Heater, for Unipotential Cathode: Voltage	6 5 Filte No.4-Sulfid Ma Ma Ma 21-7/16" 20-3/32": 18-11/16" ± 14-15/16" ± 17-1/4" x 1	amp µµf rglass e Type: White Short gnetic gnetic 700 660 500 Magnet ± 3/16" : 3/16" 3-1/4" Any J1-21) B5-57) .hode ater
Maximum Ratings, Design-Center Values:		
ANODE VOLTAGE	18000 max. 410 max.	volts volts
Negative bias value	125 max. 0 max. 2 max.	volts volts volts
exceeding 15 seconds After equipment warm-up period Heater positive with respect to cathode.	410 max. 150 max. 150 max.	volts volts volts





Typical Operation:			
Anode Voltage*	14000	16000	volts
Grid-No. 2 Voltage	300	300	volts
Grid-No.1 Voltage for Visual	ŕ		
Extinction of Undeflected			
Focused Spot	-33 to -77	-33 to -77	volts
Focusing-Coil Current (DC).	104 ± 10%	110 ± 10%	ma
Field Strength of Single-			
Field, lon-Trap Magnet			
(Approx.) †	50	55	gausses

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 1.5 max. megohms

- Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 14000 volts.
- For specimen focusing coil similar to JETEC Focusing Coil No.109, positioned with air gap toward kinescope screen, and center line of air gap about 3 inches from Reference Line (see Outline Drawing). The indicated currents are for the condition with the combined grid No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 17" x 12-3/4" picture area sharply focused at center of screen.
- † Measured at center of field with General Electric Gauss Meter, Cat. No. 409X51.



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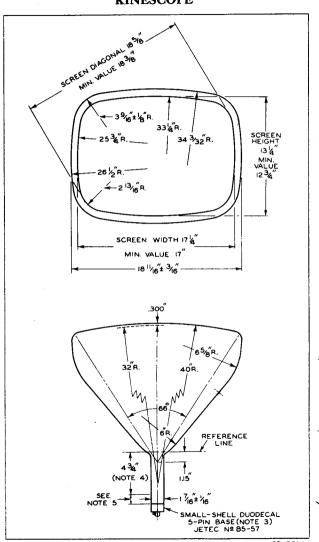
KINESCOPE

OPERATING NOTES

X-Ray Warning. When operated at or below 16000 volts, the 20CP4 does not produce any harmful x-ray radiation. In general, picture tubes may be operated at voltages (if ratings permit) up to 16000 volts without personal injury on prolonged exposure at close range. Above 16000 volts, special shielding precautions for x-ray radiation may be necessary.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

RCA 20CP4 KINESCOPE



MAY 1, 1951

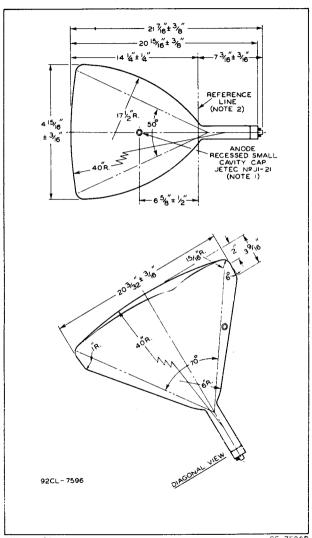
20CPA

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7596A







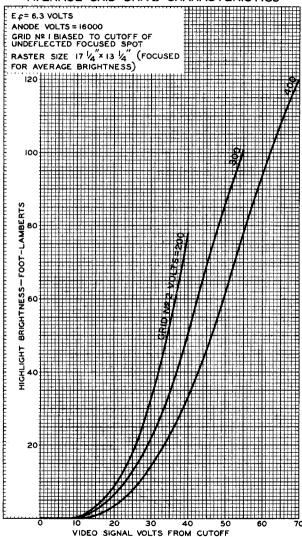
MAY 1, 1951



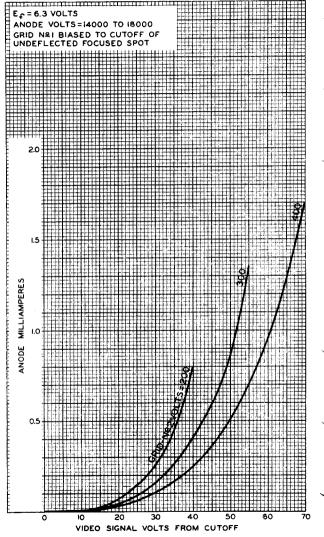


- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 30°. ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFER-ENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC! OF THE GAUGE WITH THE GLASS FUNNE!
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A
- NOTE 4: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.
- NOTE 5: KEEP THIS SPACE CLEAR FOR SINGLE-FIELD, ION-TRAP MAGNET.











20MP4

DATA

KINESCOPE RECTANGULAR GLASS TYPE

LOW-VOLTAGE FOCUS

MAGNETIC DEFLECTION

COMPO

General:	VA.1A
Heater, for Unipotential Cath	node:
Voltage	6.3 ac or dc volts
Current	0.6 amp
Direct Interelectrode Capacit	ances:
Grid No.1 to All Other Elec	
Cathode to All Other Election	
	(750
External Conductive Coating	to Ultor 750 max . $\mu\mu$ f
For all Associations	
Faceplate, Spherical	
Light Transmission (Approx.	.)
Phosphor (For Curves, see front of	of this Section) P4—Sulfide Type
Fluorescence	White
Phosphorescence	White
Persistence	Short
Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angles (Approx.):	_
Diagonal	709
Horizontal	66°
Vertical	50°l
Ion-Trap Gun Requi	res External, Single-Field Magnet
Tube Dimensions:	, , ,
Overall Length	21-3/4" ± 3/8"
Greatest Diagonal	20-3/32" ± 3/16"
Greatest Width	18-11/16" ± 3/16"
Greatest Height	
Screen Dimensions:	17–1/4"
Greatest Width	
Greatest Height	13-1/4"
Diagonal	
Weight (Approx.)	
Mounting Position.	Any
Cap Reces	sed Small Cavity (JETEC No. J1-21)
	Duodecal 6-Pin (JETEC No. B6-63)
	TOM VIEW
Pin 1-Heater	Cap - Grid No.3,
Pin 2-Grid No.1	Grid No.5,
Pin 6-Grid No.4	Collector
Pin 10 - Grid No. 2	C - External
Pin 11 - Cathode	Conductive
Pin 12 - Heater	Coating
1 117 12 - Heater	()•@
Maximum Ratings, Design-Cent	er Values:
	16000 max. volts
ULTOR® VOLTAGE	
In the 20MPH, grid No. 5 which	has the ultor function, grid No.3, and er within the tube and are conveniently for." The "ultor" in a cathode-ray tube ode in combination with one or more ad-
collector are connected togeth	er within the tube and are conveniently tor. " The "ultor" in a cathode—ray tube
is the electrode, or the electr	ode in combination with one or more ad-
ditional electrodes connecte	d within the tube to it, to which is for accelerating the electrons in the
beam prior to its deflection.	ode in combination with one or more ac- d within the tube to it, to which is e for accelerating the electrons in the
	TENTATIVE DATA

TENTATIVE DATA

20MPA

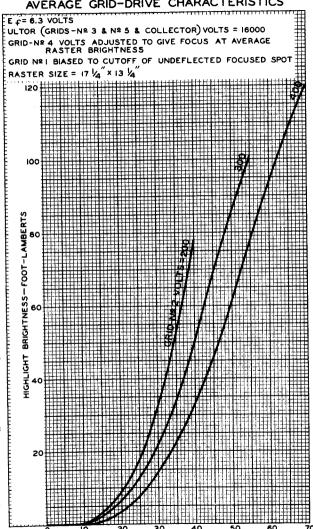


GRID-No.4 VOLTAGE:			
Positive value		1000 max.	volts
Negative value⁴		500 max.	volts
GRID-No.2 VOLTAGE		500 max.	volts
GRID-No.1 VOLTAGE:			- 1
Negative bias value		125 max.	volts
Positive bias value		0 max.	volts
		2 max.	volts
Positive peak value		2 1114.	VOILS
PEAK HEATER-CATHODE VOLTAGE:			ĺ
Heater negative with respect t			I
During equipment warm-up per		440	144
not exceeding 15 second		410 max.	volts
After equipment warm-up peri	od	180 max.	volts
Heater positive with respect t	o cathode.	180 max.	volts
Equipment Design Ranges:			l
For any ultor voltage (E_u) bet	weem 1.000*	and 16000	volts
and grid-No.2 voltage (E_{C_2})	between 150	and 500 vo	lts
	3	,	
Grid-No.4 Voltage for Focus			
with Ultor Current of	-0.4% to +	വ വധ കെ	volts
100 μamp	-0.4% 10 +	2.2% OI Lu	VO113
Grid-No.1 Voltage for Visual			
Extinction of Undeflected		701 C F	
Focused Spot		7% of Ec2	volts
Grid-No.4 Current	−25 t		μ amp
Grid-No.2 Current	-15 t	o +15	μ amp
Field Strengthof Single-Field	a E.		-
lon-Trap Magnet (Approx.).	V 14000	× 45	gausses
Field Strength of Adjustable	,		1
Centering Magnet	0 t	08	gausses
Examples of Use of Design Ranges:			
For ultor voltage of	14000	16000	volts
and grid-No.2 voltage of	300	300	volts
	3	_	
Grid-No.4 Voltage for Focus			
with Ultor Current of	-55 to +300	65 to +35	sa valts
100 /200.19		-33 to -7	
	-33 to -77	-22 10 -1	/ (0) 63
lon-Trap Magnet		Ε0.	
(Rated Strength)	- 45	50	gausses
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance		1.5 max.	megohms
•			
* Brilliance and definition decrease general, the ultor voltage should a	with decreasi	ng ultor volt	age. In
			•
For visual extinction of undeflecte	su rocuseu spi	ho condition	whore an
This value has been specified to to ac voltage is provided for dynamic	ike care of t focusing.	ne condition	milete dili
For x-ray shielding con:			
X-RAY PRECAUTIONS FOR			
at front of t	his Section		
			

MAY 1, 1952

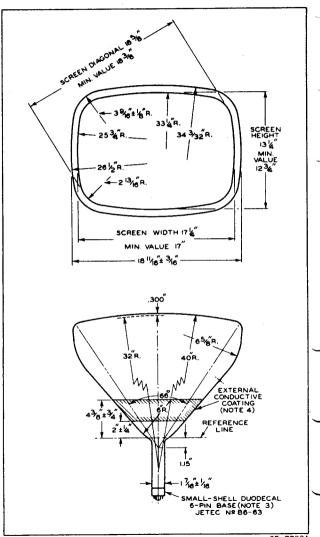
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RCA 20MP 4 KINESCOPE



MAY 1, 1952

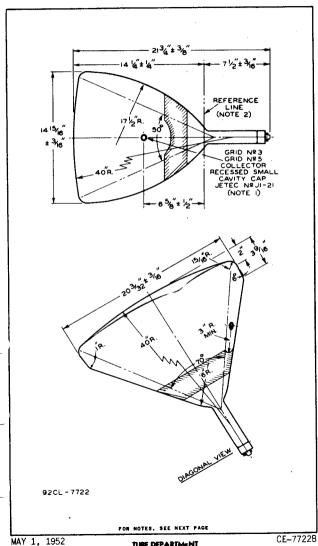
20MP 4

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7722A







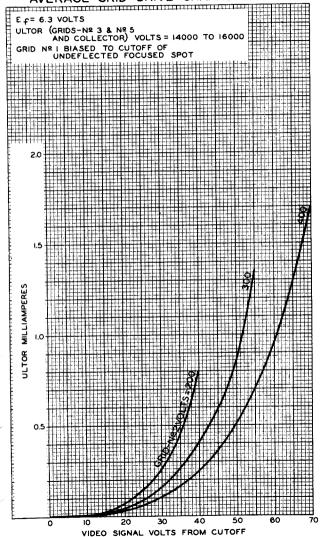
20MPA



- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN NO. 6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND CAP BY ANGULAR TOLERENCE (MEASURED ABOUT THE TUBE AXIS) OF ± 30°. CAP IS ON SAME SIDE AS PIN NO. 6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO. 110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BERIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 3".
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.



CHARACTERISTICS AVERAGE GRID-DRIVE



L'OND X



6-140×

RECTANGULAR METAL-SHELL TYPE
MAGNETIC FOCUS MAGNETIC DEFLECTION

	DATA	, i
General:		
Heater, for Unipotential Ca		
Voltage	6.3	ac or dc volts
Current	0.6	amp
Grid No.1 to All Other El		. 6 μμf
Cathode to All Other Elec		. 5 μμf
Faceplate (With about 66% light		
Phosphor (For Curves, see front	t of this Section).	No.4Sulfide Type
Fluorescence and Phosphor	rescence	White
Persistence of Phosphores		
Focusing Method.		Magnetic
Deflection Method		Magnetic
Deflection Angles (Approx.)	1:	700
Horizontal		66°
Vertical		500
Vertical	uires External,	Single-Field Magnet
Maximum Overall Length . Greatest Diagonal of Tube (22-5/16"
Greatest Diagonal of Tube a	at Lip	. 20-3/4" ± 1/4"
Greatest Width of Tube at 1	_! p	19-42/34" ± 1/0"
Greatest Height of Tube at Screen Size	Lip	15-5/16" ± 1/8"
Mounting Position		16-5/6 X 15-13/10 Any
Mounting Position Ultor® Terminal		. Metal-Shell Lip
Base Small-She	eli Duodecal 5-P	in (JETEC No.B5-57)
	OTTOM VIEW	
Pin 1 - Heater		Pin 12 - Heater
Pin 2~Grid No.1	· _ \	Metal - Shell Lip-
لل دی		Grid No.3.
Fill 10 - Gird No. 2 CE	X . V \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Pin 11 Cathode GN	5 Dr. 19 O.V	Collector
	н н	
Maximum Ratings, Design-Cer	nter Values:	
ULTOR® VOLTAGE		18000 max. volts
GRID-No. 2 VOLTAGE		500 max. voits
GRED-No.1 VOLTAGE: Negative bias value		125 max. volts
Positive bias value		0 max. volts
Positive peak value		2 max. volts
In the 21AF4, grid No.3, whi are connected together within to collectively as "ultor". electrode, or the electrode in	ch has the ultor fu r the tube and are	conveniently referred
to collectively as "ultor".	The "ultor" in a ca	ithode-ray tube is the
electrodes connected within	the tube to it, to	which is applied the
electrode, or the electrode a electrodes connected within highest do voltage for acce to its deflection.	nerating the electi	ions in the beam prior
		·

21484



KINESCOPE

PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode: During equipment warm—up period not exceeding 15 seconds
Ultor Voltage*
Grid-No.2 Voltage
Focused Spot33 to -77 -33 to -77 volts Focusing-Coil Current (DC) 00 . 104 ± 6% 110 ± 6% ma Field Strength of Single- Field Ion-Trap Magnet 45 50 gausses Ion-Trap Magnet Current (DC, approx.)* 90 - ma Field Strength of Adjustable Centering Magnet 0 to 8 0 to 8 gausses Maximum Circuit Values: Grid-No.1-Circuit Resistance 1.5 max. megohms * Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 14000 volts. OF or specimen focusing coil similar to JETEC Focusing Coil No. 109 positioned with hair gap toward kinescope screen and center line of air gap 3 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 18-3/8 "x 13-15/16" picture area sharply focused at center of screen. # For specimen inon-trap magnet similar to JETEC Ion-Trap Magnet No. 111
Ion-Trap Magnet Current (DC, approx.)# 90 - ma
Field Strength of Adjustable Centering Magnet
Centering Magnet
Grid-No.1-Circuit Resistance 1.5 max. megohms * Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 14000 volts. OF of specimen focusing coil similar to JETEC Focusing Coil No.100 positioned with air gap toward kinescope screen and center line of air gap 3 inches from Reference Line (see Outline Drawing). The indicated current is for condition with combined grid-No.1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foct-lamberts on a 18-3/8 x 13-15/16 picture area sharply focused at center of screen. # For specimen ion-trap magnet similar to JETEC Ion-Trap Magnet No.111





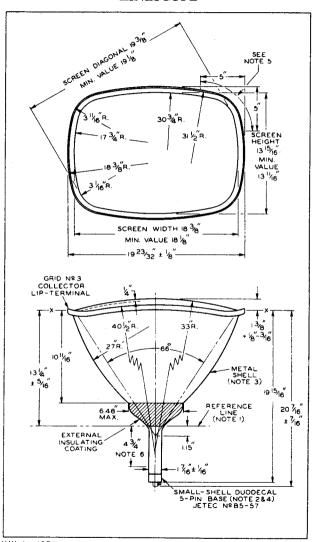
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OPERATING NOTES

 $\emph{A-Ray Warning.}$ When operated at ultor voltages up to 16 kilovoits, the 21AP4 does not produce any harmful x-ray radiation. However, because the rating of the tube permits operation at voltages as high as 19.8 kilovoits (absolute value), shielding of the 21AP4 for x-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovoits.

Direction of the field of the ion-trap magnet should be such that the north pole is adjacent to vacant pin position No.8 and the south pole to pin No.2.

2 RCA 2 RCA 2 IAP4 KINESCOPE

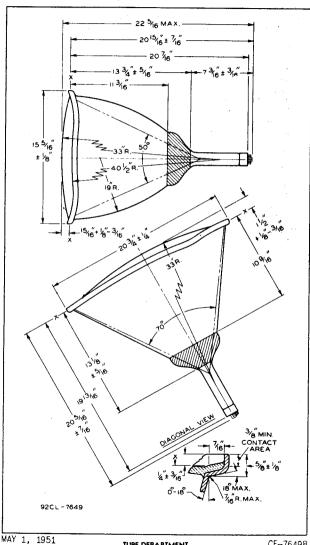


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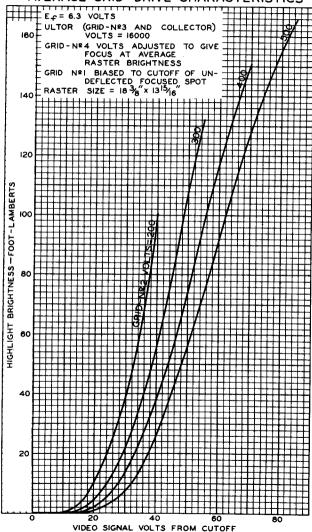


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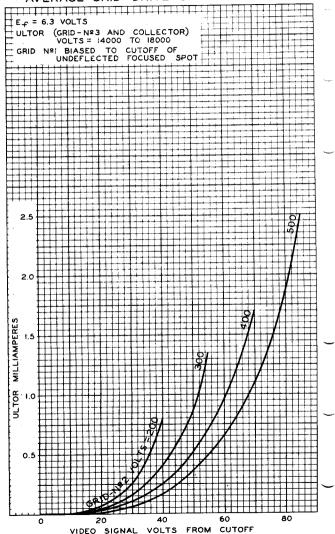
- NOTE :: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH METAL-SHELL AXIS AND HAVING A DIAMETER OF 3-1/4".
- NOTE 3: METAL SHELL AND GLASS FACE OPERATE AT HIGH VOLTAGE.

 ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST
 BE INSULATED TO WITHSTAND THE MAXIMUM APPLIED ULTOR
 VOLTAGE.
- NOTE 4: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE HORIZONTAL AXIS OF THE GLASS FACE BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 10°.
- NOTE 5: SUPPORT TUBE IN LIP REGION ONLY AT CORNERS WITHIN THIS SPACE.
- NOTE 6: LOCATION OF DEFLECTING YOKE AND FOCUSING DEVICE MUST BE WITHIN THIS SPACE.











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KINESCOPE

The 21EP4 is like the 21EP4-A except that it has no external conductive bulb coating.

BOTTOM VIEW





Pin 12 - Heater Cap - Ultor (Grid No.3, Collector)



RECTANGULAR GLASS TYPE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

MAGNETIC FOCUS
DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6
External Conductive Coating to Ultor \ 500 min. \ \mu f
Faceplate, Cylindrical Filterglass Light Transmission (Approx.)
Diagonal
Tube Dimensions: 23" ± 3/8" Overall Length
Minimum Screen Dimensions: Greatest Width Greatest Height Diagonal Weight (Approx.) Mounting Position Cap Recessed Small Cavity (JETEC No. J1-21) Bulb Base Small-Shell Duodecal 5-Pin (JETEC No. B5-57) BOTTOM VIEW
Pin 1-Heater Pin 2-Grid No.1 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Cap-Ultor (Grid No.3, Collector) C-External Conductive Coating
Maximum Ratings, Design-Center Values:
TOP® VOLTACE 18000 max. Volta
The "ultor" in a cathode-ray tube is the electrode to which is applie the highest dc voltage for accelerating the electrons in the beam prio to its deflection. In the 21E-types, the ultor function is performed by grid No.3. Since grid No.3 and collector are connected together within the 21E-types, they are collectively referred to simply as "ultor" for convenience in presenting data and curves.
TENTATIVE DAT

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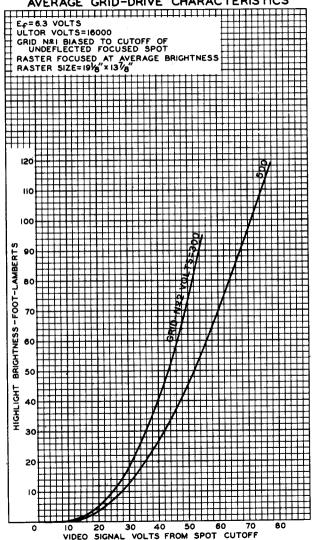


GRID-No.2 VOLTAGE	500 max. volt
Positive bias value	0 max. volt
Positive peak value	2 max. volt
PEAK HEATER-CATHODE VOLTAGE:	Z IIIAX VOITE
Heater negative with respect to cathe During equipment warm-up period	ode:
not exceeding 15 seconds	410 max. volt
After equipment warm-up period .	180 max. volt
Heater positive with respect to cath	
Equipment Design Ranges:	
For any ultor voltage (E_{C3}) between and grid-No.2 voltage (E_{C2}) between	14000* and 18000 volts n 200 and 500 volts
Grid-No.1 Voltage for Visual Extinction of Undeflected	
Focused Spot 11% to	25.7% of E_{c2} volts
Grid-No.2 Current	-15 to $+15$ μ amı
Focusing-Coil Current (DC) 00 . $\sqrt{\frac{E_c}{140}}$	$\frac{3}{00} \times 104 \pm 10\%$ ma
Field Strength of Single-Field Technology Figure Field	 3 00 × 45 gausse:
Field Strength of Adjustable Centering Magnet 0	to 8 gausse
Examples of Use of Design Ranges:	
	16000 volt:
For ultor voltage of 14000	
For ultor voltage of 14000 and grid-No.2 voltage of 200	200 volts
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected	5,44
and grid-No.2 voltage of 300 Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -73	7 -33 to -77 volts
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 109	7 -33 to -77 volts
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC). 104 ± 10%	7 -33 to -77 volt: 6 110 ± 10% ma
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 109 Ion-Trap Magnet (Rated Strength) 45	7 -33 to -77 volts
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 109 Ion-Trap Magnet (Rated Strength) 45 Maximum Circuit Values:	7 -33 to -77 volt: 6 110 ± 10% ma 50 gausse:
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 109 Ion-Trap Magnet (Rated Strength) 45	7 -33 to -77 volt: 6 110 ± 10% ma
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 103 Ion-Trap Magnet (Rated Strength) 45 Maximum Circuit Values: Grid-No.1-Circuit Resistance	7 -33 to -77 volt: 6 110 ± 10% ms 50 gausse: 1.5 max. megohm:
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 103 Ion-Trap Magnet (Rated Strength) 45 Maximum Circuit Values: Grid-No.1-Circuit Resistance	7 -33 to -77 volt: 6 110 ± 10% ms 50 gausse: 1.5 max. megohm:
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 103 Ion-Trap Magnet (Rated Strength) 45 Maximum Circuit Values: Grid-No.1-Circuit Resistance	7 -33 to -77 volt: 6 110 ± 10% ms 50 gausse: 1.5 max. megohm:
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 103 Ion-Trap Magnet (Rated Strength) 45 Maximum Circuit Values: Grid-No.1-Circuit Resistance	7 -33 to -77 volt: 6 110 ± 10% ms 50 gausse: 1.5 max. megohm:
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC). 104 ± 103 lon-Trap Magnet (Rated Strength)	7 -33 to -77 volt: 6 110 ± 10% ma 50 gausses 1.5 max. megohms creasing ultor voltage. I ss than 14000 volts. ETEC Focusing Coll No.10 screen, and center line of outline Drawking. The in- ined grid-No.10 bias voltage a highlight brightness o
and grid-No.2 voltage of goo Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot33 to -77 Focusing-Coil Current (DC) . 104 ± 103 Ion-Trap Magnet (Rated Strength)	7 -33 to -77 volt: 6 110 ± 10% ma 50 gausses 1.5 max. megohms creasing ultor voltage. I ss than 14000 volts. ETEC Focusing Coll No.10 screen, and center line of outline Drawking. The in- ined grid-No.10 bias voltage a highlight brightness o

For x-ray shielding considerations, see sheet I-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section

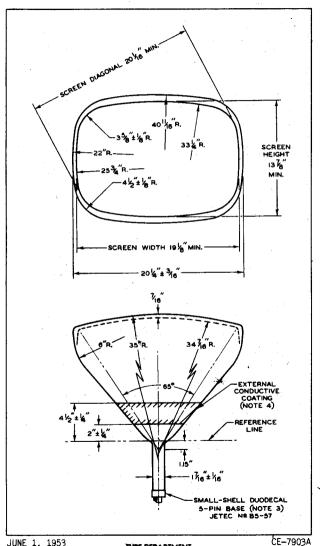
JUNE 1, 1953





21EPA-A

2IEP4-A KINESCOPE

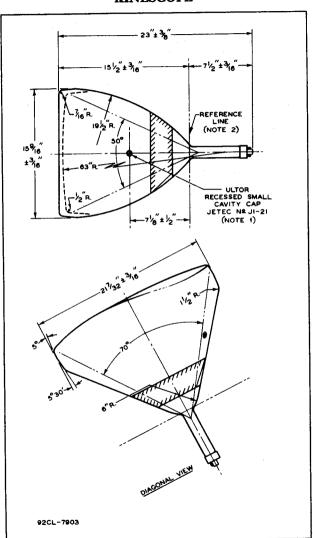


JUNE 1, 1953

TUBE DEPARTMENT







JUNE 1, 1953

21EPA-A



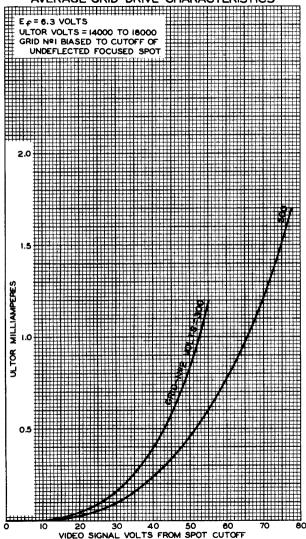
NOTE I: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 30°. BULB TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION NO.6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFER-ENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SEC-TION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED: IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.







LOW-VOLTAGE FOCUS

KINESCOPE RECTANGULAR GLASS TYPE

DATA

MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ac or dc volts Current 0.6 amp
Direct Interelectrode Capacitances: Grid No.1 to All Other Electrodes 6 Cathode to All Other Electrodes 5
External Conductive Coating to Ultor 1500 min
Faceplate, Cylindrical Filterglass Light Transmission (Approx.)
Vertical 500 Ion-Trap Gun Requires External, Single-Field Magnet Tube Dimensions:
Overall Length
Minimum Screen Understons 19-1/8" Greatest Width 13-7/8" Greatest Height 13-7/8" Diagonal 20-1/16" Weight (Approx.) 31 bs Mounting Position Any
Cap Recessed Small Cavity (JETEC No.J1-21) Bulb
Pin 1-Heater Pin 2-Grid No.1 Pin 6-Grid No.2 Pin 10-Grid No.2 Pin 11-Cathode Pin 12-Heater Cap-Ultor (Grid No.3, Grid No.5, Collector) C-External Conductive Coating
Maximum Ratings, Design-Center Values: ULTOR® VOLTAGE

2HP dr. A



GRID-No.4 VOLTAGE:						
Positive value			. 1000	max.	vol:	ts
Negative value*			. 500	max.	vol:	ts
GRID-No.2 VOLTAGE			. 500	max.	vol	ts
GRID-No.1 VOLTAGE:						
Negative bias value			. 125	max.	vol:	ts
Positive bias value				max.	vol:	ts
Positive peak value			. 2	max.	vol:	ts
PEAK HEATER-CATHODE VOLTAGE:						
Heater negative with respec	t to ca	thode	:			
During equipment warm-up	period					
not exceeding	15 sec	onds	. 410	max.	vol	ts
After equipment warm-up	period .		. 180	max.	vol	ts
Heater positive with respec	ct to ca	thode	180	max.	vol	ts
Equipment Design Ranges:						
For any ultor voltage (E_{C5})	between	140	00# and 1	8000	volts	
' and grid-No.2 voltage ($E_{ m c}$) between	een 2	oo and 5	00 V	lts	
Grid-No.4 Voltage for Focus	-					
with Ultor Current						
of 100 μamp	0.4	% to	+2.2% of	Eas	vol	ts
Grid-No.1 Voltage for	• •••	~		-65		
Visual Extinction of						
Undeflected Focused Spot	. 11%	to 2	5.7% of	Eca	vol	ts
Grid-No.4 Current			to +25	-62	μa	
Grid-No.2 Current	•		to +15		μa	
Field Strengh of Single-	•	-10	10 110			۳
Field fon-Trap Magnet		<i>r</i> =				
(Approx.)		/ t	·C5 x 45		gauss	es
	•	$\sqrt{14}$	000		Ş	
Field Strength of Adjustable		٠,				
Centering Magnet		C) to 8		gauss	es
Examples of Use of Design Ram	nges:					
For ultor voltage of	1400	0	1600	0	vol	ts
and grid-No.2 voltage of	300		300		vol	ts
Grid-No.4 Voltage for Focus	•		•			
with Ultor Current						
	-55 to	+300	-65 to	+350	vol	ts
Grid-No.1 Voltage for	-55 10	, , , ,	- 00 10	. ,,,,,,	•••	•
Visual Extinction of Un-						
deflected Focus Spot .	-33 to	- 77	-33 to	- 77	vol	t.s
on-Trap Magnet)) :0	.,	// !0			
(Rated Strength)	45		50		gauss	es
(Mateu Strength)	43				94400	-
Maximum Circuit Values:						
Grid-No.1-Circuit Resistance			1.5 m	ax.	megoh	ms
				_		
The "ultor" in a cathode-ray tub	e is the	elect	rode to wi	ich i the h	s appli eam pr	ied i or
to its deflection. In the 21FP4	-A, the u	itor f	unction i	s per	formed	бy
grid No.5. Since grid No.5, gri	d No.3, a	nd col ective	lector are	conn	ected t simply	as
"ultor" for convenience in prese	nting dat	a and	curves.		p · J	۵.5
The "ultor" in a cathode-ray tub the highest dc voltage for accel to its deflection, in the 21FP grid No.5. Since grid No.5, gri gether within the 21FP4—A, the "ultor" for convenience in prese	nting dat	a and	curves.			

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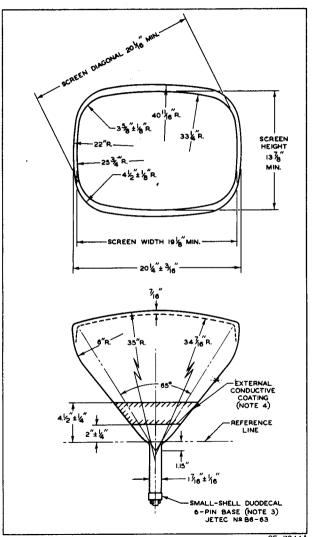
KINESCOPE

* This value has been specified to take care of the condition where an ac voltage is provided for dynamic focusing.

Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 14000 volts.

For x-ray shielding considerations, see sheet X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section. 2HPA-A



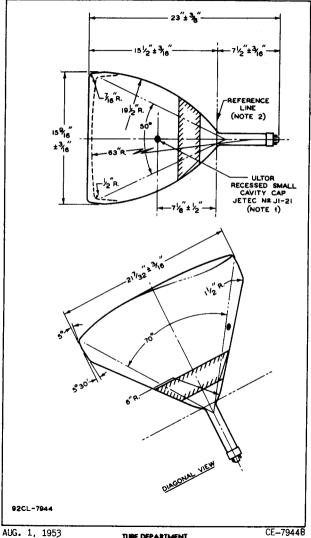


AUG. 1, 1953

TUBE DEPARTMENT







TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

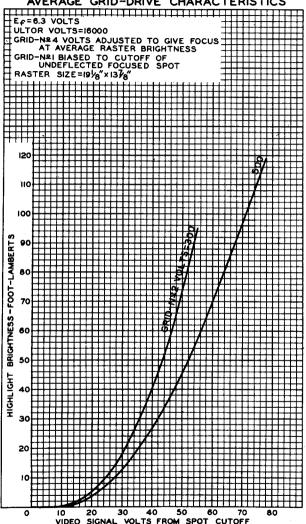
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- NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND BULB TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 30°. BULB TERMINAL IS ON SAME SIDE AS PIN No.6.
- NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.IIO (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFER-ENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC¹ OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED: IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".
- NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

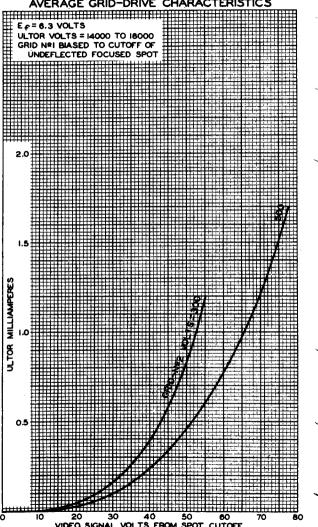


AVERAGE GRID-DRIVE CHARACTERISTICS





AVERAGE GRID-DRIVE CHARACTERISTICS





CIAID &

RECTANGULAR METAL-SHELL TYPE

LOW-VOLTAGE FOCUS

MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode:
Voltage 6.3 ac or dc volts
Current 0.6 amp
Direct Interelectrode Capacitances:
Grid No.1 to All Other Electrodes 6 μμ
Cathode to All Other Electrodes 5 ###1
Faceplate, Spherical Frosted Filterglass
Light Transmission (Approx.)
Phosphor (For Curves, see front of this Section) P4-Sulfide Type
Fluorescence
,
PersistenceShort Focusing MethodElectrostatio
Deflection Method
Deflection Angles (Approx.):
Diagonal 70 ^c
Horizontal
Vertical
Jon-Trap Gun Requires External, Single-Field Magnet
Tube Dimensions:
Maximum Overall Length
Greatest Diagonal
Greatest Width 19-23/32" ± 1/8'
Greatest Height 15-5/16" ± 1/8'
Screen Dimensions:
Greatest Width
dieatest hergitt.
Diagonal
Weight (Approx.)
الله dunting rosition
Base Small-Shell Duodecal 6-Pin (JETEC No. B6-63)
BOTTOM VIEW
Pin 1-Heater Pin 12-Heater
Pin 2-Grid No.1 /T Metal-Shell Lip-
Pin 6-Grid No.4 Grid No.3,
Grid No.5,
(2)
Pin 11 - Cathode
Maximum Ratings, Design-Center Values:
ULTOR® VOLTAGE 16000 max. volts
to the 21MPH, grid No.5 which has the ultor function, grid No.3, and
In the 21MPu, grid No.5 which has the ultor function, grid No.3, and collector are connected together within the tube and are conveniently referred tocollectively as "ultor." The "ultor" in a cathode-ray tube is the electrode, or the electrode in combination with one or more additional electrodes connected within the tube to it, to which is applied
is the electrode, or the electrode in combination with one or more ad-
ditional electrodes connected within the tube to it, to which is applied the highest dc voltage for accelerating the electrons in the beam prior
to its deflection.
MAY 1, 1952 TENTATIVE DAT

21MP 4



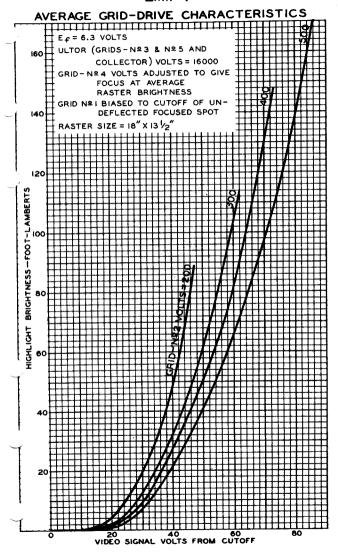
GRID-No.4 VOLTAGE: Positive value
During equipment warm-up period not exceeding 15 seconds 410 max. volts After equipment warm-up period 180 max. volts
Heater positive with respect to cathode. 180 max. volts
Equipment Design Ranges:
For any ultor voltage (E _u) between 14000# and 16000 volts and grid-No.2 voltage (E _{c2}) between 150 and 500 volts Grid-No.4 Voltage for Focus
with Ultor Current of 100 µamp0.4% to +2.2% of Eu volts Grid-No.1 Voltage for Visual Extinction of Undeflected
Focused Spot
Examples of Use of Design Ranges:
For ultor voltage of 14000 16000 volts and grid-No. 2 voltage of 300 300 volts Grid-No. 4 Voltage for Focus
with Ultor Current of 100 µamp
Maximum Circuit Values:
Grid-No.1-Circuit Resistance 1.5 max. megohms * This value has been specified to take care of the condition where an ac voltage is provided for dynamic focusing. # Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 14000 volts. † For visual extinction of undeflected focused spot.
For x-ray shielding considerations, see sheet X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section

MAY 1, 1952

TENTATIVE DATA



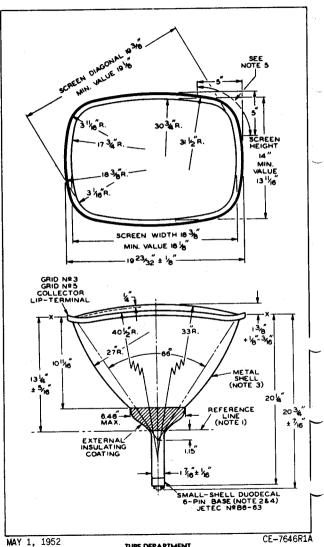
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SIAPR.

