

MAGNETOSPHERE

Your source for hard to find and special electronics
<http://www.magnetosphere.net>

CATHODE RAY TUBE STOCK LIST

January 01, 2012

OVER 150 CRTS AVAILABLE

MANY NOS AND JAN TYPES

SPECIAL PHOSPHORS

P1 P2 P4 P7 P11 P14 P15 P31 P47

ROUND, RECTANGULAR, SQUARE

COMMON TYPES AS WELL AS TEK, HP, ENGLISH, BRIMAR..

AND SOME REALLY WEIRD ONES: MILITARY, FAA, OFFSET NECK, RADAR, MICROCHANNEL FACE, AND SOME I HAVE NO IDEA WHAT..

Best to order a few now; they don't make 'em any more and I don't know how long these will remain available.

Patrick Jankowiak KD5OEI at your service!

recycler@swbell.net - email is best

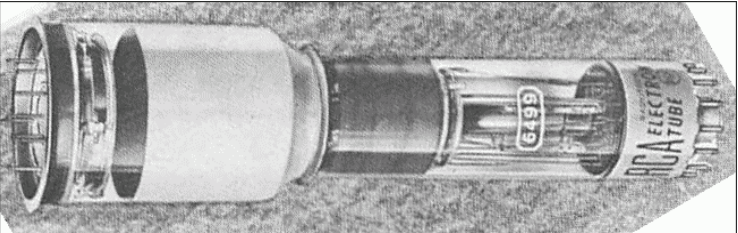
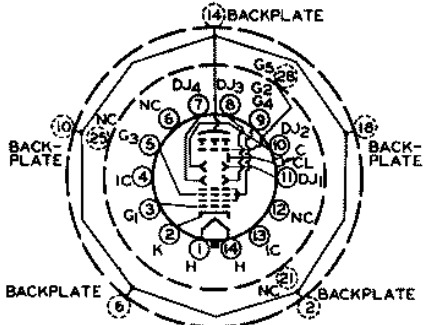
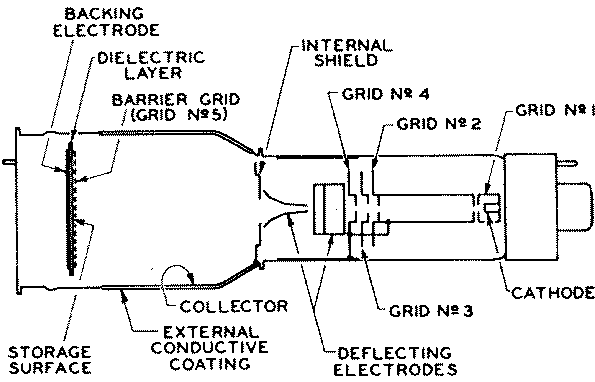
Perfect low-cost CRTs in many sizes for ham radio operators and Oscilloscope -Clock builders!

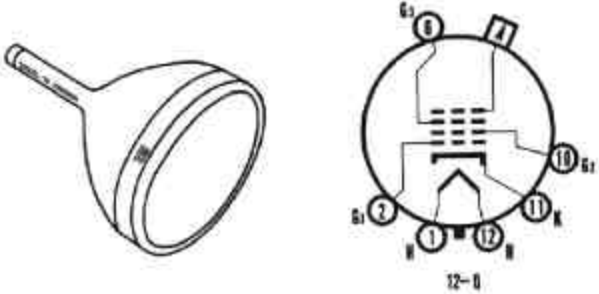
Be sure to check out my free website, The Bunker Of DOOM, with all kinds of electronics information: www.bunkerofdoom.com

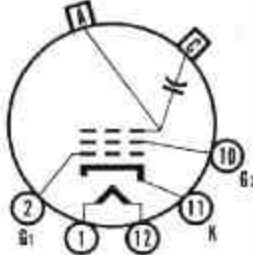
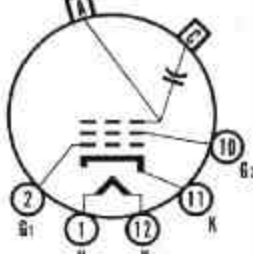
						NOTES: Aside from the “regular” CRT types, many oscilloscope-specific types are listed, and for very good prices. Did you know that these are also easily used in projects? Professional oscilloscope CRTs (H/P, TEK..) are of very high quality and are capable of great brightness. The way to find the ratings and base pinouts is to look up the associated scope manual (bama.edebris.com, or bama.com, etc..) and download the scope manual free. From this, the operating voltages are easily found. Don’t overlook these values!	CRT POLICY: Unless a tube is NOS, I can only guarantee to check filament and appearance. In some cases I might be able to check emission. CRT’s require so many different voltages that it is not economical to try to test them all, and TV-type CRT Testers don’t generally test scope CRTs. In no case will I send out a CRT that I find questionable in any way. It might be dusty, it might be used, it might have a mark or two on it (never a mark on the face unless stated), but no 2nd degree burn victims, no rattlers, gassy getters, etc. Of course a used CRT might have a very slight burn. Ask me! Bottom line: I would not sell you one I would not try to use myself. I guarantee that if you are dissatisfied with a CRT after trying it out, you may obtain a R.A. # and return it within 10 days at your expense in the original packing for a refund of the purchase price of the tube. Once it has been received in the same condition and same packing as it was shipped in, I will cheerfully refund the price of the CRT. Please understand that at these low prices starting at \$20 per CRT, I cannot refund any shipping costs.
ITEM#	TYPE	BRAND	PRICE	TECH COMMENT	CRT SHELF #		

C0001	5820	RCA	\$20	OLD COLOR TV STUDIO CAMERA TUBE	STORAGE	CAMERA TUBE (IMAGE IS OF SIMILAR APEARANCE, BUT TUBE IS IN A BOX) SEE ALSO 5820A
-------	------	-----	------	---------------------------------	---------	--



