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Radio Valve Data

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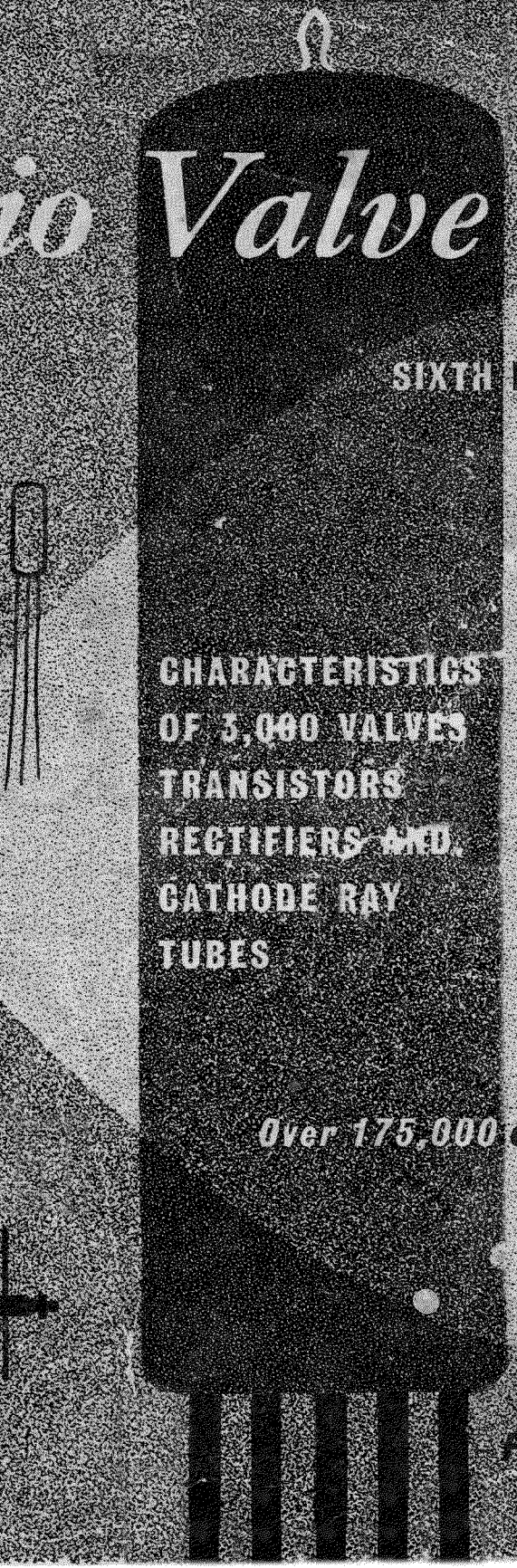

CHARACTERISTICS OF 3,000 VALVES TRANSISTORS RECTIFIERS AND CATHODE RAY TUBES

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RADIO VALVE DATA

Characteristics of 3,000 Valves, Transistors, Rectifiers and Cathode-Ray Tubes

Compiled by the staff of 'WIRELESS WORLD'

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GENERAL ABBREVIATIONS

Used in Valve Data Tables

* appended to filament or heater voltage indicates a directly heated cathode (that is, filament). Valves without the asterisk have indirectly heated cathodes.

† appended to filament or heater current indicates that the valve has a centre-tapped filament or heater. The figures given are invariably for the parallel connection of the two parts ; for the series connection the voltage is doubled and the current halved.

(Some directly heated valves of low current consumption may need the connection of a resistor across one half of the filament when using the series connection.)

Valve Abbreviations

a—a	Anode-to-anode
BT	Beam tetrode
c_{ak}	Anode-cathode capacitance
c_{ga}	Grid-anode capacitance
c_{gk}	Grid-cathode capacitance
D	Distortion
DD	Double-diode
DBT	Double-beam tetrode
DP	Double-pentode
DT	Double-triode
FW	Full-wave
g—g	Grid-to-grid
g_c	Conversion conductance
g_m	Mutual conductance
HW	Half-wave
H	Heptode
H_x	Hexode
I_k	Cathode current
MV	Mercury vapour
O	Octode
P	Pentode
P_a	Anode dissipation
PI	Peak inverse
R	Rectifier
r_a	Anode a.c. resistance
R_K	Cathode bias resistance
R_L	Optimum load resistance
SD	Single diode
SE	Secondary emission
SQ	Special Quality
T	Triode
TD	Triple diode
TH	Triode heptode
TH_x	Triode hexode
TP	Triode pentode
TT	Tetrode
VD	Voltage-doubler
VM	Variable mu

Transistor Abbreviations

P_c	Collector dissipation at 25°C
V_c	Collector volts
I_c	Collector current
I_e	Emitter current
$r_b=r_{b'}$	Base resistance
$r_e=r_{e'}$	Emitter resistance
r_c	Collector resistance
$r_{c'}$	Collector resistance (common emitter connection)
r_m	Mutual resistance
α'	Current gain (common emitter connection)
α	Current gain
$f_{c\alpha}$	Alpha cut-off frequency
I_{co}	Collector current at $I_e=0$
$r_c=r_{c'}(1+\alpha')$	

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EXPLANATION OF THE TABLES

THE INFORMATION GIVEN refers to the main electrical characteristics of valves together with their base connections. Physical dimensions are not included since there is a limit to the amount of information which it is practicable to give and size is only occasionally an important factor in the choice of a valve.

The valves are classified under main headings according to their type. In each section they are divided according to their make and then sub-divided into obsolete, replacement and current types. The tables are largely self-explanatory, but the following notes should be read carefully if they are to be fully understood.

Limitations of space necessarily restrict the amount of information which can be included in these tables, so designers requiring more detailed information should consult the valve manufacturers' published literature.

FREQUENCY-CHANGERS

Valves in this section are intended primarily for use as frequency-changers in superheterodynes and the figures given are the normal operating conditions for this application. Some of the valves included are occasionally used for other purposes, however, and the voltages and currents may then be very different. Even in their normal application differences may be found in individual receivers, since not all designers adopt the "normal" conditions; this is particularly the case when the operation is on short-wave bands.

It is to be noted that some valves which do not include an oscillator section, and which thus apparently require a separate oscillator, can actually be used as complete frequency-changers by using an oscillator circuit coupled between cathode and another electrode. The operation of such valves is likely to be more critically dependent on the oscillator circuit design than that of types having separate oscillator sections.

SCREENED TETRODES AND PENTODES

The main application of valves in this section is to r.f. and i.f. amplification and the operating conditions are normal ratings for this condition. No distinction is made between tetrodes and pentodes because it is immaterial in most cases which type a valve is as long as its characteristics are otherwise suitable. It is only in special applications, where separate use is made of the suppressor grid, that it is important and then the normal characteristics are in any case insufficient to enable a choice of valve to be made. Except where the suppressor grid (g_3) is internally connected, it is possible to determine whether a valve is a tetrode or a pentode by reference to the valve-base connections.

Some of the valves in this section are also listed under Amplifier Triodes. The characteristics given there are the ones obtained with the screen-grid connected to the anode.

Many of the valves are suitable for use in RC-coupled a.f. amplifier stages. When so used the voltages applied to the electrodes and the currents obtained are very different from the r.f. amplifier condition. They cannot readily be given, however, since they are as much a property of the circuit values as of the valve.

OUTPUT VALVES 1

Triodes, beam tetrodes and pentodes are all included here with normal maximum operating conditions as output valves for single-valve Class A operation for a.f. application. They are distinguished by the letters (T), (BT) and (P) following the type number and those containing diodes have additionally (SD) or (DD) for single- or double-diode.

A few contain the elements of an h.t. rectifier in addition and these are distinguished by the letter R.

In some cases the conditions for a tetrode or pentode operating as a triode with screen-grid joined to anode are given also. This condition can be distinguished by the absence of a figure for screen voltage, but in addition (T) is placed after the type number to indicate that the conditions are those of a triode. The fact that the electrode structure is that of a tetrode or a pentode is obvious as the valve appears in another row followed by (BT) or (P).

Even under Class A conditions the anode and screen currents rise with the signal input to a small extent. The anode current with full drive is about 2 per cent greater than the quiescent value. With some valves the screen current increases much more and may become as high as three or four times the quiescent value. This increase is usually greatest when the valve is of a type drawing a very low quiescent current.

Since there is no standard method of rating valves, the figures quoted in the tables are sometimes for the no-signal condition and sometimes for full drive. It is believed that most of the figures for British valves are for no-signal, whereas most of those for American types are for maximum applied signal.

The matter is mentioned chiefly to explain small differences which may exist between the figures given here and those which may be found in other lists. The differences are, in practice, unimportant for they are less than the normal variations between individual specimens of the same type.

Because of the rising current with drive there is a slight difference in the output powers obtainable with fixed grid bias on the one hand and self-bias by a cathode resistor on the other. Figures for battery-type valves are invariably for the fixed bias condition. For other valves there may be some discrepancies since again there seems to be no standard procedure for indicating output. The difference is not large, however, and can be ignored for most purposes. In general, the output with cathode bias is up to 10 per cent less than with fixed bias.

The maximum resistance which may safely be included in the grid-to-cathode external circuit depends on the method of obtaining grid bias. With valves taking more than about 20 mA cathode current it is a safe rule to limit the grid resistor to 0.5 MΩ for self-bias and 0.1 MΩ for fixed bias.

In individual cases and under particular operating conditions it may be safe to exceed these figures, but this should not be done without close investigation.

OUTPUT VALVES 2

The conditions included here are those for push-pull operation of a.f. output stages. Five modes of push-

-pull are recognized and distinguished in the "Class" column; they are A, AB_1, AB_2, B_1 and B_2. In Class A both valves are conductive over the whole input cycle and the anode current with full drive is substantially the same as that with no drive. In Class AB the valves are worked individually under non-linear conditions and may be individually cut-off over a small part of the input cycle; the anode current for full output is appreciably higher than that with no input. In Class B each valve is cut off for about one-half of the input cycle and the anode current at full output is much greater than that with no input signal. The subscripts $_1$ and $_2$ show that operation is respectively without and with grid current. The anode and screen currents quoted for Class A and AB operation are with the maximum input signal voltage; the currents for Class AB_2, B_1 and B_2 operation, however, are subject to considerable variation with input, so it is more useful here to give figures for the quiescent conditions. With Class AB and B operation the manufacturers' literature should, in any case, be consulted.

For Class AB_2 and B_2, the minimum grid-to-grid input resistance is given. The figure, together with that of the input voltage, is necessary for the design of the driver stage.

The valves included in this section fall into two groups. One consists of double triodes and double pentodes intended mainly for Class B_1 and Class B_2 operation. They are chiefly battery types which used to be designated as q.p.p. and Class B stages. There are also a few indirectly heated cathode types (for example 6A6) which have other applications; these last will also be found in the appropriate section (usually Amplifier Triodes) with the figures appropriate to one section of the valve as an amplifier.

Figures for anode and screen currents are quoted *per valve* (or per unit in the case of double valves) and in some cases several sets of different figures are given for the same valve under different conditions. Apart from double valves, most of the valves in the section appear also in Output Valves 1, and to distinguish between pairs of valves and double valves, which may not be listed elsewhere, the heater-current figures are given only for double valves (unless otherwise stated). The figures for the others are obtainable from Output Valves 1.

Very few Class A conditions are given because they are usually obtainable directly from Output Valves 1. For push-pull Class A the currents and anode-to-anode load are normally twice the figures for single-valve operation. The power output for the same odd-order distortion is usually a little more than double.

The differences between fixed bias and self-bias are considerable under Class AB and Class B conditions. Where no value is quoted for a bias resistor it is to be understood that operation with a fixed bias is required; where a bias-resistor value is given, the other figures refer to self-bias operation. With fixed bias, it is usually necessary for the bias source to be of low impedance; with positive drive it is essential.

The value of bias resistor quoted (R_K) is that required per valve, or per unit in the case of double valves.

OUTPUT VALVES 3

The valves in this section are used mainly in television as output amplifiers for the line scan waveforms. They can, however, be used in other applications where pulses of high peak voltage occur for short periods.

The amount of information provided in this section is necessarily limited, and operating conditions vary so widely with circuit application that in all cases of doubt the manufacturers' literature should be consulted.

THERMIONIC DIODES

The main characteristics required to be known about a diode are given here. Some of the double types have a common cathode, whereas others have separate cathodes. These can be distinguished by reference to the valve-base connections. Some guidance to the internal resistance of a diode is given by the column giving the maximum rectified current, since types of high current are invariably of lower resistance than those of low current.

Multiple valves which include diodes are not listed here but will be found under the section appropriate to the main assembly of the valve; that is, Screened Tetrodes and Pentodes, Amplifier Triodes and Output Valves 1.

SEMICONDUCTOR DIODES

This section includes crystal diodes, together with those metal rectifiers which are suitable for signal-frequency use. Maximum ratings are given, and in order to assist in the correct choice of a type, a column is included to show typical applications.

JUNCTION TRANSISTORS

All ratings and parameters here are for a temperature of 25°C. This enables the products of different manufacturers to be compared, but if operation at higher temperature is required fuller data should be consulted to determine the appropriate ratings and characteristics. In general it may be said that the major effects of elevated temperature are to reduce the permissible dissipation and increase the collector leakage current I_{co}. (This approximately doubles for each rise of 10°C and can affect bias conditions with unsuitable circuit arrangements.) Other characteristic changes which take place with temperature are of a relatively minor magnitude and in many cases may be ignored.

The figure for V_c *max.* should never be exceeded in normal use. In many circuits the maximum allowable h.t. rail voltage will be half this figure.

The small-signal parameters chosen for tabulation are the conventional equivalent-T network ones for the common emitter configuration. This is by far the most common circuit arrangement in use with junction transistors. Corresponding figures for common base and common emitter arrangements are easily derived.

The collector voltage and current at which the small signal parameters are given is defined. This is important since some of the parameters vary considerably with the bias point. In particular there is a large increase in r_e with decreasing I_e.

The figure for alpha cut-off is for the common base configuration and is lower by a factor of approximately α' for the common emitter arrangement. No attempt is made to specify large signal behaviour. In general the most important departures from the figures quoted

for small-signal conditions are likely to be decreased r_a and decreased μ'. The table on page 2 explains the symbols used.

AMPLIFIER TRIODES

The conditions given are those pertaining to operation as transformer-coupled a.f. amplifiers at maximum rating, which is the most suitable condition for comparing valve characteristics. Conditions for RC coupling depend too much upon the circuit constants to be useful. At the reduced voltages normally applied to the electrodes with RC coupling, the a.c. resistance and mutual conductance are usually 20 to 50 per cent higher and lower respectively than the figures listed

SMALL TRANSMITTING VALVES

All categories are included in this section (triodes, pentodes, beam tetrodes, etc.) having up to 50 watts anode dissipation. The figures given are for Class C r.f. amplification on telegraphy. It should be noted that in the case of double valves (identified by (DT), (DBT), etc., in the " Type " column) the figures for anode, screen and grid currents, dissipation and output refer to the pair.

Regarding the operating frequency column, the figures under " Reduced Rating " can generally be taken to be the maximum frequencies at which the valves will give a useful power output. As the efficiency of a valve decreases at these higher frequencies, it is necessary to make some reduction to the ratings (or power input) in order to ensure that the power dissipated in the valve does not exceed the safe limit. The percentage reduction varies from valve to valve, however, so it is advisable to consult the manufacturers' literature if the reduced ratings are required.

VALVE RECTIFIERS

The ratings given are maximum ones and assume a supply frequency of 50 c/s. In some cases a higher current output is permissible if the input voltage is reduced and in nearly all cases the input voltage can be considerably increased and the output current slightly increased if the rectifier is followed by a choke-input filter instead of the usual reservoir capacitor.

The figure for minimum resistance can be reduced if a smaller reservoir capacitor is used. When an input transformer is used, this resistance is usually provided by the resistance and leakage reactance of its windings, but in transformerless circuits it must be provided to limit the peak current.

Figures for the mean unsmoothed output voltage are not given, since they depend on the current and reservoir capacitance as well as the valve. With no current drain the voltage reaches 1.414 times the r.m.s. input voltage and this figure should be taken for the voltage rating of the reservoir capacitor. At maximum current the output voltage is approximately equal to the r.m.s. input voltage in the case of rectifiers of 60 mA and upwards current rating.

METAL RECTIFIERS

Copper oxide and selenium rectifiers are both made in basic units of low voltage rating and in various sizes for different currents. Different voltages are catered for by stacking together various numbers of the basic units and there are also different stacking methods for units for use as half-wave, full-wave, voltage-doubler and bridge rectifiers. The total number of rectifier assemblies possible with only a few basic units is thus very large. In order to reduce the numbers, therefore, a few examples are listed as guides and from these the other possible ratings can be reduced. For example, with the G.E.C. P types and Westinghouse 16 types the highest and lowest ratings are given and it is to be understood that intermediate ones are available. With the S.T.C. V and B types, voltage ratings are available at 18V per plate up to a limit of 40 plates where the suffix is W or 60 plates where the suffix is RW ; e.g., B25-14-1RW indicates 25-mm plates (permitting max. current of 100mA) and 14 plates $\times$ 18V = 250V.

E.H.T. RECTIFIERS

These rectifiers are used in television for obtaining the e.h.t. voltages of several thousand volts necessary for the anode of the cathode-ray tube. Two common methods of doing this are recognised in the data. First, by rectifying the high voltage obtained from the flyback pulse of the line timebase—and here the ratings given assume a pulse duration of approximately 10 microsecs—and secondly by rectifying the output of an oscillator working at 100 kc/s or upwards.

Both thermionic diodes and metal rectifiers are included in this section.

TELEVISION CATHODE-RAY TUBES

All the tubes in this section are designed for magnetic deflection. It should be noted that the figure given for deflection angle is the total number of degrees subtended by the picture diagonal. Although the diameter of the screen is given as a round number of inches for the sake of convenience, this should not be taken too literally as there are slight variations of a few millimetres from tube to tube.

OSCILLOSCOPE CATHODE-RAY TUBES

The deflection sensitivity of an oscilloscope tube is normally expressed in millimetres per volt. Since, however, this depends on the e.h.t. voltage applied to the final anode, the figure in the " Deflection " column is given as a constant which must be divided by whatever final anode voltage is used to obtain the deflection sensitivity in the correct terms. For example, the deflection sensitivity of the Y plates of the Mullard DP7-6 with, say, 800 volts on A_2 is given by

$$\frac{200}{800} = 0.25 \text{ mm/V.}$$

In the " Capacitance " column, the figures given are measured between one plate and earth.

Included in this section are a number of the older types of television cathode-ray tubes with electrostatic deflection plates and some radar tubes.

EFFICIENCY DIODES

The purpose of these diodes, applied to television line scan circuits, is to provide a section of the line scan sawtooth waveform from the energy stored in the deflector coils during the flyback, thereby reducing the amount of anode current required in the line scan output stage. The thermionic diodes here may also be found under Valve Rectifiers, and from the latter section it will

be apparent whether they are single or double diodes. Where only one unit of a double diode can be used as a damping diode, this is made clear by a note.

AMERICAN TYPES

Valves listed as "American" require some explanation. The basic type number of many American valves consists of two figure groups separated by a letter group (for example 6L6). Many of these have a following letter group also to distinguish different physical forms of electrically similar valves. These following letter groups do not appear in the tables; only the basic number is listed.

Among the main 6- and 12-number types the following letters have meanings as follows:—

No letter; metal valve; for example, 6L6.
MG; metal-glass; for example, 6L6MG.
G; glass; for example, 6L6G.
GT; glass, tubular; for example, 6L6GT.

The majority of American-type valves in use and available or manufactured in this country are the G and GT types and should be ordered by appending the appropriate letters to the type number as listed in the tables. For replacement purposes it is important to distinguish between the G and GT types, since the former is much larger physically. Electrically all are usually interchangeable but there are small differences of inter-electrode capacitance which may necessitate re-trimming when types are substituted in r.f. and i.f. circuits.

Many of the latest types, notably those with the miniature 7-pin base (identical with the B7G and so listed) and with the Loctal base (interchangeable with the B8G and listed as B8B) are only available in one form and never have following letters.

Many American-type valves are made in this country and are available under the American-type numbers. These are listed under the names of the British firms concerned.

It may be mentioned also that the American 7- and 14-series valves are listed as having 6.3-V and 12.6-V heaters respectively since these are common operating conditions. These valves also have maximum ratings of 7V and 14V, from which they derive their type numbers. They are intended primarily for car radio and the high maximum rating is adopted to suit the voltage of a battery on charge.

"SPECIAL QUALITY" VALVES

These valves are generally improved versions of existing types, designed for operation under more severe conditions than found in ordinary domestic receivers. The description covers several classes of improvement, such as long life, resistance to mechanical shock, electrical stability and various combinations of these. It also includes the improved valves hitherto known as "reliable" valves. No distinction is made in the tables between these various classes, however. The valves are bracketed with their ordinary equivalents and are indicated by the abbreviation "SQ" alongside.

GROUPING

The valves are grouped within their sections as Obsolete, Replacement and Current Types and this has been done in accordance with the recommendations of the manufacturers concerned.

These terms are used in the following senses—

Obsolete; Valves which are no longer manufactured and which are normally unobtainable. The list is obviously incomplete, since it is impracticable to include all valves back to the first ever made! The object has been to include only those types which may still be in use in old sets to assist, by giving their characteristics, in the choice of the most suitable replacement. Isolated specimens may, of course, still be obtainable.

Replacement; Valves which are no longer manufactured in large quantities, but of which so many are in use that small batches are still made for replacement purposes. They are normally still obtainable, but may have to be specially ordered and may be subject to temporary delay. They are valves not normally to be recommended for use in new equipment which is to be manufactured in any large quantity.

Current; These valves include the latest types and older ones which are still being produced in quantity. The latter are usually more readily available but may be expected to become replacement types relatively early.

It should be realised that all the groups really merge into one another from the user's point of view. Particular obsolete valves may be easily obtainable for a time; individual replacement valves and even some current types may be quite hard to get.

INDEX, BASES AND EQUIVALENTS

On account of the large number of valves included—roughly 2,400 British and 600 American types—an index is provided to assist in finding them quickly. All valves are listed in alphabetic and numerical order of their type numbers in the index (figures precede letters) and against each valve is the page number (or numbers) where it can be found. Also against each valve are its base connections and a list of its equivalents. The last-mentioned are only direct plug-in replacements and do not include "near equivalents," which usually necessitate slight changes in circuitry.

The information on British valves and their equivalents has been supplied by the individual valve manufacturers and collected into its present form by the staff of *Wireless World*. The data on American types has been collected from many sources, but notably data lists provided by the Radio Corporation of America.

Blanks in the columns indicate that the figures missing have been found to be unobtainable. Every effort has been made to secure accuracy, and in the case of British valves proofs have been passed by the manufacturers concerned. As there are over 35,000 sets of figures in the tables, apart from the base connections, of which there are 570 distributed among 36 bases, it is perhaps too much to expect that there are no errors. It is hoped that there are very few.

FREQUENCY-CHANGERS

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR																	
Obsolete Types																	
20A1	(TH_x)	mix	4.0	1.2	250	80	−1.5	2.2	3.0	0.7	0.65	12.5	7.0	21.0	0.05	B7	3
		osc			100	—	—	2.3	—	—	—	—	—	—	—		
6F7	(TP)	mix	6.3	0.3	250	100	−3.0	2.8	0.6	2.0	0.3	7.0	3.2	12.5	0.008	UX7	13
		osc			100	—	—	2.4	—	—	—	—	2.5	3.0	2.0		
Replacement Types																	
1LA6	(H)	mix	1.4*	0.05	90	45	0	0.55	0.6	0.75	0.25	7.0	7.7	8.0	0.4	B8B	29
		osc			90	—	—	1.2	—	—	—	—	2.9	3.3	0.6		
1A7	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	7.0	7.0	10.0	0.5	IO	76
		osc			90	—	—	1.2	—	—	—	—	3.4	4.4	0.9		
15A2	(H)	mix	4.0	0.65	250	100	−3.0	3.5	2.7	0.36	0.55	20.0	7.5	9.5	0.2	B7	2
		osc			170	—	—	4.0	—	—	—	—	—	—	—		
6A7 } 6A8 }	(H)	mix	6.3	0.3	250	100	−3.0	3.5	2.7	0.36	0.55	20.0	9.5	12.0	0.26	UX7	1
		osc			170	—	—	4.0	—	—	—	—	6.0	4.6	1.1	IO	1
6K8	(TH_x)	mix	6.3	0.3	250	100	−3.0	2.5	6.0	0.6	0.36	7.5	4.6	4.8	0.08	IO	4
		osc			100	—	—	3.8	—	—	—	—	6.5	3.4	1.8		
7S7	(TH)	mix	6.3	0.3	250	100	−2.0	1.8	3.0	1.25	0.53	20.0	5.0	8.0	0.03	B8B	8
		osc			150	—	—	5.0	—	—	—	—	7.0	3.5	1.0		
ECH42	(TH_x)	mix	6.3	0.23	250	85	−2.0	3.0	3.0	1.0	0.75	9.4	4.0	9.2	0.1	B8A	3
		osc			115	—	—	4.8	—	—	—	—	5.5	2.3	1.2		
12K8	(TH_x)		12.6	0.15	Other data as Type 6K8												
14S7	(TH)		12.6	0.15	Other data as Type 7S7												
15D2	(H)		13.0	0.15	Other data as Type 15A2												
20D2	(TH_x)	mix	13.0	0.15	250	100	−3.0	2.5	6.0	0.6	0.36	7.5	4.5	5.0	0.03	B7	3
		osc			100	—	—	3.8	—	—	—	—	—	—	—		
15D1	(H)		13.0	0.2	Other data as Type 15A2												
UCH42	(TH_x)	mix	14.0	0.1	200	85	−2.0	3.0	3.0	1.0	0.75	9.4	3.8	9.2	0.1	B8A	3
		osc			100	—	—	3.1	—	—	—	—	5.5	2.3	1.2		
Current Types																	
1AC6	(H)		1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	3.1	7.5	8.5	0.4	B7G	54
1R5	(H)		1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.0	0.4	B7G	3
DK96/ 1AB6	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	6.0	7.4	8.1	0.36	B7G	54
		osc				—	—	—	—	—	—	—	—	—	—		
6BE6 } 5750 }	(H) (SQ)		6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
12AH8	(TH)	mix	6.3	0.3†	250	100	−3.0	2.6	4.4	1.5	0.55	9.4	5.0	8.0	0.025	B9A	9
		osc			100	—	—	5.7					7.0	2.5	1.2		
ECF82/ 6U8	(TP)	mix	6.3	0.45	170	170	—	6.6	2.5	0.4	1.65	5.0	5.0	3.5	0.006	B9A	25
		osc			100	—	—	7.0	—	—	—	—	2.5	1.0	1.8		
20D4	(TH)	mix			250	100	−2	3.0	3.6	0.9	0.850	12.5	4.5	8.2	0.034	B9A	52
		osc	6.3	0.3	100			5.0					2.1	0.87			
PCF82/ 9U8	(TP)		9.5	0.3	Other data as Type ECF82/6U8												
12BE6	(H)		12.6	0.15	Other data as Type 6BE6												
12AD6	(H)		12.6	0.15	12.6	12.6	0	0.45	1.5	1.0	0.26	2.2	8.0	8.0	0.3	B7G	29
COSSOR																	
Obsolete Types																	
210SPG	(H)	mix	2.0*	0.1	150	40	0	0.4	0.8	—	0.45	7.0	14.0	21.5	—	B7	1
		osc			150	—	—	1.1	—	—	—	—	—	—	—		
13PGA	(H)	mix	13.0	0.2	250	100	−3.0	3.5	2.2	—	0.75	12.0	8.0	9.5	—	B7	2
		osc			200	—	—	4.0	—	—	—	—	—	—	—		
202MPG	(H)	mix	20.0	0.2	200	100	−1.5	2.5	3.0	—	1.5	14.0	15.5	22.5	—	B7	2
		osc			100	—	—	3.0	—	—	—	—	—	—	—		
Replacement Types																	
1A7	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	—	7.0	10.0	0.5	IO	76
		osc			90	—	—	1.2	—	—	—	—	3.4	4.4	0.9		
210PG	(H)	mix	2.0*	0.1	150	40	0	0.4	0.8	—	0.45	7.0	14.0	21.5	—	B7	1
		osc			150	—	—	1.1	—	—	—	—	—	—	—		
220TH	(TH)	mix	2.0*	0.2	120	60	0	0.6	1.7	—	0.25	7.0	6.5	23.0	0.04	B7	34
		osc			100	—	—	1.7	—	—	—	—	—	—	—		
41MPG	(H)	mix	4.0	1.0	250	100	−1.5	2.5	3.0	—	1.5	14.0	15.5	22.5	—	B7	2
		osc			100	—	—	3.0	—	—	—	—	—	—	—		
41STH	(TH_x)	mix	4.0	1.15	250	100	−1.5	3.0	4.0	—	0.6	12.0	6.5	14.5	0.001	B7	3
		osc			100	—	—	2.0	—	—	—	—	—	—	—		
4THA	(TH_x)	mix	4.0	1.5	250	100	−2.0	3.5	5.5	—	0.85	10.0	8.0	14.0	0.001	B7	3
		osc			100	—	—	1.5	—	—	—	—	—	—	—		
OM10	(TH_x)	mix	6.3	0.2	250	100	−2.0	2.7	3.8	0.6	0.7	11.0	5.0	11.9	0.002	IO	3
		osc			70	—	—	3.0	—	—	—	—	5.9	—	—		
202STH	(TH_x)	mix	20.0	0.2	250	100	−1.5	3.0	4.0	—	0.6	12.0	6.5	14.5	0.001	B7	3
		osc			100	—	—	2.0	—	—	—	—	—	—	—		
203THA	(TH_x)		20.0	0.3	Other data as Type 4THA												
302THA	(TH_x)		30.0	0.2	Other data as Type 4THA												

Continued

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
COSSOR (*Continued*)																	
Current Types																	
1R5	(H)	mix	1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.5	0.4	B7G	3
1AC6	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	54
		osc			—	—	—	—	—	—	—	—	—	—	—		
DK96	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	6.0	7.6	8.4	0.36	B7G	54
		osc			—	—	—	—	—	—	—	—	—	—	—		
ECF80	(TP)	mix	6.3	0.43	170	170	−5.5	5.2	1.5	0.87	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
6AJ8	(TH)	mix	6.3	0.3	250	103	−2.0	3.25	6.7	1.0	0.775	—	4.8	7.9	0.006	B9A	24
		osc			100	—	—	13.5	—	—	—	—	2.6	2.1	1.0		
7S7	(TH)	mix	6.3	0.3	250	100	−2.0	1.8	3.0	1.25	0.525	20.0	5.0	8.0	0.03	B8B	8
		osc			150	—	—	5.0	—	—	—	—	—	—	—		
62TH	(TH_x)	mix	6.3	0.23	250	85	−2.0	3.2	3.75	1.0	0.71	11.0	4.0	9.2	0.1	B8A	3
		osc			115	—	—	4.2	—	—	—	—	5.5	2.3	1.2		
8A8	(TP)	mix	9.0	0.3	170	170	−5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
9U8	(TP)	mix	9.5	0.3	170	170	—	6.6	2.5	0.4	1.65	5.0	5.0	2.6	0.01	B9A	25
		osc			100	—	—	7.0	—	—	—	—	2.5	0.4	1.8		
14S7	(TH)	mix	12.6	0.15	Other data as Type 7S7												
141TH	(TH_x)	mix	14.0	0.1	200	85	−2.0	3.2	3.35	1.25	0.69	13.0	4.0	9.2	0.1	B8A	3
		osc			110	—	—	4.2	—	—	—	—	5.5	2.3	1.2		
EDISWAN MAZDA																	
Obsolete Types																	
FC141	(H)	mix	1.4*	0.05	82	45	0	0.55	0.6	0.6	0.25	—	—	—	—	MO	5
		osc			75	—	—	1.2	—	—	—	—	—	—	—		
TP23	(TP)	mix	2.0*	0.25	120	60	−1.5	0.55	0.95	1.6	0.25	8.0	9.25	12.25	0.02	B7	34
		osc			80	—	—	2.5	—	—	—	—	13.75	8.75	4.5		
TP26	(TP)	mix	2.0*	0.2	103	65	−2.0	1.2	0.3	1.4	0.55	3.0	6.75	8.25	0.02	MO	22
		osc			65	—	—	0.9	—	—	—	—	3.75	4.25	2.0		
AC/THIA	(TH)	mix	4.0	1.3	250	100	−3.0	3.0	6.0	1.6	0.75	9.0	9.25	11.5	0.001	MO	12
		osc			80	—	—	4.5	—	—	—	—	10.5	4.0	2.25		
TP1340	(TP)	mix	13.0	0.4	250	200	−5.0	6.5	2.5	0.9	0.7	3.0	8.0	7.75	0.07	B9	2
		osc			150	—	—	1.5	—	—	—	—	5.25	4.25	2.5		
TH2320	(TH)	mix	23.0	0.2	150	100	−3.0	3.0	6.0	1.2	0.75	9.0	9.5	11.5	0.0015	B7	3
		osc			80	—	—	4.5	—	—	—	—	10.25	4.0	2.25		
Replacement Types																	
1C1 } 1R5 }	(H)	mix	1.4*	0.05	90	67.5	0	1.6	3.2	0.6	0.3	37.0	7.0	7.5	0.4	B7G	3
TP22	(TP)	mix	2.0*	0.25	150	60	−1.5	1.2	0.4	1.6	0.5	3.0	9.25	10.0	0.02	B9	1
		osc			100	—	—	0.8	—	—	—	—	4.5	6.5	4.5		
TP25	(TP)	mix	2.0*	0.2	120	60	−1.5	0.58	0.92	1.3	0.26	8.0	6.5	8.0	0.01	MO	23
		osc			80	—	—	2.5	—	—	—	—	9.0	3.75	2.0		
AC/TP	(TP)	mix	4.0	1.25	250	200	−5.0	6.5	2.5	0.9	0.7	3.0	8.0	7.75	0.07	B9	2
		osc			150	—	—	1.5	—	—	—	—	5.25	4.25	2.5		
AC/TH1	(TH)	mix	4.0	1.3	250	100	−3.0	3.0	6.0	1.6	0.75	9.0	9.5	11.5	0.0015	B7	3
		osc			80	—	—	4.5	—	—	—	—	10.25	4.0	2.25		
TH41	(TH)	mix	4.0	1.3	250	100	−3.0	3.0	6.05	1.6	0.75	9.0	9.25	11.0	0.001	MO	12
		osc			80	—	—	5.0	—	—	—	—	10.5	3.75	2.4		
6C31	(TH)	mix	6.3	0.85	250	100	−3.0	3.0	6.05	1.6	0.75	9.0	9.5	13.0	0.001	IO	3
		osc			80	—	—	5.0	—	—	—	—	11.5	4.4	3.0		
TH232	(TH)	mix	23.0	0.2	150	100	−3.0	3.0	6.0	1.0	0.65	9.0	9.5	11.5	0.0015	B7	3
		osc			80	—	—	4.5	—	—	—	—	10.25	4.0	2.25		
TH233	(TH)	mix	23.0	0.2	175	100	−3.0	2.6	5.6	1.3	0.64	8.0	9.25	11.25	0.0005	MO	12
		osc			80	—	—	4.5	—	—	—	—	10.5	3.5	2.4		
TP2620	(TP)	mix	26.0	0.2	250	200	−5.0	6.5	2.5	0.9	0.7	3.0	8.0	7.75	0.07	B9	2
		osc			150	—	—	1.5	—	—	—	—	5.25	4.25	2.5		
Current Types																	
1C2	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	5.7	7.5	8.5	0.4	B7G	54
		osc			30	—	—	1.6	—	—	—	—	4.0	5.0	—		
1C3	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	5.7	7.4	8.1	0.36	B7G	54
		osc			35	—	—	1.5	—	—	—	—	3.9	4.8	—		
6C9	(TH)	mix	6.3	0.45	250	100	−2.5	3.0	6.0	3.0	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80	—	—	5.0	—	—	—	—	7.7	1.7	1.8		
6C10	(TH_x)	mix	6.3	0.225	250	100	−2.5	3.6	3.75	1.03	0.71	17.0	4.0	9.2	0.05	B8A	3
		osc			115	—	—	5.0	—	—	—	—	6.4	2.7	1.5		
6C12	(TH)	mix	6.3	0.3	250	103	−2.0	3.25	6.7	1.0	0.775	12.0	4.8	7.9	0.006	B9A	24
		osc			100			4.5					2.6	2.1	1.0		
30C1	(TP)	mix	9.0	0.3	170	145	—	6.8	2.0	0.8	2.0	5.0	6.1	4.9	0.013	B9A	25
		osc			120	—	—	6.0	—	—	—	—	3.1	2.9	1.7		

(*Continued*)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
EDISWAN MAZDA *(Continued)*																	
Current Types (Continued)																	
30C13	(TP)	mix	9.0	0.3	170	145	—	6.8	2.0	0.8	2.0	5.0	6.3	5.2	0.016	B9A	42
		osc			120	—	—	6.0	—	—	—	—	3.5	3.3	1.7		
10C14	(TH)	mix	19.0	0.1	200	119	−2.6	3.7	8.1	1.0	0.78	14.0	4.8	7.9	0.006	B9A	24
		osc			100	—	—	4.5	—	—	—	—	2.6	2.1	1.0		
10C1	(TH)	mix	28.0	0.1	175	100	−2.5	3.0	6.0	2.2	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80	—	—	5.0	—	—	—	—	7.7	1.7	1.8		
10C2	(TP)	mix	28.0	0.1	150	150	0	4.7	1.3	—	2.1	3.25	7.5	2.6	0.012	B8A	19
		osc			80	—	—	5.0	—	—	—	—	4.1	1.6	1.7		
EMITRON																	
Current Types																	
1R5	(H)	mix	1.4*	0.05	90	67.5	0	1.6	3.2	0.6	0.3	15.0	7.0	7.5	0.4	B7G	3
6BE6	(H)		6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
ECH81/ 6AJ8	(TH)	mix	6.3	0.3	250	100	−2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
7S7	(TH)	mix	6.3	0.3	250	100	−2.0	1.8	3.0	1.25	0.525	20.0	5.0	8.0	0.03	B8B	8
		osc			150	—	—	5.0	—	—	—	—	—	—	—		
PCF80/ 9A8	(TP)	mix	9.0	0.3	170	170	−5.5	5.2	1.5	0.7	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
14S7	(TH)	mix	12.6	0.15	Other data as Type 7S7												
FERRANTI																	
Obsolete Types																	
VHTA	(H)	mix	13.0	0.2	250	100	−1.5	3.2	5.6	0.5	0.65	15.0	15.0	16.0	0.3	B7	2
		osc			100	—	—	1.3	—	—	—	—	—	—	—		
VHTS	(H)	mix	13.0	0.3	200	100	−3.0	2.6	5.1	0.5	0.65	15.0	15.0	16.0	0.3	B7	2
		osc			100	—	—	1.2	—	—	—	—	—	—	—		
Replacement Types																	
VHT2A	(H)	mix	2.0*	0.1	120	45	0	—	1.9	0.75	0.35	10.0	11.5	7.0	0.3	B7	1
		osc			120	—	—	—	—	—	—	—	6.0	5.0	4.0		
VHT4	(H)	mix	4.0	1.0	250	100	−3.0	2.6	5.1	0.5	0.7	15.0	15.0	16.0	0.3	B7	2
		osc			100	—	—	1.2	—	—	—	—	11.0	9.0	5.0		
6A7 } 6A8 }	(H)	mix	6.3	0.3	250	100	−3.0	3.5	2.7	0.36	0.55	20.0	12.0	12.0	0.06	UX7	1
		osc			100	—	—	4.0	—	—	—	—	6.5	5.0	0.8	IO	1
6K8	(TH_x)	mix	6.3	0.3	250	100	−3.0	2.5	6.0	0.6	0.35	7.5	4.6	4.8	0.08	IO	4
		osc			100	—	—	3.8	—	—	—	—	6.5	3.4	1.8		
6SA7 } 6SA7GT/G }	(H)		6.3	0.3	250	100	−2.0	3.5	8.5	1.0	0.45	—	9.5	12.0	0.13	IO	6
																IO	7
7S7	(TH)	mix	6.3	0.3	250	100	−2.0	1.8	3.0	1.25	0.525	20.0	5.0	8.0	0.03	B8B	8
		osc			150	—	—	5.0	—	—	—	—	—	—	—		
12K8			12.6	0.15	Other data as Type 6K8											IO	4
Current Type																	
1AB6/ DK96	(H)		1.4*	0.025	85	64	0	0.6	1.5	1.0	0.3	6.0	7.6	8.4	0.36	B7G	54
1AC6/ DK92	(H)		1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	54
1R5/DK91	(H)		1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.0	0.4	B7G	3
6BE6/EK90	(H)		6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
ECH42/ 6CU7	(TH_x)	mix	6.3	0.23	250	85	−2.0	3.0	3.0	1.0	0.75	11.0	4.0	9.2	0.1	B8A	3
		osc			115	—	—	4.8	—	—	—	—	5.5	2.3	1.2		
ECH81/ 6AJ8	(TH)	mix	6.3	0.3	250	100	−2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
9A8/ PCF80	(TP)	mix	9.0	0.3	170	170	—	6.3	2.5	0.7	2.05	4.0	5.5	3.8	0.02	B9A	25
		osc			100	—	—	14.0					2.5	1.8	1.5		
9U8/ PCF82	(TP)	mix	9.5	0.03	250	110	—	5.2	2.0	0.4	1.0	5.0	5.0	2.5	0.006	B9A	25
		osc			170	—	—	3.3	—	—	—	—	2.5	0.4	1.8		
G.E.C.																	
Obsolete Types																	
X24	(TH_x)	mix	2.0*	0.2	150	60	−1.5	0.7	1.7	—	0.25	6.0	7.5	17.5	—	B7	3
		osc			100	—	—	2.1	—	—	—	—	19.0	9.5	—		
X41	(TH_x)	mix	4.0	1.2	250	80	−1.5	2.3	8.8	—	0.64	12.0	7.2	17.0	0.46	B7	3
		osc			150	—	—	2.2	—	—	—	—	15.5	6.0	—		
MX40	(H)	mix	4.0	1.0	250	80	−3.0	—	—	—	0.5	10.0	13.3	—	0.3	B7	2
		osc			150	—	—	—	—	—	—	—	11.3	9.4	2.6		
X63	(H)	mix	6.3	0.3	250	100	−3.0	—	—	—	0.49	25.0	8.0	8.9	0.38	IO	1
		osc			100	—	—	—	—	—	—	—	7.3	5.9	0.83		

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
G.E.C. (*Continued*)																	
Replacement Types																	
X101	(TH_x)	mix	19.0	0.1			Other data as Type X81										
X14	(H)	mix	1.4*	0.05	90	45	0	0.45	0.6	—	0.25	10.0	7.0	7.6	0.47	IO	76
		osc			90	—	—	—	—	—	—	—	5.1	5.4	1.25		
X22	(H)	mix	2.0*	0.15	150	70	0	—	—	—	0.35	10.0	13.8	20.5	0.4	B7	1
		osc			150	—	—	—	—	—	—	—	7.8	6.4	1.47		
X61M	(TH_x)	mix	6.3	0.3	250	100	−3.0	3.0	3.0	0.7	0.62	15.0	4.9	11.5	—	IO	3
		osc			100	—	—	3.3	—	—	—	—	10.5	6.0	—		
X65	(TH_x)	mix	6.3	0.3	250	100	−3.0	3.0	3.0	2.5	0.23	10.0	3.5	5.5	0.12	IO	3
		osc			100	—	—	3.3	—	—	—	—	9.6	5.5	2.0		
X78	(TH_x)	mix	6.3	0.3	250	75	0	4.5	3.4	0.7	0.78	10.0	4.1	4.34	0.11	B7G	48
		osc			100	—	—	4.5	—	—	—	—	—	—	—		
X81	(TH_x)	mix	6.3	0.3	250	100	−2.0	3.0	2.4	1.0	0.65	10.0	6.0	11.5	0.07	B8B	8
		osc			100	—	—	3.6	—	—	—	—	9.6	4.8	1.15		
X76M	(TH_x)	mix	13.0	0.16	250	100	−3.0	3.0	3.0	0.7	0.62	15.0	4.7	13.1	—	IO	3
		osc			100	—	—	3.3	—	—	—	—	10.6	6.3	—		
Current Types																	
X17	(H)	mix	1.4*	0.05	90	67.5	0	—	—	0.75	0.25	—	7.0	7.0	0.4	B7G	3
		osc				—	—	—	—	—	—	—	3.8	—	0.1		
X18	(H)		1.4*	0.05	90	67.5	0	1.15	2.85	0.6	0.32	15.0	7.0	7.0	0.4	B7G	54
X20	(H)	mix	1.4	0.05	85	60	0	0.7	0.15	0.65	0.39	7.0	7.5	8.5	0.4	B7G	54
		osc			30			1.6									
X25	(H)	mix	1.4	0.025	85	68	0	0.6	0.14	0.8	0.3	5.7	7.4	8.1	0.36	B7G	54
		osc			35			1.5					3.9	4.8			
X727/6BE6	(H)		6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
X79	(TH_x)	mix	6.3	0.3	250	75	0	4.5	3.4	0.7	0.78	10.0	4.1	4.34	0.08	B9A	21
		osc			100	—	—	4.5	—	—	—	—	5.47	1.5	1.48		
X719/ ECH81	(TH)	mix	6.3	0.3	250	100	−2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
LZ319/ PCF80	(TP)	mix	9.0	0.3	170	170	−2.0	10.0	10.0	—	2.18	4.0	4.5	4.0	0.02	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	3.0	0.5	2.0		
X109	(TH_x)	mix	19.0	0.1	175	75	0	4.3	3.6	0.25	0.71	10.0	4.1	4.34	0.11	B9A	21
		osc			100	—	—	4.5	—	—	—	—	—	—	—		
X118	(TH)	mix	28.0	0.1	175	100	−2.5	3.0	6.0	2.2	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80			5.0					7.7	1.8			
LZ329	(TP)	mix	28.0	0.1	170	170	−2.8	6.5	2.0	0.8	2.2	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	—	10.0	—	—	—	—	2.3	0.3	1.5		
MARCONI																	
Obsolete Types																	
X14	(H)	mix	1.4*	0.05	90	45	0	0.45	0.6	—	0.25	10.0	7.0	7.6	0.47	IO	76
		osc			90	—	—	—	—	—	—	—	5.1	5.4	1.25		
X21	(H)	mix	2.0*	0.1	150	70	0	—	—	—	0.24	10.0	11.8	19.2	0.55	B7	1
		osc			150	—	—	—	—	—	—	—	7.4	—	1.8		
X23	(TH_x)	mix	2.0*	0.3	150	60	−1.5	0.7	—	—	0.25	6.0	6.3	17.5	0.05	B7	34
		osc			150	—	—	2.1	—	—	—	—	21.5	9.8	4.1		
X24	(TH_x)	mix	2.0*	0.2	150	60	−1.5	0.7	1.7	—	0.25	6.0	7.5	17.5	—	B7	3
		osc			100	—	—	2.1	—	—	—	—	19.0	9.5	—		
X42	(H)	mix	4.0	0.6	250	100	−3.0	—	—	—	0.49	25.0	8.6	—	0.95	B7	2
		osc			200	—	—	—	—	—	—	—	8.7	7.0	1.64		
X64	(H)	mix	6.3	0.3	250	150	−6.0	—	—	—	0.31	18.0	11.3	8.5	1.0	IO	2
		osc			—	—	—	—	—	—	—	—	6.0	—	—		
X30 X32	(H)	mix	13.0	0.3	250	100	−3.0	4.0	—	—	0.75	10.0	15.6	—	0.36	B7	2
		osc			150	—	—	3.0	—	—	—	—	12.2	9.5	2.66		
X31	(TH_x)	mix	13.0	0.3	250	80	−1.5	—	—	—	0.55	12.0	7.0	21.5	0.046	B7	3
		osc			150	—	—	—	—	—	—	—	17.0	8.5	3.56		
X71M	(TH_x)	mix	13.0	0.16	250	100	−3.0	—	—	—	0.62	15.0	5.0	14.1	0.085	IO	3
		osc			100	—	—	—	—	—	—	—	11.0	7.1	2.3		
X101	(TH_x)	mix	19.0	0.1			Other data as Type X81										
Replacement Types																	
X22	(H)	mix	2.0*	0.15	150	70	0	—	—	—	0.35	10.0	13.8	20.5	0.4	B7	1
		osc			150	—	—	—	—	—	—	—	7.8	6.4	1.47		
X41	(TH_x)	mix	4.0	1.2	250	80	−1.5	2.3	8.8	—	0.64	12.0	7.2	17.0	0.46	B7	3
		osc			150	—	—	2.2	—	—	—	—	15.5	6.0	—		
MX40	(H)	mix	4.0	1.0	250	80	−3.0	—	—	—	0.5	10.0	13.3	—	0.3	B7	2
		osc			150	—	—	—	—	—	—	—	11.3	9.4	2.6		
X61M	(TH_x)	mix	6.3	0.3	250	100	−3.0	3.0	3.0	0.7	0.62	15.0	4.9	11.5	—	IO	3
		osc			100	—	—	3.3	—	—	—	—	10.5	6.0	—		
X63	(H)	mix	6.3	0.3	250	100	−3.0	—	—	—	0.49	25.0	8.0	8.9	0.38	IO	1
		osc			100	—	—	—	—	—	—	—	7.3	5.9	0.83		
X65	(TH_x)	mix	6.3	0.3	250	100	−3.0	3.0	3.0	2.5	0.23	10.0	3.5	5.5	0.12	IO	3
		osc			100	—	—	3.3	—	—	—	—	10.4	5.5	2.0		