ZIMPA

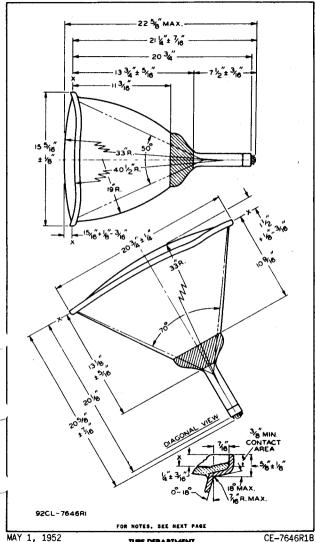




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21MP A

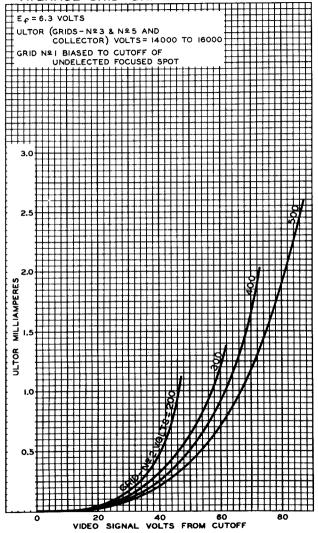


- NOTE 1: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 2: SOCKET FOR THIS BASE SHOULD NOT BERIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH METAL—SHELL AXIS AND HAVING A DIAMETER OF 3-1/4".
- NOTE 3: METAL SHELL AND GLASS FACE OPERATE AT HIGH VOLTAGE. ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST BE INSULATED TO WITHSTAND THE MAXIMUM APPLIED ULTOR VOLTAGE.
- NOTE 4: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.6 MAY VARY FROM THE HORIZONTAL AXIS OF THE GLASS FACE BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF + 10°.
- NOTE 5: SUPPORT TUBE IN LIP REGION ONLY AT CORNERS WITHIN THIS SPACE.

MAY 1. 1952



AVERAGE GRID-DRIVE CHARACTERISTICS





KINESCOPE

RECTANGULAR METAL-SHELL TYPE MAGNETIC FOCUS

METAL-BACKED SCREEN MAGNETIC DEFLECTION

MAGNETIC FOCUS		MAGNETIC DEFLECTION
	DATA	
General:		÷
	Cathode:	
Voltage	6.3	ac or dc volts
Current	0.6	amp
Direct Interelectrode Ca	apacitances (App	rox.):
Grid No.1 to All Other	Electrodes	6 μμf
Cathode to All Other E	lectrodes	5 μμt
lFaceolate Soberical .		Frosted Filterglass
Light Transmission (Approximately Phosphor (For curves, see fr	oprox.)	DA Sulfide Type
Fluorescence	onto this section	White
Phosphorescence		
Persistence		Short
Focusing Method		
Deflection Method		
Deflection Angles (Appro	×.):	
Diagonal		90°
Vertical R	Poquiros Extorna	
Tube Dimensions:	leduilles externa	i, Single-i leta magnet
Maximum Overall Length		22–3/16"
Greatest Width		26-7/8" ± 1/4"
Greatest Width		25-1/4" ± 3/16"
Greatest Height		19–15/16" ± 3/16"
Screen Dimensions (Minim	num):	
Greatest Width		23–7/16" 18–1/8"
Greatest Height		25–1/16"
Diagonal		
Mounting Position		Any
Illtor® Terminal		Metal-Shell Lip
Base Small-	-Shell Duodecal	5-Pin (JETEC No.B5-57)
	BOTTOM VIEW	
Pin 1-Heater		Metal-Shell
Pin 2-Grid No.1	/ 	Lip-
Pin 10 - Grid No. 2	1/==\bar{\pi}	Ultor
Pin 11 - Cathode	7 7 C	(Grid No.3,
Pin 12 - Heater	@ H 20	Collector)
i	0 0	
GR	ID-DRIVE SERVIC	E
Unless otherwise spe	cified, voltage	values are positive
with	respect to cat	hode
Maximum Ratings, Design-	Center Values:	
ULTOR® VOLTAGE		. 18000 max. volts
• • • • • • • • • • • • • • • • • • • •		
, .: See next page.		TENTATIVE DATA 1





GRID-No.2 VOLTAGE		500 max.	volts
Negative bias value		125 max.	volts
Positive bias value	<i></i>	0 max.	volts
Positive peak value		2 max.	volts
PEAK HEATER—CATHODE VOLTAGE: Heater negative with respect During equipment warm—up p not exceeding 15	eriod seconds	410 max.	volts
After equipment warm-up pe		180 max.	volts
Heater positive with respect	to cathode .	180 max.	volts
Equipment Design Ranges:			1
With any ultor voltage (Ec3k) and grid-No.2 voltage (Ec2k			
Grid-No.1 Voltage for		_	1
Visual Extinction of Focused Raster	12.3% to 24.	3% of E _{c2k}	volts
Grid-No.1 Video Drive from Raster Cutoff (Black Level):			
White-level value	10.0% - 04	O# . C F .	
(Peak positive) Grid-No.2 Current	12.3% to 24. -15 to		volts μamp
Focusing-Coil Current (DC)	$\sqrt{\frac{E_{c3k}}{16000}} \times$	110 ± 10%	ma
Field Strength of Single-Field Ion-Trap Magnet (Approx.) .	$\sqrt{\frac{E_{c3k}}{16000}}$	× 50	gausses
Field Strength of Adjustable	¥ 10000	,	
Centering Magnet	0 to	8 9	gausses
Examples of Use of Design Rang	es:		
With ultor voltage (Ec3k) of	16000	16000	volts
and grid-No. voltage (E_{COR}) of	300	400	volts
Grid-No.1 Voltage for Visual Extinction of			
Focused Raster Grid-No.1 Video Drive	−37 to −73	–49 to <i>–</i> 97	volts
from Raster Cutoff (Black Level):			İ
White-level value (Peak positive)	37 to 73	49 to 97	volts
Focusing-Coil Current (DC)	110 ± 10%	110 ± 10%	ma
on=Trap Magnet (Rated Strength)	50	50 (ausses
▲ Grid drive is the operating condit the grid—No.1 potential with respe	ion in which th	e video signa	l varies
the grid-No.1 potential with respe	ct to cathode.	· ·	
			i
•,*, ^{OO} : See next page.			-
			

AUG. 1, 1953



CIMPA

Maximum Circuit Values:	
Grid-No.1-Circuit Resistance 1.5 max. me	30hms
CATHODE-DRIVE SERVICE	
Unless otherwise specified, voltage values are positi	ve
with respect to grid No.1	
Maximum Ratings, Design-Center Values:	,
III I I I I I I I I I I I I I I I I I	volts
IGRIDENO.Z-IDEGRIDENO.I VOLINGE	volts
GRID-No.2-TO-CATHODE VOLTAGE 500 max.	volts
Positive bias value	volts
Negative bias value 0 max.	volts
	volts
PEAK HEATER-CATHODE VOLTAGE:	,
Heater negative with respect to cathode:	
During equipment warm-up period	
not exceeding 15 seconds 410 max.	volts
After equipment warm-up period 180 max.	volts
Heater positive with respect to cathode. 180 max.	volts
Equipment Design Ranges:	1
With any ultor-to-grid-No.1 voltage (Ec3g1) between	
16000* and 18000	volts
and grid-No.2-to-grid-No.1 voltage (E _{C2g1}) between 220 and 620	
Cathode-to-Grid-No.1 Voltage	00000
for Viewal Extinction	
of Focused Raster 11% to 19.7% of Ec2g1	volts
Cathode-to-Grid-No.1 Video	
Drive from Raster Cutoff	
(Black Level):	
White-level value	1+
(Peak negative) 11% to 19.7% of Ec2g1	volts
Grid=No 2 Current	μ amp
/E _{c3a1}	
Focusing-Coil Current (DC) $^{\circ\circ}$. $\left[\sqrt{\frac{E_{c3g1}}{16000}} \times 110\right] \pm 10\%$	ma
a the electrode to which is	apolied
The "ultor" in a cathode-ray tube is the electrons in the bea	m prio
to its deflection. In the 27MPH, the ultor function is perfo	rmed by
The "ultor" in a cathode-ray tube is the electrode to which is the highest dc voltage for accelerating the electrons in the beat to its deflection. In the 27MPM, the ultor function is perforgrid No.2. Since grid No.3 and collector are connected together the 27MPM, they are collectively referred to simply as "ultor" if versione in presenting data and curves.	or con-
ventonce in presenting data and curves.	

venience in presenting data and curves.

Venience in presenting data and curves.

Cathode drive is the operating condition in which the video signal

Cathode drive is the operating condition in which the video signal

varies the cathode potential with respect to grid No.1 and the other
varies the cathode potential with respect to grid No.1 and the other
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varies the cathode potential with respect to grid No.1 and the other with

Brilliance and definition decrease with decreasing ultor voltage or ultor-to-grid-No.1 voltage. In general, the ultor voltage or the ultor-to-grid-No.1 voltage should not be less than 16000 volts.

OO; See next page.





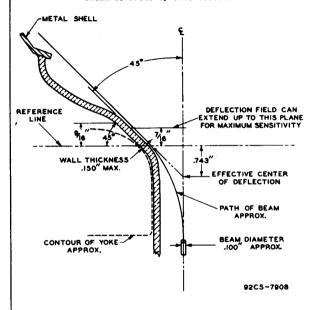
Field Strength of Single-Field Ion-Trap Magnet (Approx.)	$\sqrt{\frac{E_{c2}}{160}}$	3g1 × 50	gausses
Field Strength of Adjustable Centering Magnet	0	to 8	gausses
Examples of Use of Design Ranges	:		
With ultor-to-grid-No.1			
voltage (E_{CQG1}) of	16000	16000	volts
and grid-No.2-to-grid-No.1			
voltage (E _{c2g1}) of	300	400	volts
Cathode-to-Grid-No.1 Voltage for Visual Extinction			
of Focused Raster	33 to 59	44 to 79	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black Level):			
White-level value			_
(Peak negative)	-33 to -59	-44 to -79	
Focusing-Coil Current (DC) Ion-Trap Magnet (Rated Strength)	50		ma
Ton Trup magnet (nated offength)	30	50	gausses
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance .		1.5 max.	megohms

Of for specimen focusing coil similar to JETEC Focusing Coil No.109
positioned with air gap toward kinescope screen and center line of air
gap 3 inches from Reference Line (see Disensional Outline). The indicated current is for condition with combined bias voltage and video
signal voltage adjusted to produce a highlight brightness of 30 foculamberts on a 23-7/16" x 18-1/8" picture area sharply focused at center
of screen.

For x-ray shielding considerations, see sheet X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES at front of this Section.

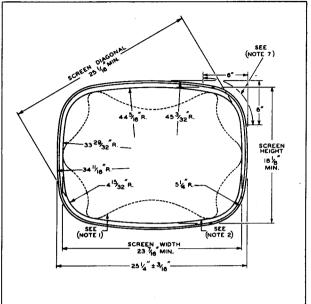
PIND

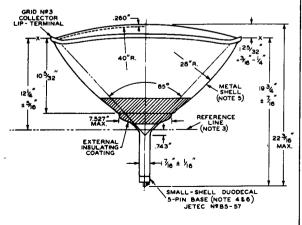
Shape of Neck-Funnel Section with Indication of Recommended Approximate Inside Contour of Yoke Based on Dimensions of Reference-Line Gauge (JETEC No. 116) Shown at Front of this Section.



2TMPA

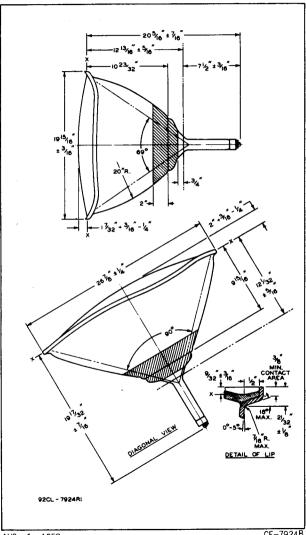
RCA) 27MP4 KINESCOPE





AUG. 1, 1953

TUBE DEPARTMENT



AUG. 1, 1953

TUBE DEPARTMENT CE-7924B

27MPA



- NOTE 1: APPROXIMATE BOUNDARY OF SPHERICAL SURFACE HAVING 40" RADIUS. OUTSIDE THIS BOUNDARY, THE CURVATURE OF THE SURFACE IS BLENDED INTO THE RIM. (SEE NOTE 2).
- NOTE 2: FACEPLATE SHAPE AT PERIMETER OF SCREEN CONFORMS
 TO SURFACE OF SPHERE HAVING 50" RADIUS.
- NOTE 3: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC NO.116 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFER-ENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC! OF THE GAUGE WITH THE GLASS FUNNEL.
- NOTE 4: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH METAL-SHELL AXIS AND HAVING A DIAMETER OF 3-1/4".
- NOTE 5: METAL SHELL AND GLASS FACE OPERATE AT HIGH VOLTAGE. ANY MATERIAL IN CONTACT WITH THE SHELL OR THE FACE MUST BE INSULATED TO WITHSTAND THE MAXIMUM APPLIED ULTOR VOLTAGE.
- NOTE 6: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION NO.6 MAY VARY FROM THE HORIZONTAL AXIS OF THE GLASS FACE BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF \pm 10°.
- NOTE 7: SUPPORT TUBE IN LIP REGION ONLY AT CORNERS WITH-IN THIS SPACE.



AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

EF= 6.3 VOLTS

ULTOR-TO-GRID-NºI VOLTS=

16000 TO 18000

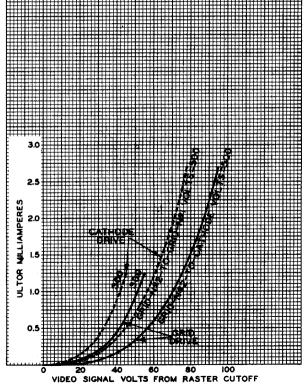
CATHODE BIASED POSITIVE WITH

RESPECT TO GRID NºI TO GIVE

FOCUSED RASTER CUTOFF

GRID-DRIVE SERVICE
E.F=6.3 VOLTS
ULTOR VOLTS=16000 TO 16000
GRID N≥1 BIASED NEGATIVE WITH
RESPECT TO CATHODE TO GIVE
FOCUSED RASTER CUTOFF

PAR





AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

E_F=6.3 VOLTS

ULTOR-TO-GRID-N®I VOLTS = 16000

CATHODE BIASED POSITIVE WITH RESPECT TO GRID N®I TO GIVE FOCUSED RASTER CUTOFF RASTER FOCUSED AT AVERAGE BRIGHTNESS RASTER SIZE=23 7/8" × 18 1/8"

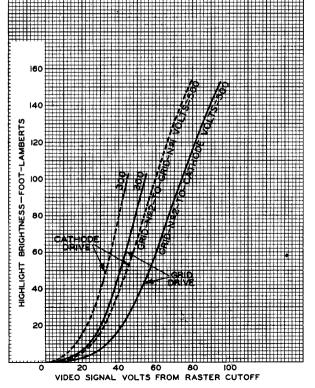
27MP 4

E_F=6.3 VOLTS

ULTOR VOLTS=16000

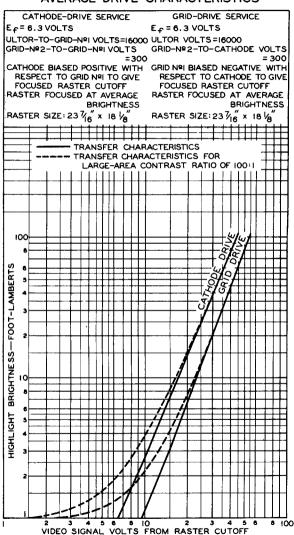
GRID NªI BIASED NEGATIVE WITH
RESPECT TO CATHODE TO GIVE
FOCUSED RASTER CUTOFF
RASTER FOCUSED AT AVERAGE
BRIGHTNESS
RASTER SIZE=23 % × 18 ½ ′

GRID-DRIVE SERVICE





AVERAGE DRIVE CHARACTERISTICS



CAR P



HIGH-VACUUM CATHODE-RAY TUBE

General:	I
Heater, for Unipotential Cathode: Voltage	whife was a second of the seco
DJ_1 and DJ_2 are nearer the screen DJ_3 and DJ_4 are nearer the base	
With DJ ₁ positive with respect to DJ ₂ , the spot is a flected toward pin 3. With DJ ₃ positive with respect DJ ₄ , the spot is deflected toward pin 1. The angle between the trace produced by DJ ₃ and DJ ₄ is intersection with the plane through the tube axis a pin I does not exceed IO°. The angle between the trace produced by DJ ₃ and DJ ₄ is the trace produced by DJ ₃ and DJ ₄ is the trace produced by DJ ₁ and DJ ₂ is 90° ± 4°.	to and and
Maximum Ratings, Absolute Values:	
ANODE-No.2 & GRID No.2 VOLTAGE	volts volts volts volts
JULY 1, 1945 RCA VICTOR DIVISION	DATA 1





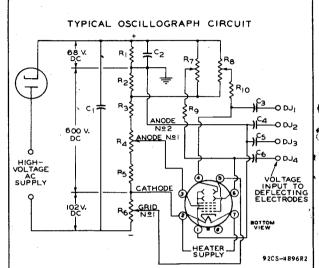
HIGH-VACUUM CATHODE-RAY TUBE

	(continued from preceding page)
	Typical Operation:
	Anode No.2 & Grid No.2 Voltage* · 400 600 volts Anode No.1 Voltage for Focus at 75% of Grid-No.1 Volt-
	age for Cutoff • 100 150 volts
	Grid-No.1 Volt. for Visual Cutoff#40 -60 volts Max. Anode-No.1 Current
	Range▲ Between -50 and +10 μamp. Deflection Sensitivity:
	DJ1 and DJ2 0.273 0.183 mm/v dc DJ3 and DJ4 0.326 0.217 mm/v dc Deflection Factor:**
A. 4.	DJ ₁ and DJ ₂ 93 139 v dc/in. DJ ₃ and DJ ₄ 78 117 v dc/in.
	* Brilliance and definition decrease with decreasing anode—No.2 voltage, In general, anode—No.2 voltage should not be less than 400 volts. • Individual tubes may require between ±20% and =35% of the values shown with grid—No.1 voltages between zero and cutoff. § Visual extinction of stationary focused spot. Supply should be adjust—able to ±50% of these values. § See curve for average values. Individual tubes may vary from these values by ± 20%. § Spot Position:
	The undeflected focused spot will fall within a 10-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ and DJ2. Suitable test conditions are: anode-No.2 voltage, 600 volts; anode-No.1 voltage, adjusted for focus; deflecting-electrode resistors, I megohm each for DJ and DJ4, connected to anode No.2; the tube shielded from all extraneous fields. To avoid damage test the tube, grid-No.1 voltage should be near cutoff before application of anode voltages.
1	Maximum Circuit Values:
	Grid-No.1-Circuit Resistance 1.5 max. megohms Impedance of Any Deflecting-Electrode
	Circuit at Heater-Supply Frequency 1.0 max. megohm Resistance in Any Deflecting-
١	Electrode Circuit≜ 5.0 max. megohms

AA It is recommended that both deflecting-electrode-circuit resistances be approximately equal.



HIGH-VACUUM CATHODE-RAY TURE



C1: 0.1 µf C2: 1.0 µf C3 C4 C5 C6: 0.05-µf Blocking Capacitors*

R1 R2: 1.0 Megohm R3: 1.3 Megohms

R4: 1-Megohm Potentiometer R5: 0.3 Megohm R6: 0.5-Megohm Potentiometer R7 R8: Dual 2-Megohm Potentiometer R9 R10: 2 Megohms

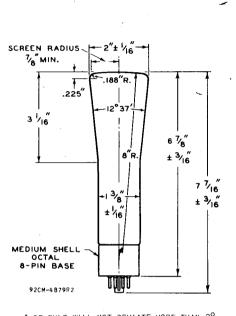
when cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have yow voltage rating. For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.



902-A

HIGH-VACUUM CATHODE-RAY TUBE

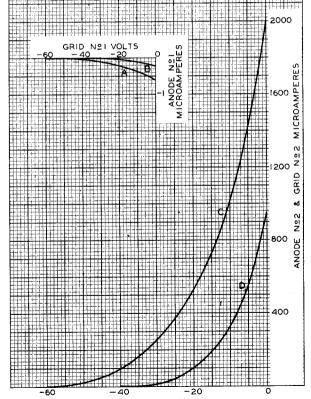


. ¢ OF BULB WILL NOT DEVIATE MORE THAN 2^O IN ANY → PIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE



AVERAGE CHARACTERISTICS

VOLTS -		O GIVE FOCUS	
CURVE	ELECTRODE CURRENT	ANODE Nº2 & GRID Nº2 VOLTS	
Α	ANODE Nº I	600	
В	ANODE Nº1	400	
C -	ANODE Nº 2 & GRID Nº 2	600	
D	ANODE Nº 2 & GRID Nº 2	400	





HIGH-VACUUM CATHODE-RAY TUBE

ELECTROSTATIC-MAGNETIC TYPE

NITH 5" MEDIUM-PERSISTENCE SCREEN FOR OSCILLOGRAPHIC USE

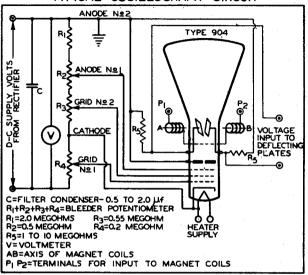
WITH 5" MEDIUM	4-PEK2121	ENCE SCI	KEEN FOR OS	CILLOGRAPHI	C USE
Heater	Coated L	Jn i poten	tial Catho	de .	
Voltage		2.5		a—c or d—	c volts
Current		2.1			amp.
Fluorescent Scre	en:				
Material					or No.1
Pattern Color				G	reenish
Direct Interelec	trode Ca	pacitano	es:	1 4	
Grid #1 to all	other E	lectrode	rs ·	10 max.	μμf
Deflecting Pla	ate to De	flecting	Plate	1 max.	μμf
Overall Length				16-1/4"	± 3/8"
Maximum Diameter	r "-			!	5-1/16"
Bulb					J-40
Caps (Three)					Metal
Base				Mediu	m 6-Pin
MAX INUM RA	TINGS an	d TYPICA	L OPERATIN	G COMDITIONS	s
High-Voltage Ele	ctrode (Anode #2) Voltage	4600 max.	volts
Focusing Electro	de (Anod	e #1) Vo	ltage	1500 max.	volts
Accelerating Ele				250 max.	
Control Electron	ie (Grid i	#II Yol1	age	Never pos	
Grid #1 Voltage	for Curr	ent Cut-	off T	_140 appro	x.volts
Peak Voltage bet			nd	4000 -	
any defle				4000 max.	volts
Fluorescent-Scre		Power/s	ed cm	10 max.	- mw
Typical Operation Heater Voltage		2.5	2.5	2.5	volts
Anode #2 Volta		1000	3000	4600	volts
Anode #1 Volta		210	630	970 approx	
	-3-		:::	TER.	

Grid #2 Voltage 100 100 250 volts
Grid #1 Voltage Adjusted to give suitable luminous spot
Deflection Sensitivity
(Electrostatic) 0.40 0.13 0.09 mm/volt d.c.
With maximum voltages applied to Grid #2, Anode #1, and Anode #2.

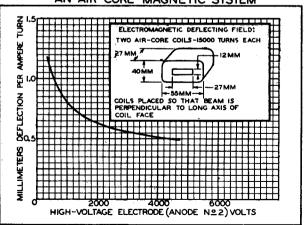
- indicates a change



TYPICAL OSCILLOGRAPH CIRCUIT



DEFLECTION SENSITIVITY OF AN AIR-CORE MAGNETIC SYSTEM

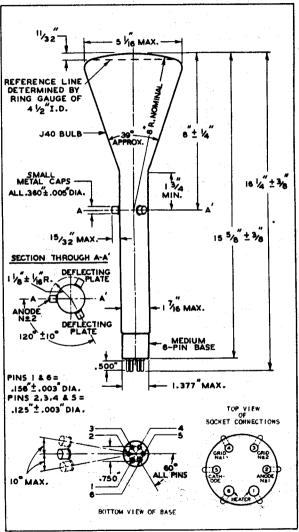


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Obsolete 904

2

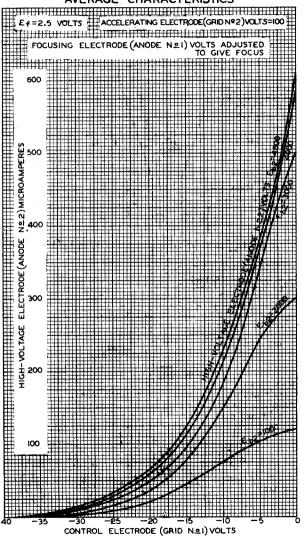
CATHODE-RAY TUBE





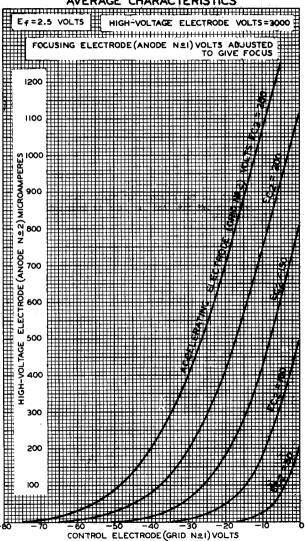


AVERAGE CHARACTERISTICS



Obsolete 904

AVERAGE CHARACTERISTICS





FLUORESCENT-SCREEN CHARACTERISTICS

CURVES FOR THE FLUORESCENT-SCREEN MATERIAL USED IN THE 904 ARE THE SAME AS THOSE FOR TYPE 903.



HIGH-VACUUM CATHODE-RAY TUBE

Supersedes Type 905
General:
Heater, for Unipotential Cathode: Voltage.
Greatest Diameter of Bulb
Minimum Useful Screen Diameter
DJ_1 and DJ_2 are nearer the screen DJ_2 and DJ_3 are nearer the base
With DJ1 positive with respect to DJ2, the spot is deflected toward pin 3. With DJ3 positive with respect to DJ4, the spot is deflected toward pin 2. The angle between the trace produced by DJ1 and DJ2 and its intersection with the plane through the tube axis and pin 3 does not exceed 10° .
The angle between the trace produced by DJ3 and DJ4 and the trace produced by DJ1 and DJ2 is 90° ± 6° .
Maximum Ratings, Absolute Values:
ANODE-No.2 & GRID-No.2 VOLTAGE
Positive Value 0 max. volts PEAK VOLTAGE BETWEEN ANODE No.2 AND
ANY DEFLECTING ELECTRODE 1100 max. volts

JULY 1, 1945



(continued from preceding page)							
Typical Operation:							
Anode-No.2 & Grid-No.2 Voltage* 1500 2000 volts Anode-No.1 Volt. for Focus at 75%							
of Grid-No.1 Volt. for Cutoff. 338 450 volts							
Grid-No.1 Volt. for Visual Cutoff#26 -35 volts							
Max. Anode-No.1 Current							
Range▲ Between -50 and +10 µamp.							
Deflection Sensitivity:							
DJ ₁ and DJ ₂ 0.295 0.221 mm/v dc							
DJ3 and DJ4 0.348 0.262 mm/v dc							
Deflection Factor:**							
DJ ₁ and DJ ₂ 86 115 v dc/in.							
DJ3 and DJ4 73 97 v dc/in.							
* Brilliance and definition decrease with decreasing anode-No.2 voltage. In general, anode-No.2 voltage should not be less than 1500 volts.							
 Individual tubes may require between -30% and +25% of the values shown with grid-No.1 voltages between zero and cutoff. 							
# Visual extinction of stationary focused spot. Supply should be adjust—							

able to ± 50% of these values.

See curve for average values.

Spot Position:

The undeflected focused spot will fall within a 12-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ_1 and DJ_2 . Suitable test conditions are: anode-No.2 voltage, 1500 volts; anode-No.1 voltage, adjusted for focus; deflecting-electrode resistors, I megohm each, connected to anode-No.2; the tube shielded from all extraneous fields. To avoid damage to the tube, grid-No.1 voltage should be near cutoff before application of anode voltages.

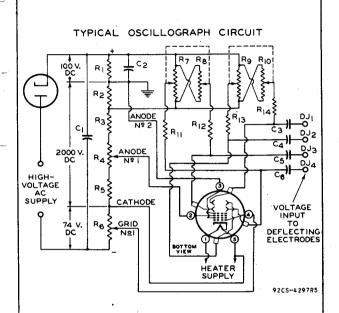
Maximum Circuit Values:

Grid-No.1-Circuit Resistance. 1.5 max. megohms
Resistance in Any DeflectingElectrode Circuit 5.0 max. megohms

AL It is recommended that all deflecting-electrode-circuit resistances be approximately equal.

Individual tubes may vary from these values by ± 20%.





C1: 0.1 µf C2: 1.0 µf C3 C4 C5 C6: 0.05-µf Blocking Capacitors *

R1 R2: 2 Megohms R3: 6 Megohms RN: 2-Megohm Potentiometer RS: 1.0 Megohm R6: 0.35-Megohm Potentiometer R7 R8: Dual 5-Megohm Potentiometer R9 R10: Dual 5-Megohm Potentiometer R11 R12 R13 R14: 2 Megohms

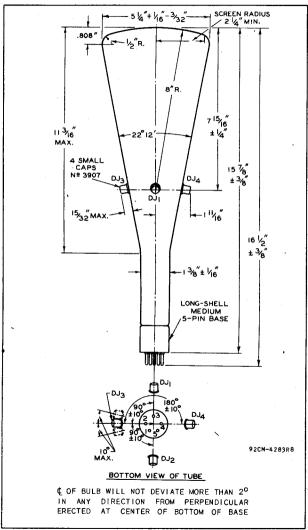
*Mhen cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected forect to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize boading effect on amplifier. In order to minimize spot defocusing, it is essentiat that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

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905-A

HIGH-VACUUM CATHODE-RAY TUBE

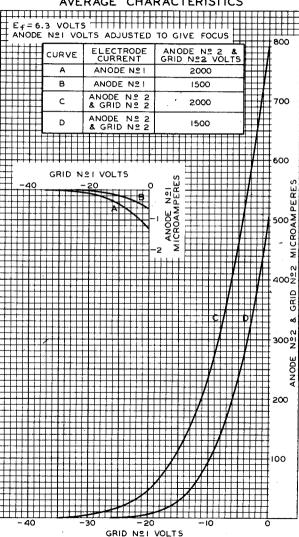


JULY 1, 1945

905iA



AVERAGE CHARACTERISTICS



APR. 27, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM - 5409R4





Heater	Coated Unipotential Cat		
Voltage	2. 5	a-c	or d-c volts
Current	2.1		amp.
Phosphor			No.5
Fluorescence			Bluish
Persistence	Brightness negligible less		microseconds
cuit, and average	gs, operating conditions, dime characteristic curve, refer t re identical except for the sc Curves of phosphor No. 5 a	reen mate are show	o. Ine 807 ana rial.

ginning of this section.							
908							
HIGH-VACUUM CATHODE-RAY TUBE							
Heater Coated Unipotential Cathode							
Voltage 2.5 a-c or d-c volts							
Current 2.1 amp.							
Focus Electrostatic							
Deflection Electrostatic							
Electrodes D ₁ and D ₂ (upper): nearest the screen							
Flectrodes Wa and Wa (lower): nearest the base							
DJ1 is on same side of tube as pins No.4 & No.5							
D ₃ is on same side of tube as pins No.2 & No.3							
T HOSPHOT							
1 Tuoi escence							
Persistence Brightness negligible in less than 30 microseconds							
Direct Interelectrode Capacitances:							
Control Electrode (Grid) to All Other Electrodes 9.0 puf							
Deflecting Electrode DJ to All Other Electrodes 8.5 µµf							
Deflecting Electrode DJz to All Other Electrodes 6.5 µµf							
[Overal] Length 11-1/2" ± 3/8"							
Diameter 3" ± 1/16"							
Bulb J-24							
Base Medium 7-Pin							
MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS							
Maximum Ratings Are Based on a Line-Voltage Design Center of 117 Volts							
High-Voltage Electrode (Anode No. 2) Volt. 1500 max. volts							
Focusing Electrode (Anode No.1) Volt. 1000 max. volts Control Electrode (Grid) Volt. Never positive							
Control Electrode (Grid) Volt. Never positive							
Peak Voltage Between Anode No.2 and							
Any Deflecting Electrode 600 max. volts							
Grid Circuit Resistance 1.5 max. megohms							
Impedance of Any Deflecting-Electrode Circuit at the Heater-Supply Frequency 1.0 max. megohm							
Typical Operation:							
Anode No. 2 Volt. 600 800 1000 1200 1500 volts							
Anode No.1 Volt. 170 230 285 345 475 approx. volts							

(continued on next page)

Adjusted to give suitable luminous spot

□, °: See next page.

→ Indicates a change.

DATA

Grid Voit.0





(continued from preceding page)

Deflection Sensitivity:

Electrodes D₁

and DJ₂ 0.55 0.41 0.33 0.27 0.22 mm/volt d.c.

Electrodes DJ3

and DJ_4 0.58 0.44 0.35 0.29 0.23 mm/volt d.c.

NOTE I: Brilliance and definition decrease with decreasing anode voltages. In general the anode No.2 voltage should not be less than 600 volts.

NOTE 2: The d-c potential of each deflecting electrode is maintained essentially equivalent to that of anode No.2 by connecting resistors having values not greater than 10 megohms between each deflecting electrode and anode No.2. This arrangement by suitable choice of resistor values minimizes pattern distortion and pattern drift resulting from unbalanced potentials on the deflecting electrodes. The smaller the resistor values, the less the distortion for a given beam current.

 $^{\circ}$ Supply should be adjustable to \pm 20% of the value shown. Approximately 20% of Anode No.1 voltage is required for current cutoff when, in some applications, it is necessary to use the maximum permissible grid-circuit resistance.