C0002	6499	RCA	\$100	ANALOG RANDOM ACCESS MEMORY TUBE NOS "RADECHON" (data at www.magnetosphere.net/radechon.zip)	STORAGE	CHARGE STORAGE TUBE OF BARRIER-GRID, SINGLE BEAM TYPE INTENDED FOR INFORMATION-PROCESSING SYSTEMS. NON-EQUILIBRIUM WRITING AND CAPACITANCE-DISCHARGED READING. ELECTRON GUN IS OF THE ELECTROSTATIC FOCUS AND DEFLECTION TYPE. BASE ON LARGE END OF TUBE IS SMALL BUTTON TWENTYNINAR 8-PIN. BASE ON SMALL END IS SMALL-SHELL DI-HEPTAL 14-PIN. MAX LENGTH 12 7/32", MAX DIAM 3.35", MAX HIGH VOLTAGE 1500 VOLTS. INFORMATION IN DIGITAL OR ANALOG FORM MAY BE INTRODUCED TO THE ACTIVE ELEMENTS OF THE TUBE, STORED (TIME CONTROLLABLE FROM MICROSECONDS TO MINUTES), AND THEN EXTRACTED AT A RATE THE SAME OR DIFFERENT FROM THE WRITING RATE.	
C0003	6499	RCA JAN	\$100	ANALOG RANDOM ACCESS MEMORY TUBE NOS "RADECHON" (data at www.magnetosphere.net/radechon.zip)	4	CHARGE STORAGE TUBE OF BARRIER-GRID, SINGLE BEAM TYPE INTENDED FOR INFORMATION-PROCESSING SYSTEMS. NON-EQUILIBRIUM WRITING AND CAPACITANCE-DISCHARGED READING. ELECTRON GUN IS OF THE ELECTROSTATIC FOCUS AND DEFLECTION TYPE. BASE ON LARGE END OF TUBE IS SMALL BUTTON TWENTYNINAR 8-PIN. BASE ON SMALL END IS SMALL-SHELL DI-HEPTAL 14-PIN. MAX LENGTH 12 7/32", MAX DIAM 3.35", MAX HIGH VOLTAGE 1500 VOLTS. INFORMATION IN DIGITAL OR ANALOG FORM MAY BE INTRODUCED TO THE ACTIVE ELEMENTS OF THE TUBE, STORED (TIME CONTROLLABLE FROM MICROSECONDS TO MINUTES), AND THEN EXTRACTED AT A RATE THE SAME OR DIFFERENT FROM THE WRITING RATE.	 SOLID-LINE CIRCLES DEPICT DIHEPTAL BASE BROKEN-LINE CIRCLES DEPICT TWENTYNINAR BASE 6499
C0004	6499	RCA JAN	\$100	ANALOG RANDOM ACCESS MEMORY TUBE NOS "RADECHON" (data at www.magnetosphere.net/radechon.zip)	4	CHARGE STORAGE TUBE OF BARRIER-GRID, SINGLE BEAM TYPE INTENDED FOR INFORMATION-PROCESSING SYSTEMS. NON-EQUILIBRIUM WRITING AND CAPACITANCE-DISCHARGED READING. ELECTRON GUN IS OF THE ELECTROSTATIC FOCUS AND DEFLECTION TYPE. BASE ON LARGE END OF TUBE IS SMALL BUTTON TWENTYNINAR 8-PIN. BASE ON SMALL END IS SMALL-SHELL DI-HEPTAL 14-PIN. MAX LENGTH 12 7/32", MAX DIAM 3.35", MAX HIGH VOLTAGE 1500 VOLTS. INFORMATION IN DIGITAL OR ANALOG FORM MAY BE INTRODUCED TO THE ACTIVE ELEMENTS OF THE TUBE, STORED (TIME CONTROLLABLE FROM MICROSECONDS TO MINUTES), AND THEN EXTRACTED AT A RATE THE SAME OR DIFFERENT FROM THE WRITING RATE.	 Schematic Arrangement of Type 6499
C0006	?		\$25	MILITARY POTTED RECTANGULAR	6	POTTED AND RUGGEDIZED 3SP1-LIKE	
C0007	?		\$30	5" P7 INSTALLED IN SHIELD W/GRATICULE AND BEZEL FOR PANADAPTER	8	GRATICULE IS NOT SO PRETTY	

C0008	10SP4	RAYTHEON	\$50	TESTED	LAB CRATES	10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE	
0010	10SP4	SYL	\$50		STORAGE	NOS 10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE	SYLVANIA TYPE 10SP4 SPECIAL PURPOSE TUBE 10" Direct Viewed Round Glass Type Spherical Faceplate Gray Filter Glass Aluminized Screen Magnetic Deflection No Ion Trap Acceleration Type Electrostatic Focus 
C0013	10SP4		\$100		STORAGE	10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE NOS	
C0014	10SP4		\$100		STORAGE	10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE NOS	
C0015	10SP4		\$100		STORAGE	10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE NOS	
C0016	10SP4		\$100		STORAGE	10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE NOS	
C0017	10SP4		\$100		STORAGE	10" ROUND MAGNETIC DEFLECTION ELECTROSTATIC FOCUS FAA TYPE NOS	
C0019	10UP14B		\$300		STORAGE	HIGH RESOLUTION ELECTROSTATIC FOCUS, ELECTROMAGNETIC DEFLECTION, ALUMINIZED, 50 DEGREE, BLUE-ORANGE. 10-12KV PDA	

						SPECIAL PURPOSE TUBE 10" Round Glass Type Spherical Faceplate Clear Glass Aluminized Screen Magnetic Deflection Magnetic Focus External Conductive Coating  SPECIAL PURPOSE TUBE 10" Round Glass Type Spherical Faceplate Clear Glass Aluminized Screen Magnetic Deflection Magnetic Focus External Conductive Coating 	
C0020	10VP15	RAYTHEON	\$200		STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0021	10VP15		\$200		STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0022	10VP15		\$200		STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
						SPECIAL PURPOSE TUBE 10" Round Glass Type Spherical Faceplate Clear Glass Aluminized Screen Magnetic Deflection Magnetic Focus External Conductive Coating  SPECIAL PURPOSE TUBE 10" Round Glass Type Spherical Faceplate Clear Glass Aluminized Screen Magnetic Deflection Magnetic Focus External Conductive Coating 	
C0023	10VP47	RAYTHEON OR EQUIV.	\$200	FAA 10VP47M	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0024	10VP47	RAYTHEON OR EQUIV.	\$200	FAA 10VP47M	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0025	10VP47	RAYTHEON OR EQUIV.	\$200	FAA 10VP47M	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0026	10VP47	RAYTHEON OR EQUIV.	\$200	FAA 10VP47M	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0027	10VP47	RAYTHEON OR EQUIV.	\$100	FAA 10VP47M	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0028	10VP47M		\$100	10VP47	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	
C0029	10VP47M		\$100	10VP47	STORAGE	10" ROUND MAGNETIC DEFLECTION MAGNETIC FOCUS FAA TYPE NOS	

C0030	1355-023	GEC	\$20	06433, 5960-00-229-5120, DOT-FA76AC-6408	STORAGE	NOS VIDICON, APPX 1" RING DIA. APPX 3/4" TARGET DIA. COMMON PHYSICAL TYPE. (APPEARANCE SIMILAR TO IMAGE)
C0031	151-0613-00	TEK TEKTRONIX	\$25		STORAGE	NOS POSSIBLY A 154-0603-00, (NEED TO CHECK THE BOX AND TUBE) FOR 561A, 567, 568, P31
C0032	154-0081-00	TEK TEKTRONIX	\$25	FOR 531, 535, RM31, RM35	STORAGE	5BGP2/T51P2A
C0033	154-0105-00	TEK TEKTRONIX	\$25	FOR 517A, T517P11H/T54P11H	STORAGE	
C0034	154-0175-00	TEK TEKTRONIX	\$25	T5430-2	STORAGE	5"
C0035	154-0175-00	TEK TEKTRONIX	\$25	T5430-3	STORAGE	5"
C0036	154-0265-00	TEK TEKTRONIX	\$25	TEKTRONIX 503, 504. P2, NO GRATICULE	STORAGE	
C0037	154-0303-00	TEK TEKTRONIX	\$25		STORAGE	
C0038	154-0345-00	TEK TEKTRONIX	\$25	T3160 T3161	STORAGE	
C0039	154-0433-00	TEK TEKTRONIX	\$25	T3211-31 321A	STORAGE	
C0041	154-0448-00	TEK TEKTRONIX	\$25	USED, P31, FOR R647, R647A, 647A	STORAGE	
C0042	154-04718-00	TEK TEKTRONIX	\$25		STORAGE	
C0043	154-0477-02	TEK TEKTRONIX	\$25		5	
C0046	154-0500-00	TEK TEKTRONIX	\$25	P31 FOR TYPE 556	STORAGE	
C0048	154-0525-10	TEK TEKTRONIX	\$25	FOR TEKTRONIX 528 TV WAVEFORM SCOPES	STORAGE	NOS RECTANGULAR
C0049	154-0525-10	TEK TEKTRONIX	\$25	FOR TEKTRONIX 528 TV WAVEFORM SCOPES	STORAGE	RECTANGULAR
C0050	154-0608-09	TEK TEKTRONIX	\$25		STORAGE	APPX. 3X4 RECTANGULAR WITH HV LEAD. USED.
C0051	154-0609-00	TEK TEKTRONIX	\$25	FOR TEKTRONIX 7704 SCOPE, P31	STORAGE	



