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Amperex®

ELECTRON TUBES



ask Amperex

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AMPEREX ELECTRONIC CORPORATION • 230 DUFFY AVE., HICKSVILLE, L. I., N. Y.

FOREWORD

This condensed catalog has been compiled for those in the engineering field who seek the proper tubes to suit their applications. It is also intended to serve as a quick reference guide for initial equipment as well as for replacement purposes.

Detailed data sheets on the various tubes listed in this catalog are available upon request.

A condensed semiconductor brochure is also available upon request.

A detailed engineering Transmitting and Power Tube Manual giving complete tube characteristics and application data is available to engineers at the nominal cost of $5.50.

The Semiconductor Manual contains detailed data concerning Amperex transistors, diodes and photo-sensitive devices, and is available at $5.50. The Amperex Special Purpose Tube Manual includes complete information concerning entertainment and industrial tubes (including reliable and rugged types), cold cathode tubes, miniature tubes, tuning indicators and permanent sensitivity radiation counter tubes and is available at a cost of $5.50. The Nuclear Products Manual covering neutron detectors, thermocoax products, GM counter tubes and photomultiplier tubes is also available at $5.50.

AMPEREX is always interested in quoting on all tube and semiconductor requirements. Our research, development and manufacturing facilities are such that we welcome inquiries on new products.

AMPEREX ELECTRONIC CORPORATION

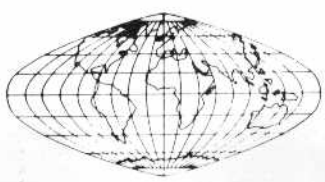


TABLE OF CONTENTS

	Page
Power Tubes	2
Tetrodes & Pentodes	2
Triodes	4
Thyratrons	10
Hydrogen	10
Mercury Vapor & Inert Gas - Triodes & Tetrodes	10
Subminiature Tubes (Screen Grid Types)	12
Entertainment & Audio Tubes	12
Tuning Indicator Tubes	18
Premium Quality Tubes	18
Premium Quality, 10,000 Hour Tubes	20
UHF Special Purpose Tubes	22
Radiation Counter Tubes (Permanent Sensitivity)	24
Neutron Detectors	28
Rectifier Diodes	30
Microwave Triodes	30
Photomultiplier Tubes	30
Counting, Selecting & Indicating Tubes	32
Traveling Wave Tubes	33
Cold Cathode Trigger Tubes	34
Ignitrons	34
Klystrons	34
Voltage Reference & Regulator Tubes	35
Magnetrons	35
Index	36, 37

POWER TUBES – TETRODES & PENTODES

TYPE NO.	FILAMENT		Mu Grid #1 to Grid #2	Max. Diss. Watts	TYPICAL OPERATION					
					PLATE			GRID		SCREEN
	Volts	Amps			Volts DC	Amps DC	Output Watts	Volts DC	MA DC	Volts DC
4-65A	6	3.5	5	65	3,000	0.115	280	-100	5	400
4CX250B (all ceramic)	6	2.6	5.2	250	2,000	0.250	390	-90	26	250
4CX250F (all ceramic)	26.5	0.56								
4W300B	6.0	2.9	5.2	300	2,000	–	390	–	–	–
4W300BF										
4X150A	6.0	2.6	5	250	1,250	0.200	140	-115	11	280
4X150D	26.5	0.58								
4X250B (ceramic)	6.0	2.6	5.2	250	2,000	0.250	390	-90	26	250
4X250F (ceramic)	26.5	0.56								
4X500A	5.0	13.5	6.2	500	4,000	0.315	930	-150	16	500
4-125A/4D21	5.0	6.5	5.9	125	2,500	0.200	375	-150	12	350
4-250A/5D22	5.0	14.5	5.1	250	4,000	0.312	1,000	-225	90	500
4-400A	5.0	14.5	5.1	400	4,000	0.350	1,100	-220	18	500
807	6.3	0.9	8	25	600	0.100	40	-45	4	250
813	10	5	8.5	125	2,000	0.18	275	-120	10	400
828	10	3.25	–	70	1,250	0.160	150	-95	15	400
829B	12.6	1.125	9	30	750	0.120	65	-50	8	200
	6.3	2.25								
5894	12.6 6.3	0.9 1.8	8.2	CCS=40 ICAS=45	CCS=600 ICAS=750	0.200	CCS=85 ICAS=105	-80	5	250
5895	6.3 3.15	10.68 1.36	7.5	CCS=12 ICAS=16	600	0.8	33.6	-80	2.6	200
6075	6.3 6.3	33.5 33.5	7.5 7.5	3,000 3,000	4,000 5,000	1.10 1.10	3,300 4,100	-250 -250	70 70	800 800
6076	6.3 6.3	33.5 33.5	7.5 7.5	3,000 3,000	4,000 5,000	1.10 1.10	3,300 4,100	-250 -250	70 70	800 800
6079	10.0	9.7	9.5	500	5,000	0.452	1,760	-200	30	700
6083	12.6	1.35	6.7	45	1,000	0.017	132	-120	5	250
6146	6.3	1.25	4.5	CCS=20 ICAS=25	600 750	0.112 0.12	52 70	-58 -62	2.8 3.1	150 160
6155	5.0	6.5	6.2	125	2,500	0.200	375	-150	10	350
6156	5.0	14.1	5.1	250	3,000	0.345	800	-180	10	500
6159	26.5	0.3	4.5	CCS=20 ICAS=25	600 750	0.112 0.12	52 70	-58 -62	2.8 3.1	150 160
6252	12.6 6.3	0.65 1.3	8.5	CCS=20 ICAS=25	600 750	0.100 0.150	42 79	-60 -60	1.4 2	250 250
6252 USN										

[1]A glass seal version of 4X250B (ceramic) is available. See tube Type 6979.

MAX. FREQ. mc / Full Input Watts	INTERELECTRODE CAPACITANCE – $\mu\mu f$ G-P	G-F	P-F	DESCRIPTION	TYPE NO.
150	0.08	8	2.1	Convection and radiation cooled tetrode having a fast heating thoriated tungsten filament. Excellent for mobile use.	4-65A
500	0.06	15.7	4.5	Forced-air cooled external anode tetrodes with brazed ratiator. For airborne and mobile applications extending into the UHF region. Also excellent for single sideband and pulse applications.	4CX250B (all ceramic) 4CX250F (all ceramic)
500	0.06	17.2	5.0	External anode tetrode electrically identical to 4X250B. Anode is water cooled. Designed for applications in which reserve anode dissipation is desirable.	4W300B
					4W300BF
500	0.03	16	4.4	Forced-air cooled external anode tetrode. Suited for high power mobile applications. Makes an excellent wide-band amplifier for video application.	4X150A
					4X150D
500	0.06	15.7	4.5	Forced-air cooled external anode tetrodes with brazed radiator. For airborne and mobile applications extending into the UHF region. Also excellent for single sideband and pulse applications.	4X250B (ceramic)
					4X250F (ceramic)
120	0.05	12.8	5.6	Forced-air cooled external anode tetrode. Useful as power amplifier in FM, TV and VHF communication transmitters.	4X500A
120	0.05	10.8	3.1	Radiation and forced-air cooled tetrode. Designed for use as power amplifier, modulator or oscillator.	4-125A/4D21
110	0.12	12.7	4.5	Radiation and forced-air cooled tetrode. Designed for use as RF power amplifier, modulator or oscillator.	4-250A/5D22
75	0.12	12.5	4.7	Radiation and forced-air cooled tetrode. Designed for use as power amplifier, modulator or oscillator at frequencies up to 110 mc.	4-400A
60	0.2	11.0	7.0	Radiation-cooled tetrode. Popular replacement as well as for initial equipment.	807
120	0.25	16.3	14	Beam power pentode designed for use as an RF amplifier and oscillator.	813
–	0.07	12	14	Beam power pentode for use as AF, RF amplifier, modulator	828
250	0.12	14.5	7.0	Twin-pentode designed for use in push-pull RF amplifier and oscillator applications.	829B
250	0.08	Input 6.7 Output 2.1 (Push-Pull)		Radiation and/or forced-air cooled twin-tetrode of original Amperex design as HF version of conventional 829-B. Makes ideal multiplier, as well as straight amplifier and modulator.	5894
186	0.05	Input 5.7 Output 1.7 (Push-Pull)		Radiation cooled twin, four electrode tube. Designed for use as a radio frequency power amplifier, oscillator, modulator and frequency multiplier. This tube features a directly heated cathode, making it suitable for instant heating applications.	5895
220 75	–	24.0 24.0	8.5 8.5	Water-cooled low drive, HF tetrode designed for FM and television transmitter power amplifier.	6075
220 75	0.2 0.2	24.0 24.0	8.5 8.5	Forced-air cooled external anode version of 6075/AX9907	6076
75	0.24	Input 25 Output 7.2		Radiation and/or forced-air cooled low drive HF tetrode for FM and AM transmitters. Also ideal in screen modulator stages.	6079
60	0.1	22.5	11.0	Radiation-cooled pentode with low voltage – high current characteristics. Powder glass dish type base with short internal lead connections. Up to 150 watts, Class C Telephony, ICAS.	6083
60	0.22	13.5	8.5	Beam power tube for use as RF power amplifier, oscillator, frequency multiplier, AF power amplifier or modulator for mobile and fixed equipment. Anode capable of dissipating 25 watts ICAS.	6146
120	0.05	10.8	3.5	Convection and forced-air cooled tetrode. "Magnisorb" anode and low drive make it excellent RF amplifier tube in FM broadcasting. Improved version of 4-125A/4D21.	6155
75	0.12	12.7	4.5	Convection and forced-air cooled tetrode. "Magnisorb" anode and low drive characteristics with "sintered" glass base. Improved version of 4-250A/5D22.	6156
60	0.22	13.5	8.5	Beam power tetrode for use as RF power amplifier, oscillator frequency multiplier, AF power amplifier or modulator for fixed and mobile equipment.	6159
300	–	Input 4.0 Output 1.3		Radiation and/or forced-air cooled twin tetrode of Amperex design. HF version of conventional 832A. Makes ideal multiplier as well as straight amplifier and modulator. Useful up to 700 mc at reduced ratings. Delivers 15 watts at 600 mc under CCS conditions.	6252
					6252 USN

POWER TUBES – TETRODES & PENTODES (Continued)

TYPE NO.	FILAMENT		Mu Grid #1 to Grid #2	Max. Diss. Watts	TYPICAL OPERATION					
					PLATE			GRID		SCREEN
	Volts	Amps			Volts DC	Amps DC	Output Watts	Volts DC	MA DC	Volts DC
6360 6360 A	12.6 6.3	0.410 0.820	7.5	CCS=10 ICAS=14	300	0.100	ICAS 18.5	-45	3	200
6883	12.6	0.625	4.5	CCS=20 ICAS=25	600 750	0.112 0.120	52 70	-58 -62	2.8 3.1	150 160
6907	12.6 6.3	0.65 1.3	8.5	CCS=20 ICAS=25	600 750	0.100 0.150	42 79	-60 -60	1.4 2	250 250
6939	12.6 6.3	0.3 0.6	31	CCS=6 ICAS=7.5	180 200	2x.027 2x.030	5.8 7.2	-20 -20	0.75 0.75	180 200
6979	6.0	2.6	5	250	2,000	0.250	410	-90	12	250
7377	12.6 6.3	0.3 0.6	28	8	250	0.035	7	-15	0.75	160
7580	6	2.6	4	250	2,000	0.250	360	-250	50	400
7378	6.3	3.9	5.7	100	750	0.385	200	-90	7 10	250
7527	5	14.1	5.1	400	4,000	0.270	800	-170	9.5	500
7609	26.5	0.57	5	250	1,250	0.200	140	-115	10	280
7645	6.3 12.6	0.6 0.3	31	CCS=5.5 ICAS=7	180	0.04	4.2	-20	.6	180
7854	12.6 6.3	0.9 1.8	8.2	60	1,000	0.200	134	-85	5.4	250
7983	3.15	1.65	7.5	7	300	0.55	11	-40	1.5	155
8042	1.6	3.2	4.5	25	650	0.160	65	-71	2.8	180
8116	26.5 13.25	0.433 0.866	7	2x30	1,000	2x0.110 2x0.131	141 P.E.P.	-34	0	250
8117	12.6 6.3	0.9 1.8	7	2x30	1,000	2x0.131	141 P.E.P.	-34	0	250
8177	4	60	9	1200	3,110	0.8	1,280	-300	10	610
8179	7.5	22.6	5.1	800	5,500	0.6	1,300	-500	0	800

POWER TUBES – TRIODES

TYPE NO.	FILAMENT		Mu	Max. Diss. Watts	TYPICAL OPERATION					MAX. FREQ. mc
					PLATE			GRID		
	Volts	Amps			Volts DC	Amps DC	Output Watts	Volts DC	MA DC	Full Input Watts
HF200	11	4	18	150	2,000	0.200	300	-250	23	30
HF201A	11	4	18	150	200	0.200	300	-250	23	30
HF300	11.0	4	23	200	3,000	0.250	600	-400	28	20

MAX. FREQ. mc / Full Input Watts	INTERELECTRODE CAPACITANCE – μμf G-P	G-F	P-F	DESCRIPTION	TYPE NO.
200	<0.1	Input Output	6.2 2.6	High-gain twin tetrode for use as Class C amplifier, oscillator, frequency multiplier and modulator, ICAS plate input = 30 watts up to 200 mc. Capable of delivering 18.5 watts output at 200 mc.	6360 6360 A
60	0.22	13.5	8.5	Beam power tube for use as RF power amplifier, oscillator, frequency multiplier, AF power amplifier or modulator for mobile and fixed equipment. Anode capable of dissipating 25 watts ICAS.	6883
300	–	Input Output	4.0 1.3	Twin tetrode, radiation-cooled. Special Amperex design for mobile service. HF version of conventional 832A. Ideal multiplier & straight amplifier & modulator. Useful up to 1000 mc. Delivers 15 watts at 600 mc, CCS.	6907
500	2x0.15	2x6.4	2x1.6	High-gain twin tetrode for use as Class C amplifier, oscillator, frequency multiplier & modulator. ICAS plate input = 14 watts up to 500 mc. Capable of delivering 7.5 watts output at 500 mc.	6939
250	0.03	15.7	4.5	Forced-air cooled external anode tetrode. Brazed radiator. Interchangeable with 4X150A where higher plate dissipation is required.	6979
960	0.145	4.5	1.35	Radiation cooled twin tetrode designed for push-pull Class C operation at frequencies up to 1000 Mc.	7377
500	0.03	17	4.5	Forced-air cooled, beam power tetrode built of ceramic and metal, especially for SSB and other linear RF amplifier applications at altitudes to 20,000 ft.	7580
30	0.9	–	–	Radiation and convection cooled all-glass beam-power tetrode especially designed for use as an AF and RF amplifier, oscillator, and frequency multiplier for operation at frequencies up to 30 mc.	7378
110	0.12	12.7	4.9	All glass tetrode. Designed for amplifier, oscillator, or modulator service extending in the VHF region at frequencies up to 110 mc.	7527
500	0.03	Input Output	15.5 4.5	A tetrode designed for use as an RF power amplifier and oscillator. The plate is forced air cooled; the cathode is oxide coated, indirectly heated. Similar to 4X150D except that it is designed for aircraft use and other applications in which resistance to vibration is important.	7609
400	0.15	6.4	1.6	Miniature twin tetrode featuring frame grid construction. It is a reduced height version of the 6939 for compact equipment.	7645
175	0.09	Input Output	11.6 3.7	Twin tetrode. Designed for use as an RF power amplifier, oscillator, modulator and frequency multiplier. Heat sink or forced-air cooling is necessary at or near maximum ratings. Built-in cross neutralizing capacitors insure neutralization over entire band. Useful to 500 mc.	7854
200	0.08	6.8	3.2	Quick heating twin tetrode having a filiment designed for hybrid mobile transceivers for power output, driver or frequency multiplier circuits. Internally neutralized up to 200 mc	7983
–	0.24	13	8.5	"Harp Cathode" instant heating beam power tetrode for use as power output, oscillator or frequency multiplier in mobile or base equipment. Full output power is available in less than one half second after filament power is applied.	8042
175	0.09	11.8 Input	3.7 Output	Twin tetrode designed and rated for SSB applications where 26.5 v is available for heater. Particularly adapted to heat sink cooling because of calibrated glass envelope.	8116
175	0.09	11.8 Input	3.7 Output	Twin tetrode designed and rated for SSB applications where 12.6 v is available for the heater.	8117
900	0.15	46	6	Ceramic coaxial power tetrode useful as a UHF amplifier or oscillator up to 1000 mc.	8177
30	0.1	47	9.5	Radiation and/or air-cooled tetrode for use as an AM or SSB amplifier. Features low distortion.	8179