(*Continued*)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI (*Continued*)																	
Current Types																	
DK91/ X17	(H)	mix	1.4*	0.05	90	67.5	0	5.5	—	—	0.25	—	7.0	7.0	0.4	B7G	3
		osc				—	—	—	—	—	—	—	3.8	—	—		
X18	(H)		1.4*	0.05	90	67.5	0	0.86	3.0	0.6	0.32	15.0	7.0	7.0	0.4	B7G	54
ECH21/ X143	(TH)	mix	6.3	0.3	250	100	−2.0	3.0	6.2	1.4	0.75	10.0	6.8	9.5	0.002	B8B	42
		osc			160	—	—	4.5	—	—	—	—	4.5	3.5	1.1		
ECH35/ X147	(TH_x)	mix	6.3	0.3	250	100	−2.0	3.0	3.0	1.3	0.65	11.0	5.0	10.0	0.0003	IO	3
		osc			100	—	—	3.3	—	—	—	—	9.0	3.0	1.6		
X148/7S7	(TH)	mix	6.3	0.3	250	100	−2.0	1.7	2.2	2.0	2.0	—	5.0	8.0	0.03	B8B	8
		osc			250	—	—	—	—	—	—	—	—	—	—		
ECH42/ X150	(TH_x)	mix	6.3	0.225	250	83	−2.0	3.15	3.15	1.0	0.69	10.0	4.0	9.2	0.05	B8A	3
		osc			100	—	—	3.2	—	—	—	—	—	—	—		
X78	(TH_x)	mix	6.3	0.3	250	75	0	4.5	3.4	0.7	0.78	10.0	4.1	4.34	0.11	B7G	48
		osc			100	—	—	4.5	—	—	—	—	—	—	—		
X79	(TH_x)	mix	6.3	0.3	250	75	0	4.5	3.4	0.7	0.78	10.0	4.1	4.34	0.08	B9A	21
		osc			100	—	—	4.5	—	—	—	—	5.47	1.5	1.48		
X719/ ECH81	(TH)	mix	6.3	0.3	250	100	−2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
X727/BE6	(H)		6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
LZ319/ PCF80	(TP)	mix	9.0	0.3	170	170	−2.0	10.0	10.0	—	2.18	4.0	4.5	4.0	0.02	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	3.0	0.5	2.0		
X76M	(TH_x)	mix	13.0	0.16	250	100	−3.0	3.0	3.0	0.1	0.62	15.0	4.7	13.1	—	IO	3
		osc			100	—	—	3.3	—	—	—	—	10.6	6.3	—		
UCH42/ X142	(TH_x)	mix	14.0	0.1	200	84	−2.0	3.2	3.35	1.25	0.69	13.0	4.0	9.2	0.05	B8A	3
		osc			110	—	—	4.2	—	—	—	—	6.4	2.7	1.5		
UCH81	(TH)	mix	19.0	0.1	200	119	−2.6	3.7	8.1	1.0	0.78	—	4.8	7.9	0.006	B9A	24
		osc			100		0	13.5	—	—	—	—	2.6	2.1	1.0		
DK96/ X109	(TH_x)	mix	19.0	0.1	175	75	0	4.3	3.6	0.25	0.71	10.0	4.1	4.34	0.11	B9A	21
		osc			100	—	—	4.5	—	—	—	—	—	—	—		
X145	(TH)	mix	28.0	0.1	175	100	−2.5	3.0	6.0	2.2	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80	—	—	5.0	—	—	—	—	7.7	1.7	1.8		
MULLARD																	
Obsolete Types																	
DK1	(H)	mix	1.4*	0.05	90	45	0	0.55	0.6	0.06	0.25	—	-		—	Ct8	31
		osc			90	—	—	1.2	—	—	—	—	—	—	—		
TH2	(TH_x)	mix	2.0*	0.23	135	60	−1.5	0.95	1.6	0.6	0.43	7.0	8.5	15.0	0.002	B7	34
		osc			100	—	—	4.0	—	—	—	—	21.0	1.4	7.7		
KCF30	(TP)	mix	2.0*	0.2	120	60	−1.5	0.8	0.92	1.6	0.26	8.0	6.5	8.0	0.01	IO	98
		osc			100	—	—	—	—	—	—	—	9.0	4.0	2.0		
TH4A	(TH_x)	mix	4.0	1.5	275	100	−2.5	3.25	7.0	1.5	0.75	11.0	8.0	13.0	—	B7	3
		osc			100	—	—	22.0	—	—	—	—	16.5	3.1	3.25		
TH4B	TH)	mix	4.0	1.45	250	100	−2.5	3.25	6.0	1.5	0.75	11.0	8.4	13.8	0.16	B7	3
		osc			100	—	—	9.5	—	—	—	—	13.6	3.5	—		
6A7	(H)	mix	6.3	0.3	250	100	−3.0	3.5	2.7	0.36	0.55	20.0	9.5	12.0	0.26	UX7	1
ECH33	(TH_x)	mix	6.3	0.2	250	100	−2.0	3.0	3.0	1.3	0.65	11.0	4.9	9.0	0.003	IO	3
		osc			100	—	—	3.3	—	—	—	—	8.8	4.4	1.4		
ECH2	(TH_p)	mix	6.3	0.95	250	100	−2.5	3.25	6.0	1.5	0.75	11.0	8.4	13.8	0.015	Ct8	1
		osc			100	—	—	9.5	—	—	—	—	17.0	3.5	3.5		
TH13C	(TH_x)		13.0	0.31	Other data as Type TH4												
TH22C	(TH)		29.0	0.2	Other data as Type TH4A												
TH30C	(TH_x)	mix	29.0	0.2	250	100	−2.5	3.25	6.0	1.5	0.75	11.0	8.4	13.8	—	B7	3
		osc			100	—	—	9.5	—	—	—	—	13.6	3.5	—		
Replacement Types																	
DK32	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	10.0	7.0	10.0	0.5	IO	76
		osc			90	—	—	1.2	—	—	—	—	4.0	4.4	0.9		
1A7	(H)		1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	7.0	7.0	10.0	0.5	IO	76
FC2	(O)	mix	2.0*	0.1	135	70	0	0.95	3.75	—	0.2	13.0	9.9	14.5	0.057	B7	1
		osc			135	—	—	—	—	—	—	—	—	—	—		
FC2A } KK32 }	(O)	mix	2.0*	0.13	135	45	0	0.07	0.7	2.5	0.27	12.0	9.0	11.0	0.07	B7	1
		osc			135	—	—	2.1	—	—	—	—	6.3	8.5	—	IO	76
FC4	(O)	mix	4.0	0.65	250	70	−1.5	1.6	3.8	—	0.6	12.0	9.0	12.5	0.06	B7	2
		osc			90	—	—	2.0	—	—	—	—	9.4	6.1	—		
EK32 } EK2 }	(O)	mix	6.3	0.2	250	50	−2.0	1.0	0.8	2.0	0.55	21.0	9.0	10.5	0.1	IO	1
		osc			200	—	—	2.5	—	—	—	—	6.0	5.0	—	Ct8	2
ECF82	(TP)	mix	6.3	0.45	250	117	0	5.2	1.9	—	1.9	4.25	5.0	2.6	0.01	B9A	25
		osc			150	—	−1.0	18	—	0.005	—	—	2.5	0.4	1.8		
ECH3	(TH_x)	mix	6.3	0.2	250	100	−2.0	3.0	3.0	1.3	0.65	11.0	4.9	9.0	0.003	Ct8	1
		osc			100	—	—	3.3	—	—	—	—	8.8	4.4	1.4		
ECH21	(TH)	mix	6.3	0.33	250	100	−2.0	3.0	6.2	1.4	0.75	14.0	6.8	9.5	0.002	B8B	42
		osc			160	—	-	4.5	—	-			4.5	3.5	1.1		

(*Continued*)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref
MULLARD *(Continued)*																	
Replacement Types (Continued)																	
ECH35	(TH_x)	mix	6.3	0.225	250	100	−2.0	3.0	3.0	1.3	0.65	11.0	5.0	10.0	0.0003	IO	3
		osc			100	—	—	3.3	—	—	—	—	9.0	3.0	1.6		
ECH42	(TH_x)	mix	6.3	0.23	250	85	−2.0	3.0	3.0	1.0	0.75	11.0	4.0	9.2	0.1	B8A	3
		osc			115	—	—	4.8	—	—	—	—	5.5	2.3	1.2		
6A8		osc			100	—	—	4.0	—	—	—	—	6.0	4.6	0.8	IO	1
6K8	(TH_x)	mix	6.3	0.3	250	100	−3.0	2.5	6.0	0.6	0.36	7.5	6.6	3.5	0.03	IO	4
		osc			100	—	—	3.8	—	—	—	—	6.0	3.2	1.1		
CCH35	(TH_x)		7.0	0.2	Other data as Type ECH35												
PCF82	(TP)	mix	9.5	0.3	170	170	0	6.6	2.5	—	1.65	4.2	5.0	2.6	0.01	B9A	25
		osc			150	—	−1.0	18.0	—	—	—	—	2.5	0.4	1.8		
12K8			12.6	0.15	Other data as Type 6K8												
FC13 }	(O)	mix	13.0	0.2	200	70	−1.5	1.6	3.8	2.0	0.6	12.0	9.0	12.5	0.1	Ct8	2
FC13C }		osc			90	—	—	2.0	—	—	—	—	9.4	6.1	—	B7	2
UCH42	(TH_x)	mix	14.0	0.1	200	85	−2.0	3.0	3.0	1.0	0.75	13.0	3.8	9.2	0.1	B8A	3
		osc			100	—	—	3.1	—	—	—	—	5.5	2.3	1.2		
UCH21	(TH)	mix	20.0	0.1	200	100	−2.0	3.5	6.5	1.0	0.75	13.0	6.8	9.5	0.002	B8B	42
		osc			120	—	—	4.1	—	—	—	—	4.5	3.5	1.1		
TH21C	(TH_x)	mix	21.0	0.2	250	70	−1.5	4.0	6.0	1.5	1.0	28.0	7.4	14.3	—	B7	3
		osc			130	—	—	6.0	—	—	—	—	—	—	1.8		
Current Types																	
DF97			1.4*	0.025	85	47	0	0.54	0.8	0.5	0.265	16.8	3.7	7.5	0.01	B7G	59
DK91	(H)		1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.5	0.4	B7G	3
DK92	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	54
		osc			30	—	—	1.4	—	—	—	—	—	—	—		
DK96	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	5.6	7.4	8.1	0.36	B7G	54
		osc			35	—	—	1.5	—	—	—	—	—	—	—		
DK40	(O)	mix	1.4	0.5	90	67.5	0	1.0	0.25	1.0	0.425	11.2	6.9	9.6	0.16	B8A	25
		osc			65.5	—	—	2.6	—	—	—	—	—	—	—		
ECH83	(TH)	mix	6.3	0.3	12.6	12.6	—	0.15	0.35	1.5	0.2	2.5	4.8	7.9	0.01	B9A	24
		osc			12.6	—	0	0.75	0.042	—	—	—	2.6	2.1	1.0		
ECF80	(TP)	mix	6.3	0.4	250	180	−5.8	5.7	1.4	1.5	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.5	1.8	1.5		
ECH81	(TH)	mix	6.3	0.3	250	250	−2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
EK90	(H)		6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
PCF80	(TP)	mix	9.0	0.3	170	170	−5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
HK90	(H)		12.6	0.15	Other data as Type EK90												
UCH81	(TH)	mix	19.0	0.1	200	120	−2.6	3.7	8.1	1.0	0.78	—	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
UCF80	(TP)	mix	27.0	0.1	170	170	−5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
TUNGSRAM																	
Obsolete Types																	
VO2 }	(O)	mix	2.0*	0.13	135	45	0	0.7	0.6	2.5	0.27	11.0	9.1	14.3	0.07	B7	1
VO2S }		osc			135	—	—	1.3	—	—	—	—	6.6	8.7	—	Ct8	31
VX2 }	(H)	mix	2.0*	0.13	150	60	−1.0	1.0	1.1	2.0	0.47	14.0	7.8	15.0	0.0015	B7	28
VX2S }																Ct8	31
MH206	(H)	mix	2.0*	0.06	135	67.5	−3.0	1.2	2.5	0.4	0.28	10.0	10.5	9.0	0.25	B7	1
		osc			135	—	—	2.3	—	—	—	—	5.0	6.0	0.8		
MO465	(O)	mix	4.0	0.65	250	70	−1.5	1.6	3.8	1.0	0.6	12.0	9.0	12.5	0.06	B7	2
		osc			70	—	—	2.0	—	—	—	—	9.4	6.1	—		
VX4 }	(H)	mix	4.0	0.65	250	80	−2.0	1.8	1.5	1.5	0.55	12.5	7.4	15.7	0.003	B7	35
VX4S }																Ct8	11
TX4	(TH_x)	mix	4.0	1.0	300	80	−1.5	5.5	6.0	1.5	1.0	17.0	6.2	13.0	0.05	B7	3
		osc			150	—	—	4.0	—	—	—	—	—	3.7	1.8		
VO4	(O)	mix	4.0	0.65	250	70	−1.5	1.6	3.8	1.0	0.6	12.0	9.0	12.5	0.06	B7	2
		osc			90	—	—	—	—	—	—	—	9.4	6.1	—		
EH2	(H)	mix	6.3	0.2	250	100	−3.0	4.2	2.8	2.0	0.4	19.0	—	—	—	Ct8	16
EK2	(O)	mix	6.3	0.2	250	60	−2.0	1.1	1.0	2.0	0.55	12.0	8.4	11.3	—	Ct8	2
		osc			200	—	—	2.5	—	—	—	—	6.0	4.5	—		
EK3	(O)	mix	6.3	0.65	250	100	−2.5	2.5	5.5	2.0	0.65	17.0	14.5	15.0	0.1	Ct8	2
		osc			100	—	—	6.0	—	—	—	—	14.0	7.5	—		
ECH2	(TH_x)	mix	6.3	0.95	250	100	−2.5	3.25	7.0	1.5	0.75	12.0	8.0	13.0	0.8	Ct8	1
		osc			100	—	—	5.0	—	—	—	—	16.5	3.1	3.25		
ECH3	(TH_x)	mix	6.3	0.2	250	100	−2.0	2.3	3.0	1.0	0.65	10.0	4.7	9.0	0.0015	Ct8	3
		osc			150	—	—	3.3	—	—	—	—	8.8	4.6	1.5		
2A7	(H)	mix	2.5	0.8	250	100	−3.0	3.5	2.2	0.36	—	—	—	—	—	UX7	1
6TH8	(TH_x)	mix	6.3	0.6	300	80	−1.5	5.5	6.0	2.0	1.0	17.0	6.2	13.0	0.05	IO	3
		osc			150	—	—	4.0	—	—	—	—	9.0	3.7	1.8		

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM *(Continued)*																	
Obsolete Types (Continued)																	
6E8	(TH_x)	mix	6.3	0.3	250	—	−2.0	—	—	—	—	—	—	—	—	IO	1
VO13	(O)	mix	13.0	0.2	250	70	−1.5	1.6	3.8	1.0	0.6	12.0	8.7	12.5	0.06	B7	2
		osc			90	—	—	2.5	—	—	—	—	9.1	6.0	—		
VO13S	(O)	mix	13.0	0.2	250	70	−1.5	1.6	3.8	1.0	0.6	12.0	8.7	12.5	0.06	Ct8	2
		osc			90	—	—	2.5	—	—	—	—	9.1	6.0	—		
VX13 / VX13S	(H)	mix	13.0	0.2	250	80	−2.0	1.8	1.5	1.5	0.55	12.5	7.4	15.7	0.003	B7 / Ct8	35 / 11
TX21	(TH_x)	mix	21.0	0.2	250	80	−1.5	5.5	6.0	1.5	1.0	17.0	6.2	13.0	0.05	B7	3
		osc			150	—	—	4.0	—	—	—	—	—	2.9	1.7		
TH29	(TH_x)	mix	29.0	0.2	250	100	−2.0	3.5	7.5	1.5	0.75	12.0	8.0	12.8	—	B7	3
		osc			125	—	—	—	—	—	—	—	16.5	3.0	3.2		
Replacement Types																	
MH4105	(H)	mix	4.0	0.5	250	100	−3.0	3.5	2.2	0.36	0.52	35.0	8.5	9.0	0.3	B7	2
		osc			200	—	—	4.0	—	—	—	—	7.0	5.5	1.0		
TH4A	(TH_x)	mix	4.0	1.45	250	100	−2.0	3.5	7.5	1.5	0.75	12.0	8.0	12.8	—	B7	3
		osc			125	—	—	5.0	—	—	—	—	16.5	3.0	3.2		
Current Types																	
1R5	(H)	mix	1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.5	0.4	B7G	3
1AB6	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	6.0	7.6	8.4	0.36	B7G	54
		osc			—	—	—	—	—	—	—	—	—	—	—		
1AC6	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	5
		osc			—	—	—	—	—	—	—	—	—	—	—		
6AJ8	(TH)	mix	6.3	0.3	250	100	−2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
6U8	(TP)	mix	6.3	0.45	250	100	0	5.2	1.9	0.4	1.9	4.0	5.0	2.6	0.01	B9A	25
		osc			150	—	—	5.7	—	—	—	—	2.5	0.4	1.8		
6CU7	(TH_x)	mix	6.3	0.23	250	85	−2.0	3.0	3.0	1.0	0.75	11.0	4.0	9.2	0.1	B8A	3
		osc			115	—	—	4.8	—	—	—	—	5.5	2.3	1.2		
ECF80	(TP)	mix	6.3	0.43	170	170	−5.5	5.2	1.5	0.87	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
ECH35	(TH_x)	mix	6.3	0.3	250	100	−2.0	2.3	3.0	1.25	0.65	10.0	4.5	9.0	0.0015	IO	3
		osc			150	—	—	—	—	—	—	—	8.8	4.0	1.5		
6A7 / 6A8	(H)	mix	6.3	0.3	250	100	−3.0	3.5	2.7	0.36	0.55	20.0	12.0	12.0	0.06	UX7	1
		osc			100	—	—	4.0	—	—	—	—	6.5	5.0	0.8	IO	1
6K8	(TH_x)	mix	6.3	0.3	250	100	−3.0	2.5	6.0	0.6	0.35	7.5	6.6	3.5	0.03	IO	4
		osc			100	—	—	3.8	—	—	—	—	6.0	3.2	1.1		
6BE6/EK90	(H)	mix	6.3	0.3	250	100	−1.5	3.0	7.1	1.0	0.47	10.0	7.2	8.6	0.3	B7G	29
6SA7	(H)	mix	6.3	0.3	250	100	−2.0	3.5	8.5	1.0	0.45	—	9.5	12.0	0.13	IO	6
CCH35	(TH_x)		7.0	0.2			Other data as Type ECH35										
9A8	(TP)	mix	9.0	0.3	170	170	−5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
9U8	(TP)	mix	9.5	0.3	170	100	0	5.2	1.9	0.4	1.9	4.0	5.0	2.6	0.01	B9A	25
		osc			150	—	—	5.7	—	—	—	—	2.5	0.4	1.8		
12A8			12.6	0.15			Other data as Type 6A7									IO	1
12K8			12.6	0.15			Other data as Type 6K8									IO	4
12SA7			12.6	0.15			Other data as Type 6SA7									IO	6
12BE6	(H)	mix	12.6	0.15			Other data as Type 6BE6									B7G	29
14K7	(TH_x)	mix	14.0	0.1	200	85	−2.0	3.0	3.0	1.0	0.75	13.0	3.8	9.2	0.1	B8A	3
		osc			100	—	—	3.1	—	—	—	—	5.5	2.3	1.2		
UCF80	(TP)	mix	27.0	0.1	170	170	−5.5	5.2	1.5	0.7	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	—	−2.0	14.0	—	—	—	—	2.3	0.3	1.5		
UCH81	(TH)	mix	19.0	0.1	200	120	−2.6	3.7	8.1	1.0	0.78	—	4.8	7.9	0.006	B9A	24
		osc			100	—	0	13.5	—	—	—	—	2.6	2.1	1.0		
AMERICAN																	
1C8	(H)	mix	1.25*	0.04	30	30	0	0.32	0.75	0.3	0.1	—	6.5	4.0	0.25		
1E8	(H)	mix	1.25*	0.04	67.5	45	—	1.0	1.5	0.4	0.15	—	—	—	—	Wires	
2G22			1.25*	0.05	22.5	22.5	0	0.2	0.3	0.5	0.06	—	—	—	—	Wires	
1AE5	(H)	mix	1.25*	0.06	45	45	0	0.9	2.0	0.2	0.2	—	—	—	—	Wires	
1A7	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	7.0	7.0	10.0	0.5	IO	76
		osc			90	—	—	1.2	—	—	—	—	3.4	4.4	0.9		
1B7	(H)	mix	1.4*	0.1	90	45	0	1.5	1.3	0.35	0.35	7.0	7.0	7.5	0.34	IO	76
		osc			90	—	—	1.6	—	—	—	—	4.0	4.2	0.9		
1LA6	(H)	mix	1.4*	0.05	90	45	0	0.55	0.6	0.75	0.25	7.0	7.7	8.0	0.4	B8B	29
		osc			90	—	—	1.2	—	—	—	—	2.9	3.3	0.6		
LB6	(H)	mix	1.4*	0.05	90	67.5	0	0.4	2.2	—	—	—	—	—	—	B8B	30
1LC6	(H)	mix	1.4*	0.05	90	35	0	0.75	0.7	0.65	—	35.0	9.0	5.5	0.3	B8B	29
1A6 / 1D7	(H)	mix	2.0*	0.06	135	67.5	−3.0	1.7	2.5	0.4	0.27	10.0	10.5	9.0	0.25	UX6	1
		osc			135	—	—	2.3	—	—	—	—	5.0	6.0	0.8	IO	76
1C6 / 1C7	(H)	mix	2.0*	0.12	135	67.5	−3.0	1.3	2.5	0.6	0.3	10.0	10.0	14.0	0.26	UX6	1
		osc			135	—	—	3.1	—	—	—	—	4.8	5.5	1.2	IO	76
6D8	(H)	mix	6.3	0.15	250	100	−3.0	3.5	2.6	0.4	0.55	20.0	8.0	11.0	0.2	IO	1
		osc			135	—	—	4.3	—	—	—	—	5.5	4.6	1.1		

Continued

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
AMERICAN (*Continued*)																	
6F7 }	(TP)	mix	6.3	0.3	250	100	−3.0	2.8	0.6	2.0	0.3	7.0	3.2	12.5	0.008	UX7	13
6P7 }		osc			100	—	—	2.4	—	—	—	—	2.5	3.0	2.0	IO	5
6J8	(TH)	mix	6.3	0.3	250	100	−3.0	1.3	2.9	4.0	0.29	20.0	4.4	8.8	0.01	IO	3
		osc			100	—	—	5.0	—	—	—	—	11.7	5.5	2.2		
6L7	(H)	mix	6.3	0.3	250	150	−6.0	3.3	8.3	1.0	0.35	18.0	7.5	11.0	0.001	IO	2
6P8	(TH_x)	mix	6.3	0.8	250	75	−2.0	1.5	1.4	—	—	—	—	—	—	IO	4
		osc			100	—	—	2.2	—	—	—	—	—	—	—		
6SA7 }																IO	6
6SA7GT/G }	(H)	mix	6.3	0.3	250	100	−2.0	3.5	8.5	1.0	0.45	—	9.5	12.0	0.13	IO	7
6SB7Y		mix	6.3	0.3	250	100	−1.0	3.8	10.0	1.0	0.95	7.0	9.6	9.2	0.15	IO	6
7A8	(O)	mix	6.3	0.15	250	100	−3.0	3.0	3.2	0.7	0.55	20.0	7.5	9.0	0.15	B8B	9
		osc			100	—	—	4.2	—	—	—	—	3.8	3.4	0.6		
7B8	(H)	mix	6.3	0.3 }	250	100	−3.0	3.5	2.7	0.36	0.55	20.0	9.0	12.0	0.2	B8B	9
14B8		osc	12.6	0.15 }	100	—	—	4.0	—	—	—	—	4.8	3.0	0.8		
6BA7	(H)	mix	6.3	0.3	250	100	−1.0	3.8	10.0	1.0	0.95	7.0	9.5	8.3	0.19	B9A	3
7D7	(TH_x)	mix	6.3	0.45	250	—	−3.0	—	—	—	—	—	—	—	—	B8B	8
		osc			150	—	—	3.5	—	—	—	—	—	—	—		
7J7	(TH)	mix	6.3	0.15 }	250	100	−3.0	1.3	2.9	1.5	0.3	20.0	5.5	7.5	0.01	B8B	8
14J7		osc	12.6	0.15 }	100	—	—	5.4	—	—	—	—	8.5	2.0	1.0		
12A8			12.6	0.15	Other data as Type 7A8												
12BA7			12.6	0.15	Other data as Type 6BA7												
12SA7			12.6	0.15	Other data as Type 6SA7												
14Q7			12.6	0.15	Other data as Type 7Q7												
12SY7	(H)	mix	12.6	0.15	250	100	−2.0	3.5	8.5	1.0	0.45	28.0	9.0	12.0	0.13	IO	6
20J8	(TH)	mix	20.0	0.15	250	100	−3.0	1.5	3.4	—	—	—	—	—	—	IO	2
		osc			100	—	−1.5	1.5	—	—	—	—	—	—	—		
21A7	(TH_x)	mix	21.0	0.16	250	100	−3.0	1.3	2.8	—	0.27	—	—	—	—	B8B	8
		osc			150	—	—	3.5	—	—	—	—	—	—	—		
26D6	(H)	mix	26.5	0.07	250	100	−1.5	3.0	7.8	1.0	0.47	26.5	7.5	14.0	0.3	B7G	29

SCREENED TETRODES and PENTODES

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR															
Obsolete Types															
1LD5	(SD)	1.4*	0.05	90	45	0	0.6	0.1	0.75	0.58	3.2	6.0	0.18	B8B	31
1LN5		1.4*	0.05	90	90	0	1.6	0.35	1.1	0.8	3.4	0.8	0.007	B8B	28
32E		2.0†	0.06	135	67.5	−3	1.7	0.4	1.0	0.6	—	—	—	UX4	2
34E		2.0†	0.06	135	67.5	−3	2.8	1.0	0.6	0.6	—	—	—	UX4	2
24A/24E	(TT)	2.5	1.75	250	90	−3	4.0	1.7	0.6	1.0	—	—	—	UX5	2
8A1		4.0	1.0	200	80	−1.5	3.5	0.7	0.6	4.0	10.7	8.0	0.007	B5	2
														B7	5
9A1	(VM)	4.0	1.0	200	80	−1.5	5.0	1.0	0.6	4.25	11.0	8.0	0.007	B5	2
														B7	5
36	(TT)	6.3	0.3	250	90	−3	3.2	1.7	0.55	1.1	—	—	—	UX5	2
39/44		6.3	0.3	250	90	−3	5.8	1.4	1.0	1.1	—	—	—	UX5	2
Replacement Type															
EBF80/6N8	(VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.5	2.2	4.2	4.9	0.0025	B9A	12
EF89/6DA6	(VM)	6.3	0.2	250	100	−1.95	9.0	3.0	1.0	3.5	5.5	5.1	0.002	B9A	36
6B8	(DD)	6.3	0.3	250	125	−3.0	9.0	2.3	0.6	1.12	4.5	10.0	0.005	IO	15
6C6		6.3	0.3	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
6D6	(VM)	6.3	0.3	250	100	−3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX6	2
6J7		6.3	0.3	250	100	−3.0	2.0	0.5	1.5	1.25	4.6	12.0	0.007	IO	8
6K7	(VM)	6.3	0.3	250	125	−3.0	10.5	2.6	0.6	1.65	5.0	12.0	0.007	IO	8
6U7	(VM)	6.3	0.3	250	100	−3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	IO	8
7B7	(VM)	6.3	0.15	250	100	−3.0	8.5	1.7	0.75	1.75	5.0	6.0	0.007	B8B	3
7H7	(VM)	6.3	0.3	250	150	−2.5	9.5	3.5	0.8	4.2	8.0	7.0	0.007	B8B	3
7R7	(DD)	6.3	0.3	250	100	−1.0	6.2	1.6	1.0	3.2	5.6	5.3	0.004	B8B	13
77		6.3	0.3	250	100	−3.0	2.3	0.5	1.0	1.25	4.7	11.0	0.007	UX6	2
78	(VM)	6.3	0.3	250	100	−3.0	7.0	1.7	0.8	1.45	4.5	11.0	0.007	UX6	2
EF41	(VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
EF80-6BX6		6.3	0.3	170	170	−2.0	10.0	2.5	0.5	7.4	7.5	3.3	0.007	B9A	10
UF41	(VM)	12.6	0.1	200	115	−3.0	7.2	2.1	1.0	2.3	5.0	7.0	0.002	B8A	7
12C8	(DD)	12.6	0.15	Other data as Type 6B8											
12J7		12.6	0.15	Other data as Type 6J7											
12K7	(VM)	12.6	0.15	Other data as Type 6K7											

(*Continued*)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{g1}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR *(Continued)*															
Replacement Types (Continued)															
14H7	(VM)	12.6	0.15	Other data as Type 7H7											
14R7	(DD)	12.6	0.15	Other data as Type 7R7											
8D2		13.0	0.2	250	100	−3.0	2.0	0.5	1.5	1.25	4.0	10.0	0.01	B7	6
9D2	(VM)	13.0	0.2	250	125	−3.0	10.5	2.6	0.6	1.65	4.0	10.0	0.005	B7	6
Current Types															
1L4		1.4*	0.05	90	90	0	4.5	2.0	0.35	1.03	3.6	7.5	0.008	B7G	2
1S5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.625	2.2	2.4	0.2	B7G	5
1T4	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
1U5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.625	—	—	0.1	B7G	11
DAF96/1AH5	(SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	5
DF96/1AJ4		1.4*	0.025	85.0	64.0	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	2
6AK5		6.3	0.175	180	120	−1.8	7.7	2.4	0.5	5.1	4.0	2.1	0.03	B7G	14
6AM6(8D3) 6064	(SQ)	6.3	0.3	250	250	−2.0	10.0	2.6	1.0	7.5	7.5	3.2	0.01	B7G	21
6AU6		6.3	0.3	250	150	−1.0	10.8	4.3	1.0	5.2	5.5	5.0	0.0035	B7G	16
6BA6 5749	(VM) (SQ)	6.3	0.3	250	100	−1.0	11.0	4.2	1.5	4.4	5.5	5.0	0.0035	B7G	16
6BH6		6.3	0.15	250	150	−1.0	7.4	2.9	1.4	4.6	5.4	4.4	0.0[illegible]	B7G	32
6BJ6	(VM)	6.3	0.15	250	100	−1.0	9.2	3.3	1.3	3.8	4.5	5.5	0.0 35	B7G	32
6BR7(8D5) 6059	(SQ)	6.3	0.15	250	100	−3.0	2.1	0.6	2.3	1.25	4.0	4.0	0.01	B9A	35
6BS7		6.3	0.15	250	100	−3.0	2.1	0.6	2.3	1.25	4.0	4.0	0.01	B9A	20
6BW7		6.3	0.3	180	180	−1.5	9.5	3.5	0.6	9.3	9.5	3.5	0.01	B9A	10
8D8		6.3	0.15	250	140	−2.0	3.0	0.6	2.5	1.9	4.0	3.9	1.3	B9A	23
6870	(SQ)	6.3	0.6†	250	250	−3.4	25.0	3.5	0.23	8.5	8.5	7.0	0.025	B9A	44
9D6 6065	(VM) (SQ)	6.3	0.2	250	200	−2.5	8.0	2.1	1.0	2.5	4.5	7.0	0.004	B7G	21
9D7	(VM)	6.3	0.3	250	100	−1.3	10.0	3.3	0.75	8.4	9.0	3.0	0.01	B9A	10
7032	(SQ) Gating	6.3	0.3	250	100	(g_1) −2.0	4.5	7.2	—	$(g_1\text{-}a)/1.8$	—	—	—	B7G	29
	Heptode					(g_3) 0				$(g_3\text{-}a)$, 0.5					
12AC6	(VM)	12.6	0.15	12.6	12.6	0	0.55	0.2	0.5	0 73	4.3	5.0	0.005	B7G	16
12AU6		12.6	0.15	Other data as Type 6AU6											
12BA6	(VM)	12.6	0.15	Other data as Type 6BA6											
PCL84	(TP)	15.0	0.3	220	220	−3.3	18.0	3.2	0.15	9.5	9.0	4.5	0.1	B9A	53
COSSOR															
Obsolete Types															
2201PT		2.0	0.2	120	60	−1.5	2.2	0.5	0.4	1.0	—	—	—	B7	26
220SG		2.0*	0.2	150	60	0	3.1	0.6	0.2	1.6	9.0	7.0	0.001	B4	2
220VS	(VM)	2.0*	0.2	150	60	0	3.6	0.9	0.4	1.6	9.5	7.0	0.001	B4	2
220VSG	(VM)	2.0*	0.2	150	60	0	5.0	0.7	0.11	1.6	9.5	7.0	0.001	B4	2
MSGHA		4.0	1.0	200	80	−1.5	2.1	—	0.5	2.0	—	—	—	B5	2
MSGLA		4.0	1.0	200	80	−1.5	5.25	—	0.2	3.75	—	—	—	B5	2
MVSG	(VM)	4.0	1.0	200	80	−1.5	7.5	0.75	0.2	2.5	—	—	—	B5	2
MS/PenA		4.0	1.0	200	150	−2.5	9.0	5.0	0.09	4.0	—	—	—	B5	2
4TSP 4TPB		4.0	1.0	250	150	−3.0	12.0	—	—	8.0	—	—	—	B7 B7	5 6
202SPB		20.0	0.2	250	100	−1.5	4.8	1.3	0.8	2.8	9.5	8.5	0.003	B7	6
Replacement Type															
1N5		1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.0	10.0	0.007	IO	77
210SPT		2.0*	0.1	150	60	0	2.95	0.75	0.6	1.3	8.0	7.0	0.008	B7	4
210VPT	(VM)	2.0*	0.1	150	60	0	2.9	0.75	0.6	1.1	8.0	7.0	0.008	B7	4
215SG		2.0*	0.15	150	60	0	2.5	0.5	0.3	1.1	9.0	7.0	0.001	B4	2
MS/Pen MS/PenB		4.0	1.0	200	100	−1.5	4.8	1.3	0.8	2.8	9.5	8.5	0.003	B7 B7	5 6
41MPT		4.0	1.0	250	100	−1.5	12.0	2.0	0.2	4.8	—	—	—	B7	5
41MTS		4.0	1.0	250	100	0	5.0	—	—	1.6	—	—	—	B7	20
4TSA		4.0	1.0	250	100	0	5.0	—	—	1.6	—	—	—	B7	38
MVS/Pen MVS/PenB	(VM)	4.0	1.0	200	100	−1.5	4.3	1.3	0.6	2.2	9.5	8.5	0.003	B7 B7	5 6
42SPT		4.0	2.0	250	250	−10.5	64.0	15.0	—	11.0	18.0	7.5	0.08	B7	5
42MPT		4.0	2.0	200	200	−3.0	34.0	—	—	8.5	—	—	—	B7	5
42PTB		4.0	2.0	200	200	−3.0	34.0	6.5	0.1	8.5	—	—	—	B7	6
6J7		6.3	0.3	250	100	−3.0	2.0	0.5	1.5	1.25	5.0	12.0	0.007	IO	8
6K7	(VM)	6.3	0.3	250	125	−3.0	10.5	2.6	0.6	1.65	5.0	12.0	0 007	IO	8
6SG7	(VM)	6.3	0.3	250	150	−2.5	9.2	3.4	1.0	4.0	8.5	7.0	0.003	IO	14
6SH7		6.3	0.3	250	150	−1.0	10.8	4.1	0.9	4.9	8.5	7.0	0.003	IO	14
6SK7	(VM)	6.3	0.3	250	100	−3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
6SS7	(VM)	6.3	0.15	250	100	−3.0	9.0	2.0	1.0	1.85	5.5	7.0	0.004	IO	10
12SG7	(VM)	12.6	0.15	250	150	−2.5	9.2	3.4	1.0	4.0	8.5	7.0	0.003	IO	14
13SPA		13.0	0.2	200	100	−3.0	2.3	0.6	1.0	1.25	5.0	9.0	0.003	B7	6

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
COSSOR (*Continued*)															
Replacement Types (Continued)															
13VPA	(VM)	13.0	0.2	200	100	−3.0	7.0	1.7	0.8	1.8	5.0	9.0	0.003	B7	6
202VP } 202VPB }	(VM)	20.0	0.02	250	100	−1.5	4.3	1.3	0.6	2.2	9.5	8.5	0.003	B7 B7	5 6
Current Types															
1S5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.4	0.2	B7G	5
1T4	(VM)	1.4*	0.05	90	67.5	0	3.5	1.5	0.5	0.9	3.6	7.5	0.01	B7G	2
DAF96	(SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	5
DF96		1.4*	0.025	85.0	64.0	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
210VPA	(VM)	2.0*	0.1	150	60	0	2.9	1.0	0.6	1.1	9.0	7.0	0.004	B7	4
6CB6		6.3	0.3	200	150	—	9.5	2.8	0.6	6.2	6.3	1.9	0.02	B7G	32
EF86		6.3	0.2	250	140	−2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
6AS6		6.3	0.175	120	120	−2.0	5.2	3.5	0.11	3.2	4.0	3.0	0.02	B7G	32
E180F		6.3	0.3	190	160	−1.0	13.0	3.0	0.035	16.5	7.9	2.9	0.02	B9A	45
OM5B		6.3	0.2	250	100	−2.0	3.0	0.8	2.5	1.8	—	—	—	IO	8
OM5C		characteristics as OM5B but suitable for use in D.C. amplifiers													
OM6	(VM)	6.3	0.2	250	100	−2.5	6.0	1.8	1.0	2.0	6.3	7.8	0.003	IO	8
6AM5		6.3	0.2	250	250	—	16.0	2.5	—	2.6	—	—	—	B7G	25
6AM6		6.3	0.3	250	250	−2.0	10.0	2.5	1.0	7.5	7.5	3.2	0.007	B7G	21
7B7	(VM)	6.3	0.15	250	100	−3.0	8.5	2.0	0.7	1.7	5.0	7.0	0.005	B8B	3
61SPT		6.3	1.27	250	250	−10.5	64.0	15.0	—	11.0	18.0	7.5	0.08	IO	49
63SPT		6.3	0.3	250	250	−2.0	10.0	3.0	1.0	6.5	8.3	5.2	0.007	B9G	1
6BX6		6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
6BY7	(VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
6F33		6.3	0.35	200	100	−1.5	5.0	2.0	—	4.35	7.3	4.5	0.01	B7G	21
62VP		6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
171DDP	(VM, DD)	17.0	0.1	170	85	−2.0	5.0	1.75	0.9	2.2	4.0	4.6	0.0025	B9A	12
UBF89	(VM, DD)	19.0	0.1	200	100	−1.5	11.0	3.3	0.6	4.5	5.0	5.2	0.002	B9A	12
EDISWAN MAZDA															
Obsolete Types															
SP141		1.4*	0.05	83	83	0	1.3	0.5	0.6	0.75	7.5	10.0	0.006	MO	4
S215A		2.0*	0.15	150	60	0	2.0	0.3	1.3	1.1	8.5	12.5	0.002	B4	2
S215B		2.0*	0.15	150	60	−1.0	1.5	0.3	0.9	1.2	10.5	10.5	0.002	B4	2
S215VM	(VM)	2.0*	0.15	150	60	−1.4	1.0	0.15	1.4	0.8	10.0	8.5	0.002	B4	2
SG215		2.0*	0.15	150	60	−1.5	1.5	0.25	1.5	0.85	8.5	11.0	0.003	B4	2
SP210		2.0*	0.1	120	120	−1.0	1.1	0.33	2.0	1.2	10.0	11.0	0.005	B7	4
SP215		2.0*	0.15	150	80	−1.5	2.1	0.7	0.8	1.6	10.0	8.5	0.007	B7	4
SP22		2.0*	0.1	120	120	−1.0	1.1	0.38	1.35	1.2	7.75	12.5	0.0055	MO	1
VP215	(VM)	2.0*	0.15	120	60	−1.5	1.1	0.38	0.9	0.82	10.0	8.5	0.007	B7	4
VP22	(VM)	2.0*	0.1	120	60	−1.5	1.2	0.32	1.3	0.8	7.0	12.5	0.0045	MO	1
AC/SG		4.0	1.0	200	60	−1.5	4.5	0.8	0.9	1.9	10.0	10.0	0.001	B5	2
AC/SP1		4.0	1.0	200	200	−3.0	4.9	4.1	0.12	2.65	13.0	8.75	0.0035	B7	5
AC/S2		4.0	1.0	200	80	−1.5	7.0	0.8	0.6	4.3	12.0	10.0	0.001	B5	2
AC/SIVM	(VM)	4.0	1.0	200	75	−1.5	5.6	1.5	0.55	1.1	6.5	11.5	0.001	B5	2
AC/S2Pen		4.0	1.0	250	100	−1.5	8.0	2.7	0.7	4.6	13.5	8.75	0.009	B7	5
AC/SP3		4.0	1.0	250	100	−1.7	7.9	2.5	0.55	7.0	14.5	11.0	0.005	B7	6
SP1320		13.0	0.2	250	100	−1.5	4.4	0.9	—	2.05	10.0	8.0	0.005	B7	5
VP1320	(VM)	13.0	0.2	250	100	−1.7	5.0	1.1	2.0	2.0	9.75	8.5	0.005	B7	5
VP1321	(VM)	13.0	0.2	250	200	−2.8	7.4	1.85	1.0	2.0	9.75	8.5	0.005	B7	5
SP2220		22.0	0.2	250	200	−3.0	4.9	4.1	0.12	2.65	13.0	8.75	0.0035	B7	5
Replacement Types															
IF2 } IL4 }		1.4*	0.05	90	67.5	0	2.9	1.2	0.6	0.92	3.6	7.5	0.008	B7G	2
VP23	(VM)	2.0*	0.05	120	60	−1.5	1.45	0.5	1.45	1.08	8.0	11.0	0.006	MO	1
VP210	(VM)	2.0*	0.1	120	60	−1.5	1.1	0.38	1.45	0.82	8.75	11.0	0.004	B7	4
AC/SG/VM	(VM)	4.0	1.0	200	60	−2.0	5.8	0.9	0.72	1.8	10.0	10.0	0.001	B5	2
AC/VP1	(VM)	4.0	0.65	250	200	−2.8	7.4	1.85	1.0	2.0	9.5	8.0	0.003	B7	5
AC/VP2	(VM)	4.0	0.65	250	200	−2.8	7.4	1.85	1.0	2.0	7.0	9.5	0.0025	B7	6
SP41		4.0	0.95	200	200	−1.5	10.9	2.7	0.7	8.5	10.75	5.25	0.005	MO	11
SP42		4.0	0.95	200	115	−1.25	20.0	5.0	—	8.5	10.0	7.0	0.0055	MO	11
V453		4.0	0.65	250	100	−1.75	4.5	0.8	—	2.0	6.75	11.6	0.004	MO	11
VP41	(VM)	4.0	0.65	250	200	−2.7	7.7	2.0	1.3	2.0	6.5	11.5	0.0025	MO	11
SP61		6.3	0.6	Other data as Type SP41											
6F13		6.3	0.35	200	200	−1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	8
6F16	(VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	18
6F32		6.3	0.63	200	200	−4.5	5.1	3.45	—	3.0	10.5	5.7	0.0005	MO	11
VP1322	(VM)	13.0	0.2	250	200	−2.8	7.4	1.85	1.0	2.0	7.0	9.5	0.0025	B7	6
VP133	(VM)	13.0	0.2	150	150	−2.7	8.0	2.2	0.7	2.1	7.0	11.5	0.0025	MO	11
SP181		18.0	0.2	200	200	−1.5	10.9	2.7	0.7	8.5	10.75	5.25	0.005	MO	11
10F3		22.0	0.1	200	200	−2.35	6.0	1.6	—	6.5	9.0	4.6	0.0065	B8A	8
Current Type															
1F3 } 1T4 }	(VM)	1.4*	0.05	90	45	0	1.8	0.65	0.8	0.75	3.6	7.5	0.01	B7G	2

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{aa}	Type	Ref.
EDISWAN MAZDA (*Continued*)															
Current Types (Continued)															
1F1	(VM)	1.4*	0.025	85	64	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	64
1FD1	(SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	65
1FD9 1S5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	3.3	0.4	B7G	5
6F1		6.3	0.35	200	200	−1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	17
6F11		6.3	0.2	250	100	−1.8	4.4	1.35	2.8	2.2	5.3	6.7	0.004	B8A	8
6F12 S6F12	(SQ)	6.3	0.3	250	250	−2.0	10.0	2.5	0.9	7.5	7.6	3.2	0.0045	B7G	21
6F14		6.3	0.35	135	135	−1.3	27.0	6.5	—	10.6	8.3	4.6	0.007	B8A	8
6F15	(VM)	6.3	0.2	250	100	−2.5	7.0	2.0	1.7	2.3	5.1	6.8	0.0035	B8A	8
6F18	(VM)	6.3	0.2	175	100	−1.3	12.0	3.5	—	4.4	5.2	5.0	0.0017	B9A	10
6F19	(VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
6F20	(VM)	6.3	0.3	170	170	−2.0	10.0	2.5	0.4	6.0	7.5	3.3	0.007	B9A	10
6F21	(VM)	6.3	0.2	250	200	−2.5	7.8	2.0	1.2	2.5	4.7	7.0	0.008	B7G	21
6F33		6.3	0.35	200	200	−4.0	5.75	3.1	—	3.55	7.3	4.5	0.01	B7G	21
6FD12	(VM, DD)	6.3	0.3	250	100	−2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.0025	B9A	12
30F5		7.3	0.3	170	170	−1.9	10.0	2.6	—	8.8	9.0	4.4	0.0073	B9A	10
30FL1	(T, BT)	9.4	0.3	170	170	−2.1	10.0	2.5	—	7.5	7.9	3.2	0.03	B9A	49
20F2		11.0	0.2	135	135	−1.3	27.0	6.5	—	10.6	8.8	4.6	0.007	B8A	8
10F9	(VM)	13.0	0.1	175	100	−2.5	7.0	2.0	1.0	2.3	5.1	6.8	0.0035	B8A	8
10F18	(VM)	13.0	0.1	175	100	−1.3	12.0	3.5	—	4.4	5.2	5.0	0.0017	B9A	10
10FD12	(VM, DD)	19.0	0.1	200	100	−1.5	11.0	3.3	0.6	4.5	5.0	5.2	0.0025	B9A	12
10F1		22.0	0.1	200	200	−1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	17
EMITRON															
Current Types															
1S5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.625	2.2	2.4	0.2	B7G	5
1T4	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
6AM6		6.3	0.3	250	250	−2.0	10.0	2.5	1.0	7.5	7.5	3.2	0.007	B7G	21
6BA6		6.3	0.3	250	100	−1.0	11.0	4.2	1.0	4.4	5.5	5.0	0.0035	B7G	16
EF80/6BX6		6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF85/6BY7	(VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
7B7	(VM)	6.3	0.15	250	100	−3.0	8.5	1.7	0.75	1.75	5.0	7.0	0.005	B8B	3
7H7	(VM)	6.3	0.3	250	150	−2.4	10.0	3.2	0.8	4.2	8.0	6.5	0.007	B8B	3
FERRANTI															
Obsolete Types															
S2		2.0*	0.15	120	60	−1.0	2.25	0.3	0.3	1.1	—	—	0.005	B4	2
VS2	(VM)	2.0*	1.15	120	60	−2.5	2.0	0.4	0.4	1.4	—	—	0.005	B4	2
VPT4B	(VM)	4.0	1.0	250	100	−3.0	6.0	3.0	1.8	3.2	10.6	8.2	0.004	B7	5
SPTA		13.0	0.2	250	100	−2.5	2.2	0.5	1.5	1.4	8.9	8.5	0.003	B7	6
VPTA		13.0	0.2	250	100	−2.0	4.2	2.0	1.0	2.9	9.0	9.0	0.002	B7	5
VPTS		13.0	0.3	200	100	−3.0	5.5	2.0	1.0	2.6	8.8	8.4	0.002	B7	5
Replacement Types															
1N5		1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.0	10.0	0.007	IO	77
SPT2		2.0*	0.1	120	120	0	2.8	0.9	2.0	1.5	10.0	10.5	0.008	B7	4
VPT2	(VM)	2.0*	0.1	120	60	−1.5	1.5	0.7	0.6	1.1	8.8	11.0	0.006	B4 B7	2 4
SPT4A		4.0	1.0	250	100	−1.5	2.0	1.0	1.5	2.3	10.6	8.0	0.003	B7	5
VPT4	(VM)	4.0	1.0	250	100	−3.0	5.5	3.0	1.0	2.0	8.8	8.5	0.002	B5	2
6AB7	(VM)	6.3	0.45	300	200	−3.0	12.5	3.2	0.7	5.0	8.0	5.0	0.015	IO	10
6AC7		6.3	0.45	300	150	−2.0	10.0	2.5	1.0	9.0	11.0	5.0	0.015	IO	10
6B8	(DD)	6.3	0.3	250	125	−3.0	10.0	2.3	0.6	1.33	3.5	9.5	0.007	IO	15
6C6		6.3	0.3	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
6D6	(VM)	6.3	0.3	250	100	−3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX6	2
6J7		6.3	0.3	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	IO	8
6K7	(VM)	6.3	0.3	250	125	−3.0	10.5	2.6	0.6	1.65	5.0	12.0	0.007	IO	8
6SG7	(VM)	6.3	0.3	250	150	−2.5	9.2	3.4	1.0	4.0	8.5	7.0	0.003	IO	14
6SH7		6.3	0.3	250	150	−1.5	10.8	4.1	0.9	4.9	8.5	7.0	0.003	IO	14
6SJ7		6.3	0.3	250	100	−3.0	3.0	0.8	1.0	1.65	6.0	7.0	0.005	IO	10
6SK7	(VM)	6.3	0.3	250	100	−3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
6SS7	(VM)	6.3	0.15	250	100	−3.0	9.0	2.0	1.0	1.85	5.5	7.0	0.004	IO	10
6U7	(VM)	6.3	0.3	250	100	−3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	IO	8
7H7	(VM)	6.3	0.3	250	150	−2.5	9.5	3.5	0.8	3.8	8.0	7.0	0.007	B8B	3
7R7	(DD)	6.3	0.3	250	100	−1.0	5.7	1.7	1.0	3.2	5.6	5.3	0.004	B8B	13
12C8	(DD)	12.6	0.15	250	125	−3.0	10.0	2.3	0.6	1.33	3.5	9.5	0.007	IO	15
12J7		12.6	0.15	Other data as Type 6J7											
12K7	(VM)	12.6	0.15	Other data as Type 6K7											
12SJ7		12.6	0.15	Other data as Type 6SJ7											
12SK7	(VM)	12.6	0.15	Other data as Type 6SK7											

(*Continued*)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
FERRANTI (*Continued*)															
Current Types															
1S5/DAF91	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.4	0.2	B8G	5
1T4/DF91	(VM)	1.4*	0.05	90	67.5	0	3.5	1.5	0.5	0.9	3.6	7.5	0.01	B7G	2
DF96/1AJ4		1.4*	0.025	85.0	64.0	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
DAF96/1AH5	(SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	5
DF97		1.4	0.025	85	60	0	1.7	0.7	0.4	0.9	3.7	7.5	0.01	B7G	59
DP61		6.3	0.175	180	120	−2.0	7.7	2.4	0.7	5.1	4.0	2.8	0.02	B7G	14
EAF42/6CT7	(VM, SD)	6.3	0.2	250	85	−2.0	5.0	1.5	1.4	2.0	4.5	5.1	0.002	B8A	12
EF41/6CJ5	(VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
EF42		6.3	0.33	250	250	−2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
EBF80/6N8	(VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
EF80/6BX6		6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF85/6BY7	(VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86		6.3	0.2	250	140	−2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
EF89/6DA6	(VM)	6.3	0.3	250	100	−2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	35
6AG5		6.3	0.3	250	150	−1.8	7.0	2.0	0.8	5.0	6.5	1.8	0.025	B7G	14
6AK5/EF95		6.3	0.175	180	120	−2.0	7.7	2.4	0.7	5.1	3.9	2.9	0.02	B7G	14
6AM6/EF91		6.3	0.3	250	250	−2.0	10.0	2.6	1.0	7.5	7.5	3.2	0.01	B7G	21
UAF42	(VM, SD)	12.6	0.1	200	85	−2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12
UF41	(VM)	12.6	0.1	170	100	−2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
UF89	(VM)	12.6	0.1	170	100	−1.0	12.0	4.4	0.3	4.4	5.5	5.1	0.002	B9A	35
UBF80	(VM, DD)	17.0	0.1	170	85	−2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UF85	(VM)	19.0	0.1	170	100	−2.0	9.7	2.6	0.3	5.9	6.9	3.2	0.006	B9A	10
G.E.C.															
Obsolete Types															
Z21		2.0*	0.1	150	120	0	2.5	0.8	—	1.7	9.7	6.1	0.005	B4	2
VMS4B	(VM)	4.0	1.0	200	80	0	8.0	1.5	—	2.9	12.0	8.1	0.0024	B5	2
MS4		4.0	1.0	200	70	−1.5	2.4	0.3	—	1.1	9.9	4.8	0.002	B5	2
MSP41		4.0	1.0	250	240	−4.0	8.5	3.2	—	3.2	17.2	10.0	0.01	B5 B7	2 5
KTZ41		4.0	1.5	250	250	−1.5	18.0	5.3	—	12.0	14.0	10.5	0.008	B7	30
VMS4	(VM)	4.0	1.0	200	80	0	14.0	3.0	—	2.4	11.3	7.7	0.002	B5	2
W42	(VM)	4.0	0.6	250	125	−3.0	7.6	1.9	—	1.5	5.1	10.4	0.005	B7	6
KTZ63		6.3	0.3	250	100	−2.0	1.0	0.25	1.5	1.23	4.7	7.5	0.0038	IO	8
KTW61	(VM)	6.3	0.3	250	100	−3.0	8.0	2.7	0.46	2.9	7.8	10.0	0.0025	IO	8
Z62		6.3	0.45	300	150	−2.0	10.0	2.7	0.75	7.5	10.9	8.0	0.02	IO	8
W30	(VM)	13.0	0.3	250	250	−1.0	12.0	6.0	1.0	4.0	5.7	10.0	0.002	B7	5
W31	(VM)	13.0	0.3	200	100	−2.0	8.0	5.0	—	2.7	14.0	8.7	0.0026	B7	5
Replacement Types															
Z14		1.4*	0.05	90	90	0	1.2	0.24	1.5	0.75	2.8	10.8	0.007	IO	77
W21	(VM)	2.0*	0.1	120	120	0	3.6	1.2	—	1.4	8.8	6.0	0.0045	B4	2
Z22		2.0*	0.1	150	120	0	2.5	0.8	—	1.4	9.7	11.0	0.0075	B7	4
MS4B		4.0	1.0	200	80	−1.0	3.4	1.2	0.35	3.2	12.7	5.6	0.002	B5	2
MSP4		4.0	1.0	250	100	−1.75	3.3	1.0	—	2.4	17.2	10.0	0.01	B5 B7	2 5
KTW63	(VM)	6.3	0.3	250	100	−3.0	7.6	1.5	—	1.5	4.5	7.5	0.005	IO	9
Z63		6.3	0.3	250	100	−2.0	1.0	0.25	1.5	1.23	4.7	7.5	0.0038	IO	8
Z66		6.3	0.63	250	250	−1.85	8.0	2.0	1.5	7.5	11.0	5.5	0.006	IO	8
W61	(VM)	6.3	0.3	250	100	−3.0	10.0	2.3	0.45	2.9	7.8	10.0	0.002	IO	8
W81	(VM)	6.3	0.3	250	100	−3.6	9.6	3.6	—	2.8	7.25	6.0	0.006	B8B	3
W101	(VM)	19.0	0.1	Other data as Type W81											
Z90		6.3	0.3	250	250	−2.0	10.0	3.0	—	6.3	8.2	5.4	0.007	B9G	1
W76	(VM)	13.0	0.16	250	100	−3.0	7.6	1.9	0.5	1.5	4.2	12.8	0.007	IO	8
Current Types															
ZD17	(SD)	1.4*	0.05	90	90	0	2.7	0.5	0.6	0.63	2.2	2.4	0.2	B7G	5
W17	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	4.5	7.5	0.006	B7G	2
W25	(VM)	1.4	0.025	85	64	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	64
Z77 / QA2403	(SQ)	6.3	0.3	250	250	−2.0	10.0	2.5	7.5	7.4	7.4	3.0	0.009	B7G	21
W77 / QA2400	(SQ) (VM)	6.3	0.2	200	200	−2.5	8.0	2.0	0.5	2.5	4.6	6.5	0.009	B7G	21
Z319	(SE)	6.3	0.3	350	250*	−1.7	15.0	1.2	0.5	19.0	8.0	3.0	0.003	B9A	46
WD709/EBF80	(VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
W719/EF85	(VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
W729	(VM)	6.3	0.3	170	170	−2.0	10.0	2.5	0.4	6.4	7.5	3.3	0.007	B9A	10
W727/6BA6	(VM)	6.3	0.3	250	100	−1.0	11.0	4.2	1.0	4.4	5.5	5.0	0.0035	B7G	16
Z309		6.3	0.6†	250	250	−2.0	20.0	5.25	0.5	15.0	13.0	2.5	0.007	B9A	22
Z719		6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.006	B9A	10
Z729		6.3	0.2	250	140	−2.0	3.0	—	2.0	1.85	4.0	5.5	0.025	B9A	23
W729	(VM)	6.3	0.3	170	170	−2.5	10.0	2.5	—	6.0	7.5	3.3	0.007	B9A	10
W739	(VM)	6.3	0.2	175	100	−1.3	12.0	3.5	—	4.5	3.3	7.8	0.01	B7G	64

