BULLETIN E-290S

CBS®

military and special-purpose tubes

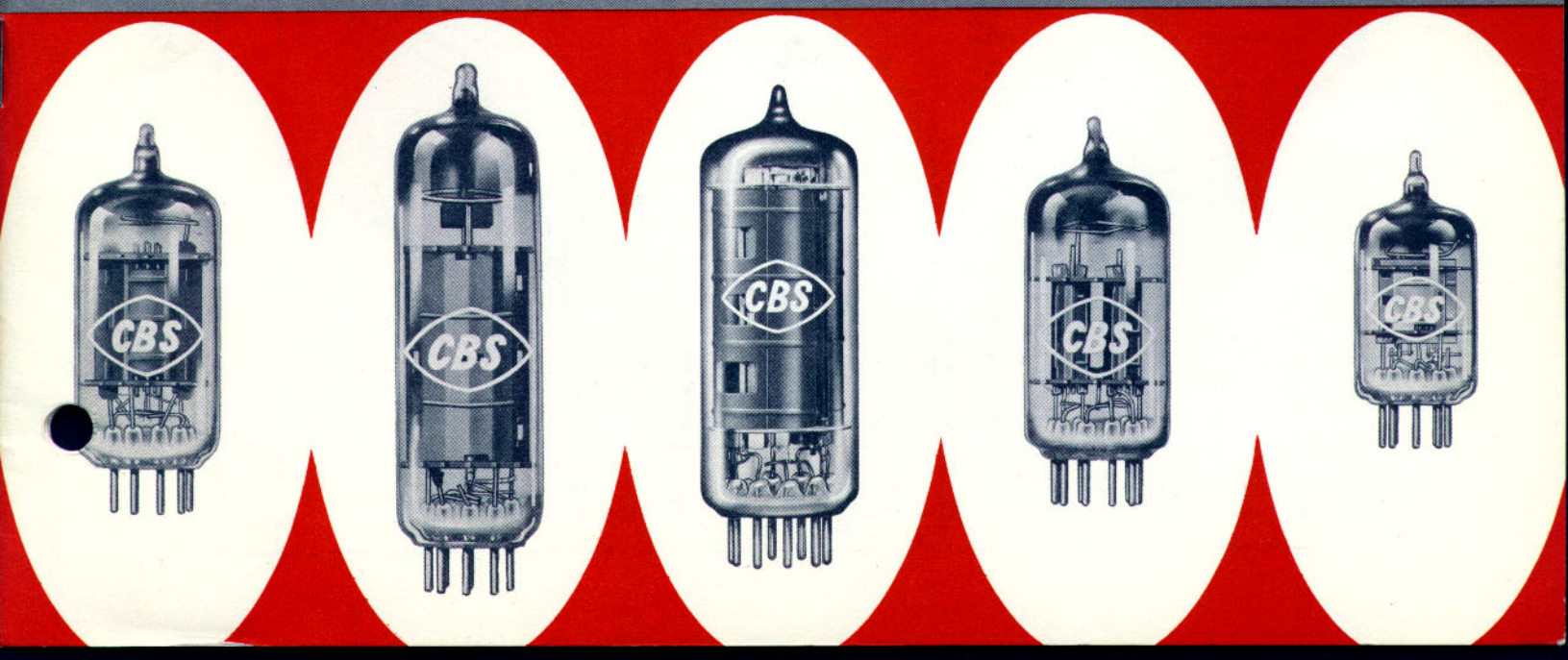
COMPUTER

HI-FI

PASS TUBE

MILITARY AND INDUSTRIAL

UHF



MILITARY AND SPECIAL-PURPOSE TUBES

CBS military and special-purpose tubes are designed and manufactured with the rigorous requirements of their special applications uppermost in mind. This booklet lists these tubes with reference data in four sections according to their particular classification; these are, Special Purpose, Computer, Military and Industrial, Hi-Fi Amplifier Tubes.

CBS SPECIAL-PURPOSE TUBES S1

CBS Special-Purpose Tubes include types for either special applications or unusual characteristics. Among them are the low plate voltage tubes, uhf lighthouse tubes, a gated amplifier, low microphonic tubes, and pass tubes for regulated power supplies.

CBS COMPUTER TUBES S2

CBS-Hytron has long recognized the need for improved tubes for use in computers and business machines where high reliability and long life under "on" and "off" intermittent conditions are a major requirement. Included among the CBS Computer tubes are both triode, pentode, and heptode amplifiers.

CBS MILITARY AND INDUSTRIAL TUBES S3

CBS-Hytron has had many years' experience in manufacturing some of the most critical tubes used in military equipment both for ground installations and aircraft. These same tubes are used in industry for critical applications, especially those where the tube may be subject to shock and vibration. An extremely wide variety of types are offered by CBS-Hytron. Included among them are: receiving tubes for mobile installations, long life industrial amplifiers, subminiature amplifier tubes, and reliable versions of commercial types.

CBS HI-FI TUBES S4

CBS tubes for hi-fi amplifiers are among the finest. They carry out the tradition for better entertainment set by the LP* record, introduced by Columbia Records Division, and the famous Columbia* 360* player, invented by CBS Laboratories. The Columbia Broadcasting System, Inc. Hi-Fi family is thus complemented by the CBS Hi-Fi tubes manufactured and fully tested by the experienced engineers of CBS-Hytron.