INTERELECTRODE CAPACITANCE – μμf G-P	G-F	P-F	DESCRIPTION	TYPE NO.
6.9	6.2	1.2	Radiation-cooled triode for use as an RF power amplifier, oscillator and class B audio amplifier or modulator.	HF200
7.0	8.8	1.2	Radiation-cooled triode especially designed for use as an AF and RF amplifier and oscillator.	HF201A
7.0	6.0	1.0	Radiation-cooled triode. Ideally suited for initial replacement of competitive types. Widely used in RF heating applications, and commercial, and police transmitters.	HF300

POWER TUBES – TRIODES (Continued)

TYPE NO.	FILAMENT		Mu	Max. Diss. Watts	TYPICAL OPERATION					MAX. FREQ. mc
					PLATE			GRID		
	Volts	Amps			Volts DC	Amps DC	Output Watts	Volts DC	MA DC	Full Input Watts
ZB3200	22.0	40.5	75	2,500	8,000	0.960	5,800	-400	150	10
356	7.5	170	20	22,500	15,000	4.4	51,000	-1500	0.37	25
502	7.5	24	17	1,500	3,500	0.860	2,175	-450	150	150
502R	7.5	24	17	1,500	3,500	0.860	2,175	-450	150	150
504R	7.5	24	17	1,000	3,500	0.860	2,175	-750	150	150
805	10	3.25		125	1,500	0.2	215	- 105	0.04	30
810	10	4.5	36	125	2,000	0.250	375	-160	40	100
811A	6.3	4	160	45	1,250	0.140	135	-50	45	100
812A	6.3	4	29	45	1,250	0.140	130	-90	30	100
834	7.5	3.25	10.5	50	1,250	0.1	75	- 225	0.015	100
838	10	3.25		100	1,250	0.175	130	- 90	0.03	30
845	10	3.25		75	1,250	0.2 Peak	105	-225		
833A	10.0	10.0	35	400	4,000	0.450	1,440	-200	75	30
849	11.0	5	19	500	2,500	0.350	630	-250	13	3
849A	11.0	7.7	19	500	3,000	0.500	1,200	-500	100	20
880	12.6	320	20	20,000	10,000	6.0	40,000	-1200	800	25
889A	11.0	125	21	5,000	7,500	2.0	10,000	-800	240	50
889RA	11.0	125	21	5,000	7,500	2.0	10,000	-800	240	25
891	22.0	60.0	8	6,000	10,000	1.45	10,000	-3000	150	1.6
891R	22.0	60.0	8	4,000	10,000	1.4	10,000	-2000	150	1.6
892	22.0	60.0	50	10,000	12,000	1.55	14,250	-1600	165	1.6
892R	22.0	60.0	50	4,000	10,000	1.40	10,500	-1300	160	1.6
5604	11.0	176.0	19	10,000	12,000	2.5	22,500	-1170	220	22.5
5619	11.0	176.0	19	20,000	12,000	2.5	22,500	-1170	220	22.5
5658	12.0	290.0	20.5	10,000	10,000	3.8	28,000	-870	550	15
5666	11.0	120.0	21	12,500	9,000	2.0	12,200	-750	210	22.5
5667	11.0	120.0	21	7,500	9,000	2.0	12,200	-750	210	22.5
5759/501R	7.5	24	17	1,000	3,500	0.870	2,175	-250	133	150
5771	7.5	170	20	22,500	12,500	4.8	44,000	-630	750	25
5866	6.3	5.4	25	135	2,500	0.200	390	-300	45	150
7986										
5867	5.0	14.1	25	250	3,000	0.363	840	-250	69	100
5867 A										
5868	10.0	10.0	27	450	4,000	0.475	1,673	-350	100	100
5923	12.6	33.0	32	6,000	6,000	1.5	6,900	-400	310	75
5924	12.6	33.0	32	5,000	6,000	1.5	6,900	-400	310	75
5924A	12.6	33.0	32	6,000	CLASS B, TV SERVICE, SYNC. LEVEL					75 Full Input 220 Derated
					5,000	1.90	6,250	-140	350	

INTERELECTRODE CAPACITANCE – μμf			DESCRIPTION	TYPE NO.
G-P	G-F	P-F		
10.0	13.0	2.0	Forced-air cooled triode. Original Amperex design. 5.8 kw output at 10 mc with zero bias. Used principally in broadcasting.	ZB3200
24.5	35	2.5	**Water-cooled tube for use as a modulator amplifier or oscillator. Suited for broadcast, communication or industrial service.**	356
10	14	1.3	Water-cooled triode for use as a power amplifier and oscillator.	502
10	14	1.3	Forced-air cooled triode. Ideal power amplifier and oscillator. Has a thoriated-tungsten filament	502R
10.5	14.0	1.3	Forced-air cooled triode similar to Amperex 501R minus flexible leads. Interchangeable with 7C26 with very minor circuit changes.	504R
6.5	8.5	10.5	**High mu tube for use as an RF amplifier, oscillator, and class B AF amplifier.**	805
4.8	8.7	12	Transmitting triode designed for use as RF power amplifier and oscillator final amplifier stage.	810
5.6	5.9	0.7	Power triode designed for use as an RF power amplifier, modulator and oscillator	811A
5.5	5.4	0.77	Power triode designed for use as an RF amplifier, modulator and self-rectifying oscillator.	812A
2.6	2.2	0.6	**A radiation cooled RF oscillator and amplifier intended for replacement service.**	834
8	6.5	5	A zero bias class B AF power amplifier, RF oscillator or power amplifier.	838
13.5	6	6.5	Class A and class AB modulator.	845
6.3	12.3	8.5	Radiation and forced-air cooled triode used widely in AM transmitters and also some RF heating applications. (Refer to 5868/AX9902 data).	833A
33.0	11.0	2.0	Radiation and forced-air cooled triode. Still popular as replacement in some AM broadcast transmitters and RF heating.	849
11.5	14.0	1.8	Same information as above. Interelectrode capacitance different.	849A
26.0	29.0	2.6	Water-cooled triode. This rugged "powerhouse" very popular in broadcasting stations and ideal for RF heating applications.	880
17.8	19.5	3.0	Water-cooled triode. Another rugged high power RF tube for broadcasting stations and RF heating applications.	889A
20.7	19.5	3.0	Forced-air cooled triode version of 889 A, with improved radiator design.	889RA
28.0	16.0	3.0	Water-cooled triode. This is one of the tubes that built Amperex reputation. Used in 5 and 10 kw broadcasting stations. Also popular in RF heating.	891
30.0	16.0	3.0	Forced-air cooled version of 891.	891R
32.0	17.0	1.8	Water-cooled triode. Widely used all over the world in broadcasting stations. Also another ideal RF heating tube. Also see 6333 improved version.	892
32.0	17.0	2.0	Forced-air cooled version of 892. Also see 6445 improved version.	892R
25.0	30.0	1.25	Forced-air cooled triode. Ideal oscillator for RF heating and broadcasting service.	5604
24.0	30.0	1.0	Water-cooled version of 5604.	5619
24.0	39.0	2.5	Industrial water-cooled version of type 880.	5658
18.0	23.5	2.6	Water-cooled triode. Heavy duty version of 889 A for industrial RF heating application.	5666
18.5	23.5	3.0	Forced-air cooled triode. Heavy duty version of 889 RA for industrial RF heating application.	5667
10.0	14.0	1.3	Forced-air cooled triode. Low voltage, high current characteristics. Ideal for RF heating. Has a thoriated-tungsten filament.	5759/501R
24.5	47.0	3.0	Improved version of 880 with thoriated-tungsten filament for high emission capability and a saving of 70% in filament power. Has rugged Kovar grid and filament seals. For industrial & communication application.	5771
5.5	5.8	0.1	Radiation and/or forced-air cooled HF triode of original Amperex design. Powdered glass dish-type base with extremely low lead inductance makes this tube ideally suited for almost any HF application.	5866 7986
5.0	6.3	0.16	Radiation and/or forced-air cooled HF low drive triode of original Amperex design.	5867 5867 A
8.0	11.0	0.35	Radiation and/or forced-air cooled HF triode with rugged 100 watt filament. Of original Amperex design, for all heavy duty RF applications.	5868
11.0	16.0	0.3	Water-cooled low drive HF triode. Rugged for HF heating application.	5923
11.0	16.0	0.3	Forced-air cooled version of type 5923	5924
11.0	16.0	0.3	Forced-air cooled triode for FM & TV transmitters. Brazed radiator shell & external surfaces silverplated throughout.	5924A

POWER TUBES – TRIODES (Continued)

TYPE NO.	FILAMENT		Mu	Max. Diss. Watts	TYPICAL OPERATION					MAX. FREQ. mc
					PLATE			GRID		
	Volts	Amps			Volts DC	Amps DC	Output Watts	Volts DC	MA DC	Full Input Watts
6077	17.5	196	27	50,000	12,000	12	108 kw	-1000	2.25 Amps	15
6078	17.5	196	27	45,000	12,000	12	108 kw	-1000	2.25 Amps	15
6333	22.0	60.0	50	10,000	12,000	1.55	14,250	-1600	165	5
6445	22.0	60.0	50	5,000	10,000	1.40	10,500	-1300	160	5
6446	22.0	60.0	50	20,000	15,000	2.0	20,000	-1250	250	5
6447	22.0	60.0	50	10,000	12,000	2.0	17,500	-500	230	5
6617	8.0	98	34	20,000	12,000	3.2	29,000	-150C	500	30
6618	8.0	98	34	15,000	12,000	4.5	39,000	-1000	800	30
6756	7.5	100	13.5	20,000	12,000	3.5	30,640	-1220	210	30
6757	7.5	100	13.5	15,000	12,000	3.5	30,640	-1220	210	30
6758	12.6	33	9	6,000	7,000	1.72	6,000	-820	82	30
6759	12.6	33	9	6,000	7,000	1.72	6,000	-820	82	30
6800	7.5	100	19.5	20,000	12,500	3.5	33,000	-1200	250	22.5
6801	7.5	107	19.5	10,000	12,500	3.0	28,000	-1200	430	22.5
6960	12.6	33	32	6,000	6,500	2.0	10,000	-450	600	55
6961	12.6	33	32	6,000	6,500	2.0	10,000	-450	600	55
7092	6.3	32.5	22	800 1,300[1]	6,000 6,000	0.600 0.950	2,840 4,400	-450 -475	150 190	50
7237	12.6	33	32	6,000	6,500	2.0	10,000	-450	600	55
7459	12.6	30	32	4,000	6,000	1.5	6,900	-400	310	110
7753	6.3	65	5	2,100	6,000	1.33	4,750	Grid Bias Res. 1450Ω	380	50
7800	8	130	33	15,000	13,000	4.8	40,000	-1500	1 Amp	30
7804	6.3	130	17.5	CCS= 10,000	6,000	3.3	14,300	–	800	30
7805	6.3	130	17.5	15,000	6,000	3.3	14,300	–	800	30
7806	8	130	21	15,000	12,000	4.5	39,300	–	900	30
7807	8	130	21	15,000	12,000	4.5	39,300	–	900	30
7899	8	130	33	8,500	15,000	70	200,000	-500	15 Amps	–
7900	12.6	32	32	4,000	4,500	1.75 (sync.)	5,600 (sync.)	-130	350 (sync.)	220
8078	5	32.5	21	500	6,000	0.70	3,200	-1250	170	50
8119	3.4	19	33	400	2,000	0.400	510 + 85	-140	120	900
8120	3.4	19.0	70	500	2,500	0.38	620 + 50	-70	160	400
8268	12.6	33	24	6,000	7,200	1.5	7,500	-1250	360	50
8269	12.6	33	24	6,000	7,200	1.5	7,500	-1250	360	50

[1] 50% duty cycle.

INTERELECTRODE CAPACITANCE – μμf			DESCRIPTION	TYPE NO.
G-P	G-F	P-F		
86	116	3.4	Water-cooled RF power amplifier, oscillator and modulator having a plate dissipation of 45 kw in class C service. The anode can dissipate up to 100 kw in class B RF operation. Useful at reduced ratings to 30 mc.	6077
86	116	3.4	Forced-air cooled power amplifier, oscillator and modulator having a plate dissipation of 45 kw. Operates at reduced ratings up to 30 mc. Ideal for pulse applications.	6078
32.0	17.0	1.8	Improved ruggedized version of standard 892 with spiral filament, Kovar seals, powdered glass stem. Grid side arm deleted and replaced with Kovar ring. Excellent industrial tube for heavy duty, also communication.	6333
32.0	17.0	1.8	Forced-air cooled version of type 6333. See above.	6445
32.0	17.0	1.8	Improved, ruggedized, heavy-wall version of type 892. Has powdered glass stem, Kovar grid ring, Kovar anode seal, stronger spiral filament giving more uniform heat distribution over anode surface. Also has strong conical, low-inductance grid support. An unusual industrial tube without equal.	6446
32.0	17.0	1.8	Forced-air cooled version of type 6446. See above.	6447
30	37	0.4	Water-cooled triode for use in industrial HF generators.	6617
30	37	0.5	Forced-air cooled triode for use as a high power RF amplifier and oscillator.	6618
47.6	25.1	1.5	Water-cooled triode with special characteristics as a low impedance, RF industrial oscillator. Particularly suited to induction and dielectric heating applications.	6756
50.0	25.1	2.0	Forced-air cooled version of type 6756.	6757
14	12	1.0	Water-cooled low impedance RF industrial oscillator.	6758
15	12	2	Forced-air cooled triode designed for use as a low impedance RF industrial oscillator. The anode can dissipate up to 6 KW.	6759
26.0	25.0	1.0	Thoriated tungsten filamentary triode. 20 kw anode dissipation. Water-cooled. High power RF amplifier and industrial oscillator.	6800
27.0	25.0	1.25	Same as 6800 except 10 kw anode dissipation. Forced-air cooled.	6801
11.0	16.0	0.3	Industrial water-cooled triode with large overload capacity on grid and plate currents. Suitable for 7.5 kw induction and dielectric heaters and 10 kw plastic sealers.	6960
11.0	16.0	0.3	Forced-air cooled version of 6960. Suitable for 7.5 kw induction and dielectric heaters and 10 kw plastic sealers.	6961
6.2	10.5	0.25	Radiation-cooled triode for industrial oscillator and amplifier applications. Rugged construction. Graphite anode with unusual overload capability. Thoriated tungsten filament.	7092
11.0	16.0	0.3	Identical with Amperex Type 6961 except with radiator design intended for interchangeability with competitive types 6366 and 6367.	7237
11	16	0.3	Forced-air cooled triode designed for use in broadcast FM & TV communication transmitters. It will replace the 5762/7C24 in most applications.	7459
7.2	13	<0.5	Forced-air cooled, high vacuum power triode of the external plate type. Designed for use as an oscillator in industrial equipment.	7753
27	45	0.6	Forced-air cooled triode. Designed for communication and industrial service. Also useful as pulse amplifier and hard tube modulator to 200 kw peak.	7800
40	40	1.0	Forced-air cooled external anode triode. Designed for use as an oscillator in industrial equipment. Large grid and plate overload capabilities.	7804
40	40	1.0	Water-cooled version of 7804.	7805
23.5	42.5	0.9	Same as for 7804.	7806
23.5	42.5	0.9	Water-cooled version of 7806.	7807
27	45	0.6	Designed for pulse application as a hard tube modulator. Forced-air cooled.	7899
18.0	17.0	0.3	Forced-air cooled triode. Designed for TV transmitter operation to 220 mc. Features brazed and silver plated radiator for high efficiency.	7900
5.1	9.2	0.2	Radiation cooled triode designed especially for industrial oscillator and amplifier applications.	8078
6.5	11.5	<0.12	Forced-air cooled, coaxial transmitting triode with a ceramic envelope designed for use in HF amplifier, oscillator, or frequency multiplier operation at frequencies up to 900 mc.	8119
3.8	11	0.05	Forced-air cooled transmitting triode with ceramic envelope and coaxial terminal arrangement. Can be used as "plug-in" in coaxial circuits. Designed for use as an RF amplifier, oscillator or frequency multiplier at frequencies up to 1000 mc.	8120
7.9	14.2	1	Water cooled triode intended for use in industrial RF heating generators.	8268
7.9	14.2	1	Forced-air cooled triode designed for use in industrial RF heating generators.	8269