(*Continued*)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
G.E.C. *(Continued)*															
Current Types (Continued)															
Z759		6.3	0.6	Other data, except base connections, as Type Z359										B9A	48
W107	(VM)	12.6	0.1	250	250	−2.5	8.0	2.0	0.5	2.5	4.2	7.0	0.006	B7G	22
Z359		12.6	0.3	250	250	−2.0	20.0	5.25	0.05	15.0	13.0	2.5	0.007	B9A	47
W118	(VM)	13.0	0.1	175	100	−2.5	7.0	2.0	1.0	2.3	5.1	6.8	0.035	B8B	8
				* Screen and secondary cathode voltage.											
HIVAC															
Obsolete Types															
HP215		2.0*	0.15	150	70	−1.5	1.5	0.3	0.5	1.2	8.4	8.0	0.004	B4 / B7	2 / 4
VP215	(VM)	2.0*	0.15	150	70	0	3.75	0.75	—	1.25	8.4	8.0	0.004	B4 / B7	2 / 4
VP215B / VP215C	(VM)	2.0*	0.15	120	120	0	3.25	0.95	1.0	1.2	5.3	8.4	0.003	B7 / B7	13 / 4
ACVPB	(VM)	4.0	1.0	250	250	−1.5	12.0	5.0	1.0	4.0	5.3	9.9	0.0025	B7	6
ACVH	(VM)	4.0	1.0	200	80	−1.5	9.3	1.6	0.45	3.3	11.5	7.4	0.0015	B5	2
ACVP	(VM)	4.0	1.0	200	100	−1.5	5.7	2.3	—	3.0	12.9	9.4	0.003	B5 / B7	2 / 5
VP13	(VM)	13.0	0.3	200	100	−1.5	6.3	2.0	—	3.0	12.6	9.3	0.003	B7	5
Replacement Types															
XFW20		0.625*	0.0125	22.5	22.5	0	—	—	1.2	—	—	—	—	B5A	2
XFW10		0.675*	0.025	22.5	22.5	0	—	—	1.2	—	—	—	—	B5A	1
XW0.75B		0.675*	0.025	30	30	0	0.2	0.01	1.0	0.18	—	—	—	B5A	1
XW0.75A		0.033*	0.25	30	30	0	0.3	0.1	1.0	0.18	—	—	—	B5A	1
XSG1.5V		1.5*	0.08	50	30	0	0.55	0.25	0.66	0.3	—	—	—	Sm4	2
XW1.5V		1.5*	0.08	50	45	0	0.75	0.2	1.0	0.52	—	—	—	Sm5	1
XSG2.0V		2.0*	0.08	50	30	0	0.6	0.3	0.5	0.4	—	—	—	Sm4	2
XVS2.0V	(VM)	2.0*	0.08	50	30	0	0.4	0.15	0.33	0.33	—	—	—	Sm4	2
XW2.0V		2.0*	0.08	50	45	0	0.95	0.3	1.0	0.6	—	—	—	Sm5	2
Current Types															
XFW30		0.625*	0.0125	22.5	22.5	0	—	—	—	—	—	—	—	B5A	1
XFW40		0.625*	0.01	22.5	22.5	0	—	—	—	—	—	—	—	B5A	1
XFW50		0.625*	0.0075	22.5	22.5	0	—	—	—	—	—	—	—	B5A	1
XFR1		1.25*	0.1	45	45	0	3.0	0.9	—	2.0	4.0	4.0	0.01	B5A	2
XFR2		1.25*	0.05	67.5	67.5	0	1.8	0.05	—	1.1	3.7	4.6	0.01	B5A	2
XFR5		1.25*	0.02	67.5	67.5	0	1.8	0.5	—	1.1	3.7	4.6	0.01	B5A	2
XR6		6.3	0.15	100	100	−1.4	7.0	2.2	0.3	5.0	—	—	—	B8D	4
XR7		6.3	0.2	100	100	−2.0	7.5	2.5	0.25	5.5	—	—	—	B8D	5
MARCONI															
Obsolete Types															
Z14		1.4*	0.05	90	90	0	1.2	0.24	1.5	0.75	2.8	10.8	0.007	IO	77
S12		2.0*	0.06	100	30	0	2.5	0.4	0.2	0.7	5.6	3.4	0.3	Sm4	2
S23		2.0*	0.1	150	70	0	2.8	0.7	0.3	1.1	8.3	9.0	0.003	B4	2
S24		2.0*	0.15	150	70	0	3.2	1.0	0.3	1.4	9.3	8.9	0.004	B4	2
VS24	(VM)	2.0*	0.15	150	75	0	4.4	0.2	0.25	1.5	9.2	8.7	0.003	B4	2
VP21	(VM)	2.0*	0.1	150	60	0	2.8	0.7	—	1.1	11.5	9.0	0.03	B7	4
VMS4B	(VM)	4.0	1.0	200	80	0	8.0	1.5	—	2.9	12.0	8.1	0.0024	B5	2
VMP4G	(VM)	4.0	1.0	250	100	−2.0	8.0	5.0	—	2.7	14.0	8.7	0.0025	B7	5
MS4		4.0	1.0	200	70	−1.5	2.4	0.3	—	1.1	9.9	4.8	0.002	B5	2
VMS4	(VM)	4.0	1.0	200	80	0	14.0	3.0	—	2.4	11.3	7.7	0.002	B5	2
KTW61	(VM)	6.3	0.3	250	100	−3.0	8.0	2.7	0.46	2.9	7.8	10.0	0.0025	IO	8
W81	(VM)	6.3	0.3	250	100	−3.6	9.6	3.6	—	2.8	7.25	6.0	0.006	B8B	3
Z62		6.3	0.45	300	150	−2.0	10.0	2.7	0.75	7.5	10.9	8.0	0.02	IO	8
W30	(VM)	13.0	0.3	250	250	−1.0	12.0	6.0	1.0	4.0	5.7	10.0	0.002	B7	5
W31	(VM)	13.0	0.3	200	100	−2.0	8.0	5.0	—	2.7	14.0	8.7	0.0026	B7	5
W101	(VM)	19.0	0.1	Other data as Type W81											
Replacement Types															
W21	(VM)	2.0*	0.1	120	120	0	3.6	1.2	—	1.4	8.8	6.0	0.0045	B4	2
Z21		2.0*	0.1	150	120	0	2.5	0.8	—	1.7	9.7	6.1	0.005	B4	2
Z22		2.0*	0.1	150	120	0	2.5	0.8	—	1.4	9.7	11.0	0.0075	B7	4
MS4B		4.0	1.0	200	80	−1.0	3.4	1.2	0.35	3.2	12.7	5.6	0.002	B5	2
MSP4		4.0	1.0	250	100	−1.75	3.3	1.0	—	2.4	17.2	10.0	0.01	B5 / B7	2 / 5
MSP41		4.0	1.0	250	240	−4.0	8.5	3.2	—	3.2	17.2	10.0	0.01	B5 / B7	2 / 5
KTZ41		4.0	1.5	250	250	−1.5	18.0	5.3	—	12.0	14.0	10.5	0.008	B7	30
W42	(VM)	4.0	0.6	250	125	−3.0	7.6	1.9	—	1.5	5.1	10.4	0.005	B7	6
KTZ63		6.3	0.3	250	100	−2.0	1.0	0.25	1.5	1.23	4.7	7.5	0.0038	IO	8
KTW63	(VM)	6.3	0.3	250	100	−3.0	7.6	1.5	—	1.5	4.5	7.5	0.005	IO	9
Z63		6.3	0.3	250	100	−2.0	1.0	0.25	1.5	1.23	4.7	7.5	0.0038	IO	8

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{ak}	c_{ak}	c_{aa}	Type	Ref.
MARCONI (*Continued*)															
Replacement Types															
Z66		6.3	0.63	250	250	−1.85	8.0	2.0	1.5	7.5	11.0	5.5	0.006	IO	8
W61	(VM)	6.3	0.3	250	100	−3.0	10.0	2.3	0.45	2.9	7.8	10.0	0.002	IO	8
W76	(VM)	13.0	0.16	250	100	−3.0	7.6	1.9	0.5	1.5	4.2	12.8	0.007	IO	8
Current Types															
DAF91/ZD17	(SD)	1.4*	0.05	90	90	0	2.7	0.5	0.6	0.63	2.2	2.4	0.2	B7G	5
DF91 W17	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	4.5	7.5	0.006	B7G	2
DF96		1.4*	0.025	85.0	64.0	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
DAF96	(SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	5
EF91/Z77		6.3	0.3	250	250	−2.0	10.0	2.5	—	7.5	7.4	3.0	0.009	B7G	21
6BJ6	(VM)	6.3	0.15	250	100	−1.0	9.2	3.3	1.3	3.8	4.5	5.5	0.0035	B7G	32
EF22/W143	(VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.2	2.2	5.5	6.4	0.002	B8B	61
EF39/W147	(VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.25	2.2	5.5	7.2	0.003	IO	8
W148/7H7	(VM)	6.3	0.3	250	150	−2.5	9.5	3.5	0.8	3.8	8.0	7.0	0.007	B8B	3
EF41/W150	(VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	5.0	8.0	0.002	B8A	18
W149/7B7	(VM)	6.3	0.15	250	100	−3.0	8.5	1.7	0.75	1.75	5.0	6.0	0.007	B8B	3
EF42/Z150		6.3	0.33	250	250	−2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
EF80/Z152		6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EBF80/ZD152	(VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
W77	(VM)	6.3	0.2	200	200	−2.5	8.0	2.0	0.5	2.5	4.6	6.5	0.009	B7G	21
Z319/6351	(SE)	6.3	0.3	350	250*	−1.7	15.0	1.2	0.5	19.0	8.0	3.0	0.003	B9A	46
WD709/EBF80	(VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
W719/EF85	(VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
W729	(VM)	6.3	0.3	170	170	−2.0	10.0	2.5	0.4	6.4	7.5	3.3	0.007	B9A	10
W727/6BA6	(VM)	6.3	0.3	250	100	−1.0	11.0	4.2	1.0	4.4	5.5	5.0	0.0035	B7G	16
EF80/Z719		6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.006	B9A	10
EF86/Z729		6.3	0.2	250	140	−2.0	3.0	—	2.0	1.85	4.0	5.5	0.025	B9A	23
EF89	(VM)	6.3	0.2	250	100	−2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	36
EBF89	(VM, DD)	6.3	0.3	250	100	−2.0	9.0	3.0	0.9	3.6	5.0	5.0	0.002	B9A	12
W107	(VM)	2.6	0.1	250	250	−2.5	8.0	2.0	0.5	2.5	4.2	7.0	0.006	B7G	22
UF41/W142	(VM)	12.6	0.1	250	250	−3.0	7.2	2.8	1.0	2.2	5.0	7.0	0.002	B8A	24
UF89	(UM)	12.6	0.1	170	110	−2.0	12.0	3.9	0.525	3.85	5.5	5.1	0.002	B9A	36
UAF42/WD142	(VM, SD)	12.6	0.1	200	115	−2.4	6.0	1.9	1.3	1.9	4.5	5.1	0.002	B8A	12
W145	(VM)	13.0	0.1	175	100	−2.5	7.0	2.0	1.0	2.3	5.1	6.8	0.0035	B8A	8
UF42/Z142		21.0	0.1	170	170	−2.0	10.0	2.8	0.2	8.5	9.5	4.5	0.005	B8A	8
Z145		22.0	0.1	200	200	−1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	17
MULLARD															
Obsolete Types															
DF70		0.625*	0.025	30	30	0	0.375	0.125	0.5	0.22	1.6	2.4	0.5	B8D†	6
DF72		1.25*	0.025	67.5	67.5	0	1.7	0.5	0.75	1.0	3.2	5.1	0.01	B8D†	2
DF1	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	—	—	—	Ct8	26
VP2B	(VM, H_x)	2.0*	0.135	135	60	−1.5	2.0	0.95	1.3	1.4	7.9	16.3	0.002	B7	28
VP2	(VM)	2.0*	0.18	135	135	0	3.0	1.25	0.4	1.5	10.7	6.3	0.007	B7	4
VP4	(VM)	4.0	1.0	200	100	−2.0	4.5	1.9	1.0	2.3	12.4	10.0	0.005	B5 B7	2 5
VP4A	(VM)	4.0	1.2	200	100	−2.0	4.25	1.8	1.4	2.5	12.5	10.2	0.006	B5 B7	2 5
TSP4		4.0	1.3	200	200	−2.5	8.0	1.5	—	4.7	9.6	7.5	0.01	B7	6
EAF41	(VM, SD)	6.3	0.2	250	110	−2.0	5.0	1.5	1.4	2.0	4.0	6.5	0.002	B8A	11
EF8 EF38	(VM)	6.3	0.2	250	250	−2.5	8.0	0.2	0.45	1.8	4.9	7.8	0.007	Ct8 IO	11 66
EF37		6.3	0.2	250	100	−2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
78	(VM)	6.3	0.3	Other data as Type 6K7										UX6	2
UAF41	(VM, SD)	12.6	0.1	200	85	−2.0	5.0	1.5	1.0	2.0	4.5	5.0	0.002	B8A	11
VP13A	(VM)	13.0	0.2	200	100	−2.0	4.0	1.4	1.0	2.2	—	—	—	Ct8	15
VP13C	(VM)	13.0	0.2	200	200	−2.0	9.0	3.6	—	2.2	8.0	6.1	0.0023	B7	6
Replacement Types															
DF66		0.625*	0.015	22.5	22.5	−1.05	0.05	0.015	2.0	0.1	1.6	2.2	0.15	B5A	1
DF64		0.62*	0.01	15	15	−0.75	0.05	0.017	1.2	0.09	1.8	2.0	0.2	B5A	3
DAF70	(SD)	1.25*	0.025	67.5	67.5	0	1.0	0.25	0.4	0.44	1.8	3.0	0.15	B8D†	1
DF73	(VM)	1.25*	0.025	67.5	67.5	0	1.7	0.5	0.8	0.8	2.9	5.0	0.015	B8D†	2
DF33	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.8	9.5	0.007	IO	77
1N5	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.0	10.0	0.007	IO	77
KF35	(VM)	2.0*	0.05	120	60	−1.5	1.45	0.5	1.5	1.08	8.0	10.0	0.01	IO	85
PM12M	(VM)	2.0*	0.18	150	90	0	2.5	0.5	—	1.4	—	—	—	B4	2
SP2		2.0*	0.18	135	135	0	3.0	1.0	0.7	1.8	11.0	6.0	0.01	B7	4
SP4		4.0	1.0	200	100	−2.0	3.0	1.1	2.2	2.3	—	—	—	B7	5
SP4B		4.0	0.65	250	250	−2.4	4.0	1.5	2.0	3.4	6.9	8.1	0.003	B7	6
VP4B	(VM)	4.0	0.65	250	250	−3.0	11.5	4.25	—	2.0	8.0	5.4	0.002	B7	6

† Flying leads

(*Continued*)

Type	Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*														
Replacement Types (Continued)														
EBF80 (VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
EF70	6.3	0.2	100	100	−2.0	3.0	2.25	0.1	2.5	4.5	4.7	0.025	B8D†	3
EF71 (VM)	6.3	0.15	100	100	−1.2	7.2	2.2	0.26	4.5	4.4	4.0	0.015	B8D†	4
EF72	6.3	0.15	100	100	−1.4	7.0	2.2	0.25	5.0	4.1	2.0	0.02	B8D†	4
EF73	6.3	0.2	100	100	−2.0	7.5	2.5	0.25	5.25	5.0	3.0	0.2	B8D†	5
EF74	6.3	0.2	100	100	−1.4	7.0	2.4	0.2	3.1	3.6	4.2	50.3	B8D†	5
EF9 (VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.25	2.2	5.5	7.2	0.002	Ct8	15
EF22 (VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.2	2.0	5.5	6.4	0.002	B8B	3
EF36	6.3	0.2	250	100	−2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF37A	6.3	0.2	250	100	−2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF39 (VM)	6.3	0.2	250	150	−2.5	6.0	1.7	1.25	2.2	5.5	7.2	0.003	IO	8
EF40	6.3	0.2	250	140	−2.0	3.0	0.55	2.5	1.85	4.0	5.5	0.025	B8A	15
EF41 (VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
EF42	6.3	0.33	250	250	−2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
EAF42 (VM SD)	6.3	0.2	250	85	−2.0	5.0	1.5	1.4	2.0	4.5	5.1	0.002	B8A	12
EF50	6.3	0.3	250	250	−2.0	10.0	3.0	1.0	6.5	8.3	5.2	0.007	B9G	1
EF54	6.3	0.3	250	250	−1.7	10.0	1.45	0.5	7.7	6.2	4.9	0.02	B9G	2
EF55	6.3	1.0	250	250	−4.5	40.0	5.5	0.055	12.0	15.0	12.0	0.15	B9G	1
6J7	6.3	0.3	250	100	−3.0	2.0	0.5	1.5	1.25	4.6	12.0	0.007	IO	8
6K7 (VM)	6.3	0.3	250	125	−3.0	10.5	2.6	0.6	1.65	4.6	12.0	0.005	IO	8
6SK7 (VM)	6.3	0.3	250	100	−3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
12J7	12.6	0.15	Other data as Type 6J7											
12K7 (VM)	12.6	0.15	Other data as Type 6K7											
12SK7 (VM)	12.6	0.15	Other data as Type 6SK7											
UF41 (VM)	12.6	0.1	170	100	−2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
UAF42 (VM SD)	12.6	0.1	200	85	−2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12
SP13	13.0	0.2	200	100	−2.0	3.3	1.2	1.3	2.2	7.1	7.7	0.003	Ct8	15
SP13C	13.0	0.2	200	200	−2.2	2.5	0.9	2.5	2.8	6.9	8.1	0.003	B7	6
UBF80 (VM, DD)	17.0	0.1	170	85	−2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UF85	19.0	0.1	200	116	−2.3	11.4	3.1	0.35	6.1	6.9	3.2	0.007	B9A	10
UF42	21.0	0.1	170	170	−2.0	10.0	2.8	0.2	8.5	9.5	4.5	0.005	B8A	8
Current Type.														
DF61	1.25*	0.025	67.5	67.5	0	1.7	0.45	1.6	0.95	3.1	3.6	0.01	B5A	3
DF62	1.25*	0.1	45	45	0	3.0	0.8	0.05	2.0	4.0	4.0	0.01	B5A	2
DF91 (VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
DF92	1.4*	0.05	90	67.5	0	3.7	1.4	0.5	1.0	3.6	7.5	0.01	B7G	2
DF96	1.4*	0.025	85	64	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	2
DF97	1.4*	0.025	85	62	0	1.7	0.7	0.45	0.94	3.7	7.5	0.01	B7G	59
DAF96 (SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	5
DAF91 (SD)	1.4*	0.05	90	90	0	2.7	0.63	0.5	0.72	2.0	2.8	0.4	B7G	5
EF85 (VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86	6.3	0.2	250	140	−2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
EF89 (VM)	6.3	0.2	250	100	−2.0	9.0	3.0	1.0	3.5	5.5	5.1	0.002	B9A	36
EF80	6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF730 / 5636 (SQ)	6.3	0.15	100	100	−1.0	5.3	4.1	0.11	3.2	4.0	3.4	<0.02	B8D†	8
EF731 / 5899 (SQ) (VM)	6.3	0.15	100	100	−1.0	7.2	2.0	0.26	4.5	4.3	3.4	<0.015	B8D†	14
EF732 / 5840 (SQ)	6.3	0.15	100	100	−1.0	7.5	2.4	0.26	5.0	4.2	3.4	<0.015	B8D†	14
EBF83 (DD)	6.3	0.3	12.6	12.6	0	0.45	0.14	1.0	1.0	5.0	5.2	<0.0025	B9A	12
EBF89 (VM, DD)	6.3	0.3	250	100	−2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.002	B9A	12
EF91 / M8083 (SQ)	6.3	0.3	250	250	−2.0	10.0	2.5	1.0	7.6	7.0	2.0	0.008	B7G	21
EF92 / M8161 (SQ) (VM)	6.3	0.2	250	150	−0.65	8.0	2.0	0.5	2.5	4.5	7.0	0.004	B7G	21
EF93 / M8101 (SQ) (VM)	6.3	0.3	250	100	−1.0	11.0	4.2	1.5	4.4	5.5	5.0	0.0035	B7G	16
EF95 / M8100 (SQ)	6.3	0.175	180	120	−2.0	7.7	2.4	0.69	5.1	4.0	2.8	0.02	B7G	14
EF98	6.3	0.3	12.6	12.6	−1.0	4.8	2.2	0.05	3.0	6.5	4.0	0.02	B7G	68
6AS6	6.3	0.175	120	120	−2.0	5.2	3.5	0.11	3.2	4.0	3.0	0.02	B7G	32
E180F	6.3	0.3	190	160	−1.0	13.0	3.5	0.035	16.5	7.9	2.9	0.02	B9A	45
HF93 (VM)	12.6	0.15	Other data as Type EF93											
UF89 (VM)	12.6	0.1	170	110	−2.0	12.0	3.9	0.525	3.8	5.5	5.1	0.002	B9A	36
UF86	12.6	0.1	Other data as Type EF86											

† Grid current biasing R_{g1} = 1.0MΩ

† Flying leads

Type	Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM														
Obsolete Type														
SS210	2.0*	0.12	150	75	−1.0	0.6	0.1	1.0	1.4	9.0	8.5	0.003	B4	2
HP210	2.0*	0.12	150	150	−1.5	1.9	0.7	2.5	1.9	9.0	8.5	0.003	B4	2
													B7	4
HP211 (VM)	2.0*	0.12	150	150	−0.9	2.6	0.6	2.0	1.7	—	—	0.003	B4	2
													B7	4
SE211 (VM)	2.0*	0.12	150	75	−0.9	1.0	0.1	1.5	1.5	—	—	0.003	B4	2
SP2B, SP2BS	2.0*	0.05	135	135	−0.5	2.6	1.0	1.0	0.8	5.3	5.0	0.006	B7	13
													Ct8	25
SP2D	2.0*	0.12	150	150	−0.1	1.45	0.35	2.0	1.7	—	—	0.005	B7	13
VP2B, VP2BS (VM)	2.0*	0.06	135	135	−0.5	2.5	0.8	2.0	0.65	5.7	5.1	0.006	B7	13
													Ct8	25
VP2D (VM)	2.0*	0.12	150	75	−1.5	1.3	0.6	0.9	2.0	—	—	0.005	B7	13
SP4, SP4S	4.0	0.65	250	100	−2.0	3.0	1.5	1.5	3.5	6.4	7.6	0.003	B7	6
													Ct8	15
HP4115 (VM)	4.0	1.02	200	100	−2.0	4.3	1.5	1.4	3.2	—	—	0.002	B5	2
													B7	5
VP4, VP4S (VM)	4.0	0.65	250	100	−3.0	8.0	2.5	1.2	1.8	6.1	7.8	0.003	B7	6
													Ct8	15
HP4101	4.0	1.0	200	100	−2.0	3.5	0.6	2.0	3.5	10.0	12.0	0.002	B5	2
													B7	5
SP4B	4.0	0.65	250	250	−2.0	2.9	0.8	2.0	4.0	6.4	7.6	0.003	B7	6
AS4120	4.0	1.0	250	100	−2.0	3.0	0.8	0.6	3.0	11.5	7.5	0.003	B5	2
AS4125 (VM)	4.0	1.2	200	100	−2.0	3.0	0.8	0.25	3.0	8.0	12.0	0.005	B5	2
HP4106 (VM)	4.0	1.0	200	100	−2.0	5.0	1.25	1.2	3.5	—	—	0.002	B5	2
													B7	5
EF6	6.3	0.2	250	100	−2.0	3.0	1.0	1.75	2.0	5.4	6.9	0.003	Ct8	15
EF8 (VM)	6.3	0.2	250	250	−2.5	8.0	0.25	2.0	1.8	4.9	7.8	0.007	Ct8	11
EF5 (VM)	6.3	0.2	250	100	−3.0	8.0	2.5	1.2	1.7	5.4	6.9	0.003	Ct8	15
EF9 (VM)	6.3	0.2	250	250	−2.5	6.0	1.7	1.5	2.2	5.0	7.0	0.003	Ct8	15
EBF2 (VM, DD)	6.3	0.2	250	250	−2.0	5.0	2.0	2.0	1.8	4.3	8.2	0.002	Ct8	13
6C6	6.3	0.3	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
6D6 (VM)	6.3	0.3	250	100	−3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX6	2
SP13B	13.0	0.2	250	250	−1.5	3.5	1.5	1.5	3.5	6.4	7.6	0.003	B7	6
VP13B (VM)	13.0	0.2	250	200	−1.0	10.0	3.5	2.0	3.5	6.4	7.6	0.003	B7	6
SP13, SP13S	13.0	0.2	250	100	−2.0	3.0	1.5	2.0	2.4	6.4	7.6	0.003	B7	6
													Ct8	1
VP13, VP13S (VM	13.0	0.2	200	100	−3.0	8.0	2.6	1.0	2.8	6.4	7.6	0.003	B7	6
													Ct8	15
HP13, HP13S (VM)	13.0	0.2	250	100	−1.0	8.0	2.9	1.0	3.5	—	—	—	B7	6
													Ct8	15
HP2118 (VM)	20.0	0.18	200	100	−2.0	5.0	1.1	1.0	3.5	—	—	—	B5	2
													B7	5
HP2018	20.0	0.18	200	100	−2.0	4.0	1.2	1.0	3.5	—	—	—	B5	2
S2018	20.0	0.18	200	60	−3.0	4.0	1.2	0.3	1.2	—	—	—	B7	5
													B5	2
SS2018	20.0	0.18	200	100	−3.0	3.0	1.0	0.5	3.0	—	—	—	B5	2
Replacement Types														
VP4B (VM)	4.0	0.65	250	250	−1.0	10.0	2.5	1.0	4.0	6.4	7.6	0.003	B7	6
6B7, 6B8 (DD)	6.3	0.3	250	125	−3.0	10.0	2.3	0.6	1.33	3.5	9.5	0.007	UX7	2
													IO	15
VP13K (VM)	13.0	0.2	200	100	−3.0	8.0	2.6	0.9	2.0	6.4	7.6	0.003	B7	6
Current Type														
IS5 (SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.4	0.2	B7G	5
IT4 (VM)	1.4*	0.05	90	67.5	0	3.5	1.5	0.5	0.9	3.6	7.5	0.01	B7G	2
1AJ4	1.4*	0.025	85	64	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
1AH5 (SD)	1.4*	0.025	67.5	67.5	−1.5	0.17	0.055	—	0.17	1.8	2.7	0.3	B7G	5
1L4	1.4*	0.05	90	67.5	0	3.7	1.4	0.5	1.0	3.6	7.5	0.01	B7G	2
1N5GT (VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.8	9.5	0.007	IO	77
6AC7	6.3	0.45	300	150	−2.0	10.0	2.5	1.0	9.0	11.0	5.0	0.015	IO	10
6AK5	6.3	0.175	180	120	−2.0	7.7	2.4	0.69	5.1	4.0	2.8	0.02	B7G	14
6AU6	6.3	0.3	250	150	−1.0	10.8	4.3	1.0	5.2	5.5	5.0	0.0035	B7G	16
6BX6	6.3	0.3	170	170	−2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
6BY7 (VM)	6.3	0.3	250	100	−2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
6CJ5 (VM)	6.3	0.2	250	100	−2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
6CT7 (VM, SD)	6.3	0.2	250	85	−2.0	5.0	1.5	1.4	2.0	4.5	5.1	0.002	B8A	12
6CQ6 (VM)	6.3	0.2	250	150	−0.65	8.0	2.0	0.5	2.5	4.5	7.0	0.004	B7G	21
6N8 (VM, DD)	6.3	0.3	250	85	−2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
6267	6.3	0.2	250	140	−2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
EF37A	6.3	0.2	250	100	−2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF50	6.3	0.3	250	250	−2.0	10.0	3.0	1.0	6.5	8.3	5.2	0.007	B9G	1
EF89 (VM)	6.3	0.2	250	100	−2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	36
EF98	6.3	0.3	12.6	12.6	−1.0†	4.8	2.2	0.05	3.0	—	—	—	B7G	68

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM *(Continued)*															
Current Types (Continued)															
EF39	(VM)	6.3	0.2	250	250	−2.5	6.0	1.7	1.5	2.2	5.0	7.0	0.003	IO	8
6AM6 / EF91		6.3	0.3	250	250	−2.0	10.0	2.1	1.0	7.5	3.25	7.6	0.0054	B7G	21
6J7		6.3	0.3	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	IO	8
6BA6		6.3	0.3	250	100	−1.0	11.0	4.2	1.0	4.4	5.5	5.0	0.0035	B7G	16
6SJ7		6.3	0.3	250	100	−3.0	3.0	0.8	1.0	1.65	6.0	7.0	0.005	IO	10
6SK7	(VM)	6.3	0.3	250	100	−3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
7		6.3	0.3	250	100	−3.0	2.3	0.5	1.0	1.25	4.7	11.0	0.007	UX6	2
8	(VM	6.3	0.3	250	125	−3.0	10.5	2.6	0.6	1.65	4.5	11.0	0.007	UX6	2
12BA6		12.6	0.15	Other data as Type 6BA6											
12J7		12.6	0.15	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
12K7	(VM)	12.6	0.15	250	125	−3.0	10.5	2.6	0.6	1.65	4.5	11.0	0.007	UX6	2
12SJ7		12.6	0.15	Other data as Type 6SJ7											
12SK7		12.6	0.15	Other data as Type 6SK7											
12AC5	(VM)	12.6	0.1	170	100	−2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
12S7	(VM, SD)	12.6	0.1	200	85	−2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12
UF89	(VM)	12.6	0.1	170	110	−2.0	12.0	3.9	0.525	3.85	5.5	5.1	0.002	B9A	36
UBF80	(VM, DD)	17.0	0.1	170	85	−2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UF85		19.0	0.1	200	116	−2.3	11.4	3.1	0.35	6.1	6.9	3.2	0.007	B9A	10
		† Grid current biasing R_{g1}=10MΩ.													
AMERICAN															
1AB5		1.2*	0.05	90	90	0	3.5	0.8	0.27	1.1	2.8	4.2	0.25	B8B	39
1AD4		1.25*	0.1	45.0	45.0	0	3.0	0.8	0.5	2.0	—	—	—	Wires	
1AD5		1.25*	0.04	67.5	67.5	0	1.85	0.75	0.7	0.74	1.8	2.8	0.01	Wires	
1T6	(SD)	1.25*	0.04	67.5	67.5	0	1.6	0.4	0.4	0.6	—	—	—	Wires	
1W5		1.25*	0.04	67.5	67.5	0	1.85	0.75	0.7	0.74	2.3	3.5	0.01	Wires	
2E31		1.25*	0.05	22.5	22.5	0	0.4	0.3	—	0.5	—	—	—	Wires	
2E32		1.25*	0.05	22.5	22.5	0	0.4	0.3	0.35	0.5	—	—	—	Wires	
2E41	(SD)	1.25*	0.03	22.5	22.5	0	0.35	0.12	—	—	—	—	—	Wires	
2E42	(SD)	1.25*	0.03	22.5	22.5	0	0.35	0.12	0.25	0.37	—	—	—	Wires	
1LC5	(VM)	1.4*	0.05	90	45	0	1.15	0.2	1.5	0.78	3.2	7.0	0.007	B8B	28
1LD5	(SD)	1.4*	0.05	90	45	0	0.6	0.1	0.95	0.6	3.2	6.0	0.18	B8B	31
1LG5		1.4*	0.05	90	45	0	1.7	0.4	1.0	0.8	—	—	—	B8B	33
1LN5		1.4*	0.05	90	90	0	1.6	0.35	1.1	0.8	3.4	0.8	0.007	B8B	28
1P5	(VM)	1.4*	0.05	90	90	0	2.3	0.7	0.8	0.75	3.0	10.0	0.007	IO	77
1SA6		1.4*	0.05	90	67.5	0	2.45	0.68	0.8	0.97	5.2	8.6	0.01	IO	89
3SB6		1.4*	0.05	90	67.5	0	1.45	0.38	0.7	0.67	3.2	3.0	0.25	IO	78
1U4		1.4*	0.05	90	90	0	1.6	0.45	1.5	0.9	3.6	7.5	0.008	B7G	2
1A8	(SD, TP)	1.4*	0.1†	90	90	0	1.2	0.3	0.6	0.75	3.0	10.0	0.012	IO	94
3D6		1.4*	0.22†	135	90	−6.0	5.7	0.7	—	2.2	7.5	6.5	0.3	B8B	32
3E6		1.4*	0.1†	90	90	0	3.8	1.3	0.3	2.1	5.5	7.5	0.007	B8B	44
1A4	(VM)	2.0*	0.06	180	67.5	−3.0	2.3	0.8	1.0	0.75	5.0	11.0	0.007	UX4	2
1B4 / 1E5		2.0*	0.06	180	67.5	−3.0	1.7	0.6	1.5	0.65	5.0	11.0	0.007	UX4 IO	2 77
1F6 / 1F7	(DD)	2.0*	0.06	180	67.5	−1.5	2.2	0.7	1.0	0.65	4.0	9.0	0.007	UX6 IO	10 79
2B7	(DD)	2.5	0.8	250	125	−3.0	9.0	2.3	0.65	1.1	3.5	9.5	0.007	UX7	2
6AB7		6.3	0.45	300	200	−3.0	12.5	3.2	0.7	5.0	8.0	5.0	0.015	IO	10
6AC7		6.3	0.45	300	150	−2.0	10.0	2.5	1.0	9.0	11.0	5.0	0.015	IO	10
6AG5		6.3	0.3	250	150	−1.8	7.0	2.0	0.8	5.0	6.5	1.8	0.025	B7G	14
6AJ5		6.3	0.175	180	75	−7.5	2.9	1.5	—	2.75	4.1	2.0	0.02	B7G	14
6AJ7		6.3	0.45	300	300	−2.0	10.0	2.5	1.0	9.0	11.0	5.0	0.015	IO	10
6AK7		6.3	0.65	300	150	−3.0	30.0	7.0	0.13	11.0	13.0	7.5	0.06	IO	11
6AS6		6.3	0.175	120	120	−2.0	5.5	3.5	—	3.5	4.0	3.0	0.02	B7G	32
6BD6		6.3	0.3	250	100	−3.0	9.0	3.5	0.7	2.0	4.3	5.0	0.004	B7G	16
6EH6		6.3	0.15	250	150	−1.0	7.4	2.9	1.4	4.6	5.4	4.4	0.004	B7G	32
6D7		6.3	0.3	250	100	−3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX7	11
6CB6		6.3	0.3	200	150	—	9.5	2.8	0.6	6.2	6.3	1.9	0.02	B7G	32
6E7	(VM)	6.3	0.3	250	100	−3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX7	11
6H8	(DD)	6.3	0.3	250	100	−2.0	8.5	—	0.65	2.4	—	—	—	IO	15
6M7		6.3	0.3	250	125	−2.5	10.5	2.8	0.9	3.4	—	—	—	IO	8
6M8	(SD, TP)	6.3	0.6	100	100	−3.0	8.5	—	0.2	1.9	—	—	—	IO	17
6R6		6.3	0.3	250	100	−3.0	7.0	1.7	—	1.45	—	—	—	IO	12
6S6	(VM)	6.3	0.45	250	100	−2.0	13.0	3.0	0.35	4.0	—	—	—	IO	13
6S7	(VM)	6.3	0.15	250	100	−3.0	8.5	2.0	1.0	1.75	4.4	8.0	0.008	IO	8
6SD7	(VM)	6.3	0.3	250	100	−2.0	6.0	1.9	1.0	3.6	9.0	7.5	0.0035	IO	10
6SE7		6.3	0.3	250	100	−1.5	4.5	1.5	1.1	3.4	8.0	7.5	0.005	IO	10
6SF7	(SD, VM)	6.3	0.3	250	100	−1.0	12.4	3.3	0.7	2.05	5.5	6.0	0.004	IO	71
6SH7		6.3	0.3	250	150	−1.5	10.8	4.1	0.9	4.9	8.5	7.0	0.003	IO	14
6SV7	(SD)	6.3	0.3	250	150	−1.0	7.5	2.8	0.8	3.4	6.5	6.0	0.004	IO	71

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
AMERICAN *(Continued)*															
6T6		6.3	0.45	250	100	−1.0	10.0	2.0	1.0	5.5	—	—	—	IO	9
6W7		6.3	0.15	250	100	−3.0	2.0	0.5	1.5	1.23	5.0	8.5	0.007	IO	8
7A7	(VM)	6.3	0.3	250	100	−3.0	8.6	2.0	0.8	2.0	6.0	7.0	0.005	B8B	3
7AB7		6.3	0.15	250	100	−2.0	1.75	0.6	0.8	1.2	3.5	4.0	0.06	B8B	46
7AC7		6.3	0.45	300	105	—	10.0	2.5	0.5	9.0	10.0	2.0	0.03	B7G	16
7AD7		6.3	0.6	300	150	—	28.0	7.0	0.3	9.5	11.5	7.5	0.03	B8B	3
7AG7		6.3	0.15	250	250	−2.0	6.0	2.0	0.75	4.2	—	—	—	B8B	3
7AH7		6.3	0.15	250	250	—	6.8	1.9	1.0	3.3	7.0	6.5	0.005	B8B	3
7C7		6.3	0.15	250	100	−3.0	2.0	0.5	2.0	1.3	5.5	6.5	0.007	B8B	3
7E7	(DD, VM)	6.3	0.3	250	100	−3.0	7.5	1.6	0.7	1.3	4.6	4.6	0.005	B8B	13
7G7		6.3	0.45	250	100	−2.0	6.0	2.0	0.8	4.5	9.0	7.0	0.007	B8B	3
7G8	(DTT)	6.3	0.3	250	100	−2.5	4.5	0.8	0.23	2.1	4.4	2.6	0.15	B8B	18
7L7		6.3	0.3	250	100	−1.5	4.5	1.5	0.1	3.1	8.0	6.5	0.001	B8B	3
7T7		6.3	0.3	250	150	−1.0	10.8	4.1	0.9	4.9	8.0	7.0	0.005	B8B	3
7V7		6.3	0.45	300	150	−2.5	9.6	3.9	0.3	5.8	9.5	6.5	0.004	B8B	3
7W7	(VM)	6.3	0.45	300	150	−2.2	10.0	3.9	0.3	5.8	9.5	7.0	0.0025	B8B	19
12AW6		12.6	0.15			Other data as Type 6AG5									
12AW7		12.6	0.15	250	150	−1.8	7.0	2.0	0.8	5.0	6.5	1.5	0.025	B7G	32
12B7 } 14A7 }	(VM)	12.6	0.15	250	100	−3.0	9.2	2.6	0.8	2.0	6.0	7.0	0.005	B8B	3
12B8	(TP, VM)	12.6	0.3	90	90	−3.0	7.0	2.0	0.2	1.8	5.2	9.6	0.015	IO	16
12BD6		12.6	0.15			Other data as Type 6BD6									
12SF7	(SD, VM)	12.6	0.15			Other data as Type 6SF7									
12SH7		12.6	0.15			Other data as Type 6SH7									
14C7		12.6	0.15	250	100	−3.0	2.2	0.7	1.0	1.58	6.0	6.5	0.007	B8B	3
14E7	(DD)	12.6	0.15			Other data as Type 7E7									
14V7		12.6	0.22	300	150	−2.0	9.6	3.9	0.3	5.8	—	—	—	B8B	3
14W7		12.6	0.22	300	150	−2.2	10.0	3.9	0.3	5.8	9.5	7.0	0.0025	B8B	19
25B8	(TP, VM)	25.0	0.15	100	100	−3.0	7.6	2.0	0.19	2.0	5.5	10.0	0.02	IO	16
25D8	(SD, TP)	25.0	0.15	100	100	−3.0	8.5	2.7	0.2	1.9	—	—	—	IO	17
26A6		26.5	0.07	250	100	−1.8	10.5	4.0	1.0	4.0	5.9	5.0	0.0035	B7G	16

OUTPUT VALVES 1

(Triodes, tetrodes and pentodes, Class A operation)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
BRIMAR																
Obsolete Types																
45	(T)	2.5†	1.5	250	—	−50.0	36.0	—	1,600	2.2	1,500	3,900	1.6	—	UX4	1
47/47E		2.5†	1.75	250	250	−16.5	31.0	6.0	60,000	2.5	450	7,000	2.7	—	UX5	3
PA1	(T)	4.0	1.0	200	—	−10.0	40.0	—	2,000	5.0	250	4,000	1.8	10	B5	1
PenA1	(P)	4.0*	1.0	250	250	−16.5	32.0	6.5	60,000	3.0	450	8,000	2.7	6	B5	6
41/41E		6.3	0.4	250	250	−18.0	32.0	5.5	68,000	2.3	500	8,000	3.4	11	UX6	8
2151		14.0	0.3	250	250	−31.0	47.0	11.6	50,000	2.4	500	5,000	5.0	—	UX6	8
18	(P)	14.0	0.3	285	285	−20.0	38.0	7.0	78,000	2.55	440	7,000	4.5	9	UX6	8
Replacement Types																
1A5	(P)	1.4*	0.05	90	90	− 4.5	4.0	0.8	300,000	0.85	—	25,000	0.115	7	IO	78
1S4	(BT)	1.4*	0.1	90	67.5	− 7.0	7.4	1.4	100,000	1.575	—	8,000	0.27	12	B7G	4
3D6	(BT)	1.4*	0.22†	135	90	− 4.5	9.8	1.2	150,000	2.4	—	12,000	0.5	—	B8B	32
3Q4	(BT)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	6
3S4	(BT)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.58	—	8,000	0.27	12	B7G	6
1C5	(P)	1.4	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.575	—	8,000	0.27	12	IO	78
3Q5	(BT)	1.4†	0.1†	90	90	− 9.0	6.0	1.4	—	1.55	—	8,000	0.24	—	IO	87
2A3	(T)	2.5*	2.5	250	—	−45.0	60.0	—	800	5.2	750	2,500	3.5	5	UX4	1
7A2	(P)	4.0	1.2	250	250	−16.5	34.0	6.5	80,000	2.35	410	7,000	3.5	10	B5 B7	7 24
7A3	(P)	4.0	2.0	250	250	− 6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	B7	24
6AG6	(P)	6.3	1.2	250	250	− 6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	IO	36
5B4	(T)	6.3*	1.0	250	—	−45.0	60.0	—	800	5.25	750	2,500	3.5	5	IO	81
5F6	(P)	6.3	0.7	285	285	−20.0	38.0	7.0	78,000	2.55	440	7,000	4.5	9	IO	36
6K6	(P)	6.3	0.4	315	285	−21.0	25.5	4.0	75,000	2.1	700	9,000	4.5	15	IO	36

(Continued)

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
BRIMAR *(Continued)*															
Replacement Types (Continued)															
7C5 (BT)	6.3	0.45	315	225	−13.0	34.0	2.2	77,000	3.75	330	8,500	5.0	11.5	B8B	10
42 (P)	6.3	0.7	250	250	−16.5	34.0	6.5	80,000	2.5	410	7,000	3.2	8	UX6	8
EL41 (P)	6.3	0.7	250	250	− 7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	23
6N7 (DT)	6.3	0.8	250	—	− 5.0	3.0	—	23,000	1.6	1,000	30,000	0.2	—	IO	22
12A6 (BT)	12.6	0.15	250	250	−12.5	30.0	3.5	70,000	3.0	350	7,500	3.4	7	IO	36
7D5 (P)	13.0	0.315	250	250	−16.5	34.0	6.5	80,000	2.5	410	7,000	3.2	8	B7	24
7D8 (P)	13.0	0.65	250	250	− 6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	B7	24
43 (P)	25.0	0.3	160	120	−18.0	33.0	6.5	42,000	2.4	440	5,000	2.2	10	UX6	8
25A6 (P)	25.0	0.3	160	120	−18.0	33.0	6.5	42,000	2.4	440	5,000	2.2	10	IO	36
35A5 (BT)	35.0	0.15	200	110	− 8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	B8B	10
35L6 (BT)	35.0	0.15	200	110	− 8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	IO	36
7D3 (P)	40.0	0.2	160	120	−18.0	33.0	6.5	42,000	2.4	440	5,000	2.2	10	B7	24
7D6 (P)	40.0	0.2	250	250	− 6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	B7	24
UL41 (P)	45.0	0.1	200	200	−14.2	45.0	8.5	24,000	8.2	250	4,300	4.2	10	B8A	7
50A5 (BT)	50.0	0.15	200	110	− 8.0	50.0	1.5	35,000	8.25	160	3,000	4.3	10	B8B	10
50L6 (BT)	50.0	0.15	200	110	− 8.0	50.0	2.0	30,000	9.5	160	3,000	4.3	10	IO	36
Current Types															
3V4 (BT)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.1	—	10,000	0.27	7	B7G	9
DL96/3C4 (P)	1.4*	0.05†	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
5763 / 6062 (SQ) (BT)	6.0	0.75	300	225	− 7.4	40.0	2.4	65,000	6.3	175	8,500	4.15	7.6	B9A	11
6AK6 (P)	6.3	0.15	180	180	− 9.0	15.0	2.5	200,000	2.3	520	10,000	1.1	10	B7G	16
6AM5 / 7D9 (P)	6.3	0.2	250	250	−13.5	16.0	2.4	150,000	2.6	680	16,000	1.4	10	B7G	25
6AQ5 (BT)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B7G	27
6BW6 / 6061 (SQ) (BT)	6.3	0.45	315	225	−13.0	34.0	2.2	77,000	3.75	360	8,500	5.5	12	B9A	19
6CD6 (BT)	6.3	2.5	200	110	−14.0	80.0	5.3	—	—	180	1,500	4.7	13	IO	39
6CH6 / 6132 (SQ) (BT)	6.3	0.75	250	250	− 4.5	40.0	6.0	50,000	11.0	100	6,000	3.0	8.5	B9A	19
6L6 (BT)	6.3	0.9	350	250	−18.0	54.0	2.5	33,000	5.2	300	4,200	11.0	15	IO	36
807 (BT)	6.3	0.9	500	200	−14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
ECL80/6AB8 (TP)	6.3	0.3	200	200	− 8.0	17.5	3.3	150,000	3.3	—	11,000	1.4	10	B9A	13
ECL82/6BM8 (TP)	6.3	0.78	200	200	−16.0	35.0	7.0	20,000	6.4	—	5,600	3.5	10	B9A	37
EL84/6BQ5 (P)	6.3	0.76	250	250	− 7.3	48.0	5.5	38,000	11.0	135	5,200	5.7	10	B9A	16
6V6 (BT)	6.3	0.45	315	225	−13.0	34.0	2.2	77,000	3.75	360	8,500	5.5	12	IO	36
F/7001 (SQ) (BT)	6.3	0.45	120	120	—	35.0	4.0	15,000	4.8	250	2,500	1.0	9	B7G†	
9BW6 (BT)	9.0	0.3	Other data as Type 6BW6												
12K5	12.6	0.45	12.6	12.6*	− 2.0 V_{g2}	8.0	85*	800	7.0	—	800	0.035	10	B7G	69
PCL82 (TP)	16.0	0.3	200	200	−16.0	35.0	6.5	20,000	6.4	—	5,000	3.5	10	B9A	37
19AQ5 (BT)	19.0	0.15	Other data as Type 6AQ5												
25L6 / G/25L6 (SQ) (BT)	25.0	0.3	200	110	− 8.0	50.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
50C5 / G-50C5 (SQ) (BT)	50.0	0.15	110	110	− 7.5	49.0	4.0	10,000	7.5	140	2,500	1.9	9	B7G	42
50DC6 (BT)	50.0	0.3	Other data as Type 6CD6												

Space-charge grid † Flying lead

COSSOR

Obsolete Types															
2XP (T)	2.0*	2.0	300	—	−36.0	50.0	—	900	7.0	700	4,000	3.15	5	B4	1
230XP (T)	2.0*	0.3	150	—	−18.0	22.0	—	1,500	3.0	—	3,500	0.45	5	B4	1
230PT (T)	2.0*	0.3	150	150	−15.0	14.0	3.0	—	2.0	—	10,000	1.0	8	B5	6
220HPT (P)	2.0*	0.2	150	150	− 4.5	8.0	1.5	—	2.5	—	10,000	0.5	8	B5	6
PT41B (P)	4.0	1.0	400	300	−40.0	30.0	6.0	—	2.25	1,200	8,000	3.6	8	B5	6
41MP (T)	4.0	1.0	200	—	− 7.5	24.0	—	2,500	7.5	320	3,000	1.0	5	B5	1
42OT (BT)	4.0	2.0	250	250	− 5.5	34.0	6.0	—	7.0	140	8,000	3.1	8	B7	24
42OTDD (BT, DD)	4.0	2.0	250	250	− 5.5	34.0	7.0	—	7.0	130	6,500	3.1	8	B7	9
40PPA (P)	40.0	0.2	150	150	−25.0	3.6	6.0	—	4.0	600	4,000	2.3	8	B7	24
402P (T)	40.0	0.2	200	—	−12.5	40.0	—	1,330	7.5	320	2,500	1.6	8	B7	23
402OT (BT)	40.0	0.2	250	250	−12.0	32.0	32.0	—	7.0	310	8,000	2.5	8	B7	15
402Pen (P)	40.0	0.2	200	200	− 6.7	40.0	—	—	7.0	137	5,500	3.1	10	B7	15
Replacement Types															
1C5 (P)	1.4*	0.1	90	90	− 7.5	7.8	3.5	115,000	1.55	—	8,000	0.24	10	IO	78
2P (T)	2.0	0.7	250	—	−22.0	40.0	—	1,150	7.0	—	3,000	2.0	5	B4	1
220OT (BT)	2.0	0.2	150	150	− 4.5	9.5	2.0	—	2.5	—	20,000	0.5	8	B5	6
215P (T)	2.0*	0.15	150	—	− 7.5	10.0	—	4,000	2.25	—	9,000	0.15	–	B4	1