**Exclusive registered trade-mark of The Columbia Broadcasting System, Inc.*

Table S1 SPECIAL-PURPOSE TUBES

DESCRIPTION		CONSTRUCTION				CATHODE			MAX. RATINGS (Design Center)				USE	CHARACTERISTICS — TYPICAL OPERATION									
TYPE	Features and Notes	Basing	Base	Length, Inches	Diameter, Inches	Heater-Filament	Volts	Amperes	Plate Volts	Screen Volts	Plate Watts	Screen Watts	Application	Plate Volts	Screen Volts	Grid Volts, D-C	Plate Ma	Screen Ma	Plate Resistance Ohms	Transconductance	Load Resistance Ohms	Amplification	Output Watts	TYPE
1AG4	Subminiature pentode with in-line flexible leads. For use in battery powered equipment.	5J	Submin.	1.5	.385 by .285	Fil.	1.25	0.04	—	—	—	—	Power Amplifier	41.4	41.4	−3.6	2.4	0.6	180,000	1000	12000	—	.035	1AG4
2C40	Air cooled, lighthouse triode for use as an RF amplifier up to 1200 Mc and a CW oscillator up to 3370 Mc.	6BY	Octal	2 9/16	1 5/16	Htr.	6.3	0.75	500	—	6.5	—	CW Oscillator 3370 Mc	250	—	−5	20	I_{c1} = 0.3 mA		—	—	36	.075	2C40
2C51	VHF duotriode. May be used as an amplifier, mixer, or an oscillator up to 800 Mc.	8CJ	9-pin Min.	1¾	⅞	Htr.	6.3	0.3	300	—	1.5	—	Class A, each section	150	—	−2	8.2	—	—	5500	—	35	—	2C51
6AJ5	Sharp cutoff pentode voltage amplifier. 28-volt plate version of type 6AK5.	7BD	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	180	1.7	0.5	R-F Amplifier	28	28	−1.0	2.7	1.0	100,000	2500	—	—	—	6AJ5
6AS6	Sharp cutoff pentode with grid 1 & 3 control for application in delay circuits, gated amplifier circuits and gain controlled amplifiers.	7CM	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	140	1.7	.75	Class A Amplifier	120	120	−2.0	5.2	3.5	110,000	3200	—	—	—	6AS6
6AS7G	Low-mu duotriode with high perveance and a plate resistance of 280 ohms. Used as a regulator tube in d-c power supplies, a d-c amplifier, etc.	8BD	Octal	5 5/16	2 1/16	Htr.	6.3	2.5	250	I_b = 125 mA	13	—	D-C Amplifier	Max. Peak Heater to Cathode Volts = ±300 Max. Grid Circuit Resistance, Cathode Bias = 1 meg.										6AS7G
6AS7GA	Identical to type 6AS7G except for use of a T12 envelope.	8BD	Octal	4⅝	1 9/16	Htr.	6.3	2.5					Same as for type 6AS7G											6AS7GA
6J4	UHF triode for grounded grid amplifier use up to 500 Mc.	7BQ	7-pin Min.	2⅛	¾	Htr.	6.3	0.4	150	I_b = 20 mA	2.25	—	Grounded-Grid Class A Amp.	150	Rk 100 ohms		15	—	4,500	12,000	—	55	—	6J4
26A7GT	Twin beam power tube for use with low voltage B+ power supplies.	8BU	Octal	3 1 3/16	1 9/32	Htr.	26.5	0.6	50	50	2	0.5	Class A Audio Class AB_1 Audio	26.5 26.5	26.5 26.5	−4.5 −7.0	20 19	1.9 2.0	— —	5700 —	1500 2500	— —	0.18 0.5	26A7GT
955	Medium-mu triode for use up to 600 Mc.	5BC	Acorn	1⅜	1 5/32	Htr.	6.3	0.15	250	—	1.6	—	Class C, 60 Mc	180	—	−35	7	I_{c1} = 1.5 mA		—	—	—	0.5	955
1612	Pentagrid amplifier similar to type 6L7 for applications critical as to microphonics.	7T	Octal	3⅛	1 5/16	Htr.	6.3	0.3	250	100	1.5	1.0	Class A Amplifier	250	100 E_{c2} & E_{c4}	−3 E_{c1} & E_{c3}	5.3	6.5	600,000	1100	—	—	—	1612
5687	Medium-mu duotriode. General-purpose amplifier with high perveance and high emission.	9H	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.9 0.45	300	—	4.2	—	Class A, each section	250 120	— —	−12.5 −2	12.5 36	— —	3,000 1,700	5500 11,000	— —	16.5 36	— —	5687
5876	UHF triode for operation up to 960 Mc.	Pencil type: anode, top section; grid flange; cathode, bottom section; heater from bottom.				Htr.	6.3	0.125 to 0.145	300	I_b = 25 mA	6.25	—	Doubler to 980 Mc Tripler to 960 Mc	300 300	— —	−70 −90	17.3 18		I_{c1} = 7mA Drive = 2W I_{c1} = 6mA Drive = 2.1W				2.0 2.1	5876
6485	Pentode for wide-band amplifier use. Equivalent to type 6AH6. Suitable for operation with long cutoff periods.	7BK	7-pin Min.	2⅛	¾	Htr.	6.3	0.45	300	150	3.2	0.6	Class A Amplifier	300	150	Rk = 160Ω	10	2.5	500,000	9000	—	—	—	6485
6591	Broadband ATR tube for use at 5400 Mc. Used in duplexers in conjunction with type 6624.	Contact mounted at window end		1.5	1.52 by 2.25	—	—	—		Transmitter Peak Power = 4Kw			High Level Characteristic	Arc Loss = 0.8db with: pi = 10Kw, tp = 1.0 μsec, prr = 1000pps, F = 5400 Mc.										6591
6624	TR tube for use from 5370 Mc to 5430 Mc. Use in duplexer in conjunction with type 6591.	Contact mounted at input end		1.44	1.0 by 2.52	—	—	—		Transmitter Peak Power = 4 Kw			Center freq. of 5400 Mc	Insertion Loss = 0.7db, Arc Loss at 4Kw = 0.8db Ignitor Supply = −700 V, Ignitor Drop = −200 V to −400V.										6624

Table S1 continued

Table S1 Special-Purpose Tubes continued

DESCRIPTION		CONSTRUCTION				CATHODE			MAX. RATINGS (Design Center)			USE	CHARACTERISTICS — TYPICAL OPERATION										
TYPE	Features and Notes	Basing	Base	Length, Inches	Diameter, Inches	Heater-Filament	Volts	Amperes	Plate Volts	Screen Volts	Plate Watts	Screen Watts	Application	Plate Volts	Screen Volts	Grid Volts, D-C	Plate Ma	Screen Ma	Plate Resistance Ohms	Transconductance	Load Resistance Ohms	Amplification	Output Watts	TYPE
9001	Sharp cutoff pentode.	7BD	7-pin Min.	1 1/16	3/4	Htr.	6.3	0.15	250	100	0.5	0.1	Class A Amplifier Mixer	250 250	100 100	−3 −10	6.7	2.7 Gc = 600 μmhos, Osc. Peak Volts = 4	700,000	1800	—	—	—	9001
9002	UHF triode for use up to 500 Mc. Electrically similar to type 955.	7BS	7-pin Min.	1 1/16	3/4	Htr.	6.3	0.15	250	—	1.6	—	Class A Amplifier	90 250	— —	−2.5 −7	2.5 6.3	— —	14,700 11,400	1700 2200	— —	25 25	— —	9002
9003	UHF pentode, electrically similar to type 956.	7BD	7-pin Min.	1 1/16	3/4	Htr.	6.3	0.15	250	—	1.7	0.3	Class A Amp. Mixer	250 250	100 100	−3 −10	6.7	2.7 Gc = 600 μmhos, Osc. Peak Volts = 4	700,000	1800	—	—	—	9003
9006	UHF detector. Half-wave rectifier.	6BH	7-pin Min.	1 1/16	3/4	Htr.	6.3	0.15		P.I.V. = 750V Ipk = .015a			—	A-C Supply Volts = 270, Max. Output Current = 5 mA										9006