C0052	154-0635-00	TEK TEKTRONIX	\$25	RECTANGULAR DUAL BEAM CRT, FOR TEKTRONIX D13/5113	STORAGE	
C0053	154-0636-12	TEK TEKTRONIX	\$25	STORAGE CRT FOR D13/5113	STORAGE	
C0054	154-0640-10	TEK TEKTRONIX	\$25	FOR 7403, 7603, P31, NOS	STORAGE	
C0055	154-0658-00	TEK TEKTRONIX	\$25	RM545	STORAGE	
C0056	154-0666-10	TEK TEKTRONIX	\$25	TEKTRONIX 434 (STORAGE) STANDARD/P31	5	
C0057	154-0670-10	TEK TEKTRONIX	\$25	STORAGE CRT FOR LATER SERIAL NUMBER 7613'S AND 5441'S WITH OPTION 5; FOR 7613, R7613	STORAGE	
C0058	154-0672-04	TEK TEKTRONIX	\$25	USED. FOR 7403N, 7603 AND AN-USM- 281C. RECTANGULAR	STORAGE	
C0059	154-0713-04	TEK TEKTRONIX	\$25	P11 FOR 7844 DUAL BEAM SCOPE	STORAGE	
C0061	154-0737-00	TEK TEKTRONIX	\$40	FOR 564B/R564B NOS 8X10 GRATICULE	STORAGE	NOS RECTANGULAR WITH GRATICULE
C0063	154-0758-00	TEK TEKTRONIX	\$40	TYPE 46-7, P31 5" ROUND, FLAT SCREEN, NO GRATICULE, HIGH BRIGHTNESS UPGRADE	STORAGE	FOR 541, 543, 545
C0064	154-0758-00	TEK TEKTRONIX	\$40	TYPE 46-7, P31 5" ROUND, FLAT SCREEN, NO GRATICULE, HIGH BRIGHTNESS UPGRADE	STORAGE	FOR 541, 543, 545
C0068	154-0968-00	TEK TEKTRONIX	\$25	TDS320, TDS350, TDS360, TDS380, TDS420, TDS420A, TDS460, TDS520A, TDS524A, TDS540, TDS544A, TDS620B, TDS640B, TDS644B, TDS680B, TDS684B, TDS744A, TDS784A, TDS754A, TDS784B	STORAGE	SPECIAL CRT-TO-CAMERA - TUBE DEVICE
C0073	317-13045	TEKTRONIX	\$25	T317-P1 FOR TEKTRONIX TYPES 317 (AN/USM-154)	7	P1 PHOSPHOR

C0074

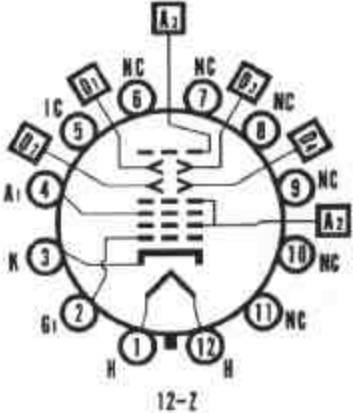
3ADP7

\$50

4

3" Direct Viewed
Round Glass Type
Flat, Clear Faceplate
Close Tolerances

Electrostatic Focus
Electrostatic Deflection
Post Deflection Acceleration



C0075

3ADP7

\$50

8

TYPICAL OPERATING CONDITIONS

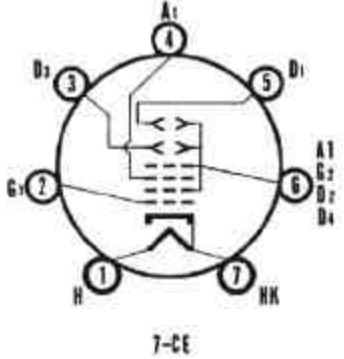
Anode No. 3 Voltage.....	4000 Volts
Anode No. 2 Voltage.....	2000 Volts
Anode No. 1 Voltage for Focus.....	320 to 470 Volts
Grid No. 1 Voltage Required for Cutoff ¹	-52 to -87 Volts
Deflection Factor	
Deflecting Plates 1-2.....	140 to 160 Volts d c/inch
Deflecting Plates 3-4.....	51 to 70 Volts d c/inch
Modulation @ Ib3 = 25 μ a ¹	38 Volts d c Max.
Line Width "A" @ Ib3 = 25 μ a ¹	.014 Inches Max.
Light Output @ Ib3 = 25 μ a ¹	
3ADP1 ¹	20 Ft. L. Min.
3ADP11 ¹	14 Ft. L. Min.
Deflection Factor Uniformity ²	2 Percent Max.
Pattern Distortion.....	2 Percent Max.
Undelected Spot Position ²	Within a 10 mm Square
Useful Scan	
D1-D2.....	$\pm$ 1.315 Inches From Tube Face Center or a Total 2.63 Inches Min.
D3-D4.....	$\pm$ 0.75 Inches From Tube Face Center or a Total 1.5 Inches Min.

CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance ³	1.0 Megohms Max.