Characteristic Curves of phosphor No.5 are shown at the beginning of this section.



OSCILLOGRAPH TUBE

Supersedes Type 908

General:
Heater, for Unipotential Cathode: Voltage. 2.5 ± 10% ac or dc volts Current. 2.1 amp. Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes. 9.0 µµf DJ1 to All Other Electrodes. 8.5 µµf Phosphor (For Curves, see front of this Section) No.5 Fluorescence Blue Persistence. Very Short Focusing Method. Electrostatic Deflection Method. Electrostatic Overall Length 11-1/2" ± 3/8" Greatest Diameter of Bulb. 3" ± 1/16" Minimum Useful Screen Diameter 2-3/4" Mounting Position. Any Base. Medium 7-Pin Basing Designation for BOTTOM VIEW 7CE Pin 1 - Heater Pin 2 - Grid No.1 Pin 3 - Deflecting Electrode DJ3 Pin 4 - Anode No.1 Pin 5 - Deflecting Electrode DJ1 Fin 7 - Heater, Cathode
${\it DJ}_1$ and ${\it DJ}_2$ are nearer the screen ${\it DJ}_3$ and ${\it DJ}_4$ are nearer the base
With DJ ₂ positive with respect to DJ ₁ , the spot is deflected toward pin I. With DJ ₄ positive with respect to DJ ₃ , the spot is deflected toward pin 6.
The angle between the trace produced by DJ3 and DJ4 and its intersection with the plane through the tube axis and pin 6 does not exceed 10° .
The angle between the trace produced by DJ $_3$ and DJ $_4$ and the trace produced by DJ $_1$ and DJ $_2$ is 90° \pm 3°.
Maximum Ratings, Design-Center Values:
ANODE-No.2 & GRID No.2 VOLTAGE
Positive Value 0 max. volts PEAK VOLTAGE BETWEEN ANODE No.2 AND DEFLECTING ELECTRODE DJ ₁ OR DJ ₃ 500 max. volts





OSCILLOGRAPH TUBE

Typical Operation: Anode No.2 & Grid No.2 Voltage* . 1000 1500 volts Anode No.1 Voltage for Focus at 75% of Grid-No.1 Volt—	(continued from preceding page)
Anode No.1 Voltage for Focus at 75% of Grid-No.1 Volt- age for Cutoff*. 287 430 volts Grid-No.1 Volt. for Visual Cutoff*33 -50 volts Max. Anode-No.1 Current Range*. Between -50 and +10 µamp. Deflection Sensitivity: DJ1 and DJ2	Typical Operation:
age for Cutoff*. 287 430 volts Grid-No.1 Volt. for Visual Cutoff*33 -50 volts Max. Anode-No.1 Current Range*. Between -50 and +10 µamp. Deflection Sensitivity: DJ1 and DJ2 0.334 0.223 . mm/v dc DJ3 and DJ4 0.348 0.233 . mm/v dc Deflection Factor:** DJ1 and DJ2	Anode No.1 Voltage for Focus
DJ1 and DJ2	age for Cutoff • 287 430 volts Grid-No.1 Volt. for Visual Cutoff #33 -50 volts Max. Anode-No.1 Current Range • Between -50 and +10 µamp.
DJ1 and DJ2	DJ1 and DJ2 0.334 0.223 mm/v dc DJ3 and DJ4 0.348 0.233 mm/v dc Deflection Factor:**
In general, anode—No.2 voltage should not be less than 1000 volts. Individual tubes may require between 729% and -44% of the values shown with grid—No.1 voltages between zero and cutoff. * visual extinction of stationary focused spot. Supply should be adjustable to ± 50% of these values. * See curve for average values. **Individual tubes may vary from these values by ± 20%. **Spot Position: The undeflected focused spot will fall within a !5—mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ; and DJ2. Suitable test conditions are: anode—No.2 voltage, 1500 volts; anode—No.1 voltage, adjusted for focus; deflecting—electrode resistors, I megohm each for DJ; and DJ3, connected to anode No.2; the tube shielded from all extraneous fields. To avoid damage to the tube, grid—No.1 voltage should be near cutoff before application of anode voltages. **Maximum Circuit Resistance	DJ1 and DJ2 76 114 v dc/in-
See curve for average values. *Individual tubes may vary from these values by ± 20\$. **Spot Position: The undeflected focused spot will fall within a 15-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ; and DJ2. Sultable test conditions are: anode-No.2 voltage, 1500 volts; anode-No.1 voltage, adjusted for focus; deflecting-electrode resistors, I megohm each for DJ; and DJ3, connected to anode No.2; the tube shielded from all extraneous fields. To avoid damage to the tube, grid-No.1 voltage should be near cutoff before application of anode voltages. **Maximum Circuit Values:* Grid-No.1 Circuit Resistance 1.5 max. megohms Impedance of Any Deflecting-Electrode	In general, anode-No.2 voltage should not be less than 1000 volts. Individual tubes may require between +29% and -44% of the values shown with grid-No.1 voltages between zero and cutoff. If visual extinction of stationary focused spot, Supply should be adjust-
The undeflected focused spot will fall within a 15-mm square centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ1 and DJ2. Suitable test conditions are: anode-No.2 voltage, 1500 volts; anode-No.1 voltage, adjusted for focus; deflecting-electrode resistors, I megohm each for DJ1 and DJ3, connected to anode No.2; the tube shielded from all extraneous fields. To avoid damage to the tube, grid-No.1 voltage should be near cutoff before application of anode voltages. Maximum Circuit Values: Grid-No.1 Circuit Resistance 1.5 max. megohms Impedance of Any Deflecting-Electrode Circuit at Heater-Supply Frequency 1.0 max. megohm Resistance in Any Deflecting-	A See curve for average values. ************************************
Grid-No.1 Circuit Resistance 1.5 max. megohms Impedance of Any Deflecting-Electrode Circuit at Heater-Supply Frequency 1.0 max. megohm Resistance in Any Deflecting-	centered at the geometric center of the tube face and having one side parallel to the trace produced by DJ1 and DJ2. SUIT—able test conditions are: anode-No.2 voltage, 1500 volts; anode-No.i voltage, adjusted for focus; deflecting-electrode resistors, I megohm each for DJ1 and DJ3, connected to anode No.2; the tube shielded from all extraneous fields. To avoid damage to the tube, grid-No.1 voltage should be near cutoff
Impedance of Any Deflecting-Electrode Circuit at Heater-Supply Frequency 1.0 max. megohm Resistance in Any Deflecting-	Maximum Circuit Values:
	Impedance of Any Deflecting-Electrode Circuit at Heater-Supply Frequency 1.0 max. megohm

JUNE 20, 1946

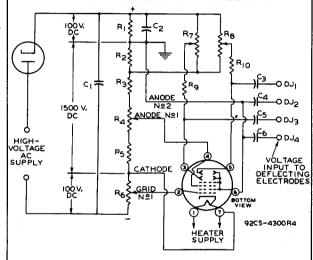
It is recommended that both deflecting-electrode-circuit resistances be approximately equal.



SO'r

OSCILLOGRAPH TUBE

TYPICAL OSCILLOGRAPH CIRCUIT



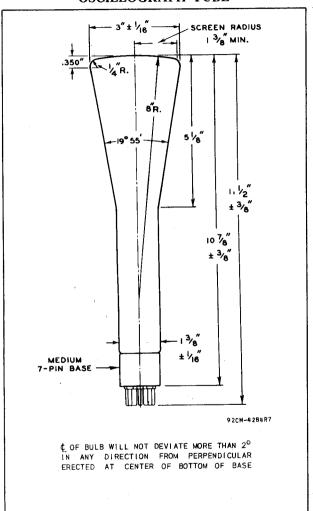
- C1: 0.1 µf C2: 1.0 µf C3 C4 C5 C6: 0.05-µf Blocking Capacitors*
- R1 R2: 1.5 Megohms R3: 4 Megohms
- R4: 2-Megohm Potentiometer
- R4: 2-Megohm Potentiometer R5: 1.0 Megohm R6: 0.5-Megohm Potentiometer R7 R8: Dual 3-Megohm Potentiometer
- R9 R10: 2-Megohms

When cathode is grounded, capacitors should have high voltage rating; when anode No.2 is grounded, they may have low voltage rating. For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that anode No.2 be returned to a point in the amplifier system which will give the lowest possible potential difference between anode No.2 and the deflecting electrodes.

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OSCILLOGRAPH TUBE



JUNE 20, 1946

. 908-A

(UBE DIVISION CE-4284R7

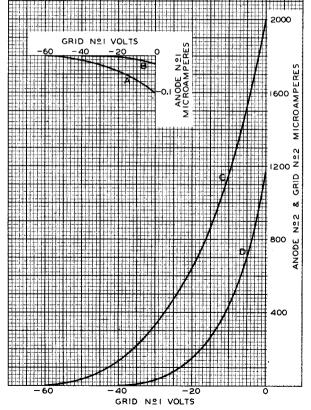


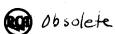
900.A

AVERAGE CHARACTERISTICS

Ŧ	E _f =6.3	VOL.	rs 🖁	1111	++++	++++	##	1111	1111	1.11	1111	###	#
÷	ANODE	NoI	VO	TS	ADI	1153	FD	TΩ	CI	VE	FC	cu	ς :

			. 444
	CURVE	ELECTRODE CURRENT	ANODE Nº2 & GRID Nº2 VOLTS
	Α	ANODE Nº I	1500
	В	ANODE Nº I	1000
	C	ANODE Nº 2 & GRID Nº 2	1500
-	D	ANODE Nº 2 & GRID Nº 2	1000





ELECTROSTATIC-DEFLECTION TYPE WITH 5" LONG-PERSISTENCE SCREEN FOR OSCILLOGRAPHIC USE

Heater Coated Unipotential Cathode Voltage 2.5 a_c or d_c volts 2.1 Current amo.

Fluorescent Screen:

Material Pattern Color Phosphor No.2 Bluish White

For further ratings, operating conditions, dimensions, connections, circuit, and curve 92S-5409R1, refer to Type 905. The 909 and 905 are identical except for the screen material.



HIGH-VACUUM CATHODE-RAY TUBE ELECTROSTATIC-DEFLECTION TYPE WITH 3" LONG-PERSISTENCE SCREEN FOR OSCILLOGRAPHIC USE

Coated Unipotential Cathode

Heater Voltage 2.5 a-c or d-c volts 2.1 Current amp.

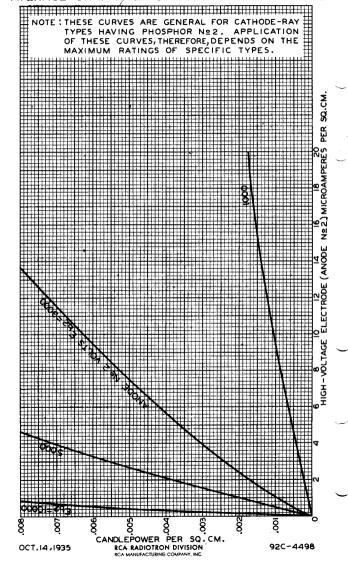
Fluorescent Screen:

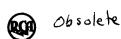
Material Pattern Color Phosphor No.2 Bluish White

For further ratings, operating conditions, and dimensions, refer to Type 908. See Type 906 for connections, circuit and Average Characteristics curve.



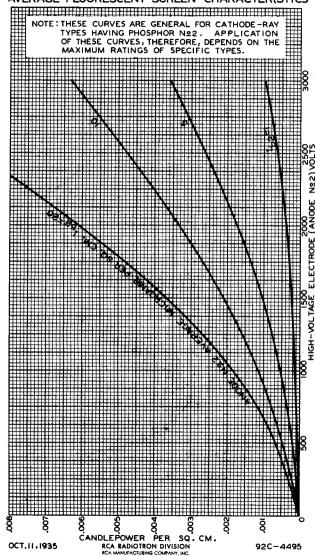
AVERAGE CHARACTERISTICS OF PHOSPHOR №2





TYPES:909, 910

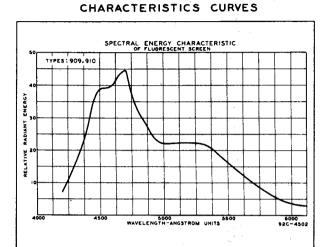
AVERAGE FLUORESCENT-SCREEN CHARACTERISTICS

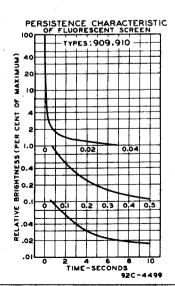


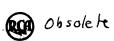
999



TYPES: 909, 910

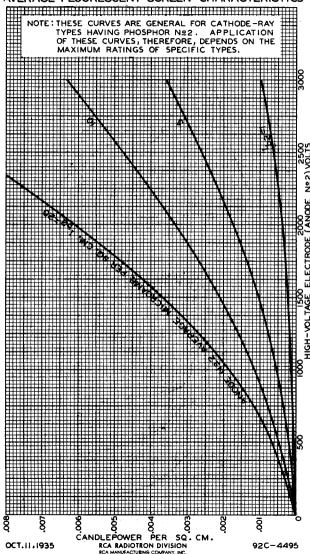






TYPES: 909, 910

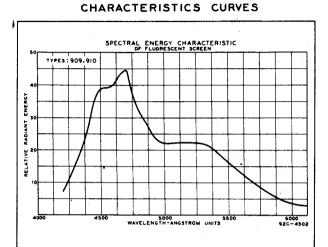
AVERAGE FLUORESCENT-SCREEN CHARACTERISTICS

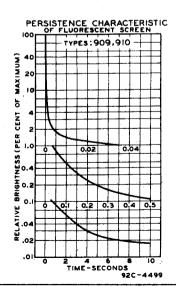


990



TYPES: 909, 910





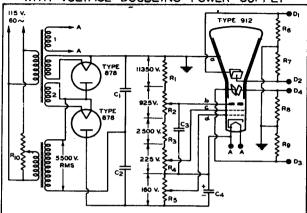


HIGH-INTENSITY ELECTROSTATIC-DEFLECTION TYPE

WITH 5" MEDIUM-PERSISTENCE SCREEN F	OR OSCILLOGRAPHIC USE
Heater Coated Unipotential Ca	athode
Voltage 2.5	a-c or d-c voits
Current 2.1	amp.
Fluorescent Screen:	i
Material	Phosphor No.1
Pattern Color	Greenish
Direct Interelectrode Capacitances:	1
Grid to all other electrodes	14 max. µµf
DJ to DJ2	3 max. µµf
DJ3 to DJ4	1.5 max. µµf
Overall Length	16-1/2" ± 3/8"
Maximum Diameter	5-1/4" + 1/16" - 3/32"
Bulb	Ĵ - 42
Caps:	· 1
Anode No-2	Medium Metal
Deflecting Electrodes (Four)	Small Metal
Base	Medium 5-Pin Micanol
BOTTOM VIEW	
Pin 1 - Heater	Cap [Deflecting
Pin 2-Grid No. 2	Over [] Electrode
Pin 3 - Anode No. 1 P2 3 PJI	Pins DJ2
Pin 4 - Grid No.1 DJ4	1 & 5)
I Pin 5 - Heater al C 770\a	Cap Deflecting
Cathode (2)	Over Electrode
Single Medium Cap -	
Anode No. 2	
Cap Dellecting	Over } { Electrode DJ4
Over } { Electrode	P(n 4) (b04
Pin 3) \ DJ	
MAXIMUM RATINGS and TYPICAL OPE	RATING CONDITIONS
Maximum Ratings Are Based on a Line-Voltage	Design Center of 117 Volts
High-Voltage Electrode (Anode #2) Vol	tage 15000 max. volts
Maccalarating Electrode (Grid #2) Volt	tage 250 max. volts
Control Electrode (Grid #1) Voltage	Never positive
Idrid Voltage for Current Cut-Oil	-125 approx.volts
Peak Voltage Between Anode #2 and	
any deflecting electrode	7000 max. volts
Typical Operation:	
neater to tege	2.5 2.5 volts
HINGE MY TOTAGE	0000 15000 volts
MILOGO WI TOTAL	2000 3000 <u>approx.volts</u> 250 250 volts
Grid #2 Voltage 250	
Grid #1 Voltage Adjusted to give	suitable luminous spot
Deflection Sensitivity:	.041 0.028 mm/volt d.c.
1 201 10 202	
0.102 0.102 0.	.051 0.034 mm/valt d.c.
* With maximum voltages on Anode #1 and Gri	id #2.
- Indicates a change.	
14 moreaus a suanger	DAT



TYPICAL OSCILLOGRAPH CIRCUIT USING THE 912 WITH VOLTAGE-DOUBLING POWER SUPPLY



C₁, C₂ = 0.5 µf, 10000 V. C₃ = 1.0 µf, 5000 V. C₄ = 16 µf, 200 V. R₃=0.55 MEGOHM, 20-WATT R₄= 50000 OHMS, 2-WATT R₅=35000 OHMS, 2-WATT

b = ANODE Nº 1 C = GRID Nº 2

R₁ = 2.5 MEGOHMS, 75-WATT

R6, R7, R8, R9 = 2 TO 5 MEGOHMS

d = GRID Nº 2

R2 = 0.2 MEGOHM, 10-WATT R10 = 100 OHMS, 600-WATT

NOTE: AS THE TOTAL VOLTAGE ACROSS THE BLEEDER IS REDUCED BY MEANS OF R₁₀. THE ELECTRODE VOLTAGES ARE REDUCED IN CORRECT PROPORTION, EXCEPT FOR GRID NO.2 VOLTAGE; THIS MAY HAVE TO BE READUSTED BY THE USE OF DIFFERENT VALUES FOR B₃ AND R₇. THEIR TOTAL RESISTANCE BEING KEPT THE SAME. COMDENSERS C₃ AND C₄ CAM BE OMITTED IF GRID-VOLTAGE SWITCHING (FOR HIGH-SPEED PHOTOGRAPHY) IS NOT CONTEMPLATED. FILAMENT WINDINGS NOS. 1 and 2 SNOULD BE INSULATED FOR 20000 VOLTS.