(Continued)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
COSSOR *(Continued)*																
Replacement Types (Continued)																
220P	(T)	2.0*	0.2	150	—	− 7.5	11.0	—	4,000	2.25	—	9,000	0.19	5	B4	1
220PA	(T)	2.0*	0.2	150	—	− 4.5	10.0	—	4,000	4.0	—	9,000	0.18	5	B4	1
220PT	(P)	2.0*	0.2	150	150	− 9.0	19.0	4.0	—	2.5	—	7,500	1.0	8	B5	6
PT10	(P)	4.0	2.0	250	250	− 7.5	40.0	—	—	9.0	160	5,000	4.2	10	B7	24
PT41	(P)	4.0	1.0	250	200	−12.5	30.0	6.0	—	3.0	350	8,000	2.6	8	B5	6
42MPPen	(P)	4.0	2.0	250	250	− 5.5	32.0	6.0	—	7.0	140	8,000	3.1	8	B7	24
MPPen	(P)	4.0	1.0	250	250	−16.0	30.0	6.0	—	3.5	450	10,000	3.5	8	B7	24
4XP	(T)	4.0*	1.0	250	—	−28.5	48.0	—	900	7.0	600	3,000	3.0	5	B4	1
41MXP	(T)	4.0	1.0	200	—	−12.5	40.0	—	1,500	7.5	300	2,000	1.6	5	B5	1
6K6	(P)	6.3	0.4	315	285	−21.0	25.5	9.0	75,000	2.1	700	9,000	4.5	15	IO	36
6L6	(BT)	6.3	0.9	300	200	−13.0	54.5	4.6	33,000	5.2	220	4,500	6.5	11	IO	36
6V6	(BT)	6.3	0.45	315	225	−13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
332Pen	(P)	33.0	0.2	200	200	− 8.5	45.0	6.0	—	8.0	167	4,500	4.0	10	IO	36
402PenA	(P)	40.0	0.2	150	150	− 9.0	56.0	11.0	—	8.0	130	2,500	3.0	8	B7	15
Current Type																
3A4	(P)	1.4*	0.2†	150	90	− 8.4	13.3	2.2	100,000	1.9	—	8,000	0.7	—	B7G	7
3S4	(BT)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.58	—	8,000	0.27	12	B7G	6
DL96	(P)	1.4*	0.05	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
EL822	(P)	6.3	0.75	250	150	− 2.5	40.0	5.0	100,000	13.0	—	—	—	—	B9A	19
6AB8	(TP)	6.3	0.3	170	170	− 6.7	15.0	2.8	150,000	3.2	—	11,000	1.0	10	B9A	13
67PT	(P)	6.3	0.7	250	250	− 7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	7
6BQ5	(P)	6.3	0.76	250	250	−7.3	48.0	5.5	38,000	11.3	135	5,200	5.7	10	B9A	16
6C4	(T)	6.3	0.15	250	—	− 8.5	10.5	—	7,700	2.2	—	—	—	—	B7G	15
6CH6	(P)	6.3	0.75	250	250	− 4.5	40.0	6.0	50,000	11.0	(Video output valve)		12.0 (Pa)	—	B9A	19
7C5	(BT)	6.3	0.45	315	225	−13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	B8B	10
807	(BT)	6.3	0.9	300	250	−14.0	83.0	8.0	20,000	6.5	155	2,850	6.7	—	UX5	6
142BT	(BT)	14.0	0.2	180	180	− 8.5	29.0	3.0	58,000	3.7	265	5,500	2.0	8	IO	36
PCL82	(TP)	16.0	0.3	170	170	−11.5	41.0	7.5	16,000	7.5	—	3,900	3.3	10	B9A	37
16A5	(P)	16.5	0.3	170	170	−10.4	53.0	10.0	20,000	9.5	—	3,000	4.2	10	B9A	16
35A5	(BT)	35.0	0.15	200	110	− 8.0	44.0	7.0	40,000	5.9	157	4,500	3.3	10	B8B	10
451PT	(P)	45.0	0.1	170	170	−10.4	53.0	10.0	20,000	9.5	140	3,000	4.2	10	B8A	7
UCL82	(TP)	50.0	0.1			Other data as PCL82										
EMITRON																
Current Types																
3A4	(BT)	1.4*	0.2†	150	90	− 8.4	13.3	2.2	100,000	1.9	—	8,000	0.7	6	B7G	7
3S4	(BT)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.58	—	8,000	0.27	12	B7G	6
ECL80/6AB8	(TP)	6.3	0.3	170	170	− 6.7	15.0	2.8	150,000	3.2	—	11,000	1.0	10	B9A	13
6AM5	(P)	6.3	0.2	250	250	−13.5	16.0	2.4	130,000	2.6	730	16,000	1.4	10	B7G	25
6AQ5	(BT)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	240	5,000	415	8	B7G	27
EL84/6BQ5	(P)	6.3	0.76	250	250	− 7.3	48.0	5.5	38,000	11.0	135	5,200	5.7	10	B9A	16
6L6	(BT)	6.3	0.9	350	250	−18.0	54.0	2.5	33,000	5.2	300	4,200	10.8	15	IO	36
7C5	(BT)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B8B	10
807	(BT)	6.3	0.9	500	200	−14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
16A5	(P)	16.5	0.3	170	170	−10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
35A5	(BT)	35.0	0.15	200	110	− 8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	B8B	10
EDISWAN MAZDA																
Obsolete Types																
Pen141	(P)	1.4*	0.1	90	90	− 9.0	5.5	1.1	—	1.4	—	10,000	0.24	12	MO	3
P215	(T)	2.0*	0.15	150	—	−13.5	5.8	—	6,500	1.1	—	11,000	0.15	5	B4	1
P220	(T)	2.0*	0.2	150	—	− 7.0	5.5	—	5,600	2.2	—	10,000	0.15	5	B4	1
P220A	(T)	2.0*	0.2	150	—	−14.0	15.0	—	2,400	2.7	—	4,100	0.35	5	B4	1
Pen220A	(P)	2.0*	0.2	150	150	− 9.0	18.0	3.6	270,000	2.2	—	6,000	1.1	7	B5	6
PA20	(T)	2.0*	2.0	300	—	−36.0	48.0	—	1,100	5.2	750	3,000	4.2	5	B4	1
Pen231	(P)	2.0*	0.3	120	120	− 2.5	5.0	1.0	500,000	3.6	—	19,000	0.37	14	B5	6
Pen24	(P)	2.0*	0.3	120	120	− 3.3	5.0	1.0	—	4.0	—	15,000	0.37	16	MO	3
AC/P	(T)	4.0	1.0	200	—	−13.5	17.0	—	3,700	2.7	800	5,000	0.65	7	B5	1
ACP1	(T)	4.0	1.0	200	—	−28.0	24.0	—	2,200	2.3	1,150	5,000	1.0	5	B5	1
Pen1340	(P)	13.0	0.4	240	240	− 8.6	41.0	8.0	80,000	6.4	175	5,500	3.5	7	B7	24
PenDD1360	(P, DD)	13.0	0.6	250	250	− 5.3	32.0	6.0	100,000	8.2	140	6,700	3.5	7	B7	9
PP3521	(T)	35.0	0.2	200	—	−25.0	70.0	—	950	6.3	360	2,000	2.3	5	B7	16
Pen3520	(P)	35.0	0.2	200	200	− 8.0	40.0	8.0	67,000	7.3	165	4,400	3.0	7	B7	24
Pen3820	(BT)	38.0	0.2	160	175	−10.0	64.0	13.0	—	10.5	130	2,600	3.75	7	B7	24
PenDD4021	(BT)	45.0	0.2	160	175	−10.0	64.0	13.0	—	10.5	130	2,600	3.75	7	B7	9
Replacement Types																
1P10 } 3S4 }	(P)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	—	1.57	—	8,000	0.27	12	B7G	6
Pen25	(P)	2.0*	0.15	120	120	−3.6	5.0	1.0	350,000	3.0	—	14,000	0.4	16	MO	3

(Continued)

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_k (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
EDISWAN MAZDA *(Continued)*															
Replacement Types (Continued)															
Pen220 (P)	2.0*	0.2	150	150	− 4.9	9.0	1.6	—	2.2	—	14,000	0.6	7	B5	6
PP3/250 (T)	4.0*	1.0	300	—	−37.0	48.0	—	1,100	5.2	770	3,000	4.2	5	B4	1
PP5/400 (T)	4.0*	2.0	400	—	−32.0	62.5	—	1,100	8.0	510	2,700	5.9	5	B4	1
AC/Pen (P)	4.0	1.0	250	250	−15.5	32.0	6.0	75,000	2.7	410	7,500	3.3	7	B7	24
AC/2Pen (P)	4.0	1.75	250	250	− 5.3	32.0	6.0	110,000	8.5	140	6,700	3.5	7	B7	24
AC/4Pen (BT)	4.0	1.75	250	250	− 8.75	64.0	13.0	20,000	12.0	115	3,300	6.9	7	B7	24
AC/5Pen (BT)	4.0	1.75	250	250	− 8.5	40.0	7.5	—	9.4	180	5,200	4.85	7	B7	24
AC/2PenDD (P, DD)	4.0	2.0	250	250	− 5.3	32.0	6.0	110,000	8.5	140	6,700	3.5	7	B7	9
AC/5PenDD(BT,DD)	4.0	2.0	250	250	− 8.5	40.0	7.5	—	9.4	180	5,200	4.85	7	B7	9
Pen44 (BT)	4.0	2.1	260	270	−11.1	70.0	12.0	—	10.6	135	3,000	8.0	7	MO	20
Pen44 (T)	4.0	2.1	275	—	−13.6	57.0	—	1,200	11.5	240	2,400	3.2	5	MO	20
Pen45 / Pen45AN (SQ) (BT)	4.0	1.75	250	250	− 8.5	40.0	8.0	40,000	8.8	180	5,000	4.5	7	MO	20
Pen45 (T)	4.0	1.75	250	—	− 9.8	35.0	—	1,900	9.3	280	3,500	1.7	5	MO	20
Pen45DD (BT, DD)	4.0	2.0	250	250	− 8.5	40.0	8.0	40,000	8.8	180	5,000	4.5	7	MO	15
Pen383 (BT)	38.0	0.2	160	175	−10.0	64.0	13.0	—	10.5	130	2,600	3.75	7	MO	20
Pen384 (BT)	38.0	0.2	110	110	− 7.0	40.0	2.9	—	7.8	160	2,200	1.9	10	MO	20
PenDD4020 (P, DD)	40.0	0.2	240	250	− 7.5	43.0	8.5	—	7.8	150	4,800	3.9	7	B7	9
Pen453DD (BT, DD)	45.0	0.2	160	175	−10.0	64.0	13.0	—	10.5	130	2,600	3.75	7	MO	15
Current Types															
1P1	1.4*	0.05‡	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
1P11 / 3V4 (P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	9
6P1 (BT)	6.3	0.8	250	250	− 8.5	40.0	7.5	40,000	8.8	180	5,000	4.2	7	IO	36
6P15 (P)	6.3	0.76	250	250	− 7.3	48.0	5.5	38,000	11.3	135	4,500	5.7	10	B9A	16
6P25 (BT)	6.3	1.1	250	250	− 8.5	40.0	8.0	40,000	8.8	180	5,000	4.5	7	IO	36
12EI (BT)	6.3	1.6	800***	300***	—	—	—							IO	38
S11E12 (SQ) (BT)	6.3	1.6	800‡	300‡	—	—	—							IO	138
30P12 (BT)	12.6	0.3	170	180	−10.3	31.0	7.3	—	6.7	270	5,000	2.25	7	B9A	16
30PL1 (T, BT)	13.0	0.3	170	180	− 9.6	28.0	6.5	—	6.5	270	6,000	2.0	7	B9A	27
13E1 (BT)	13.0	2.6†	800ϕ	300ϕ	—	—	—	—	—	—	—	—	—	B7A	2
30P16 (P)	16.3	0.3	170	170	−10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
20P3 (BT)	20.0	0.2	195	210	−11.5	51.0	12.7	—	7.4	180	3,700	4.5	7	IO	36
20P5 (BT)	20.0	0.2	180	150	− 6.3	29.0	5.8	—	7.5	180	5,400	2.6	10	B8A	7
10P13 (BT)	40.0	0.1	180	150	− 6.3	29.0	5.8	—	7.5	180	5,400	2.6	10	B8A	7
10P14 (BT)	40.0	0.1	195	210	−11.5	51.0	12.7	—	7.4	180	3,700	4.5	7	IO	36
10P18 (P)	45.0	0.1	160	170	−12.5	70.0	5.0	23,000	10.0	—	2,200	5.2	10	B9A	16

*** Maximum Values for use in stabilized H.T. supply circuits. $I_k(max)$=300mA, $P_a(max)$=35W
ϕ Maximum Values for use in stabilized H.T. supply circuits. $I_k(max)$=800mA, $P_a(max)$=90W.
‡ Maximum Values for use in stabilized H.T. Supply circuits. $I_k(max)$=300mA, $P_a(max)$=28W.

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_k (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
FERRANTI															
Obsolete Types															
LP2 (T)	2.0*	0.3	150	—	−18.0	22.0	—	1,500	3.0	—	3,500	0.45	5	B4	1
PTA (P)	13.0	0.3	250	250	− 9.8	32.5	6.0	—	6.0	250	7,000	—	—	B7	24
PTSD (DD, P)	26.0	0.3	250	200	− 5.0	40.0	7.0	—	6.0	120	6,000	3.5	—	B7	9
PTZ (P)	10.0	0.2	250	250	− 6.2	32.5	5.0	—	7.5	160	5,000	—	—	B7	15
Replacement Type															
1A5 (P)	1.4*	0.05	90	90	− 4.5	4.0	1.1	300,000	0.85	—	25,000	0.115	7	IO	78
1C5 (P)	1.4*	0.1	90	90	− 7.5	7.8	3.5	115,000	1.55	—	8,000	0.24	10	IO	78
3Q5 (BT)	1.4*	0.1†	90	90	− 4.5	9.5	1.3	80,000	2.15	—	10,000	0.27	6	IO	87
3S4 (P)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.58	—	8,000	0.27	12	B7G	6
PT2 (P)	2.0*	0.2	120	120	− 4.5	5.3	1.1	—	2.6	—	20,000	0.35	—	B5	6
L4 (T)	4.0*	1.0	250	—	−16.0	20.0	—	3,300	3.2	800	10,000	0.5	4	B5	1
LP4 (T)	4.0*	1.0	250	—	−36.0	48.0	—	870	5.5	700	2,500	3.0	4	B4	1
PT4 (P)	4.0	2.0	250	250	− 6.0	32.5	7.0	—	7.5	150	6,500	3.5	10	B7	24
PT4D (DD, P)	4.0	2.0	250	250	− 6.0	32.5	7.0	—	7.5	150	6,500	3.5	10	B7	9
6F6 (P)	6.3	0.7	285	285	−22.0	38.0	12.0	78,000	2.55	440	7,000	4.5	9	IO	36
6K6 (P)	6.3	0.4	250	250	−18.0	32.0	5.5	68,000	2.3	470	7,600	3.4	10	IO	36
6V6 (BT)	6.3	0.45	315	225	−13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
6Y6 (BT)	6.3	1.25	200	135	−14.0	66.0	9.0	18,300	7.1	186	2,600	6.0	10	IO	36
7C5 (BT)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B8B	10
807 (BT)	6.3	0.9	500	200	−14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
6C4 (T)	6.3	0.15	250	—	− 8.5	10.5	—	7,700	2.2	—	—	—	—	B7G	15
12A6 (BT)	12.6	0.15	250	250	−12.5	30.0	3.5	70,000	3.0	375	7,500	2.4	—	IO	36
25L6 (BT)	25.0	0.3	200	110	− 8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
35L6 (BT)	35.0	0.15	200	110	− 8.0	44.0	7.0	40,000	5.9	185	4,500	3.3	10	IO	36
50L6 (BT)	50.0	0.15	200	110	− 8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
Current Types															
DL96/3C4 (P)	1.4*	0.05‡	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
3V4/DL94 (P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	9
EL41 (P)	6.3	0.7	250	250	− 7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	4

(Continued)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
FERRANTI *(Continued)*																
Current Types (Continued)																
EL42	(P)	6.3	0.2	225	225	−12.5	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	7
EL84/6BQ5	(P)	6.3	0.76	250	250	− 7.3	48.0	5.5	38,000	11.0	135	5,200	5.7	10	B9A	16
EL85/6BN5	(P)	6.3	0.2	225	225	−10.8	26.0	4.1	90,000	3.2	360	9,000	2.8	12	B9A	26
6AQ5/EL90	(P)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
6AM5/EL91	(P)	6.3	0.2	250	250	−13.5	16.0	2.4	250,000	2.6	750	6,000	2.0	10	B7G	25
6L6	(BT)	6.3	0.9	300	200	−13.0	54.5	4.6	33,000	5.2	220	4,500	6.5	11	IO	36
ECL80/6AB8	(TP)	6.3	0.3	200	200	− 8.0	17.5	3.3	150,000	3.3	—	11,000	1.4	10	B9A	13
PCL83	(TP)	12.6	0.3	200	200	−13.0	27.0	4.4	55,000	5.5	—	7,500	2.5	10	B9A	13
PCL82/16A8	(TP)	16.0	0.3	170	170	−11.5	41.0	7.5	16,000	7.5	—	—	—	—	B9A	27
UL41	(P)	45.0	0.1	200	200	−14.2	45.0	8.5	24,000	8.2	—	4,300	4.2	10	B8A	7
UL84	(P)	45.0	0.1	170	170	−12.5	70.0	5.0	23,000	10.0	—	2,400	5.6	10	B9A	16
G.E.C.																
Obsolete Types																
N15	(P)	1.4*	0.1†	90	90	− 7.0	7.0	1.7	—	1.55	—	8,000	0.25	12	IO	87
L12	(T)	2.0*	0.06	45	—	− 4.0	2.2	—	—	0.8	2,000	10,000	0.012	6	Sm4	1
KT21	(BP)	2.0*	0.3	150	120	− 2.5	5.3	1.0	—	5.3	—	19,000	0.46	—	B5	6
P2	(T)	2.0*	0.2	150	—	−10.0	19.0	—	2,150	3.5	—	4,500	0.3	—	B4	1
KT42	(BP)	4.0	1.0	250	—	−16.5	34.0	5.5	7,000	2.5	420	7,000	3.25	—	B7	24
KT41	(BP)	4.0	2.0	250	250	− 4.4	50.0	8.5	—	10.5	90	6,000	4.3	8	B7	24
KT45	(BP)	4.0	2.0	‡	300	−15.0	85.0	6.3	—	6.3	160	2,200	7.25	9	B7	37
N43	(P)	4.0	2.0	250	250	− 4.4	40.0	10.0	—	10.0	90	5,400	4.5	—	B7	15
DN41	(P, DD)	4.0	2.3	250	200	− 3.3	32.0	8.0	—	10.0	90	7,800	4.5	—	B7	9
PT25	(P)	4.0*	2.0	400	200	−22.0	62.5	10.6	—	4.0	330	6,000	10.0	—	B5	6
KT30	(BP)	13.0	0.3	250	250	−12.0	40.0	7.0	—	3.9	260	7,500	2.7	—	B7	24
KT35	(BP)	13.0	0.6†	200	200	−11.5	50.0	8.5	—	10.0	200	4,000	4.2	—	IO	73
KT31	(BP)	26.0	0.3	200	180	− 4.0	40.0	10.6	5,500	10.0	80	5,500	2.5	—	B7	15
KT33	(BP)	26.0	0.3	200	200	−13.2	60.0	10.0	—	10.0	190	3,000	5.0	—	IO	73
KT71	(BP)	48.0	0.16	175	175	− 9.8	70.0	12.0	—	10.0	120	2,500	5.0	9	IO	36
Replacement Types																
N14	(P)	1.4*	0.1	90	90	− 7.0	7.0	1.7	—	1.55	700	8,000	0.25	—	IO	78
N16	(P)	1.4*	0.1†	90	90	− 4.5	9.5	1.3	125,000	2.1	—	8,000	0.27	6	IO	87
N17	(P)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	—	1.58	—	8,000	0.27	12	B7G	6
KT2	(BP)	2.0*	0.2	150	150	− 4.5	7.5	1.7	—	2.5	—	17,000	0.5	—	B5	6
LP2	(T)	2.0*	0.2	150	—	− 4.5	10.0	—	4,170	3.6	—	7,000	0.15	—	B4	1
KT24	(BP)	2.0*	0.2	150	150	− 2.8	10.0	2.1	—	3.2	200	10,000	0.64	10	B5	6
MKT	(BP)	4.0	1.0	250	225	−13.5	32.0	5.0	—	3.0	365	8,000	2.5	10	B7	24
PX25	(T)	4.0*	2.0	500	—	−50.0	50.0	—	1,265	7.5	1,000	5,500	8.5	7	B4	1
KT63	(BP)	6.3	0.7	250	250	−16.5	34.0	5.5	—	2.5	420	7,000	3.0	—	IO	36
KT81	(BP)	6.3	0.95	250	250	− 4.4	40.0	7.5	—	10.8	90	6,000	4.3	8	B8B	10
KT76	(BP)	15.0	0.16	175	175	−13.0	35.0	6.0	—	2.5	300	5,000	2.0	4.5	IO	36
KT32	(BP)	26.0	0.3	135	135	− 7.6	75.0	5.0	—	9.0	95	1,300	3.5	11	IO	35
KT101	(BP)	80.0	0.1	200	200	−12.5	60.0	10.0	—	10.0	180	3,000	5	12	B8B	10
KT101	(T)	80.0	0.1	175	—	− 7.5	120.0	—	—	11.5	—	—	—	—	B8B	10
Current Types																
N19	(P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	58
N18	(P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	6
N25	(P)	1.4	0.05	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
PX4	(T)	4.0*	1.0	300	—	−50.0	50.0	—	830	6.0	1,000	3,500	4.5	4	B4	1
KT61	(BP)	6.3	0.95	250	250	− 4.4	40.0	7.5	—	10.5	90	6,000	4.3	8	IO	36
N77 QA2402	(SQ)	6.3	0.2	250	250	−12.0	16.0	3.0	130,000	2.6	680	16,000	1.4	10	B7G	25
A2134	(P)	6.3	0.635	165	165	− 9.3	53.0	9.0	23,200	9.5	150	3,000	4.1	10	B7G	33
N78	(P)	6.3	0.64	250	250	− 5.5	36.0	5.0	40,000	10.0	120	7,000	4.0	10	B7G	25
KT66	(BP)	6.3	1.27	250	250	−15.0	85.0	6.3	22,500	6.3	160	2,200	7.25	9	IO	36
N709	(P)	6.3	0.76	250	250	− 7.5	48.0	—	38,000	11.3	120	5,000	6.0	10	B9A	16
N727/6AQ5	(BP)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B7G	27
A1834	(DT)	6.3	2.5	135	—	−31.5	125.0	7.5	280	7.5	250	—	—	—	IO	26
LN309	(P)	12.6	0.3	165	165	− 8.4	32.0	6.5	45,000	4.7	220	6,000	2.1	10	B9A	27
HN309	(TP)	12.6	0.3	165	165	—	32.0	6.0	45,000	4.7	220	6,000	2.1	10	B9A	27
N369	(BT)	12.6	0.3	170	180	−10.3	31.0	7.3	—	6.7	270	5,000	2.25	7	B9A	16
LN319	(T, BT)	13.0	0.3	170	180	− 9.6	28.0	6.5	—	6.0	270	6,000	2.0	7	B9A	27
KT33C	(BP)	13.0	0.6†	200	200	−13.3	60.0	10.0	—	10.0	190	3,000	5.0	8	IO	73
N309/PL83	(P)	15.0	0.3	170	170	− 2.5	32.0	4.2	41,000	10.0	68	5,000	1.65	7.8	B9A	14
N329	(P)	16.5	0.3	170	170	−10.6	50.0	9.0	20,000	9.0	180	3,000	4.0	10	B9A	16
N108	(P)	40.0	0.1	165	165	− 9.3	53.0	9.0	23,200	9.5	150	3,000	4.1	10	B7G	25
N118	(BT)	40.0	0.1	180	150	− 6.3	29.0	5.8	—	7.5	180	5,400	2.6	10	B8A	7
N119	(P)	45.0	0.1	170	170	−12.5	70.0	5.0	230,000	10.0	170	2,200	5.2	10	B9A	16

‡ Maximum anode voltage. 8,000V peak.

(Continued)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
HIVAC																
Obsolete Types																
XHP1.5V	(DT)	1.5*	0.16 (1)	50	—	− 4.5	1.75	—	7,250	0.72	—	8,500	0.0062	—	Sm5	3
			(2)	50	—	0	0.45	—	50,000	0.50	—	—	—	—		
P215	(T)	2.0*	0.15	150	—	−12.0	8.0	—	3,600	2.2	—	10,000	0.15	—	B4	1
P220	(T)	2.0*	0.2	150	—	− 7.5	6.0	—	4,750	3.0	—	9,000	0.18	—	B4	1
PP220	(T)	2.0*	0.2	150	—	−12.0	12.5	—	2,300	3.0	—	5,000	0.25	—	B4	1
PX230	(T)	2.0*	0.3	150	—	−15.0	17.5	—	1,850	3.5	—	4,000	0.45	—	B4	1
Y220	(TT)	2.0*	0.2	150	150	− 4.5	10.5	1.3	—	—	—	11,500	0.5	—	B4	7
															B5	6
Z220	(TT)	2.0*	0.2	150	150	− 6.0	18.0	2.1	—	—	—	7,500	1.0	—	B4	7
															B5	6
Y230	(TT)	2.0*	0.3	150	150	− 3.0	7.0	1.0	—	—	—	20,000	0.4	—	B5	6
ACL	(T)	4.0	1.0	250	—	−13.5	17.0	—	2,350	4.25	760	6,300	0.67	—	B5	1
PX5	(T)	4.0*	2.0	400	—	−34.0	62.5	—	1,480	6.5	530	3,000	5.75	—	B4	1
ACY	(TT)	4.0	1.0	250	250	−10.0	32.0	4.3	—	—	30	6,500	3.0	—	B5	7
															B7	24
ACZ	(TT)	4.0	2.0	250	250	− 5.5	32.0	4.3	—	—	160	6,500	3.0	—	B5	7
															B7	24
ACZDD	(DD, TT)	4.0	2.0	250	250	− 5.5	32.0	4.3	—	—	160	6,500	3.0	—	B7	9
FY	(TT)	4.0*	1.0	250	250	−10.0	32.0	6.0	—	—	250	6,000	3.0	—	B5	6
ACQ	(TT)	4.0	1.35	375	250	−22.0	57.0	2.5	—	—	370	4,000	11.5	—	B7	24
Y13	(TT)	13.0	0.3	250	250	−22.0	35.0	4.5	—	—	550	4,000	3.0	—	B7	24
Z26	(TT)	26.0	0.3	250	250	− 5.5	32.0	4.3	—	—	160	6,500	3.0	—	B7	24
XY1.4B	(P)	1.25*	0.025	45	45	− 4.5	1.5	0.45	50,000	0.6	—	30,000	0.0275	—	B5A	1
Replacement Types																
XY1.4C	(P)	1.25*	0.025	45	45	− 1.5	0.5	0.10	250,000	0.5	—	100,000	0.0065	—	B5A	1
XFY11	(P)	1.25*	0.025	22.5	22.5	0	0.3	0.009	—	0.42	—	200,000	0.0012	—	B5A	1
XFY21	(BT)	1.25*	0.0125	22.5	22.5	− 0	0.38	0.095	—	0.41	—	100,000	0.0018	—	B5A	1
XFY23	(BT)	1.25*	0.0175	22.5	22.5	− 2.0	0.4	0.09	—	0.34	—	50,000	0.00375	—	B5A	1
XY1.4A	(P)	1.4*	0.032	45	45	− 4.5	1.75	0.75	40,000	0.55	—	30,000	0.010	—	B5A	1
XP1.5V	(T)	1.5*	0.08	50	—	− 4.5	1.75	—	7,250	0.72	—	8,500	0.0067	—	Sm4	1
XY1.5V	(P)	1.5*	0.16	45	45	− 1.5	1.75	0.35	66,000	1.0	—	27,000	0.014	—	Sm5	1
XP2.0V	(T)	2.0*	0.08	50	—	− 3.0	2.0	—	6,000	1.0	—	7,200	0.0052	—	Sm4	1
XY2.0V	(P)	2.0*	0.16	50	50	− 2.0	1.75	0.4	60,000	1.4	—	25,000	0.020	—	Sm5	1
6C4	(T)	6.3	0.15	250	—	− 8.5	10.5	—	7,700	2.2	—	—	—	—	B7G	15
Current Type																
XFY10	(P)	1.25*	0.025	22.5	22.5	− 1.25	0.5	0.2	—	0.35	—	50,000	0.003	—	B5A	1
XFY12	(P)	1.25*	0.025	22.5	22.5	− 0.5	0.25	0.08	—	0.37	—	175,000	0.00175	—	B5A	1
XFY14	(P)	1.25*	0.05	67.5	67.5	− 6.5	3.1	0.95	—	0.65	—	—	0.07	—	B5A	1
XFY15	(P)	1.25*	0.02	67.5	67.5	− 6.5	3.1	0.95	—	0.65	—	—	0.07	—	B5A	1
XFY31	(P)	1.25*	0.0125	22.5	22.5	0	0.38	0.095	—	0.41	—	100,000	0.0018	—	B5A	1
XFY32	(P)	1.25*	0.0125	16.25	16.25	0	0.44	0.1	—	0.35	—	100,000	0.0018	—	B5A	1
XFY33	(P)	1.25*	0.0175	15	15	− 1.2	0.2	0.05	—	0.23	—	75,000	0.001	—	B5A	1
XFY41	(P)	1.25*	0.01	22.5	22.5	0	0.38	0.095	—	0.41	—	100,000	0.0018	—	B5A	1
XFY43	(P)	1.25*	0.01	15	15	− 1.2	0.2	0.05	—	0.23	—	75,000	0.001	—	B5A	1
XFY51	(P)	1.25*	0.01	22.5	22.5	0	0.32	0.09	—	0.32	—	80,000	0.0023	—	B5A	1
XFY53	(P)	1.25*	0.01	22.5	22.5	− 3.0	0.45	0.17	—	0.34	—	40,000	0.00375	—	B5A	1
XFY54	(P)	1.25*	0.01	22.5	22.5	− 2.0	0.34	0.08	—	0.28	—	30,000	0.00275	—	B5A	1
MARCONI																
Obsolete Types																
N14	(P)	1.4*	0.1	90	90	− 7.0	7.0	1.7	—	1.55	700	8,000	0.25	—	IO	78
N15	(P)	1.4*	0.1†	90	90	− 7.0	7.0	1.7	—	1.55	—	8,000	0.25	12	IO	87
N16	(P)	1.4*	0.1†	90	90	− 4.5	9.5	1.3	—	2.1	—	8,000	0.27	6	IO	87
KT21	(BP)	2.0*	0.3	150	120	− 2.5	5.3	1.0	—	5.3	—	19,000	0.46	—	B5	6
KT24	(BP)	2.0*	0.2	150	150	− 2.8	10.0	2.1	—	3.2	200	10,000	0.64	10	B5	6
KT42	(BP)	4.0	1.0	250	250	−16.5	34.0	5.5	—	2.5	420	7,000	3.25	—	B7	24
KT45	(BP)	4.0	2.0	‡	300	−15.0	85.0	6.3	—	6.3	160	2,200	7.25	9	B7	37
N43	(P)	4.0	2.0	250	250	− 4.4	40.0	10.0	—	10.0	90	5,400	4.5	—	B7	15
PT25	(P)	4.0*	2.0	400	200	−22.0	62.5	10.6	—	4.0	330	6,000	10.0	—	B5	1
KT81	(BP)	6.3	0.95	250	250	− 4.4	40.0	7.5	—	10.8	90	6,000	4.3	8	B8B	10
KT30	(BP)	13.0	0.3	250	250	−12.0	40.0	7.0	—	3.9	260	7,500	2.7	—	B7	24
KT35	(BP)	13.0	0.6†	200	200	−11.5	50.0	8.5	—	10.0	200	4,000	4.2	—	IO	73
KT31	(BP)	26.0	0.3	200	180	− 4.0	40.0	10.6	—	10.0	80	5,500	2.5	—	B7	15
KT33	(BP)	26.0	0.3	200	200	−13.2	60.0	10.0	—	10.0	190	3,000	5.0	—	IO	73
Replacement Type																
N17	(P)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	—	1.58	—	8,000	0.27	12	B7G	6
KT2	(BP)	2.0*	0.2	150	150	− 4.5	7.5	1.7	—	2.5	—	17,000	0.5	—	B5	6
LP2	(T)	2.0*	0.2	150	—	− 4.5	10.0	—	4,170	3.6	—	7,000	0.15	—	B4	1
P2	(T)	2.0*	0.2	150	—	−10.0	19.0	—	2,150	3.5	—	4,500	0.3	—	B4	1
DA30	(T)	4.0*	2.0	250	250	−25.0	20.0	—	—	3.85	—	6,000	11.0	5.5	B4	1
KT41	(BP)	4.0	2.0	250	250	− 4.4	40.0	8.5	—	10.5	90	6,000	4.3	8	B7	24
MKT4	(BP)	4.0	1.0	250	225	−13.5	32.0	4.0	—	3.0	365	8,000	2.5	10	B7	24

(Continued)

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MARCONI (*Continued*)															
Replacement Types (Continued)															
PX25 (T)	4.0*	2.0	500	—	−50.0	50.0	—	1,265	7.5	1,000	5,500	8.5	7	B4	1
DN41 (P, DD)	4.0	2.3	250	200	− 3.3	32.0	8.0	—	10.0	90	7,800	4.5	—	B7	9
KT63 (BP)	6.3	0.7	250	250	−16.5	34.0	5.5	—	2.5	420	7,000	3.0	—	IO	36
KT76 (BP)	15.0	0.16	175	175	−13.0	35.0	6.0	—	2.5	300	5,000	2.0	4.5	IO	36
KT32 (BP)	26.0	0.3	135	135	− 7.6	75.0	5.0	—	9.0	95	1,300	3.5	11	IO	36
KT71 (BP)	48.0	0.16	175	175	− 9.8	70.0	12.0	—	10.0	120	2,500	5.0	9.0	IO	36
KT101 (BP)	80 0	0 1	200	200	−12.5	60.0	10.0	—	10.0	180	3,000	5.0	12	B8B	10
KT101 (T)	80.0	0.1	175		− 7.5	120.0	—	—	11.5	—	—	—	—	B8B	10
Current Types															
N19 (P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	58
DL96 (P)	1.4*	0.05	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
N18 (P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	6
PX4 (T)	4.0*	1.0	300	—	−50.0	50.0	—	830	6.0	1,000	3,500	4.5	4	B4	1
KT44/45 (BT)	4.0	2.0	250	250	−15.0	85.0	20.0	—	6.3	—	2,200	7.5	9	B7	37
KT61 (BP)	6.3	0.95	250	250	− 4.4	50.0	8.5	—	10.5	90	6,000	4.3	8	IO	36
N78 (P)	6.3	0 64	250	250	− 5.5	36.0	5.0	40,000	10.0	120	7,000	4.0	10	B7G	25
KT66 (BP)	6.3	1.27	250	250	−15.0	85.0	6.3	—	6.3	160	2,200	7.25	9	IO	36
EL84/N709 (P)	6.3	0.76	250	250	− 7.5	48.0	—	38,000	11.3	120	5,000	6.0	10	B9A	16
N727/6AQ5 (BP)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B7G	27
LN152/EEL 80 (TP)	6.3	0 3	170	170	− 6.7	15.0	2.8	150,000	3.2	—	11,000	1.0	10	B9A	13
DN143/EBL 21 (P, DD)	6 3	0.8	250	275	− 6.2	44.0	5.8	50,000	9.5	120	5,700	5.5	10	B8B	62
N144 (P)	6.3	0.2	250	250	−12.5	16.0	2.4	130,000	2.6	680	16,000	1.4	10	B7G	63
N147/EL33 (P)	6.3	0.9	250	250	− 6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	IO	36
N150/EL41 (P)	6 3	0.7	250	250	− 7.0	36.0	5.2	40,000	10.0	—	7,000	4.5	10	B8A	23
N151/EL42 (P)	6.3	0.2	225	225	−10.5	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	21
N155 (P)	6.3	0.2	225	225	−10.8	26.0	—	90,000	3.2	—	9,000	2.5	—	B9A	26
N148/7C5 (BT)	6.3	0 45	315	225	−13.0	35.0	6.0	77,000	3.75	360	8,500	5.5	12	B8B	63
PCL83/LN 309 (P)	12.6	0.3	165	165	− 8.4	32.0	6.5	45,000	4.7	220	6,000	2.1	10	B9A	27
HN309 (TP)	12.6	0.3	165	165	—	32.0	6.0	45,000	4.7	220	6,000	2.1	10	B9A	27
KT33C (BP)	13 0	0.6†	200	200	−13.3	60.0	10.0	—	10.0	190	3,000	5.0	8	IO	73
N37 (P)	13 0	0.3	165	165	−11.4	29.0	5.4	23,200	9.5	330	6,000	2.3	10	B7G	25
N309/PL83 (P)	15.0	0.3	170	170	− 2.5	32.0	4.2	41,000	10.0	68	5,000	1.65	7.8	B9A	14
PL/82N329 (P)	16.5	0.3	170	170	−10.6	50.0	9.0	20,000	9.0	180	3,000	4.0	10	B9A	16
N108 (P)	40.0	0.1	165	165	− 9.3	53.0	9.0	23,200	9.5	150	3,000	4.1	10	B7G	25
N145 (P)	40.0	0.1	180	150	− 6.3	29.0	5.8	—	7.5	180	5,800	2.6	10	B8A	7
N142/UL41 (P)	45.0	0.1	165	165	− 9.0	54.5	9.0	20,000	9.5	140	3,000	4.2	10	B8A	23

‡ Maximum anode voltage, 8,000V peak.

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MULLARD															
Obsolete Types															
DL72 (P)	1.25*	0.025	45	45	− 4.5	1.25	0.4	170,000	0.55	2,700	30.000	0.02	10	B8D†	6
DL71 (P)	1.25*	0.025	45	45	− 1.25	0.6	0.15	350,000	0.55	—	100,000	0.0063	10	B8D†	6
DL75 (P)	1.25*	0.025	90	90	− 2.5	1.75	0.4	450,000	0.85	—	60,000	0.05	10	B8D†	6
DL2 (P)	1.4*	0.1	90	90	− 7.5	7.5	1.6	115,000	1.55	—	8,000	0.24	10	Ct8	25
PM2 (T)	2.0*	0.2	100	—	− 7.0	4.0	—	7,000	0.9	—	9,000	—	—	B4	1
PM2A (T)	2.0*	0 2	135	—	− 6.0	5.0	—	6,000	2.0	—	7,000	0.15	5	B4	1
PM22 (P)	2.0*	0.2	150	150	−10.0	15.0	4.0	—	1.3	—	8,000	—	—	B5	6
ACO42 (T)	2.0*	2 0	300	—	−38.0	50.0	—	1,200	5.0	760	2,300	3.5	5	B4	1
ACO44 (T)	4.0*	1.0	300	—	−38.0	50.0	—	1,200	5.0	760	2,300	3.5	5	B4	1
DO24 (T)	4.0*	1.85	400	—	−40.0	63.0	—	1,070	7.5	630	3,200	7.1	4	B4	1
DO26 (T)	4.0*	2 0	400	—	−92.0	63.0	—	950	3.8	1,500	3,000	7.5	10	B4	1
DO30 (T)	4.0*	2 0	500	—	−134.0	60.0	—	580	6.9	2,250	6,000	11.0	—	B4	1
Pen4VA (P)	4.0	1.35	250	250	—	36.0	3.0	40,000	2.8	500	6,000	3.8	10	B5 B7	7 24
EBL1 (P, DD)	6.3	1.2	250	250	− 6.0	36.0	5.0	55.000	9.5	146	7,000	4.3	10	Ct8	13
EC31 (T)	6.3	0 65	250	—	−16.0	20.0	—	3,300	3.2	800	10,000	0.5	5	IO	20
EL3 (P)	6.3	0 9	250	250	− 6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	Ct8	12
EL35 (P)	6.3	1.35	250	250	−15.5	72.0	8.0	15.500	5.0	180	2,500	6.0	10	IO	36
EL3 (T)	6.3	0.9	250	—	− 8.5	20.0	—	3,000	6.5	425	7,000	1.1	5	Ct8	12
EL6 EL36 (P)	6.3	1.2	250	250	− 7.0	72.0	8.0	20,000	14.5	90	3,500	8.0	10	Ct8 IO	12 36
EL22 (P)	6.3	0.7	250	250	− 7.0	44.0	5.2	45,000	9.5	140	5,750	5.2	10	B8B	10
EL50 (P)	6.3	1.35	250	275	−14.0	72.0	8.0	22,000	8.5	175	3,500	8.8	10	Ct8	21
Pen26 (P)	24.0	0 2	200	100	−19.0	40.0	5.0	—	3.1	420	5,000	3.0	10	Ct8	4
Pen36C (P)	33.0	0.2	200	200	− 8.5	45.0	6.0	35.000	8.0	167	4,500	4.0	10	B7	24
CL6 (P)	35.0	0.2	200	100	− 9.5	45.0	5.5	19,000	8.0	190	4,500	4.0	10	Ct8	4
Pen40DD (P, DD)	44.0	0.2	200	200	− 8.5	45.0	6.0	35.000	8.0	170	4,500	4.0	10	B7	22
Replacement Types															
DL66 (P)	1.25*	0.015	22.5	22.5	− 1.4	0.3	0.075	300,000	0.35	—	75,000	0.0027	10	B5A	
DL68 (P)	1 25*	0 025	22 5	22 5	− 2.2	0.6	0.15	100,000	0.43	—	37,000	0.005	10	B5A	1

† Flying leads

(*Continued*)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MULLARD *(Continued)*																
Replacement Types (Continued)																
DL64	(P)	1.25*	0.01	15.0	15.0	− 1.5	0.16	0.04	400,000	0.18	—	100,000	0.00095	10	B5A	3
DL94	(P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	9
DL33	(P)	1.4*	0.1†	90	90	− 4.5	9.5	1.3	90,000	2.2	—	8,000	0.27	6	IO	87
DL35	(P)	1.4*	0.1	90	90	− 7.5	7.5	1.6	115,000	1.55	—	8,000	0.24	10	IO	78
1C5	(P)	1.4*	0.1	90	90	− 7.5	7.8	3.5	115,000	1.55	—	8,000	0.24	10	IO	78
3Q5	(P)	1.4*	0.1†	110	110	− 6.6	10.0	1.4	100,000	2.2	—	8,000	0.4	6	IO	87
KL35	(P)	2.0*	0.15	135	135	− 4.5	5.6	—	150,000	2.2	—	19,000	0.34	10	IO	78
PM22A/5	(P)	2.0*	0.15	135	135	− 4.5	5.6	—	150,000	2.2	—	19,000	0.34	10	B5	6
PM22D	(P)	2.0*	0.3	135	135	− 2.4	5.0	0.8	—	3.0	—	24,000	0.3	10	B5	6
PM202	(T)	2.0*	0.2	150	—	−15.0	14.0	—	2,000	3.5	—	3,700	—	—	B4	1
Pen4DD	(P, DD)	4.0	2.25	250	250	− 6.0	36.0	5.0	50,000	9.5	146	7,000	4.3	10	B7	22
PenB4	(P)	4.0	2.1	250	275	—	72.0	7.0	22,000	8.5	175	3,500	8.8	10	B7	24
PenA4	(P)	4.0*	1.95	250	250	− 5.8	36.0	5.0	50,000	9.5	145	8,000	3.8	10	B7	24
PM24A	(P)	4.0*	0.275	300	200	−22.5	20.0	3.5	—	1.7	—	10,000	2.5	10	B5	6
PM24M	(P)	4.0*	1.1	250	250	−17.0	30.0	5.6	43,000	3.0	540	7,000	2.8	—	B5	6
Pen428	(P)	4.0	2.1	250	250	—	72.0	—	—	—	150	3,200	8.0	10	B7	24
EL42	(P)	6.3	0.2	225	225	−10.0	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	7
EBL21	(P, DD)	6.3	0.8	250	275	− 6.2	44.0	5.8	50,000	9.5	125	5,700	5.5	10	B8B	6
EBL31	(P, DD)	6.3	1.2	250	250	− 6.0	36.0	5.0	55,000	9.5	146	7,000	4.3	10	IO	15
EL2	(P)	6.3	0.2	250	250	−18.0	32.0	5.0	70,000	2.8	485	8,000	3.6	10	Ct8	33
EL31	(P)	6.3	1.4	275	275	− 9.0	91.0	11.0	20,000	14.0	—	—	—	—	IO	40
EL32	(P)	6.3	0.2	250	250	−18.0	32.0	5.0	70,000	2.8	485	8,000	3.6	10	IO	9
EL33	(P)	6.3	0.9	250	250	− 6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	IO	36
EL33	(T)	6.3	0.9	250	—	− 8.5	20.0	—	3,000	6.5	425	7,000	1.1	5	IO	36
EL37	(P)	6.3	1.4	250	250	−13.5	100.0	13.5	13,500	11.0	120	2,500	11.5	13.5	IO	36
EL41	(P)	6.3	0.7	250	250	− 7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	4
EL41	(T)	6.3	0.7	250	—	—	33.0	—	—	—	250	3,500	1.55	8	B8A	4
6F6	(P)	6.3	0.7	285	285	−22.0	38.0	12.0	78,000	2.55	440	7,000	4.5	9	IO	36
6L6	(P)	6.3	0.9	350	250	−18.0	54.0	2.5	33,000	5.2	330	4,200	10.8	15	IO	36
6V6	(P)	6.3	0.45	315	225	−13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
42	(P)	6.3	0.7	Other data as Type 6F6											UX6	8
PL82	(P)	16.5	0.3	170	170	−10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
PL33	(P)	19.0	0.3	250	250	− 6.0	36.0	4.0	50,000	9.0	150	7,000	4.5	10	IO	36
PL33	(T)	19.0	0.3	250	—	− 8.5	20.0	—	3,000	6.5	425	7,000	1.1	5	IO	36
25A6	(P)	25.0	0.3	160	120	−18.0	36.0	12.0	42,000	2.4	450	5,000	2.2	10	IO	36
25L6	(P)	25.0	0.3	200	110	− 8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
43	(P)	25.0	0.3	Other data as Type 25A6											UX6	8
CL4	(P)	33.0	0.2	200	200	− 8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	Ct8	4
CL33	(P)	33.0	0.2	200	200	− 8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	IO	36
35L6	(P)	35.0	0.15	200	110	− 8.0	44.0	7.0	40,000	5.9	185	4,500	3.3	10	IO	36
UCL83	(TP)	40.0	0.1	170	170	− 9.5	30.0	5.0	53,000	5.5	—	5,500	2.2	10	B9A	27
CBL1	(P, DD)	44.0	0.2	200	200	− 8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	Ct8	13
CBL31	(P, DD)	44.0	0.2	200	200	− 8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	IO	15
UL41	(P)	45.0	0.1	170	170	−10.4	53.0	10.0	20,000	9.5	160	3,000	4.2	10	B8A	7
UL46	(P)	45.0	0.1	170	170	−10.4	53.0	10.0	20,000	9.5	—	3,000	4.2	10	B8A	7
50L6	(P)	50.0	0.15	200	110	− 8.0	55.0	7.0	30,000	9.5	160	3,000	4.2	10	IO	36
UBL21	(P, DD)	55.0	0.1	220	200	−13.0	55.0	9.5	25,000	8.0	200	3,500	4.8	10	B8B	6
Current Type																
DL69	(P)	1.25*	0.025	90	90	− 3.0	1.75	0.04	600,000	0.85	—	60,000	0.05	10	B5A	5
DL70	(P)	1.25*	0.11	135	90	− 7.5	7.5	1.5	150,000	1.9	—	16,000	0.5	10	B8D†	6
DL73	(P)	1.25*	0.2	100	100	− 9.0	15.0	3.8	16,000	2.5	—	—	—	—	B8D†	6
DL620	(P)	1.25*	0.05	67.5	67.5	− 6.5	3.25	1.0	110,000	0.65	—	15,000	0.085	10	B5A	1
DL92	(P)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.57	—	8,000	0.27	12	B7G	6
DL93	(P)	1.4*	0.2†	150	90	− 8.4	13.3	2.2	100,000	1.9	—	8,000	0.7	6	B7G	7
DL96	(P)	1.4*	0.05	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
EL34	(P)	6.3	1.5	250	250	−13.5	100.0	14.9	15,000	11.0	120	2,000	11.0	10	IO	133
EL84	(P)	6.3	0.76	250	250	− 7.3	48.0	5.5	38,000	11.3	135	5,200	5.7	10	B9A	16
EL85	(P)	6.3	0.2	225	225	−10.8	26.0	4.1	90,000	3.2	360	9,000	2.6	10	B9A	26
EL86	(P)	6.3	0.76	170	170	−12.5	70.0	5.0	23,000	10.0	—	24,000	5.6	10	B9A	16
EL90	(P)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
EL91 / M8082	(P) (SQ)	6.3	0.2	250	250	−13.8	16.0	2.4	130,000	2.6	740	16,000	1.4	10	B7G	25
EL95	(P)	6.3	0.2	250	250	− 9.0	24.0	4.5	80,000	5.0	320	10,000	3.0	12	B7G	67
EL71 / 590	(P) (SQ)	6.3	0.45	110	110	− 8.5	30.0	2.0	15,000	4.0	270	3,000	1.0	—	B8D†	14
EL821 / M8135	(BT) (SQ)	6.3	0.75	250	250	− 4.5	40.0	6.0	50,000	11.0	—	—	—	—	B9A	10
ECL83	(TP)	6.3	0.6	200	200	− 1.3	27.0	4.4	65,000	5.0	—	75,000	2.5	10.5	B9A	27
EL821	(P)	6.3	0.75	250	250	− 4.5	40.0	6.0	50,000	11.0	—	—	—	—	B9A	19
EL822	(P)	6.3	0.75	250	150	− 2.5	40.0	5.0	100,000	13.0	—	—	—	—	B9A	19
ECL80	(TP)	6.3	0.3	200	200	− 8.0	17 5	3.3	150,000	3.3	—	11,000	1.4	10	B9A	13

† Flying leads

(Continued)

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MULLARD *(Continued)*															
Current Types (Continued)															
ECL82 (TP)	6.3	0.78	250	250	−22.5	28.0	5.5	25,000	5.0	680	9,000	3.4	10	B9A	37
PCL83 (TP)	12.6	0.3	170	170	− 9.5	30.0	5.0	53,000	5.5	—	5,500	2.2	10	B9A	27
PL83 (P)	15.0	0.3	170	170	− 2.3	36.0	5.0	100,000	10.0	—	—	—	—	B9A	14
PCL84 (TP)	15.0	0.3	220	220	− 3.4	18.0	3.1	150,000	10.0	—	—	—	—	B9A	53
PCL82 (TP)	16.0	0.3	170	170	−11.5	41.0	8.0	16,000	7.5	—	3,900	3.3	10	B9A	37
UL84 (P)	45.0	0.1	170	170	−12.5	70.0	5.0	23,000	10.0	170	2,400	5.6	10	B9A	16
HL92 (P)	50.0	0.15	110	110	− 7.5	49.0	4.0	10,000	7.5	—	2,500	1.9	9	B7G	42
TUNGSRAM															
Obsolete Types															
PP2 (P)	2.0*	0.14	135	135	− 5.0	7.0	1.0	—	—	—	19,000	0.44	—	B4 / B5	7 / 6
PP215 (P)	2.0*	0.15	90	90	− 4.5	8.0	1.2	—	—	—	14,000	0.2	—	B5	6
PP222 (P)	2.0*	0.22	150	150	− 6.0	9.0	2.0	—	—	—	14 000	0.6	—	B4 / B5	7 / 7
P215 (T)	2.0*	0.15	150	—	−12.0	12.0	—	3,300	1.5	—	7,000	0.26	—	B4	1
SP220 (T)	2.0*	0.2	150	—	−12.0	14.0	—	2,200	3.0	—	6,700	0.36	—	B4	1
PP225 (P)	2.0*	0.265	135	135	−12.0	18.0	2.0	—	—	—	6,000	0.8	—	B5	6
P12/250 (T)	4.0*	1.0	250	—	−35.0	48.0	—	830	6.0	700	2,400	2.75	—	B4	1
P15/250 (T)	4.0*	1.0	250	—	−44.0	60.0	—	660	6.0	750	2,500	3.5•	—	B4	1
O15/400 (T)	4.0*	1.0	500	—	−37.0	40.0	—	1,800	4.5	900	6,000	3.5	—	B4	1
PP4 (P)	4.0	1.1	250	250	−15.0	36.0	6.0	—	—	400	7,500	3.1	—	B5	6
APP4E (P)	4.0	2.0	375	275	−13.5	72.0	8.0	—	—	175	3,500	8.8	—	B7	25
APP4g / APP4g* (P)	4.0	2.0	250	250	− 6.0	36.0	4.0	—	10.0	150	7,000	3.6	—	B7 / B7	5 / 15
EBL1 (P, DD)	6.3	1.4	250	250	− 6.0	36.0	4.0	—	9.5	150	7,000	3.6	—	Ct8	13
EL2 (P)	6.3	0.2	250	250	−18.0	32.0	5.0	—	2.8	480	8,000	3.6	—	Ct8	4
EL3 (P)	6.3	1.2	250	250	− 7.0	36.0	4.5	—	9.5	175	7,000	4.5	—	Ct8	12
EL5 (P)	6.3	1.2	250	275	−14.0	72.0	7.0	—	8.5	175	3,500	8.8	—	Ct8	12
EL6 (P)	6.3	1.4	250	250	− 7.0	72.0	8.5	—	15.0	85	3,500	8.2	—	Ct8	12
EL36 (P)	6.3	1.4	250	250	− 7.0	72.0	8.5	—	15.0	85	3,500	8.2	—	IO	36
P2018 (T)	20.0	0.18	200	—	−15.0	20.0	—	—	4.0	750	5,000	0.9	—	B5	1
PP2018 (P)	20.0	0.18	200	200	−18.0	20.0	5.0	—	2.5	720	8,800	1.4	—	B5	7
PP24 / PP24S (P)	24.0	0.2	200	100	−19.0	40.0	5.0	—	3.0	400	5,000	3.2	—	B7 / Ct8	15 / 4
PP34 / PP34S (P)	35.0	0.2	200	200	− 6.5	45.0	5.0	—	8.5	170	4,400	3.2	—	B7 / Ct8	15 / 4
PP36 (P)	35.0	0.2	200	200	− 6.5	45.0	5.0	—	8.5	170	5,000	3.2	—	B7	25
PP37 / CL6 (P)	35.0	0.2	200	100	− 9.5	45.0	5.0	—	8.5	190	4,500	3.5	—	B7 / Ct8	15 / 4
Replacement Types															
1S4 (BT)	1.4*	0.1	90	67.5	− 7.0	7.4	1.4	100,000	1.58	—	8,000	0.27	12	B7G	4
2A5 (P)	2.5	1.75	250	250	−16.5	34.0	6.5	100,000	2.2	—	7,000	3.0	—	UX6	8
LP220 (T)	2.0*	0.2	150	—	− 4.5	5.0	—	3,900	3.5	—	7,500	0.2	—	B4	1
P27/500 (T)	4.0*	2.0	500	—	−31.0	62.5	—	1,050	8.5	500	5,000	5.0	—	B4	1
APP4A (P)	4.0	1.2	250	250	−16.5	36.0	6.0	—	—	400	7,000	3.5	—	B5 / B7	7 / 24
APP4B (P)	4.0	2.0	250	250	− 5.0	36.0	4.0	—	—	140	7,000	3.6	—	B7	24
DDP4B / DDP4M (P, DD)	4.0	2.0	250	250	− 5.0	36.0	4.0	—	8.0	150	7,000	3.6	—	B7 / B7	9 / 22
DDPP6B (DD)	6.3	1.4	250	250	− 6.0	36.0	5.0	—	9.5	150	7,000	4.3	—	B7	9
DDPP39 / DDPP39M (P, DD)	35.0	0.2	200	200	− 8.0	45.0	6.0	—	8.5	170	4,400	3.2	—	B7 / B7	9 / 22
PP35 (P)	35.0	0.2	200	200	− 6.5	45.0	5.0	—	8.5	170	4,400	3.2	—	B7	24
Current Types															
1C5GT (P)	1.4*	1	90	90	− 7.5	7.5	1.6	115,000	1.55	—	8,000	0.24	10	IO	78
3A4 (P)	1.4*	0.2†	150	90	− 8.4	13.3	2.2	100,000	1.9	—	8,000	0.7	6	B7G	7
3C4 (P)	1.4*	0.05	85	85	− 5.2	5.0	0.9	150,000	1.4	—	13,000	0.2	10	B7G	9
3Q4 (P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	6
3Q5GT (P)	1.4*	0.1†	90	90	− 4.5	9.5	1.3	90,000	2.2	—	8,000	0.27	6	IO	87
3S4 (P)	1.4*	0.1†	90	67.5	− 7.0	7.4	1.4	100,000	1.57	—	8,000	0.27	12	B7G	6
3V4 (P)	1.4*	0.1†	90	90	− 4.5	9.5	2.1	100,000	2.15	—	10,000	0.27	7	B7G	9
6AB8 (TP)	6.3	0.3	200	200	− 8.0	17.5	3.3	150,000	3.3	—	11,000	1.4	10	B9A	13
6AM5 (P)	6.3	0.2	250	250	−12.5	16.0	2.4	130,000	2.6	680	16,000	1.4	10	B7G	25
6AQ5 (P)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
6BQ5 (P)	6.3	0.76	250	250	− 7.3	48.0	5.5	38,000	11.3	135	5,200	5.7	10	B9A	16
6C4 (T)	6.3	0.15	250	—	− 8.5	10.5	—	7,700	2.2	—	—	—	—	B7G	15
6CK5 (P)	6.3	0.7	250	250	− 7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	4
6CK5 (T)	6.3	0.7	250	—	—	33.0	—	—	—	250	3,500	1.55	8	B8A	4