THYRATRONS–HYDROGEN

TYPE NO.	Peak Forward Anode Voltage Max.	Peak Anode Current Max. (Amps)	Avg. Anode Current Max. (ma)	Pulse Width Max.
4C35	8,000	90	100	2 μsec.
5C22	16,000	325	200	2 μsec.
6268	8,000	90	100	2 μ sec
6279	16,000	325	200	2 μ sec

THYRATRONS–MERCURY VAPOR & INERT GAS–TRIODES & TETRODES

TYPE NO.	HEATER OR FILAMENT		Filament Heating Time (sec.)	Tube Drop (Volts)	PEAK VOLTAGE		ANODE CURRENT		Max. Grid Volts	Ionization Time (μ sec.)
	Volts	Amps			Forward Volts	Inverse Volts	Peak Amps	Average Amps		
AX105	5.0	10.0	300	16	10000	10000	8.0	4.0	–500	10
AX255	5.0	16.0	300	12	1500	2500	80.0	12.5	–300	10
AX260	5.0	25.0	600	10	1500	2500	160.0	25.0	–300	10
2D21	6.3	0.6	10	8	650	1300	0.5	0.1	–100	0.5
3C23	2.5	7	15	15	1250	1250	6	1.5	–500	3
632B	5	5	300	12	1500	1500	30	2.5	–300	10
2050	6.3	0.6	10	8	650	1300	1.0		–250	.5
5544	2.5	12.0	60	16	1500	1500	40.0	3.2	–250	–
5545	2.5	21.0	60	16	1500	1500	80.0	6.4	–250	–
5557/1701	2.5	5.0	5	16	2500	5000	1.0	0.5	–500	10
5559	5.0	4.5	300	16	1000	1500	15.0	2.5	–500	10
5560/FG95	5.0	4.5	300	16	1000	1000	15.0	2.5	–1000	10
5632/C3J	2.5	8.5	60	10	900	1250	30.0	2.5	–300	10
5684/C3JA	2.5	8.5	60	10	1000	1250	30.0	2.5	–300	10
5685/C6JA	2.5	21	60	9	1000	1250	77	6.4	–100	–
5727	6.3	0.6	10	8	650	1300	0.5	0.1	–100	0.5
5869/AGR9950	5.0	6.5	120	15	13000	13000	4.0	1.0	–100	10
5870/AGR9951	5.0	14.0	120	12	27000	27000	10.0	2.5	–100	10
6786	5.0	15-20	600	12	15000	15000	45.0	10-15		–
8270	5	13	90	12	21000	21000	10	2.5	–300	10

DESCRIPTION	TYPE NO.
These tubes are used as drivers for pulsing magnetrons and other oscillators and as high speed switches. Hydrogen-filled, they have extremely low de-ionization time. They are zero bias tubes, triggered by a positive grid pulse. Maximum pulse repetition frequency (prf in pulses per second) will depend on the peak forward anode voltage (epy in volts) according to formula: $(epy)^2 \times (prf) = 2.6 \times 10^{11}$ max.	
See 6268.	4C35
See 6279.	5C22
Completely interchangeable with 4C35 in every respect except that it has self-contained source of hydrogen providing life expectancy of minimum 1000 hours.	6268
Completely interchangeable with 5C22 in every respect except that it has self-contained source of hydrogen providing life expectancy of minimum 1000 hours.	6279

Deionization Time (μ sec.)	Condensed Mercury Temp. Range (°C)	DESCRIPTION	TYPE NO.
1000	+40° to +80°	Radiation-cooled mercury-vapor thyratron-tetrode.	AX105
1000	+35° to +75°	Heavy-duty, mercury vapor thyratron for motor control and A.C. welder control.	AX255
1000	+35° to +75°	Heavy-duty, mercury vapor thyratron for motor control and A.C. welder control.	AX260
–	–	High control ratio, temperature independent Thyratron with high circuit sensitivity. Inert gas filled. Negative control characteristics.	2D21
360	–40° to +80°	Gas and mercury triode.	3C23
1000	+45° to +50°	Mercury vapor tetrode for ignitor firing and grid-controlled rectifier service	632E
50	–	Gas tetrode for relay service.	2050
400	–	Xenon filled thyratron with reliable operation over wide temperature range. For electronic control of D.C. motor speed, regulation of current and voltage, counting and sorting devices and electronic switching machines.	5544
500	–	Same as for type 5544 above.	5545
1000	+30° to +80°	Radiation-cooled mercury-vapor low voltage thyratron. Similar in structure to 866 A.	5557/1701
1000	+40° to +75°	Indirectly heated, mercury-vapor triode with negative control characteristics.	5559
1000	+40° to +80°	Four electrode, mercury vapor thyratron with negative control characteristics. Designed for applications where the available grid power is very small and where it is desired to actuate the grid from a high impedance source.	5560/FG95
1000	–	Xenon filled, three-electrode thyratron with negative-control characteristics for reliable operation over wide temperature range. Especially suitable for control relay service, motor control, and ignitor firing service.	5632/C3J
1000	–	Xenon filled, three-electrode thyratron with negative-control characteristics for reliable operation over wide temperature range. Especially suitable for control relay service, motor control, and ignitor firing service.	5684/C3JA
1000	–	A gas filled triode for applications requiring precise control.	5685/C6JA
35 min.	–	Ruggedized version of 2D21. Particularly suitable for mobile and aircraft operation where mechanical strength and reliability are important. Designed for relay, servo control applications, etc.	5727
250	+25° to +55°	Radiation-cooled mercury-vapor thyratron. Oxide coated filament. Used for stepless control of voltage output and D-C motor control.	5869/AGR9950
250	+30° to +45°	Same as above for type 5869/AGR9950.	5870/AGR9951
–	+25° to +55°	High voltage, grid controlled mercury vapor thyratron. For industrial RF generators and transmitting equipment.	6786
500	+25° to +45°	Grid controlled mercury vapor thyratron.	8270

SUBMINIATURE TUBES (SCREEN GRID TYPES)

TYPE NO.	FILAMENT		CAPACITANCES μμf			PLATE		Grid No. 1 Volts	Grid No. 2 Volts	PLATE	
	D-C Volts	Current ma	G-P	Input	Output	Volts	Diss. Milliwatts			Micro. Amps	Resistance Megohms
6007/5913	1.25	13.3	0.2	2.5	2.2	45	25	−0.2	45	475	0.4
6008/5911	0.625	13.3	0.2		1.5	45	1.5	−0.2	45	50	0.4

ENTERTAINMENT & AUDIO TUBES

TYPE NO.	FILAMENT		TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS							
			Circuit Application	Applied Voltages			Plate Current (ma)	Screen Current (ma)	Amplification Factor	Plate Resistance (K ohms)
	Volts	Amps		Plate	Screen	Grid				
1S2A	1.4	0.55	Peak Inverse Voltage 22,000 (absolute max.)				Plate Current 40 ma			
2ER5	2.1	0.6	VHF Triode for TV tuners	200	–	-1.2	10.0	–	80	–
2FY5	2.4	0.6	VHF Triode for TV tuners	135	–	-4.5	11.0	–	70	–
2GK5	2.3	0.6	VHF Triode	135	–	-1	11	–	70	5.2
2HA5	2.2	0.6	RF Amplifier triode	200	–	-5.7	11.5	–	72	5.6
3EH7/XF183	3.4	0.6	IF Amplifier	200	90	-2	12	4.5	–	500
3EJ7/XF184	3.4	0.6	IF Amplifier	200	200	-2.5	10	4.1	60	350
3ER5	2.8	0.45	RF Amplifier triode	200	–	-1.2	10.0	–	80	–
3FY5	3.1	0.45	RF Amplifier triode	135	–	-4.5	11.0	–	70	–
3GK5	2.8	0.45	VHF Triode	135	–	-1	11	–	70	5.2
3HA5	3.1	0.45	RF Amplifier triode	200	–	-5.7	11.5	–	72	5.6
4EH7/YF183	4.4	0.45	IF Amplifier	250	250	-1.3	10.0	4.1	60	350
4EJ7/YF184	4.4	0.45	IF Amplifier	200	200	-2.5	10	4.1	60	350
4ES8	4.2	0.6	Low Noise Cascode RF Amplifier	90	–	-1.2	15	–	34	2.72
4GJ7	4.3	0.6	TV oscillator mixer: Triode-Pentode	100 170	– 120	-3 -1.2	15 10	– 3.0	– 20	– >350
4GK5	4.0	0.6	VHF Triode	135	–	-1	11	–	70	5.2
4HA5	3.8	0.3	RF Amplifier triode	200	–	-5.7	11.5	–	72	5.6
5AR4/GZ34	5.0	1.9	Full Wave Rectifier	AC Supply (Plate-to-Plate) Voltage (RMS) = 2X 550 volts DC Output Current (max.) = 250 ma Max. Capacity Condenser Input Filter = 60 μf DC Output Voltage = 610 volts dc						
5ES8	5.6	0.45	Cascode AGC Controlled RF Amplifier	90	–	-1.4	15.0	–	34	2.5
5GJ7	5.7	0.45	Pentode-Triode Osc.-mixer for TV applications	170 100	120 –	-1.2 -3	10 15	3.0 –	– 20	>350
6AJ8	6.3	0.3	General purpose Triode-Heptode	250 250	– 100	0 -2	13.5 6.5	– 3.8	22 20	33 –
6AL3/EY88	6.3	1.55		Peak inverse 7,500 absolute maximum			Peak anode current 55 ma		Average Anode current 22 ma	

Trans-conductance Micromhos	Output Milliwatts	DESCRIPTION	TYPE NO.
420	6	Radiation-cooled pentode output amplifier for hearing aids and other purposes, where small size, light weight and low battery drain are important. An ideal tube for receivers.	6007/5913
100	2.25	Same as above except this tube is a voltage amplifier.	6008/5911

Trans-conduct-ance (microm-hos)	Max. Power Output – 2 Tubes, Push-Pull Class B	Load Resist-ance (K ohms)	Cut-Off Bias (volts)	DESCRIPTION	TYPE NO.
				Miniature half-wave vacuum rectifier designed for use in high voltage, low current applications in TV scanning systems.	1S2A
10,500	–	–	–	Miniature frame grid shielded triode with remote cut-off. Low noise figure at 220 Mc. Operates at low supply voltages. Controlled warm-up for 600 ma series string operation.	2ER5
13,000	–	–	–	Frame grid shielded triode with remote cut-off, for low supply voltages. Controlled warm-up for 600 ma series string operation.	2FY5
13,000	–	–	-4.2	A high gain frame grid VHF triode for series operation.	2GK5
14,500	–	–	–	Ampliframe sheilded triode for TV RF amplifiers. High stage gain, low noise figure, low interelectrode capacitance.	2HA5
12,500	–	–	–	See 6EH7 designed for warm-up series string operation.	3EH7/XF183
15,000	–	–	–	See 6EJ7 designed for warm-up series string operation.	3EJ7/XF184
10,500	—	—	—	Frame grid sheilded triode with remote cut-off and low noise figure. For use in VHF tuners with low supply voltages. Controlled warm-up for 450 ma series string operation.	3ER5
13,000	—	—	—	Miniature frame grid shielded triode with remote cut-off. Designed for VHF tuners in television receivers. Low noise figure at 220 Mc and operates at low supply voltages.	3FY5
13,000	—	—	-4.2	A high gain frame grid VHF triode for 450 ma series string operation.	3GK5
14,500	—	—	—	Ampliframe shielded triode for TV RF amplifiers. High stage gain, low noise figure and low interelectrode capacitances.	3HA5
15,000	–	–	–	Frame grid remote cut-off pentode designed for use as an IF amplifier in television receivers.	4EH7/YF183
15,000	–	–	–	See 6EJ7 designed for warm-up series string operation.	4EJ7/YF184
12,500	–	–	–	High performance frame-grid twin-triode with remote cut-off characteristics. Designed for use as a low noise cascode tube for 600 mA series string operation in premium TV tuners.	4ES8
11,000	–	–	–	Ampliframe triode-pentode designed for operation as an oscillator-mixer in television applications. Stable oscillator performance at low line voltage. Controlled warm-up for 600 ma series string operation.	4G57
13,000	–	–	-4.2	A high gain frame grid VHF triode for series operation.	4GK5
14,500	–	–	–	Ampliframe shielded triode for TV RF amplifiers. Controlled warm-up for 450 ma series string operation.	4HA5
				Indirectly heated, full-wave receifier with 5.0 volt, 1.9 amp heater and 250 ma output capacity. Octal base.	5AR4/GZ34
12,500	—	—	—	High performance, frame grid triode with remote cut-off characteristics. Designed for use as low noise cascode tube in premium TV tuners.	5ES8
11,000	—	—	—	Ampliframe triode-pentode for operation as an oscillator mixer in television applications. Has stable oscillator performance even at low line voltages. Controlled warm-up for 450 ma series string operation.	5GJ7
650 2,400	—	—	—	Triode-heptode designed for use in AM, FM and television receivers.	6AJ8
				Booster diode designed for application in horizontal circuits in TV receivers.	6AL3/EY88

ENTERTAINMENT & AUDIO TUBES (Continued)

TYPE NO.	FILAMENT		TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS							
			Circuit Application	Applied Voltages			Plate Current (ma)	Screen Current (ma)	Amplification Factor	Plate Resistance (K ohms)
	Volts	Amps		Plate	Screen	Grid				
6AL5	6.3	0.3	Full Wave Rectifier	117 ac rms (per plate)	–	–	Output Current 9dc (per plate)	Minimum Total Effective Plate Supply Impedance = 300 ohms.		
6AL5W	6.3	0.3	Ratio detector Dual Diode	–	–	–	9 (per plate)	Minimum Total Effective Plate Supply Impedance = 300 ohms.		
6AQ8/ECC85	6.3	0.435	RF Amplifier and Mixer	RF Amp 230	–	-2.0	10.0	–	57	9.7
				Mixer 190	–	[1]	5.2	–	57	2.2
6AT6	6.3	0.3	Duo Diode High Mu Triode	250	–	-3	1	–		58
6AV6	6.3	0.3	Duo Diode High Mu Triode	250	–	-2	1.2	–	100	62
6AU6	6.3	0.3	RF-IF Amplifier: Triode	250	Plate	–	12.2	–	36	–
			RF-IF Amplifier: Pentode	250	150	6.5	10.6	4.3	36	1000
6BA6	6.3	0.3	Remote cut-off RF Amplifier for broadcast receivers	250	100	-1	11	4.2	–	1 meg.
6BE6	6.3	0.3	Frequency Convertor for broadcast receivers	250	Eg 2-4 100	Eg 3 -1.5	2.9	Ig 2-4 6.8	–	1 meg
6BL8/ECF80	6.3	0.43	AM/FM Oscillator	170	170	-2	10	2.8	47[3]	400
			Mixer	100	–	-2	14	–	20	4
6BM8/ECL82	6.3	0.78	Voltage Amplifier & Power Output Tube	V.Amp. 100	–	0	3.5	–	70	28.0
				Output 170	170	-11.5	41	9.0	–	–
6BQ5/EL84	6.3	0.76	Power Output Tube	300	300	-14.5	2 x 46	2 x 11	–	–
6BX6/EF80	6.3	0.3	RF-IF Amplifier	250	250	-3.5	10	2.8	50	65
6CA4/EZ81	6.3	1.0	Full Wave Rectifier	AC Supply (Plate-to-Plate) Voltage (RMS) = 2 x 350 volts DC Output Current (max.) = 150 ma Max. Capacity Condenser Input Filter = 50 μf DC Output Voltage = 347 volts dc						
6CA7/EL34	6.3	1.5	Power Output Tube	800	400	-39	2 x 91	2 x 19	–	–
6CM4	6.3	0.017	UHF Triode	175	–	-1.5	12	–		
6CW5/EL86	6.3	0.76	Medium Power Hi-Fi Amplifiers	250	200	-18.5	70	170	8	23
6DA6/EF89	6.3	0.2	RF-IF Pentode	250	100	-1.95	9	3		900
6DC8/EBF89	6.3	0.30	AM detector and AGC RF or IF Amplifier	200	–	–	0.8	–	–	–
				250	100	2.0	9	2.7	20	1000
6DJ8/ECC88	6.3	0.365	Cascode RF Amplifier Mixer	90	–	-1.3	15.0	–	33	2.65
6DL4/EC88	6.3	0.18	RF grounded-grid amplifier	160	–	-1.25	12.5	–	65	–
6DX8/ECL84	6.3	0.72	Video Output Tube: Pentode	–	220	–	18	3.1	–	3
			Keyed AGC, Sync-Separation, Sync-Amplification, Noise Suppression: Triode	200	–	1.7	3	–	65	–