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92C-4621R1

FLUORESCENT-SCREEN CHARACTERISTICS

CURVES SHOWING THE AVERAGE CHARACTERISTICS, SPECTRAL EMERGY CHARACTERISTIC, AND PERSIST-ENCE CHARACTERISTIC OF PHOSPHOR NO.1 ARE SHOWN AT THE BEGINNING OF THIS SECTION.

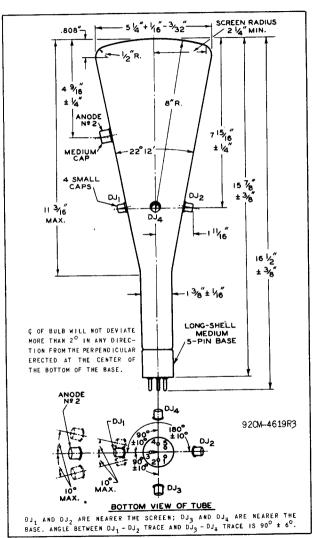
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AUG. 15, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

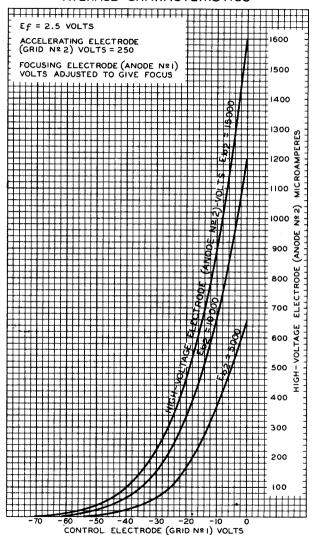
DATA







AVERAGE CHARACTERISTICS







Heater Coated Unipotential	Cathode
Voltage 6.3	a-c or d-c volts
Current 0.6	amp.
Focus	Electrostatic
Deflection	Electrostatic
Electrodes D1 and D2 (upper): r Electrodes D3 and D4 (lower): r	nearest to screen
Flectrodes Dia and Dia (lower): r	nearest to base
DI is on the same side of tube a	as pins No.2 and No.4
Dig is on the same side of tube as	s pins No.2 and No.8
Phosphor	No.1
Fluorescence	Green
Persistence	Medium
Direct Interelectrode Capacitances:	
Control Electrode (Grid) to All Other El	lectrodes 8 µµ1
Deflecting Electrode Di to Deflecting E	
Deflecting Electrode Dig to Deflecting E	
Maximum Overall Length	4-3/4"
Maximum Diameter	1–5/8"
Bulb	Metal Shell, MT-10
1577	Small Wafer Octal 8-Pin
Base	
MAXIMUM RATINGS and TYPICAL OF	PERATING CONDITIONS
Maximum Ratings Are Based on a Line-Volta	ge Design Center of 117 Volts
High-Voltage Electrode (Anode No.2)	
Focusing Electrode (Anode No.1) Vol	
Control Electrode (Grid) Volt.	Never positive
Peak Voltage Between Anode No.2 and	
Any Deflecting Electrode	250 max. volts
Grid Circuit Resistance	1.5 max. megohms
Impedance of Any Deflecting-Electron	
Circuit at Heater-Supply Frequency	y 1.0 max. megohm
Typical Operation:	,
Anode No.2 Voltage 250	500 volts
Anode No.1 Voltage 50	100 approx. volts
	ive suitable luminous spot
Deflection Sensitivity:	
Electrodes D ₁ & D ₂ 0.15	0.07 mm/volt d.c.
Electrodes D ₃ & D ₄ 0.21	0.10 mm/volt d.c.
1	docreses with decressing
anode voltages. In general	
should not be less than 250 vo	dits.
NOTE 2: The d-c potential of each	deflecting electrode IS
maintained essentially equiva	lent to that of anode No. 2
by connecting resistors having	g values not greater than
10 megohms between each defle	cting electrode and anode

See next page.

Jan. 30, 1942

the distortion for a given beam current.

No.2. This arrangement by suitable choice of resistor values minimizes pattern distortion and pattern drift resulting from unbalanced potentials on the deflecting electrodes. The smaller the resistor values, the less

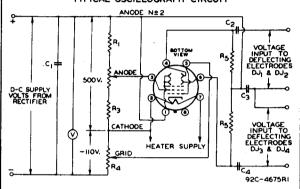


(continued from preceding page)

Supply should be adjustable to ± 30% of the value shown,
Approximately 80% of Anode No.1 voltage is required for current cutoff when, in some applications, it is necessary to use the maximum
permissible grid-circuit resistance.

Characteristic Curves of phosphor No.1 are shown at the beginning of this section.

TYPICAL OSCILLOGRAPH CIRCUIT



C. = FILTER CONDENSER R. C_2 C. C_3 C. C_4 SEE NOTE 3 R. $R_1+R_2+R_3+R_4$ = BLEEDER POTENTIOMETER R. = 0.200 MEGOMM V

R3 = 0.030 MEGOHM
R3 = 0.050 MEGOHM
R5 = SEE NOTE 2
AT END OF DATA
V = VOLTMETER

NOTE 3: When the cathode or the negative end of the cathoderay high-voltage supply is grounded, blocking condensers C_2 , C_3 , and C_4 should have a high voltage rating. When anode No.2 is grounded, C_3 may be omitted and C_2 and C_4 may be low-voltage condensers.

For d-c amplifier service, the deflecting electrodes should be coupled direct to the output of the amplifier by omitting the blocking condensers. In addition, it will usually be preferably to remove the associated deflecting electrode resistor in order to minimize the loading effect of the resistor on the d-c amplifier. With the resistor removed, it is essential, in order to minimize spot defocusing, that anode No.2 be returned to some point in the d-c amplifier circuit such that the potential difference between anode No. 2 and the average voltage across the deflecting electrodes will be as low as possible.

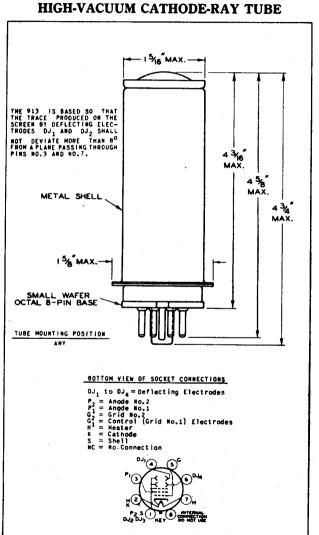
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Indicates a change.

0.050 MEGOHM

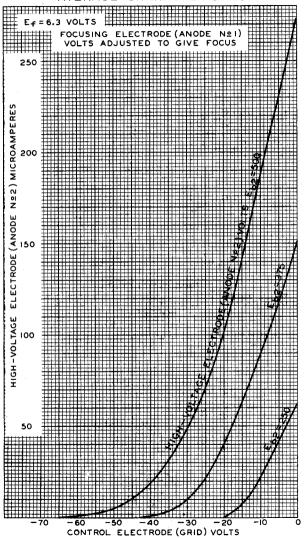


913





AVERAGE CHARACTERISTICS





914-A

OSCILLOGRAPH TUBE

ELECTROSTATIC DEFLECTION ELECTROSTATIC FOCUS DATA General: Heater, for Unipotential Cathode: ac or dc volts Voltage. . 2.1 Current. . Direct Interelectrode Capacitances (Approx.): Grid No.1 to All Other Electrodes. . . μμf 10.5 \mathbb{D}_1 to \mathbb{D}_2 \mathbb{D}_3 to \mathbb{D}_4 2.0 ilii f 1.0 this Section) see front of Phosphor (For Curves, Fluorescence . Medium Persistence. . Electrostatic Focusing Method. Electrostatio Deflection Method. 20-1/16" ± 3/8" Overall Length ± 1/8" 9-1/4" Greatest Diameter of Bulb. 8-1/4" Minimum Useful Screen Diameter Anv Mounting Position. . . . Caps: Med i um Anode No.2 . Small. Deflecting Electrodes (Four) Long Medium-Shell Small 6-Pin Base . . . BOTTOM VIFW (Deflecting Pin 1 - Heater Cap over Electrode Pin 2-Anode No.1 Pin 5 DJa Pin 3-Grid No.2 Deffecting Cap Pin 4 - Grid No.1 Electrode Pin 5 - Cathode over DJ_3 Pins Pin 6 - Heater Single Medium Cap-1 & 6 Deflecting Anode No. 2 Cap (Deflecting Electrode over Cap Pins Electrode DJ_{4} over Pin 2 DJ1 3 & 4 DJ_1 and DJ_2 are nearer the screen DJ_{2}^{\perp} and DJ_{4}^{\perp} are nearer the base With DJ_1 positive with respect to DJ_2 the spot is deflected toward pin 2. With DJ, positive with respect to DJ, the spot is deflected toward pins I and 6. The angle between the trace produced by DJ; and DJ2 and its intersection with the plane through the tube axis and pin 2 does not exceed 100. The angle between the trace produced by DJ_3 and DJ_4 and the trace produced by DJ and DJ $_2$ is $90^{\circ} \pm 6^{\circ}$. Maximum Ratings, Design-Center Values: ANODE-No.2 VOLTAGEO. 7000 max. volts 1900 max. volts ANODE-No.1 VOLTAGE. The product of anode—No.2 voltage and average anode—No.2 current should never exceed 6 watts.





OSCILLOGRAPH TURE

OSCII	LUGI	АГП	LODE		
GRID No. 2 VOLTAGE GRID No. 1 VOLTAGE:				300 max.	volts
Negative bias value.				125 max.	volts
Positive bias value.				0 max.	volts
Positive peak value. PEAK VOLTAGE BETWEEN A		2		2 max.	volts
AND ANY DEFLECT PEAK HEATER-CATHODE VOI	TING ELE		3	000 max.	volts
Heater negative with		to cath	ode	125 max.	volts
Heater positive with					volts
Equipment Design Range:	s :				
For any anode-No. 2 vol:	tage (Eb) betwe	en 1500	and 7000	volts*
Anode-No.1 Voltage	. 15%	to 26% a	f Ebo		volts
Grid-No.2 Voltage		250	~ 2		volts
Max. Grid-No.1 Voltage for Visual Cutoff.		0% of Eb	2		volts
Max. Anode-No.1 Current Range.	- 1	5 to + 1	0		μ amp
Deflection Factors: D1 to D2 D3 to D4		38 to 54 30 to 44	v d v d	c/in./kv c/in./kv	of Eb2 of Eb2
Examples of Use of Des	ign Rang	es:			
For Anode-No.2 Volt. of	1500	2500	5000	7000	volts
Anode-No.1 Voltage	225-390	375-650	750-1300	1050-1800	volts
Grid-No.2 Voltage Max. Grid-No.1 Volt.	250	250	250	250	volts
for Visual Cutoff Deflection Factors:	- 7 5	~75	-75	-75	volts
\mathbb{D}_1 to \mathbb{D}_2	57-81	93-135	190-270	266-378	v dc/in
ω ₃ to ω ₄	45-66	75–110	150-220	210-308	v dc/in
Maximum Circuit Values:	:				
Grid-No.1-Circuit Resis	stance .		1.	5 max. r	negohms
Resistance in Any Defle	ecting-E	lectrode Circuit ^o		5 max. r	negohms
		CITCUIT	• •	J	
Minimum Circuit Values:					
The power supply shou inherent regulation t current to 5 milliampe	o limit res. If	the cor	ntinuous ply perm	short-c	ircuit nstan-
taneous short-circuit	current 1	o exceed	1 amper	e, or is o	capable

of storing more than 250 microcoulombs, the effective re-

Brilliance and definition decrease with decreasing anode-No.2 voltage. In general, anode-No.2 voltage should not be less than 1500 volts.

sistance in circuit between indicated electrode and the output

 $\ensuremath{\mathsf{D}}$ it is recommended that the deflecting-electrode-circuit resistances be approximately equal.

-- Indicates a change.

MAY 1, 1950



Ola .

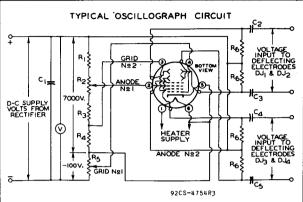
OSCILLOGRAPH TUBE

	OSCILLOGRAPH TUBE
10	capacitor should be as follows: Grid-No.1-Circuit Resistance
1	Anode-No.1 - Circuit Resistance 2000 min. ohms Anode-No.2 - Circuit Resistance 8200 min. ohms
,	The resistors should be capable of withstanding the applied voltages.





OSCILLOGRAPH TUBE



NOTE: when the cathode or the negative end of the cathode-ray high-voltage supply is grounded, blocking capacitors C_2 , C_3 , C_4 , and C_5 should have a high voltage rating. When anode No.2 is grounded, C_2 , C_3 , C_4 , and C_5 may be low-voltage capacitors.

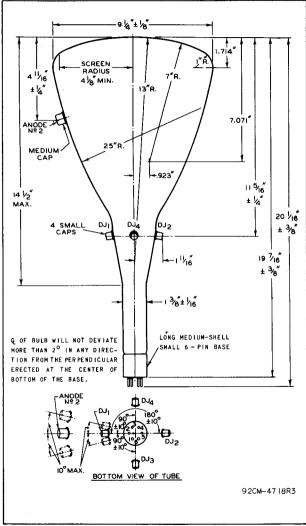
For dc amplifier service, the deflecting electrodes should be coupled direct to the output of the amplifier by omitting the blocking capacitors. In addition, it will usually be preferable to remove the associated deflecting-electrode resistor in order to minimize the loading effect of the resistor on the dc amplifier. With the resistor removed, it is essential, in order to minimize spot defocusing, that anode No.2 be returned to some point in the dc amplifier circuit such that the potential difference between anode No.2 and the average voltage across the deflecting electrodes will be as low as possible.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.



914-A OSCILLOGRAPH TUBE





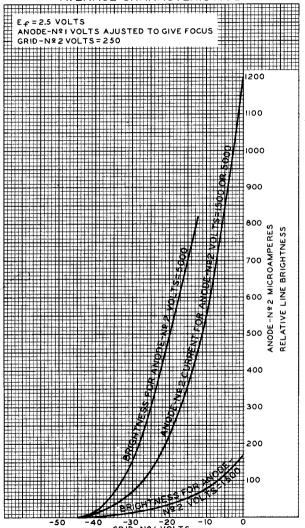
MAY 1, 1950

TUBE DEPARTMENT

CE-4718R3



AVERAGE CHARACTERISTICS





ICONOSCOPE
FOR PICKUP FROM MOTION-PICTURE FILM OR SLIDES

FOR PICKUP FROM MOTION-PICTORE FILM OR SLIDES.	_
DATA	
General:	
Heater, for Unipotential Cathode:	-
Voltage 63 + 10% ac or de volt	+ -
Voltage 6.3 ± 10% ac or dc vol Current ar	200
Direct Interelectrode Capacitances (Approx.):	۳۱
Grid No.1 to All Other Electrodes 6.5	u f
Signal Electrode to Grid No.4° 10	
Mosaic, Photosensitive:	
Response See Curv	vel
Useful Size of Rectangular Image	
(4 x 3 Aspect Ratio) 5.75" max. diagona	a1 -
Focusing Method Electrostat	ic
IDeflection Method Magnet	iC
Deflection Angle (Approx.)	5º 🗗
May Width of Mounted Tube 8-1/8	2"
Height of Mounted Tube	4"
Depth of Mounted Tube 12-13/16" ± 3/4	4"
Mounting Position	ne
Minimum Deflecting-Coil Inside Diameter 1-1/	2" -
Maximum Deflecting-Coil Length 2-1/4	4" -
Caps (Two) Medium (JETEC No.C1-	5)
[Base Long Meditine-Shelf Shalf G-1	in
BOTTOM VIEW	- 1
Pin 1 - Heater 3 T 4 See Outline	- 1
Pin 2 - Grid No 2	- 1
Pin 3-Grid No.3 Pin 4-Grid No.1 Sj-Signal Electrode	- 1
Pin 5 - Cathode G4 - Grid No. 4	
Pin 6 - Heater (Collector)
DIRECTION OF LIGHT IS NORMAL TO MOSAIC	- 1
IS NORMAL TO MOSAIC	
Maximum Ratings, Absolute Values:	ı
_	
AT ENAGE MOONTO TEEDMINE	
OPERATING TEMPERATURE OF BULB AT LARGE END OF TUBE 40 max.	ocl.
SIGNAL-ELECTRODE VOLTAGE	
GRID-No.4 (COLLECTOR) VOLTAGE 1200 max. vol	
GRID-No.3 VOLTAGE	
GRID-No.2 VOLTAGE	
GRID-No.1 VOLTAGE:	- 1
Negative bias value	ts
Positive bias value 0 max. vol	ts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode. 125 max. vol	ts
Heater positive with respect to cathode. 10 max. vol	ts
IGRID-No.4 CURRENT 0.5 max. µar	
GRID-NO.4 COMMENT	
O with external shield.	- [
● Averaged over any interval of 1 sec. max. ← Indicates a chang	ge.

(850.A





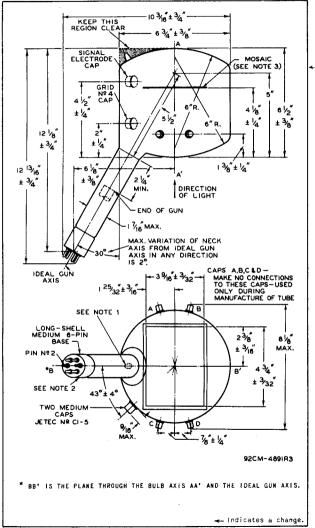
	Typical Operation and Characteristics:		
	Signal-Electrode Voltage	1000	volts
	Grid-No.4 Voltage	1000	volts
	Grid-No.3 Voltage (Beam Focus)		
	24% to 36% of Grid-No.4 Voltage		volts
	Grid-No.2 Voltage	1000	volts
-	Max. Grid-No.1 Voltage for Pattern		
	Cutoff— 7% of Grid-No.4 Voltage	-70	volts
-	Grid-No.4 Current		1
	(With no illumination on mosaic)*		μ amp
	External Load Resistance	0.1	megohm
>	Illumination on Mosaic:		٠. ا
	Steady Highlight Value for Slides	4 to 6	ft-c
	Average Pulsed Highlight Value		٠. ا
	for Motion-Picture Film	10 to 20	ft-c
*	Ratio of Peak-to-Peak Highlight		
	Video-Signal Current to RMS Noise	100	
	Current (Approx.).	100	1 +
	Minimum Peak-to-Peak Blanking Voltage	20	volts
>	Deflecting-Coil Current (Approx.):**	000	
	Horizontal (Peak to peak)	600	ma
	Vertical (Peak to peak)	140	ma
	Maximum Circuit Values:		
	Grid-No.1-Circuit Resistance	1.0 max.	megohm
	* Allowance should be made for leakage currents.	•	

^{**} For RCA Deflecting Yoke No. 201D76.