(Continued)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
FUNGSRAM (*Continued*)																
Current Types (*Continued*)																
ECL82	(TP)	6.3	0.78	170	170	−11.5	41.0	7.5	16,000	7.5	—	3,900	3.3	10	B9A	37
ECL83	(TP)	6.3	0.6	200	200	−13.0	27.0	4.4	65,000	5.5	—	7,500	—	10.5	B9A	27
EBL31	(P. DD)	6.3	1.2	250	250	− 6.0	36.0	5.0	—	9.5	150	7,000	4.3	—	IO	15
EL33	(P)	6.3	1.2	250	250	− 6.0	36.0	5.0		9.5	150	7,000	4.4	—	IO	36
PP60	(BT)	6.3	1.27	250	250	−15.0	85.0	6.3	—	6.3	160	2,200	7.25	9	IO	36
6F6	(P)	6.3	0.7	285	285	−22.0	38.0	12.0	78,000	2.55	440	7,000	4.5	9	IO	36
6AQ5	(BT)	6.3	0.45	250	250	−12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	—	B7G	27
807	(BT)	6.3	0.9	500	200	−14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
6L6	(BT)	6.3	0.9	300	200	−13.0	54.5	4.6	33,000	5.2	220	4,500	6.5	11	IO	36
6M6		6.3	1.2	250	250	− 6.0	36.0	4.0	—	9.5	150	7,000	4.4	—	IO	36
6V6	(BT)	6.3	0.45	315	225	−13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
42	(P)	6.3	0.7	Other data as Type 6F6											UX6	8
EL32	(P)	6.3	0.2	250	250	−18.0	32.0	5.0	70,000	2.8	485	8,000	3.6	10	IO	9
EL37	(P)	6.3	1.4	250	250	−13.5	100.0	13.5	13,500	11.0	120	2,500	10.5	10	IO	36
PCL82	(TP)	12.6	0.3	170	170	− 9.5	30.0	5.0	53,000	5.5	—	5,500	2.2	10	B9A	27
12A6	(BT)	12.6	0.15	250	250	−12.5	30.0	3.5	70,000	3.0	375	7,500	2.4	—	IO	36
18	(P)	14.0	0.3	315	315	−22.0	42.0	8.0	75,000	2.65	—	7,000	5.0	—	UX6	8
15A6	(P)	15.0	0.3	170	170	− 2.3	36.0	5.0	100,000	10.0	—	—	—	—	B9A	14
16A5	(P)	16.5	0.3	170	170	−10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
16A8	(TP)	16.0	0.3	170	170	−11.5	41.0	7.5	16,000	7.5	—	3,900	3.3	10	B9A	37
PL33	(P)	19.0	0.3	250	250	− 6.0	36.0	4.0	50,000	9.0	150	7,000	4.5	10	IO	36
PL33	(T)	19.0	0.3	250	—	− 8.5	20.0	—	3,000	6.5	425	7,000	1.1	5	IO	36
25A6	(P)	25.0	0.3	160	120	−18.0	36.0	12.0	42,000	2.4	450	5,000	2.2	10	IO	36
25L6	(BT)	25.0	0.3	200	110	− 8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
CL33	(P)	35.0	0.2	200	200	− 7.5	45.0	5.0	—	8.0	170	4,300	3.2	—	IO	36
35L6	(BT)	35.0	0.15	200	110	− 8.0	44.0	7.0	40,000	5.9	185	4,500	3.3	10	IO	36
CBL31	(P. DD)	39.0	0.2	200	200	− 8.0	45.0	6.0	—	8.5	170	4,400	3.2	—	IO	15
UCL83	(TP)	40.0	0.1	170	170	− 9.5	30.0	5.0	53,000	5.5	—	5,500	2.2	10	B9A	27
UL46	(P)	45.0	0.1	170	170	−10.4	53.0	10.0	20,000	9.5	—	3,000	4.2	10	B8A	7
UL84	(P)	45.0	0.1	165	165	−12.0	73.0	4.5	20,000	10.5	—	2,400	5.6	10	B9A	16
45A5	(P)	45.0	0.1	170	170	−10.4	53.0	10.0	20,000	9.5	140	3,000	4.2	10	B8A	7
UCL82	(TP)	50.0	0.1	200	100	−16.0	35.0	7.0	25,000	6.4	—	5,600	—	—	B9A	37
50C5	(BT)	50.0	0.15	110	110	− 7.5	49.0	4.0	14,000	7.5	—	3,000	1.9	—	B7G	42
50L6	(BT)	50.0	0.15	200	110	− 8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
AMERICAN																
1AC5	(P)	1.25*	0.04	67.5	67.5	− 4.5	2.0	0.4	150,000	0.75	—	25,000	0.05	10	Wires	
1V5	(P)	1.25*	0.04	67.5	67.5	− 4.5	2.0	0.04	150,000	0.75	—	25,000	0.05	—	Wires	
2E35	(P)	1.25*	0.03	22.5	22.5	0	0.27	0.07	—	0.39	—	—	0.001	—	Wires	
2E36		1.25*	0.03	45	45	− 1.25	0.45	0.11	250,000	0.5	—	100,000	0.006	—	Wires	
1A5	(P)	1.4*	0.05	90	90	− 4.5	4.0	1.1	300,000	0.85	—	25,000	0.115	7	IO	78
1B8	(SD. TP)	1.4*	0.1	90	90	− 6.0	6.3	1.4	—	1.15	—	14,000	0.21	—	IO	92
1C5	(P)	1.4*	0.1	90	90	− 7.5	7.8	3.5	115,000	1.55	—	8,000	0.24	10	IO	78
1D8	(SD, TP)	1.4*	0.1	90	90	− 9.0	5.0	1.0	200,000	0.93	—	12,000	0.2	10	IO	92
1LA4	(P)	1.4*	0.05	90	90	− 4.5	4.0	1.1	300,000	0.85	—	25,000	0.115	7	B8B	27
1LB4	(P)	1.4*	0.1	90	90	− 9.0	5.0	1.0	200,000	0.93	—	12,000	0.2	10	B8B	27
1N6	(SD, P)	1.4*	0.05	90	90	− 4.5	3.4	1.2	300,000	0.8	—	25,000	0.1	7	IO	84
1Q5	(BT)	1.4*	0.1	90	90	− 4.5	9.5	1.3	75,000	2.2	—	8,000	0.27	6	IO	78
1S4	(BT)	1.4*	0.1	90	67.5	− 7.0	7.4	1.4	100,000	1.58	—	8,000	0.27	12	B7G	4
1T5	(BT)	1.4*	0.05	90	90	− 6.0	6.5	1.5	250,000	1.15	—	14,000	0.17	7.5	IO	78
3B5	(BT)	1.4*	0.1†	67.5	67.5	− 7.0	8.0	0.6	100,000	1.65	—	5,000	0.2	—	IO	87
3C5	(P)	1.4*	0.1†	90	90	− 9.0	6.0	1.4	—	1.55	—	8,000	0.24	—	IO	87
3LF4		1.4*	0.1†	90	90	− 4.5	8.0	1.0	80,000	2.0	—	7,000	0.23	—	B8B	32
3Q5	(BT)	1.4*	0.1†	110	110	− 6.6	10.0	1.4	100,000	2.2	—	8,000	0.4	6	IO	87
1F4, 1F5	(P)	2.0*	0.12	135	135	− 4.5	8.0	2.4	200,000	1.7	—	16,000	0.31	5	UX5 IO	3 78
1G5	(P)	2.0*	0.12	135	135	−13.5	9.7	3.6	160,000	1.55	—	9,000	0.55	11	IO	78
1J5	(P)	2.0*	0.12	135	135	−16.5	7.0	2.0	100,000	0.95	—	13,500	0.45	—	IO	78
2A3	(T)	2.5*	2.5	250	—	−45.0	60.0	—	800	5.25	750	2,500	3.5	5	UX4	1
3LE4	(P)	2.8*	0.05	90	90	− 9.0	9.0	1.8	110,000	1.6	—	6,000	0.3	—	B8B	32
6A3, 6B4	(T)	6.3*	1.0	250	—	−45.0	60.0	—	800	5.25	750	2,500	3.2	5	UX4 IO	1 81
6A4	(P)	6.3*	0.3	180	180	−12.0	22.0	3.9	45,500	2.2	465	8,000	1.4	9	UX5	3
6A5	(T)	6.3	1.0	250	—	−45.0	60.0	—	800	5.25	750	2,500	3.75	—	IO	35
6AB6		6.3	0.5	250	—	0	34.0	—	40,000	1.8	—	8,000	3.5	—	IO	23
6AC5	(T)	6.3	0.4	250	—	—	—	—	36,000	3.4	—	7,000	3.7	—	IO	20
6AC6		6.3	1.1	180	—	0	45.0	—	—	3.0	—	4,000	3.8	—	IO	23
6AD7	(TP)	6.3	0.85	250	250	−16.5	36.0	10.5	80,000	2.5	—	7,000	3.2	—	IO	42
6AG7	(P)	6.3	0.65	300	150	− 3.0	30.0	7.0	130,000	11.0	—	10,000	3.0	7	IO	11
6AH5	(BT)	6.3	0.9	350	250	−18.0	—	—	33,000	5.2	—	4,200	10.8	—	IO	104
6AL6	(BT)	6.3	0.9	250	250	−14.0	72.0	5.0	22,500	6.0	180	2,500	6.5	—	IO	38
6AN5	(P)	6.3	0.5	120	120	− 6.0	35.0	12.0	12,500	8.0	—		—	—	B7G	14

(*Continued*)

Type		Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
AMERICAN *(Continued)*																
6AR5	(P)	6.3	0.4	250	250	−16.5	35.0	5.5	65,000	2.4	—	7,000	3.2	—	B7G	41
6AR6	(BT)	6.3	1.2	250	250	−22.5	77.0	5.0	21,000	5.4	275	—	—	—	IO	37
6AS5	(BT)	6.3	0.8	150	110	− 8.5	36.0	6.5	—	5.6	—	4,500	2.2	—	B7G	42
6AS7	(DT)	6.8	2.5	135	—	−31.5	125.0	7.5	280	7.5	250	—	—	—	IO	26
6AU5	(P)	6.3	1.25	450	175	−50.0	85.0	—	—	6.0	—	—	—	—	IO	140
6B5 6N6		6.3	0.8	300	—	0	42.0	—	24,000	2.4	—	7,000	4.0	5	UX6 IO	5 23
6G6	(P)	6.3	0.15	180	180	− 9.0	15.0	2.5	175,000	2.3	540	10,000	1.1	10	IO	36
6K6	(P)	6.3	0.4	315	250	−21.0	28.0	9.0	75,000	2.1	570	9,000	4.5	15	IO	36
6U6		6.3	0.75	250	135	−14.0	56.0	3.0	20,000	6.2	240	3,000	5.5	—	IO	36
6W6	(BT)	6.3	1.25	135	135	− 9.5	61.0	12.0	—	9.0	130	2,000	3.3	—	IO	36
7A5	(BT)	6.3	0.75	125	125	− 9.0	45.0	9.5	17,000	6.0	165	2,700	2.2	10	B8B	10
7B5	(BT)	6.3	0.4	315	250	−21.0	28.0	9.0	75,000	2.1	570	9,000	4.5	15	B8B	10
12A5	(P)	6.3*	0.6†	180	180	−25.0	48.0	14.0	35,000	2.4	400	3,300	3.4	11	UX7	7
12A7	(P, R)	12.6	0.3	135	135	−13.5	9.0	2.5	100,000	0.98	1,200	13,500	0.55	—	UX7	3
12L8	(DP)	12.6	0.15	180	180	− 9.0	13.5	4.6	160,000	2.5	—	10,000	1.0	—	IO	41
14A5	(BT)	12.6	0.15	250	250	−12.5	30.0	3.5	70,000	3.0	375	7,500	2.8	—	B8B	10
14C5	(BT)	12.6	0.22	Other data as Type 6V6											B8B	10
25A7	(P, R)	25.0	0.3	100	100	−15.0	20.5	4.0	50,000	1.8	615	4,500	0.77	9	IO	99
25AC5	(T)	25.0	0.3	165	For use with direct-coupled 6AF5 driver							3,500	3.3	—	IO	20
25B5 25N6		25.0	0.3	180	—	0	46.0	—	15,000	2.3	—	4,000	3.8	9	UX6 IO	5 23
25B6	(P)	25.0	0.3	200	135	−23.0	71.0	13.0	18,000	5.0	275	2,500	7.1	15	IO	36
25C6	(BT)	25.0	0.3	200	135	−14.0	66.0	9.0	18,300	7.1	186	2,600	6.0	10	IO	36
26A7	(DBT)	26.5	0.6	26.5	26.5	− 4.5	20.0	2.0	2,500	5.5	—	1,500	0.2	—	IO	41
28D7	(DBT)	28.0	0.4	28	28	—	9.0	0.7	—	—	—	4,000	0.08	—	B8B	38
32L7	(BT, R)	32.5	0.3	90	90	− 7.0	27.0	8.0	17,000	4.8	200	2,600	1.0	9	IO	99
35B5	(BT)	35.0	0.15	110	110	− 7.5	41.0	7.0	—	5.8	185	2,500	1.5	10	B7G	27
35C5	(BT)	35.0	0.15	110	110	− 7.5	41.0	7.0	—	5.8	—	2,500	1.5	—	B7G	42
50B5	(BT)	50.0	0.15	110	110	− 7.5	49.0	4.0	14,000	7.5	140	2,500	1.9	9	B7G	27
50C6	(BT)	50.0	0.15	135	135	−13.5	58.0	3.5	9,300	7.0	220	2,000	3.6	—	IO	36
70A7	(BT, R)	70.0	0.15	110	110	− 7.5	40.0	3.0	—	5.8	175	2,500	1.5	—	IO	105
70L7	(BT, R)	70.0	0.15	110	110	− 7.5	43.0	6.0	15,000	7.5	150	2,000	1.8	10	IO	43
117L7 117M7	(BT, R)	117.0	0.09	105	105	− 5.2	43.0	5.5	17,000	5.3	110	4,000	0.85	5	IO	44
117N7	(BT, R)	117.0	0.09	100	100	− 6.0	51.0	5.0	16,000	7.0	110	3,000	1.2	6	IO	45
117P7	(BT R)	117.0	0.09	105	105	− 5.2	43.0	5.5	17,000	5.3	110	4,000	0.85	5	IO	45

OUTPUT VALVES 2
(Push-pull operation)

Type		Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} g—g (Ω)	R_K (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
BRIMAR																	
Obsolete Types																	
19	(DT)	2.0†	0.26	135	—	0	10–27	—	—	10,000	—	—	2.1	—	B	UX6	7
41/41E	(P)	—	—	285	285	—	27.5–31	4.5–6.5	51.0	—	400	12,000	9.8	4.0	A_1	—	—
6A3	(T)	—	—	Data as Type 2A3													
18	(P)	—	—	Data as Type 6F6													
79		6.3	0.6	250	—	—	10.6	—	—	—	—	14,000	8.0	—	B	UX6	6
2151		—	—	250	250	−31.0	47.0	11.5	—	—	250	7,000	12.0	—	A	—	—
Replacement Types																	
1S4	(BT)	—	—	Data as Type 3S4													
2A3	(T)	—	—	300	—	−62.0	40.0–74	—	124	∞	—	3,000	15.0	2.5	AB_1	—	—
3Q4	(BT)	—	—	Data as Type 3V4													
3S4	(BT)	—	—	90	90	−16.5	2.0–8.4	0.35–2.7	32.5	—	—	10,000	0.78	6.0	AB_1	—	—
7A2	(P)	—	—	Data as Type 6F6													
6B4	(T)	—	—	Data as Type 2A3													
6F6	(P)	—	—	315	285	—	31.0	9.0	58.0	∞	320	10,000	10.5	3.0	A_1	—	—
6K6	(P)	—	—	285	285	—	27.5–31	4.5–6.5	51.0	∞	400	12,000	9.8	4.0	A_1	—	—
6N7	(DT)	6.3	0.8	300	—	0	35.0	—	82.0	1,032	—	8,000	10.0	8.0	B	10	22
7C5	(BT)	—	—	Data as Type 6V6													
42	(P)	—	—	Data as Type 6F6													
EL41	(P)	—	—	300	300	—	36.0	9.5	24.0	—	140	9,000	13.0	2.5	AB_1	—	—
7D5	(P)	—	—	Data as Type 6F6													
UL41	(P)	—	—	200	200	—	45.0–53.0	9.0–19	35.0	∞	130	4,000	12.5	4.0	AB_1	—	—

(Continued)

Type		Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} g—g (Ω)	R_K (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
BRIMAR (*Continued*)																	
Current Types																	
3V4	(BT)	—	—	90	90	− 9.4	2.0–6.4	0.5–2.3	20.0	—	—	14,000	0.58	3.8	AB_1	—	—
DL96/3C4	(P)	—	—	81.5	81.5	− 8.5	1.0–5.0	0.2–1.3	22.4	—	—	16,000	0.44	2.6	B	—	—
5763	(BT)	—	—	300	225	—	43.0	7.3	13.75	∞	68	11,500	7.5	4.2	A_1	—	—
				300	225	—	28.5	7.3	21.0	∞	150	13,500	8.8	4.4	AB_1	—	—
				300	225	−12.5	70.0	9.0	71.0	—	—	4,500	25.0	9.6	AB_2	—	—
6AK6	(P)	—	—	180	180	—	14.5	3.8	18.0	∞	260	20,000	2.5	5.3	A_1	—	—
				275	225	−21.0	15.7	4.0	42.0	∞	—	20,000	5.2	4.2	AB_1	—	—
6AM5	(P)	—	—	250	250	—	13.0	4.1	30.0	∞	600	24,000	4.0	3.2	A	—	—
6AQ5	(BT)	—	—	250	250	−15.0	35.0–40	2.5	30.0	∞	—	10,000	10.0	3.0	AB_1	—	—
6BW6	(BT)	—	—	250	250	—	49.0	6.8	26.0	∞	120	10,000	9.0	2.5	A_1	—	—
				285	285	—	39.3	5.0	45.0	∞	260	8,000	12.0	1.0	AB_1	—	—
				315	285	−19.0	77.5	8.0	80.0	—	—	5,000	30.0	7.0	AB_2	—	—
6BW6	(T)	—	—	285	—	—	41.4	—	38.0	∞	240	4,500	3.1	0.5	A_1	—	—
6CD6	(BT)	—	—	200	110	−14.0	80.0	5.8	28.0	∞	90	3,000	13.5	1.75	A_1	—	—
6CD6	(T)	—	—	200	—	−33.5	70.0	—	62.0	∞	240	1,500	4.8	2.7	A_1	—	—
6CH6	(BT)	—	—	250	250	—	40 0	8.8	9.0	∞	50	9,000	8.0	7.5	A_1	—	—
6CH6	(T)	—	—	250	—	—	46.0	—	9.0	∞	50	5,000	1.8	1.0	A_1	—	—
13D3	(DT)	6.3	0.6†	250	—	—	21.6	—	45.3	—	—	20,000	6.7	11.5	B	B9A	1
6L6	(BT)	—	—	270	270	—	72.5	8.5	40.0	∞	125	5,000	18.5	4.0	A_1	—	—
				360	270	—	50.0	9.5	57.0	∞	250	9,000	24.0	4.0	AB_1	—	—
				360	270	−22.5	69.0	8.0	45.0	—	—	6,600	26.5	1.8	AB_2	—	—
6L6	(T)	—	—	325	—	—	42.0	—	60.0	∞	375	8,000	6.0	0.6	A_1	—	—
6V6	(BT)	—	—	285	285	−19.0	35–46	2–6.8	38.0	∞	250	8,000	14.0	3.5	AB_1	—	—
807	(BT)	—	—	500	300	—	50–60	1.25–8.3	72.0	∞	270	9,000	32.5	2.7	A_1		
				600	300	−29.5	40–75	0.75–8.8	59.0	∞	—	10,000	47.5	2.2	A_1	—	—
				600	300	−30.0	30–100	2.5–10 5	78.0	—	—	6,400	80.0	3.5	AB_2		
807	(T)	—	—	325	—	—	40–42	—	60.0	∞	375	8,000	6.0	0.6	A	—	—
				400	—	−45.0	30–70	—	90.0	∞	—	3,000	15.0	3.0	AB_1		
6164 (SQ)		6.3	1.25	750	165	−46.0	11–120	0.15–10	108	—	—	7,400	131	—	AB_2	10	134
ECL81/6BM8	(TP)	—	—	200	200	—	39.5	16.5	35.0	∞	380	6,000	9.8	4.0	AB_1	—	—
EL84/6BQ5	(P)	—	—	300	300	—	36.0	4.0	28.0	∞	130	8,000	17.0	10.0	AB_1	—	—
9BW6	(BT)	—	—						Data as Type 6BW6								
PCL82	(TP)	—	—						Data as Type ECL82								
19AQ5	(BT)	—	—						Data as Type 6AQ5								
50C5	(BT)	—	—	110	110	− 7.5	49.0	4.0	15.0	∞	70	4,000	3.75	7.0	A_1	—	—
50C5	(T)	—	—	110	—	− 7.5	53 0	—	15.0	∞	70	2,000	0.75	2.1	A_1	—	—
50CD6	(BT)	—	—						Data as Type 6CD6								
COSSOR																	
Obsolete Types																	
220B	(DT)	2.0*	0.2	120	—	0	6.0	—	—	3,000	—	12,000	1.1	—	B_2	B7	10
240B	(DT)	2.0*	0.4	120	—	0	8.5	—	—	2,500	—	8,000	2.0	—	B_2	B7	10
Replacement Types																	
240QP	(DP)	2.0*	0.4	150	150	−12.0	6.0	—	—	∝	—	24,000	1.25	—	B_1	B7	11
6L6	(BT)	—	—	270	270	—	67.0	5.5	40 0	∝	250	5,000	18.5	2.0	A	—	—
				360	270	—	44.0	2.5	57.0	∝	500	9,000	24.0	4.0	AB_1	—	—
				360	270	−22.5	44 0	2.5	72 0	—	—	3,800	47.0	2.0	AB_2	—	—
6V6	(BT)	—	—	285	285	−19.0	35.0	2.0	38.0	∞	500	8,000	14.0	3.5	AB_1	—	—
Current Types																	
6BQ5	(P)	—	—	300	300	—	46.0	11.0	28.0	—	130*	8,000	17.0	4.0	AB	—	—
807	(BT)	—	—	400	300	−25.0	100-165	5-10	48.0	—	—	8,400	45.0	—	AB_1	—	—
				600	300	−30.0	66-150	5-10	58.0	—	—	12,000	65.0	—	AB_1	—	—
DL96	(P)	—	—	81.5	81.5	− 8.5	1.0	0.2	20.0	—	—	16,000	0.44	2.2	B	—	—
PCL82	(TP)	—	—	200	200	—	35.0	7.0	25.0	—	190	6,000	9.8	4.0	AB	—	—
UCL82	(TP)	—	—	200	200	—	35.0	7.0	25.0	—	190	6,000	9.8	4.0	AB	—	—
													* Common				
EDISWAN MAZDA																	
Obsolete Types																	
PD220	(DT)	2.0*	0.2	150	—	− 1.15	0.4	—	58.0	3,300	—	11,500	2.85	5.0	B_2	B7	10
PD220A	(DT)	2.0*	0.2	150	—	− 6.0	1.25	—	74.0	7,000	—	10,000	2.9	5.0	B_2	B7	10
QP240	(DP)	2.0*	0.45	150	130.5	−11.5	2.0	0.45	23.0	∞	—	15,000	2.25	5.0	B_1	B9	4
PA40	(T)	4.0*	2.0‡	450	—	−96.5	107.0	—	192.0	∞	—	4,000	40.0	5.0	AB_1	B4	1
1IE1	(BT)	6.3	1.2‡	450	250	−25.0	101.0	10.5	50.0	∞	—	5,000	52.0	3.0	AB_1	MO	20
Replacement Types																	
QP230	(DP)	2.0*	0.3	120	120	− 9.6	2.3	0.6	19.0	∞	—	17,000	0.85	5.0	B_1	B7	11
QP25	(DP)	2.0*	0.2	120	120	− 9.75	2.3	0.43	19.5	∞	—	15,500	1.2	5.0	B_1	MO	9
V503	(T)	4.0*	2.0‡	450	—	−96.5	107.0	—	192 0	∞	—	4,000	40.0	5.0	AB_1	B4	1
Pen44	(BT)	—	—	300	275	−12.2	77.0	25.0	23.0	∞	—	5,000	24.0	5.0	AB_1	—	—
Pen45	(BT)	—	—	250	250	—	41.5	12.5	19.0	∞	180	7,500	11.5	5.0	AB_1	—	—

(Continued)

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} g—g (Ω)	R_K (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
EDISWAN MAZDA (*Continued*)																
Current Types																
6P15 (P)	—	—	250	250	—	37.5	7.5	22.5	∞	260	8,000	11.0	3.0	AB_1	—	—
6P25 (BT)	—	—	250	250	—	41.5	12.5	19.0	∞	180	7,500	11.5	5.0	AB_1	—	—
10P13 (BT)	—	—	180	185	—	30.0	13.0	22.0	∞	270	7,000	7.0	3.0	AB_1	—	—
10P13 (T)	—	—	220	—	—	30.0	—	27.0	∞	470	4,500	3.4	3.0	A	—	—
10P14 (BT)	—	—	195	210	—	48.0	26.5	26.0	∞	180	6,000	10.7	4.0	AB_1	—	—
			200	210	—	34.0	22.5	36.0	∞	330	7,000	10.0	3.0	AB_1	—	—
10P14 (T)	—	—	250	—	—	45.0	—	36.0	∞	430	4,000	5.9	3.0	—	—	—
20P3 (BT)	—	—	195	210	—	48.0	26.5	26.0	∞	180	6,000	10.7	4.0	AB_1	—	—
			200	210	—	34.0	22.5	36.0	∞	330	7,000	10.0	3.0	AB_1	—	—
20P3 (T)	—	—	250	—	—	45.0	—	36.0	∞	430	4,000	5.9	3.0	A	—	—
1P1	—	—	81.5	81.5	− 8.5	1.0	0.18	22.0	∞	—	16,000	0.44	2.6	B	—	—
30P16 (P)	—	—	170	170	—	49.0	16.5	26.0	∞	200	4,000	9.0	4.0	AB_1	—	—
						‡ Filament current per valve.										
EMITRON																
Current Types																
6L6 (BT)	—	—	270	270	—	67.0	5.5	40.0	∞	250	5,000	18.5	2.0	A	—	—
			360	270	—	44.0	2.5	57.0	∞	500	9,000	24.5	4.0	AB_1	—	—
			360	270	−22.5	44.0	2.5	72.0	—	—	3,800	47.0	2.0	AB_2	—	—
7C5 (BT)	—	—	285	285	−19.0	35.0	2.0	38.0	∞	—	8,000	14.0	3.5	AB_1	—	—
6AQ5 (BT)	—	—	250	250	−15.0	35.0	2.5	30.0	∞	—	10,000	10.0	3.0	AB_1	—	—
EL84/6BQ5 (P)	—	—	300	300	—	46.0	11.0	28.0	—	130	8,000	17.0	4.0	AB	—	—
FERRANTI																
Replacement Types																
QPT2 (DP)	2.0*	0.4	150	150	− 9.0	3.3	0.9	—	∞	—	25,000	1.2	—	B_1	B7	11
LP4 (T)	—	—	300	—	−50.0	50.0	—	110.0	∞	500	3,800	13.5	2.5	AB_1	—	—
6F6 (P)	—	—	375	250	−26.0	32.0	2.5	82.0	∞	—	10,000	18.5	3.5	AB_2	—	—
			315	285	—	31.0	6.0	58.0	∞	320	10,000	10.5	3.0	A_1	—	—
6K6 (P)	—	—	285	285	—	27.5	4.5	51.0	∞	400	12,000	9.8	4.0	A_1	—	—
6L6 (BT)			270	270	—	67.0	5.5	40.0	∞	125	5,000	18.5	2.0	A_1	—	—
			360	270	—	44.0	2.5	57.0	∞	250	9,000	24.0	4.0	AB_1	—	—
			360	270	−22.5	44.0	2.5	72.0	—	—	3,800	47.0	2.0	AB_2	—	—
6V6 (BT)	—	—	282	285	−19.0	35.0	2.0	38.0	∞	—	8,000	14.0	3.5	AB_1	—	—
42 (P)								Data as Type 6F6								
Current Types																
3S4/DL92 (P)	—	—	90	90	−16.5	8.4	2.7	32.0	—	—	10,000	0.78	6.0	AB_1	—	—
3V4/D494 (P)	—	—	90	90	− 9.4	6.4	2.3	20.0	—	—	14,000	0.58	3.8	AB_1	—	—
DL96/3C4 (P)	—	—	81.5	81.5	− 8.5	4.5	1.1	20.0	—	—	16,000	0.44	2.2	B	—	—
			90	90	—	4.25	1.25	20.0	—	560	20,000	0.42	4.0	AB_1		
EL41/ (P)	—	—	300	300	—	36.0	9.5	24.0	—	140	9,000	13.0	2.5	AB_1	—	—
6CK5 (T)	—	—	300	—	—	33.0	—	9.4	—	150	10,000	4.0	1.0	AB_1	—	—
EL42 (P)	—	—	250	250	—	21.5	6.7	35.0	—	310	15,000	7.0	5.5	AB_1	—	—
EL84/ (P)	—	—	300	300	—	46.0	11.0	28.0	—	130	8,000	17.0	4.0	AB_1	—	—
6BQ5 (T)	—	—	—	—	—	26.0	—	28.0	—	270	10,000	5.3	2.5	AB_1	—	—
EL90/6AQ5 (P)	—	—	250	250	—	35.0	2.5	30.0	—	200	10,000	10.0	3.0	AB_1	—	—
EL91/6AM5 (P)	—	—	250	250	—	11.0	1.6	34.0	∞	600	24,000	4.0	3.2	AB_1	—	—
PL81/21A6 (P)	—	—	200	200	−31.5	87.0	12.5	31.0	—	—	2,500	20.0	5.5	B	—	—
PL82 16A5 (P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4,000	9.0	4.0	AB_1	—	—
UL41 (P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4,000	9.0	4.0	AB_1	—	—
UL84 (P)	—	—	170	170	—	57.5	20.5	18.5	—	120	3,500	13.0	4.5	AB_1	—	—
G.E.C.																
Obsolete Types																
N15 (P)	—	—	90	90	−11.0	6.0	2.3	17.0	∞	2,200	16,000	0.56	6.0	B_1	—	—
KT35 (BP)	—	—	200	200	−14.7	58.5	15.0	14.7	∞	100	4,000	14.0	5.6	AB_1	—	—
KT71 (BP)	—	—	175	175	−10.2	72.5	15.0	28.0	∞	140	2,500	11.5	4.5	AB_1	—	—
QP21 (DP)	2.0*	0.4	150	150	− 9.0	12.6	6.0	—	∞	—	25,000	1.0	—	B_1	B7	11
Replacement Types																
KT76 (BP)	—	—	175	175	−18.0	25.0	7.5	41.0	∞	350	8,000	4.8	3.0	AB_1	—	—
KT81 (BP)	—	—	275	275	− 8.7	38.0	10.0	17.5	∞	80	10,000	11.5	6.5	AB_1	—	—
(T)	—	—	350	—	—	36.5	—	23.0	∞	150	6,000	6.0	2.0	AB_1	—	—
KT101 (BP)	—	—	175	175	−10.5	59.0	11.0	28.0	∞	140	2,500	11.5	4.5	AB_1	—	—
N14 (P)	—	—	90	90	−11.0	6.0	2.4	17.0	∞	2,200	16,000	0.56	6.0	AB_1	—	—
KT63 (BP)	—	—	250	250	−20.0	32.0	7.0	39.0	∞	250	12,000	6.0	4.0	AB_1	—	—
KT32 (BP)	—	—	135	135	−10.0	50.0	4.0	19.7	∞	200	2,500	7.5	5.0	AB_1	—	—
PX25 (T)	—	—	500	—	−50.0	50.0	—	102.0	∞	1,000	10,000	20.0	2.0	A	—	—
(T)	—	—	500	—	−54.0	82.5	—	108.0	∞	—	3,400	26.0	4.0	AB_1	—	—

(*Continued*)

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} g—g (Ω)	R_K (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
G.E.C. *(Continued)*																
Current Types																
PX4 (T)	—	—	300	—	−50.0	50.0	—	110.0	∞	1 000	4,000	13.5	2.5	AB_1	—	—
KT33C (BP)	—	—	200	200	−19.1	56.5	9.0	44.0	∞	240	4,000	15.5	7.5	AB_1	—	—
KT61 (BP)	—	—	275	275	− 6.7	36.0	6.0	16.0	∞	80	10,000	11.5	6.5	AB_1	—	—
KT66 (BP)	—	—	400	400	−35.0	62.5	*	80.0	∞	560	7,000	32.0	2.0	$UL.AB_1$	—	—
KT66 (BP)	—	—	500	500	−60.0	80.0	*	130.0	∞	—	8,000	50.0	2.0	$UL.AB_1$	—	—
KT66 (T)	—	—	400	—	−38.0	62.5	—	80.0	∞	600	4,000	14.5	3.5	AB_1	—	—
DA41 (T)	7.5	3.1	1,000	—	0	140.0	—	220.0	—	—	7,000	175.0	5.0	B	UX4	20
N78 (P)	—	—	250	250	− 5.0	35.0	5.5	11.2	—	120	9,000	9.0	4.6	AB_1	—	—
N78 (T)	—	—	350	—	− 9.5	28.5	—	21.0	—	330	8,000	6.3	1.6	AB_1	—	—
N329 (P)	—	—	170	170	—	49.0	16.5	26.0	—	200	4,000	9.0	4.0	AB_1	—	—
N727/6AQ5 (BP)	—	—	250	250	−15.0	35.0	2.5	30.0	—	—	10,000	10.0	3.0	AB_1	—	—
LN309 (P)	—	—	165	165	−11.5	23.0	3.0	28.0	—	440	6,000	5.2	2.3	AB_1	—	—
N709 (P)	—	—	250	250	—	31.0	3.5	22.5	—	260	8,000	11.0	3.0	AB_1	—	—
HN309 (TP)	—	—	165	165	—	28.0	6.0	28.0	—	220	6,000	5.2	2.3	AB_1	—	—
DA42 (T)	—	—	1,250	—	− 4.0	120.0	—	20.0	—	—	13,000	20.0	6.0	B	—	—
KT55 (BP)	—	—	190	190	−25.0	112.5	22.5	28.8	—	185	2,000	25.0	—	AB_1	—	—
KT55 (T)	—	—	200	—	−22.0	120.0	—	21.0	—	185	1,500	15.0	—	AB_1	—	—
KT88 (BP)	—	—	425	425	−44.0	83.0	*	110.0	—	525	6,000	50.0	2.0	$UL.AB_1$	—	—
KT88 (BP)	—	—	550	550	−80.0	150.0	*	160.0	—	—	4,500	100.0	3.6	$UL.AB_1$	—	—
KT88 (T)	—	—	425	—	—	90.0	—	100.0	—	525	4,000	27.0	1.3	A	—	—
A2134 (P)	—	—	250	165	—	40.0	12.0	30.0	—	300	7,500	13.3	4.5	AB_1	—	—
A2134 (T)	—	—	165	—	−10.5	32.5	—	24.0	—	330	3,000	2.6	1.4	AB_1	—	—

* Included under anode current.

HIVAC																
Obsolete Types																
B230 (DT)	2.0*	0.3	150	—	0	5.5	—	—	4,000	—	14,500	1.25	—	B_2	B7	10
QP240 (DP)	2.0*	0.4	150	150	−18.0	14.0	—	—	∞	—	14,500	1.4	—	B_1	B7	11

MARCONI																
Obsolete Types																
N15 (P)	—	—	90	90	−11.0	6.0	2.3	17.0	∞	2,200	16,000	0.56	6.0	B_1	—	—
KT35 (BP)	—	—	200	200	−14.7	58.5	15.0	14.7	∞	100	4,000	14.0	5.6	AB_1	—	—
KT81 (BP)	—	—	275	275	− 8.7	38.0	10.0	17.5	∞	80	10,000	11.5	6.5	AB_1	—	—
KT81 (T)	—	—	350	—	—	36.5	—	23.0	∞	150	6,000	6.0	2.0	AB_1	—	—
KT101 (BP)	—	—	175	175	−10.5	59.0	11.0	28.0	∞	140	2,500	11.5	4.5	AB_1	—	—
N14 (P)	—	—	90	90	−11.0	6.0	2.4	17.0	∞	2,200	16,000	0.56	6 0	AB_1	—	—
Replacement Types																
QP21 (DP)	2.0*	0.4	150	150	− 9.0	12.6	6.0	—	∞	—	25,000	1.0	—	B_1	B7	11
KT76 (BP)	—	—	175	175	−18.0	25.0	7.5	41.0	∞	350	8,000	4.8	3.0	AB_1	—	—
KT63 (BP)	—	—	250	250	−20.0	32.0	7.0	39.0	∞	250	12,000	6.0	4.0	AB_1	—	—
KT32 (BP)	—	—	135	135	−10.0	50.0	4.0	19.7	∞	200	2,500	7.5	5.0	AB_1	—	—
PX25 (T)	—	—	500	—	−50.0	50.0	—	102.0	∞	1.000	10,000	20.0	2.0	A	—	—
PX25 (T)	—	—	500	—	−54.0	82.5	—	108.0	∞	—	3.400	26.0	4.0	AB_1	—	—
Current Types																
PX4 (T)	—	—	300	—	−50.0	50.0	—	110.0	∞	1,000	4,000	13.5	2.5	AB_1	—	—
KT33C (BP)	—	—	200	200	−19.1	56.5	9.0	44.0	∞	240	4,000	15.5	7.5	AB_1	—	—
KT61 (BP)	—	—	275	275	− 6.7	36.0	6.0	16.0	∞	80	10,000	11.5	6.5	AB_1	—	—
KT66 (BP)	—	—	400	400	−35.0	62.5	*	80.0	∞	560	7,000	32.0	2.0	$UL.AB_1$	—	—
KT66 (BP)	—	—	500	500	−60.0	80.0	*	130.0	∞	—	8,000	50.0	2.0	$UL.AB_1$	—	—
KT66 (T)	—	—	400	—	−38.0	62.5	—	80.0	∞	600	4,000	14.5	3.5	AB_1	—	—
KT71 (BP)	—	—	175	175	−10.2	72.5	15.0	28.0	∞	140	2,500	11.5	4.5	AB_1	—	—
DA41 (T)	7.5	3.1	1,000	—	0	140.0	—	220.0	—	—	7,000	175.0	5.0	B	UX4	20
N78 (P)	—	—	250	250	− 5.0	35.0	5.5	11.2	—	120	9,000	9.0	4.6	AB_1	—	—
N78 (T)	—	—	350	—	− 9.5	28.5	—	21.0	—	330	8,000	6.3	1.6	AB_1	—	—
PL82/N329 (P)	—	—	170	170	—	49.0	16.5	26.0	—	200	4,000	9.0	4.0	AB_1	—	—
N727/6AQ5 (BP)	—	—	250	250	−15.0	35.0	2.5	30.0	—	—	10.000	10 0	3.0	AB_1	—	—
PCL83/ LN309 (P)	—	—	165	165	−11.5	23.0	3.0	28.0	—	440	6.000	5.2	2.3	AB_1	—	—
EL84/N709 (P)	—	—	250	250	—	31.0	3.5	22.5	—	260	8,000	11.0	3.0	AB_1	—	—
HN309 (TP)	—	—	165	165	—	28.0	6.0	28.0	—	220	6,000	5.2	2.3	AB_1	—	—
KT55 (BP)	—	—	190	190	−25.0	112.5	22.5	28.8	—	185	2,000	25.0	2.0	AB_1	—	—
KT55 (T)	—	—	200	—	−22.0	120.0	—	21.0	—	185	1.500	15.0	—	AB_1	—	—
PCL83 (TP)	—	—	200	200	—	35.0	7.0	25.0	—	190	6,000	9.8	4.0	AB	—	—
UL41/N142 (P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4.000	9.0	4.0	AB_1	—	—

(continued)

Type		Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} g—g (Ω)	R_K (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
MULLARD																	
Obsolete Types																	
EL6	(P)	—	—	250	250	—	53.0	8.5	20.0	∞	90	5,000	14.5	2.2	AB_1	—	—
CL6	(P)	—	—	250	125	—	42.5	12.5	38.0	∞	180	7,000	13.5	6.3	AB_1	—	—
EL50	(P)	—	—	375	275	—	62.0	9.0	45.0	∞	165	6,500	28.5	2.25	AB_1	—	—
PM2B	(DT)	2.0*	0.2	120	—	0	20.0	—	40.0	4,000	—	14,000	1.25	—	B_2	B7	10
EL22	(P)	—	—	300	300	—	43.0	7.8	26.0	∞	140	8,000	15.4	5.0	A	—	—
DO30	(T)	—	—	500	—	−145.0	55.0	—	285.0	∞	—	3,400	45.0	3.0	AB_1	—	—
EL35	(P)	—	—	360	270	—	53.0	17.5	65.0	∞	250	7,000	21.0	3.0	AB_1	—	—
DL75	(P)	—	—	90	90	—	1.5	0.33	—	—	2,200	100,000	0.1	4.5	AB	—	—
Replacement Types																	
QP22B	(DP)	2.0*	0.3	120	120	−10.7	3.3	0.45	23.0	∞	—	14,700	1.0	—	B_1	B7	11
KLL32	(DP)	2.0*	0.3	135	135	−11.3	16.9	5.7	12.0	∞	—	16,000	1.2	2.8	AB_1	IO	97
Pen428	(P)	—	—	375	275	−23.5	62.0	9.0	45.0	∞	165	6,500	28.0	3.0	AB_1	—	—
6F6	(P)	—	—	315	285	—	31.0	6.0	58.0	—	640	10,000	10.5	3.0	A	—	—
6V6	(P)	—	—	285	285	—	35.0	2.0	45.0	—	520	8,000	14.0	3.5	AB	—	—
6L6	(P)	—	—	360	270	−22.5	44.0	2.5	72.0	—	—	3,800	47.0	2.0	AB_2	—	—
EBL21	(P)	—	—	300	300	—	36.0	6.5	20.0	∞	130	9,000	13.2	1.8	AB_1	—	—
EL31	(P)	—	—	800	400	−26.0	30.0	3.1	51.0	—	—	10,000	120	5.0	AB_1	—	—
				400	400	—	63.0	8.3	44.0	—	145	7,000	37	5.0	AB_1	—	—
EL32	(P)	—	—	250	250	—	32.0	8.0	42.0	∞	310	8,000	7.0	1.5	A	—	—
EL33	(P)	—	—	250	250	—	28.5	4.6	18.0	∞	140	10,000	8.2	3.1	A	—	—
EL37	(P)	—	—	325	325	—	90.0	30.0	61.0	∞	130	4,000	35.0	4.4	AB_1	—	—
	(P)	—	—	400	400	−36.0	138.0	36.0	70.0	∞	—	3,250	69.0	2.5	AB_1	—	—
	(T)	—	—	400	—	—	80.0	—	77.0	∞	245	4,000	20.6	4.3	A	—	—
EL41	(P)	—	—	300	300	—	36.0	9.5	24.0	—	140	9,000	13.0	2.5	AB_1	—	—
	(T)	—	—	300	—	—	33.0	—	9.4	—	150	10,000	4.0	1.0	A	—	—
EL42	(P)	—	—	250	250	—	21.5	6.7	35.0	—	310	15,000	7.0	5.5	AB_1	—	—
UL41	(P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4,000	9.0	4.0	AB_1	—	—
Current Types																	
DL92	(P)	—	—	90	90	−16.5	8.4	2.7	32.0	—	—	10,000	0.78	6.0	AB_1	—	—
DL96	(P)	—	—	81.5	81.5	− 8.5	5.0	1.3	22.5	—	—	16,000	0.44	2.6	B	—	—
EL34	(P)	—	—	375	$Rg_2$470Ω	−32.0	120.0	25.0	63.0	—	—	2,800	44.0	5.0	—	—	—
	(P)†	—	—	800	400	−39.0	91.0	19.0	66.0	—	—	11,000	100.0	5.0	—	—	—
	(P)	—	—	375	$Rg_2$470Ω	—	95.0	22.5	59.0	—	130 (common)	3,400	35.0	5.0	—	—	—
	(T)	—	—	430	—	−32.0	67.0	—	58.0	—	250 (common)	10,000	14.0	1.0	—	—	—
EL84	(P)	—	—	300	300	—	46.0	11.0	28.0	—	130	8,000	17.0	4.0	AB	—	—
EL85	(P)	—	—	250	250	—	22.1	7.1	34.5	—	310	12,000	6.8	5.4	AB	—	—
EL86	(P)	—	—														
EL95	(P)	—	—	250	250	—	26.0	7.5	13.0	—	360	10,000	7.0	5.0	AB	—	—
				250	250	− 9.0	24.0	7.5	13.0	—	—	10,000	6.5	3.5	B	—	—
ECL80	(TP)	—	—	430	Rg_2=1kΩ	—	70.0	7.5	74.0	—	470	6,600	37.0	1.3	UL.AB	—	—
				200	200	—	25.0	3.9	33.5	—	—	7,500	7.2	4.2	AB	—	—
UL84	(P)	—	—	200	200	—	50.0	50.0	41.0	—	150 (common)	3,500	15.0	3.5	AB	—	—
EL90	(P)	—	—	250	250	−15.0	35.0	2.5	30.0	—	—	10,000	10.0	3.0	AB_1	—	—
EL91	(P)	—	—	250	250	—	12.8	4.1	34.0	∞	600	24,000	4.0	3.2	AB	—	—
PCL82	(TP)	—	—	200	200	—	39.5	16.5	3.50	—	190	6,000	9.8	4.0	AB	—	—
PCL83	(TP)	—	—	200	200	—	29.0	8.5	33.0	—	220	7,500	7.2	4.2	AB	—	—
PL33	(P)	—	—	250	250	—	28.5	4.8	18.0	∞	140	10,000	8.2	3.1	A	—	—
PL82	(P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4,000	9.0	4.0	AB_1	—	—

† Fixed bias and separate screen grid supply.

S.T.C.																	
Current Types																	
5B/254M, 5B/225M	(T)	6.3	0.9φ	400	—	−45.0	140.0	—	90.0	—	—	3,000	15.0	3.0	AB_1	B8B	66, 65
828	(BP)	10.0	3.25	1,700	750	−120.0	248.0	43.0	240.0	—	—	16,200	300.0	1.0	AB_1	UX5	8
				1,250	750	−120.0	150.0	—	—	—	—	12,500	200.0	<1			

φ Each valve

TUNGSRAM																	
Obsolete Types																	
CB220	(DT)	2.0*	0.35	150	—	− 3.0	15.0	—	—	4,000	—	10,000	2.0	—	B_2	B7	10
CB215, CB215S	(DT)	2.0*	0.22	135	—	0	12.0	—	—	—	—	10,000	1.7	—	B_2	B7, Ct8	10, 28
ELL1	(DT)	6.3	0.45	250	250	−21.5	15.0	2.5	43.0	∞	600	16,000	5.4	—	A	Ct8	19
Current Types																	
EL32	(P)	—	—	250	250	—	32.0	8.0	42.0	∞	310	8,000	7.0	1.5	A	—	—
EL33	(P)	—	—	250	250	—	28.5	4.8	18.0	∞	140	10,000	8.2	3.1	A	—	—
EL37	(P)	—	—	325	325	—	90.0	30.0	61.0	∞	130	4,000	35.0	4.4	AB_1	—	—
EL37	(P)	—	—	400	400	−36.0	138.0	36.0	70.0	∞	—	3,250	69.0	2.5	AB_1	—	—
EL37	(T)	—	—	400	—	—	80.0	—	77.0	∞	245	4,000	20.6	4.3	A	—	—
PL33	(P)	—	—	250	250	—	28.5	4.8	18.0	∞	140	10,000	8.2	3.1	A	—	—

(Continued)

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
TUNGSRAM (*Continued*)																
Current Types (Continued)																
PP60 (BT)	—	—	390	275	—	62.5	9.0	70.0	∞	500	8,000	30.0	6.0	AB_1	—	—
PP60 (BT)	—	—	480	385	−40.0	87.5	9.5	80.0	∞	—	6,000	50.0	5.0	AB_1	—	—
PP60 (T)	—	—	400	—	−38.0	62.5	—	80.0	∞	600	4,000	14.5	3.5	AB_1	—	—
6F6 (P)	—	—	315	285	−24.0	31.0	6.0	48.0	∞	—	10,000	11.0	4.0	A	—	—
			315	285	—	31.0	6.0	58.0	∞	640	10,000	10.5	3.0	A	—	—
6L6 (BT)	—	—	270	270	—	67.0	5.5	40.0	∞	250	5,000	18.5	2.0	A	—	—
			360	270	—	44.0	2.5	57.0	∞	500	9,000	24.0	4.0	AB_1	—	—
			360	270	−22.5	44.0	2.5	72.0	—	—	3,800	47.0	2.0	AB_2	—	—
6V6 (BT)	—	—	285	285	−19.0	35.0	2.0	38.0	∞	500	8,000	14.0	3.5	AB_1	—	—
6AQ5 (BT)	—	—	250	250	−15.0	35.0	2.5	30.0	∞	—	10,000	10.0	3.0	AB_1	—	—
807 (BT)	—	—	400	300	−25.0	45–120	1–9	78.0	—	—	3,200	55.0	—	AB_2	—	—
			500	300	−29.0	36–120	1–8	86.0	—	—	4,240	75.0	—	AB_2	—	—
			600	300	−30.0	30–100	1–6	78.0	—	—	6,400	80.0	—	AB_2	—	—
			750	300	−32.0	26–120	1–8	92.0	—	—	6,950	15.0	3.0	AB_1	—	—
807 (T)	—	—	400	—	−45.0	30–70	—	90.0	—	—	3,000	15.0	3.0	AB_1	—	—
3C4 (P)	—	—	81.5	81.5	− 8.5	1.0	0.2	20.0	—	—	16,000	0.44	2.2	B	—	—
3S4 (P)	—	—	90	90	−16.5	8.4	2.7	32.0	—	—	10,000	0.78	6.0	AB_1	—	—
6AM5 (P)	—	—	250	250	—	12.8	4.1	34.0	∞	600	24,000	4.0	3.2	A	—	—
6BQ5 (P)	—	—	300	300	—	46.0	11.0	28.0	—	130	8,000	17.0	4.0	AB	—	—
6CK5 (P)	—	—	300	300	—	36.0	9.5	24.0	—	140	9,000	13.0	2.5	AB_1	—	—
6CK5 (T)	—	—	300	—	—	33.0	—	9.4	—	150	10,000	4.0	1.0	A	—	—
16A5 (P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4,000	9.0	4.0	AB_1	—	—
45A5 (P)	—	—	170	170	—	49.0	16.5	26.0	—	100	4,000	9.0	4.0	AB_1	—	—
AMERICAN																
1G6	1.4*	0.1	90	—	0	11.0	—	48 0	2,500	—	12,000	0.35	4.0	B_2	IO	96
1J6	2.0*	0.25	135	—	0	—	—	—	—	—	10,000	2.1	—	B_2	IO	96
1E7	2.0*	0.24	135	135	− 7.5	10.5	3.5	15.0	∞	—	24,000	0.57	0.55	A	IO	97
4A6	2.0*	0.12‡	90	—	− 1.5	10.8	—	—	—	—	8,000	1.0	—	B_2	IO	95
2A3	—	—	300	—	−62.0	40.0	—	—	∞	—	3,000	15.0	2.5	AB_1	—	—
6A3	—	—	300	—	—	40.0	—	—	∞	1,550	5,000	10.0	5.0	AB_1	—	—
2E30	—	—	250	250	−25.0	40.0	6.8	—	∞	—	8,000	12.5	—	AB_1	—	—
			250	250	−30.0	60.0	10.0	—	—	—	3,000	17.0	—	AB_2	—	—
6A6 / 6N7 (DT)	6.3	0.8	300	—	0	35.0	—	82.0	—	—	8,000	10.0	8.0	B_2	UX7	5
															IO	22
6A5 (T)	—	—	325	—	−68.0	40.0	—	—	∞	1,700	5,000	10.0	—	AB_1	—	—
6AC5 (T)	—	—	250	—	0	—	—	—	—	—	10,000	8.0	—	B_2	—	—
6E6 (DT)	6.3	0.6	250	—	−27.5	18.0	—	—	—	—	14,000	1.6	—	A	UX7	5
6Y7 (DT)	6.3	0.3	250	—	0	10.6	—	—	—	—	14,000	—	—	B_2	IO	22
6Z7 (DT)	6.3	0.3	180	—	0	8.4	—	—	—	—	12,000	4.2	—	B_2	IO	22

‡ Filament current per valve.