[1]Grid leak resistance = 1 megohm [2]Conversion Conductance [3]Grid 1 to Grid 2

Trans-conductance (micromhos)	Max. Power Output – 2 Tubes, Push-Pull Class B	Load Resistance (K ohms)	Cut-Off Bias (volts)	DESCRIPTION	TYPE NO.
				Miniature high-perveance twin diode for FM or TV detector, or as half or full-wave rectifier or doubler.	6AL5
				Premium Quality version of 6AL5. Resonant frequency 700 Mc.	6AL5W
6,000 2,300[2]	–	–	–	Twin triode specifically designed for use in "front-end" stages of FM receivers as a combined RF Amplifier and self-oscillating additive mixer. Features extensive internal screening between the two triodes which reduces oscillator radiation. The high mutual conductance, input resistance and amplification factor make possible an average over-all "front-end" gain of 350.	6AQ8/ECC85
1,200	–	–	-5	For second detector audio amplifier service	6AT6
1,600	–	–	-4	For second detector audio amplifier service	6AV6
4,800 5,200	– –	– –	– –	Sharp cut-off triode-pentode designed for use as high gain RF or IF amplifier. Valuable in UHF wide band applications.	6AU6
4,400	–	–	-20	Miniature RF amplifier pentode with remote cut-off	6BA6
475[2]	–	–	Eg 3 -30	Miniature frequency convertor for superheterodyne circuits in both standard and FM band broadcast receivers.	6BE6
6,200 5,000	– –	– –	– –	Single-envelope triode-pentode designed for applications in television and AM/FM receivers as a combined oscillator and mixer.	6BL8/ECF80
2,200 7,500	– –	– –	– –	Single-envelope triode-pentode designed for application in medium power hi-fi amplifiers. Suitable for one-tube phono amplifiers, simple stereo circuits and for vertical deflection in TV applications.	6BM8/ECL82
11,300	17	8 Plate-to-Plate	–	High quality pentode designed especially for high fidelity audio systems. High efficiency with low distortion. High sensitivity. Exceedingly small spread in characteristics between individual tubes so that maximum rated output is obtained with all tubes.	6BQ5/EL84
	–	–	–	Pentode RF, IF, video amplifier or mixer in TV receivers	6BX6/EF80
				Indirectly heated, full-wave rectifier with 6.3 volt, 1 amp heater, 150 ma output capacity and 9 pin miniature construction.	6CA4/EZ81
11,300	100	11 Plate-to-Plate	–	High quality pentode designed especially for high fidelity audio systems. High efficiency with low distortion. High sensitivity. Exceedingly small spread in characteristics between individual tubes so that maximum rated output is obtained with all tubes.	6CA7/EL34
14,000				A high gain frame grid UHF triode	6CM4
10,000	25	–	–	High current, low voltage output pentode for use in medium power hi-fi amplifiers. Useful in single ended push-pull circuits. In a typical transformerless circuit, a pair of tubes can deliver up to 10 watts in class AB.	6CW5/EL86
	–	–	-20	High gain remote cutoff pentode.	6DA6/EF89
– 3,800	– –	– –	– –	Double diode pentode designed especially for use as an RF or IF amplifier. The diodes are for AM detection and AGC. The pentode features high mutual conduction – important in AM, FM and TV applications.	6DC8/EBF89
12,500	–	–	–	Twin triode designed for use in cascode circuits, RF and IF amplifiers, mixer and phase inverter stages. Frame grid construction provides high transconductance, low noise and extreme reproducibility of characteristics. Operation at low voltage has been successfully shown in DC coupled amplifiers and 12 volt B+, FM and VHF receivers.	6DJ8/ECC88
13,500	–	–	–	Single triode for use as an RF grounded grid amplifier in UHF tuners for TV receivers. Features higher RF gain and improved signal-to-noise ratio. Reduced oscillator radiation because of improved pinning sequence.	6DL4/EC88
9,700 4,000	– –	– –	– –	Triode-pentode with separate cathodes. Triode designed for use in circuits for keyed AGC, sync-separation, sync-amplification and noise suppression. The pentode is designed for use as a video output tube.	6DX8/ECL84

ENTERTAINMENT & AUDIO TUBES (Continued)

TYPE NO.	FILAMENT		TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS							
			Circuit Application	Applied Voltages			Plate Current (ma)	Screen Current (ma)	Amplification Factor	Plate Resistance (K ohms)
	Volts	Amps		Plate	Screen	Grid				
6EH7/EF183	6.3	0.3	IF Amplifier	200	90	-2	12	4.5	–	500
6EJ7/EF184	6.3	0.3	IF Amplifier	200	200	-2.5	10	4.1	60	350
6ER5	6.3	0.18	RF Amplifier triode	200	–	-1.2	10	–	80	–
6ES8/ECC189	6.3	0.365	Cascode AGC controlled RF Amplifier.	90	–	-1.4	15.0	–	34	2.5
6FY5	6.3	.2	RF Amplifier	135	–	-4.5	11.0	–	70	–
6GB5/EL500	6.3	1.4	Horizontal deflection output stages of TV receivers	75	200	-10	440	37	–	–
6GJ7	6.3	0.41	TV oscillator-mixer: Triode-Pentode	100 170	– 120	-3 -1.2	15 10	– 3.0	– 20	– >350
6GK5	6.3	0.18	VHF Triode	135	–	-1	11	–	70	5.2
6GM8/ECC86	6.3	0.33	RF Amplifier	25	–	0	7.5	–	14	2.1
			Mixer	25	–	–	2.6	–	–	0.5
6GV8/ECL85	6.3	0.9	Driver for pentode stage: Triode	100	–	-0.8	5	–	50	7.6
			Vertical deflection tube for 110° picture tubes: Pentode	170	170	–	41	2.7	7	25
6GW8/ECL86	6.3	0.7	AF Amplifier: Triode	250	–	-1.7	1.2	–	100	–
			AF Amplifier: Pentode	250	250	-7	36	5.5	22[3]	45
6HA5	6.3	0.18	RF Amplifier Triode	200	–	-5.7	11.5	–	72	5.6
6HG8/ECF86	6.3	0.34	VHF, TV tuners: Triode-Oscillator	100	–	-3	14	–	17	–
			VHF, TV tuners: Pentode-Mixer	170	150	-1.5	10	3.3	60[3]	350
6J6	6.3	0.45	HF Oscillator, RF Amplifier or Mixer	300	–	-40	15	–		10
6JX8/ECH84	6.3	0.3	Heptode-Triode	135 60	14 –	0 0	1.7 3	0.9 –	– 50	– 16
6R3/EY81	6.3	0.81	Damper Diode	Peak Inverse Voltage 5,600			Peak Plate Current 450 ma		Average Plate Current 150 ma	
6U8	6.3	0.45	Pentode – Triode	300 150	300 –	-0.7 -1	10 18	3.5 –	– 40	400
6V4/EZ80	6.3	0.6	Full Wave Rectifier	AC Supply (Plate-to-Plate) Voltage (RMS) = 2 X 300 volts DC Output Current (max.) = 90 ma Max. Capacity Condenser Input Filter = 50 μf DC Output Voltage = 310 volts dc						
6X4	6.3	0.6	Full Wave Rectifier	AC Supply (Plate to Plate) Voltage (RMS) = 2 x 325 DC Output Current (Max.) = 70 ma Maximum Input Capacitor = 10 μf DC Output Voltage = 310 Volts						
7HG8/PCF86	8	0.3		(For other data see 6HG8/ECF86)						
8BQ5	8	0.6	Output Pentode	250	250	-7.3	48	5.5	–	40
8GJ7	8.6	0.3	TV oscillator-mixer: Triode-Pentode	100 170	– 120	-3 -1.2	15 10	– 3.0	– 20	– >350

[3]Grid 1 to Grid 2

Trans-conductance (micromhos)	Max. Power Output – 2 Tubes, Push-Pull Class B	Load Resistance (K ohms)	Cut-Off Bias (volts)	DESCRIPTION	TYPE NO.
12,500	–	–	–	Frame grid remote cut-off pentode designed for use as an IF amplifier in TV receivers. High transconductance, low capacities, and low feed back capacity, enables construction of simplified broad band amplifiers with high stability.	6EH7/EF183
15,000	–	–	–	Frame grid sharp cut-off pentode designed for use as an IF amplifier in TV receivers. High transconductance, low capacities, and low feed back capacity, enables construction of simplified broad band amplifiers with high stability.	6EJ7/EF184
10,500	–	–	–	High gain miniature frame grid shielded triode designed for service in VHF tuners for television receivers.	6ER5
12,500	–	–	–	High performance, frame grid twin triode with remote cut-off characteristics. Designed for use as low noise cascode tube in premium TV tuners.	6ES8/ECC189
13,000	–	–	–	High gain miniature frame grid shielded triode with remote cut-off. Designed for service in VHF tuners for television receivers, and is controlled for low noise figure at 220 mc and operation at low supply voltages.	6FY5
–	–	–	–	All-glass beam power pentode designed for use in horizontal deflection output stages of TV receivers. Features large plate-to-screen grid current ratio and a magnoval base with peak plate voltage of 7KV.	6GB5/EL500
– 11,000	– –	– –	– –	Ampliframe triode – pentode for oscillator-mixer service in television applications.	6GJ7
13,000	–	–	-4.2	A high gain frame grid VHF triode.	6GK5
7,800 2,000	– –	– –	– –	Frame grid twin triode designed for low voltage applications. Suitable for instrumentation and industrial applications as a direct-coupled wide band amplifier and for automobile radio sets and as an RF amplifier and self-oscillating mixer. May be operated directly from a storage battery.	6GM8/ECC86
6,500	–	–	–	Triode-pentode especially intended for vertical output stages, particularly 110° picture tubes. Special attention has been paid to microphony, linearity and S-effect.	6GV8/ECL85
7,500	–	–	–		
1,600	–	–	–	Triode-pentode with separate cathodes. Designed for sound output and preamplifier stages in audio apparatus and TV receivers.	6GW8/ECL86
10,000	–	–	–		
14,500	–	–	–	Ampliframe shielded triode for use as RF amplifier in VHF television tuners.	6HA5
6,000	–	–	–	Triode-pentode for use in mixer stage of VHF tuners in TV receivers. Pentode section incorporates a frame grid for high conversion gain.	6HG8/ECF86
12,000	–	–	–		
5,300	–	–	–	Miniature dual triode having a common cathode.	6J6
2,200 3,700	– –	– –	– -11	Triode-heptode for use as a pulse separator, noise inverter and sync. amplifier	6JX8/ECH84
				Diode designed for use as damper in horizontal output circuits of television receivers.	6R3/EY81
5,200 8,500	– –	– –	-10 -12	As local oscillator – pentode mixer in FM and TV receivers and other uses	6U8
				Indirectly heated, full-wave rectifier with 90 ma output capacity and 9 pin miniature construction.	6V4/EZ80
				Miniature cathode type rectifier	6X4
				This tube is a 300 ma version of the 6HG8/ECF86.	7HG8/PCF86
11,300	17	8	-17.5	Output pentode for medium power hi-fi amplifiers	8BQ5
– 11,000	– –	– –	– –	Ampliframe triode-pentode for 300 ma series string operation as an oscillator-mixer in television applications.	8GJ7

ENTERTAINMENT & AUDIO TUBES* (Continued)

TYPE NO.	FILAMENT		TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS							
			Circuit Application	Applied Voltages			Plate Current (ma)	Screen Current (ma)	Amplification Factor	Plate Resistance (K ohms)
	Volts	Amps		Plate	Screen	Grid				
9A8/PCF80	9	0.3	AM/FM Oscillator Mixer	(For other data see 6BL8 / ECF80)						
12AT7/ECC81	12.6 6.3	0.15 0.30	Voltage Amplifier	250	–	-2.0	10.0	–	55	–
12AU7/ECC82	12.6 6.3	0.15 0.30	Voltage Amplifier	250	–	-8.5	10.5	–	17	7.7
12AX7/ECC83	12.6 6.3	0.15 0.30	Voltage Amplifier	250	–	-2.0	1.2	–	100	62.5
15CW5/PL84	15	0.3	Medium Power Hi-Fi Amplifiers		(For other data see 6CW5/EL86)					
16AQ3/XY88	16.4	0.6	Damper diode		(For other data see 6AL3/EY88)					
17EW8	17.5	0.15	RF Dual Triode	200	–	-2.1	10	–	–	15
27GB5	27	0.3	Horizontal Deflection Output of TV Receivers		(For other data see 6GB5 data)					
45B5/UL84	45	0.1	IDENTICAL ELECTRICAL CHARACTERISTICS AS 6CW5/EL86							
50BM8	50	0.1	Voltage Amplifier & Power Output Tube		(For other data see 6BM8/ECL82)					
6267/EF86	6.3	0.2	Voltage Amplifier	250	140	-2.0	3.0	0.6	–	2500
7025	12.6 6.3	0.15 0.30	Voltage Amplifier	250	–	-2.0	1.2	–	100	62.5
7189	6.3	0.76	Power Output Tube	250	250	-7.3	48	5.5	19.5	40
8278	6.3	1.2	Audio Output Tetrode	265	265	-12.5	2x115	2x27	–	–

TUNING INDICATOR TUBES

TYPE NO.	FILAMENT		Supply And Screen Volts	Screen Current At Start Of Control (ma)	Anode Series Resistance (Megohms)	Grid Bias For End Of Control Range (Volts)
	Volts	Amps				
IM3/DM70	1.4	0.025	85	0.17	–	–10
IN3/DM71	1.4	0.025	85	0.17	–	–10
6CD7/EM34	6.3	0.2	250	2.0	1.0	Section 1 = -5 Section 2 = -16
6FG6/EM84	6.3	0.27	250	1.1	0.47	–22
6HU6/EM87	6.3	0.3	250	2	0.1	–10

PREMIUM QUALITY TUBES

TYPE NO.	PROTOTYPE	HEATER		Amplification Factor	Transconductance (Micromhos)	TYPICAL OPERATION					
						PLATE			Grid Volts DC	SCREEN	
		Volts	Amps			Volts DC	Current ma-DC	Resistance K Ohms		Volts DC	Current ma-DC
5726	6AL5	6.3	0.3	Max. plate 117 V. rms at 9ma-DC total output; Peak plate current 54 ma max.							
5654	6AK5	6.3	0.175	–	5000	120	7.5	340	R_k=200	120	2.5

[1]Available to Military Specifications. [2]Grid 2 to Grid 1. [3]Plate Current = 10 μa approx.