-- Indicates a change.



ICONOSCOPE



(850; A



RCA 1850-A ICONOSCOPE

NOTE 1: VARIATION OF TIP CENTER FROM PLANE BB! IS 1/2".

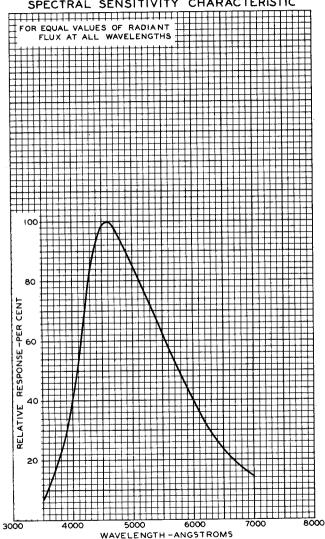
NOTE 2: MAXIMUM ROTATION OF LINE THROUGH PINS 2 AND 5
ABOUT IDEAL GUN AXIS IS ± 10°, MEASURED FROM PLANE BB'.

NOTE 3: DEVIATION OF PLANE OF MOSAIC FROM PLANE PERPENDICULAR TO THE BULB AXIS AA' IS 2.5° MAX. ROTATION OF MOSAIC ABOUT THE BULB AXIS AA' WITH RESPECT TO A LINE OF INTERSECTION FORMED BY MOSAIC PLANE AND PLANE BB' IS 2.5° MAX.

MAY 1, 1951



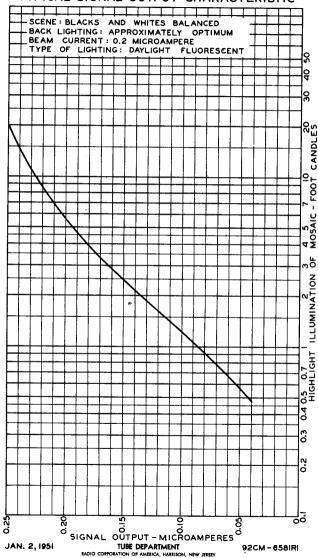
SPECTRAL SENSITIVITY CHARACTERISTIC

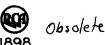












MONOSCOPE

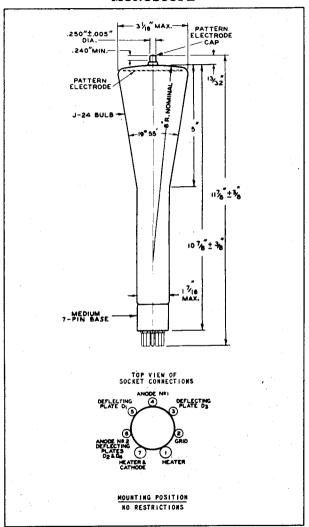
	3" ELECTROSTAT	IC-DEFLE	CTION TY	PE				
Heater	Coated Unipo	tential	Cathode					
Voltage		2.5		a-c	or	d-c	volt	s
Current		2.1					amp.	
Pattern:								
Туре					Gi		s Hea	
Diameter		_				2	2-5/8	"
Direct Inter	electrode Capaci	tances: "	,					
	ectrode to Anode				.5		μμf	J
Deflecting	Plate D1 to All C	ther Ele	ctrodes				μμf	
Deflecting	PlateDoto All C)th er Ele	ctrodes	15.	.5		μμf	
Grid to Al	l Other Electrod	es		11	.6		μμf	
Overall Leng				1	1–7		£ 3/8	
Maximum Diam	eter						-1/16	**
Bulb							J-24	
Сар		Ski	rted Mir	niati				Α

Overall Length Maximum Diameter		•	1	11-7/8"	± 3/8" 3-1/16"
Bulb			•	•	J-24
Cap	Sk	irted k	liniat	ure - S	
Base	OK	i i cca n	······································		n 7-Pin
base					
MAXIMUM RATINGS and TYPI	CAL O	PERATII	IG CON	ID IT I ONS	3
Pattern Electrode Voltage				max.⊕	volts
Focusing Electrode #2 (Anode #2				max.e	volts
Focusing Electrode #1 (Anode #1		tage		max.⊕	volts
Control Electrode (Grid) Volta				er posit	
Pattern Electrode Dissipation/	sq cm		1	max.⊕	TRW
D-C Resistance between:					
Cathode and Grid				max.	megohm
Cathode and Deflecting Plate				max.	megohm
_ Cathode and Deflecting Plate	υ3		כ	max.	megohm
Typical Operation:	2.5	2 5	2 5		1
Heater Voltage	750	2.5 950	2.5 1150		volts volts
Pattern Electrode Voltage	800	1000	1200		volts
Anode #2 Voltage	240	300		approx	
Anode #1 Voltage Grid Voltage Adjusted					
		gnal ar			LION
Grid Voltage for	na si	gna i ar	прітц	106	
Current Cut-off	-50	-60	-70	approx	volte
Vertical-Deflection Volt#	-50	-00	-,0	appiox	VOICS
on Deflecting Plates D ₁ - D ₂	125	155	185		volts
Horizontal-Deflection Volt.		100	100		10163
on Deflecting Plates D ₂ - D ₄	135	170	200		volts
Internal Resistance between	100	1,0	200		10.15
Anode #2 & Pattern Electrode	Gre	ater ti	an 1		megohm
Beam Current *	1	2	• 3	approx	
Pattern Electrode Signal	_	-		<u></u>	· / · · · / · ·
Current, peak-to-peak value	1	2	3	approx	uamp.
l	-	_	_	p , G / 1	·
Without external shielding. B Design maximum for 117-volt line.					
# Peak-to-peak values of deflection	vol	ages r	equire	d for	scanning
largest rectangle having 4:3 aspe	ect ra	tto and	conta	inea in	pattern





MONOSCOPE



DEC. 1, 1939

RCA RADIOTRON DIVISION RCA MANUFACTURING COMPANY, INC. CE-6068



ICONOSCOPE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

General:
Heater, for Unipotential Cathode: Voltage 6.3 ± 10% ac or dc volts Current 0.6 Direct Interelectrode Capacitances (Approx.):* Grid No.1 to All Other Electrodes 7.5
DJ3 DJ3 DJ3 DIRECTION OF LIGHT: NTO END OF BULB 4 Pin 12 - Internal Connection— Do Not Use Electrode Pin 14 - Heater DJ4 Cap - Signal Electrode
Maximum Ratings, Design-Center Values:
SIGNAL-ELECTRODE VOLTAGE 900 max volts GRID-No.4 & GRID-No.2 VOLTAGE 900 max volts GRID-No.3 VOLTAGE 450 max volts
GRID-No.1 VOLTAGE: Negative bias value 100 max volts Positive bias value 0 max volts PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode 125 max volts Heater positive with respect
to cathode 10 max volts AMBIENT TEMPERATURE 40 max oc MOSAIC ILLUMINATION 50 max. foot-candles
▲ With external shield.





ı:				1
Voltage No.2 Voltage		800 800		
for Focus .	:	125 to 25	0	volts
		Adjust	for best	picture
				·
				volts
		ak)*:		
ical)		120		volts
		100		volts
Blanking Vol	tage	30		volts
rent (Approx.)	0.025		μ amp
Approx.)		1.0		megohm
	Voltage No.2 Voltage e for Focus Plage for Focus foltage for Picture Cutof (oltages (Peakical) zontal) Ellanking Voltager (Approx.	Voltage	Voltage	Voltage

Maximum Circuit Values:

Grid-No.1-Circuit Resistance in any	Resistance .	•	1.0	max.	٠,	•	megohm
	trode Circuit		5.0	max.		. m	negohms

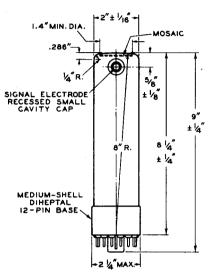
* To scan picture of 1.4* diagonal (4 x 3 aspect ratio).

The SPECTRAL SENSITIVITY CHARACTERISTIC curve for the 5527 is the same as that shown for Type 1850-A.

It is recommended that the deflecting-electrode-circuit resistances be approximately equal.



ICONOSCOPE

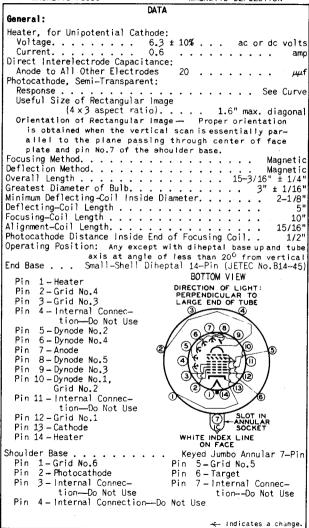


THE PLANE THROUGH THE TUBE AXIS AND BASE-PLUG KEY MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND SIGNAL ELECTRODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF 20°. SIGNAL ELECTRODE TERMINAL IS ON SAME SIDE AS BASE-PLUG KEY.

DJI AND DJ2 ARE NEARER THE MOSAIC; DJ3 AND DJ4 ARE NEARER THE BASE. WITH DJI POSITIVE WITH RESPECT TO DJ2, THE SPOT IS DEFLECTED TOWARD PIN 5. WITH DJ3 POSITIVE WITH RESPECT TO DJ4, THE SPOT IS DEFLECTED TOWARD PINS I AND 2. WITH DJI AND DJ2 USED FOR VERTICAL DEFLECTION, THE VERTICAL AXIS OF THE SCANNED AREA OF THE MOSAIC IS PARALLEL TO VERTICAL PLANE THROUGH PINS 5 AND 12 WITHIN ±15°. THE ANGLE BETWEEN THE SCANNING DIRECTION PRODUCED BY DJ3 AND DJ4 AND THE SCANNING DIRECTION PRODUCED BY DJI AND DJ2 IS 90° ± 3°.



MAGNETIC FOCUS MAGNETIC DEFLECTION







Maximum Ratings, Absolute Values:	
PHOTOCATHODE VOLTAGE	volts
PHOTOCATHODE ILLUMINATION 50 max.	ft-c
OPERATING TEMPERATURE OF ANY PART OF BULB. 65 max.	oC
OPERATING TEMPERATURE OF BULB AT	-
LARGE END OF TUBE (Target Section) 35 min.	oC
TEMPERATURE DIFFERENCE BETWEEN TARGET	_
SECTION AND ANY PART OF BULB HOTTER	
THAN TARGET SECTION 5 max.	. oc
GRID-No.6 VOLTAGE550 max.	volts
TARGET VOLTAGE:	
Positive value 50 max.	volts
Negative value 50 max.	volts
GRID-No. 5 VOLTAGE	volts
GRID-No.4 VOLTAGE 300 max.	volts
GRID-No.3 VOLTAGE 400 max.	volts
GRID-No.2 & DYNODE-No.1 VOLTAGE 350 max.	volts
GRID-No.1 VOLTAGE:	
Negative bias value	volts
Negative bias value	volts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode. 125 max.	volts
Heater positive with respect to cathode. 10 max.	volts
ANODE-SUPPLY VOLTAGE® 1650 max.	volts
VOLTAGE PER MULTIPLIER STAGE 350 max.	volts
Typical Operation:	
Photocathode Voltage (Image Focus)300 to -500	volts
Grid-No.6 Voltage (Accelerator)-	
75% of photocathode voltage225 to -375	volts
Target Voltage 0	volts
Grid-No.5 Voltage (Decelerator) ● 0 to 100	volts
Grid-No.4 Voltage (Beam Focus) 160 to 240	volts
Grid-No.3 Voltage#	volts
Grid-No.2 & Dynode-No.1 Voltage 300	volts
Grid-No.1 Voltage (For Picture Cutoff) -45 to -115	volts
Dynode-No.2 Voltage 600	volts
Dynode-No.3 Voltage 880	volts
Dynode-No.4 Voltage	volts
Dynode-No.5 Voltage 1450	volts
Anode Voltage	volts
Anode Current 50	μ amp
Target Temperature Range 35 to 60	oÇ.

Ratio of dynode voltagesis shown under Typical Operation.

Adjustable from -3 to + 5 volts with blanking voltage off.

→ Indicates a change

Taps at 0, 30, 60, and 90 volts are recommended. Set at voltage giving most uniform resolution and signal output over entire picture area.

adjust to give the most uniformly shaded picture near maximum signal.



Highlight Illumination on Photocathode	
for Maximum Signal Output:	ı
With 2870°K Tungsten Illumination,	ı
Daylight, or White Fluorescent	- 1
Illumination 0.01 ft-	ᅄ
Ratio of Peak-to-Peak Highlight Video-	-1
Signal Cur. to RMS Noise Current (Approx.) 35	
Minimum Peak-to-Peak Blanking Voltage 10 volt	sĺ
Field Strength at Center of Focusing Coil. 75 gausse	s
Focusing-Coil Current (Approx. for coil	
	al
Deflecting-Coil Current (Approx. for	~
assembly listed below):	- 1
l	al
	a
Alignment-Coil Current (Approx. for coil	- 1
listed below) 0 to 30 m	a
Components:	
Deflecting-Coil Assembly (Includes	-
Keyed Jumbo Annular 7-Pin Socket) RCA Type No. 201D7	5
Focusing-Coil Assembly RCA Type No. 202D7	
Alignment-Coil Assembly RCA Type No. 204D7	
Hor. Deflection Output Transformer RCA Type No. 2047	
indi. Dellection output italistoffiel RCA Type No. 2041	4

Direction of current should be such that a north-seeking pole is attracted to the image end of focusing coil.

Ver. Deflection Output Transformer . . .

OPERATING NOTES

After the 5820 has been inserted in its sockets and the voltages applied, allow it to warm up for 1/2 to 1 hour with the camera lens iris closed. Then, proceed with normal operating adjustments.

When the equipment design or operating conditions are such that the maximum temperature rating or maximum temperature difference will be exceeded, provision should be made to direct a blast of cooling air from the diheptal-base end of the tube along the entire length of the bulb surface, i.e., through the space between the bulb surface and the surrounding deflecting coil and its extension. For this purpose, a small blower is satisfactory, but it should run at low speed to prevent vibration of the 5820 and the associated amplifier equipment. Unless vibration is prevented, distortion of the picture may occur. To keep the operating temperature of the large end of the tube from falling below 35°C, some form of controlled heating should be employed. Ordinarily, adequate heat will be supplied by the focusing coil, deflecting coils, and associated amplifier tubes so that the temperature can be controlled by the amount of cooling airdirected along the bulb surface.

RCA Type No.

204T2

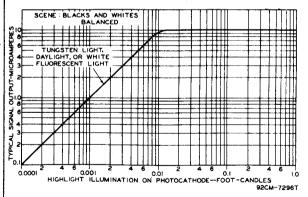


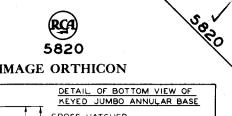
(RCA) 5820 IMAGE ORTHICON

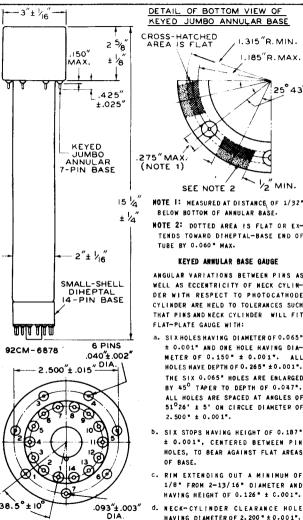
Resolution of better than 500 lines at the center of the picture can be produced by the 5820 when the highlight illumination from an RMA Standard Test Chart is above the knee of the typical signal-output curve for this type. To utilize such resolution capability in the horizontal direction with the standard scanning rate of 525 lines, it is necessary to use a video amplifier having a bandwidth of at least 6 megacycles. The maximum resolution obtainable is limited by the mesh-screen portion of the target.

On very bright days, it may not be possible to stop the lens down far enough to reduce the highlight illumination on the photocathode to a value near the knee of the signal—output curve. When such a condition is encountered, the use of a Wratten neutral filter selected to give the required reduction in illumination is recommended. Ordinar—ily, two filters—one having 5% transmission and the other 10%—will give sufficient choice.

TYPICAL SIGNAL OUTPUT







ENLARGED BOTTOM VIEW





5820

SPECTRAL SENSITIVITY CHARACTERISTIC WITH AND WITHOUT FILTER

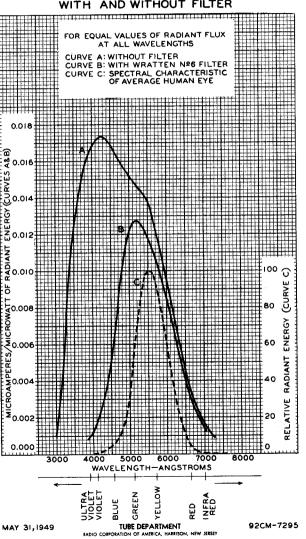




IMAGE ORTHICON MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode:
Voltage6.3 ± 10% ac or dc volts Current
Anode to All Other Electrodes 20 μμf Photocathode, Semi-Transparent:
Response See Curve Useful Size of Rectangular Image
(4 x 3 aspect ratio) 1.6" max. diagonal Orientation of Rectangular Image—Proper orientation is obtained when the vertical scan is essentially parallel to the plane passing through center of face
plate and pin No.7 of the shoulder base.
Focusing Method
Pin 1 - Heater BOTTOM VIEW Pin 2 - Grid No.4 DIRECTION OF LIGHT:
Pin 3 - Grid No.3 Pin 4 - Internal Connec-
tion—Do Not Use Pin 5-Dynode No.2
Pin 6 – Dynode No. 4 Pin 7 – Anode
Pin 8 – Dynode No.5 Pin 9 – Dynode No.3 Pin 10 – Dynode No.1,
Grid No.2 Pin 11 - Internal Connec-
tion—Do Not Use Pin 12 - Grid No.1 SLOT IN SANDULAR
Pin 13 - Cathode Pin 14 - Heater On FACE
Shoulder Base Keyed Jumbo Annular 7-Pin
Pin 1-Grid No.6 Pin 5-Grid No.5
Pin 2-Photocathode Pin 6-Target Pin 3-Internal Connec- Pin 7-Internal Connec-
tion—Do Not Use tion—Do Not Use Pin 4-Internal Connection—Do Not Use ←Indicates a change.