OUTPUT VALVES 3

(*For television line scan*)

Type	Heater		Anode Supply Volts	Screen Volts	Typical R_K (Ω)	Positive Surge Anode Volts (max.)	Negative Surge Grid Volts (max.)	Max. Diss. (W)		Typical Current (mA)		Base	
	Volts	Amps						Anode	Screen	Anode	Screen	Type	Ref.
BRIMAR													
Replacement Types													
6BG6 (BT)	6.3	0.9	700	350	100	6,000	−400	20	3.2	70.0	6.0	IO	39
19BG6 (BT)	19.0	0.3	Other data as Type 6BG6										
PL81/21A6	21.5	0.3	170	170	—	7,000	—	8	4.5	45.0	3.0	B9A	17
Current Types													
6CD6 (BT)	6.3	2.5	700	175	—	6,600	−200	15	3.0	100.0	6.0	IO	39
50CD6 (BT)	50.0	0.3	Other data as Type 6CD6										
COSSOR													
Replacement Types													
41MPT	4.0	1.0	—	200	—	4,000	—	—	—	22.0	—	B7	5
42MPT	4.0	2.0	—	250	—	4,000	—	—	—	36.0	—	B7	5
61BT	6.3	0.7	200	200	470	5,000	—	8	1.75	40.0	3.5	IO	38
185BTA (BT)	18.0	0.45	180	180	140	10,000	—	25	5.5	120.0	10.0	IO	38

Continued.

Type	Heater		Anode Supply Volts	Screen Volts	Typical R_K (Ω)	Positive Surge Anode Volts (max.)	Negative Surge Grid Volts (max.)	Max. Diss. (W)		Typical Current (mA)		Base	
	Volts	Amps						Anode	Screen	Anode	Screen	Type	Ref.
COSSOR (*Continued*)													
Current Types													
62BT	6.3	1.27	180	180	160	8,000	—	25	5.5	120.0	9.5	IO	38
EL38	6.3	1.4	300	250	120	8,000	—	25	8.0	64.0	18.0	IO	40
EL81	6.3	1.05	250	250	—	7,000	—	8.0	4.5	32.0	2.4	B9A	17
185BT	18.0	0.45	180	180	160	8,000	—	25	5.5	120.0	9.5	IO	38
21A6	21.5	0.3	170	170	—	7,000	—	8.0	4.5	45.0	3.0	B9A	17
PL36	25.0	0.3	170	170	—	7,000	1,500	8.0	5.0	100.0	8.0	IO	129
EDISWAN MAZDA													
Obsolete Type													
AC/6Pen (BT)	4.0	1.75	310	210	90	3,000	—	20	3.0	63.0	14.0	B7	36
Replacement Types													
Pen46 (BT)	4.0	1.75	315	230	100	3,000	—	20	3.4	63.0	14.0	MO	14
20P1* (BT)	38.0	0.2	400	250	—	6,000	1,500	15	5.0	—	—	IO	38
Current Types													
6P28 (BT)	6.3	1.1	350	250	100	5,000	—	15	4.5	27.0	16.0	IO	38
20P4	38.0	0.2	400	250	—	6,000	—	10	4.0	—	—	IO	38
30P4 (BT)	25.0	0.3	400	250	—	6,000	—	10	4.0	—	—	IO	129
* For use under self-oscillating conditions.													
EMITRON													
Replacement Types													
185BT (BT)	18.0	0.45	180	180	140	8,000	—	25	5.5	120.0	10.0	IO	38
185BTA (BT)	18.0	0.45	180	180	140	10,000	—	25	5.5	120.0	10.0	IO	38
Current Type													
PL81/21A6	21.5	0.3	170	170	—	7,000	—	8	4.5	—	—	B9A	17
G.E.C.													
Obsolete Type													
KT45	4.0	2.0	250	250	—	8,000	—	21.5	3.5	—	—	B7	37
Current Types													
KT36	26.0	0.3	250	200	—	4,000	—	10.0	3.0	—	—	IO	38
N339	20.0	0.3	190	150	—	7,500	—	12.0	4.5	50.0	—	B9A	17
N359 (P)	21.5	0.3	170	170	—	7,000	—	8	4.5	45.0	3.0	B9A	17
N308 (BT)	25.0	0.3	400	250	—	6,000	—	10	4.0	—	—	IO	129
MARCONI													
Obsolete Types													
KT45	4.0	2.0	—	300	—	8,000	—	21.5	—	—	—	B7	37
N359, PL81/N152	21.5	0.3	170	170	—	7,000	—	8.0	4.5	45.0	3.0	B9A	17
Current Types													
N339	20.0	0.3	190	150	—	7,500	—	12.0	4.5	50.0	—	B9A	17
PL36	25.0	0.3	170	170	—	7,000	1,500	8.0	5.0	100.0	8.0	IO	129
KT36	26.0	0.3	250	200	—	4,000	—	10.0	3.0	—	—	IO	38
MULLARD													
Obsolete Type													
EL820	6.3	1.05	250	250	—	7,000	—	8.0	4.5	32.0	2.4	B9A	17
Replacement Types													
EL38	6.3	1.4	300	300	120	8,000	—	25	8.0	64.0	18.0	IO	40
PL820	21.5	0.3	170	170	—	7,000	—	8.0	4.5	45.0	3.0	B9A	17
PL38	30.0	0.3	200	200	—	8,000	—	25	8.0	75.0	9.0	IO	40
UL44	45.0	0.1	175	175	—	3,500	—	5.0	3.0	30.0	4.7	B8A	16
Current Types													
EL81	6.3	1.05	250	250	—	7,000	—	8.0	4.5	32.0	2.4	B9A	17
PL81	21.5	0.3	170	170	—	7,000	—	8.0	4.5	45.0	3.0	B9A	17
PL36	25.0	0.3	170	170	—	7,000	1,000	10.0	5.0	100.0	8.0	IO	129
TUNSGRAM													
Current Types													
6CJ6	6.3	1.05	250	250	—	7,000	—	8.0	4.5	32.0	2.4	B9A	17
EL38	6.3	1.4	300	250	120	8,000	—	25	8.0	64.0	18.0	IO	40
21A6	21.5	0.3	170	170	—	7,000	—	8.0	4.5	45.0	3.0	B9A	17
PL36	25.0	0.3	170	170	—	7,000	1,500	8.0	5.0	100.0	8.0	IO	129
PL38	30.0	0.3	200	200	—	8,000	—	25	8.0	75.0	9.0	IO	40
UL44	45.0	0.1	175	175	—	3,500	—	5.0	3.0	30.0	4.7	B8A	17

THERMIONIC DIODES

Type	Heater		Max. Input Volts (R.M.S.)	Max. Rect. Current (mA)	No. of Diodes	Capacitances (pF)			Base	
	Volts	Amps				a'-k	a''-k	a -a''	Type	Ref.
BRIMAR										
Replacement Types										
6H6	6.3	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
10DI	13.0	0.2	50	8.0	2	5.0	5.0	0.6	B5	3
Current Types										
6AL5, 5726 (SQ), 6058 (SQ)	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
COSSOR										
Obsolete Types										
220DD	2.0	0.2	20	1.0	2	3.5	3.5	0.7	B5	3
DD4	4.0	0.75	100	10.0	2	3.7	3.7	0.7	B5	3
Replacement Types										
DDL4	4.0	0.75	100	10.0	2	4.0	4.0	2.5	B5	3
6H6	6.3	0.3	117 per anode	8.0	2	3.0	4.0	0.1	IO	53
12H6	12.6	0.15								
Current Types										
6AL5	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
SD6	6.3	0.15	150	10.0	1	1.45	—	—	B7G	39
SD61	6.3	0.15	50	5.0	1	2.1	—	—	B3G	1
EDISWAN MAZDA										
Obsolete Types										
DD207	2.0*	0.075	—	—	2	4.0	3.25	0.8	B4	5
AC/DD	4.0	1.0	—	—	2	5.0	5.0	1.2	B5	3
V914	4.0	0.3	—	0.5	2	3.5	3.0	0.25	B5	3
DD620	6.0	0.2	—	0.5	2	3.5	3.0	0.25	B5	3
DD101	10.0	0.2	175	5.0	2	5.0	4.6	0.06	MO	13
Replacement Types										
1D13	1.4	0.15	130	0.5	1	0.6	—	—	B7G	13
DD41	4.0	0.5	175	5.0	2	4.0	4.25	0.06	MO	13
D1	4.0	0.2	125	5.0	1	2.1	—	—	B3G	1
6D1	6.3	0.15	125	5.0	1	2.1	—	—	B3G	1
6D3*	6.3	0.3	—	5.0	1	—	—	—	B7G	50
Current Types										
6D2	6.3	0.3	175	9.0	2	3.4	3.4	0.018	B7G	18
20D1	9.5	0.2	175	9.0	2	3.4	3.4	0.018	B7G	18
10D2	19.0	0.1	175	9.0	2	3.4	3.4	0.018	B7G	18
			* Slow-heating cathode.							
EMITRON										
Current Type										
6AL5	6.3	0.3	150	9.0	2	3.0	3.0	0.026	B7G	18
FERRANTI										
Obsolete Types										
SD, ZD	7.0	0.2	50	1.0	1	—	—	—	B5	8
Replacement Types										
6H6	6.3	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
EB41	6.3	0.3	150	9.0	2	<0.01	<0.01	<0.03	B8A	10
Current Types										
DD6	6.3	0.3	150	9.0	2	3.0	3.1	0.026	B7G	18
6AL5/EB91	6.3	0.3	150	9.0	2	3.2	3.2	0.025	B7G	18
G.E.C.										
Obsolete Type										
D42	4.0	0.6	75	15.0	1	4.0	—	—	B4	8
Replacement Types										
D41	4.0	0.3	—	—	2	3.5	2.5	0.5	B5	3
D63	6.3	0.3	100	2.0	2	6.0	7.0	0.18	IO	53
Current Type										
D77	6.3	0.3	120	5.0	2	2.2	2.2	0.025	B7G	18

(Continued)

Type	Heater		Max. Input Volts (R.M.S.)	Max. Rect. Current (mA)	No. of Diodes	Capacitances (pF)			Base	
	Volts	Amps				a′-k	a′′-k	a′-a′′	Type	Ref.
HIVAC										
Obsolete Types										
ACDD	4.0	1.0	—	—	2	3.0	2.4	0.4	B5	3
IA3	1.4	0.15	117	0.5	1	0.4	—	—	B7G	13
MARCONI										
Obsolete Types										
D41	4.0	0.3	—	—	2	3.5	2.5	0.5	B5	3
D152	6.3	0.3	150	9.0	2	3.0	3.0	0.03	B7G	18
Replacement Types										
D42	4.0	0.6	75	15.0	1	4.0	—	—	B4	8
D63	6.3	0.3	100	2.0	2	6.0	7.0	0.18	IO	53
D43	4.0	0.6	75	15.0	1	4.0	—	—	B4	1
Current Type										
EB91/D77	6.3	0.3	120	5.0	2	3.5	3.5	0.025	B7G	18
MULLARD										
Obsolete Types										
2D2	2.0	0.09	90	0.5	2	2.8	2.8	<0.5	B5	3
2D4A	4.0	0.65	200	0.8	2	4.5	4.5	<0.5	B5	3
2D4B	4.0	0.35	200	0.8	2	3.8	3.9	<0.07	B7	21
T4D	4.0	0.2	50	5.0	1	2.1	—	—	B3G	1
EAB1	6.3	0.2	200	0.8	3	1.5	1.35	<0.65	Ct8	17
EB4	6.3	0.2	200	0.8	2	1.2	1.2	<0.2	Ct8	10
2D13C	13.0	0.2	200	0.8	2	4.5	4.5	0.3	B5	3
Replacement Types										
EA50	6.3	0.15	50	5.0	1	2.1	—	—	B3G	1
EB34	6.3	0.2	200	0.8	2	4.5	4.5	0.5	IO	53
EB41	6.3	0.3	150	9.0	2	<0.01	<0.01	<0.03	B8A	10
UB41	19.0	0.1	150	9.0	2	<0.01	<0.01	<0.03	B8A	10
Current Types										
DA90	1.4	0.15	117	0.5	1	0.4	—	—	B7G	13
EA76	6.3	0.15	150	9.0	1	2.5	—	—	B5B	1
EB91 / M8079 (SQ)	6.3	0.3	150	9.0	2	3.0	3.0	<0.025	B7G	18
6AL5 / M8212	6.3	0.3	117	9.0	2	3.1	3.1	50.026	B7G	18
TUNGSRAM										
Obsolete Types										
D418	4.0	0.18	100	5.0	1	7.0	—	—	B4	10
DD4D	4.0	0.4	100	4.0	2	4.5	4.5	4	B7	21
DD4	4.0	0.65	200	0.8	2	4.0	4.0	0.5	B5	3
DD465	4.0	0.65	200	0.8	2	—	—	—	B5	4
EB91	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
DD6G	6.3	0.3	165	10.0	2	3.0	3.0	0.016	B7G	18
6H6	6.3	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
EB4	6.3	0.2	100	0.8	2	1.2	1.2	0.2	Ct8	10
EAB1	6.3	0.2	200	0.8	3	2.25	1.0	0.4	Ct8	17
DD6	6.3	0.2	200	0.8	2	3.5	3.5	0.5	B5	3
DD818	8.0	0.18	100	1.5	2	—	—	—	B5	4
DD13	13.0	0.2	200	0.8	2	4.0	4.0	0.5	B5	3
Current Type										
6AL5	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
AMERICAN										
1R4	1.4*	0.15	30	0.34	1	2.4	—	—	B8B	23
6AN6	6.3	0.2	75	3.5	4	—	—	—	B7G	38
6H4	6.3	0.15	100	4.0	1	—	—	—	IO	56
6H6	6.3	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
7A6	6.3	0.15	150	10.0	2	2.0	2.6	0.1	B8B	11
7C4	6.3	0.15	150	8.0	1	0.85	—	—	B8B	23
12H6	12.6	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
12AL5	12.6	0.15	150	9.0	2	3.2	3.2	0.026	B7G	18

SEMICONDUCTOR DIODES

Type	Nature	Peak Inverse Volts	Max. Rect. Current (mA)	Reverse Current (μA) −10V	Reverse Current (μA) −50V	Forward Current +1V (mA)	Application	Connections
BRIMAR								
Current Types								
GD3	Germanium	25	30	−200	—	3	Vision and sound detector	Axial lead wires
GD4	Germanium	50	30	−40	—	3	Detector and noise limiter	Axial lead wires
GD5	Germanium	85	30	−20	—	3	Detector and noise limiter	Axial lead wires
M1	Selenium	68	0.25	—	—	0.5*	R.F. rectifier	Wires
M3	Selenium	68	1	—	—	4*	L.F. rectifier	Wires

* At +5 volts.

B.T.-H.								
Current Types								
CGI-E	Germanium	65	30	—	1,000	4	General-purpose diode	Wire ended
CG4-E	Germanium	80	30	—	100	3.3	High-voltage general-purpose diode	Wire ended
CG6-E	Germanium	70	30	50	—	2	TV g.p. diode	Wire ended
CG10-E	Germanium	100	30	50	250	2	High-voltage general-purpose diode	Wire ended
CG12-E	Germanium	25	30	200	—	3.3	TV detector diode	Wire ended
CS2-A	Silicon	—	—	—	—	—	Frequency converter	Single plug
CS3-A	Silicon	—	—	—	—	—	Frequency converter	Single plug
CS3-B	Silicon	—	—	—	—	—	Frequency converter	Coaxial
CS4-B	Silicon	—	—	—	—	—	Frequency converter	Coaxial
GJ3-M	Germanium	200	240*	—	—	—	Medium-power rect.	Terminal studs
GJ4-M	Germanium	75	475*	—	—	—	Medium-power rect.	Terminal studs
GJ5-M	Germanium	300	240*	—	—	—	Medium-power rect.	Terminal studs
GJ6-M	Germanium	150	475*	—	—	—	Medium-power rect.	Terminal studs

* These current ratings apply to an ambient temperature of 50°C and without the rectifiers mounted in a cooling fin.

FERRANTI								
Current Types								
ZS10A	Silicon junction diodes	60	100 mA	< 0.05	0.05	100*	General-purpose diode for medium frequencies and ambient temp up to 150°C	Wires
ZS10B		60	100 mA	< 0.5	0.5	100*		Wires
ZS20A		120	100 mA	< 0.05	0.05	100*		Wires
ZS20B		120	100 mA	< 0.5	0.5	100*		Wires
ZS21		200	100	—	0.5†	100		Wires
ZS22		300	100	—	0.5†	100		Wires
ZW2		10	150	0.5	—	100	Surge limiter	Wires
ZR10		50	1,500	—	50†	—	Power rectifiers	Wires
ZR11		100	1,500	—	50†	—		Wires
ZR12		200	1,500	—	50†	—		Wires
ZR20		50	8,000‡	—	50†	—		Wire and Screw
ZR21		100	8,000‡	—	50†	—		Wire and Screw
ZR22		200	8,000‡	—	50†	—		Wire and Screw

* At 1.2 volts. † At P.I.V. ‡ With cooling fin.

G.E.C.								
Obsolete Types								
GEX55/1	Germanium	> 75	30	—	<200	> 1	General purpose	Cathode end red
GEX54/4	Germanium	>170	30	—	<500 at −150V	> 2	General purpose	Cathode end red
Current Type								
GEX34	Germanium	> 60	30	<50	<1,000	> 1	TV detector	Cathode end red
GEX35	Germanium	> 30	30	—	—	—	TV detector	Cathode end red
GEX36	Germanium	> 30	30	<100	—	5 at 0.7V	Ring modulator	Cathode end red
GEX39	Germanium	—	30	<100	<1,000	> 15	General purpose	Cathode end red
GEX45/1	Germanium	> 75	30	—	<1,000	> 4	General purpose	Cathode end red
GEX54	Germanium	>100	30	<10	<100	> 3	General purpose	Cathode end red
GEX54/3	Germanium	>120	30	< 6 at −3V	<625 at −100V	> 3	General purpose	Cathode end red
GEX56	Germanium	—	30	< 2	<1000	> 1	Computers	Cathode end red
GEX64	Germanium	—	30	< 60 at −1V	—	5 at 0.25V	Ring modulator	Cathode end red
GEX66	Germanium	—	30	<50 at −1V	—	>5 at 0.5V	Mixer	Cathode end red

(Continued)

Type	Nature	Peak Inverse Volts	Max. Rect. Current (mA)	Reverse Current (μA) −10V	Reverse Current (μA) −50V	Forward Current +1V (mA)	Application	Connections
MULLARD								
Obsolete Types								
OA60	Germanium	30	5.0	—	—	—	Video signal detector	Wires. Coloured band at positive end
OA61	Germanium	100	5.0	—	—	—	D.C. restorer, sync. pulse clipper	Wires. Coloured band at positive end
OA71	Germanium		Replaced by OA81					
Current Types								
OA5	Germanium	100	115*	1.1	2.5	200 (at +0.8V)	General purpose industrial	Wires. Cathode adjacent to coloured dot
OA10	Germanium	30	50	< 5 (at −3V)	<10 (at −20V)	—	Pulse circuits. Has low hole storage	Wires. Cathode adjacent to red dot
OA70	Germanium	22.5	50	—	—	—	Video signal detector	Wires. Coloured band at positive end
OA73	Germanium	30	50*	100	1,200 (at −30V)	8	—	Wires. Coloured band at positive end
OA79 2-OA79	Germanium	45	4	4.5	90 (at −45V)	4	AM/FM detectors	Wires. Coloured band at positive end
OA81	Germanium	115	50*	4	18	6	General purpose high performance	Wires. Coloured band at positive end
OA85	Germanium	115	50*	7	20	8	General purpose, high back resistance	Wires. Coloured band at positive end
OA86	Germanium	90	35*	2.5	22	> 5	Computing	Wires. Coloured band at positive end
OA91	Germanium	115	50*	4	17	7	General purpose industrial	Wires. Coloured band at positive end
OA95	Germanium	115	50*	2.5	12	9	General purpose industrial	Wires. Coloured band at positive end

Characteristics measured at $T_{ambient}$=25°C

* Averaged over any 50ms period or d.c. component, at an ambient temperature of 25°C with zero inverse voltage At higher ambient temperatures, and when appreciable inverse voltages occur during part of the cycle, a derating must be applied.

S.T.C.								
Replacement Types								
2X102 G	Germanium	85	15	6	33	2.5	Audio and low R.F. rectifier	Axial lead wires
2X103 G	Germanium	20	40	5	—	5	Audio and low R.F. rectifier	Axial lead wires
2X104 G	Germanium	30	40	20	—	3	Audio and low R.F rectifier	Axial lead wires
2X105 G	Germanium	100	25	5	45	4	Audio and low R.F.	Axial lead wires
2X106 G	Germanium	70	50	50	450	7	Audio and low R.F.	Axial lead wires
Current Types								
RS20A	Silicon	50	500	—	—	—	Power rectifier	Axial lead wires. Red and black sleeves
RS21A	Silicon	100	500	—	—	—	Power rectifier	
RS22A	Silicon	150	500	—	—	—	Power rectifier	
RS23A	Silicon	200	500	—	—	—	Power rectifier	
RS24A	Silicon	300	500	—	—	—	Power rectifier	
RS25A	Silicon	400	500	—	—	—	Power rectifier	
RS530A	Silicon	50	1A	—	—	—	Power rectifier	
RS31A	Silicon	100	1A	—	—	—	Power rectifier	
RS32A	Silicon	150	1A	—	—	—	Power rectifier	
RS33A	Silicon	200	1A	—	—	—	Power rectifier	
RS34A	Silicon	200	1A	—	—	—	Power rectifier	
RS35A	Silicon	400	1A	—	—	—	Power rectifier	
GD8	Germanium	85	30	7	—	5	Industrial	Wires
GD9	Germanium	125	50	—	50	9	Interference limiter	Wires
GD10	Germanium	150	40	—	40	7.5	Interference limiter	Wires
GD11	Germanium	50	100	—	—	10–20	Computing	Wires
GD12	Germanium	25	40	—	—	—	Detector	Wires

TEXAS								
Current Types								
1S001	Diffused Silicon, Metal case	200	750	—	10^{+}	—	Magnetic amplifiers Universal power supplies	Wires
1S002		300	750	—	10^{+}	—		Wires
1S003		400	750	—	10^{+}	—		Wires
1S004		500	750	—	10^{+}	—		Wires
1S005		600	750	—	10^{+}	—		Wires
1S111	Diffused silicon, Glass seal.	225	400	—	0.2+	—	As above and modulators, demodulators and networks	Wires
1S112		300	400	—	0.2+	—		Wires
1S113		400	400	—	0.2+	—		Wires
1S114		500	400	—	0.2+	—		Wires
1S115		600	400	—	0.2+	—		Wires

(Continued)

Type	Nature	Peak Inverse Volts	Max. Rect. Current (mA)	Reverse Current (μA) −10V	Reverse Current (μA) −50V	Forward Current −1V (mA)	Application	Connections
TEXAS (*Continued*)								
Current Types (Continued)								
1S401	Diffused silicon, Metal case, Stud mounting	200	2,500	—	−10†	—	Power rectifiers	Cathode to stud, anode to tag. Addition of 'R' to type reference indicates anode to stud, etc.
1S402		300	2,500	—	−10†	—		
1S403		400	2,500	—	−10†	—		
1S404		500	2,500	—	−10†	—		
1S405		600	2,500	—	−10†	—		
† at P.I.V.								
WESTINGHOUSE								
Current Types								
WG4A	Germanium	20	50 (mean)	1000 (max.)	—	2 (min.)	Video dectector	Wires
WG4B	Germanium	20	50 (mean)	1000 (max.)	—	10 (min.)	Crystal receiver det.	Wires
WG5A	Germanium	40	50 (mean)	100 (max.)	—	1 (min.)	Television dound det.	Wires
WG5B	Germanium	60	50 (mean)	100 (max.)	1000 (max.)	5 (min.)	Television video and sound detector	Wires
WG6A	Germanium	60	50 (mean)	30 (max.)	600 (max.)	1 (min.)	Television noise limiter video and sound	Wires
WG7B	Germanium	40	50 (mean)	10 (max.)	—	5 (min.)	Instrument rectifier	Wires
WG7C	Germanium	00	50 (mean)	10 (max.)	200 (max.)	5 (min.)	General purpose	Wires
WG7D	Germanium	00	50 (mean)	10 (max.)	100 (max.)	3 (min.)	D.C. restorer, sync separator, F.M. disc.	Wires
310EA1	Selenium	60	0.01 (mean)	0.05 (max.)	10 (max.)	0.04 (min.)	Very high impedance detector	Wires
W1	Copper oxide	6	0.25	50 (max.) at −6V		5 (min.) at + 2.4V.		Wires
W2	Copper oxide	12	0.25	50 (max.) at −12V.		5 (min.) at + 4.8V.		Wires
W3	Copper oxide	18	0.25	50 (max.) at −18V.		5 (min.) at + 7.2V.		Wires
W4	Copper oxide	24	0.25	50 (max.) at −24V.		5 (min.) at + 9.6V		Wires
W5	Copper oxide	30	0.25	50 (max.) at −30V		5 (min.) at +12.0V.		Wires
W6	Copper oxide	36	0.25	50 (max.) at −36V		5 (min.) at +14.4V		Wires
W7	Copper oxide	42	0.25	50 (max.) at −42V.		5 (min.) at +16.8V	Detectors, a.g.c. noise suppressors, clippers, etc.	Wires
W8	Copper oxide	48	0.25	50 (max.) at −48V.		5 (min.) at +19.2V.		Wires
W9	Copper oxide	54	0.25	50 (max.) at −54V.		5 (min.) at +21.6V.		Wires
W10	Copper oxide	60	0.25	50 (max.) at −60V		5 (min.) at +24.0V.		Wires
W11	Copper oxide	66	0.25	50 (max.) at −66V		5 (min.) at +26.4V.		Wires
W12	Copper oxide	72	0.25	50 (max.) at −72V		5 (min.) at +28.8V		Wires
W13	Copper oxide	78	0.25	50 (max.) at −78V.		5 (min.) at +31.2V.		Wires
W14	Copper oxide	84	0.25	50 (max.) at −84V		5 (min.) at +33.6V.		Wires
W15	Copper oxide	90	0.25	50 (max.) at −90V		5 (min.) at +36.0V		Wires
WX1	Copper oxide	6	0.1	12 (max.) at − 6V		0.5 (min.) at − 2.4V.		Wires
WX2	Copper oxide	12	0.1	12 (max.) at −12V		0.5 (min.) at + 4.8V.		Wires
WX3	Copper oxide	18	0.1	12 (max.) at −18V		0.5 (min.) at + 7.2V.		Wires
WX4	Copper oxide	24	0.1	12 (max.) at −24V		0.5 (min.) at + 9.6V.		Wires
WX5	Copper oxide	30	0.1	12 (max.) at −30V		0.5 (min.) at +12.0V.		Wires
WX6	Copper oxide	36	0.1	12 (max.) at −36V		0.5 (min.) at +14.4V.		Wires
WX7	Copper oxide	42	0.1	12 (max.) at −42V		0.5 (min.) at −16.8V	Detectors, a.g.c. noise suppressors clippers etc	Wires
WX8	Copper oxide	48	0.1	12 (max.) at −48V		0.5 (min.) at −19.2V		Wires
WX9	Copper oxide	54	0.1	12 (max.) at −54V		0.5 (min.) at +21.6V.		Wires
WX10	Copper oxide	60	0.1	12 (max.) at −60V		0.5 (min.) at +24.0V.		Wires
WX11	Copper oxide	66	0.1	12 (max.) at −66V		0.5 (min.) at −26.4V.		Wires
WX12	Copper oxide	72	0.1	12 (max.) at −72V		0.5 (min.) at +28.8V.		Wires
WX13	Copper oxide	78	0.1	12 (max.) at −78V		0.5 (min.) at +31.2V.		Wires
WX14	Copper oxide	84	0.1	12 (max.) at −84V		0.5 (min.) at +33.6V.		Wires
WX15	Copper oxide	90	0.1	12 (max.) at −90V		0.5 (min.) at −36.0V		Wires
KF1	Copper oxide	6	1	100 (max.) at − 6V		1 (min.) at + 0.7V.		Wires
KF2	Copper oxide	12	1	100 (max.) at −12V		1 (min.) at − 1.4V	Instrument rectifiers, modulators, etc.	Wires
KF4	Copper oxide	24	1	100 (max.) at −24V		1 (min.) at + 2.8V		Wires
KF6	Copper oxide	36	1	100 (max.) at −36V		1 (min.) at + 4.2V		Wires
KG1	Copper oxide	6	5	175 (max.) at − 6V		5 (min.) at + 0.7V.		Wires
KG2	Copper oxide	12	5	175 (max.) at −12V		5 (min.) at − 1.4V	Instrument rectifiers modulators, etc	Wires
KG4	Copper oxide	24	5	175 (max.) at −24V		5 (min.) at + 2.8V		Wires
KG6	Copper oxide	36	5	175 (max.) at −36V		5 (min.) at + 4.2V		Wires
KH1	Copper oxide	6	10	300 (max.) at − 6V		10 (min.) at + 0.7V		Wires
KH2	Copper oxide	12	10	300 (max.) at −12V		10 (min.) at + 1.4V	Instrument rectifiers modulators etc	Wires
KH4	Copper oxide	24	10	300 (max.) at −24V		10 (min.) at + 2.8V		Wires
KH6	Copper oxide	36	10	300 (max.) at −36V		10 (min.) at + 4.2V		Wires
39K1	Selenium	85	0.1	100 (max.) at −60V.		0.8 (min.) at + 1.7V.		Wires
39K2	Selenium	170	0.1	100 (max.) at −120V		0.8 (min.) at + 3.4V	High-voltage low-power detectors	Wires
39MA1	Selenium	85	0.1	100 (max.) at −60V.		0.8 (min.) at − 1.7V.		Wires
39MA2	Selenium	170	0.1	100 (max.) at −120V		0.8 (min.) at + 3.4V.		Wires
39MA3	Selenium	225	0.1	100 (max.) at −180V		0.8 (min.) at − 5.1V.	—	Wires
39MA4	Selenium	340	0.1	100 (max.) at −240V		0.8 (min.) at − 6.8V	—	Wires

POINT CONTACT TRANSISTORS

Type	P_c max. (mW)	V_c max. (V)	I_c max. (mA)	I_e max. (mA)	r_b (Ω)	r_e (Ω)	r_c (kΩ)	r_m (Ω)	α	Connections
BRIMAR/S.T.C. *Replacement Types*										
TP1	150	−50	−30	30	135	200	20	60	3	Emitter : red
TP2	150	−50	−30	30	110	140	25	75	3	Collector : black
G.E.C. *Obsolete Types*										
GET1	100	−50	−15	—	—	—	—	—	2.5	Base, single lead ;
GET2	75	−30	−15	—	55	—	—	—	3.8	Collector coded blue
MULLARD *Obsolete Types*										
OC50	120	−30	−12 to +20	−1 to +10	—	—	—	—	2.1	Base, metal casing Emit. straight pin
OC51	100	−50	−15	12	—	—	—	—	2.2	Coll., bent pin

SYMMETRICAL TRANSISTORS

Type	p-n-p. or n-p-n.	P_c max. (mW)	V_c max. (V)	I_c max. (mA)	Small Signal Parameters								Connections
					V_c (V)	I_c (mA)	r_e' (Ω)	r_b' (Ω)	r_c' (kΩ)	α′	I_{co} (μA)	$f_{c\alpha}$ (kc/s)	
EDISWAN MAZDA *Current Type*													
XS101	p-n-p.	150	12	—	5	1	6.8	460	45	20	5_{max}	$2{,}500_{min}$	Base, centre lead
S.T.C. *Current Type*													
TS4	p-n-p.	50	>30*	50	0.5	20	—	—	—	>10	−10 max.†	—	Em.-Em. diametrically opposite

* This figure is not a max. rating, but refers to min. collector turnover at $I_b = 0$. † At $V_b = +1$V, $V_c = -30$V.

JUNCTION TRANSISTORS

Type	p-n-p or n-p-n	P_c max. (mW)	V_c max. (V)	I_c max. (mA)	Small Signal Parameters								Connections
					V_c (V)	I_c (mA)	r_e' (Ω)	r_b' (Ω)	r_c' (kΩ)	α′	I_{co} (μA)	$f_{c\alpha}$ (kc/s)	
BRIMAR/S.T.C. *Replacement Types*													
TJ1	p-n-p	200	>20*	50	1.5	2	15	350	30	20	10_{max}†	500	Emitter : red Base : green Collector : black
TJ2	p-n-p	200	>20*	50	1.5	2	15	650	25	40	10_{max}†	600	
TJ3	p-n-p	200	>20*	50	1.5	2	15	850	17.5	60	10_{max}†	800	
TS1	p-n-p	50	>20*	50	1.5	2	15	350	30	20	10_{max}†	500	Collector : white
TS2	p-n-p	50	>20*	50	1.5	2	15	650	25	40	10_{max}†	600	
TS3	p-n-p	50	>20*	50	1.5	2	15	850	17.5	60	10_{max}†	800	Coll.-Base-Em. clockwise
TS4	p-n-p	50	>30*	50	0.5	20	(Bidirectional transistor)			10	10_{max}‡		Em.-Em. diametrically opposite
Current Types													
TS7	p-n-p	70	12	**	6	1	(Bidirectional R.F. transistor)			35	10_{max}	4,500	Collector . coded white
TS8	p-n-p	70	6	**	6	1	(Bidirectional R.F transistor)			60	10_{max}	8,500	
TS13	p-n-p	70	20	**	9	1	13	1,200	60	55	7_{max}	800	Base, Emitter clockwise
TS14	p-n-p	70	20	**	9	1	13	950	80	35	7_{max}	700	
TS15	p-n-p	70	45	**	9	1	13	1,050	70	40	7_{max}	750	

* These figures are not max. ratings, but refer to min. collector turnover voltage at $I_b = 0$. † $V_c = -10$V. ‡ At $V_b = +1$V, $V_c = -30$V.
** Limited only by collector dissipation and the fall in current gain at high currents.

(Continued)

Type	p-n-p or n-p-n	P_c max. (mW)	V_c max. (V)	I_c max. (mA)	Small Signal Parameters								Connections
					V_c (V)	I_c (mA)	r_e' (Ω)	r_b' (Ω)	r_c' (kΩ)	α'	I_{co} (μA)	$f_c\alpha$ (kc/s)	
B.T.-H. *Current Types*													
GT1	p-n-p	125	9	*	4.5	1	20	700	55	20	5	800	Base centre lead. Coll. coded white
GT2	p-n-p	125	9	*	4.5	1	20	1,000	50	40	5	900	
GT3	p-n-p	125	9	*	4.5	1	20	1,300	40	60	5	1.000	
GT11	p-n-p	100	9	*	4.5	1	15	430	50	30	5	4,000	
GT12	p-n-p	100	9	*	4.5	1	12	850	40	60	5	6,000	
GT13	p-n-p	100	9	*	4.5	1	10	1,700	33	100	5	9,000	
* The maximum current is limited by collector dissipation and permissible distortion													
G.E.C. *Current Types*													
GET3	p-n-p	100	−15	250	6	1.0	25	400	2,000	55	6	1,000	Coll. coded white, then clockwise Base, Emitter
GET4	p-n-p	50	−30	70	12	1	25	450	2.000	50	6	1,000	
GET5	p-n-p	200	−30	350	medium power transistor						6	1,000	
GET6	p-n-p	50	−12	50	2	0.5	50	700	1,000	50	6	1,000	
GET15	p-n-p	600	−15	350	—	—	—	—	—	70	10	950	—
GET16	p-n-p	600	−30	350	—	—	—	—	—	60	10	900	—
GET20	p-n-p	600	−30	500	—	—	—	—	—	60	10	1,000	—
HIVAC *Current Type*													
XFT2	p-n-p	50	12	10	3.0	0.5	50	860	3.500	49	4	460	Base, centre lead Coll. coded red
EDISWAN MAZDA *Current Types*													
XA101	p-n-p	90	16	—	5.0	1.0	8.5	790	40	35	5_{max}	5,000	Base, centre lead Coll. coded white
XA102	p-n-p	90	16	—	5.0	1.0	8.1	1,230	38	60	5_{max}	8,000	
XB102	p-n-p	90	16	—	5.0	1.0	15	510	74	30	10_{max}	—	
XB103	p-n-p	90	16	—	5.0	1.0	21	740	46	66	10_{max}	—	
XC101	p-n-p	165	16	—	6.0	8.0	2.1	280	10	66	10_{max}	—	
MULLARD *Current Types*													
OC16	p-n-p	6,250*†	32†† (R_b<200Ω)	1,500	7	300	—	—	—	45**	20 (at V_c=14V)	200	Base, centre lead. Coll. stands apart
OC44	p-n-p	20	−10 (R_b< 1kΩ)	5	6	1	—	—	—	100	0.5 (at V_c=2V)	15,000	Base, centre lead. Collector coded red
OC45	p-n-p	20	−10 (R_b<1kΩ)	5	6	1	—	—	—	50	0.5 (at V_c=2V)	6,000	
OC65	p-n-p	25	− 5	10	2	0.5	40	1 000	1.400	20 to 40	5 (at V_c=4.5V)	—	
OC66	p-n-p	25	−15 (R_b<500Ω)	10	2	3	7	500	625	30 to 80	8 (at V_c=4.5V)	—	
OC70	p-n-p	50	−20 (R_b<500Ω)	10	2	0.5	40	1.000	1 400	20 to 40	8 (at V_c=4.5V)	—	
OC71	p-n-p	50	−20 (R_b<500Ω)	10	2	3	7	500	625	30 to 75	8 (at V_c=4.5V)	—	
OC72 } 2-OC72 }	p-n-p	100‡‡	−32 (R_b<1kΩ)	125	5.4	10	—	—	—	70	4.5 (at V_c=10V)	350	
OC73	p-n-p	50	−30	10	10	0.5	—	—	—	30 to 65	3.5 (at V_c=4.5V)	—	
OC76	p-n-p	75	−32 (V_{bc}=>+1V)	125	5.4	10	—	—	—	>15**	4.5 (at V_c=10V)	—	
OC77	p-n-p	75	−60	125	5.4	10	—	—	—	45	4.5 (at V_c=10V)	—	

† At $T_{ambient}$ = 45°C.
†† The maximum collector voltage in grounded emitter circuits depends upon the external base to emitter resistance, and the values quoted are applicable providing R_b is not greater than the values given in brackets.
* Mounted on a heat sink of thermal conductivity θh = 3.5°C W.
** Large signal current amplification (α').
‡‡ With a cooling fin mounted on a heat sink 3.5 × 3.5cm or equivalent, with a thermal conductivity = 0.3°C mW

(Continued)

Junction Transistors

Type	p-n-p or n-p-n	P_c max. (mW)	V_c max. (V)	I_c max. (mA)	Small Signal Parameters: V_c (V)	I_c (mA)	r_e' (Ω)	r_b' (Ω)	r_c' (kΩ)	α'	I_{co} (μA)	$f_{c\alpha}$ (kc/s)	Connections
NEWMARKET—PYE *Current Types*													
V10/15A	p-n-p	100	10	30	4.5	1.0	26	600	35	20	10	600	Base, centre lead.
V10/30A	p-n-p	100	10	30	4.5	1.0	26	1,000	25	40	10	700	
V10/50B	p-n-p	100	10	30	4.5	1.0	26	1,500	20	75	10	1,200	Coll. stands apart
V6/R2	p-n-p	25	6	12	4.5	1.0	26	400†	10*	25†	1.0	3,000	Base, centre lead.
V6/R4	p-n-p	25	6	12	4.5	1.0	26	500†	10*	50†	1.0	5,500	
V6/R8	p-n-p	25	6	12	4.5	1.0	26	600†	10*	80†	1.0	10,000	Collector stands apart
V15/10P	p-n-p	10,000‡	15	3,000	1.5	200	0.13	20	0.275**	18	30	—	Collector, 0 B.A. screw Emitter left (screw at top)
V15/20P	p-n-p	10,000‡	15	3,000	1.5	200	0.13	20	0.275**	24	30	—	
V15/30P	p-n-p	10,000‡	15	3,000	1.5	200	0.13	20	0.275**	38	30	—	
V30/10P	p-n-p	10,000‡	30	3,000	1.5	200	0.13	20	0.425**	18	30	—	
V30/20P	p-n-p	10,000‡	30	3,000	1.5	200	0.13	20	0.425**	24	30	—	
V30/30P	p-n-p	10,000‡	30	3,000	1.5	200	0.13	20	0.425**	38	30	—	
SEMICONDUCTORS *Current Types*													
SB101	Surface barrier	20	5	5	—	—	—	—	—	11–33	3	50,000	Coll. coded red, then clockwise. Base, Emitter
SB102		20	5	5	—	—	—	—	—	25–110	3	50,000	
SB103		20	5	5	—	—	—	—	—	10 *min*	3	75,000	
2N128		30	10	5	—	—	—	—	—	—	15_{max}	65,000	
2N129		30	10	5	—	—	—	—	—	—	15_{max}	60,000	
2N240		10	6	15	—	—	—	—	—	16	—	30,000	
T1166	Micro-alloy	50	6	50	—	—	—	—	—	—	—	60,000	
T1025	Surface alloy	150	25	50	—	—	—	—	—	—	—	15,000	Base, centre lead. Emitter left. Collector right
T1159	Surface alloy	150	10	50	—	—	—	—	—	—	—	25,000	
TEXAS *Current Types*													
2S001	n-p-n	150	45	25	Small signal transistors					9–20	0.02	$4{,}000_{min}$	Emitter next to key. Base centre lead.
2S002	n-p-n	150	45	25						20–40	0.02	$4{,}000_{min}$	
2S003	n-p-n	150	45	25						20–40	0.02	$10{,}000_{min}$	
2S004	n-p-n	150	45	25						36–90	0.02	$4{,}000_{min}$	
2S005	n-p-n	125	40	20	High frequency and switching transistors					45–150*	1_{max}	$20{,}000_{min}$	
2S014	n-p-n	125	40	20						20–55*	1_{max}	$10{,}000_{min}$	
2S017	n-p-n	4W	60	200	Medium power audio or servo transistors					12–36†	0.2	$200‡_{min}$	Emitter next to key. Base centre lead.
2S018	n-p-n	4W	100	200						12–36†	0.2	$200‡_{min}$	
2S012	n-p-n	37.5W	60	2A Power transistor						10–30†	—	$300‡_{min}$	Base, centre lead. Collector to case.
3S001	n-p-n	125	30	10	Tetrode transistors	Power gain 18dB min. at 12.5Mc/s							Clockwise from key :—Emitter, Base 1, Coll., Base 2
3S002	n-p-n	125	30	10		Power gain 16dB min. at 30Mc/s							
3S003	n-p-n	125	30	10		Power gain 20dB min. at 4.3Mc/s							

† Measured at 1 kc/s. * Measured at 1.5 Mc/s. ‡ On heat sink 7in × 7in 16 s.w.g. aluminium at 25°C. ** With $R_{gen} = 50\Omega$.

* D.C. Beta. † Large signal beta. ‡ Typical beta cut-off frequency.