Trans-conductance (micromhos)	Max. Power Output – 2 Tubes, Push-Pull Class B	Load Resistance (K ohms)	Cut-Off Bias (volts)	DESCRIPTION	TYPE NO.
				This tube is a 300 ma version of the 6BL8/ECF80	9A8/PCF80
5,500	–	–	-12.0	Medium-gain dual triode with low hum, noise and microphonics. High quality replacement for the standard 12AT7 without circuit changes.	12AT7/ECC81
2,200	–	–	–	Low noise dual triode with low hum, noise and microphonics. High quality replacement for the standard 12AU7 without circuit changes.	12AU7/ECC82
1,600	–	–	–	High-gain dual triode with low hum, noise and microphonics. High quality replacement for the standard 12AX7 without circuit changes.	12AX7/ECC83
				This tube is a 300 ma version of the 6CW5/EL86	15CW5/PL84
				This tube is a 600 ma version of the 6AL3/EY88	16AQ3/XY88)
5,800	–	–	–	Dual triode for use as an RF amplifier and self oscillating mixer	17EW8
				This tube is a 300 ma version of the 6GB5	27GB5
					45B5/UL84
					50BM8
2,000	–	–	–	High gain pentode particularly suitable for pre-amplifier and input stages in which hum, noise and microphony must be kept to a minimum. Electrode structure rigid. Heater is bifilar, twisted pair of wires with magnetic field of one opposed to that of the other.	6267/EF86
1,600	–	–	–	High gain dual triode with low hum, noise and microphonics, the 7025 is a direct, high quality replacement for the 12AX7/ECC83.	7025
11,300	24	–	–	Miniature pentode designed for use as a power amplifier in high fidelity audio equipment. It is a specially tested and improved tube intended for use in amplifiers of over 20 watt capabilities.	7189
24,000	40	2.4 Plate to Plate	–	Beam power tetrode designed for push-pull audio output stages.	8278

DESCRIPTION	TYPE NO.
Tuning indicator especially designed for battery operated sets featuring low filament consumption (25mA), subminiature size and "on-off" indication. Ideal for transistorized computers.	IM3/DM70
Tuning indicator especially designed for battery operated sets featuring low filament consumption (25mA), subminiature size and "on-off" indication. Ideal for transistorized computers.	IN3/DM71
Tuning indicator featuring double sensitivity, clear indication even with weak signals.	6CD7/EM34
9 pin miniature tuning indicator for use in broadcast receivers and tape recorders. The deflection electrode is connected separately to a pin at the base. Converging dual fluorescent bar pattern.	6FG6/EM84
Designed especially as an audio level indicator for tape recorders.	6HU6/EM87

			CAPACITANCES - $\mu\mu f$				
Power Output Watts	Load Resistance K ohms	Cut-Off Bias Volts	G-P	Input	Output	DESCRIPTION	TYPE NO.
			–	–	–	High perveance twin diode. Rugged and reliable. For use in critical applications in which operational dependability is of primary importance.	5726
–	–	–12	0.02	4.0	2.9	Sharp cut-off pentode particularly suited for use as a wide band, high frequency amplifier. Ruggedized construction makes it suitable for critical applications in which operational dependability is of primary importance.	5654

[4]For transconductance of 1500 micromhos.

PREMIUM QUALITY TUBES (Continued)

TYPE NO.	PROTO-TYPE	HEATER		Amplification Factor	Transconductance (Micromhos)	TYPICAL OPERATION					
						PLATE			Grid Volts DC	SCREEN	
		Volts	Amps			Volts DC	Current ma-DC	Resistance K Ohms		Volts DC	Current ma-DC
5847[1]	404A	6.3	0.3	–	12500	160	13	–	+8.5	160	4.50
6201	12AT7	6.3	0.30	60	5500	250	10	10.9	R_k=200	–	–
		12.6	0.15								
6218/E80T		6.3	0.15	–	–	100	1.35	–	0	70	–
7316		6.3	0.3	19.5	3100	100	11.8	6250	–8.5	–	–
7643	Triode Section	6.3	0.33	18	5000	Supply 100	14		R_k=120 Ohms	–	–
	Pentode Section	6.3	0.33	40[2]	6200	Supply 170	10	0.4 meg	R_k=155 Ohms	Supply 170	2.8
7693/E90F		6.3	0.15	50	4600	250	7.4	1.3 meg		150	2.9
7694/E99F		6.3	0.15	27[2]	3600	250	9.2	1 meg	–20[4]	100	3.3
8233		6.3	0.6	30	45000	140	50	20	–1.5	140	5.5

[2]Grid 2 to Grid 1. [3]Plate Current = 10 μa approx.

PREMIUM QUALITY 10,000 HOUR TUBES[1]

TYPE	HEATER		CAPACITANCES			MAXIMUM RATINGS				
	Voltage	Current	Cold Values	Input	Output	Max. Anode Dissipation	Anode Voltage	Suppressor Grid Voltage	Screen Grid Voltage	Cathode Current
	volts	amps		$\mu\mu$f	$\mu\mu$f	watts	volts	volts	volts	ma
E92CC Twin Triode	6.3	0.4	one section	3.1	0.3	2.0[2] (absolute value)	300	–	–	15
5842[4] Triode	6.3	0.3	–	9.0	1.8	4.5	400	–	–	38
5920/E90CC Twin Triode	6.3	0.4	one section	3.4	0.35	2.0[2] (absolute value)	300	–	–	15
6084/E80F[3] Sharp cut-off amplifier pentode	6.3	0.3	–	5.0	7.3	1.3 (absolute value)	300	0	200	9
6085/E80CC[3] Twin Triode	Series 12.6	0.3	one section	2.6	3.5	2.0[2] (absolute value)	300	–	–	12
	Par. 6.3	0.6								
6211 Twin Triode	6.3	0.3	one section	2.9	0.35	1.5[2] (absolute value)	200	–	–	14
	12.6	0.15								

[1]These tubes are designed for a life of 10,000 hours or more. [2]Ratings and operating conditions apply to one section.

			CAPACITANCES - μμf				
Power Output Watts	Load Resistance K ohms	Cut-Off Bias Volts	G-P	Input	Output	DESCRIPTION	TYPE NO.
–	–	–	0.05	7.0	2.5	High-gain, miniature pentode for use in broad band amplification where its high figure of merit is required for Replacement purposes only. For new equipment design Amperex 6688 is recommended.	5847
–	–	–20	1.6	2.5	0.45	Premium quality twin triode designed for use as RF amplifier in grounded grid circuits; as a frequency changer below 300 mc; in mobile and industrial equipment with intermittent operation; and in on-off control applications where operation under cut-off conditions is required.	6201
–	–	–	–	2.2	2.0 max.	Ruggedized beam deflecting tube designed for use as a phase discriminator in impulse-governed oscillators.	6218/E80T
–	–	–	1.6	1.8	0.5	Medium mu long life, reliable twin triode with separate cathodes designed for application in computer circuits not critical as to hum, microphony and noise.	7316
–	–	–	1.5	2.5	1.5	Long-life, ruggedized triode-pentode. Pentode section designed for use as a mixer, RF or AF amplifier. Triode section designed for use as an oscillator up to 300 mc, multivibrator or blocking oscillator.	7643
–	–	–	<0.025	5.6	3.4		
–	–	6.5[3]	0.0035	5.0	4.2	Sharp cut-off, shock and vibration resistant HF pentode for mobile applications. Premium type replacement for 6BH6/6661.	7693/E90F
–	–	–	0.0035	4.5	5.2	Variable slope HF pentode for mobile and industrial applications. Shock and vibration resistant premium type replacement for 6BJ6/6662.	7694/E99F
–	–	–6	110	18	4	Double frame grid power pentode for video, pulse or deflection amplifier service in micro wave, radar, TV or measuring instruments. It has a plate dissipation of 10 watts.	8233

[4]For transconductance of 1500 micromhos.

TYPICAL CHARACTERISTICS										
Screen Grid Voltage	Anode Voltage	Cathode Resistor	Anode Current	Screen Grid Current	Trans-conductance	Amplification Factor	Plate Resistance	Maximum Length	Maximum Diameter	TYPE
volts	volts	ohms	ma	ma	micromhos		megohms	inches	inches	
–	150	–	8.5	–	6,000	45	0.0083	2-5/8	3/4	E92CC Twin Triode
–	130	360	27	–	27,000	43	0.0016	1-3/4	7/8	5842[4] Triode
–	100	–	8.5	–	6,000	27	0.0045	2-5/8	3/4	5920/E90CC Twin Triode
100	250	550	3	0.65	1,850	25	1.5	2-5/8	7/8	6084/E80F[3] Sharp cut-off amplifier pentode
–	250	920	6	–	2,700	27	0.01	3-1/16	7/8	6085/E80CC[3] Twin Triode
–	100	470	4.6	–	3,600	27	0.0075	2-5/8	7/8	6211 Twin Triode

[3]Rugged construction. [4]Available to military specifications.

PREMIUM QUALITY 10,000 HOUR TUBES[1] (Continued)

TYPE	HEATER		CAPACITANCES			MAXIMUM RATINGS				
	Voltage	Current	Cold Values	Input	Output	Max. Anode Dissipation	Anode Voltage	Suppressor Grid Voltage	Screen Grid Voltage	Cathode Current
	volts	amps		μμf	μμf	watts	volts	volts	volts	ma
6227/E80L[3] Power Pentode	6.3	0.75	–	11.0	7.0	8.0 (absolute value)	300	0	300	50
6463 medium mu twin triode	6.3 12.6	0.6 0.3	one section	3.4	0.5	4.4	330	–	–	31
6686/E81L Power Pentode	6.3	0.375	–	11.5	6.5	4.5 (design center value)	210	0	210	30
6687/E91H dual control heptode	6.3	0.27	–	5.4	7.6	1.0	250	-100 +0	100	20
6688 [3] [4] Broad-band amplifier pentode 6688 A	6.3	0.3	–	7.5	3.0	3.0 (absolute value)	210	0	175	25
6689/E83F wide-band amplifier pentode	6.3	0.3	–	8.0	3.6	2.1 (design center value)	210	0	210	16
6922/E88CC[3] Twin Triode	6.3	0.3	one section	3.1	0.5	1.5[2] (design center value)	220	–	–	20
7062 Twin Triode	6.3 12.6	0.400 0.200	one section	3.5	0.5	2.0[2] (absolute value)	600	–	–	20
7119/E182CC Twin Triode	Series 12.6 Par. 6.3	0.4 0.8	one section	5.3	6.7	4.5 (absolute value)	300	–	–	60
7308/E188CC[4] Twin Triode	6.3	0.335	one section	3.1	1.75	2.0	250	–	–	22
7534 Pentode	6.3	1.7	–	35	17	27.5	900	–	250	300
7737[4] Pentode	6.3	0.32	–	7.6	3.3	3	210	–	175	25
7788 Pentode	6.3	0.34	–	16.5	3.3	5	250	–	200	50

[1]These tubes are designed for a life of 10,000 hours or more. [2]Ratings and operating conditions apply to one section.

UHF SPECIAL PURPOSE TUBES

TYPE NO.	FILAMENT		Plate Dissipation Watts	Mu	Transconductance (micromhos)	PLATE		Power Output Characteristics
	Volts	Amps				Volts	Ma	
6923/EA52	6.3	0.3	–	–	–	1000 V at <100 mc 1000 x $\frac{fo^1}{f}$ at >100 mc	0.3	–
EFP60	6.3	0.37	2	–	25,000	300	20	–
6Q4/EC80	6.3	0.45	4	30	12,000	550	15	15 db gain at 300 mc (Bandwidth 4.5 mc)
6R4/EC81	6.3	0.24	5	16	5,500	300	27.7	Power output 1.1 w at 750 mc

[1]fo = 100 mc

TYPICAL CHARACTERISTICS										
Screen Grid Voltage	Anode Voltage	Cathode Resistor	Anode Current	Screen Grid Current	Trans-conductance	Amplification Factor	Plate Resistance	Maximum Length	Maximum Diameter	TYPE
volts	volts	ohms	ma	ma	micromhos		megohms	inches	inches	
250	250	270	24	3.3	9,000	21.5	0.09	3-1/16	7/8	6227/E80L[3] Power Pentode
–	250	620	14.5	–	5,200	20	–	2-5/8	7/8	6463 medium mu twin triode
210	210	120	20	5.3	11,000	36	0.3	2-5/8	7/8	6686/E81L Power Pentode
Dual control heptode for use as a gated amplifier in computer and "on-off" control circuits. With either control at –10 volts and plate voltage at 150 volts, the plate current will be less than 0.2 ma. With both control grids at 0 volts, the plate current is nominally 5.75 ma. Direct replacement for 5915A.								2-1/8	3/4	6687/E91H dual control heptode
160	190	630	13	3.3	16,500	50	0.09	1-3/4	7/8	6688 [3] [4] Broad-band amplifier pentode
										6688 A
120	210	165	10	2.1	9,000	34	0.5	2-5/8	7/8	6689/E83F wide-band amplifier pentode
–	100	680	15	–	12,500	33	0.00264	2-3/16	7/8	6922/E88CC[3] Twin Triode
–	150	–	8.5	–	6,400	46	0.0072	2-5/8	7/8	7062 Twin Triode
–	120	–	36	–	15,500	24.5	0.0016	2-5/8	7/8	7119/E182CC Twin Triode
–	100 (supply)	680	15	–	12,500	33	–	2-3/16	7/8	7308/E188CC[4] Twin Triode
150	250	–	100	4	25,000	6.5	–	5	1-9/16	7534 Pentode
–	–	630	13	3.3	16,500	53	0.1	1-1/2	7/8	7737[4] Pentode
–	–	360	35	5	50,000	60	–	2-13/16	7/8	7788 Pentode

[3]Rugged construction. [4]Available to military specifications.

Max. Freq. mc	CAPACITANCES μμf			DESCRIPTION	TYPE NO.
	G-P	Input	Output		
1000	–	$\leq$0.5	–	Disc-seal, vacuum diode for UHF voltmeters and monitoring devices. Anode pin connection adaptable for use as probe contact.	6923/EA52
–	0.004	9.2	6	Secondary emission pentode for wide band amplifier application where stability and high ratio of transconductance to capacities is important. Used in high speed computer service and high quality TV applications.	EFP60
500	0.06	5.4	3.4	Radiation-cooled triode, button type base, indirectly heated cathode. For use as amplifier and mixer up to 500 mc. Ideally suited for UHF television, baloon sondes, measuring equipment, etc.	6Q4/EC80
1200	1.5	1.7	0.5	Radiation-cooled triode, standard button base, indirectly heated cathode. Used as oscillator up to 1200 mc. High efficiency at high frequencies.	6R4/EC81

UHF SPECIAL PURPOSE TUBES (Continued)

TYPE NO.	FILAMENT		Plate Dissipation Watts	Mu	Transconductance (micromhos)	PLATE		Power Output Characteristics
	Volts	Amps				Volts	MA	
7699	6.3	0.6	6	–	10,500	275	90	–
EA53	6.3	0.3	–	–	–	Inverse 1000 V at <1000 mc $1000 \times \frac{fo^1}{f}$ at > 100 mc	0.3	– –
8254	6.3	0.185	1.5		14,500	110	22	

[1] fo = 100 mc

RADIATION COUNTER TUBES[1] (PERMANENT SENSITIVITY)

TYPE NO.	Filling	Operating Voltage D.C.	Plateau	Slope Plateau	Dead Time (Approx. μ sec.)	Background C/M (Shielded 2" Lead)
75N-7	Neon + quenching admixture	700[2]	in excess of 125 volts	15% per 100 volts max.	100	50 max.
75NB3-7	Neon + quenching admixture	700[2]	in excess of 125 volts	15% per 100 volts max.	100	50 max.
75NB3-9	Neon + halogen admixture	825	In excess of 125 volts	15%/100 volts	100	50 max.
76NB3	Neon + halogen admixture	arbitrary within plateau range	in excess of 125 volts	< 15% per 100 volts	100	50
90CB	Neon + quenching admixture	1400	in excess of 200 volts	10% per 100 volts max.	100	50 max.
90NB-4	Neon + quenching admixture	900[2]	in excess of 200 volts	10% per 100 volts max.	100	50 max.
100C	Argon + quenching admixture	1200	in excess of 300 volts	5% to 10% per 100 volts	200	50 max.
100CB	Argon + quenching admixture	1200	in excess of 300 volts	5% to 10% per 100 volts	200	50 max.
100HB	Helium + organic quenching agent	1300	in excess of 250 volts	1.5% per 100 volts	150	50 max.
100LB	Neon, argon + quenching admixture	arbitrary within plateau range	450-750 volts	1% avg. 2% max. per 100 volts	250	25 max.
100N	Neon + quenching admixture	900[2]	in excess of 200 volts	5% to 10% per 100 volts	200	50 max.
100NB	Neon + quenching admixture	900[2]	in excess of 200 volts	5% to 10% per 100 volts	200	50 max.
120C	Argon + quenching admixture	1200	in excess of 300 volts	5% to 10% per 100 volts	300	100 max.
120N	Neon + quenching admixture	900	in excess of 200 volts	5% to 10% per 100 volts	300	100 max.
120NB	Neon + quenching admixture	900[2]	in excess of 200 volts	5% to 10% per 100 volts	300	100 max.
150N	Neon + quenching admixture	900	in excess of 180 volts	10% per 100 volts max.	150	75 max.
150NB	Neon + quenching admixture	900	in excess of 180 volts	10% per 100 volts max.	150	75 max.
153C	Argon + quenching admixture	1500	in excess of 400 volts	3% to 8% per 100 volts	150	60 max.
155N	Neon + halogen admixture	arbitrary within plateau range	in excess of 180 volts	10% per 100 volts max.	150	75

NOTE: All cathodes are stainless steel. Operating temperature range, −55°C to +75°C.