3" Direct Viewed
Round Glass Type

Electrostatic Deflection
Electrostatic Focus



C0076

3AP1

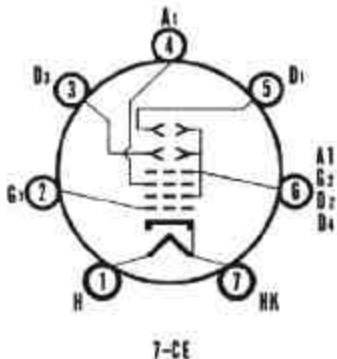
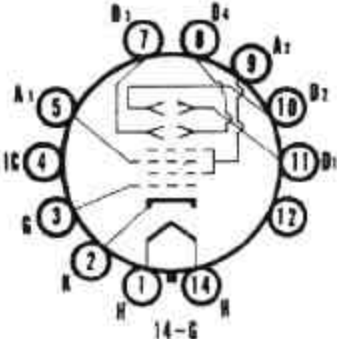
SYLVANIA

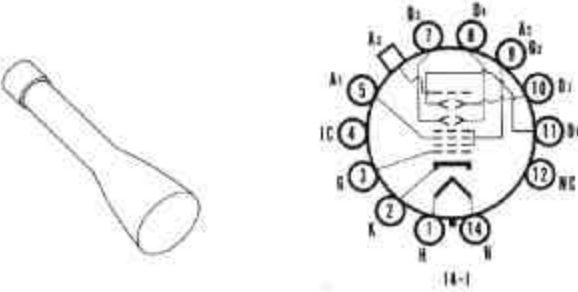
\$30

JAN 3AP1 HEATER 2.5V @ 2.1A

LAB CRATES

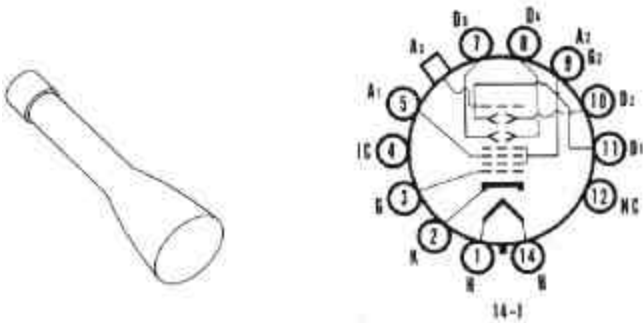
3" DIA. 11.5"L, 800-1500V, RMA BASING 7CE
MEDIUM SHELL 7 PIN

C0077	3AP1	SYLVANIA	\$30	JAN 3AP1 HEATER 2.5V @ 2.1A	STORAGE	3" DIA. 11.5"L, 800-1500V, RMA BASING 7CE MEDIUM SHELL 7 PIN	3" Direct Viewed Round Glass Type  Electrostatic Deflection Electrostatic Focus 
C0078	3AP1A		\$30	HEATER 2.5V @ 2.1A	2	3" DIA. 11.5"L, 800-1500V, RMA BASING 7CE MEDIUM SHELL 7 PIN	
C0079	3AP1A		\$30	HEATER 2.5V @ 2.1A	4	3" DIA. 11.5"L, 800-1500V, RMA BASING 7CE MEDIUM SHELL 7 PIN	
C0080	3AP1A		\$30	HEATER 2.5V @ 2.1A	8	3" DIA. 11.5"L, 800-1500V, RMA BASING 7CE MEDIUM SHELL 7 PIN	
							3" Direct Viewed Round Glass Type  Electrostatic Deflection Electrostatic Focus 
C0081	3BP1	NATIONAL UNION	\$50	JAN	LAB CRATES	NOS	
C0082	3BP1	PHILIPS	\$50		STORAGE	NOS	
C0083	3BP1	RCA	\$50	JAN	LAB CRATES	NOS	
C0084	3BP1	RCA	\$50	JAN	LAB CRATES	NOS	
C0085	3BP1	RCA	\$50	JAN	LAB CRATES	NOS	
C0086	3BP1	RCA	\$50	JAN	LAB CRATES	NOS	
C0087	3BP1		\$30			2	
C0088	3BP1		\$30			3	
C0089	3BP1		\$30			6	
C0090	3BP1A		\$30			2	

C0091	3DP1A	\$50	FRONT ELECTRODE WILL EXPAND OR CONTRACT A CIRCLE IMAGED ON THE CRT FACE. CAN BE USED AS A SIMPLE ELECTROSCOPE OR AN ULTRA HIGH IMPEDANCE VOLTAGE SENSOR. WILL DETECT SMALL CHARGES SUCH AS STATIC ELECTRICITY.	3	3" ELECTROSTATIC CRT. WITH FRONT ELECTRODE AND PAINTED GRATICULE, FOR AIRBORNE RADAR SYSTEM. FSN NSN FED STOCK NUMBER: 5960-00-170-4578 AND 65P215385. 14 PIN DIHEPTAL BASE. NO SCALE ON THESE. SCALE IS ADDED WHEN INSTALLED.	
C0092	3DP1A	\$50	FRONT ELECTRODE WILL EXPAND OR CONTRACT A CIRCLE IMAGED ON THE CRT FACE. CAN BE USED AS A SIMPLE ELECTROSCOPE OR AN ULTRA HIGH IMPEDANCE VOLTAGE SENSOR. WILL DETECT SMALL CHARGES SUCH AS STATIC ELECTRICITY.	3	3" ELECTROSTATIC CRT. WITH FRONT ELECTRODE AND PAINTED GRATICULE, FOR AIRBORNE RADAR SYSTEM. FSN NSN FED STOCK NUMBER: 5960-00-170-4578 AND 65P215385. 14 PIN DIHEPTAL BASE . NO SCALE ON THESE. SCALE IS ADDED WHEN INSTALLED.	
C0093	3GP1	\$30	ANODE NO. 2 VOLTAGE 1500 V ANODE NO. 1 VOLTAGE 350 V GRID NO. 1 CUTOFF -50 V DEFLECTING PLATES NO. 1 & 2 120 V/IN DEFLECTING PLATES NO. 3 & 4 106 V/IN	3	1000-1500V	
C0094	3JP1	\$30		3		3" Direct Viewed Round Glass Type Post Deflection Accelerator Electrostatic Deflection Electrostatic Focus 

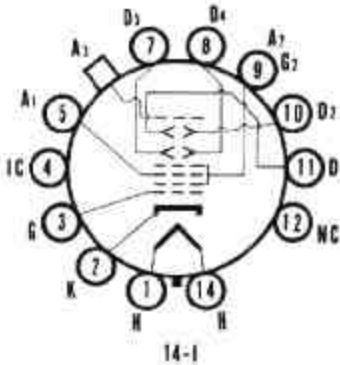
					MAXIMUM RATINGS (Absolute Maximum Values)	
					Anode No. 3 Voltage.....	4400 Volts d c
					Anode No. 2 Voltage.....	2200 Volts d c
					Anode No. 1 Voltage.....	1100 Volts d c
					Grid No. 1 Voltage.....	
					Negative Bias Value.....	220 Volts d c
					Positive Bias Value.....	0 Volts d c
					Positive Peak Value.....	2 Volts
					Peak Heater-Cathode Voltage.....	
					Heater Negative with Respect to Cathode.....	140 Volts
					Heater Positive with Respect to Cathode.....	140 Volts
					Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	550 Volts
					TYPICAL OPERATING CONDITIONS	
					Anode No. 3 Voltage ²	3000 Volts d c
					Anode No. 2 Voltage ³	1500 Volts d c
					Anode No. 1 Voltage.....	300 to 515 Volts d c
					Grid No. 1 Voltage Required for Cutoff ⁴	-22.5 to 57.5 Volts d c
					Deflection Factor ^{5a}	
					Deflecting Plates 1-2 ⁷	127-173 Volts d c/Inch
					Deflecting Plates 3-4 ⁸	94-128 Volts d c/Inch
C0095	3JP1		\$30	6		