AMPLIFIER TRIODES

Type	Heater: Volts	Heater: Amps	Volts: Anode	Volts: Grid	Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF): c_{gk}	c_{ak}	c_{ga}	Base: Type	Base: Ref.
BRIMAR *Obsolete Types*												
30	2.0*	0.06	135	− 9.0	3.0	10,300	0.9	3.0	2.0	6.0	UX4	1
27	2.5	1.75	250	−21.0	5.2	9,000	1.0	—	—	—	UX5	1
11A2 (DD)	4.0	1.0	200	− 2.0	3.0	18,000	2.8	7.0	7.0	5.0	B7	7
7K7 (DD)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.6	3.1	2.7	B8B	21
37	6.3	0.3	250	−18.0	7.5	8,400	1.1	—	—	—	UX5	1
85 (DDT)	6.3	0.3	250	−20.0	8.0	7,500	1.1	—	—	—	UX6	4

(Continued)

Type		Heater		Volts		Anode Current	r_a	g_m	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid	(mA)	(Ω)	(mA/V)	c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR *(Continued)*													
Replacement Types													
1H5		1.4*	0.05	90	0	0.15	240,000	0.274	1.1	4.6	1.0	IO	91
6N7	(DT)	6.3	0.8	250	− 5.0	3.0	23,000	1.6	—	—	—	IO	22
6Q7	(DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.0	5.0	1.6	IO	29
7B6	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	3.0	2.4	1.6	B8B	2
7C6	(DD)	6.3	0.15	250	− 1.0	1.3	100,000	1.0	2.4	2.4	1.6	B8B	2
6SL7	(DT)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.15	0.9	3.5	IO	26
6SN7, 13D2	(DT) (SQ)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.6	0.8	4.1	IO	26
6C5		6.3	0.3	250	− 8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6R7	(DD)	6.3	0.3	250	− 9.0	9.5	8,500	1.9	2.6	5.2	2.4	IO	29
6SC7		6.3	0.3	250	− 2.0	2.0	53,000	1.325	2.0	3.0	2.0	IO	25
76		6.3	0.3	250	−13.5	5.0	9,500	1.45	3.4	5.5	2.2	UX5	1
75	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	4.2	3.4	1.8	UX6	4
EBC41	(DD)	6.3	0.23	250	− 3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
12Q7	(DD)	12.6	0.15		Other data as Type 6Q7								
12SL7	(DT)	12.6	0.15		Other data as Type 6SL7								
14B6	(DD)	12.6	0.15		Other data as Type 7B6								
4D1		13.0	0.2	250	− 3.0	10.0	10,000	4.0	—	—	—	B7	23
11D3	(DD)	13.0	0.2	250	− 2.0	0.4	90,000	1.1	2.0	4.0	2.0	B7	7
11D5	(DD)	13.0	0.15	250	− 3.0	3.8	26,700	1.5	—	—	—	B7	7
UBC41	(DD)	14.0	0.1	170	− 1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
Current Types													
6AF4A		6.3	0.225	80	− 2.4	16.0	2,270	6.6	2.2	0.45	1.9	B7G	60
6AM4		6.3	0.225	200	− 1.0	10.0	8,700	9.8	4.4	0.16	2.4	B9A	38
6AT6, 6066	(DD) (SQ)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
6BQ7A	(DT)	6.3	0.4	150	− 2.0	9.0	6,100	6.4	2.85	0.15	1.15	B9A	39
6C4, G/6C4	(SQ)	6.3	0.15	250	− 8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
6AV6	(DD)	6.3	0.3	250	− 2.0	1.2	62,500	1.6	2.3	1.1	2.1	B7G	19
6J6	(DT)	6.3	0.45	100	R_K50Ω	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
5965		6.3	0.45†	150	R_K220Ω	8.2	7,250	6.5	3.8	a_{t1}0.5, a_{t2}0.38	3.0	B9A	1
6J5		6.3	0.3	250	− 8.0	9.0	7,700	2.6	4.2	5.0	5.0	IO	20
6T8	(TD)	6.3	0.45	250	− 3.0	1.0	58,000	1.2	1.6	1.0	2.2	B9A	2
12AT7, 6060	(DT) (SQ)	6.3	0.3†	250	− 2.0	10.0	10,000	5.5	2.5	0.4	1.5	B9A	1
12AU7, 6067	(DT) (SQ)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
12AX7, 6057	(DT) (SQ)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
12BH7	(DT)	6.3	0.6†	250	−10.5	11.5	5,500	3.1	3.0	0.8	2.4	B9A	1
13D3, 6158	(DT) (SQ)	6.3	0.6†	250	− 4.6	6.0	14,000	2.3	2.3	0.9	2.1	B9A	1
EABC80/6AK8	(TD)	6.3	0.45	250	− 3.0	1.0	58,000	1.2	1.9	1.6	2.2	B9A	2
ECC84/6CW7	(DT)	6.3	0.335	90	− 1.5	12.0	4,000	6.0	2.3	0.5	2.3	B9A	28
ECC85	(DT)	6.3	0.435	250	− 2.0	10.0	97,000	6.0	3.0	0.18	1.5	B9A	39
ECL80/6AB8	(TP)	6.3	0.3	100	− 2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
ECL82/6BM8	(TP)	6.3	0.78	100	0	3.5	27,000	2.5	2.7	4.0	4.0	B9A	37
PCC84/7AN7	(DT)	7.0	0.3		Other data as Type ECC84								
12AV6	(DD)	12.6	0.15	250	− 2.0	1.2	62,500	1.6	2.3	1.1	2.1	B7G	19
12AE6	(DD)	12.6	0.15	12.6	0	0.75	15,000	1.0	1.8	1.1	2.0	B7G	19
12AT6	(DD)	12.6	0.15		Other data as Type 6AT6								
PCL84	(TP)	15.0	0.3	200	− 1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
PCL82	(TP)	16.0	0.3		Other data as Type ECL82								
19T8	(TD)	19.0	0.15		Other data as Type 6T8								
HABC80	(TD)	19.0	0.15		Other data as Type EABC80								
13D1(25SN7)	(SQ) (DT)	25.0	0.15		Other data as Type 6SN7								
COSSOR													
Obsolete Types													
210RC		2.0*	0.1	150	− 1.5	0.85	50,000	0.8	5.0	2.0	6.0	B4	1
210HL		2.0*	0.1	150	− 3.0	1.6	22,000	1.1	—	—	—	B4	1
210DET		2.0*	0.1	150	− 4.5	3.8	13,000	1.1	—	—	—	B4	1
41FP		4.0	1.0	250	−18.0	19.0	3,600	2.8	6.6	3.0	4.6	B5	1
41MH		4.0	1.0	200	− 1.5	3.2	18,000	4.0	9.5	14.0	2.5	B5	1
41MTB		4.0	1.0	100	0	3.6	—	2.6	—	—	—	B5	1
13DHA	(DD)	13.0	0.2	250	− 1.5	1.0	83,300	1.5	—	—	1.0	B7	7

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
COSSOR (*Continued*)													
Replacement Types													
1H5		1.4*	0.05	90	0	0.15	240,000	0.275	1.1	4.6	1.0	IO	91
210DDT	(DD)	2.0*	0.1	100	0	2.3	25,000	1.1	3.0	10.5	1.6	B5	5
210HF		2.0*	0.1	150	− 3.0	1.6	15,800	1.5	—	—	—	B4	1
210LF		2.0*	0.1	150	− 4.5	4.8	10,000	1.4	—	—	—	B4	1
41MTA		4.0	1.0	100	0	4.9	18,000	4.0	—	—	—	B5	1
41MHL		4.0	1.0	200	− 3.0	4.0	11,500	4.5	9.5	14.0	2.5	B5	1
6DDT	(DD)	4.0	1.0	200	− 3.0	3.0	17,000	2.4	4.0	6.5	1.0	B7	7
41MTL		4.0	1.0	200	− 2.5	5.9	15,000	3.0	8.4	8.9	2.6	B5	1
6C5		6.3	0.3	250	− 8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6J5		6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6Q7	(DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	5.0	3.8	1.4	IO	29
6M4	(DD)	6.3	0.2	250	− 5.0	5.5	15,000	2.2	2.5	3.6	1.4	IO	29
6SL7	(DT)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.15	0.9	3.5	IO	26
12SC7	(DT)	12.6	0.15	250	− 2.0	2.0	53,000	1.3	2.2	3.0	2.0	IO	25
12SR7	(DD)	12.6	0.15	250	− 9.0	9.5	8,500	1.9	3.6	2.8	2.4	IO	31
202DDT	(DD)	20.0	0.2	200	− 3.0	3.0	17,000	2.4	4.0	6.5	1.0	B7	7
Current Types													
6SN7	(DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.8	0.8	3.8	IO	26
7C6	(DD)	6.3	0.15	250	− 1.0	1.3	100,000	1.0	2.4	3.0	1.4	B8B	2
6J6	(DT)	6.3	0.45	100	− 0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
12AT7	(DT)	6.3	0.3†	170	− 1.5	7.0	12,000	4.8	2.2	0.4	1.5	B9A	1
6ZDDT	(DD)	6.3	0.23	250	− 3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
6AB8	(TP)	6.3	0.3	100	− 2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
6AK8	(TD)	6.3	0.45	100	− 1.0	0.8	54,000	1.45	1.9	1.4	2.0	B9A	2
6AQ8	(DT)	6.3	0.435	230	− 2.0	10.0	9,700	6.0	3.0	0.18	1.5	B9A	39
6BQ7A	(DT)	6.3	0.4	150	− 2.0	9.0	6,100	6.4	2.6	0.12	1.2	B9A	39
6C4		6.3	0.15	250	− 8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
7AN7	(DT)	7.0	0.3	90	− 1.5	12.0	—	6.0	2.3	0.45	1.1′, 2.3″	B9A	28
12AU7	(DT)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0.5′, 0.35″	1.5	B9A	1
12BH7	(DT)	6.3	0.6†	250	−10.5	11.5	5,500	3.1	3.0	0.8	2.4	B9A	1
PCL82	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
UCL82	(TP)	50.0	0.1	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
EDISWAN MAZDA													
Obsolete Types													
H141D	(SD)	1.4*	0.05	90	− 0.6	0.1	260,000	0.25	1.8	6.0	2.3	MO	6
HL2		2.0*	0.1	150	− 2.0	2.0	24,000	1.35	3.0	5.25	4.5	B4	1
HL22		2.0*	0.1	150	− 2.0	2.0	25,000	1.3	2.75	5.0	4.5	MO	2
L2		2.0*	0.1	150	− 3.8	4.0	12,500	1.5	3.75	5.25	4.75	B4	1
HL21DD	(DD)	2.0*	0.15	150	− 2.0	2.0	25,000	1.3	2.5	7.0	3.5	B5	5
HL22DD	(DD)	2.0*	0.1	150	− 2.0	2.0	25,000	1.3	2.25	6.75	3.25	MO	7
L21DD	(DD)	2.0*	0.1	150	− 4.2	4.0	12,000	1.55	2.25	6.75	3.25	B5	5
L22DD	(DD)	2.0*	0.1	150	− 4.2	4.0	12,000	1.55	2.25	6.75	3.25	MO	7
AC/HL/DDD	(TD)	4.0	1.0	200	− 3.0	4.9	13,500	2.6	3.75	9.5	2.0	B9	5
AC/P4		4.0	1.0	700	For electrostatic scanning				8.4	4.4	5.7	B5	9
HL1320		13.0	0.2	200	− 3.3	6.0	10,000	3.0	5.0	5.25	2.5	B7	23
HL133		13.0	0.2	200	− 3.3	6.0	12,500	2.9	4.0	5.0	4.75	MO	19
HLDD1320	(DD)	13.0	0.2	200	− 3.0	4.3	16,000	1.9	4.25	10.5	2.0	B7	7
Replacement Types													
HL23		2.0*	0.05	150	− 2.4	1.5	27,000	1.2	2.75	5.25	5.0	MO	2
HL23DD	(DD)	2.0*	0.05	150	− 2.8	1.5	24,000	1.05	2.0	6.0	3.5	MO	7
AC/HL		4.0	1.0	200	− 3.5	5.0	12,500	2.8	8.0	11.5	3.25	B5	1
AC/2HL		4.0	1.0	200	− 1.75	4.9	15,000	5.0	9.0	6.0	6.5	B5	1
AC/HLDD	(DD)	4.0	1.0	200	− 3.0	4.3	14,500	2.5	5.0	9.75	2.0	B7	7
V312		4.0	0.65	250	− 4.8	6.0	13,000	2.3	4.5	4.5	2.2	B5	13
HL41		4.0	0.65	250	− 4.5	7.0	11,500	3.1	5.25	4.5	5.25	MO	16
P41		4.0	0.95	250	−11.8	16.0	3,700	4.5	7.0	4.75	3.5	MO	16
HL41DD	(DD)	4.0	0.65	250	− 5.2	6.0	13,500	2.2	3.5	4.5	3.5	MO	10
HL42DD	(DD, VM)	4.0	0.65	65	− 1.25	2.8	12,500	1.85	3.5	4.5	3.5	MO	10
P61		6.3	0.6	250	−11.8	16.0	3,700	4.5	7.0	4.75	3.5	MO	16
6F13	(P)	6.3	0.35	200	− 1.8	12.6	5,300	11.3	—	—	—	B8A	8
6LD20	(DD)	6.3	0.25	250	− 5.9	5.0	13,500	2.3	3.6	3.7	1.5	B8A	9
HL133DD	(DD)	13.0	0.2	250	− 5.4	6.0	14,000	2.3	3.5	4.5	3.5	MO	10
10LD11	(DD)	15.0	0.1	250	− 5.9	5.0	13,500	2.3	3.6	3.7	1.5	B8A	9
Current Types													
6/30L2	(DT)	6.3	0.3	200	− 7.9	10.0	5,300	3.4	2.5	2.1	2.5	B9A	39
6F1	(P)	6.3	0.35	200	− 1.8	12.6	5,300	11.3	—	—	—	B8A	17
6F11	(P)	6.3	0.2	100	− 1.8	5.75	9,000	2.85	—	—	—	B8A	8
6F12	(P)	6.3	0.3	250	− 2.0	12.6	8,000	9.4	—	—			21
6L1	(DT)	6.3	0.4	250	−11.5	10.0	6,200	2.8	2.8	2.3			13

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
EDISWAN MAZDA (*Continued*)													
Current Types (Continued)													
6L12	(DT)	6.3	0.435	250	− 2.3	10.0	9,700	5.9	3.0	1.2	1.5	B9A	39
6L13	(DT)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
6L18		6.3	0.3	250	−13.3	12.0	3,000	4.8	4.6	5.8	2.2	B8A	6
6L19	(DT)	6.3	0.4	250	− 3.1	4.0	20,000	2.75	2.9	2.5	2.5	B8A	13
6L34		6.3	0.3	250	− 1.5	10.0	10,500	8.5	5.1	0.1	3.6	B7G	24
6LD3	(DD)	6.3	0.23	100	− 0.7	0.8	54,000	1.4	3.0	1.9	1.3	B8A	9
6LD12	(TD)	6.3	0.45	250	− 3.0	1.0	50,000	1.4	1.9	1.6	2.2	B9A	2
6LD13	(DD)	6.3	0.2	100	− 0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
30L1	(DT)	7.0	0.3	90	− 1.5	12.0	4,000	6.0	2.3	0.5	1.1	B9A	28
30L15	(DT)	7.0	0.3	90	− 1.2	15.0	3,100	9.0	3.7	—	—	B9A	28
30F5	(P)	7.3	0.3	170	− 1.85	12.6	—	11.0	—	—	—	B9A	10
30FL1	(T, BT)	9.4	0.3	200	− 7.9	10.0	5,300	3.4	3.6	2.6	2.7	B9A	49
20L1	(DT)	12.6	0.2	250	−11.5	10.0	6,200	2.8	2.8	2.3	2.7	B8A	13
10LD3	(DD)	13.0	0.1	100	− 0.7	0.8	54.000	1.4	3.0	1.9	1.3	B8A	9
10LD13	(DD)	13.0	0.1	100	− 0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
30PL1	(T, BT)	13.0	0.3	200	− 7.9	10.0	5,300	3.4	2.6	2.0	2.4	B9A	27
10L1		19.0	0.1	250	− 1.5	10.0	10,500	8.5	5.1	0.1	3.6	B7G	24
10F1	(P)	22.0	0.1	200	− 1.8	12.6	5,300	11.3	—	—	—	B8A	17
10L14	(DT)	26.0	0.1	200	− 2.1	10.0	8,300	5.8	3.0	1.2	1.5	B9A	39
10LD12	(TD)	28.0	0.1	200	− 2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
EMITRON													
Current Types													
6AT6	(DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
7C6	(DD)	6.3	0.15	250	− 1.0	1.3	100,000	1.0	2.4	2.1	1.5	B8B	2
EABC80/6AK8	(TD)	6.3	0.45	250	− 3.0	1.0	58,000	1.2	1.9	2.2	1.6	B9A	2
ECC81/12AT7	(DT)	6.3	0.3†	250	− 2.0	10.0	10,000	5.5	2.5	0.4	1.5	B9A	1
ECC85/6AQ8	(DT)	6.3	0.435	250	− 2.3	10.0	9,700	5.9	3.0	1.2	1.5	B9A	39
ECL80/6AB8	(TP)	6.3	0.3	100	− 2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
PCC84/7AN7	(DT)	7.0	0.3	90	− 1.5	12.0	4,000	6.0	2.3	0.45	2.3, 1.1	B9A	28
FERRANTI													
Obsolete Types													
HP2	(DT)	2.0*	0.4	120	0	4.0	8,000	—	—	—	—	B7	11
DA		13.0	0.2	200	− 2.6	3.7	20,000	2.2	7.1	6.7	3.5	B7	23
HAD	(DD)	13.0	0.2	200	− 2.0	4.5	18,000	2.9	—	—	—	B7	7
Replacement Types													
1G6	(DT)	1.4*	0.1	90	0	1.0	45,000	0.68	—	—	—	IO	96
1H5	(SD)	1.4*	0.05	90	0	0.15	240,000	0.28	1.1	4.6	1.0	IO	91
HL2		2.0*	0.1	120	− 3.0	4.5	10,000	1.4	—	—	—	B4	1
H2D		2.0*	0.1	100	0	3.5	15,000	1.3	—	—	—	B5	5
L2		2.0*	0.1	120	− 6.0	7.5	7,000	1.6	—	—	—	B4	1
D4		4.0	1.0	200	− 3.0	4.0	12,500	3.3	8.8	10.0	2.4	B5	1
H4D	(DD)	4.0	1.0	200	− 2.5	5.5	14,500	2.7	3.5	5.5	2.0	B7	7
6A6 6N7	(DT)	6.3	0.8	250	− 5.0	3.0	22,600	1.55	—	—	—	UX7 IO	5
6C5		6.3	0.3	250	− 8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6F8	(DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	28
6J5		6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6Q7	(DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	3.2	5.0	1.5	IO	29
6SQ7	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	4.2	3.4	1.8	IO	31
7C6	(DD)	6.3	0.15	250	− 1.0	1.3	100,000	1.0	2.4	2.4	1.6	B8B	2
7K7	(DD)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.6	3.1	2.7	B8B	21
12Q7	(DD)	12.6	0.15		Other data as Type 6Q7								
12SQ7	(DD)	12.6	0.15		Other data as Type 12SQ7								
12SC7	(DT)	12.6	0.15	250	− 2.0	2.0	53,000	1.3	2.2	3.0	2.0	IO	25
12SL7	(DT)	12.6	0.15		Other data as Type 6SL7								
Current Types													
EABC80	(DT)	6.3	0.45	250	− 3.0	1.0	50 000	1.4	1.9	1 4	2.0	B9A	2
EBC41	(DD)	6.3	0.23	250	− 3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
6J6	(DT)	6.3	0.45	100	− 0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
6SL7	(DT)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.15	0 9	3.5	IO	26
6SN7	(DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.6	0.8	4.1	IO	26
12AT7/ECC81	(DT)	6.3	0.3†	170	− 1.5	7.0	12,000	4.8	2.2	0.4	1.5	B9A	1
12AU7/ECC82	(DT)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0 5	1.5	B9A	1
12AX7/ECC83	(DT)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
PCC84/7AN7	(DT)	7.0	0.3	90	− 1.5	12.0	4,000	6.0	2.3	0.5	2.3	B9A	28
PCC85/9AQ8	(DT)	9.5	0.3	170	− 1.5	10.0	8,000	6.2	0.003	0.18	1.5	B9A	39
UBC41	(DD)	14.0	0.1	170	− 1.6	1.5	42,000	1.65	2.75	1 5	1.3	B8A	9
UCC85	(DT)	26.0	0.1	200	− 2.1	10.0	—	6.2	0.003	0.18	1.5	B9A	39

(*Continued*)

Type	Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
G.E.C.												
Obsolete Types												
L21	2.0*	0.1	150	− 6.0	2.2	8,900	1.8	4.4	3.4	5.9	B4	1
HD22 (DD)	2.0*	0.2	150	− 3.0	1.2	18,000	1.5	1.8	15.0	3.6	B5	5
HD23 (DD)	2.0*	0.15	150	− 2.0	1.0	28,600	1.4	2.75	10.0	2.5	B5	5
HD24 (DD)	2.0*	0.1	150	− 1.5	1.7	28,600	1.4	2.75	10.0	2.5	B5	5
MH4	4.0	1.0	250	− 4.0	5.0	11,100	3.6	7.0	6.5	5.7	B5	1
MHL4	4.0	1.0	250	− 8.0	8.0	8,000	2.5	5.4	4.5	3.9	B5	1
MHD4 (DD)	4.0	1.0	250	− 4.0	4.0	18,200	2.2	2.42	4.6	3.76	B7	7
ML4	4.0	1.0	250	−16.0	14.0	2,860	4.2	7.2	4.5	6.3	B5	1
H42	4.0	0.6	250	− 2.0	1.0	66,000	1.5	2.6	5.3	3.0	B7	23
DH42 (DD)	4.0	0.6	250	− 3.0	1.1	58,000	1.2	2.5	4.8	2.0	B7	7
MH40	4.0	1.0	200	− 3.0	2.7	18,750	2.4	6.0	4.0	7.3	B5	1
DH30 (DD)	13.0	0.3	200	− 2.0	2.8	18,000	4.5	4.8	2.4	2.86	B7	7
H30	13.0	0.3	250	− 1.7	5.5	13,300	6.0	5.0	2.7	3.5	B7	23
L30	13.0	0.3	200	− 8.0	25.0	2,860	4.2	5.0	2.7	3.5	B7	16
Replacement Types												
HD14 (SD)	1.4*	0.05	90	0	0.14	240,000	0.28	0.48	3.5	1.1	IO	91
HL2	2.0*	0.1	150	− 3.0	1.8	18,000	1.5	8.0	9.0	4.0	B4	1
DH81 (DD)	6.3	0.3	250	− 0.68	1.0	58,000	1.2	2.4	1.4	1.7	B8B	12
H63	6.3	0.3	250	− 2.0	1.0	66,000	1.5	2.3	3.7	2.5	IO	18
DL82 (DD, VM)	6.3	0.3	250	− 3.0	5.0	17,000	1.4	2.0	1.5	2.0	B8B	12
DH76 (DD)	13.0	0.16	250	− 3.0	1.1	5,800	1.2	1.5	5.0	1.5	IO	29
DH101 (DD)	19.0	0.1	250	− 3.0	1.0	58,000	1.2	2.4	1.4	1.7	B8B	12
Current Types												
DH77/6AT6 (DDT)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.0	1.1	1.9	B7G	19
L77 / QA2401 (SQ)	6.3	0.15	250	− 8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
DH63 (DD)	6.3	0.3	250	− 3.0	1.1	58,000	1.2	2.5	7.0	1.6	IO	29
L63	6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.8	3.2	4.1	IO	20
B309 / QA2406 (SQ) (DT)	6.3	0.3†	250	− 2.0	10.0	10,000	5.5	2.5	0.4	1.6	B9A	1
B329/12AU7 (DT)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
B339/12AX7 (DT)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
DH179/EABC80 (TD)	6.3	0.45	250	− 3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
B719/ECC85 (DT)	6.3	0.435	230	− 2.0	10.0	9,700	6.0	3.0	0.18	1.5	B9A	39
Z729	6.3	0.2	250	− 5.0	4.0	16,000	2.0	—	—	—	B9A	23
B65 (DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.95	0.77	4.15	IO	26
DH718 (DDT)	6.3	2.3	250	− 3.0	1.0	54,000	1.3	3.0	1.9	1.3	B8A	9
B319 (DT)	7.0	0.3	—	− 1.5	12.0	4,000	6.0	2.3	0.45	—	B9A	28
LN309 (TP)	12.6	0.3	250	− 8.5	10.5	7,700	2.2	1.7	0.3	1.5	B9A	27
B36 (DT)	12.6	0.3	250	− 8.0	9.0	7,700	2.6	3.7	1.2	4.5	IO	26
LN319 (TP)	13.0	0.3	200	− 7.9	10.0	5,300	3.4	2.6	2.0	2.4	B9A	27
DH118 (DDT)	13.0	0.1	250	− 3.0	1.0	54,000	1.3	3.0	1.9	1.3	B8A	9
DH107 (DD)	19.0	0.1	250	− 3.0	1.0	58,000	1.2	2.0	1.1	1.9	B7G	19
DH109 (TDT)	28.0	0.1	200	− 2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
HIVAC												
Obsolete Types												
L210	2.0*	0.1	150	− 6.0	4.2	7,500	1.6	—	—	—	B4	1
ACDDT (DD)	4.0	1.0	200	− 4.0	5.0	15,000	2.3	2.4	5.1	3.5	B7	7
ACHL	4.0	1.0	200	− 2.75	6.0	10,000	3.5	6.8	7.0	5.5	B5	1
DDT13 (DD)	13.0	0.3	200	− 4.0	5.0	15,000	2.3	2.4	5.1	3.3	B7	7
HL13	13.0	0.3	200	− 2.75	6.0	10,000	3.5	6.5	6.9	5.5	B7	23
Replacement Types												
XH1.5V	1.5*	0.08	50	0	0.45	50,000	0.5	—	—	—	Sm4	1
XD1.5V	1.5*	0.08	50	0	0.45	50,000	0.4	—	—	—	Sm4	1
XL1.5V	1.5*	0.08	50	− 1.0	0.7	20,000	0.6	—	—	—	Sm4	1
XLO1.5V	1.5*	0.08	50	− 1.0	0.9	20,000	0.65	—	—	—	Sm4	1
XH2.0V	2.0*	0.08	50	0	0.45	50,000	0.56	—	—	—	Sm4	1
XD2.0V	2.0*	0.08	50	0	0.65	38,000	0.56	—	—	—	Sm4	1
XL2.0V	2.0*	0.08	50	− 1.0	1.0	12,500	0.84	—	—	—	Sm4	1
XLO2.0V	2.0*	0.08	50	− 1.0	1.1	12,500	0.92	—	—	—	Sm4	1
12AU7	12.0	0.15	250	− 8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
Current Types												
XFR3	1.25*	0.12	135	− 5.0	4.0	—	1.65	1.35	3.25	1.3	B5A	4
XR8	6.3	0.15	100	− 2.5	8.0	4,750	4.2	—	—	—	B8D	8
XR9 (DT)	6.3	0.1	100	− 1.85	8.5	4,000	5.0	—	—	—	B8D	12

(Continued)

Type		Heater		Volts		Anode Current	r_a	g_m	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid	(mA)	(Ω)	(mA/V)	c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI													
Obsolete Types													
HD14	(SD)	1.4*	0.05	90	0	0.14	240,000	0.28	0.48	3.5	1.1	1O	91
L21		2.0*	0.1	150	− 6.0	2.2	8,900	1.8	4.4	3.4	5.9	B4	1
HD22	(DD)	2.0*	0.2	150	− 3.0	1.2	18,000	1.5	1.8	15.0	3.6	B5	5
HD23	(DD)	2.0*	0.15	150	− 2.0	1.0	28,600	1.4	2.75	10.0	2.5	B5	5
ML4		4.0	1.0	250	−16.0	14.0	2,860	4.2	7.2	4.5	6.3	B5	1
H42		4.0	0.6	250	− 2.0	1.0	66,000	1.5	2.6	5.3	3.0	B7	23
DH42	(DD)	4.0	0.6	250	− 3.0	1.1	58,000	1.2	2.5	4.8	2.0	B7	7
MH40		4.0	1.0	200	− 3.0	2.7	18,750	2.4	6.0	4.0	7.3	B5	1
DH81	(DD)	6.3	0.3	250	− 0.68	1.0	58,000	1.2	2.4	1.4	1.7	B8B	12
DL82	(DD, VM)	6.3	0.3	250	− 3.0	5.0	17,000	1.4	2.0	1.5	2.0	B8B	12
DH30	(DD)	13.0	0.3	200	− 2.0	2.8	18,000	4.5	4.8	2.4	2.86	B7	7
H30		13.0	0.3	250	− 1.7	5.5	13,300	6.0	5.0	2.7	3.5	B7	23
L30		13.0	0.3	200	− 8.0	25.0	2,860	4.2	5.0	2.7	3.5	B7	16
DH101	(DD)	19.0	0.1	250	− 3.0	1.0	58,000	1.2	2.4	1.4	1.7	B8B	12
Replacement Types													
HL2		2.0*	0.1	150	− 3.0	1.8	18,000	1.5	8.0	9.0	4.0	B4	1
HD24	(DD)	2.0*	0.1	150	− 1.5	1.7	28,600	1.4	2.75	10.0	2.5	B5	5
MH41		4.0	1.0	200	− 1.5	5.2	13,300	6.0	8.5	4.1	3.2	B5	1
MH4		4.0	1.0	250	− 4.0	5.0	11,100	3.6	7.0	6.5	5.7	B5	1
MHL4		4.0	1.0	250	− 8.0	8.0	8,000	2.5	5.4	4.5	3.9	B5	1
MHD4	(DD)	4.0	1.0	250	− 4.0	4.0	18,200	2.2	2.42	4.6	3.76	B7	7
DL63	(DD)	6.3	0.3	250	− 3.0	4.2	22,500	1.6	1.5	3.5	2.3	1O	29
H63		6.3	0.3	250	− 2.0	1.0	66,000	1.5	2.3	3.7	2.5	1O	18
DH76	(DD)	13.0	0.16	250	− 3.0	1.1	5,800	1.2	1.5	5.0	1.5	1O	29
Current Types													
DH77/6AT6	(DDT)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.0	1.1	1.9	B7G	19
L77		6.3	0.15	250	− 8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
DH63	(DD)	6.3	0.3	250	− 3.0	1.1	58,000	1.2	2.5	7.0	1.6	1O	29
L63		6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.8	3.2	4.1	1O	20
ECC81/B309	(DT)	6.3	0.3†	250	− 2.0	10.0	10,000	5.5	2.5	0.4	1.6	B9A	1
ECC82/B329	(DT)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83/B339	(DT)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
DH719/EABC80	(TD)	6.3	0.45	250	− 3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
B719/ECC85	(DT)	6.3	0.435	230	− 2.0	10.0	9,700	6.0	3.0	0.18	1.5	B9A	39
EF86/Z729		6.3	0.2	250	− 5.0	4.0	16,000	2.0	—	—	—	B9A	23
B65	(DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.95	0.77	4.15	1O	26
EBC33/DH147	(DD)	6.3	0.2	250	− 5.5	5.0	15,000	2.0	—	—	—	1O	29
DH149/7C6	(DD)	6.3	0.15	250	− 1.0	1.3	100,000	1.0	2.4	3.0	1.4	B8B	60
EBC41/DH150	(DD)	6.3	0.225	250	− 3.0	1.0	54,000	1.3	—	—	—	B8A	9
ECL80/LN152	(TP)	6.3	0.3	100	− 2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
PCC84/B319	(DT)	7.0	0.3	—	− 1.5	12.0	4,000	6.0	2.3	0.45	—	B9A	28
PCL83/LN309	(DT)	7.0	0.3	—	− 1.5	12.0	4,000	6.0	2.3	0.45	—	B9A	28
B36	(DT)	12.6	0.3	250	− 8.0	9.0	7,700	2.6	3.7	1.2	4.5	1O	26
12AT6	(DD)	12.6	0.15	250	− 3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
UBC41/DH142	(DD)	14.0	0.1	170	− 1.6	1.5	48,000	1.65	2.75	1.5	1.3	B8A	9
DL145	(DD)	15.0	0.1	250	− 5.9	5.0	13,500	3.4	3.6	3.7	1.5	B8A	9
PCL82	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
DH107	(DD)	19.0	0.1	250	− 3.0	1.0	58,000	1.2	2.0	1.1	1.9	B7G	19
UCC85	(DT)	26.0	0.1	200	− 2.1	10.0	8,300	5.8	0.003	0.008	0.008	B9A	39
UABC80	(TDT)	28.0	0.1	200	− 2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UCL83	(TP)	40.0	0.1	200	− 1.5	2.4	34,000	2.5	2.3	0.32	1.6	B9A	27
MULLARD													
Obsolete Type													
DAC1	(SD)	1.4*	0.05	90	0	0.14	240,000	0.275	—	—	—	Ct8	32
PMIHF		2.0*	0.1	100	0	2.3	22,500	0.8	—	—	—	B4	1
PMILF		2.0*	0.1	100	0	5.8	12,000	0.9	—	—	—	B4	1
DA1		2.0*	0.05	40	− 0.25	0.25	80,000	0.4	3.8	5.4	1.6	Sm4	1
DA2		2.0*	0.05	40	− 2.15	1.25	13,600	0.5	3.4	5.4	1.4	Sm4	1
DA3		2.0*	0.055	40	− 2.8	1.8	7,600	0.62	—	—	—	Sm4	1
TDD2A	(DD)	2.0*	0.12	135	− 1.5	1.95	25,000	1.2	2.5	7.6	3.7	B5	5
TT4		4.0	1.0	250	−16.0	20.0	3,300	3.2	3.7	7.0	3.4	B5	1
TT4A		4.0	1.0	250	− 9.0	20.0	4,400	4.1	—	—	—	B5	1
164V		4.0	0.65	200	− 9.0	12.0	4,700	3.4	8.6	8.4	3.2	B5	1
354V		4.0	0.65	250	− 4.5	6.5	11,500	3.5	5.3	4.2	3.3	B5	1
904V		4.0	0.65	200	− 2.0	2.0	36,000	2.0	8.8	7.8	3.4	B5	1
EC31		6.3	0.65	250	−16.0	20.0	3,300	3.2	—	—	—	1O	20
EC53		6.3	0.25	200	− 3.3	7.5	11,400	2.9	1.3	0.13	1.3	B3G	1
75	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	4.2	3.4	1.8	UX6	4
EBC3	(DD)	6.3	0.2	250	− 5.5	5.0	15,000	2.0	—	—	—	Ct8	7
ECC31	(DT)	6.3	0.95	250	− 4.6	6.0	14,000	2.3	4.0	1.9	3.4	1O	22

(Continued)

Type	Heater		Volts		Anode Current	r_a	g_m	Capacitances (pF)			Base	
	Volts	Amps	Anode	Grid	(mA)	(Ω)	(mA/V)	c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*												
Obsolete Types (Continued)												
EF37 (P)	6.3	0.2	150	− 3.0	6.0	10,000	2.8	—	—	—	IO	8
TDD13C (DD)	13.0	0.2	200	− 5.0	4.0	13,500	2.0	3.5	2.9	—	B7	7
Replacement Types												
DAC32 (SD)	1.4*	0.05	90	0	0.15	240,000	0.275	1.3	6.0	1.0	IO	91
IH5 (SD)	1.4*	0.05	90	0	0.15	240,000	0.275	1.1	4.6	1.0	IO	91
KBC32 (DD)	2.0*	0.05	100	0	2.4	21,000	1.2	1.9	7.0	3.1	IO	88
PM2HL	2.0*	0.1	135	− 1.5	2.2	21,500	1.4	3.6	5.0	3.2	B4	1
TDD4 (DD)	4.0	0.65	250	− 7.0	4.0	13,500	2.0	3.5	2.9	—	B7	7
6C5	6.3	0.3	250	− 8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6J5	6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6Q7 (DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	5.0	3.8	1.4	IO	29
6SN7	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.8	0.8	3.8	IO	26
EC52	6.3	0.43	250	− 2.6	10.0	9,200	6.5	5.2	1.3	3.1	B9G	3
EC92	6.3	0.15	250	− 2.0	10.0	11,000	5.5	2.6	0.24	1.6	B7G	66
EBC33 (DD)	6.3	0.2	250	− 5.5	5.0	15,000	2.0	—	—	—	IO	29
EBC41 (DD)	6.3	0.23	250	− 3.0	1.0	58,000	1.2	2.75	1.5	1.3	B8A	9
EBC90 (DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
ECC32 (DT)	6.3	0.95	250	− 4.6	6.0	14,000	2.3	4.3	2.0	4.3	IO	26
ECC33 (DT)	6.3	0.4	250	− 4.0	9.0	9,700	3.6	3.5	1.5, 1.2	2.5	IO	26
ECC34 (DT)	6.3	0.95	250	−16.0	10.0	5,200	2.2	3.5	1.8	4.0	IO	26
ECC35 (DT)	6.3	0.4	250	− 2.5	2.3	34,000	2.0	3.0	1.0, 1.3	2.5, 3.0	IO	26
ECC40 (DT)	6.3	0.6	250	− 5.2	6.0	11,000	2.7	3.0, 2.6	1.15	2.6, 2.7	B8A	13
EF37A (P)	6.3	0.2	150	− 3.0	6.0	10,000	2.8	—	—	—	IO	8
UC92	9.5	0.1	170	− 1.0	8.5	11,000	5.9	2.6	0.24	1.6	B7G	66
HBC90 (DD)	12.6	0.15	Other data as Type EBC90									
12Q7 (DD)	12.6	0.15	Other data as Type 6Q7									
12SN7 (DT)	12.6	0.3	Other data as Type 6SN7									
HL13 } HL13C }	13.0	0.2	200	− 3.7	5.0	12,000	3.3	3.9	4.6	3.1	Ct8 / B7	3 / 23
UBC41 (DD)	14.0	0.1	170	− 1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
UCL83 (TP)	40.0	0.1	200	− 1.5	2.4	34,000	2.5	2.3	0.32	1.6	B9A	27
Current Types												
DCC90 (DT)	1.4*	0.22†	90	− 2.5	3.7	8,300	1.8	0.9	1.0	3.2	B7G	8
EAC91 } M8097 } (SQ) (SD)	6.3	0.3	200	− 3.2	7.5	12,800	2.8	1.7	0.4	1.6	B7G	23
ECC70 } 6021 } (SQ) (TT)	6.3	0.3	100	− 1.0	6.5	6,500	5.4	2.4	0.3	1.5	B8D†	15
EC71 } 8718 } (SQ) (TT)	6.3	0.15	100	− 1.25	8.5	4,700	5.8	2.2	0.7	1.45	B8D†	16
ECC82 } M8136 } (SQ) (DT)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83 } M8137 } (SQ) (DT)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
ECC84 (DT)	6.3	0.34	90	− 1.5	12.0	4,000	6.0	2.1, 2.3	0.16, 0.45	1.1, 2.3	B9A	28
ECC88 (DT)	6.3	0.33	90	− 1.2	15.0	2,650	12.5	3.3	1.8	1.4	B9A	39
ECL80 (TP)	6.3	0.3	100	− 2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
ECL82 (TP)	6.3	0.78	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37
ECL83 (TP)	6.3	0.6	200	− 1 5	2.5	34,000	2.5	2.3	0.32	1.6	B9A	27
EC90	6.3	0.15	250	− 8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
EC91 } M8099 } (SQ)	6.3	0.3	250	− 1.5	10.0	12,000	8.5	5.3	0.2	3.8	B7G	24
ECC81 } M8162 } (SQ) (DT)	6.3	0.3†	170	− 1.0	8.5	11,000	5.9	2.3	0.2	1.6	B9A	1
ECC85 (DT)	6.3	0.435	250	− 2.3	10.0	9,700	5.9	3.0	0.18	1.5	B9A	39
ECC91 } M8081 } (SQ) (DT)	6.3	0.45	100	− 0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
EABC80 (TD)	6.3	0.45	250	− 3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
EBC91 (DD)	6.3	0.3	250	− 2.0	1.2	62,500	1.6	—	—	—	B7G	19
EBC81 (DD)	6.3	0.23	250	− 3.0	1.0	58,000	1.2	2.3	2.3	1.2	B9A	54
E88CC (DT)	6.3	0.3	90	− 1.0	15.0	—	12.5	3.3	0.18	1.4	B9A	39
E90CC (DT)	6.3	0.4	100	− 2.1	8.5	4,500	6.0	3.4	0.35, 0.4	3.2, 3.5	B7G	17
PCC84 (DT)	7.0	0.3	90	− 1.5	12.0	4,000	6.0	2.1, 2.3	0.16, 0.45	1.2, 2.3	B9A	28
PCC88 (DT)	7.0	0.3	90	− 1.2	15.0	2,650	12.5	3.3	1.8	1.4	B9A	39
PCC89 (DT)	7.2	0.3	90	− 1.2	15.0	3,000	12.0	4.0, 6.8	0.4, 0.2	1.7, 3.1	B9A	28
HBC91 (DD)	12.6	0.15	250	− 2.0	1.2	62,500	1.6	—	—	—	B7G	19
PCL83 (TP)	12.6	0.3	250	− 8.5	10.5	7,700	2.2	2.0	0.35	1.6	B9A	27
PCL84 (TP)	15.0	0.3	200	− 1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
UBC81 (DD)	14.0	0.1	170	− 1.6	1.5	42,000	1.65	2.3	2.3	1.2	B9A	54
PCL82 (TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
UCC84 (DT)	21.0	0.1	Other data as Type PCC84									
UCC85 (DT)	26.0	0.1	200	− 2.1	10.0	8,300	5.8	0.003	0.18	1.5	B9A	39
UABC80 (TDT)	28.0	0.1	200	− 2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UCL82 (TP)	50.0	0.1	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37

† Flying leads

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
AMERICAN (*Continued*)													
2C22		6.3	0.3	300	−10.5	11.0	6,600	3.0	2.2	0.7	3.6	IO	107
2C51	(DT)	6.3	0.3	150	− 2.0	8.2	—	5.5	2.2	1.0	1.3	B9A	4
6A6 6N7	(DT)	6.3	0.8	250	− 5.0	3.0	22,600	1.55	—	—	—	UX7 IO	5 22
6AB4		6.3	0.15	250	− 2.0	10.0	10,000	5.5	2.2	0.5	1.5	B7G	45
6AD5		6.3	0.3	250	− 2.0	0.9	66,000	—	—	—	—	IO	20
6AE5		6.3	0.3	95	−15.0	7.0	3,500	1.2	—	—	—	IO	20
6AE6	(DT)	6.3	0.15	250	− 1.5	6.5	25,000	1.0	—	—	—	IO	23
6AE7	(DT)	6.3	0.5	250	−13.5	5.0	9,300	1.5	3.0	1.8	2.5	IO	24
6AF5		6.3	0.3	180	−18.0	7.0	4,900	1.5	—	—	—	IO	20
6AH6 7AC7	(P)	6.3	0.45	150	—	12.5	3,600	11.0	10.0	2.0	0.03	B7G	16
6AH7		6.3	0.3	250	− 9.0	12.0	6,600	2.4	2.2	3.0	2.2	IO	27
6AQ6	(DD)	6.3	0.15	250	− 3.0	1.0	58,000	1.2	—	—	—	B7G	19
6AQ7	(DD)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.3	1.5	2.8	IO	32
6AR7	(SD, R)	6.3	0.3	250	− 2.0	1.3	66,500	1.05	1.4	1.0	2.0	IO	33
6B6	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	1.7	3.8	1.7	IO	29
6BF6	(DD)	6.3	0.3	250	− 9.0	9.5	8,500	1.9	1.8	1.1	2.0	B7G	19
6C7	(DD)	6.3	0.3	250	− 9.0	4.5	16,000	1.25	—	—	—	UX7	9
6C8	(DT)	6.3	0.3	250	0	3.2	22,500	1.6	2.6	2.0	2.5	IO	28
6F4		6.3	0.23	80	—	13.0	2,900	5.8	2.0	0.6	1.9	—	—
6F5 6SF5 7B4		6.3	0.3	250	− 2.0	0.9	66,000	1.5	4.0	3.6	2.4	IO IO B8B	18 21 15
6F8	(DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	28
6J4		6.3	0.4	100	—	10.0	5,000	11.0	5.5	0.24	4.0	B7G	30
7A4		6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	B8B	15
6J6	(DT)	6.3	0.45	100	− 0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
6K4		6.3	0.15	200	—	11.5	4,650	3.45	2.4	0.8	2.4	Wires	
6K5		6.3	0.3	250	− 3.0	1.1	50,000	1.4	2.4	3.6	2.0	IO	19
6L4		6.3	0.225	80	—	9.5	4,400	6.4	1.8	0.5	1.6	—	—
6L5		6.3	0.15	250	− 9.0	8.0	9,000	1.9	3.0	5.0	2.7	IO	20
6N4		6.3	0.2	180	− 3.5	12.0	5,300	6.0	3.0	1.6	1.1	B7G	37
6P5		6.3	0.3	250	−13.5	5.0	9,500	1.45	3.4	5.5	2.6	IO	20
6Q6	(SD)	6.3	0.15	250	− 3.0	1.2	—	1.05	—	—	—	IO	30
6R7 7E6	(DD)	6.3	0.3	250	− 9.0	9.5	8,500	1.9	4.8	3.8	2.4	IO B8B	29 12
6S4		6.3	0.6	250	− 8.0	26.0	3,600	4.5	—	—	—	B9A	7
6S8	(DD, R)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	1.2	5.0	2.0	IO	34
6SC7	(DT)	6.3	0.3	250	− 2.0	2.0	53,000	1.3	2.2	3.0	2.0	IO	25
6SR7	(DD)	6.3	0.3	250	− 9.0	9.5	8,500	1.9	3.6	2.8	2.4	IO	31
6ST7	(DD)	6.3	0.15	250	− 9.0	9.5	8,500	1.9	2.8	3.0	1.5	IO	31
6SU7	(DT)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	—	—	—	IO	26
6SZ7	(DD)	6.3	0.15	250	− 3.0	1.0	58,000	1.2	2.6	2.8	1.1	IO	31
6T7	(DT)	6.3	0.15	250	− 3.0	1.2	62,000	1.05	1.8	3.1	1.7	IO	29
6V7	(DD)	6.3	0.3	250	−20.0	8.0	7,500	1.1	1.5	4.3	1.5	IO	29
7AF7	(DT)	6.3	0.3	250	−10.0	9.0	7,600	2.1	2.2	1.6	2.3	B8B	14
7B6	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	3.0	2.4	1.6	B8B	2
7E5		6.3	0.15	180	− 3.0	5.5	12,000	—	3.6	2.8	1.5	B8B	—
7F7	(DT)	6.3	0.3	250	− 2.0	2.3	44,000	1.6	2.4	2.0	1.6	B8B	14
7F8	(DT)	6.3	0.3	250	− 2.5	10.0	10,400	5.0	2.8	1.4	1.2	B8B	20
7X7	(SD, R)	6.3	0.3	250	− 1.0	1.9	67,000	1.5	—	—	—	B8B	22
12AY7		6.3	0.3†	250	− 4.0	3.0	—	1.75	1.3	0.6	1.3	B9A	1
12AH7		12.6	0.15	180	− 6.5	7.6	8,400	1.9	2.8	2.6	3.0	IO	27
12B6	(SD)	12.6	0.15	250	− 2.0	0.9	91,000	1.1	—	—	—	IO	30
12BF6	(DD)	12.6	0.15	250	− 9.0	9.5	8,500	1.9	1.8	1.1	2.0	B7G	19
12E5		12.6	0.15	250	−13.5	—	—	1.45	3.4	5.5	2.6	IO	20
12F5		12.6	0.15	Other data as Type 6F5									
12G7	(DD)	12.6	0.15	250	− 3.0	—	58,000	1.2	—	—	—	IO	29
12S8	(TD)	12.6	0.15	Other data as Type 6S8									
12SC7	(DT)	12.6	0.15	Other data as Type 6SC7									
12SF5		12.6	0.15	Other data as Type 6SF5									
12SR7	(DD)	12.6	0.15	Other data as Type 6SR7									
12SW7	(DD)	12.6	0.15	250	− 9.0	9.5	8,500	1.9	3.0	2.8	2.4	IO	31
12SX7	(DT)	12.6	0.3	250	− 8.0	9.0	7,700	2.6	3.0	0.8	3.6	IO	26
14A4		12.6	0.15	Other data as Type 7A4									
14AF7	(DT)	12.6	0.15	250	−10.0	9.0	7,600	2.1	2.2	1.6	2.3	B8B	14
14B6	(DD)	12.6	0.15	Other data as Type 7B6									
14E6	(DD)	12.6	0.15	Other data as Type 7E6									
14F7	(DT)	12.6	0.15	Other data as Type 7F7									
14F8	(DT)	12.6	0.15	250	− 2.5	10.0	10,400	5.0	2.8	1.4	1.2	B8B	20
19J6	(DT)	18.9	0.15	100	—	8.5	7,100	5.3	2.0	0.4	1.5	B7G	17
19T8	(TD)	19.0	0.15	Other data as Type 6T8									
26C6	(DD)	26.5	0.07	250	− 9.0	9.5	8,500	1.9	1.9	1.4	2.0	B7G	19

SMALL TRANSMITTING VALVES

(Up to 50W anode dissipation)

Type	Heater		Volts			Current (mA)			Drive (W)	Max. Diss. (W)	R.F. Output (W)	Frequency (Mc/s)		Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen	Grid				Full Rating	Reduced Rating	Type	Ref.
BRIMAR															
Current Types															
5763 / 6062 (SQ) (BT)	6.0	0.75	300	250	− 60	50	5.0	3.0	0.35	12.0	8	50	175	B9A	11
807 (BT)	6.3	0.9	600	250	− 45	100	7.0	3.5	0.2	25.0	40	60	120	UX5	6
6J6 (DT)	6.3	0.45	150	—	− 10	30	—	—	0.35	3	3.5	80	250	B7G	17
6146	6.3	1.25	600	150	− 58	112	9.0	2.8	0.2	20	52	60	175	IO	134
6870 (SQ)	6.3	0.6†	250	250	− 30	28.5	8.0	1.4	7.15	6.3	3.2	75	150	B9A	44
6C4	6.3	0.15	300	—	− 27	25	—	7.0	0.35	5.0	5.5	70	150	B7G	15
					* Anode and grid TC.										
COSSOR															
Current Type															
807 (BT)	6.3	0.9	600	250	− 45	100	7.0	3.5	0.2	25.0	42.5	60	120	UX5	6
EMITRON															
Current Type															
807 (BT)	6.3	0.9	600	250	− 45	100	7.0	3.5	0.2	25.0	40	60	125	UX5	6
ENGLISH ELECTRIC															
Current Types															
3C24 (T)	6.3	3.0	1,000	—	− 70	72	—	9	1.3	25	47	60	100	UX4	9
4D32 (BT)	6.3	3.75	750	300	−100	250	34	12	1.5	50	140	60	—	B7A	—
829B (DBT)	6.3	2.25†	500	200	− 45	240	32	12	0.7	40	83	200	250	B7A	1
832A (DBT)	6.3	1.6†	500	200	− 65	72	14	2.6	0.18	15	26	200	250	B7A	1
G.E.C.															
Obsolete Types															
PT15 (BT)	6.0*	1.3	1,000	300	− 70	80	23	6.0	0.7	30	60	20	60	B5	14
DET19 (DT)	6.3	0.8	300	—	− 50	80	—	15	2.0	5	15.9	50	250	UX7	12
DET20 (T)	6.3	0.2	300	—	—	25	—	—	—	3.5	4.25	50	300	IO	107
Replacement Type															
TT11 (BT)	6.3	0.8	250	160	− 50	30	8.0	1.5	0.12	2.7	4.8	100	200	IO	113
KT8 (BT)	6.3	1.27	600	300	−100	85	6.0	4.0	0.5	25	38	25	100	B5	2
Current Types															
DET18 (T)	5.0	4.0	1,000	—	− 87.5	100	—	35	6.0	35	70	100	150	UX4	20
DET22 (T)	6.3	0.4	350	—	—	40	—	—	—	10	3	600	4,000	co-axial	
DET24 (T)	6.3	1.0	400	—	—	120	—	—	—	20	14	500	2,600	co-axial	
TT20 (DT)	6.3	1.3†	500	250	− 80	80	8	2	3	13	31	200	400	B7A	1
TT15 (DBT)	6.3	1.6	300	175	− 50	120	14	2.5	0.3	15	24	160	250	B9G	5
TT12 (BT)	19.0	0.42	600	275	− 60	100	12	4.0	0.4	20	40	90	130	B9G	8
TT19 (DBT)	19.0	0.5	300	175	− 50	120	14	2.5	0.3	15	24	160	250	B9G	5
MULLARD															
Obsolete Types															
MZ05-20 (T)	6.0	1.0	600	—	−107	80	—	11.0	2.0	20	33.5	2	30	B4	1
TZ05-20 (T)	6.0	1.1	600	—	− 60	85	—	20	2.7	20	36	2	30	B4	1
EC53 (T)	6.3	0.25	250	—	—	12.5	—	3.6	—	2.5	0.5	285	400	B3G†	1
PV06-25 (P)	6.3	1.3	600	300	− 75	109	11.5	2.0	0.2	25	45	20	60	B7	39
QQV04-20(DBT)	6.3	1.6†	400	145	− 45	150	17	4.5	0.23	20	44	125	200	IO	114
EC52 (T)	6.3	0.43	250	—	− 2.6	10	—	—	—	7.0	—	300	400	B9G	3
TY1-50 (T)	7.5	3.25	1,250	—	−225	90	—	15.0	4.5	50	75	20	330	B4	16
PV1-35 (P)	12.0	0.9	1,000	300	−170	97	10	5.0	1.0	35	73	20	60	B7	39
Replacement Types															
EC70 (T)	6.3	0.15	175	—	—	20	—	2.0	—	3.0	0.75	500	—	B8D	8
QQV07-40(DBT)	6.3	2.5†	750	200	− 55	160	30	12	0.8	40	87	100	250	B7A	1
QQZ04-15(DBT)	6.3*	0.68	400	200	− 80	60	8	3	—	12	14.5	186	—	B8B	50
QV04-7 / M8157 (BT) (SQ)	6.3	0.6	300	250	− 50	44	6	0.4	—	7.5	7.7	60	150	B9G	6
QV05-25 (BT)	6.3	0.9	600	250	− 45	100	7	3.5	0.2	25	40	60	75	UX5	6
Current Types															
DC70 (T)	1.25*	0.2	150	—	—	18.7	—	1.3	—	2.4	0.55	500	—	B8D	7
DL70 (P)	1.25*	0.11	150	110	− 22	10.5	2.5	0.06	—	1.0	0.45	200	—	B8D	6
DL73 (P)	1.25*	0.2	150	75	− 20	18.6	5.6	0.8	—	2.0	1.2	200	—	B8D	6
DL93 (P)	1.4*	0.2	150	135	—	18.3	6.5	0.13	—	2.0	1.2	50	—	B7G	7
QQV03-10(DBT)	6.3	0.83†	300	175	− 40	76	3	3	0.5	100	14	225	—	B9A	29
										Anode and Grid TC					

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM													
Obsolete Types													
HL2		2.0*	0.13	135	− 1.5	2.2	21,000	1.5	3.9	4.0	3.2	B4	1
DDT2	(DD)	2.0*	0.1	135	− 3.0	1.0	21,000	1.4	2.0	7.7	2.8	B5	5
DDT2B, DDT2BS	(DD)	2.0*	0.1	135	− 4.5	2.5	16,000	1.0	—	—	—	B5 Ct8	5 28
HR2, HR2S		2.0*	0.065	135	− 1.5	1.2	40,000	0.6	6.5	5.5	2.5	B4 Ct8	1 18
LL2, LL2S		2.0*	0.2	135	− 2.5	3.0	11,500	2.6	—	—	—	B4 Ct8	1 18
HR210		2.0*	0.1	200	− 1.5	1.0	23,000	1.3	—	—	4.0	B4	1
LD210		2.0*	0.1	150	− 4.5	3.0	14,000	1.3	—	—	4.0	B4	1
2A6	(DD)	2.5	0.8	250	− 1.35	0.4	91,000	1.1	1.7	3.8	1.7	UX6	4
HL4g		4.0	0.65	250	− 4.5	5.0	11,000	3.5	4.9	4.5	1.7	B7	6
EBC3	(DD)	6.3	0.2	250	− 5.5	5.0	15,000	2.5	4.0	3.1	1.6	Ct8	7
6C5		6.3	0.3	250	− 8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6R7	(DD)	6.3	0.3	250	− 9.0	9.5	8,500	1.9	4.8	3.8	2.4	IO	29
HL13		13.0	0.2	200	− 3.0	6.0	11,000	3.5	4.9	5.5	1.7	B7	3
HL13S		13.0	0.2	200	− 3.0	6.0	11,000	3.5	4.9	5.5	1.7	Ct8	6
DDT13, DDT13S	(DD)	13.0	0.2	200	− 5.0	4.0	11,000	3.6	4.3	3.1	1.7	B7 Ct8	7 7
25SN7		25.0	0.15		Other data as Type 6SN7								
Replacement Types													
HL4+		4.0	0.65	250	− 4.5	5.0	11,000	3.5	4.9	4.5	3.5	B5	1
DDT4	(DD)	4.0	0.65	250	− 5.0	4.0	11,000	3.6	4.3	3.1	1.7	B7	7
Current Types													
EBC33	(DD)	6.3	0.2	250	− 5.5	5.0	15,000	2.5	4.0	3.1	1.6	IO	29
6J5		6.3	0.3	250	− 8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6Q7	(DD)	6.3	0.3	250	− 3.0	1.0	58,000	1.2	3.2	5.0	1.5	IO	29
6SN7	(DT)	6.3	0.6	250	− 8.0	9.0	7,700	2.6	2.8	0.8	3.8	IO	26
75, 6SQ7	(DD)	6.3	0.3	250	− 2.0	0.9	91,000	1.1	4.2	3.4	1.8	UX6 IO	4 31
6AT6		6.3	0.3	250	− 3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
6AV6		6.3	0.3	250	− 2.0	1.2	62,500	1.6	—	—	—	B7G	19
EAC91		6.3	0.3	200	− 2.8	7.5	12,800	2.8	1.7	0.4	1.6	B7G	23
6AB8	(TP)	6.3	0.3	100	− 2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
6AK8	(TD)	6.3	0.45	250	− 3.0	1.0	50,000	1.4	1.9	1.6	2.2	B9A	2
6CV7	(DD)	6.3	0.23	250	− 3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
6J6	(DT)	6.3	0.45	100	− 0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
6SL7GT	(DT)	6.3	0.3	250	− 2.0	2.3	44,000	2.0	3.0	1.0, 1.3	2.5, 3.0	IO	26
12AT7	(DT)	6.3	0.3†	170	− 1.5	8.5	12,000	5.5	2.2	0.4, 0.5	1.5	B9A	1
12AU7	(DT)	6.3	0.3†	250	− 8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
12AX7	(DT)	6.3	0.3†	250	− 2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
EBC81	(DDT)	6.3	0.23	250	− 3.0	1.0	58,000	1.2	—	—	—	B9A	54
ECC84	(DT)	6.3	0.335	90	− 1.5	12.0	4,000	6.0	2.3	0.5	2.3	B9A	28
EF37A	(P)	6.3	0.2	150	− 3.0	6.0	10,000	2.8	—	—	—	IO	8
PCC88	(DT)	7.0	0.3	90	− 1.2	15.0	2,650	12.5	—	—	—	B9A	39
7AN7	(DT)	7.0	0.3	90	− 1.5	12.0	4,000	6.0	2.3	0.45	2.3, 1.1	B9A	28
12AT6		12.6	0.15		Other data as Type 6AT6								
12AV6		12.6	0.15		Other data as Type 6AV6								
12J5		12.6	0.15		Other data as Type 6J5								
12SN7	(DT)	12.6	0.3		Other data as Type 6SN7								
12SQ7	(DD)	12.6	0.15		Other data as Type 6SQ7								
UBC81	(DD)	14.0	0.1	170	− 1.6	1.5	42,000	1.65	—	—	—	B9A	39
14L7	(DD)	14.0	0.1	170	− 1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
UCC84	(DT)	21.0	0.1	90	− 1.5	12.0	4,000	6.0	2.3	0.45	2.37, 1.1	B9A	28
UCC85	(DT)	26.0	0.1	200	− 2.1	10.0	8,300	5.8	0.003	0.008	0.008	B9A	39
UABC80	(TD)	28.0	0.1	200	− 2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
AMERICAN													
1E4		1.4*	0.05	0	− 3.0	1.5	17,000	0.83	2.4	6.0	2.4	IO	81
1G4		1.4*	0.05	90	− 6.0	2.3	10,700	0.83	2.2	3.4	2.8	IO	81
1H5, 1LH4	(SD)	1.4*	0.05	90	0	0.15	240,000	0.28	1.1	4.6	1.0	IO B8B	91 26
1LE3		1.4*	0.05	90	− 3.0	1.3	19,000	0.76	1.7	3.0	1.7	B8B	36
3A5	(DT)	1.4*	0.22†	90	− 2.5	3.7	8,300	1.8	—	—	—	B7G	8
3B7	(DT)	1.4*	0.22†	90	0	5.2	11,350	1.85	R.F. Amplifier			B8B	34
3C6	(DT)	1.4*	0.1†	90	0	4.5	11,200	1.3	—	—	—	B8B	35
1H4		2.0*	0.06	180	−13.5	3.1	10,300	0.9	3.6	5.0	5.5	IO	81
1B5L, 1H6	(DD)	2.0*	0.06	135	− 3.0	0.8	35,000	0.58	1.6	1.9	3.4	UX6 IO	3 80
4A6	(DT)	2.0*	0.12†	90	− 1.5	1.1	26,600	0.75	—	—	—	IO	95
2A6	(DD)	2.5	0.8	250	− 1.35	0.4	91,000	1.1	1.7	3.8	1.7	UX6	4
2B6	(DT)	2.5	2.25	250	−24.0	40.0	5,150	3.5	—	—	—	UX7	4
2C21	(DT)	6.3	0.6	250	−16.5	8.3	7,600	1.4	—	—	—	UX7	12