[1] Detailed data available upon request.

[2] Also available in 600 volt operating voltage. Specify Type followed by -6. For 900 volt operation, specify Type followed by -9.

Max. Freq. mc	CAPACITANCES μμf			DESCRIPTION	TYPE NO.
	G-P	Input	Output		
500	0.15	6.4	1.6	Wide band push-pull amplifier tube for use in test instruments, distributed amplifiers and computers. Push-pull construction offers high gain band width product coupled with low output capacitance.	7699
1000	–	0.5	–	Disc seal, vacuum diode for UHF voltmeters and monitoring devices. Anode pin connection suitable for use as probe contact. Coaxial filament connection suited for use in coaxial probes.	EA53
Z in = 450Ω at 250 mc	1.9	3.5	0.3	Special quality triode for use as an amplifier in probes.	8254

Average Mica Window or Wall Thickness	Effective Dia. of Mica Window (Inches)	Effective Cathode Dimensions (Inches)	Max. Overall Tube Dimensions (Inches)	Life Expectancy (Counts)	Application
150 mg/cm²	–	2.687 x 0.625 O.D. x 0.009 wall	0.625 x 4.375	Unlimited by use	Gamma
150 mg/cm²	–	2.687 x 0.625 O.D. x 0.009 wall	0.625 x 4.312 (3 pin base)		Gamma
0.009 inches	--	2.687 x 0.607 O.D. x 0.009 wall	4.31 x 0.62 O.D.		Gamma
–	–	5.812 x 0.605 I.D. x 0.009 wall	0.625 x 7.531		Gamma
30-40 mg/cm²	–	3 x 0.625 O.D.	0.625 O.D. x 5.625 (3 pin base)		Beta & Gamma
30-40 mg/cm²	–	3 x 0.625 O.D.	0.625 O.D. x 5.625 (3 pin base)		Beta & Gamma
.0005 in. = 3.5 mg/cm² = 12.70 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.5 x 3.75		Beta & X-Ray
.0005 in. = 3.5 mg/cm² = 12.70 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.375 x 4.344 (4 pin base)		Beta & X-Ray
.0005 in. = 3.5 mg/cm² = 12.70 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.375 x 4.344 (4 pin base)	1.5×10^8 approx.	Beta
2.5-3.5 mg/cm²	1.093	1.42 x 1.5 O.D. x 0.051 wall	1.312 x 4.344 (4 pin base)	Unlimited by use	Beta & Gamma
.0005 in. = 3.5 mg/cm² = 12.70 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.5 x 3.75		Beta
.0005 in. = 3.5 mg/cm² = 12.70 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.375 x 4.344 (4 Pin Base)		Beta
.0008 in. = 5.6 mg/cm² = 20.32 microns	1.906	2.687 x 2 O.D. x 0.078 wall	2.375 x 5.125		Beta & X-Ray
.0008 in. = 5.6 mg/cm² = 20.32 microns	1.906	2.687 x 2 O.D. x 0.078 wall	2.375 x 5.125		Beta
.0008 in. = 5.6 mg/cm² = 20.32 microns	1.906	2.687 x 2 O.D. x 0.078 wall	2.312 x 5.75 (4 pin base)		Beta
.0005 in. = 3.5 mg/cm² = 12.70 microns	0.781	4 x 0.875 O.D. x 0.046 wall	1 x 6.625 (4 pin base)		Beta & Gamma
.0005 in. = 3.5 mg/cm² = 12.70 microns	0.781	4 x 0.875 O.D. x 0.046 wall	1.156 x 7.125		Beta & Gamma
.0005 in. = 3.5 mg/cm² = 12.70 microns	0.781	4.375 x 0.875 O.D.	1 O.D. x 6 lg.		X-Ray
1.4-2.0 mg/cm²	0.950	4.375 x 0.875 O.D. x 0.046 wall	0.937 x 6		Beta, Gamma, Alpha

RADIATION COUNTER TUBES[1] (PERMANENT SENSITIVITY) (Continued)

TYPE NO.	Filling	Operating Voltage D.C.	Plateau	Slope Plateau	Dead Time (Approx. μ sec.)	Background C/M (Shielded 2" Lead)
160G	Neon + halogen quenching admixture	700	680-780 volts	15% per 100 volts	–	40 max.
171G	Neon, argon, + halogen admixture	630	700-840 volts	8%/100 volts	--	40
200C	Argon + quenching admixture	1200	in excess of 300 volts	5% to 10% per 100 volts	200	50 max.
200CB	Argon + quenching admixture	1200	in excess of 300 volts	5% to 10% per 100 volts	200	50 max.
200HB	Helium + organic quenching agent	1300	in excess of 250 volts	1.5% per 100 volts	150	50 max.
200LB	Neon, argon + quenching admixture	arbitrary, within plateau range	450-750 volts	1% avg. 2% max. per volt	250	25 max.
200N	Neon + quenching admixture	900	in excess of 200 volts	5% to 10% per 100 volts	200	50 max.
200NB	Neon + quenching admixture	900	in excess of 200 volts	5% to 10% per 100 volts	200	50 max.
240N	Neon + quenching admixture	850-900	in excess of 150 volts	Less than 15% per 100 volts	100	50 max.
300PC	Xenon-methane	1850	--	--	--	--
310PC	P-10	1500 for pulse amp. of 10 mv.	Resolution with Fe 55 < 30%	–	–	–
311PC	P-10	1425 for pulse amp. of 10 mv.	Resolution with Fe 55 < 30%	–	–	–
312PC	P10	1225-1525	--	--	--	--
315PC	P-10	1500 for pulse amp. of 10 mv.	Resolution with Fe 55 < 30%	–	–	–
400PC	Methane 99.6% or Argon 10% Methane	1400 1200	Pulse amp. for 5 alpha particle is 0.5 V.			
500N	Neon+ Argon + halogen	500	200		75	10
505N	Argon + halogen	875	400		–	–
506N	Argon + halogen admixture	875	900-1200 volts	2%/100 volts	--	--
507N	Krypton + halogen admixture	1000	1050-1300 volts	4%/100 volts	--	--
912NB-4[3]	Neon + quenching admixture	900	in excess of 200 volts	10% per 100 volts max.	100	75 max.
18503	Neon, argon + halogen quenching agent	arbitrary, within plateau range	400-600 volts	0.01%/volt avg. 0.02%/volt max.[8]	100	10 max.
18504	Neon, argon + halogen quenching agent	arbitrary, within plateau range	400-600 volts	0.01%/volt avg. 0.02%/volt max.[8]	100	10 max.
18505	Neon, argon + halogen quenching agent	arbitrary, within plateau range	470-750 volts	0.01%/volt avg. 0.02%/volt max.[8]	200	15 max.
18506	Neon, argon + halogen quenching agent	arbitrary, within plateau range	470-800 volts	0.01%/volt avg. 0.02%/volt max.[8]	250	25 max.

NOTE: All cathodes are stainless steel. Operating temperature range, −55°C to +75°C.

[3] Also available with 3 Pin Base, specify Type 912NB-3. Overall tube length = 11-3/8".

Average Mica Window or Wall Thickness	Effective Dia. of Mica Window (Inches)	Effective Cathode Dimensions (Inches)	Max. Overall Tube Dimensions (Inches)	Life Expectancy (Counts)	Application
–	–	6.312 x 0.406 O.D. x 0.187 wall	0.406 x 8.125	Unlimited by use	Gamma
0.20 inches	--	0.410 O.D. x 17 x 0.20 wall	0.418 O.D. x 18.750		Gamma Detector for High Temperature Applications
.0002 in. = 1.4 mg/cm² = 5.08 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.5 x 3.75		Alpha, Beta, Gamma & X-Ray
.0002 in. = 1.4 mg/cm² = 5.08 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.375 x 4.343 (4 pin base)		Alpha, Beta, Gamma & X-Ray
.0002 in. = 1.4 mg/cm² = 5.08 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.375 x 4.343 (4 pin base)	1.5×10^8 approx.	Alpha & Beta
1.4-2.0 mg/cm²	1.093	1.42 x 1.5 O.D. x 0.051 wall	1.937 x 4.344 (4 pin base)	Unlimited by use	Alpha, Beta & Gamma
.0002 in. = 1.4 mg/cm² = 5.08 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.5 x 3.75		Alpha & Beta
.0002 in. = 1.4 mg/cm² = 5.08 microns	1.093	1.5 x 1.187 O.D. x 0.093 wall	1.375 x 4.344 (4 pin base)		Alpha & Beta
.0002 in. = 1.4 mg/cm² = 5.08 microns	0.406	4 x 0.625 O.D. x 0.010 wall	0.625 x 5.875 (3 pin base)		X-Ray
1.5-2.0 mg/cm²	0.250	3.25 x 0.834 O.D.	4.090 x 1 O.D.	Unlimited by use	Side window sealed proportional counter for low energy applications as Mossbauer studies, X-ray diffraction and spectrometry.
2 mil beryllium	0.5	0.687 O.D. x 0.844	0.687 O.D. x 1.781 lg.		Low energy electrons > 30 kev and gamma or X-Rays < 11Å
1 – 1.5 mg/cm²	0.25	0.687 O.D. x 0.844	0.687 O.D. x 1.781 lg.		Low energy electrons > 30 kev and gamma or X-Rays < 11Å
2 mil beryllium	0.250	0.688 O.D. x 0.844	0.688 O.D. x 1.78		End window sealed proportional for low energy electrons >15 kev and gamma or X-rays <10Å
2.5-3.5 mg/cm²	0.875	1 O.D. x 0.912	1 O.D. x 1.975 lg.		Low energy electrons > 40 kev and gamma or X-Rays < 9Å
–	–	–	–	Unlimited by use	2π windowless flow counter for measurement of alpha and low energy beta particles.
1 – 1.5 mg/cm²	0.3437	0.3437 O.D. x 1.562	0.687 O.D. x 3 lg.		Low energy electrons > 30 kev and gamma or X-Rays ≦ 11Å
1.4 – 2 mg/cm²	–	0.5 O.D. x 1.75	0.5 O.D. x 3 lg.		Low energy electrons > 35 kev and gamma or X-Rays ≦ 10Å
1.4-2.0 mg/cm²	0.360	0.5 O.D. x 1.75	0.5 O.D. x 3		Ruggedized low energy X-Ray and gamma Detector
1.4-2.0 mg/cm²	0.360	0.5 O.D. x 1.75	0.5 O.D. x 3		Ruggedized Low energy X-Ray and gamma detector
30-40 mg/cm²	–	7 x 0.625 O.D.	0.625 x 11.781 (4 pin base)		Beta & Gamma
250 mg/cm²	–	1.57 x 0.57 I.D. x 250 mg/cm²	0.594 x 1.687		Gamma
2-3 mg/cm²	0.35	1.57 x 0.57 I.D. x 250 mg/cm²	0.594 x 1.687		Beta, Gamma
1.5-2 mg/cm²	0.78	1.422 x 0.781 I.D. x 0.047 wall	1.015 x 2.25		Alpha, Beta, Gamma
2.5-3.5 mg/cm²	1.09	1.422 x 1.094 I.D. x 0.05 wall	1.344 x 2.25		Beta, Gamma

[4] Shielded with 2'' mercury within 4'' iron.
[5] Can be used in radiation fields up to 200 roentgens per hour.
[6] Can be used in radiation fields up to 20-50 roentgens per hour.
[7] Can be used in radiation fields up to 500-1000 roentgens per hour.
[8] At 100 counts per second, R = 10, megohms.

RADIATION COUNTER TUBES[1] (PERMANENT SENSITIVITY) (Continued)

TYPE NO.	Filling	Operating Voltage D.C.	Plateau	Slope Plateau	Dead Time (Approx. μ sec.)	Background C/M (Shielded 2" Lead)
18508	Neon, argon + halogen admixture	Arbitrary within plateau range	650-900 volts	4%/100 volts max.	350	150
18509[5]	Neon, argon + halogen quenching agent	arbitrary, within plateau range	400-550 volts	0.07%/volt avg. 0.15%/volt max.[8]	60	2 max.
18510	Neon, argon or halogen admixture	Arbitrary within plateau range	500-700 volts	7%/100 volts	--	15
18515	Neon, argon, + halogen quenching admixture	550	450-650 volts	3% per 100 volts	150	5 max.[4]
18516	Neon, argon, + halogen quenching admixture	550	450-650 volts	3% per 100 volts	200	8 max.[4]
18517	Neon, argon, + halogen quenching admixture	1000	800-1200 volts	4% per 100 volts	1000	80 max.[4]
18518	Neon, argon, + halogen quenching admixture	1000	800-1200 volts	4% per 100 volts	1000	80 max.[4]
18522	Neon, argon + halogen admixture	Arbitrary within plateau range	700-1000 volts	3%/100 volts	500	100 c/hr.
18526	Neon, argon + halogen admixture	Arbitrary within plateau range	450-750 volts	2%/100 volts	200	20
18529[7]	Neon, argon, + halogen quenching agent	arbitrary, within plateau range	500-650 volts	25%/volt max.[8]		1
18536	Neon, argon + halogen admixture	Arbitrary within plateau range	500-750 volts	3%/100 volts	70	10
18546	Neon, argon + halogen quenching agent	Arbitrary within plateau range	700-1000 volts	3%/100 volts	30 μsec.	50
18550[6]	Neon, argon, + halogen quenching agent	arbitrary, within plateau range	500-650 volts	0.04%/volt. max.[8]	75	5 max.

NOTE: All cathodes are stainless steel. Operating temperature range, −55°C to +75°C.

[1] Detailed data available upon request.

[2] Also available in 600 volt operating voltage. Specify Type -6. For 900 volt operation, specify Type -9.

[3] Also available with 3 Pin Base, specify Type 912NB-3. Overall tube length = 11-3/8".