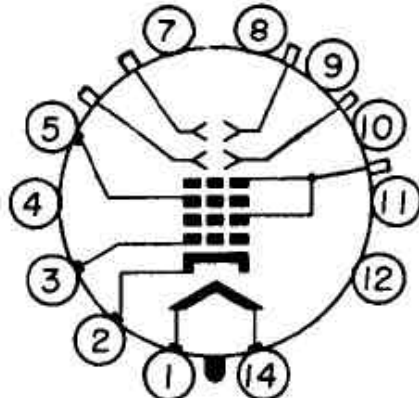
3" Direct Viewed
Round Glass Type
Electrostatic Deflection
Electrostatic Focus
Post Deflection Accelerator

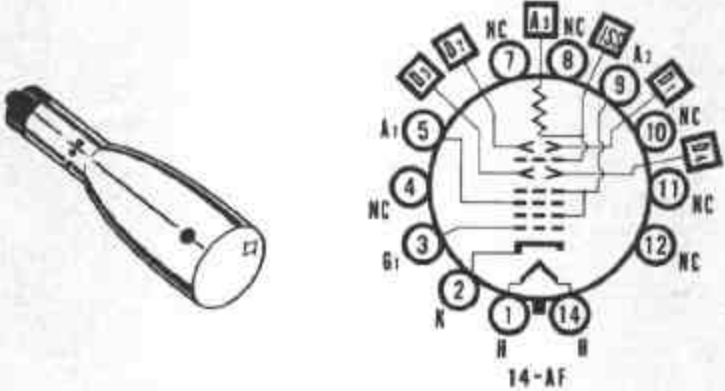


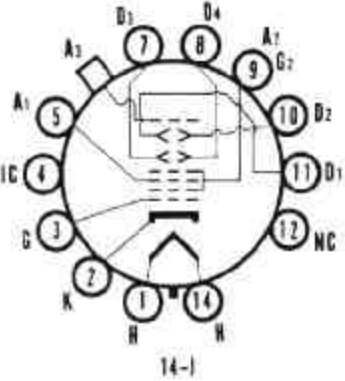
C0096	3JP1A		\$35	7		
					MAXIMUM RATINGS (Absolute Maximum Values)	
					Anode No. 3 Voltage.....	4400 Volts d c
					Anode No. 2 Voltage.....	2200 Volts d c
					Anode No. 1 Voltage.....	1100 Volts d c
					Grid No. 1 Voltage.....	
					Negative Bias Value.....	220 Volts d c
					Positive Bias Value.....	0 Volts d c
					Positive Peak Value.....	2 Volts
					Peak Heater-Cathode Voltage.....	
					Heater Negative with Respect to Cathode.....	140 Volts
					Heater Positive with Respect to Cathode.....	140 Volts
					Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	550 Volts
					TYPICAL OPERATING CONDITIONS	
					Anode No. 3 Voltage ²	3000 Volts d c
					Anode No. 2 Voltage ³	1500 Volts d c
					Anode No. 1 Voltage.....	300 to 515 Volts d c
					Grid No. 1 Voltage Required for Cutoff ⁴	-22.5 to 57.5 Volts d c
					Deflection Factor ^{5a}	
					Deflecting Plates 1-2 ⁷	127-173 Volts d c/Inch
					Deflecting Plates 3-4 ⁸	94-128 Volts d c/Inch
C0097	3JP7	DUMONT	\$50	MIL	LAB CRATES	W/ DC-4 SILICON INSIDE TUBE FOR HIGH ALTITUDE OPERATION
C0097A	3JP7		\$30	MIL	LAB CRATES	

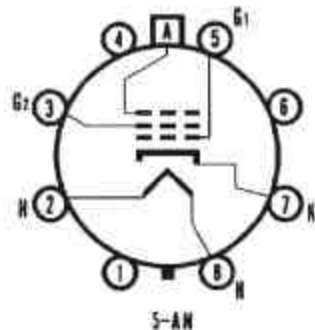
							
C0103	4MP1	DUMONT	\$60	PDA 6.6KV MAX / 4KV TYP	STORAGE	NOS SQUARE 4" DIAG. SCREEN HIGH SPEED	
C0104	4MP1	ETC	\$40	PDA 6.6KV MAX / 4KV TYP	LAB CRATES	SQUARE 4X4" WITH PDA	
C0105	4MP1		\$60	PDA 6.6KV MAX / 4KV TYP	3	NOS SQUARE 4" DIAG. SCREEN HIGH SPEED	
C0106	5083-0552	HP	\$20		STORAGE	NOS BUT MAY HAVE SOME AGE RELATED BALSAM SEPARATION AROUND OUTER 1/4" OF FACE. THIS WOULD NOT BE A PROBLEM FOR MOST USES. 5". INTERNAL GRATICULE.	
C0107	5083-0552	HP	\$20		STORAGE	NOS BUT MAY HAVE SOME AGE RELATED BALSAM SEPARATION AROUND OUTER 1/4" OF FACE. THIS WOULD NOT BE A PROBLEM FOR MOST USES. 5". INTERNAL GRATICULE.	
C0108	5083-0552	HP	\$20		STORAGE	NOS BUT MAY HAVE SOME AGE RELATED BALSAM SEPARATION AROUND OUTER 1/4" OF FACE. THIS WOULD NOT BE A PROBLEM FOR MOST USES. 5". INTERNAL GRATICULE.	
C0109	5083-0552	HP	\$20		STORAGE	NOS BUT MAY HAVE SOME AGE RELATED BALSAM SEPARATION AROUND OUTER 1/4" OF FACE. THIS WOULD NOT BE A PROBLEM FOR MOST USES. 5". INTERNAL GRATICULE.	
C0110	5083-3552	HP	\$20	FOR H/P 1740A SCOPE	1	P31 PHOSPHOR, GREEN, MED. SHORT	
C0111	5083-9083	HP	\$20		STORAGE	GOOD CRT FOR HP 180. A FEW VERY SMALL BUBBLES IN FACE, OTHERWISE SEEMS FINE.	
C0112	5820A	RCA	\$25	OLD COLOR TV STUDIO CAMERA TUBE	5	CAMERA TUBE (IMAGE IS OF SIMILAR APEARANCE, BUT TUBE IS IN A BOX) SEE ALSO 5820	
C0113	5820A	RCA	\$25	OLD COLOR TV STUDIO CAMERA TUBE	5	CAMERA TUBE (IMAGE IS OF SIMILAR APEARANCE, BUT TUBE IS IN A BOX) SEE ALSO 5820	
C0114	5820A	RCA	\$25	OLD COLOR TV STUDIO CAMERA TUBE	5	CAMERA TUBE (IMAGE IS OF SIMILAR APEARANCE, BUT TUBE IS IN A BOX) SEE ALSO 5820	

						5" Direct Viewed Round Glass Type Flat Faceplate	Clear Faceplate Electrostatic Focus Electrostatic Deflection
							