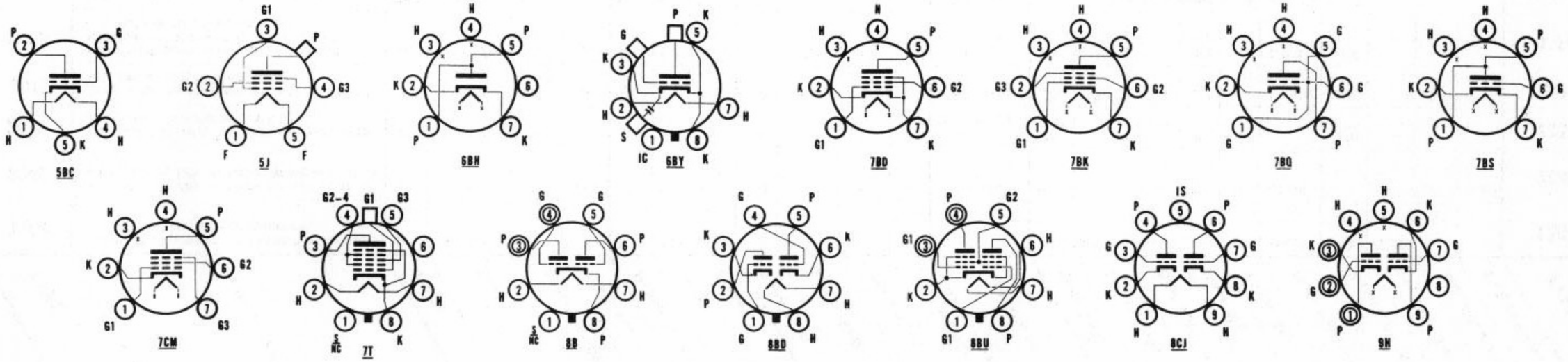


Table S2 COMPUTER TUBES

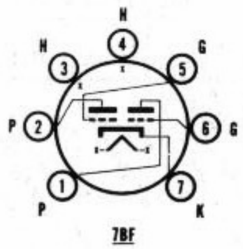
DESCRIPTION			CONSTRUCTION					CATHODE		USE	CHARACTERISTICS — TYPICAL OPERATION									
TYPE*	Features and Notes	Basing	Base	Length, inches	Diameter, inches	Heater-Filament	Volts	Amperes	Application	Plate Supply Volts	Grid 1 Volts	Grid 2 & 4 Volts	Grid 3 Supply Volts	Plate Ma	Grid 2 & 4 Ma	Plate	Circuit Resistance, Ohms: Grid 1	Circuit Resistance, Ohms: Grid 3	TYPE*
5915	Pentagrid amplifier for use as a gated amplifier in computers. Grids 1 & 3 are independent control grids.	7CH	7-pin Min.	2⅛	¾	Htr.	6.3	0.3	Gated Amplifier G_1 Control, cutoff G_2 Control, cutoff "ON"	150 150 150	—10† 0 0	75 75 0	0 —10 0	0 0 5.8	0 14 9	20000 20000 20000	47000 47000 47000	47000 47000 47000	5915
5963	Medium-mu duotriode with a separate terminal for each cathode. Values are for each unit.	9A	9-pin Min.	2 3/16	⅛	Htr.	12.6 6.3	0.15 0.3	Freq. Halfer, cutoff "ON"	150 150	—15 0	— —	— —	0 5.1	— —	20000 20000	47000 47000	— —	5963
5964	Medium-mu duotriode. Values are for each unit.	7BF	7-pin Min.	2⅛	¾	Htr.	6.3	0.45	Freq. Halfer, cutoff "ON"	150 150	—10 0	— —	— —	0 5.1	— —	20000 20000	47000 47000	— —	5964
5965	Medium-mu duotriode. Closely controlled cutoff bias balance between each unit. Values are for each unit. Separate terminals for each cathode.	9A	9-pin Min.	2 3/16	⅛	Htr.	12.6 6.3	0.225 0.45	Freq. Divider	150 150	Grid volts for I_b of 150 μa = —5.5; Difference between grid voltages of units for I_b of 150 μa/unit = 1.5 V maximum; Plate load resistance = 20,000 ohms Grid volts for I_{c1} of 140 μa = less than 1 V; Plate current = 10.5 ma; Plate circuit resistance = 7200 ohms								5965
6197	Sharp cutoff power pentode; also designed for pulse amplifier circuits. Has a G_m of 11,000 μmhos.	9BV	9-pin Min.	2⅝	⅞	Htr.	6.3	0.65	Freq. Divider, cutoff "ON"	250▲ 250▲	—12 —3	150▲ 150▲	0 0	0 30	— —	— —	— —	— —	6197
6211	Medium-mu duotriode with a closely controlled cutoff bias balance between each unit. Each cathode has a separate terminal. Values are for each unit.	9A	9-pin Min.	2 3/16	⅛	Htr.	12.6 6.3	0.15 0.3	Freq. Divider, cutoff "ON"	150 150	Grid volts for I_b of 100 μa = —10 volts max. Difference between grid voltages of units for I_b of 100 μa/unit = 1.0 V maximum. 0	— —	— —	5.15	— —	20000	47000	— —	6211
6463	Medium-mu duotriode with extremely high zero-bias plate current and sharp cutoff for each section. Designed for dependable service under intermittent operation.	9CZ	9-pin Min.	2⅝	⅞	Htr.	12.6 6.3	0.3 0.6	Freq. Divider	100 200 250	★ —11 0	— — —	— — —	29 1.0 14.5	— — —	— — 3850	— — —	— — —	6463

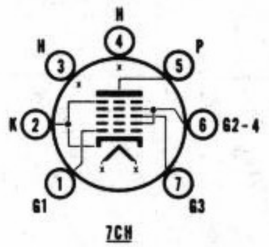
*All types listed are designed for "on-off" control usage during long periods of operation under cutoff conditions. Steady plate current is provided during "on" cycles. All types except the 5915 can be used in frequency divider circuits of electronic computers.

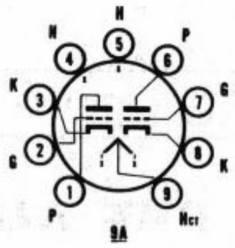
†Grid 1 supply volts.

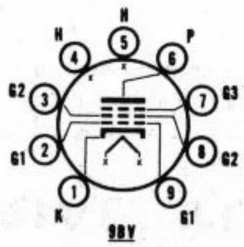
▲Voltages at electrode terminals.

★ With grid current adjusted for 200 μa approx.