NEUTRON DETECTORS

TYPE NO.	Filling	Operating Voltage	Resolution
B300D Series	Argon	200-500	--
BF101S6 / BF102S6	Boron trifluoride enriched in B^{10} to 96%	2100	25% max.
BF101S8 / BF102S8	Boron trifluoride enriched in B^{10} to 96%	2100	25% max.
BF101S11 / BF102S11	Boron trifluoride enriched in B^{10} to 96%	2100	25% max.
F175D5	Argon	500	--

Average Mica Window or Wall Thickness	Effective Dia. of Mica Window (Inches)	Effective Cathode Dimensions (Inches)	Max. Overall Tube Dimensions (Inches)	Life Expectancy (Counts)	Application
Wall Thickness 650 mg/cm^2	--	2.756 x 2.362 I.D.	--	Unlimited by use	Well-Type Gamma Counter
80-100 mg/cm^2	–	0.063 x 0.197 O.D. x 80-100 mg/cm^2	0.281 x 1.5		Gamma
2-3 mg/cm^2	0.35	1.417 x 0.583 I.D.	3.228 x 0.748 O.D.		Flow through type counter for Beta & Gamma in liquids.
1.5 - 2.0 mg/cm^2	0.781	0.5 x 0.781 O.D. x 0.046 wall	1.031 x 1.281		Beta
10 mg/cm^2	1.093	0.718 x 1.093 I.D. x 0.062 wall	1.344 x 1.468		Beta
–	–	–	–		Gamma & Cosmic Ray
–	–	–	–		Gamma & Cosmic Ray
0.020 inches	--	15.8 x 1.54 O.D.	18.1 x 1.614 O.D.		Large Volume Gamma or Cosmic Ray use.
1.5-2 mg/cm	1.09	1.46 x 1.1 I.D.	2.249 x 1.217 O.D.		Alpha, Beta and Gamma
80-100 mg/cm^2	–	0.328 x 0.187 I.D. x 80-100 mg/cm^2	1.062 x 0.203		Gamma
1.5-2mg/cm	1.09	1.09 I.D. x 0.67	1.339 x 1.339 O.D.		Beta
10 mg/cm^2	2.00	1.102 x 2.007 I.D.	1.930 x 2.284 O.D.		Beta
36 ± 4 mg/cm^2	–	1.062 x 0.31 I.D.	0.391 x 2.125		Beta, Gamma

[4] Shielded with 2'' mercury within 4'' iron.
[5] Can be used in radiation fields up to 200 roentgens per hour.
[6] Can be used in radiation fields up to 20-50 roentgens per hour.
[7] Can be used in radiation fields up to 500-1000 roentgens per hour.
[8] At 100 counts per second, R = 10, megohms.

Neutron Sensitivity	Max. Operating Temperature	Background	Effective Cathode Dimensions (inches)	Application
1c/S/10^3n to 1c/S/10^8n	+200°C	<1c/hr	Window Diameter 66 cm	Monitoring neutron beams from reactor experimental holes
6.6 c/S/ unit flux	75°C	<1c/S	1.00 O.D. x 6.375	Available with either MHV or HN type connector
9.3 c/S/ unit flux	75°C	<1c/S	1.00 O.D. x 8.75	Tubes are available in either S. S, or Aluminum
11.7 c/S/ unit flux	75°C	<1c/S	1.00 O.D. x 11.375	
1c/S per 10n/ cm^2/sec. 0.6 c/hr.	--	<1c/hr	O.D.–1 3/4 Length– 7 3/8	Reactor Monitoring and Control

RECTIFIERS — DIODES

TYPE NO.	FILAMENT		Fil. Heating Time	Tube Drop	Peak Inverse Anode Volts	ANODE CURRENT		Surge Current	TEMPER-ATURE
	Volts	Amps	(sec)	(Volts)	(Volts)	Peak Amps	Average Amps	Amps	Ambient
3B-28	2.5	5.0	5	10.0	10,000	1.0	0.250	–	–
4B-32	5.0	7.5	30	10.0	10,000	5.0	1.25	50.0	–
249-B	2.5	7.5	15	15.0	7,500	2.5	0.640	–	–
575-A	5.0	10.0	30	10.0	15,000	6.0	1.5	60.0	–
673	5.0	10.0	30	10.0	15,000	6.0	1.5	60.0	–
857-B	5.0	30.0	60	10.0	22,000	40.0	10.0	400.0	–
866-AX	2.5	5.0	20	10.0	10,000	1.0	0.250	–	–
869-B	5.0	18.0	60	10.0	20,000	10.0	2.50	–	–
869-BL	5.0	18.0	60	10.0	20,000	10.0	2.50	–	–
872-AX	5.0	7.5	30	10.0	10,000	5.0	1.25	50.0	–
6339	6.3	1.5	30	–	WITH LIQUID COOLING				
					16,000 10,000	0.250 0.400	0.065 0.100	–	–65 to +165°
					WITHOUT COOLING – AIR OPERATION				
					12,000	0.200	0.050	–	–55 to +85°
6508	5.0	12.5	90	12.0	21,000	10.0	2.5	100.0	–
6693	5.0	11.5	60	12.0	2,500 15,000	10.0 12.0	5.0 3.0	200.0 120.0	+15 to +55° +15 to +35°
7136	5.0	11.5	60	12.0	15,000	12.0	2.5	120.0	+15 to +35°
8008-AX	5.0	7.5	30	10.0	10,000	5.0	1.25	50.0	–
8020-AX	5.0	6.0	5	200V at 100ma	40,000	0.750	0.100	–	–

MICROWAVE TRIODES

TYPE NO.	FILAMENT		Plate Dissi-pation (Watts)	Mu	Trans-con-ductance (microm-hos)	PLATE		POWER OUTPUT CHARACTERISTICS			
	Volts	Amps				Volts	Amps	Power (Watts)	Gain (DB)	Bandwidth (mc)	Frequency (mc)
5861/EC55	6.3	0.4	10	30	6,000	250	0.020	2.8	OSC	OSC	1,000
								0.5	OSC	OSC	3,000
8108	6.3	0.73	10	43	21,000	180	0.060	1.8	8	50-0.1 db	4,000
								0.5	13	50-0.1 db	4,000
								0.5	19	25-3.0 db	3,000
								0.25	0	Doubler	6,000
EC158	6.3	0.85	30	30	25,000	180	0.140	5	8	50-0.1 db	4,000
								2	12	50-0.1 db	4,000

PHOTOMULTIPLIER TUBES

TYPE NO.	Min. Useful Photocathode Diameter (mm)	Number of Stages	Base	Maximum Spectral Response (Angstroms)	Reso-lution Ce 137	Minimum Photocathode Sensitivity (μA/lm)	Average Photocathode Sensitivity (μA/lm)	Minimum Anode Sensitivity (A/lm)	For a Supply Voltage of (V)	Minimum Gain at 2000 V
150 AVP*	32	10	duodecal	4200		25	50	60	1800	–

*See XP1010

RANGE (°C) Mercury	DESCRIPTION	TYPE NO.
–	Xenon gas filled half-wave rectifier with wider temperature ranges than mercury-vapor tubes. Used largely by armed services to replace 866-A's.	3B-28
–	Xenon gas filled half-wave rectifier with wider temperature ranges than mercury-vapor tubes. Used largely by armed services to replace 872-A's.	4B-32
+25 to +70°	Convection-cooled mercury-vapor half-wave rectifier. Used in most Western Electric r-f equipment.	249-B
+20 to +50°	Convection-cooled mercury-vapor half-wave rectifier. Refer to 7136 for improved version.	575-A
+20 to +50°	Convection-cooled mercury-vapor half-wave rectifier. Refer to 6693 for improved version.	673
+30 to +40°	Mercury-vapor half-wave rectifier with low voltage drop. Extremely popular in most high power broadcasting stations. Convection cooled.	857-B
+25 to +70°	Mercury-vapor half-wave rectifier of Amperex own design. More rugged trouble-free operation at only slight additional cost. Convection cooled.	866-AX
+30 to +40°	Mercury-vapor half-wave rectifier. Refer to type 6508, economy version.	869-B
+30 to +40°	Electrically same as 869-B. Base has flexible filament leads with spade lugs for better, low-resistance contact with socket.	869-BL
+20 to +60°	Mercury-vapor half-wave rectifier. Universally used by almost every user and designer of H-V equipment. Convection cooled.	872-AX
–	High vacuum clipper diode and rectifier. Miniature version of 3B29 for liquid immersion cooling or air operation.	6339
–		
+25 to +45°	Mercury vapor rectifier for relatively high voltage and current. A high quality, long-life tube priced lower than any tube in its class on the market.	6508
+25 to +75° +25 to +55°	Single-anode, mercury vapor rectifier with ratings, intermediate between standard types 575A and 869B. Delivers 9 amps up to 12 KV in a full wave, 3 phase power supply. Three tubes in a three phase half-wave power supply deliver 6 KV at 9 amps using only one filament transformer. Has large contact area, industrial base preventing base contact oxidation. Priced low for replacement market and original equipment.	6693
+25 to +55°	Single anode, mercury vapor, high voltage rectifier. Plate current ratings intermediate between types 575-A and 6693. Cathode and anode design similar to 6693 but with 575-A base. Recommended replacement for 575-A in older equipment. For new equipment design, the 6693 is recommended.	7136
+20 to +60°	Mercury-vapor half-wave rectifier similar to 872-A characteristics; with heavy long pin industrial base. Used by armed services and in commercial applications. Convection cooled.	8008-AX
–	Half-wave, high vacuum rectifier with high inverse voltage and low average current. Used in radar and precipitator power supplies.	8020-AX

CAPACITANCES (pf) G-P	Input	Output	Maximum Frequency (mc)	DESCRIPTION	TYPE NO.
1.3	1.8	0.03	3,000	Disc-seal triode, for amplifier and oscillator applications.	5861/EC55
1.4	3.0	0.035	> 6,000	Disc-seal triode, for amplifier, oscillator doubler or tripler applications. Long life.	8108
1.75	4.0	0.055	> 6,000	Disc-seal triode, for amplifier, oscillator doubler or tripler applications. Long life.	EC158

Average Anode Sensitivity (A/lm)	For a Supply Voltage of (V)	Maximum Direct Dark Current (nA)	For an Anode Sensitivity of (A/lm)	Or a Gain of	Maximum Anode Dissipation (W)	Ratio Luminous Flux/Anode Current Linear up to (voltage distribution A, see instr. for use) (ma)	Ratio Luminous Flux/Anode Current Linear up to (voltage distribution B, see instr. for use) (ma)	TYPE NO.
300	1800	50	60	–	0.5	30	100	150 AVP

PHOTOMULTIPLIER TUBES

TYPE NO.	Min. Useful Photocathode Diameter (mm)	Number of Stages	Base	Maximum Spectral Response (Angstroms)	Resolution Cs-137	Minimum Photocathode Sensitivity (μA/lm)	Average Photocathode Sensitivity (μA/lm)	Minimum Anode Sensitivity (A/lm)	For a Supply Voltage of (V)	Minimum Gain at 1800 V
152AVP	14	10		4200		25	40	30	1800	$5x10^6$
50 AVP	32	11	duodecal	4200		25	50	60	1800	–
51 UVP	32	11	duodecal	4000		25	50	60	1800	–
52 AVP	20	10	spec. 13 pin	4200		15	30	15	1800	–
53 AVP	44	11	diheptal	4200		25	50	60	1800	–
53 UVP	44	11	diheptal	4000		25	50	60	1800	–
54 AVP	111	11	diheptal	4200		25	50	100	1800	–
55 AVP	44	15	bidecal	4200		25	50	–	–	10^8
56 AVP	42	14	bidecal	4200		–	50	–	–	10^8
57AVP	200	11	diheptal	4200				60	1800	$5 \cdot 10^6$
58AVP	110	14	bidecal	4200		–	50	–	3000	$>10^8$
150 CVP	32	10		8000		–	20	100	1800	$5 \cdot 10^6$
153 AVP		11	diheptal		<9%	For all other chacteristics, see 53 AVP				
XP1010					<9%	Selected for low noise and resolution. For all other characteristics, see 150 AVP				
XP1030	63.5	10		4200		40	60	100	1800	$4x10^6$
XP1031	63.5	10		4200	<9%	40	70	100	1800	$4x10^6$

INSTRUCTIONS FOR USE — To take full advantage of the possibilities offered by the Amperex photomultipliers and to insure a long life of the tubes, the following rules must be observed.

Voltage distribution	A[1]	B
Between D_1 and PK	$1.5\ V_0$[2]	$2\ V_0$[2]
Between D_2 and D_1	V_0[3]	V_0[3]
Between D_3 and D_2	V_0	V_0
Between D_{n-3} and D_{n-4}	V_0	V_0
Between D_{n-2} and D_{n-3}	V_0	$1.25\ V_0$
Between D_{n-1} and D_{n-2}	V_0	$1.5\ V_0$
Between D_n and D_{n-1}	V_0	$1.75\ V_0$
Between anode and D_n	$0.75\ V_0$	$2\ V_0$

[1] When the supply voltage is low, special attention has to be paid to the fact that the voltage between photocathode and dynode No. 1 may never be less than 180 V and that the voltage between the other electrodes may never drop below 80 V. (With the tubes 50 AVP and 51 UVP between D_3 and D_1 at least 160 V.)

[2] In case of gamma-spectrometry this must be between 2 and $3V_0$.

[3] With the tubes 50 AVP and 51 UVP between D_3 and D_1: $2V_0$.

[4] n means last dynode i.e.:
n = 10 for the 150 AVP and 52 AVP
n = 11 for the 50 AVP, 51 UVP, 53 AVP, 53 UVP and 54 AVP
n = 14 for the 56 AVP
n = 15 for the 55 AVP

COUNTING, SELECTING and INDICATING TUBES

TYPE NO.	FILAMENT		Maintaining Voltage (V)	at Cathode Current (μ a)	Maximum Counting Rate (KC)	Bias (V)	Minimum A-K Ignition Voltage (V)
	Volts	Amps					
6370/E1T	6.3	0.3	–	–	100	–	–
6977[1]	1.0	0.3	Anode: 50 DC	Zero light output at 3.5 grid volts. Maximum light output at 0 grid volts.			
ET51	6.3	0.3	T:100 S: 100	T:5.5 S: 1.0	1,000	+25 V (Grid)	
Z303C	–	–	186 to 196	300	4	+35 Guide - 20 Cath.	–
Z502S	–	–	186 to 196	300	4	+35 Guide - 20 Cath.	–
Z503M	–	–	108	60	–	–	129
Z550M	–	–	82	3 ma	–	Fires on 5 V above common starter voltage	
NF00649	24	0.125	Small, compact, selective, digital indicator (Green)				
NF00650	24	0.125	Small, compact, selective, digital indicator (Orange)				

[1] Available to Military Specifications.

Average Anode Sensitivity (A/lm)	For a Supply Voltage of (V)	Maximum Direct Dark Current (nA)	For an Anode Sensitivity of (A/lm)	Or a Gain of	Maximum Anode Dissipation (W)	Ratio Luminous Flux/Anode Current Linear up to		TYPE NO.
						(voltage distribution A, see instr. for use) (ma)	(voltage distribution B, see instr. for use) (ma)	
150	1800	100	30	–	0.5	5	10	152 AVP
500	1800	50	60	–	0.5	30	100	50 AVP
500	1800	50	60	–	0.5	30	100	51 UVP
30	1800	100	15	–	0.5	5	10	52 AVP
500	1800	50	60	–	0.5	30	100	53 AVP
500	1800	50	60	–	0.5	30	100	53 UVP
500	2000	500	250	–	0.5	30	100	54 AVP
–	–	5000	–	10^8	0.5	30	100	55 AVP
–	–	5000	–	10^8	1	100	300	56 AVP
500	–	1000	60	–	0.5	30	100	57AVP
–	–	10000	–	10^8	1	100	300	58AVP
100	1800	10000	20	–	0.5	30	100	150CVP
								153AVP
								XP1010
250	1800	200	100		0.5	50	100	XP1030
300	1800	200	100		0.5	50	100	XP1031

TRAVELING WAVE TUBES

TYPE	Description	Freq. Range Kmc	Type Output	HEATER		Helix Voltage (volts)	Mag. Field (Gauss)	Gain (db)	Power Output Watts
				Volts	Amps				
55340	Amplifier	3.8-4.2	Waveguide	6.3	0.8	1100	600	37	5
7537	Amplifier	4.4-5	Waveguide	6.3	0.8	1100	600	34	3.5

K_o Reset Voltage (V)	DESCRIPTION	TYPE NO.
–	Special beam deflecting decade counter with numerals 0 to 9 for scalers, computers, etc.	6370/E1T
	Subminiature vacuum triode with fluorescent anode particularly suited for transistorized circuits. 20,000 hour life.	6977[1]
	Ultra-fast beam-switching decade counter for scalers, analyzers, etc.	ET51
-120	Cold cathode bi-directional visual indicating decade counting tube.	Z303C
-120	Cold cathode bi-directional visual indicating decade selector tube.	Z502S
Ext'ing 105 V	Cold cathode decade indicator tube.	Z503M
	Cold cathode decade numerical indicator tube especially designed for transistorized circuits.	Z550M
		NF00649
		NF00650

COLD CATHODE TRIGGER TUBES

TYPE NO.	Anode Voltage Range (V)	Starter-to-Cathode Breakdown Voltage (V)	Anode-to-Cathode Burning Voltage (V)	Anode-to-Cathode Breakdown Voltage (V)	Recommended Priming Resistor (megohms)	Cathode Current Range (ma)	Peak Cathode Current[1] (ma)	
5823/Z900T	140-200 dc 117 ac	73-105	62	>200		25 (max.)	100	
7709/Z70W	200-310	137-153	111-121	> 325	18	2-4	16	
7710/Z70U	200-310	137-153	111-121	> 325	18	2-4	16	
7711/Z71U	125-165	73-90	54-68	> 175		3-7[2]	12	
7713/Z804U	180-350 dc 180-275 ac	-115 to -131	106-115	> 400		5-40 dc 5-25 ac	125	
7714/Z805U	250-450 dc 180-275 ac	137 - 155 dc 98 - 110 ac	118-128	> 500		5-25	150	
Z803U	170-290	128 - 137	105	> 290	10	25 (max.)	100	

[1]Higher peak currents are permissible in pulse forming circuits. [2]For passing speech current in intermittent use, 7 to 9 ma is recommended.