C0116	5ADP1	RCA EQUIV	\$30	7	PDA 0-6KV		
						MAXIMUM RATINGS (Absolute Maximum Values) Anode No. 3 Voltage..... 6600 Volts d c Anode No. 2 Voltage ² 2860 Volts d c Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage..... 2.3:1 Anode No. 1 (Focus Electrode) Voltage..... 1100 Volts d c Grid No. 1 Voltage..... Negative Bias Value..... 220 Volts d c Positive Bias Value..... 0 Volts d c Positive Peak Value..... 2 Volts Peak Heater-Cathode Voltage..... Heater Negative with Respect to Cathode..... 140 Volts d c Heater Positive with Respect to Cathode..... 140 Volts d c Peak Voltage Between Anode No. 2 and Any Deflection Plate..... 550 Volts	
						TYPICAL OPERATING CONDITIONS Anode No. 3 Voltage ³ 3000 Volts d c Anode No. 2 Voltage ⁴ 1500 Volts d c Anode No. 1 Voltage for Focus..... 300 to 515 Volts d c Grid No. 1 Voltage Required for Cutoff ⁵ -39 to -65 Volts d c Deflection Factor ⁶ Deflecting Plates 1-2 ⁷ 40 to 54 Volts d c/Inch Deflecting Plates 3-4 ⁸ 27 to 36 Volts d c/Inch	
C0117	5ADP2	RCA EQUIV	\$50	4	PDA 0-6KV		
C0118	5ADP2	RCA EQUIV	\$50	7	PDA 0-6KV		
C0119	5ADP31	RCA EQUIV	\$55	4	PDA 0-6KV	W / SHIELD	
C0120	5ADP7	?	\$50	LAB CRATES	IN SHIELD WITH LIGHTED BEZEL AND ORANGE GRATICULE FOR SPECTRUM DISPLAY IN dB. ORANGE LEXAN GRATICULE NEEDS A BIT OF POLISHING..		
C0121	5ADP7	DUMONT FAIRCHILD	\$50	STORAGE			

C0122	5AMP2	HP	\$50	5083-0120, 6KV MAX. PDA VOLTS	8	DEFL PLATE AND PDA ON NECK, HIGH PRECISION 4-6KV																															
C0122A	5AHP4A	JAN	\$100	JAN CHS 5AHP4A NOS	LAB CRATES	NOS 5" Round Television type. MAG DEFLECTION, ELECTROSTATIC FOCUS, 6.3V HEATER, 53DEG DEFLECTION ANGLE, 8EF BASE, 10KV PDA MAX, 5-7KV TYP, 0-250V FOCUS, 300V G2, EXTREMELY SMALL 0.009" FOCUSED SPOT.																															
C0123	5AMP2	RAYTHEON	\$50	6KV MAX. PDA VOLTS	STORAGE	DEFL PLATE AND PDA ON NECK, HIGH PRECISION HIGH BANDWIDTH 4-6KV PDA VOLTAGE.	<table><tr><td>Heater Voltage</td><td>6.3 volts</td></tr><tr><td>Anode Voltage</td><td>2500 volts DC</td></tr><tr><td>Focusing Voltage</td><td>0 to 300 volts DC</td></tr><tr><td>Grid #1 Voltage (Note 2)</td><td>-34 to -56 volts DC</td></tr><tr><td>Deflection Factors</td><td></td></tr><tr><td> D1-D2</td><td>40 to 50 volts DC /inch</td></tr><tr><td> D3-D4</td><td>20 to 25 volts DC/inch</td></tr><tr><td>P1 Light Output (Note 3)</td><td>15 Fr. L Min.</td></tr><tr><td>Modulation (Note 3)</td><td>45 Max. volts DC</td></tr><tr><td>Line Width A (Note 3)</td><td>0.032 Inch Max.</td></tr><tr><td>Anode Current (Note 3)</td><td>800 Microamperes DC Max.</td></tr><tr><td>Useful Scan</td><td></td></tr><tr><td> D1-D2</td><td>4.00 (±2.00 min. from tube face center) inches</td></tr><tr><td> D3-D4</td><td>2.50 (±1.25 min. from tube face center) inches</td></tr><tr><td>Spot Position (Note 7)</td><td>Within a 5/16 inch radius circle</td></tr></table>	Heater Voltage	6.3 volts	Anode Voltage	2500 volts DC	Focusing Voltage	0 to 300 volts DC	Grid #1 Voltage (Note 2)	-34 to -56 volts DC	Deflection Factors		D1-D2	40 to 50 volts DC /inch	D3-D4	20 to 25 volts DC/inch	P1 Light Output (Note 3)	15 Fr. L Min.	Modulation (Note 3)	45 Max. volts DC	Line Width A (Note 3)	0.032 Inch Max.	Anode Current (Note 3)	800 Microamperes DC Max.	Useful Scan		D1-D2	4.00 (±2.00 min. from tube face center) inches	D3-D4	2.50 (±1.25 min. from tube face center) inches	Spot Position (Note 7)	Within a 5/16 inch radius circle
Heater Voltage	6.3 volts																																				
Anode Voltage	2500 volts DC																																				
Focusing Voltage	0 to 300 volts DC																																				
Grid #1 Voltage (Note 2)	-34 to -56 volts DC																																				
Deflection Factors																																					
D1-D2	40 to 50 volts DC /inch																																				
D3-D4	20 to 25 volts DC/inch																																				
P1 Light Output (Note 3)	15 Fr. L Min.																																				
Modulation (Note 3)	45 Max. volts DC																																				
Line Width A (Note 3)	0.032 Inch Max.																																				
Anode Current (Note 3)	800 Microamperes DC Max.																																				
Useful Scan																																					
D1-D2	4.00 (±2.00 min. from tube face center) inches																																				
D3-D4	2.50 (±1.25 min. from tube face center) inches																																				
Spot Position (Note 7)	Within a 5/16 inch radius circle																																				
C0124	5AMP2A	ETC	\$55		STORAGE	DEFL PLATE AND PDA ON NECK, HIGH PRECISION 4-6KV																															