	The state of the s	
	Maximum Ratings, Absolute Values:	
	PHOTOCATHODE VOLTAGE550 max.	volts
	PHOTOCATHODE ILLUMINATION 50 max.	ft-c
٠	OPERATING TEMPERATURE OF ANY PART OF BULB. 65 max.	00
	OPERATING TEMPERATURE OF BULB AT	ĭ
	LARGE END OF TUBE (Target Section) 35 min.	oc
	TEMPERATURE DIFFERENCE BETWEEN TARGET	۲
	SECTION AND ANY PART OF BULB HOTTER	
	THAN TARGET SECTION 5 max.	o _C
	GRID-NO.6 VOLTAGE	volts
	TARGET VOLTAGE:	VOLUS
		14-
	Positive value 50 max.	volts
	Negative value 50 max.	volts
	GRID-No.5 VOLTAGE	volts
	GRID-No.4 VOLTAGE 300 max.	volts
	GRID-No.3 VOLTAGE. 400 max. GRID-No.2 & DYNODE-No.1 VOLTAGE. 350 max.	voits
	GRID-No.2 & DYNODE-No.1 VOLTAGE 350 max.	volts
	GRID-No.1 VOLTAGE: Negative bias value	
	Negative bias value 125 max.	volts
	Positive bias value 0 max.	volts
	PEAK HEATER-CATHODE VOLTAGE:	٠,, ا
	Heater negative with respect to cathode. 125 max.	volts
	Heater positive with respect to cathode. 10 max.	volts
	ANODE-SUPPLY VOLTAGE®	volts
	VOLTAGE PER MULTIPLIER STAGE 350 max.	volts
	Typical Operation:	
	Photocathode Voltage (Image Focus)300 to -500	volts
	Grid-No.6 Voltage (Accelerator)—	.0,00
	75% of photocathode voltage225 to -375	volts
-		volts
	Target Voltage	volts
	Grid—No.4 Voltage (Beam Focus) 160 to 240	volts
	Grid-No.3 Voltage** 225 to 330	volts
	Grid-No.2 & Dynode-No.1 Voltage 300	volts
	Grid-No.1 Voltage (For Picture Cutoff)45 to -115	volts
	Dynode-No.2 Voltage 600	volts
	Dynode-No.3 Voltage 800	volts
	Dynode-No.4 Voltage	volts
	Dynode-No.5 Voltage	volts
	Anode Voltage	volts
	Anode Current 50	νοιτα
	Target Temperature Range	°C
_	Transport reinperature hange	~
	Ratio of dynode voltages is shown under Typical Operation.	
	Adjustable from -3 to + 5 volts with blanking voltage off.	
		aivina
	Taps at 0,30,60, and 90 volts are recommended. Set at voltage most uniform resolution and signal output over entire picture	area.
	₩ Adjust to give the most uniformly shaded picture near maximum	signa1.
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		l l

FEB. 1, 1952

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-> Indicates a change







Highlight Illumination on Photocathode for Maximum Signal Output:
With 2870°K Tungsten Illumination,
White Fluorescent Illumination,
or Daylight 0.04 ft-c
Ratio of Peak-to-Peak Highlight Video-
Signal Cur. to RMS Noise Current (Approx.) 70
Minimum Peak-to-Peak Blanking Voltage 10 volts
Field Strength at Center of Focusing Coil 75 gausses
Focusing-Coil Current (Approx. for coil
listed_below)
Deflecting-Coil Current (Approx. for
assembly listed below):
Horizontal (Peak to Peak) 625 ma
Vertical (Peak to Peak)
Alignment-Coil Current (Approx. for coil
listed below) 0 to 30 ma
Components:
Deflecting-Coil Assembly (Includes
Keyed Jumbo Annular 7-Pin Socket) RCA Type No. 201D75
Focusing-Coil Assembly RCA Type No. 202D75
Alignment-Coil Assembly RCA Type No. 204D75
Hor. Deflection Output Transformer RCA Type No. 204T1
Ver. Deflection Output Transformer RCA Type No. 204T2

Direction of current should be such that a north-seeking pole is at-tracted to the image end of focusing coil.

OPERATING NOTES

After the 5826 has been inserted in its sockets and the voltages applied, allow it to warm up for 1/2 to I hour with the camera lens iris closed. Then, proceed with normal operating adjustments.

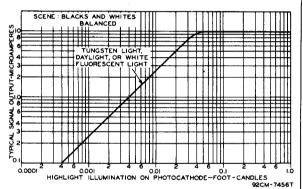
When the equipment design or operating conditions are such that the maximum temperature ratingor maximum temperature difference will be exceeded, provision should be made to direct a blast of cooling air from the diheptal-base end of the tube along the entire length of the bulb surface, i.e., through the space between the bulb surface and the surrounding deflecting coil and its extension. For this purpose, a small blower is satisfactory, but it should run at low speed to prevent vibration of the 5826 and the associated amplifier equipment. Unless vibration is prevented, distortion of the picture may occur. To keep the operating temperature of the large end of the tube from falling below 45°C, some form of controlled heating should be employed. Ordinarily, adequate heat will be supplied by the focusing coil, deflecting coils, and associated amplifier tubes so that the temperature can be controlled by the amount of cooling air directed along the bulb surface.





Resolution of better than 500 lines at the center of the picture can be produced by the 5826 when the highlight illumination from an RMA Standard Test Chart is above the knee of the typical signal-output curve for this type. To utilize such resolution capability in the horizontal direction with the standard scanning rate of 525 lines, it is necessary to use a video amplifier having a bandwidth of at least 6 megacycles. The maximum resolution obtainable is limited by the mesh-screen portion of the target.

TYPICAL SIGNAL OUTPUT



SPECTRAL SENSITIVITY CHARACTERISTIC and OUTLINE DIMENSIONS are the same as those shown for Type 5820



MAGNETIC FOCUS

MAGNETIC DEFLECTION

DATA
General:
Heater, for Unipotential Cathode: Voltage 6.3 ± 10% ac or dc volts Current 0.6 amp Direct Interelectrode Capacitance: Signal Electrode to All Other Electrodes 4.5
Spectral Response See Curve Photoconductive Layer: Maximum Useful Diagonal of Rectangular
Image (4 x 3 Aspect Ratio) 0.62 inch Orientation of Quality Rectangle—Proper orientation is obtained when the horizontal scan is essentially parallel to the plane passing through the tube axis and short index pin. Focusing Method Magnetic
Deflection Method
Base Small-Button Ditetrar 8Pin (JETEC No.E8-11) BOTTOM VIEW Pin 1 - Heater Pin 7 - Cathode
Pin 2-Grid No.1 Pin 3- Int. Conn Do Not Use Pin 4- Int. Conn Pin 4- Int. Conn Pin 8- Heater Flange (SJ)- Signal Electrode
Do Not Use Pin 5 - Grid No.2 Pin 6 - Grid No.3, Grid No.4 DIRECTION OF LIGHT: INTO FACE END OF TUBE Short Index Pin - Int. Conn Make No Conn.
Maximum Ratings, Absolute Values:
SIGNAL-ELECTRODE VOLTAGE
Negative bias value
respect to cathode 125 max. volts Heater positive with
respect to cathode 10 max. volts FACEPLATE TEMPERATURE 60 max. OC





Typical Operation and Characteristics:	
For scanned area of 1/2" x 3/8"	
Signal-Electrode Voltage for Dark Current of 0.02 µamp 10 to 125 Grid-No.4 (Decelerator) & Grid-	volts
No.3 (Beam Focus) Voltage 200 to 300 Grid-No.2 (Accelerator) Voltage 300	volts volts
Grid-No.1 Voltage (For picture cutoff)45 to -100 Signal-Output Current:*	volts
Normal Operating Range 0.1 to 0.2 Minimum, with 0.6 foot-candle of	μ amp
uniform 2870°K tungsten il- lumination on tube face 0.02 Uniform 2870°K Tungsten Illumi-	μamp
nation on Tube Face to Produce Signal-Output Current of 0.1 to 0.2 µamp	ft-c
Output Current of 0.2 μamp to That Required to Produce 0.02 μamp 30 Minimum Peak-to Peak	
When applied to grid No.1 30 When applied to cathode 10	volts volts
Field Strength at Center of Focusing Device	gausses
Alignment Coil 0 to 4	gausses

Defined as the component of the signal—electrode current after the darkcurrent component has been subtracted.

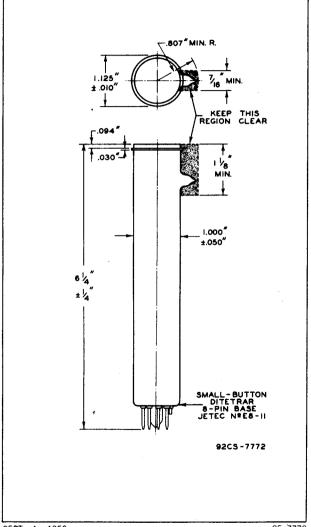
OPERATING CONSIDERATIONS

The base pins of the 6198 fit the ditetrar8-pin connector such as Cinch No.54A1808B, or equivalent.

Resolution of better than 350 lines at the center of the picture can be produced by the 6198. To utilize the resolution capability of the 6198 in the horizontal direction with the standard scanning rate of 525 lines, it is necessary to use a video amplifier having a bandwidth of at least 6 megacycles per second. The maximum resolution obtainable is limited by the size of the scanning-beam spot.



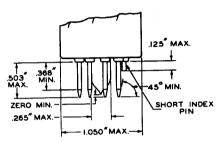


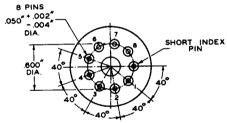






SMALL - BUTTON DITETRAR 8-PIN BASE JETEC NºE8-11





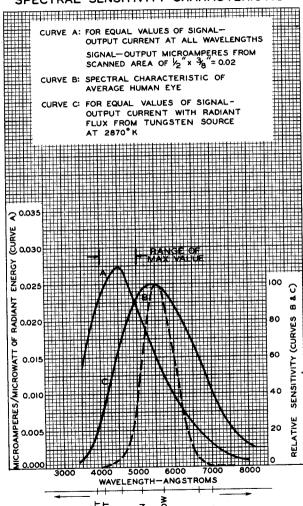
92CS - 7765

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





SPECTRAL SENSITIVITY CHARACTERISTIC



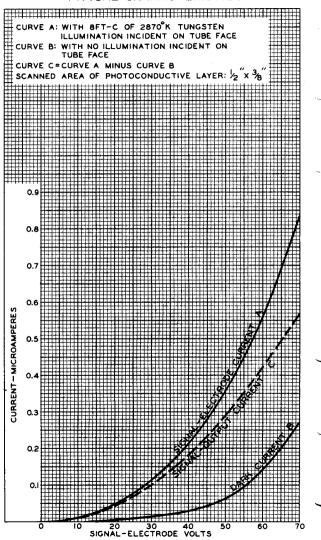
JUNE 18,1952

TUBE DEPARTMENT.
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7783RI



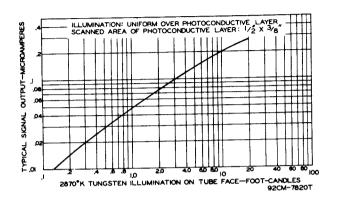
TYPICAL CHARACTERISTICS

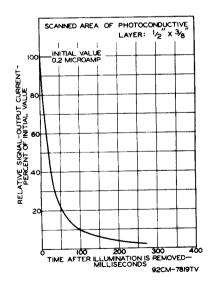




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VIDICON FOR PICKUP FROM MOTION-PICTURE FILM 600-LINE RESOLUTION

DATA			
General:			
Heater, for Unipotential Cathode: Voltage 6.3±10% ac or dc volts Current 0.6 amp Direct Interelectrode Capacitance: Signal Electrode to			
All Other Electrodes 4.5 µµf Spectral Response See Curves Photoconductive Layer: Maximum Useful Diagonal of Rectangular Image (4 x 3 Aspect Ratio) 0.62 inch Orientation of Quality Rectangle—Proper orientation is obtained when the horizontal scan is essentially parallel to the			
plane passing through the tube axis and short index pin.			
Focusing Method			
Weight (Approx.) Base			
Pin 1: Heater Pin 2: Grid No.1 Pin 3: Grid No.3 Pin 4: Int. Conn.— Do Not Use Pin 5: Grid No.2 Pin 6: Grid No.5 Grid No.5 Pin 6: Grid No.5 Pin 7: Cathode Pin 8: Heater Flange (SJ): Signal Electrode Short Index Pin: Int. Conn.— Make No			
DIRECTION OF LIGHT: Connection			
Maximum Ratings, Absolute Values: 125 max. volts SIGNAL—ELECTRODE VOLTAGE 125 max. volts GRID—No.5 & GRID—No.4 VOLTAGE 350 max. volts GRID—No.3 VOLTAGE 350 max. volts GRID—No.2 VOLTAGE 350 max. volts			
GRID-No.1 VOLTAGE: Negative bias value			
Heater positive with respect to cathode . 10 max. volts This capacitance, which effectively is the output impedance of the 6326 is increased by about 3 μμf when the tube is mounted in the RCA deflecting-yoke and focusing-coil assembly. The resistive component of the output impedance is in the order of 100 megohms.			





FACEPLATE:			
Illumination	1000 max. 60 max.	ft-c °C	
Typical Operation with Static Focusing:			
Grid No.3 connected to grids scanned area of 1/2"	No.4 and No.5; x 3/8"		
Faceplate Illumination:			
Average Highlight*, for pickup from film	100 to 300	ft-c	
Constant, for pickup from trans- parencies or opaques.	10	ft-c	
Signal—Electrode Voltage: For pickup from film	10 to 30	volts	
For pickup from transparencies or opaques	30 to 60	volts	
Grid-No.5 (Decelerator) and Grids-No.4 & No.3 (Beam-Focus		,	
Electrodes*) Voltage .	200 to 300	volts volts	
Grid-No.2 (Accelerator) Voltage	300 -45 to -100	volts	
Grid-No.1 Voltage for Picture Cutoff	0.3 to 0.4	μamp	
Highlight Signal-Electrode Current	0.1 to 0.2	μ amp	
Average Signal-Output Current* Maximum Dark Current:	0.1 (0 0.2	إ	
For pickup from film	0.004	μатр	
For pickup from transparencies	0.004	,	
or opaques	0.02	μ amp	
Average "Gamma" of Transfer		<i>'</i>	
Characteristic for signal-output			
current between 0.02 μamp and			
0.2 μamp	0.65		
Visual Equivalent Signal-to-Noise			
Ratio (Approx.)	300:1		
Minimum Peak-to-Peak Blanking Voltage:		, .	
When applied to grid No.1	40	volts	
When applied to cathode	10	volts	
Field Strength of Adjustable Alignment Coil	0 to 4	gausses	
Averaged over the time of one TV frame.			
* Beam focus is obtained by combined effect of grids-No.4 & No.3 voltage which should be adjustable over indicated range, and RCA-217D1 focusing Coil with 40 milllamperes passing through it.			
# Defined as the component of the signal-electrode current after the dark-			

[#] Defined as the component of the signal-electrode current after current component has been subtracted.

Of or amplifier system of the low-noise cascode type having 8-Mc bandwidth. Because the noise in such a system is predominately of the high-frequency type, the visual equivalent signal-to-noise ratio is taken as the ratio of highlight video-signal current to rms noise current, multiplied by a factor of 3.

MARCH 1, 1954



6326

VIDICON

Typical Operation with Dynamic Focusing:

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

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

Grid-No.5 (Decelerator) and

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

Grid-No.3 (Dynamic-Focus

* Static beam focus is obtained by combined effect of grid-No.4 voltage which should be adjustable over indicated range, and RCA-217D1 Focusing Coll with 40 milliamperes passing through it. Dynamic beam focus to give improved edge focus is supplementary to static beam focus and is accomplished by adjusting the dc grid-No.3 voltage to the same value as that of grid No.4 and by applying to grid No.3 an ac voltage having parabolic waveform.

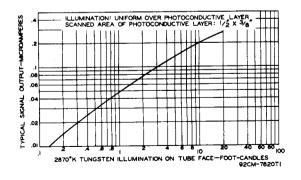
BASE CONNECTOR

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

SPECTRAL SENSITIVITY CHARACTERISTIC,
DIMENSIONAL OUTLINE,
and

BASE DIMENSIONS

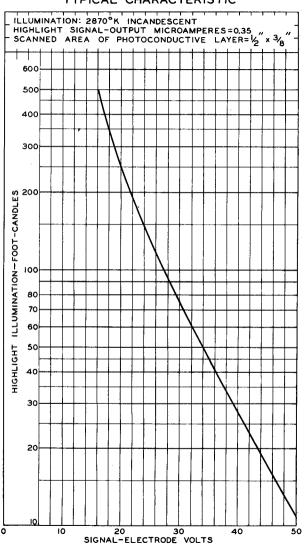
are the same as shown for Type 6198







TYPICAL CHARACTERISTIC



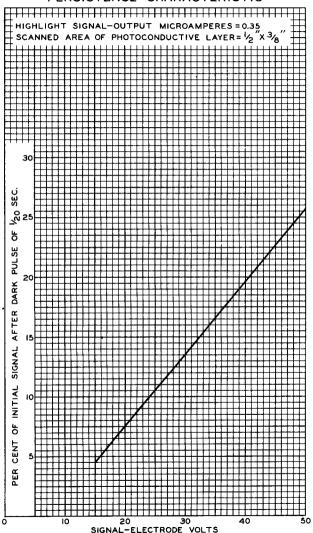
OCT. 12,1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8118



PERSISTENCE CHARACTERISTIC



OCT. 12, 1953

TUBE DEPARTMENT

92CM-8119