IGNITRONS–WELDER CONTROL SERVICE

TYPE NO.	R.M.S. Volts Range	Maximum KVA Demand & Corresponding Average Current		Maximum Average Current & Corresponding KVA Demand		Type Cooling
		K.V.A.	Amps	K.V.A.	Amps	
5555/653B	2400	2400	135.0	1105	207	Water
5822-A	220-600	424	20	188	70	Water

IGNITRONS–RECTIFIER SERVICE

TYPE NO.	Typical D.C. Output Voltage (v)	Maximum Peak Inverse & Forward Voltage (v)	Maximum Peak Anode Current (A)	Max. Continuous Average Anode Current (A)	Maximum Average Current (A) 1 minute	Type Cooling
AX5555	300[1] 600[1]	900 2100	1800 1200	200 150	400 300	Water

[1]Spread in operating voltage from tube to tube at recommended quiescent current.

IGNITRONS–THERMOSTATICALLY CONTROLLED[1]

TYPE NO.	R.M.S. Volts Range	Maximum KVA Demand & Corresponding Average Current		Maximum Average Current & Corresponding KVA Demand		Type Cooling
		K.V.A.	Amps	K.V.A.	Amps	
AX5551-A	250-600	600	30.2	200	56	Water
AX5552	250-600	1200	75.6	400	140	Water
5553-B	250-600	2400	192.0	800	355	Water
AX5822	220-600	424	20.0	188	70	Water

[1]These tubes are identical with the corresponding types 5551, 5552 and 5553 except that they are fitted with a "sensing" plate for adaptation of a thermostat. They do not include the thermostat or thermostat mounting under these designations. If thermostatic control is required, one of the following accessory groups should be ordered with each tube:

(A) AMPEREX "Water Saver" Thermostat Assembly. Cat. No. S-17024. (Consists of Thermostat No. C4391-7-51, mounting clamp, terminal block and four sets of nuts, bolts and washers).

(B) Amperex "Overload Protection" Thermostat Assembly, Cat. No. S-17025. (Consists of Thermostat No. C4391-7-52, mounting clamp, terminal block and four sets of nuts, bolts and washers).

KLYSTRONS (Listed in order of frequency range)

TYPE	DESCRIPTION	Freq. Range mc	HEATER		Beam Voltage (volts)	Reflector Voltage (volts)	Beam Current (ma)	ETR mc	Po(W)
			Volts	Amps					
6975	OSC, Reflex, Tunable	8500-9600	6.3	0.45	300	160-230	30	50	0.040
DX184	OSC, Reflex, Tunable	31000-36000	6.3	0.8	2250	100-500	15	60	0.100
DX151	OSC, Reflex, Tunable	67000-73000	3.5	1.75	2450	300	17	100	0.100

Typical DC Starter Current (μa)	Maximum Negative Starter Current (μa)	Maximum Ambient Temperature (°C)	DESCRIPTION	TYPE NO.
100		70	Three electrode, gas filled relay tubes for "on-off" control of a low-voltage apparatus.	5823/Z900T
30	150	70	Subminiature tube with priming cathode and positive starter voltage for dc circuit.	7709/Z70W
20	150	70	Subminiature tube with priming cathode and positive starter voltage, for dc circuit.	7710/Z70U
40		70	Subminiature tube with two starters for counting and switching in dc circuit.	7711/Z71U
-50		70	T-6½ tube with high inverse breakdown voltage. Negative dc trigger.	7713/Z804U
50		70	Miniature relay tube for ac circuits, short ignition delay and excellent high voltage properties.	7714/Z805U
50		70	Stable trigger striking characteristic for positive triggering.	Z803U

VOLTAGE REFERENCE & REGULATOR TUBES

TYPE NO.	Operating Voltage (Approx. Volts)	Operating Voltage Limits[1] (Volts)	Recommended Quiescent Current (Milliamperes)	Ignition Voltage[2] (Volts)	Internal Resistance (Max. Ohms)	Current Range (Milliamperes)	Regulation[3] (Max. Volts)
OA2	150	144-164	17.5	185 max.	240	5-30	6
OB2	108	106-111	17.5	133 max.	140	5-30	3.5
OE3/85A1[5] [6]	85	83-87	4	120 max.	—	1-8	3.15
OG3/85A2[5] [6]	85	83-87	6	125 max.	450	1-10	4
90C1	90	86-94	20	125 max.	350	1-40	14
5651[6]	87	82-92	2.5	115 min.	—	1.5-3.5	3
6354/150B2	150	146-154[4]	10	180 max.	500	5-15	5
8228/ZZ1000	82	81-84	2	115 max.	500	0.5-3.5	1

[1]Spread in operating voltage from tube to tube at recommended quiescent current
[2]Over tube life
[3]Over full current range
[4]Voltage Reference Tubes
[5]Drift in operating voltage during the first 300 hours of life: max. 0.3%. Short term drift in operating voltage (100 hours max.) after the first 300 hours of operation: max. 0.1%.
Temperature coefficient of operating voltage = -2.7 mv/°C
[6]Drift in operating voltage during 1000 hours: max. 1%

MAGNETRONS (Listed in order of frequency range)

TYPE	DESCRIPTION	Freq. Range mc	HEATER		E_A (KV)	I_A (Amps)	Duty	Pulling Figure (mc)	Type[1] Output	Pulse Dur. (μ sec.)	Po(KW)
			Volts	Amps							
7090	CW Osc. Fixed Frequency	2425-2475	5.3	3.2	1.6	0.200	CW	5	CO	CW	.200
7091	CW Osc. Fixed Frequency	2425-2475	5	32	4.5	0.75	CW	4	CO	CW	2.5
7292	Same as 7091 except liquid cooled. 7091 is forced air cooled.										
55125	CW Osc. Fixed Frequency	2425-2475	5	66	6.3-6.6	1.4	CW	—	CO	CW	5.0
5586	Osc. Tunable	2700-2900	16.0	3	27-32	70	.0005	15	CO	1	800
5657	Osc. Tunable	2900-3100	16.0	3	27.5-32.5	70	.0005	15	CO	1	800
6589	Osc. Tunable	3350-3500	16.0	3	26-30	50	.0005	10	WG	1	500
4J59	Osc. Fixed Frequency	6275-6375	12.6	3.5	16-19	30	.001	15	WG	1	210
4J58	Osc. Fixed Frequency	6375-6475	12.6	3.5	16-19	30	.001	15	WG	1	210
4J57	Osc. Fixed Frequency	6475-6575	12.6	3.5	16-19	30	.001	15	WG	1	210
2J51	Osc. Tunable	8500-9600	6.3	1.0	14	14	.001	18	WG	1	63
7093	Osc. Fixed Frequency	34,512-35,208	4	4	13.5-15	15.5	.0001	40	WG	0.02	25

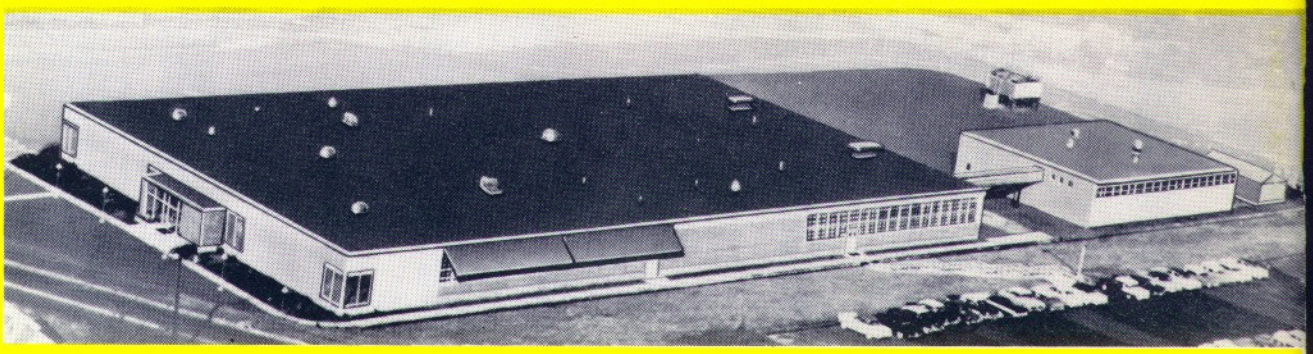
[1]CO = Coaxial
WG = Waveguide

Type No.	Page
AGR9950	10
AGR9951	10
AX105	10
AX255	10
AX260	10
AX5551-A	34
AX5552	34
AX5555	34
AX5822	34
AX9900	See 5866
AX9901	See 5867
AX9902	See 5868
AX9904	See 5923
AX9904R	See 5924
AX9906	See 6077
AX9906R	See 6078
AX9907	See 6075
AX9907R	See 6076
AX9908	See 6079
AX9909	See 6083
AX9910	See 6252
AX9911	See 6268
AX9912	See 6279
B300D Series	28
BF101S6	28
BF102S6	28
BF101S8	28
BF102S8	28
BF101S11	28
BF102S11	28
C3J	10
C3JA	10
C6JA	10
DM70	18
DM71	18
DX151	34
DX184	34
E1T	32
E80CC	20
E80F	20
E80L	22
E80T	20
E81L	22
E83F	22
E88CC	22
E90CC	20
E90F	20
E91H	22
E92CC	20
E99F	20
E182CC	22
E188CC	22
EA52	22
EA53	24
EBF89	14
EC55	30
EC80	22
EC81	22
EC88	14
EC158	30
ECC81	18
ECC82	18
ECC83	18
ECC85	14
ECC86	16
ECC88	14
ECC189	16
ECF80	14
ECF86	16
ECH84	16
ECL82	14
ECL84	14
ECL85	16
ECL86	16
EF80	14
EF86	18
EF89	14
EF183	16
EF184	16
EFP60	22
EL34	14
EL84	14
EL86	14
EL500	16
EM34	18
EM84	18
EM87	18
ET51	32
EY81	16
EY88	12
EZ80	16
EZ81	14
F175D5	28
FG95	10
GZ34	12
HF200	4
HF201A	4
HF300	4
NF00649	32
NF00650	32
OA2	35
OB2	35
OE3/85A1	35
OG3/85A2	35
PCF80	18
PCF86	16
PL84	18
UL84	18
XF183	12
XF184	12
XP1010	32
XP1030	32
XP1031	32
XY88	18
YF183	12
YF184	12
ZB3200	6
ZZ1000	35
Z70U	34
Z70W	34
Z71U	34
Z303C	32
Z502S	32
Z503M	32
Z550M	32
Z803U	34
Z804U	34
Z805U	34
Z900T	34
1M3/DM70	18
1N3/DM71	18
1S2A	12
2D21	10
2ER5	12
2FY5	12
2GK5	12
2HA5	12
2J51	35
3B-28	30
3C23	10
3EH7/XF183	12
3EJ7/XF184	12
3ER5	12
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6AL5	14
6AL5W	14
6AQ3/XY88	18
6AQ8/ECC85	14
6AT6	14
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6CD7/EM34	18
6CM4	14
6CW5/EL86	14
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6DL4/EC88	14
6DX8/ECL84	14
6EH7/EF183	16
6EJ7/EF184	16
6ER5	16
6ES8/ECC189	16
6FG6/EM84	18
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6GJ7	16
6GK5	16
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6GW8/ECL86	16
6HA5	16
6HG8/ECF86	16
6HU6/EM87	18
6J6	16
6JX8/ECH84	16
6Q4/EC80	22
6R3/EY81	16
6R4/EC81	22
6U8	16
6V4/EZ80	16
6X4	16
7HG8/PCF86	16
8BQ5	16
8GJ7	16
9A8/PCF80	18
12AT7/ECC81	18
12AU7/ECC82	18
12AX7/ECC83	18
15CW5/PL84	18
16AQ3/XY88	18
17EW8	18
27GB5/PL500	18
45B5/UL84	18
50AVP	32
50BM8	18
51UVP	32
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75N-7	24
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75NB3-9	24
76NB3	24
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90NB-4	24
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100LB	24

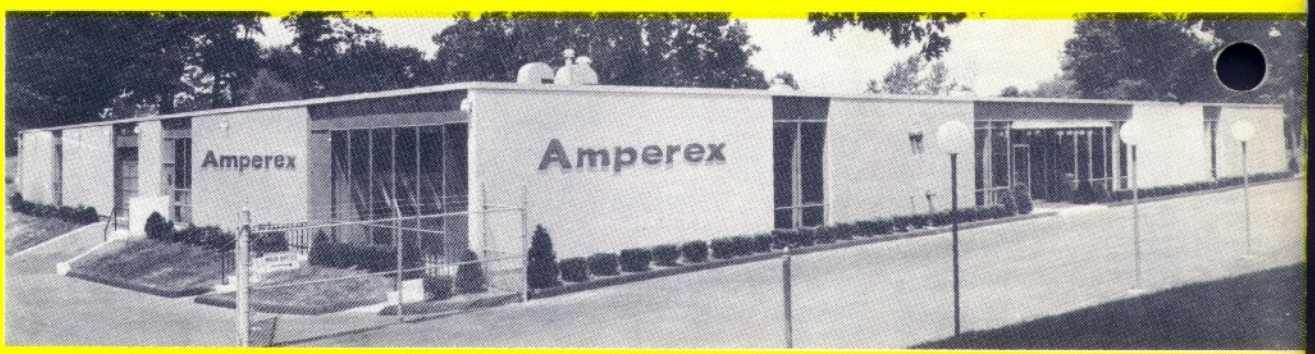
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150B2	35
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150N	24
150NB	24
152AVP	32
153AVP	32
153C	24
155N	24
160G	26
171G	26
200C	26
200CB	26
200HB	26
200LB	26
200N	26
200NB	26
240N	26
249B	30
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310C	26
311PC	26
312PC	26
315PC	26
356	6
400PC	26
500N	26
501R	6
502	6
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505N	26
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507N	26
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866-AX	30
869-B	30
869-BL	30
872-AX	30
880	6
889A	6
889RA	6
891	6
891R	6
892	6
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1701	10
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5823/Z900T	34
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6687/E91H	22
6688	22
6688A	22
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6923/EA52	22
6939	4
6960	8
6961	8
6975	34
6977	32
6979	4
7025	18
7062	22
7090	35
7091	35
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7119/E182CC	22
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7316	20
7377	4
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7459	8
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7534	22
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7643	20
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7693/E90F	20
7694/E99F	20
7699	24
7709/Z70W	34
7710/Z70U	34
7711/Z71U	34
7713/Z804U	34
7714/Z805U	34
7737	22
7753	8
7788	22
7800	8
7804	8
7805	8
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8120	8
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8270	10
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18504	26
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18508	28
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18510	28
18515	28
18516	28
18517	28
18518	28
18522	28
18526	28
18529	28
18536	28
18546	28
18550	28
55125	35
55340	33



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