					5" Direct Viewed Flat Faceplate Round Glass Type Electrostatic Deflection Helical Resistor Post Deflection Acceleration Electrostatic Focus High Deflection Sensitivity High Deflection Accuracy Aluminized Screen Deflection Acceleration 	
C0127	5AQP31	HP	\$50	STORAGE	DEFL PLATE AND PDA ON NECK, HIGH PRECISION 2.5-4KV	MAXIMUM RATINGS (Absolute Maximum Values) Anode No. 2 Input..... 5 Watts Max. Anode No. 3 Voltage..... 13,200 Volts d c Isolation Shield Voltage..... 2300 Volts d c Anode No. 2 Voltage..... 2200 Volts d c Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage..... 6 : 1 Maximum Anode No. 1 (Focus Electrode) Voltage..... 880 Volts d c Grid No. 1 Voltage Negative Bias Value..... 220 Volts d c Positive Bias Value..... 0 Volts d c Positive Peak Plate..... 2 Volts Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode During Warm-up Period Not to Exceed 15 Seconds..... 200 Volts After Equipment Warm-up Period..... 140 Volts Heater Positive with Respect to Cathode..... 140 Volts Peak Voltage Between Anode No. 2 and Any Deflection Plate..... 550 Volts TYPICAL OPERATING CONDITIONS Anode No. 3 Voltage¹..... 10,000 Volts d c Isolation Shield Voltage²..... 1575 to 1700 Volts d c Anode No. 2 Voltage³..... 1670 Volts d c Anode No. 1 Voltage for Focus..... 180 to 590 Volts d c Grid No. 1 Voltage Required for Cutoff⁴..... -50 to -80 Volts d c Deflection Factor⁵ Deflection Plates 1-2..... 70 to 86 Volts d c/Inch Deflection Plates 3-4..... 28.4 to 34.6 Volts d c/Inch Pattern Distortion at 100% Useful Scan..... 1 Percent Max. Undelected Spot Position⁷ (Deviation from Center)..... 5 MM. Max. Useful Scan D1-D2..... 10 cm. D3-D4..... 6 cm. CIRCUIT VALUES Grid No. 1 Circuit Resistance..... 1.5 Megohms Max.
C0130	5BHP2	TEKTRONIX	\$50		5BHP1/T54P1 - 154-0106-00 5BHP2/T54P2 - 154-0098-00 5BHP7/T54P7 - 154-0104-00	
C0131	5BTP7	MAGNAVOX	\$50	STORAGE	5" ELECTROSTATIC CRT. PDA TYPE, SHORT TUBE, 12 INCHES LONG	
C0132	5CBP2A	TEKTRONIX	SOLD		5CBP1/T55P1 - 154-0125-00 5CBP2/T55P2 - 154-0120-00 5CBP7/T55P7 - 154-0126-00 5CBP11/T55P11 - 154-0127-00 5CBP16/T55P16 - 154-0161-00 5CBP24/T55P24 - 154-0177-00	REFERENCE ENTRY ONLY

					5" Direct Viewed Round Glass Type Electrostatic Deflection		Electrostatic Focus: Post Deflection Accelerator Clear Faceplate	
								
C0134	5CP1	ATL INC	\$30	JAN 5CP1	LAB	2-4KV PDA	MAXIMUM RATINGS (Absolute Maximum Values) Anode No. 3 Voltage: 4400 Volts d c Anode No. 2 Voltage: 2200 Volts d c Anode No. 1 Voltage: 1100 Volts d c Grid No. 1 Voltage: Negative Bias Value: 220 Volts d c Positive Bias Value: 0 Volts d c Positive Peak Value: 2 Volts Peak Heater Cathode Voltage: Heater Negative with Respect to Cathode: 140 Volts Heater Positive with Respect to Cathode: 140 Volts Peak Voltage Between Anode No. 2 And Any Deflecting Plate: 550 Volts TYPICAL OPERATING CONDITIONS Anode No. 3 Voltage: 4000 Volts d c Anode No. 2 Voltage: 2000 Volts d c Anode No. 1 Voltage: 375 to 690 Volts d c Grid No. 1 Voltage Required for Cutoff: -30 to -90 Volts d c Deflection Factor: Vertical Plates²: 92 Volts d c/Inch Horizontal Plates²: 78 Volts d c/Inch CIRCUIT VALUES Grid No. 1 Circuit Resistance: 1.5 Megohms Max. Deflection Circuit Resistance: 5.0 Megohms Max.	
C0135	5CP11A	SYLVANIA	\$50		STORAGE			
C0136	5CP1A	DUMONT EQUIV	\$35		3	2-4KV PDA		
C0137	5CP1A	DUMONT EQUIV	\$35		7	2-4KV PDA		
C0138	5CP1A	DUMONT EQUIV	\$35		7	2-4KV PDA		
C0139	5CP1A	RCA	\$50	JAN	LAB CRATES	NOS 2-4KV PDA		
C0140	5CP1A	RCA	\$50		LAB	NOS 2-4KV PDA		
C0141	5CP1A	RCA	\$35		STORAGE	2-4KV PDA		
C0142	5CP1A		\$35		STORAGE	USED 2-4KV PDA		
C0143	5CP1A		\$35		STORAGE	2-4KV PDA		

C0144	5DEP1	WESTINGHOUSE	\$75	SPECIAL FOR FRIDEN EC-130 CALCULATOR	LAB CRATES	USED IN THE FRIDEN EC-130 ELECTRONIC CALCULATOR, MACHINE IS QUITE RARE NOW. IN REMOVABLE SHIELD AS SHOWN. (NO CALCULATOR, CRT AND SHIELD ONLY)																																																																																	
C0145	5FP11	SYLVANIA EQUIV	\$100	BLUE MED/SHORT	4		5" Direct Viewed Round Glass Type  Magnetic Deflection Magnetic Focus 																																																																																
C0146	5FP14	SYLVANIA EQUIV	\$100	VIOLET SHORT / ORANGE LONG	3		<table><tr><th colspan="4">MAXIMUM RATINGS (Absolute Maximum Values)</th></tr><tr><th></th><th>5FP4A</th><th>5FP7A 5FP11A 5FP14A</th><th></th></tr><tr><td>Anode Voltage¹</td><td>8800</td><td>8800 Volts d c</td><td></td></tr><tr><td>Grid No. 2 Voltage</td><td>450</td><td>770 Volts d c</td><td></td></tr><tr><td>Grid No. 1 Voltage</td><td></td><td></td><td></td></tr><tr><td> Negative Bias Value</td><td>140</td><td>200 Volts d c</td><td></td></tr><tr><td> Positive Bias Value</td><td>0</td><td>0 Volts d c</td><td></td></tr><tr><td> Positive Peak Value</td><td>2</td><td>2 Volts</td><td></td></tr><tr><td>Peak Heater-Cathode Voltage</td><td></td><td></td><td></td></tr><tr><td> Heater Negative with Respect to Cathode</td><td>165</td><td>200 Volts</td><td></td></tr><tr><td> Heater Positive with Respect to Cathode</td><td>165</td><td>200 Volts</td><td></td></tr><tr><th colspan="4">TYPICAL OPERATING CONDITIONS</th></tr><tr><th></th><th>5FP4A</th><th>5FP7A 5FP11A 5FP14A</th><th></th></tr><tr><td>Anode Voltage²</td><td>6,000</td><td>4,000 Volts d c</td><td></td></tr><tr><td>Grid No. 2 Voltage</td><td>250</td><td>250 Volts d c</td><td></td></tr><tr><td>Grid No. 1 Voltage³</td><td>-25 to -70</td><td>-25 to -70 Volts d c</td><td></td></tr><tr><td>Focusing Coil Current (approx.)^{4,5}</td><td>120 ± 15%</td><td>96 ± 15% Ma d c</td><td></td></tr><tr><td>Spot Position (Undelected)⁵</td><td></td><td>9 mm</td><td></td></tr><tr><th colspan="4">CIRCUIT VALUES</th></tr><tr><td>Grid No. 1 Circuit Resistance</td><td></td><td>1.5 Megohms Max.</td><td></td></tr></table>	MAXIMUM RATINGS (Absolute Maximum Values)					5FP4A	5FP7A 5FP11A 5FP14A		Anode Voltage ¹	8800	8800 Volts d c		Grid No. 2 Voltage	450	770 Volts d c		Grid No. 1 Voltage				Negative Bias Value	140	200 Volts d c		Positive Bias Value	0	0 Volts d c		Positive Peak Value	2	2 Volts		Peak Heater-Cathode Voltage				Heater Negative with Respect to Cathode	165	200 Volts		Heater Positive with Respect to Cathode	165	200 Volts		TYPICAL OPERATING CONDITIONS					5FP4A	5FP7A 5FP11A 5FP14A		Anode Voltage ²	6,000	4,000 Volts d c		Grid No. 2 Voltage	250	250 Volts d c		Grid No. 1 Voltage ³	-25 to -70	-25 to -70 Volts d c		Focusing Coil Current (approx.) ^{4,5}	120 ± 15%	96 ± 15% Ma d c		Spot Position (Undelected) ⁵		9 mm		CIRCUIT VALUES				Grid No. 1 Circuit Resistance		1.5 Megohms Max.	
MAXIMUM RATINGS (Absolute Maximum Values)																																																																																							
	5FP4A	5FP7A 5FP11A 5FP14A																																																																																					
Anode Voltage ¹	8800	8800 Volts d c																																																																																					
Grid No. 2 Voltage	450	770 Volts d c																																																																																					
Grid No. 1 Voltage																																																																																							
Negative Bias Value	140	200 Volts d c																																																																																					
Positive Bias Value	0	0 Volts d c																																																																																					
Positive Peak Value	2	2 Volts																																																																																					
Peak Heater-Cathode Voltage																																																																																							
Heater Negative with Respect to Cathode	165	200 Volts																																																																																					
Heater Positive with Respect to Cathode	165	200 Volts																																																																																					
TYPICAL OPERATING CONDITIONS																																																																																							
	5FP4A	5FP7A 5FP11A 5FP14A																																																																																					
Anode Voltage ²	6,000	4,000 Volts d c																																																																																					
Grid No. 2 Voltage	250	250 Volts d c																																																																																					
Grid No. 1 Voltage ³	-25 to -70	-25 to -70 Volts d c																																																																																					
Focusing Coil Current (approx.) ^{4,5}	120 ± 15%	96 ± 15% Ma d c																																																																																					
Spot Position (Undelected) ⁵		9 mm																																																																																					
CIRCUIT VALUES																																																																																							
Grid No. 1 Circuit Resistance		1.5 Megohms Max.																																																																																					