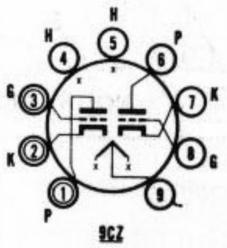


Table S3 MILITARY and INDUSTRIAL TUBES

DESCRIPTION		CONSTRUCTION						CATHODE				MAX. RATINGS (Design Center)			USE	CHARACTERISTICS — TYPICAL OPERATION										
TYPE	Features and Notes	Basing	Base	Length, Inches	Diameter, Inches	Heater-Filament	Volts	Amperes	Plate Volts	Screen Volts	Plate Watts	Screen Watts	Application	Plate Volts	Screen Volts	Grid Volts, D-C	Plate Ma	Screen Ma	Plate Resistance Ohms	Transconductance	Load Resistance Ohms	Amplification	Output Watts	TYPE
6AU6WA	Sharp cutoff pentode RF or IF amplifier where reliable operation is required.	7BK	7-pin Min.	2⅛	¾	Htr.	6.3	0.3	300	150	3.0	.65	Class A Amp.	250	150	68△	10.6	4.3	1 meg	5200	—	—	—	6AU6WA
6SL7WGT	Rugged high-mu duotriode for RC amplifier or phase inverter service.	8BD	8-pin O.	3 5/16	1 9/32	Htr.	6.3	0.3	250	—	1.0†	—	Class A Amp.†	250	—	−2	2.3	—	44,000	1600	—	70	—	6SL7WGT
6SN7WGT	Rugged medium-mu duotriode for voltage amplifier or phase inverter service.	8BD	8-pin O.	3 5/16	1 9/32	Htr.	6.3	0.6	300	—	2.5†	—	Class A Amp.†	90 250	— —	0 −8	10 9	— —	6,700 7,700	3000 2600	— —	20 20	— —	6SN7WGT
12AT7WA	Medium-mu duotriode high frequency oscillator and mixer for service where reliability of performance is desired.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	.30 .15	300	—	2.5†	—	Class A Amp.†	250 180	— —	−2 −1	10 11	— —	10,900 9,400	5500 6000	— —	60 62	— —	12AT7WA
1621	Power pentode for applications where continuity of service is required.	7S	7-pin O.	3¼	1 5/16	Htr.	6.3	0.7	300	300	7.9	1.9	Push-Pull Class A Amp.‡	300	300	−30	38	6.5	—	—	4000▲	—	—	1621
5636	Subminiature dual-control pentode for use as a gated or gain-controlled amplifier.	8DC	Submin.	Bulb 1.375	7/16	Htr.	6.3	0.15	165	155	.55	.45	Class A Amp.	100	100	150△	5.6	4	110,000	3200	—	—	—	5636
5654	High-frequency pentode amplifier similar to type 6AK5, designed for military use.	7BD	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	140	1.5	0.5	Class A Amp.	120	120	−2	7.5	2.5	.3 meg	5000	—	—	—	5654
5654/6AK5W	High-frequency pentode amplifier similar to type 6AK5, designed for military use.	7BD	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	140	1.5	0.5	Class A Amp.	120	120	−2	7.5	2.5	.3 meg	5000	—	—	—	5654/6AK5W
5654/6AK5W /6096	Reliable USAF version of type 5654.	7BD	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	140	1.5	0.5	Class A Amp.	120	120	−2	7.5	2.5	.3 meg	5000	—	—	—	5654/6AK5W /6096
5670	Medium-mu duotriode. Military or industrial version of type 2C51.	8CJ	9-pin Min.	1¾	⅛	Htr.	6.3	0.35	300	—	1.5†	—	Class A Amp.†	150	—	240△	8.2	—	—	5500	—	35	—	5670
5686	Beam power pentode for AF or RF service up to 160 Mc. Rugged construction for critical industrial and military applications.	9G	9-pin Min.	2 3/16	⅞	Htr.	6.3	0.35	250	250	7.5	3.0	Class A Amp. Class C Amp.	250 250	250 250	−12.5 −50	27 40	3.0 10.5	45,000 R_{g1} = 25,000	3,100 Drive = 0.15W	9,000	—	2.7 6.5	5686
5691	High-mu duotriode. Long-life 6SL7GT for use in industrial applications.	8BD	8-pin O.	2⅛	1 9/32	Htr.	6.3	0.6	250	—	0.9†	—	Class A Amp.†	250	—	−2	2.3	—	44,000	1600	—	70	—	5691
5692	Medium-mu duotriode. Long-life 6SN7GT for industrial service.	8BD	8-pin O.	2⅛	1 9/32	Htr.	6.3	0.6	250	—	1.6†	—	Class A Amp.†	250	—	−9	6.5	—	9,100	2200	—	20	—	5692
5693	Reliable, long-life sharp-cutoff pentode, improved 6SJ7.	8N	8-pin O.	2⅝	1 5/16	Htr.	6.3	0.3	300	125	2.0	0.3	Class A Amp.	250	100	−3	3.0	.00085	1 meg	1650	—	—	—	5693
5718	Rugged subminiature medium-mu triode for service up to 500 Mc.	8DK	Submin.	Bulb 1.375	0.4	Htr.	6.3	0.15	150	—	0.8	—	Class A Amp.	100 150	— —	150△ 180△	8.5 13	— —	4,650 4,150	— —	— —	27 27	— —	5718
5719	Rugged subminiature high-mu triode for AF service.	8DK	Submin.	Bulb 1.375	0.4	Htr.	6.3	0.15	150	—	0.09	—	Class A Amp.	150	—	680△	1.7	—	26,000	—	—	70	—	5719
5725	Reliable sharp-cutoff dual-control pentode for use in gated or gain controlled amplifier.	7CM	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	140	1.5	0.5	Class A Amp.	120	120	−2	5.2	3.5	—	3200	—	—	—	5725
5725/6AS6W	Reliable sharp-cutoff dual-control pentode for gated amplifier use.	7CM	7-pin Min.	1¾	¾	Htr.	6.3	0.175	180	140	1.5	0.5	Same as 5725											5725/6AS6W
5726	Reliable 6AL5. Low power full-wave rectifier or detector.	6BT	7-pin Min.	1¾	¾	Htr.	6.3	0.3	360 P.I.V.	I_b = 60mA			H-W Rectifier Each Section	117		Plate Supply Z = 300Ω			I_b = 9mA					5726
5726/6AL5W	Reliable 6AL5. Median control of characteristics. Resistant to shock and vibration.	6BT	7-pin Min.	1¾	¾	Htr.	6.3	0.3	Ratings and Characteristics same as for type 5726															5726/6AL5W
5726/6AL5W 6097	Military controlled reliable 6AL5.	6BT	7-pin Min.	1¾	¾	Htr.	6.3	0.3	Ratings and Characteristics same as for type 5726															5726/6AL5W 6097

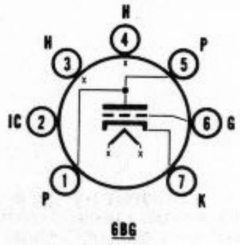
5727/2D21W	Reliable gas tetrode with high sensitivity. Will operate directly from phototube.	7BN	7-pin Min.	2⅛	¾	Htr.	6.3	0.6	—	—	—	—	Max. Ratings e_{px}=1300V, e_p=650, e_c=—100V before conduction, E_c=—10V, during conduction, i_K = 0.5a, I_K = 0.1A											**5727/2D21W**
5749	Remote cutoff pentode for RF or IF service. It is the reliable version of type 6BA6.	7BK	7-pin Min.	2⅛	¾	Htr.	6.3	0.3	300	140	3.0	0.6	Class A Amp.	250	100	68△	11	4.2	1 meg	4400	—	—	—	**5749**
5749/6BA6W	Remote cutoff pentode for RF or IF service. It is designed for reliable operation in mobile and aircraft applications.	7BK	7-pin Min.	2⅛	¾	Htr.	6.3	0.3	300	140	3.0	0.6	Class A Amp.	250	100	68△	11	4.2	1 meg	4400	—	—	—	**5749/6BA6W**
5750/6BE6W	Reliable 6BE6; pentagrid converter for military use.	7CH	7-pin Min.	2⅛	¾	Htr.	6.3	0.3	300	100	1.1	1.1	Converter	100 250	100 100	—1.5 —1.5	7.5 7.5	— —	.4 meg 1.0 meg	455 475	— —	— —	— —	**5750/6BE6W**
5751	High-mu duotriode; reliable version of type 12AX7.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.35 0.175	300	—	0.7†	—	Class A Amp.†	250	—	—3	1.0	—	58,000	1200	—	70	—	**5751**
5814	Medium-mu duotriode which is a reliable version of type 12AU7.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.35 0.175	300	—	2.75†	—	Class A Amp.	100 250	— —	0 —8.5	11.8† 10.5†	— —	6,250 7,700	3100 2200	— —	19.5 17	— —	**5814**
5814A	Medium-mu duotriode tested for military use. Reliable version of 12AU7.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.35 0.175	300	—	2.75†	—	Class A Amp.†	100 250	— —	0 —8.5	11.8 10.5	— —	6,250 7,700	3100 2200	— —	19.5 17	— —	**5814A**
5814WA	Same as 5814A. Tested for military aircraft use. Reliable version of 12AU7.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.35 0.175	300	—	2.75†	—	Same as 5814A											**5814WA**
5902	Subminiature beam power pentode for dependable industrial or military operation.	8DE	Submin.	Bulb 1.75	.4	Htr.	6.3	0.45	150	140	3.6	.9	Class A Amp.	110	110	270△	30	2.2	15,000	4200	3000	—	1.0	**5902**
6005	Beam pentode specially designed to assure dependable life and reliable service.	7BZ	7-pin Min.	2⅝	¾	Htr.	6.3	0.45	250	250	12	2	Class A Amp. Class AB Push-Pull‡	180 250 250	180 250 250	—8.5 —12.5 —15	30 47 35	4 7 13	58,000 52,000 60,000▲	3700 4400 —	5500 5000 10,000▲	— — —	2.0 4.5 10	**6005**
6005/6AQ5W	Reliable beam power pentode for military use.	7BZ	7-pin Min.	2⅝	¾	Htr.	6.3	0.45	250	250	12	2	Same as 6005											**6005/6AQ5W**
6021	Subminiature medium-mu duotriode for general purpose applications where reliable performance is required.	8DG	Submin.	Bulb 1.375	.4	Htr.	6.3	0.30	150	—	1.0†	—	Class A Amp.†	100	—	150△	6.5	—	6,500	5400	—	35	—	**6021**
6072	Reliable, low-noise, low-microphonic duotriode. For low-level audio amplifier.	9A	9-pin Min.	2 3/16	⅞	Htr.	12.6 6.3	0.175 0.35	300	—	1.5	—	A_1, Each Section RC Amp.	250	—	—4	3.0	—	25,000	1750	—	44	—	**6072**
													E_{bb} = 150V, R_L = 20K, R_g = 0.1 meg, R_K = 2700Ω, C_K = 40μf, V_G = 12.5											
6080	Reliable low-mu duotriode with reduced susceptibility to electrolysis.	8BD	8-pin O.	4 1/16	1 2 3/32	Htr.	6.3	2.5	250	—	13†	—	D-C Amp.†	135	—	250△	125	—	280	7000	—	2	—	**6080**
6099	USAF version of 6101/6J6WA with balanced sections.						Same as 6101/6J6WA except maximum I_b difference of 0.25 ma when I_{1b} = 1.0 ma																	**6099**
6100/6C4WA	Reliable, low-microphonic level 6C4. Tested for resistance to shock and vibration.	6BG	7-pin Min.	2⅛	¾	Htr.	6.3	0.175	300	—	3.5	—	Class A_1 Class C	250 100 300	— — —	—8.5 0 —27	10.5 11.8 25	— —	7,700 6,250 I_c = 8mA	2200 3100 Drive = .35W	— —	17 19.5 5.5	— —	**6100/6C4WA**
6101/6J6WA	Reliable 6J6 (duotriode) for military aircraft use. Electrically identical to type 6099 except that the sections are not balanced.	7BF	7-pin Min.	2⅛	¾	Htr.	6.3	0.45	300	—	1.6	—	Class A Amp. Class C Amp. and Osc. Mixer	100 150 150	— — —	50△ —10 810△	8.5 30 4.8	— I_{c1} = 16 ma —	7,100 Drive = .35 W 10,200	5300 G_c = 1900	— Osc. Peak = 3 V	38 3.5	— —	**6101/6J6WA**
6111	Subminiature medium-mu duotriode for general purpose applications or high frequency oscillator-mixer service.	8DG	Submin.	Bulb 1.375	.4	Htr.	6.3	0.30	150	50	1.0†	—	Class A Amp.†	100	—	220△	8.5	—	4,000	5000	—	20	—	**6111**
6112	Subminiature high-mu duotriode for dependable operation as a voltage amplifier or phase inverter.	8DG	Submin.	Bulb 1.375	.4	Htr.	6.3	0.30	150	50	0.5†	—	Class A Amp.†	100 150	— —	1500△ 820△	.8 1.75	— —	39,000 28,000	1800 2500	— —	70 70	— —	**6112**
6135	Rugged medium-high mu triode for use as a high frequency oscillator or a general purpose amplifier.	6BG	7-pin Min.	2⅛	¾	Htr.	6.3	0.175	300	—	3.5	—	Class A Amp.	100 250	— —	0 —8.5	11.8 10.5	— —	6,250 7,700	3100 2200	— —	19.5 17	— —	**6135**
6136	Sharp-cutoff, high-transconductance pentode for use in RF or IF amplifier applications. Specially designed and tested for dependability and reliability.	7BK	7-pin Min.	2⅛	¾	Htr.	6.3	0.30	300	300	3.0	0.65	Class A Amp.	100 250	100 150	150△ 68△	5 10.6	2.1 4.3	.5 meg 1.0 meg	3900 5200	— —	— —	— —	**6136**
6189/ 12AU7WA	Reliable, medium-mu duotriode. Identical electrically to type 12AU7. Resistant to shock and vibration.	9A	9-pin Min.	2 3/16	⅞	Htr.	12.6 6.3	0.15 0.3	300	—	3.0	—	Class A_1	250 100	— —	—8.5 0	10.5 11.8	— —	7,700 6,800	2200 3100	— —	17 20	— —	**6189/ 12AU7WA**
6201	High-mu duotriode for VHF amplifier and converter applications.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.30 0.15	300	—	2.5	—	Grounded-Grid Amp.	100 250	— —	270△ 200△	3.3 10	— —	14,500 10,900	4000 5500	— —	57 60	— —	**6201**