[illegible]

C0163	D13-47GH	BRIMAR	\$10	D13-47H ALSO CALLED D13/47GH	6	4" SOMEWHAT OVAL SHAPED SCREEN WITH PROTECTIVE TAPE STILL ON FACE. PINS SOMEWHAT OXIDIZED NEEDING CLEANUP BUT STILL OK. NOTE THE HELICAL PDA ARRANGEMENT. ENGLISH MAKE.
C0164	D13-6510GH	BRIMAR	\$10	GH INDICATES P31	6	5" ROUND, FLAT FACE. HELICAL PDA. APPEARS SIMILAR TO BRIMAR "D13 610 GH". PINS SOMEWHAT OXIDIZED, STILL OK.
C0165	D14/181GH	BRIMAR	\$50	D14 181 GH	STORAGE	NOS, NO RUST ON PINS
C0166	D14-121 GM-08	AMPEREX EQUIV	\$25	GM INDICATES P7	2	4.5" RECTANGULAR/FLAT ELECTROSTATIC CRT
C0167	D14-121-GM-08	AMPEREX EQUIV	\$25	GM INDICATES P7	7	4.5" RECTANGULAR/FLAT ELECTROSTATIC CRT
C0168	D14-1256-4-00	AMPEREX EQUIV	\$25	POSSIBLY D14-125GH-00 / D14-125 GH-00	7	D14-125GH-00 / D14-125 GH-00 IS A 5" RECTANGULAR ELECTROSTATIC CRT, SCOPE CRT CW ROTATION COIL AND FRONT GRATICULE, P31 PHOSPHOR.
C0169	FA-8968	FAA	\$1500	PPI DISPLAY, COMPLETE, SN#59, 14" VIEWABLE, ROUND P7, 120VAC 60HZ 121 LBS IN PORTABLE DESKTOP RACK	8	CERTIFIABLE FAA EQUIPMENT. VOLTAGES LOOK REASONABLY CLOSE ON SEF - TEST METER WHEN POWERED UP. POWEED FOR 60 MINUTES, NO APPARENT ISSUES. NO FURTHER TESTS DONE.
C0170	H1193BP20	HUGHES TONOTRON	\$30	MIL	LAB CRATES	INTEGRATED YOKE, ENCLOSED SHIELD
C0171	K-1154P1	ETC	\$25	K1154-P1-51LEP1	STORAGE	NOS
C0173	K2130P31	DUMONT	\$25		STORAGE	5"



C0174	K2130P31	FAIRCHILD DUMONT	\$25		2	5"
C0175	K2130P31	FAIRCHILD DUMONT	\$25		6	5"
C0176	R6179-P2	RAULAND / ZENITH	\$25		3	
C0177	T317 P31	TEK	\$25	T317-P31 TEKTRONIX TYPES 317 (AN/USM-154)	STORAGE	3" CRT P2 PHOSPHOR
C0178	T317P1	TEK	\$25	TEKTRONIX TYPES 317 (AN/USM-154)	STORAGE	USED, SLIGHT BURN 'LINE'
C0179	T317P2	TEK	\$25	TEKTRONIX TYPES 317 (AN/USM-154)	STORAGE	3" CRT P2 PHOSPHOR
C0180	T317P2	TEK	\$25	T317-P2 TEKTRONIX TYPES 317 (AN/USM-154)	STORAGE	3" CRT P2 PHOSPHOR TEKTRONIX TYPES 317 (AN/USM-154)
C0182	T503 P2	TEKTRONIX	\$500	RM503, 503	5	5" P2, FITS SCOPE SHOWN AS WELL AS BENCHTOP NON-RACKMOUNT VERSION
C0183	T51 P2	TEK	\$25	T51-P2	STORAGE	
C0184	T54-P2	TEK	\$25	T54P2, T54 P2	STORAGE	USED
C0188	T55-P2	TEK	SOLD	TEKTRONIX 515A, RM15	LAB	5CBP1/T55P1 - 154-0125-00 5CBP2/T55P2 - 154-0120-00 5CBP7/T55P7 - 154-0126-00 5CBP11/T55P11 - 154-0127-00 5CBP16/T55P16 - 154-0161-00 5CBP24/T55P24 - 154-0177-00 REFERENCE ENTRY ONLY
C0189	WX31016	WESTINGHOUSE	\$20	MIL STORAGE POTTED	5	
C0190	WX31016	WESTINGHOUSE	\$20	MIL STORAGE POTTED	8	
C0191	WX-31016	WESTINGHOUSE	\$20	MIL STORAGE POTTED	STORAGE	
C0192	WX3230PX55	WESTINGHOUSE	\$20	FIBER OPTIC STRIPE FACE FOR FILM RECORDING	4	ENTIRE FACE OF CRT IS COMPRESSED BY FIBER OPTIC TO A 1/4" STRIP.
C0193	WX5038P2	WESTINGHOUSE	\$20		3	
C0194	WX5038P2	WESTINGHOUSE	\$50		LAB CRATES	NOS