Table S3 continued

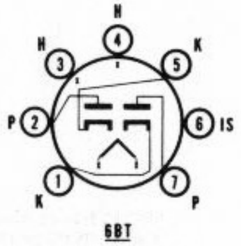
Table S3 Military and Industrial Tubes continued

DESCRIPTION				CONSTRUCTION					CATHODE			MAX. RATINGS (Design Center)		USE	CHARACTERISTICS — TYPICAL OPERATION									
TYPE	Features and Notes	Basing	Base	Length, Inches	Diameter, Inches	Heater-Filament	Volts	Amperes	Plate Volts	Screen Volts	Plate Watts	Screen Watts	Application	Plate Volts	Screen Volts	Grid Volts, D-C	Plate Ma	Screen Ma	Plate Resistance Ohms	Transconductance	Load Resistance Ohms	Amplification	Output Watts	TYPE
6216	Rugged, high perveance beam pentode. Used for filter reactor service, pass tube, r-f amplifier, etc.	9CE	9-pin Min.	2⅝	⅛	Htr.	6.3	1.2	300 300 300	200 200 200	10 10 10	1.0 1.0 1.0	Filter Reactor Class C Class C Dblr.	100 300 300	100 150 150	−3 −50 −75	72 63 50	3 8 6	r_p = 18.5K — —	— —	g_m = 12800 Drive = 0.3W Drive = 0.6W	8.8 4.0		6216
6660/6BA6	Remote cutoff pentode for mobile communication equipment. Capable of withstanding appreciable on-off heater cycling.	7BK	7-pin Min.	2⅛	¾	Htr.	6.3	0.3	300	300	3.0	0.6	Class A	250 100	100 100	68△ 68△	11 10.8	4.2 4.4	1.0 meg .25 meg	4400 4300	—	—	—	6660/6BA6
6661/6BH6	R-f pentode for mobile communication equipment. Capable of withstanding appreciable on-off cycling.	7CM	7-pin Min.	2⅛	¾	Htr.	6.3	0.15	300	300	3.0	0.5	Class A_1	250	150	100△	7.4	2.6	1.4 meg	4600	—	—	—	6661/6BH6
6662/6BJ6	Remote cutoff pentode for mobile communication equipment. Capable of withstanding appreciable on-off cycling.	7CM	7-pin Min.	2⅛	¾	Htr.	6.3	0.15	300	300	3.0	0.6	Class A_1	250 100	100 100	80△ 80△	9.2 9.0	3.3 3.5	1.3 meg .25 meg	3600 3650	— —	— —	— —	6662/6BJ6
6677	Power pentode for mobile communications equipment. Similar to type 6CL6.	9BV	9-pin Min.	2⅝	⅞	Htr.	6.3	0.65	330	330	8.5	2.0	Class A Amp.	250	150	−3	30	7	.15 meg	11000	2800	—	2.8	6677
6678	Medium-mu triode and sharp-cutoff pentode for oscillator-mixer service in mobile equipment.	9AE	9-pin Min.	2 3/16	⅞	Htr.	6.3	0.45	330 330	330 —	3.0 3.0	0.55 —	Pentode Class A Triode Class A	250 150	110 —	68△ 56△	10 18	3.5 —	.4 meg 5,000	5200 8500	— —	— —	— —	6678
6679/12AT7	High-mu duotriode for mobile communication equipment. Designed for grounded grid amplifier or mixer service. Capable of withstanding appreciable on-off cycling.	9A	9-pin Min.	2 3/16	⅞	Htr.	12.6 6.3	0.15 0.3	300	—	—	2.8	Class A_1	250 180	— —	200△ 90△	10	—	10,900 9,400	5500 6000	— —	60 62	— —	6679/12AT7
6680/12AU7	Medium-mu duotriode for mobile communications equipment. Similar to type 12AU7.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.30 0.15	300	—	3.0†	—	Class A Amp.†	100 250	— —	0 −8.5	11.8 10.5	— —	6,500 7,700	3100 2200	— —	20 17	— —	6680/12AU7
6681/12AX7	High-mu duotriode for use in resistance coupled voltage amplifiers, phase inverters, and multivibrators for mobile equipment.	9A	9-pin Min.	2 3/16	⅞	Htr.	6.3 12.6	0.30 0.15	330	—	1.1†	—	Class A Amp.†	100 250	— —	−1 −2	0.5 1.2	— —	80,000 62,500	1250 1600	— —	100 100	— —	6681/12AX7

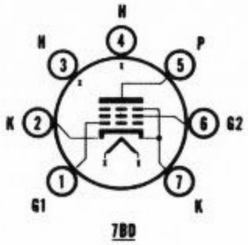
†Each section. §Both sections.
‡Values for two tubes.
▲Plate to plate.
△Cathode resistor in ohms.
m Maximum



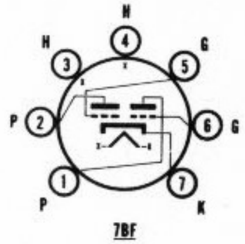
6BG



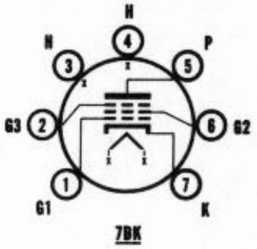
6BT



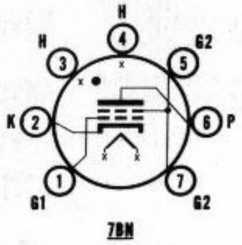
7BD



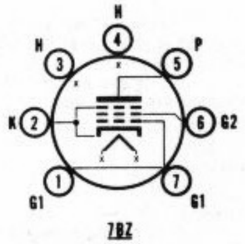
7BF



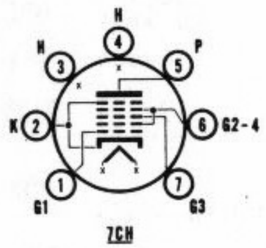
7BK



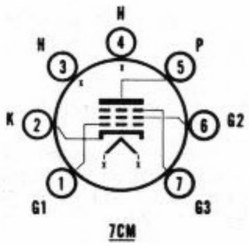
7BN



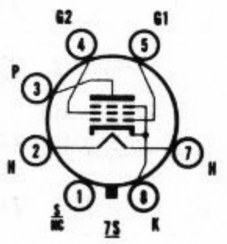
7BZ



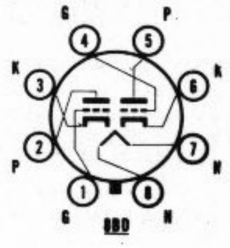
7CH



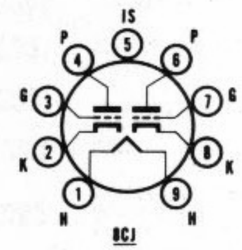
7CM



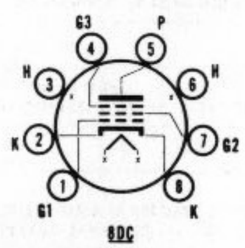
7S



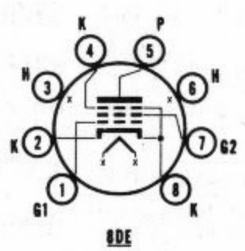
8BD



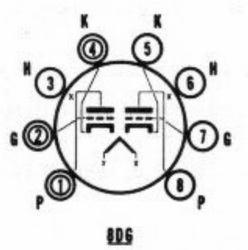
8CJ



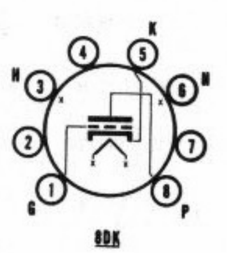
8DC



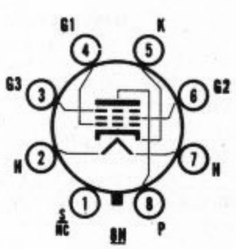
8DE



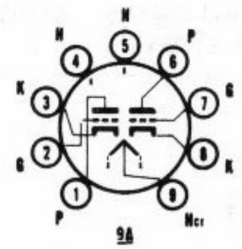
8DG



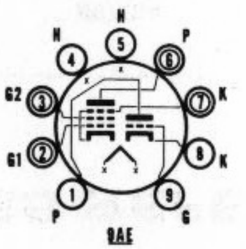
8DK



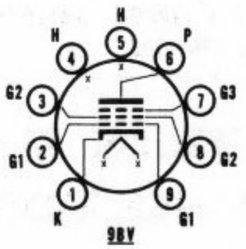
8H



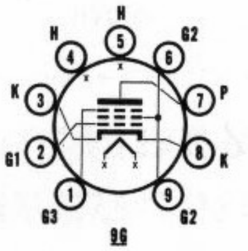
9A



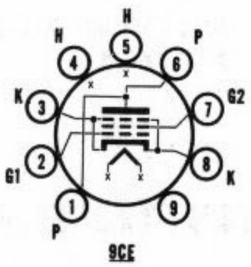
9AE



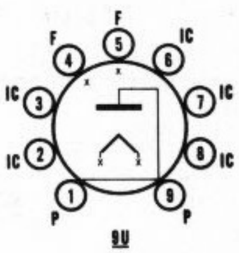
9BV



9G



9CE



9U

CROSS REFERENCE OF COMMERCIAL TYPE NUMBERS TO SPECIAL NUMBERS

PROTOTYPE	RELIABLE OR RUGGED TYPES	NOTES★
0A2	OA2WA, 6626, 6626/OA2WA, USN 6626/OA2WA, 6073	Min. Supply Volts OA2 = 185, 6626 = 165. USN types also supplied by CBS.
0B2	OB2WA, 6627, 6627/OB2WA, USN 6627/OB2WA, 6074	Min. Supply Volts OB2 = 133, 6627 = 130. USN types also supplied by CBS.
2A3	5930	
2C51	5670, 5670WA, 6385	Heater Current 2C51 = 0.3A, 5670 = 0.35A, 6385 = 0.5A
2D21	5727, 5727/2D21W	
5R4G	5R4WGA, 5R4GY	5R4GY for altitudes up to 40,000 ft.
5U4G	5931	
5Y3GT	6087, 5Y3WGTB, 5Y3WGTA	6087 has coated unipotential cathode, 5Y3 is filamentary. 5Y3WGTA rugged and for altitudes to 50,000 ft.
6AC7	6134, 6AC7W	
6AG5	6186/6AG5WA	
6AK5	5654, 5654/6AK5W, 6968, 5654/6AK5W/6096	6968 is a CBS tube development, Has controlled triode cutoff.
6AL5	5726, 5726/6AL5W, 5726/6AL5W/6097, 6663/6AL5	5726 has median control of characteristics. 6663 has improved heater.
6AQ5	6669, 6669/6AQ5, 6005, 6005/6AQ5W, 6005/6AQ5W/6095	Plate dissipation 6AQ5 = 12W, 6005 = 11W. 6669 has improved heater.
6AS6	5725, 5725/6AS6W, 5725/6AS6W/6187	
6AS7G	6080, 6080WA, 6AS7Y	Shock and vibration tested. Reduced electrolysis.
6AU6	6AU6WA, 6136	6136 has median control of characteristics.
6BA6	5749, 5749/6BA6W, 6660/6BA6	5749 has median control of characteristics.
6BE6	5750, 5750/6BE6W	5750 has median control of characteristics.
6BH6	6265, 6661/6BH6	6661 has improved heater, 6265 for on-off operation.
6BJ6	6662/6BJ6	6662 has improved heater.
6C4	6100/6C4WA, 6135, 6C4W	6135 has median control of characteristics and has stabilization. 6C4W is ruggedized and heater cycled test. 6100 has larger envelope and low microphonics.
6CL6	6677/6CL6	6677 has improved heater.
6J4	6J4WA	
6J6	6J6WA, 6099, 6101/6J6WA	6101 has balanced sections.
6L6GA	5932, 5693	5932 is ruggedized. 5693 is 10,000 hr. industrial type.
6SJ7	6SJ7WGT	Ruggedized.
6SK7	6SK7WA, 6137	6137 has median control of characteristics. 6SK7WA has low microphonics.
6SL7	6SL7WGT, 5691	6SL7WGT is ruggedized. 5691 is 10,000 hr. industrial.
6SN7	6SN7WGT, 5692	6SN7WGT is ruggedized. 5692 is 10,000 hr. industrial.
6U8	6678/6U8	6678 has improved heater.
6X4	6X4W, 6202	6202 has slightly lower plate current rating.
6X5GT	6X5WGT	Ruggedized.
12AT7	6679/12AT7, 12AT7WA, 6201	6201 has median control of characteristics. 6679 for mobile use.
12AU7	5814, 5814A, 5814WA, 6189/12AU7WA, 6680/12AU7	Heater current 12AU7 = 0.15A, 5814 = 0.175A. 6680 = 0.15A. 6680 is for mobile use and type 6189 has altitude test.
12AX7	5751, 6681	5751 has lower mu. 6681 for mobile use.
12AY7	6072	12AY7: Heater Current = 0.15A, μ = 40. 6072: Heater Current = 0.175A., μ = 44.

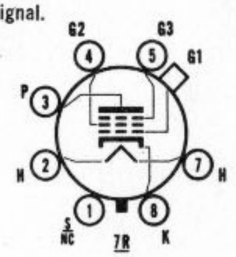
★Only primary differences are given. These types are all constructed to withstand different degrees of hard usage. For complete testing data refer to MIL-E-1 standards.

Table S4 HI-FI TUBES

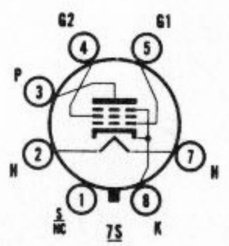
TYPE	Features and Notes	Basing	Base	Length, Inches	Diameter, Inches	Volts	Amperes	Plate Volts	Screen Volts	Plate Watts	Screen Watts	Operation Class	Plate Volts	Screen Volts	Grid Volts D-C or Cathode Resistor	Plate Ma†	Screen Ma†	Plate Resistance Ohms	Transconductance	Load Resistance Ohms‡	Amplification	Output Watts	% Distortion	TYPE
	DESCRIPTION	CONSTRUCTION				HEATER		MAX. RATINGS (Design Center)				USE	TYPICAL OPERATION											
6BQ5	High power beam pentode with high power sensitivity.	9CV	9-pin Min.	3 1/16	1/8	6.3	0.76	300	300	12	—	A_1, Single A_1, Triode AB_1, P.P.	250 250 250	250 — 250	—7.3 270Ω 130Ω	48/49.5 34/36 62/75	5.5/10.8 — 7/15	38,000 — —	11,300 — —	5200 3500 8000	— — —	5.7 1.95 11	10 9 3	**6BQ5**
6CA7 /EL34	Hi-fi power output tube. Will replace types KT66, 5881, and 807. Requires only slight circuit and/or socket adjustments in replacements.	8ET	Octal	4 1/8	1 1/2	6.3	1.5	800	425	25	8	A_1, Single AB_1, P.P. Common Resistors A_1, Triode AB_1 Triode P.P., Common Resistors	250 350 375 400	250 Rg2=470Ω — —	—13.5 130Ω 370Ω 220Ω	100 150/190 70 130/142	15 23/25 —	15,000 	11,000 	2000 3400 3000 5000	— — — —	11 35 6 16.5	10 5 8 3	**6CA7 /EL34**
12AY7	Medium-mu duotriode for use in the first stages of audio amplifiers. It has low microphonics, low leakage noise, and low hum.	9A	9-pin Min.	2 3/16	1/8	12.6 6.3	0.15 0.3	300	—	1.5	—	A_1, Each Section	250 150	— —	—4 2700Ω	3.0	— Ck = 40μf	22,800 Rg = 100K	1,750	— 20K	40	— VG=12.5	—	**12AY7**
1620	Sharp cutoff pentode similar to 6J7. For use where microphonics are critical. Metal envelope with miniature cap.	7R	Octal	3 1/8	1 5/16	6.3	0.3	250	100	—	—	A_1	100 250	100 100	—3 —3	2.0 2.0	0.5 0.5	1 meg >1 meg	1,185 1,225	— —	— —	— —	— —	**1620**
5879	Sharp cutoff AF pentode for use where reduced microphonics, leakage, noise, and hum are required.	9AD	9-pin Min.	2 3/16	1/8	6.3	150	250 100	100 —	—	—	A_1, Single A_1, triode	250 100	100 —	—3 —3	1.8 2.2	0.4 —	2 meg 17,000	1,000 1,240	— —	— 21	— —	— —	**5879**
5881	Beam power tube for continuous service. Similar electrically to type 6L6 but having higher dissipation ratings and improved construction.	7S	Octal	3 15/16	1 7/16	6.3	900	400	400	23	3	A_1, Single A_1, Triode A_1, P.P. AB_1, P.P. AB_1, P.P. Triode	350 300 250 360 400	250 — 250 270 —	—18 —20 —16 —22.5 —45	53/65 78/85 120/140 88/132 65/130	2.5/8.5 — 10/16 5/16 —	48,000 — 24,500 — —	5,200 — 5,500 — —	4200 4000 5000 6600 4000	— 8 — — —	11.3 1.8 14.5 26.5 13.3	13 5.5 2 2 4.4	**5881**
6550	High power beam tube for audio service.	7S	Octal	4 3/4	2 1/16	6.3	1.6	600	400	35	6	A_1, Single A_1, P.P. A_1, triode P.P.	250 400 450	250 275 —	—14 —23 —46	140/150 180/270 150/220	12/28 9/44 —	12,000 — —	11,000 — —	1500 3500 4000	— — —	12.5 55 28	7 3 2.5	**6550**
7025	High-mu duotriode for use in the first stages of audio amplifiers. Tested for less than 10 microvolts hum output. Same electrical characteristics as type 12AX7.	9A	9-pin Min.	2 3/16	1/8	12.6 6.3	150 300	300	—	1.0	—	A_1, Each Section	250 100	— —	—2 —1	1.2 0.5	— —	62,500 80,000	1,600 1,250	— —	100 100	— —	— —	**7025**

†In P.P. (push-pull) operation values for two tubes are given. The first figure for zero signal and the second for maximum signal.

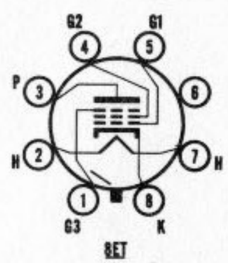
‡Plate-to-plate load for push-pull operation.



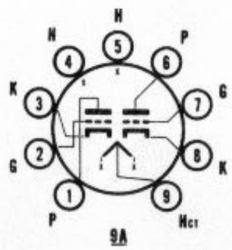
7R



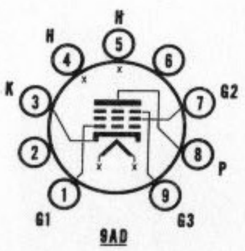
7S



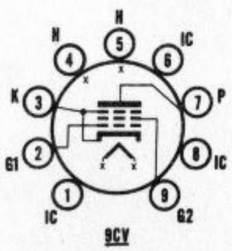
8ET



9A



9AD



9CV

ELECTRON TUBES

CBS

SEMICONDUCTORS

CBS-HYTRON, Danvers, Massachusetts • A Division of Columbia Broadcasting System, Inc.

5-8-10M