(Continued)

Type	Heater		Volts			Current (mA)			Drive (W)	Max. Diss. (W)	R.F. Output (W)	Frequency (Mc/s)		Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen	Grid				Full Rating	Reduced Rating	Type	Ref.
MULLARD *(Continued)*															
Current Types (Continued)															
QV03-12 } (P) M8096 } (SQ)	6.0	0.75	300	250	− 60	50	5.0	3.0	0.4	12	8.0	175	—	B9A	11
EC56 (T)	6.3	0.65	220	—	—	30	—	—	—	10	0.5	4,000	IO	Disc seal	
EC57 (T)	6.3	0.65	220	—	—	60	—	—	—	10	1.8	4,000	IO	Disc seal	
EL85 (P)	6.3	0.2	300	175	− 30	20.2	3.9	0.9	—	6	3.1	120	—	B9A	26
ECC91 } (DT) M8081 } (SQ)	6.3	0.45	150	—	− 10	30	—	16	0.35	3	3.5	80	250	B7G	17
QQV03-20A (DBT)	6.3	1.3†	600	250	− 60	100	8	1.4	1.5	20	48	200	600	B7A	1
QQV06-40A (DBT)	6.3	1.8†	600	250	− 80	200	18	7	3.0	40	90	275	486	B7A	1
QQV5-P10 (DT)	6.3	2.4†	5,000	850	−200	10	2.0	1.0	85	15	—	pulse modulator		B7A	1
QV06-20	6.3	1.25	600	150	− 58	112	10.0	5.0	—	20	52	60	175	IO	134
TD03-5	6.3	0.4	250	—	− 2.0	10	—	—	0.6	5	—	2,000	—	co-axial	
TD03-10 (T)	6.3	0.4	250	—	− 3.5	20	—	—	10	10	3	1,000	3,000	co-axial	
TD04-20	6.3	1.0	400	—	—	50	—	—	2.0	20	13	1,000	2,000	co-axial	
TD03-10F (T)	6.3	0.4	250	—	− 3.5	20	—	—	—	10	3	1,000	3,000	co-axial	
TD05-12 (T)	6.3	0.75	150	—	—	10	—	1.5	1.5	0.02	12	1,300	—	IO	138
QQV02-6 (DBT)	6.3	0.8†	180	180	− 2.5	55	11	2	1.6	6	6.0	490	—	B9A	29
S.T.C.															
Obsolete Types															
4061A (P)	6.3	0.8	500	200	− 90	55	35	6.0	0.8	10	24"	30	—	UX7	—
3A/154M (T)	6.3	0.43	250	—	− 2	12	—	—	—	—	—	—	—	B8B	15
55A 165M (DP)	12.6	1.0	500	200	− 80	125	20	1	—	16	47.5	30	60	B8B	38
Replacement Types															
3A 146J (T)	4.0	0.65	350	—	—	—	—	—	—	2	—	350	450	—	
3A 147J (T)	4.0	0.7	350	—	—	28	—	—	—	6	1.5	750	850	—	
4300A (T)	5.0	1.2	400	—	− 89	50	—	—	—	40	—	—	—	UX4	1
3A 148J (T)	6.3	0.4	350	—	—	—	—	—	—	2	—	600	—	—	
4074A (DT)	6.3	0.8	300	—	− 50	90	—	17	1.0	10	15	100	300	UX7	12
4043C (T)	7.5	1.2	600	—	−170	130	—	—	—	35	52	2	10	UX4	1
5B 256M (BT)	19.0	0.3	600	250	− 45	100	7	3.5	0.2	25	40	60	—	B8B	65
Current Types															
4033L (T)	6.0	1.4	600	—	− 65	125	—	30	—	25	53	45	—	B5	1
33A 158M (DT)	6.3	0.8	300	—	− 50	90	—	17	1.0	12	15.5	100	—	B8B	14
5B/254M (BT)	6.3	0.9	600	250	− 45	100	7	3.5	0.2	25	40	60	—	B8B	66
5B 255M (BT)	6.3	0.9	600	250	− 45	100	7	3.5	0.2	25	40	60	—	B8B	65
3B/240M (T)	6.3	1.1	300	—	− 10	90	—	35	2.5	15	16	200	—	B8B	54
44A/160M (DBT)	6.3	1.6	350	200	− 48	45	5	1.5	0.3	15	20	150	200	B9G	5
33B/152M (DT)	6.3	0.92	275	—	− 8.5	100	—	13	2.0	16	13.5	300	420	B9G	10
4304CB (T)	7.5	3.2	1,000	—	−170	100	—	22	6	50	70	100	300	B4	16
5B/257M (BT)	12.0	0.47	600	250	− 45	100	7	3.5	0.2	25	40	60	—	B8B	65
3B/241M (T)	19.0	0.37	300	—	− 10	90	—	35	2.5	15	16	200	—	B8B	54
TUNGSRAM															
Current Types															
3A4 (P)	1.4*	0.2	150	135	—	18.3	6.5	0.13	—	2	1.2	50	—	B7G	7
6J6 (DT)	6.3	0.45	150	—	− 10	30	—	16	0.35	3	3.5	80	250	B7G	17
807 (BT)	6.3	0.9	600	275	− 90	100	6.5	4.0	0.4	25	42.5	60	125	UX5	6

VALVE RECTIFIERS

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
BRIMAR									
Obsolete Types									
R1	4.0	1.0	F.W.	250–0–250	60	8	100	B4	14
25RE, 25Y5	25.0	0.3	F.W.	350–0–350	85	—	—	UX6	9
35RE	35.0	0.3	F.W.	250–0–250	100	—	—	UX6	9
35Z3	35.0	0.15	H.W.	250	100	40	100	B8B	16
R14	52.0	0.3	2 H.W.	240	400	50	50	IO	52

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref
BRIMAR (*Continued*)									
Replacement Types									
0Z4	—	—	F.W	300–0–300	75	—	—	IO	57
R2	4.0	2.5	F.W	350–0–350	120	16	30	B4	14
R3	4.0	2.5	F.W	500–0–500	120	16	150	B4	14
R11	4.0*	1.1	H.W	5,000	50	1.0	4,000	B4	6
83V	5.0	2.0	F.W	375–0–375	175	32	100	UX4	22
5Z3	5.0*	3.0	F.W	450–0–450	225	32	75	UX4	3
80	5.0*	2.0	F.W	350–0–350	125	32	30	UX4	3
80s	5.0	2.0	F.W	350–0–350	125	32	30	UX4	21
6X5	6.3	0.6	F.W	325–0–325	70	32	150	IO	54
7Y4	6.3	0.5	F.W	325–0–325	70	40	525	B8B	1
7Z4	6.3	0.9	F.W	325–0–325	100	32	75	B8B	1
EZ40	6.3	0.6	F.W	350–0–350	90	50	300	B8A	14
1D6	25.0	0.3	H.W	250	100	16	50	UX6	14
25Z4	25.0	0.3	H.W	250	100	40	100	IO	111
UY41	31.0	0.1	H.W	250	100	50	210	B8A	1
35Z4	35.0	0.15	H.W	250	100	40	100	IO	55
1D5	40.0	0.2	H.W	250	100	16	50	B5	8
Current Types									
R10	4.0	0.5	H.W	3,500	5	0.25	62,000	B7G	22
5R4	5.0*	2.0	F.W	750–0–750	250	4	250	IO	60
5U4	5.0*	3.0	F.W	450–0–450	225	32	75	IO	60
5V4	5.0	2.0	F.W	375–0–375	175	32	100	IO	62
5Y3	5.0	2.0	F.W	350–0–350	125	32	30	IO	60
5Z4	5.0	2.0	F.W	350–0–350	125	32	30	IO	62
83	5.0*	3.0	F.W	450–0–450	225	—	50	UX4	3
6X4, 6063 (SQ)	6.3	0.6	F.W	325–0–325	70	40	525	B7G	31
EZ80/6V4	6.3	0.6	F.W	350–0–350	90	50	300	B9A	31
EZ81	6.3	1.0	F.W.	350–0–350	150	50	240	B9A	31
R12	6.3*	0.09	H.W	5,000	0.5	0.1	100,000	Wires	
R17, 6157 (SQ)	6.3	0.8	H.W	500	75	32	50	B9A	30
R18, 6443 (SQ)	6.3	1.1	H.W	625	125	8	160	B9A	30
35W4	35.0	0.15	H.W	240	100	40	120	B7G	33
COSSOR									
Obsolete Types									
442BU	4.0*	2.5	F.W	350–0–350	120	16	100	B4	5
460BU	4.0*	2.5	F.W	500–0–500	120	16	100	B4	5
441U	4.0	2.5	F.W	500–0–500	150	16	75	B4	5
Replacement Types									
225DU	2.0	0.5	V.D	750	25	2	2,000	B7	31
SU25	2.0	0.5	H.W	7,000	1.0	0.1	100,000	IO	102
SU2150	2.0	1.15	H.W	8,000	2	0.25	100,000	B4	6
4/100BU	4.0*	2.5	F.W	500–0–500	200	16	75	B4	5
405BU	4.0*	0.5	F.W	1,500–0–1,500	25	4	2,000	B4	5
451U	4.0*	3.5	F.W	500–0–500	250	16	75	B4	5
506BU	4.0*	1.0	F.W	250–0–250	60	16	100	B4	5
5U4	5.0*	3.0	F.W	450–0–450	225	32	75	IO	60
5Z4	5.0	2.0	F.W	350–0–350	125	32	50	IO	62
80	5.0*	2.0	F.W	350–0–350	125	10	50	UX4	3
6X5	6.3	0.6	F.W	325–0–325	70	8	150	IO	54
27SU	13.2*	0.9†	H.W	250	250	60	15	IO	106
OMI	30.0	0.2	H.W	250	120	32	50	IO	55
40SUA	40.0	0.2	H.W	250	75	32	50	B5	8
Current Types									
SU2150A	2.0	1.5	H.W	5,000	10	0.25	10,000	B4	6
SU42	4.0	1.25	H.W	6,000 5,000	40 50	1.0 1.0	5,000 4,000	IO	103
431U	4.0	2.5	F.W	500–0–500	150	16	75	B4	5
52KU	5.0	2.0	F.W	500–0–500	150	16	75	IO	62
53KU	5.0	2.8	F.W	500–0–500	250	16	75	IO	62
54KU	5.0	2.0	F.W	350–0–350 300–0–300	250 300	32	100	IO	62
EZ81	6.3	1.0	F.W	350–0–350	150	50	240	B9A	31
66KU	6.3	0.6	F.W	350–0–350	90	50	300	B8A	14
6V4	6.3	0.6	F.W.	350–0–350	90	50	200	B9A	31
7Y4	6.3	0.5	F.W.	325–0–325	70	8	150	B8B	1
19Y3	19.0	0.3	H.W	250	180	60	100	B9A	18

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref
COSSOR *(Continued)*									
Current Types (Continued)									
PY32	29 0	0 3	H.W.	250	275	100	56	IO	111
311SU	31 0	0 1	H.W.	250	90	50	160	B8A	5
35Z3	35 0	0 15	H.W.	250	100	16	100	B8B	16
UY85	38 0	0 1	H.W.	250	110	100	100	B9A	18
EDISWAN MAZDA									
Obsolete Types									
MU2	2 0*	3 1	H.W. , M.V.	4,500	5	—	10.000	B4	6
U21	2 0	1 85	H W.	4 500	5	—	—	B4	6
UU4	4 0	2 2	F.W.	400	120	16	—	B4	14
UD41	4 0	1 15	V D.	550	35	2	—	B7	33
Replacement Types									
U22	2 0	2 0	H.W.	5,200	1	0 1	50,000	MO	17
U24	2 0	0.15	H W.	7,800	0.5	0.1	100,000	IO	102
UU 5	4 0	2.3	F.W.	500–0–500	120	8	—	B4	14
UU6	4 0	1.4	F W.	350–0–350	120	16	—	MO	8
UU7	4 0	2.3	F.W.	350–0–350	180	16	—	MO	8
UU8	4 0	2.8	F.W.	350–0–350	250	16	—	MO	8
UU10	4 0	2 3	F W.	500–0–500	180	8	—	B4	14
U201	20 0	0 2	H W.	250	90	16	47	IO	55
U281	28 0	0 2	H W.	250	120	16	47	IO	55
U403	40 0	0 2	H W.	250	120	16	47	MO	18
U4020	40 0	0 2	H W.	250	120	16	47	B5	8
Current Types									
U25	2 0	0.2	H.W.	7,800	0.5	0.1	100,000	Wires	
ESU76	2 0*	7.5	H W . M.V	10,000 P.I.V	250	—	—	Edison Screw	
19H4	2 5	1.7	H W.	7,000	30	0.5	18,000	IO	58
ESU103	2 5*	5 0	H.W.‡	5.000 P.I.V.	500	—	—	B4	6
ESU866	2 5*	5 0	H.W . M.V.	10.000 P.I.V.	250	—	—	UX4	15
ESU866ES	2 5*	5.0	H W .. M.V.	10.000 P.I.V.	250	—	—	Edison Screw	
ESU101	4 0*	2.7	H.W., M.V.	10.000 P.I.V.	250	—	—	B4	6
19G6	4 0	0 5	H W.	2,500	30	1 0	5,400	B7G	22
19G3	4 0	1 4	H.W.	2.200	50	50	1,900	IO	119
19H1	4 0*	2 0	H W.	5.300	75	1.0	2,500	B4	6
19H5	4 0	4 0	H.W	6.500	125	2.0	1,600	Goliath Edison Screw	
UU9	6 3	0 58	F W.	350–0–350	90	50	300	B8A	14
UU12	6 3	0 95	F W.	350–0–350	150	50	240	B9A	31
U192	19 0	0 3	H W.	250	180	60	100	B9A	18
U291	29 0	0 3	H.W.	250	275	100	56	IO	142
U381	38 0	0 1	H W.	250	110	100	100	B9A	18
U404	40 0	0 1	H.W.	250	90	50	180	B8A	1
U801	80.0	0 2	H.W.	250	300	80	47†	IO	117

‡ Xenon-filled. † Each anode.

EMITRON									
Replacement Types									
SU25	2 0	0 5	H.W.	9,000	1.0	0.1	100.000	IO	102
431U	4 0	2 5	F.W.	500–0–500	150	16	75	B4	5
451U	4 0	3.5	F W.	500–0–500	250	16	75	B4	5
52KU	5 0	2.0	F.W.	500–0–500	150	16	75	IO	62
27SU	13 2	0.9†	H.W.	250	250	64	15	IO	106
SU2150A	2 0	1.5	H.W.	5.000	10	0.25	10,000	B4	17
SU45	4 0	0.5	H.W.	2,500	30	1.1	5,400	B7G	22
52KU	5 0	2 8	F.W.	500–0–500	250	16	75	IO	62
6W2	6 3	0.08	H.W.	5,000	3	0.1	100,000	Wires	
6X4	6 3	0.6	F.W.	325–0–325	70	10	520	B7G	31
EZ80 6V4	6 3	0.6	F.W.	350–0–350	90	50	300	B9A	31
U709 EZ81	6 3	0 95	F.W.	350–0–350	150	8	270	B9A	31
6Y4	6 3	0.5	F.W.	325–0–325	70	40	150	B8B	1
PY82 19Y3	19 0	0.3	H.W.	250	180	60	100	B9A	18
35Z3	35 0	0.15	H.W.	250	100	40	100	B8B	16
FERRANTI									
Obsolete Types									
HR4	4 0	0 5	H W.	2,500	30	1	5,400	B7G	22
HR7	4 0	1 25	H W.	6,200	40	1	11.000	IO	103
R4	4 0*	2 5	F.W.	350–0–350	120	32	120	B4	5

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
FERRANTI (*Continued*)									
Obsolete Types (*Continued*)									
R4A	4.0*	2.5	F.W.	500–0–500	120	32	100	B4	5
RA	13.0	0.3	F.W.	250–0–250	50	8	100	B5	8
R13A	13.0	0.3	H.W.	250–0–250	70	8	100	IO	54
RZ	20.0	0.2	H.W.	250	75	16	100	B5	8
Replacement Types									
OZ4	—	—	F.W.	300–0–300	75	—	—	IO	57
R42	4.0	2.5	F.W.	350–0–350	120	16	100	B4	14
R43	4.0*	2.5	F.W.	500–0–500	120	16	100	B4	5
R52	5.0	2.0	F.W.	350–0–350	125	32	50	IO	62
5U4	5.0*	3.0	F.W.	450–0–450	225	32	75	IO	60
5V4	5.0	2.0	F.W.	375–0–375	175	32	100	IO	62
5Y3	5.0*	2.0	F.W.	350–0–350	125	32	50	IO	60
5Z4	5.0	2.0	F.W.	350–0–350	125	32	50	IO	62
80	5.0*	2.0	F.W.	350–0–350	125	16	50	UX4	3
6X5	6.3	0.6	F.W.	325–0–325	70	8	150	IO	54
7Y4	6.3	0.5	F.W.	325–0–325	70	32	150	B8B	1
7Z4	6.3	0.9	F.W.	325–0–325	100	32	75	B8B	1
EZ40	6.3	0.6	F.W.	350–0–350	90	50	300	B8A	14
UY41	31.0	0.1	H.W.	250	100	50	210	B8A	1
35Z4	35.0	0.15	H.W.	250	100	40	100	IO	55
35Z5	35.0	0.15	H.W.	240	100	40	100	IO	51
Current Types									
HR2	4.0	0.5	H.W.	5,500	5	0.25	50,000	B7G	22
HR3	4.0	0.5	H.W.	5,000	15	1.0	30,000	B7G	22
HR6	4.0	1.25	H.W.	5,000	60	2	8,000	IO	22
HR8	4.0	1.25	H.W.	6,000 5,000	40 50	1.0 1.0	5,000 4,000	IO	103
HR9	4.0	1.3	H.W.	20,000	0.75	—	—	IO	131
HR11	4.0*	1.9	H.W.	14,500	3.0	—	—	IO	120
5R4	5.0	2.0	F.W.	750–0–750 1,000–0–1,000	250 150	4 4	250 575	IO	60
GZ32	5.0	2.3	F.W.	500–0–500	125	60	150	IO	62
EZ80 6V4	6.3	0.6	F.W.	350–0–350	90	50	300	B9A	31
EZ90 6X4	6.3	0.6	F.W.	325–0–325	70	8	150	B7G	31
EY91	6.3	0.42	H.W.	250	75	32	100	B7G	50
PY82/19Y3	19.0	0.3	H.W.	250	180	60	100	B9A	18
UY85	38.0	0.1	F.W.	250–0–250	110	—	—	B9A	43
PZ30	52.0	0.3	2 × H.W.	240	200	50	50	IO	52
G.E.C.									
Obsolete Types									
U16	2.0*	1.0	H.W.	5,000	2	0.25	—	B4	6
U17	4.0*	1.0	H.W.	2,500	30	1	2,000	B4	6
U12	4.0*	2.5	F.W.	350–0–350	120	4	—	B4	5
MU12	4.0	2.5	F.W.	350–0–350	120	—	—	B4	5
GU1	4.0*	3.0	H.W., M.V.	1,000	250	—	—	B4	4
GU5	4.0*	3.0	H.W., M.V.	1,500	250	—	—	B4	6
U30	26.0	0.3	F.W.	250–0–250	120	—	—	B7	12
Replacement Types									
U33	2.0*	1.0	H.W.	6,300	3.0	0.25	100,000	B4	6
MU14	4.0	2.5	F.W.	500–0–500	120	32	100	B4	5
U10	4.0*	1.0	F.W.	250–0–250	100	—	—	B4	5
U14	4.0*	2.5	F.W.	500–0–500	120	32	100	B4	5
U19/23	4.0	3.3	H.W.	2,500	250	4	600	B4	6
U84	4.0*	1.0	F.W.	250–0–250	75	16	100	B8B	24
U81	6.3	1.6	F.W.	500–0–500	150	16	100	B8B	24
U82	6.3	0.6	F.W.	325–0–325	75	4	150	B8B	1
U76	30.0	0.16	H.W.	250	100	32	100	IO	55
U101	50.0	0.1	H.W.	250	100	32	100	B8P	25
Current Types									
U18/20	4.0*	3.0	F.W.	500–0–500	275	16	130	B4	5
U19	4.0	3.3	H.W.	2,500	250	4	600	B4	6
GU50	4.0*	3.0	H.W., M.V.	1,750	250	4	—	B4	6
U50	5.0*	2.0	F.W.	350–0–350	120	32	100	IO	60
U52	5.0*	3.0	F.W.	500–0–500	250	16	180	IO	60
U54	5.0	2.8	F.W.	500–0–500	250	16	75	IO	62
U78	6.3	0.6	F.W.	325–0–325	70	16	435	B7G	31
U709	6.3	0.95	F.W.	350–0–350	150	8	270	B9A	31
U718	6.3	0.58	F.W.	350–0–350	90	50	300	B8A	14
U119	38.0	0.1	H.W.	250	110	100	100	B9A	18

(*Continued*)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
G.E.C. *(Continued)*									
Current Types (Continued)									
U319	20.0	0.3	H.W.	250	170	—	55	B9A	18
U31	26.0	0.3	H.W.	250	120	32	100	IO	55
U107	40.0	0.1	H.W.	250	90	12	200	B7G	13
U118	40.0	0.1	H.W.	250	90	40	180	B8A	1
HIVAC									
Obsolete Types									
UU60/250	4.0	1.25	F.W.	300–0–300	75	—	—	B4	5
U U120/350A	4.0	2.5	F.W.	350–0–350	120	—	—	B4	5
U U120 500	4.0	2.5	F.W.	500–0–500	120	—	—	B4	5
MARCONI									
Obsolete Types									
U12	4.0*	2.5	F.W.	350–0–350	120	—	—	B4	5
U14	4.0	2.5	F.W.	500–0–500	120	—	—	B4	5
GU1	4.0*	3.0	H.W., M.V.	1,000	250	—	—	B4	4
GU5	4.0*	3.0	H.W., M.V.	1,500	250	—	—	B4	6
U84	4.0*	1.0	F.W.	250–0–250	75	16	100	B8B	24
U81	6.3	1.6	F.W.	500–0–500	150	16	100	B8B	24
U82	6.3	0.6	F.W.	325–0–325	75	4	150	B8B	1
U154	9.0	0.3	H.W.	250	180	60	100	B9A	18
U30	26.0	0.3	F.W.	250–0–250	120	—	—	B7	12
U101	50.0	0.1	H.W.	250	100	32	100	B8B	25
Replacement Types									
U35	1.4	0.12	H.W.	3,500	2	0.001	—	IO	120
U16	2.0*	1.0	H.W.	5,000	2	0.25	—	B4	6
U33	2.0*	0.15	H.W.	6,300	3.0	0.25	100,000	B4	6
U17	4.0*	1.0	H.W.	2,500	30	1	2,000	B4	6
U18/20	4.0*	3.0	F.W.	500–0–500	250	16	180	B4	5
MU14	4.0	2.5	F.W.	500–0–500	120	32	100	B4	5
U10	4.0*	1.0	F.W.	250–0–250	100	—	—	B4	5
U14	4.0*	2.5	F.W.	500–0–500	120	32	100	B4	5
U76	30.0	0.16	H.W.	250	100	32	100	IO	55
Current Types									
GU50	4.0*	3.0	H.W., M.V.	1,750	250	4	—	B4	6
AZ31 U143	4.0*	1.1	F.W.	500–0–500	60	16	100	IO	60
U50	5.0*	2.0	F.W.	350–0–350	120	32	100	IO	60
U52	5.0*	3.0	F.W.	500–0–500	250	16	180	IO	60
EZ80	6.3	0.6	F.W.	350–0–350	90	50	300	B9A	31
U70	6.3	0.6	F.W.	325–0–325	70	16	350	IO	54
U78/6X4	6.3	0.6	F.W.	325–0–325	70	8	435	B7G	31
EZ35 U147	6.3	0.6	F.W.	325–0–325	70	16	350	IO	54
U149 7X4	6.3	0.5	F.W.	325–0–325	70	40	—	B8B	1
U150/EZ40	6.3	0.6	F.W.	350–0–350	90	50	300	B8A	20
U709/EZ81	6.3	0.95	F.W.	350–0–350	150	—	270	B9A	31
PY82 U319	20.0	0.3	H.W.	250	170	—	55	B9A	18
U31	26.0	0.3	H.W.	250	120	32	100	IO	55
PY32	29.0	0.3	H.W.	250	275	100	56	IO	111
U Y41 U142	31.0	0.1	H.W.	250	100	50	210	B8A	22
35W4	35.0	0.15	H.W.	240	100	40	120	B7G	33
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
U145	40.0	0.1	H.W.	250	90	16	50	B8A	5
U107	40.0	0.1	H.W.	250	90	12	200	B7G	13
MULLARD									
HVR1	2.0	0.29	H.W.	6,000	5	—	—	B4	6
HVR2A	2.0	1.5	H.W.	6,000	3	0.2	—	B4	17
AX50	4.0*	3.75	F.W.	500–0–500	250	16	100	B4	5
DW2	4.0*	1.0	F.W.	250–0–250	60	16	—	B4	5
HVR2	4.0	0.65	H.W.	6,000	3	0.2	—	B4	17
6X5	6.3	0.6	F.W.	325–0–325	70	4	150	IO	54
CY32	30.0	0.2	2 H.W.	250	120	32	125	IO	53
UR3C	30.0	0.2	2 H.W.	250	120	32	125	B7	29
UY21	50.0	0.1	H.W.	250	140	60	175	B8B	4
UY31	50.0	0.1	H.W.	250	125	60	175	IO	55

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref
MULLARD (*Continued*)									
Replacement Types									
DY70	1.25*	0.14	H.W.	2,900	1.8	0.1	150,000	Wires	
AZ31	4.0*	1.1	F.W.	500–0–600	60	60	—	IO	60
DW4–350	4.0*	2.0	F.W.	350–0–350	120	16	0	B4	5
DW4–500	4.0*	2.0	F.W.	500–0–500	120	16	200	B4	5
FW4–500	4.0*	3.0	F.W.	500–0–500	250	16	200	B4	5
FW4–800	4.0*	3.0	F.W.	850–0–850	125	4	150	B4	5
IW4–350	4.0	2.0	F.W.	350–0–350	120	12	—	B4	14
IW4–500	4.0	2.5	F.W.	500–0–500	120	16	150	B4	14
GZ30	5.0	2.0	F.W.	350–0–350	125	50	380	IO	62
5U4	5.0*	3.0	F.W.	450–0–450	225	—	75	IO	90
5V4	5.0	2.0	F.W.	375–0–375	175	—	100	IO	62
5Y3	5.0*	2.0	F.W.	350–0–350	125	—	—	IO	60
5Z4	5.0	2.0	F.W.	350–0–350	125	—	50	IO	62
80	5.0*	2.0	F.W.	350–0–350	125	—	50	UX4	3
EY70	6.3	0.45	H.W.	235	45	20	270	B8D	11
EY91	6.3	0.42	H.W.	250	75	32	100	B7G	50
EZ41	6.3	0.4	F.W.	250–0–250	60	50	325	B8A	14
EZ35	6.3	0.6	F.W.	325–0–325	70	16	350	IO	54
EZ40	6.3	0.6	F.W.	350–0–350	90	50	300	B8A	14
PY31	17.0	0.3	H.W.	250	125	60	175	IO	55
CY31	20.0	0.2	H.W.	250	120	32	125	IO	55
URIC	20.0	0.2	H.W.	250	120	32	125	B5	8
25Z4	25.0	0.3	H.W.	250	100	—	—	IO	55
25Z6	25.0	0.3	V.D.	235	150	—	—	IO	53
UY41	31.0	0.1	H.W.	250	100	50	210	B8A	1
35Z4	35.0	0.15	H.W.	235	100	—	100	IO	55
35Z5	35.0	0.15	H.W.	235	100	40	100	IO	51
UY1N	50.0	0.1	H.W.	250	140	60	175	IO	122
PZ30	52.0	0.3	2 × H.W.	240	200	50	50	IO	52
Current Types									
RG3–250	2.5*	5.0	H.W.	3,500	250	2	—	Edison Screw	
RG3–250A	2.5*	5.0	H.W.	3,500	250	2	—	B4D	1
RR3–250	2.5*	5.0	H.W.	1,700	500	—	—	B4D	1
RG3–1250	4.0*	7.0	H.W.	8,000 P.I.V.	1,250	—	—	Edison Screw	
RG1–240A	4.0*	2.7	H.W.	2,220	250	5	—	B4	6
RG4–1250	4.0*	11.0	H.W.	20,000 P.I.V.	—	1,250	—	Edison Screw	
RR3–1250A	4.0*	11.0	H.W.	13,000 P.I.V.	1,250	—	—	Edison Screw	
RR3–1250B	4.0*	7.0	H.W.	13,000 P.I.V.	1,250	—	—	Edison Screw	
A241	4.0*	0.72	F.W.	300–0–300	70	50	100	B8A	26
RG4–300	5.0*	11.5	H.W.	15,000 P.I.V.	3,000	—	—	B4D	1
GZ32	5.0	2.3	F.W.	500–0–500	125	60	150	IO	62
GZ33	5.0	3.0	F.W.	500–0–500	250	60	250	IO	62
GZ34	5.0	1.9	F.W.	550–0–550	160	60	175	IO	62
RR3–1250/4B32	5.0*	7.1	H.W.	10,000 P.I.V	1,250	—	—	B4F	1
EY51	6.3	0.09	H.W.	5,000	3.0	0.1	100,000	Wires	
EY84	6.3	1.0	H.W.	625	125	24	250	B9A	30
EY86	6.3	0.09	H.W.	22,000 P.I.V Pulsed input	0.5	0.002	—	B9A	50
EZ80	6.3	0.6	F.W.	350–0–350	90	50	200	B9A	31
EZ81	6.3	1.0	F.W.	350–0–350	150	50	240	B9A	31
EZ90	6.3	0.6	F.W.	325–0–325	70	8	520	B7G	31
PY82	19.0	0.3	H.W.	250	130	60	100	B9A	18
PY32	29.0	0.3	H.W.	250	275	100	56	IO	111
HY90	35.0	0.15	H.W.	117	100	40	120	B7G	33
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
S.T.C									
Replacement Type									
4274A (DD)	5.0	2.0	F.W.	1,000	175	4	230	UX4	3
Current Types									
866A	2.5	5.0	H.W.	10,000 P.I.V.	500	—	—	UX4	9
3B28	2.5	5.0	H.W.	10,000 P.I.V.	250	—	—	UX4	9
705A	5.0	5.0	H.W	30,000 P.I.V.	200	—	—	B4A	1
4B32	5.0	7.5	H.W.	10,000 P.I.V.	1,250	—	—	B4F	1
872A	5.0	7.25	H.W.	10,000 P.I.V.	1,250	—	—	B4F	1
TUNGSRAM									
Obsolete Types									
RG250/3000	2.5*	5.0	H.W	3,000	250	—	—	UX4	6
RG250/1000	4.0*	3.0	H.W.	1,000	250	4	—	B4	6
RV120/350	4.0*	2.0	F.W.	350 0 350	120	—	—	B4	5

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
TUNGSRAM (*Continued*)									
Obsolete Types (Continued)									
5X4	5.0*	3.0	F.W.	500–0–500	250	—	—	IO	61
5Z3	5.0*	3.0	F.W.	450–0–450	225	—	75	UX4	3
EZ3	6.3	0.65	F.W.	400–0–400	100	—	—	Ct8	14
EZ4	6.3	0.9	F.W.	400–0–400	175	—	—	Ct8	14
PVB6	6.3	0.6	F.W.	400–0–400	100	—	—	B5	3
6Z4 / 84	6.3	0.5	F.W.	350–0–350	60	—	—	UX5	5
V2118	20.0	0.18	H.W.	250	80	—	—	B5	9
PV25	25.0	0.3	2 × H.W.	250	120	—	—	B7	29
25Y5	25.0	0.3	2 × H.W.	235	75	—	—	UX6	9
PV30	30.0	0.2	2 × H.W.	275	60	—	—	B7	29
PV29	30.0	0.2	2 × H.W.	125	120	—	100	B7	29
50Y6	50.0	0.15	2 × H.W.	117	75	16	30	IO	53
Replacement Type									
V30	30.0	0.2	H.W.	275	120	—	50	B5	1
Current Types									
APV4	4.0*	2.0	F.W.	400–0–400	120	—	—	B4	14
AZ31	4.0	1.1	F.W.	300–0–300	100	60	—	IO	61
RV200/600	4.0*	2.8	F.W.	600–0–600	200	—	—	B4	5
RV120/500	4.0*	2.0	F.W.	500–0–500	120	—	—	B4	5
5U4	5.0*	3.0	F.W.	450–0–450	225	—	75	IO	61
5Y3	5.0*	2.0	F.W.	350–0–350	125	—	—	IO	61
5Z4	5.0	2.0	F.W.	350–0–350	125	—	50	IO	61
80	5.0*	2.0	F.W.	350–0–350	125	—	50	UX4	3
GZ32	5.0	2.3	F.W.	500–0–500	125	60	150	IO	62
GZ33	5.0	2.8	F.W.	500–0–500	250	16	75	IO	62
GZ34	5.0	1.9	F.W.	550–0–550	160	60	175	IO	62
5V4G	5.0	2.0	F.W.	375–0–375	175	—	100	IO	62
6BT4	6.3	0.6	F.W.	350–0–350	90	50	300	B8A	14
6V4	6.3	0.6	F.W.	350–0–350	90	50	300	B9A	31
6X2	6.3	0.09	H.W.	5.000	3	0.1	100.000	Wires	
6X4	6.3	0.6	F.W.	325–0–325	70	8	520	B7G	31
			For pulsed input P.I.V. max. = 22kV						
EZ41	6.3	0.4	F.W.	250–0–250	60	50	325	B8A	14
EZ81	6.3	1.0	F.W.	350–0–350	150	50	240	B9A	31
EZ35	6.3	0.6	F.W	325–0–325	70	16	350	IO	54
6X4	6.3	0.6	F.W.	325–0–325	70	—	150	B7G	31
6X5	6.3	0.6	F.W.	325–0–325	70	4	150	IO	54
	P.I.V. = 4.5kV max.			$I_a(_{pk})$ = 450mA max.		$V_{hk(_{pk})}$ = 4.5kV max.			
PY31	17.0	0.3	H.W.	250	125	60	175	IO	55
	P.I.V. = 4.0kV max.			$I_a(_{pk})$ = 180mA max.		$V_{hk(_{pk})}$ = 650V max.			
19X3	19.0	0.3	—	—	—	—	—	B9A	18
19Y3	19.0	0.3	H.W.	250	180	60	100	B9A	18
V20	20.0	0.2	H.W.	250	120	32	125	B5	8
25Z4	25.0	0.3	H.W.	250	100	16	100	IO	55
CY1	20.0	0.2	H.W.	250	75	32	125	Ct8	5
CY31	20.0	0.2	H.W.	250	120	32	125	IO	55
25Z5 / 25Z6	25.0	0.3	2 × H.W.	235	150	16	100	UX6 / IO	9 / 53
PY32	29.0	0.3	H.W.	250	275	100	56	IO	111
31A3	31.0	0.1	H.W.	250	100	50	210	B8A	1
35W4	35.0	0.15	H.W.	117	100	—	15	B7G	33
35Z4	35.0	0.15	H.W.	235	100	—	100	IO	55
35Z5	35.0	0.15	H.W.	235	100	40	100	IO	51
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
PZ30	52.0	0.3	2 × H.W.	240	200	50	50	IO	52
AMERICAN									
OZ4	—	—	F.W.	300–0–300	75	—	—	IO	57
OY4	—	—	H.W.	95	75	—	—	IO	61
1B48	—	—	H.W.	350	50	—	—	—	—
1V2	0.625*	0.3	H.W.	—	0.5	—	—	B9A	5
1B3	1.25*	0.2	H.W.	P.I.V.=40kV	2	—	—	IO	58
2B25	1.4*	0.11	H.W.	1.000	1.5	—	—	B7G	12
1Z2	1.5*	0.3	H.W.	7.800	2	—	—	B7G	10
2V3	2.5*	5.0	H.W.	P.I.V.=16.5kV	2	—	—	IO	58
2W3	2.5*	1.5	H.W.	350	55	—	—	IO	59
2X2	2.5	1.75	H.W.	4.500	7.5	—	—	UX4	8

(*Continued*)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
AMERICAN *(Continued)*									
2Y2	2.5	1.75	H.W.	4,400	5	—	—	UX4	8
2Z2	2.5*	1.5	H.W.	350	50	—	—	UX4	4
3B25	2.5*	5.0	H.W.	P.I.V.=4.5kV	500	—	—	UX4	9
3B26	2.5	4.75	H.W.	P.I.V.=15kV	20	—	—	IO	58
3B27	2.5	5.0	H.W.	3,000	250	—	—	UX4	4
3B24	5.0*	3.0	H.W.	—	60	—	—	UX4	13
5AZ4	5.0*	2.0	F.W.	500	125	—	—	IO	60
5T4	5.0*	3.0	F.W.	450–0–450	225	—	150	IO	61
5V4	5.0	2.0	F.W.	375–0–375	175	—	100	IO	62
5W4	5.0*	1.5	F.W.	350–0–350	100	4	50	IO	60
5X3	5.0*	2.0	F.W.	1,275–0–1,275	30	—	—	UX4	3
5Y4	5.0*	2.0	F.W.	350–0–350	125	—	—	IO	61
6AX5	6.3	1.2	F.W.	450	40	—	—	IO	54
6W4	6.3	1.2	H.W.	—	125	—	—	IO	109
6W5	6.3	0.9	F.W.	350–0–350	100	—	—	IO	54
6Y3	6.3	0.7	H.W.	5,000	7.5	—	—	IO	102
6Y5	6.3	0.8	F.W.	350–0–350	50	—	—	UX6	12
6Z3	6.3	0.3	H.W.	350	50	—	—	UX4	3
6Z5	6.3	0.8	F.W.	230–0–230	60	—	—	UX6	13
6ZY5	6.3	0.3	F.W.	325–0–325	40	—	25	IO	54
12Z3	12.6	0.3	H.W.	250	60	—	—	UX4	5
12Z5	12.6	0.3	H.W.	225	60	—	—	UX7	10
12Y4	12.6	0.3	F.W.	325	70	—	—	B8B	1
14Z3	12.6	0.3	H.W.	250	60	—	—	UX4	5
25W4	25.0	0.3	H.W.	350	125	—	—	IO	109
25X6	25.0	0.15	V.D.	125	60	—	—	IO	53
25Y4	25.0	0.15	H.W.	250	75	—	—	IO	55
25Z3	25.0	0.3	H.W.	250	50	—	—	UX4	5
28Z5	28.5	0.24	F.W.	325	100	—	—	B8B	1
35Y4	35.0	0.15	H.W.	235	100	—	—	IO	50
35Z6	35.0	0.3	V.D.	125	110	—	—	IO	53
40Z5	40.0	0.15	H.W.	125	100	—	—	IO	51
45Z3	45.0	0.075	H.W.	117	65	—	15	B7G	20
45Z5	45.0	0.15	H.W.	235	60	—	100	IO	51
50X6	50.0	0.15	V.D.	117	75	—	—	B8B	11
50Y7	50.0	0.15	F.W.	117	65	—	—	B8B	49
50Z6	50.0	0.3	V.D.	125	150	—	—	IO	53
50Z7	50.0	0.15	V.D.	117	65	—	15	IO	52
50Z6	50.0	0.3	V.D.	125	150	—	—	IO	53
50Z7	50.0	0.15	V.D.	117	65	—	15	IO	52
117Z3	117.0	0.04	H.W.	117	90	—	15	B7G	35
117Z4	117.0	0.04	H.W.	117	90	—	—	IO	55
117Z6	117.0	0.075	2 × H.W.	235	120	40	100	IO	53

METAL RECTIFIERS

Type	Type of Rectification	Input Volts R.M.S.	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rect. Volts
BRIMAR					
Replacement Types					
RM4B	H.W.	250	250	32	268
SB2	H.W.	125	40	32	125
SB3	H.W.	250	60	32	220
K3/15	H.W.	360	1.0	—	840**
K3/25	H.W.	600	1.0	—	1,400**
K3/40	H.W.	960	1.0	—	2 240**
K3/45	H.W.	1,080	1.0	—	2,520**
K3/50	H.W.	1,200	1.0	—	2,800**
K3/100	H.W.	2,400	1.0	—	5.600**
Q1/1	H.W.	68*	0 25	—	56**

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rect. Volts
BRIMAR *(Continued)*					
Replacement Types (Continued)					
Q1/2	H.W.	136*	0.25	—	112**
Q1/5	H.W.	340*	0.25	—	280*
Q3/3	H.W.	204*	1.0	—	168**
Q3/4	H.W.	272*	1.0	—	224**
Q3/5	H.W.	340*	1.0	—	280**
Q6/1	H.W.	68*	3.5	—	56**
Q6/5	H.W.	340*	3 5	—	280**
D3/2/1Y	H.W.	136* per arm	1.0 per arm	—	112** per arm
V3/1/1Y	H.W.	68* per arm	1.0 per arm	—	56** per arm
V3/2/1Y	H.W.	136* per arm	1.0 per arm	—	112** per arm
Current Types					
DRM1B	H.W.	250	60	16	280
DRM2B	H.W.	250	100	16	260
DRM3B	H.W.	250	120	16	285
RM0	H.W.	125	30	8	130
RM1	H.W.	125	60	16	140
RM1A	H.W.	125	100	16	150
RM2	H.W.	125	100	32	130
RM3	H.W.	125	120	16	140
RM4	H.W.	250	250	32	268
RM5	H.W.	250	300	32	255
C2H†	H.W.	125	60	16	115
C3H†	H.W.	125	120	16	85
C2D†	H.W.	250	60	16	245
C2D†	V.D.	125	60	16	245
C3D†	H.W.	250	120	16	245
C3D†	V.D.	125	120	16	205
C2V†	F.W.	125-0-125	120	16	120
C3V†	F.W.	125-0-125	240	16	115
C3B†	Bridge	250	120	16	250

* Peak inverse volts. ** Max. instantaneous reverse d.c. volts. † Contact cooled types.

G.E.C.					
Replacement Types					
MR4A	H.W.	250	300	100	290
ZC13H16XFB2	H.W.	250	500	100	250
Current Types					
Z11H8X	H.W.	125	80	20	130
Z21H8X	H.W.	125	125	32	130
Z12H8X	H.W.	125	190	48	130
Z22H8X	H.W.	125	275	64	130
Z13H8X	H.W.	125	375	100	130
Z116AHX	H.W.	250	80	20	290
Z21H16X	H.W.	250	125	32	290
Z12H16X	H.W.	250	190	48	290
Z22H16X	H.W.	250	275	64	290
Z13H16X	H.W.	250	375	100	290
AR2	H.W.	250	300	100	290
PR1	H.W.	250	275	64	290
KB4	H.W.	250	275	64	290
KB5	H.W.	250	300	100	290
ZC13H16XE	H.W.	240	300	64	270
ZC13H17XE	H.W.	250	300	100	280
ZC13D8XE	V.D.	120	300	64	270
ZC13D9XE	V.D.	125	300	100	280
ZC12H16XFE	H.W.	240	200	48	270
ZC12H17XFE	H.W.	250	200	48	280
Z11B1X	Bridge	27	150	—	21.5
Z21B1X	Bridge	27	240	—	21.5
Z12B1X	Bridge	27	360	—	21.5
Z22B1X	Bridge	27	520	—	21.5
Z13B1X	Bridge	27	720	—	21.5
CR-1†	H.W.	250	30	4	270
	V.D.	125	30	4	270
CR-1A†	H.W.	125	60	8	135
	F.W.	60-0-60	60	8	130

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rect. Volts
G.E.C. *(Continued)*					
Current Types (Continued)					
CR-2†	H.W.	250	60	8	270
	Bridge	243	60	4	260
	F.W.	121–0–121	60	4	260
	V.D.	125	60	8	270
CR-2A†	H.W.	125	120	32	135
	F.W.	60–0–60	120	8	130
CR-2B†	H.W.	500	30	4	540
	V.D.	250	30	4	540
9649776	H.W.	250	300	100	280
	V.D.	125	300	120	270
9749730‡	H.W.	250	60	16	290
ZE22H16X‡	H.W.	250	275	64	290
ZE22H18X‡	H.W.	250	300	100	290
RRO	H.W.	125	30	16	140
RR1	H.W.	125	60	16	130
RR2	H.W.	125	100	32	135
RR3	H.W.	125	120	32	130
P46H1X and intermediate types to	H.W.	16 and multiples to	5	8	16
P46H9X	H.W.	144	5	1.0	144
Z46H10X and intermediate types to	H.W.	160 and multiples to	5	0.8	160
ZC46H440X	H.W.	7,040	5	0.02	7,040
Z48H10X and intermediate types to	H.W.	160 and multiples to	12	2	160
Z48H440X	H.W.	7,040	12	0.045	7,040

† Contact-cooled types. ‡ Printed-circuit types.

S.T.C.					
RM0	H.W.	125	30	8	130
RM1	H.W.	125	60	16	130
RM2	H.W.	125	100	32	125
RM3	H.W.	125	120	16	125
DRM1B	H.W.	250	60	8	250
DRM2B	H.W.	250	100	16	250
DRM3B	H.W.	250	120	16	260
RM4	H.W.	250	250	32	275
C2H	H.W.	125	60	16	120
C3H	H.W.	125	120	16	100
C2D	H.W.	250	60	16	250
C3D	H.W.	250	120	16	250
C2D	F.W.	125	60	16	260
C3D	F.W.	125	120	16	240
C2V	F.W.	125–0–125	120	16	130
C3V	F.W.	125–0–125	240	16	120
C3B	Bridge	250	120	16	260
V18-28-1RW	F.W.	250–0–250	60	4	250
V25-28-1RW	F.W.	250–0–250	100	4	250
V25-40-1W	F.W.	350–0–350	150	4	345
V25-56-1RW	F W.	500–0–500	100	4	535
B18-14-1RW	Bridge	250	60	4	250
B25-14-1RW	Bridge	250	100	4	250
B18-1-1RW	Bridge	18	60	—	14
B25-1-1W	Bridge	18	150	—	14
BA40-1-1W	Bridge	18	300	—	14
B45-1-1W	Bridge	18	600	—	14
Q3/1 and intermediate types to	H.W.	24	1	4	23
K8/200	H.W.	4,800	1	0.01	5kV
Q8/1 and intermediate types to	H.W.	24	5	16	25
K8/200	H.W.	4,800	5	0.25	5.7kV
N388/6 and intermediate types to	H.W.	108	10	16	137
N388/200	H.W.	3 600	10	0.5	4.25kV

C = Contact Cooled selenium rectifiers of small volume.

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rect. Volts
WESTINGHOUSE					
HT43	V.D.	275	120	2 × 16	600
HT44	V.D.	210	120	2 × 16	400
HT45	V.D.	170	120	2 × 16	300
HT46	H.W.	250	120	16	240
HT47	H.W.	250	120	16	260
HT48	H.W.	250	35	8	260
HT49	H.W.	108	30	8	120
HT50	F.W.	300–0–300	40	8	350
HT51	F.W.	350–0–350	100	16	400
HT52	F.W.	350–0–350	200	32	400
HT53	F.W.	500–0–500	200	32	600
HT54	H.W.	120*	60	16	110
HT57	H.W.	240	300	100	270
HT59	H.W.	250	300	100	280
14A86	H.W.	240	200‡	64	280
4A88	V.D.	150	200‡	2 × 32	250
14A100	H.W.	250	200‡	64	290
4C1017	C.T.	2.5–0–2.5	120‡	2,000	1.5
LW7	H.W.	240	300‡	100	270
LW9	H.W.	250	300‡	100	280
LW13	H.W.	240	300	100	280
14B35	H.W.	100	70‡	32	110
14A163	V.D.	120	120‡	2 × 50	250
14A975	H.W.	250	120‡	16	260
14A342	H.W.	250	300‡	100	290
14B261	H.W.	210	70‡	32	240
14A124	F.W.	250	200‡	80	300
15B35	H.W.	240	45‡	32	270
14B986	H.W.	250	70‡	16	275
14A97	F.W.	240	250‡	64	275
14B130	H.W.	240	200‡	64	265
2 × 15D39	C.T.	120–0–120	45‡	32	140
14A144	F.W.	350	200‡	64	500
15B39	C.T.	95–0–95	100‡	32	95
14B980	H.W.	240	70‡	50	275
41D958	C.T.	2.5–0–2.5	100	2,000	1.5
151D19	H.W.	125	25	32	150
15C997	H.W.	125	35	36	150
5D1	H.W.	2	40	240	1.5
O11L999	H.W.	3	225	1,000	2.0
14A949	H.W.	250 a.c./d.c.	200	100	280
18RA.1-1-8-1†	H.W.	125	60	32	140
18RA.1-1-8-2†	H.W.	125	120	64	140
16RC.1-1-16-1†	H.W.	250	20	4	280
18RA.1-1-16-1†	H.W.	250	60	16	280
14RA.1-2-8-2†	H.W.	250	200	64	280
14RA.1-2-8-3†	H.W.	250	300	100	280
18RA.1-2-8-1†	V.D.	125	60	32	270
16RD.2-2-8-1†	Bridge	250	40	4	260
18RD.2-2-8-1†	Bridge	250	120	16	270
16RE.2-1-8-1†**	C.T.	120–0–120	40	8	130
18RA.2N-1-8-1†	C.T.	120–0–120	120	24	130
18RD.2N-1-16-1	C.T.	250–0–250	120	16	270
14RA.2-1-16-1	C.T.	250–0–250	200	24	270
16K1 and intermediate types to	H.W.	15 and multiples to	8	32	15
16K16	H.W.	240	8	2	240
16HT12 and intermediate types to	H.W.	180	8	4	190
16HT258	H.W.	3,865	8	0.2	4,120
16MB1 and intermediate types to	H.W.	15	8	32	15
16MB4	H.W.	60	8	4	60
36MB1 and intermediate types to	H.W.	27	2	4	30
36MB4	H.W.	108	2	0.55	108
36K1 and, intermediate types to	H.W.	27 and multiples to	2	4	30
36K14	H.W.	378	2	0.5	440

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rect. Volts
WESTINGHOUSE (*Continued*)					
36EHT10 and intermediate types to	H.W.	270†	2	0.5	300
36EHT240	H.W.	6,480	2	0.05	7,900
39K1 and intermediate types to	H.W.	27 and multiples to	0.1	0.25	32
39K12	H.W.	324	0.1	0.02	370
39E10	H.W.	270	0.1	0.25	310
intermediate types to		and multiples to			
39E60	H.W	1,620	0.1	0.005	1,900

* Max. open circuit voltage. Potential Divider (Line Cord) A.C. or D.C.
† Contact-cooled types.
‡ The current rating given is typical for average conditions of ventilation, but the actual rating in any particular application will depend on the cooling provided and may be above or below the figure quoted.
** Case forms D.C. negative connection.

E.H.T. RECTIFIERS

(Pulse and sine-wave operation for television e.h.t. supplies)

Type	Heater		Peak Inverse Volts	Max. Rect. Current (mA)	Min. Effective Series R (Ω)	Recommended Reservoir Capacitance (μF)	D.C. Output Voltage	Capacitance a-k (pF)	Base	
	Volts	Amps							Type	Ref.
BRIMAR										
Replacement Type										
R16/1T2	1.4	0.14	15,000	2.0	—	—	—	0.65	Wires	
Current Types										
R19/1X2B	1.25	0.2	25,000	2.0	—	—	—	1.0	B9A	32
R10	4.0	0.5	12,500	5.0	—	—	—	—	B7G	22
R12	6.3	0.09	17,000	0.1	—	—	—	—	Wires	
COSSOR										
Replacement Type										
SU25	2.0	0.5	25,000	1.0	—	0.1	—	—	IO	102
Current Types										
SU61	6.3	0.09	15,000	0.1	100,000	0.001	—	—	Wires	
SU61 Sine-wave operation			15,000	0.5	100,000	0.1	—	—		
6W2	6.3	0.08	25,000	0.5	—	0.005	—	0.7	Wires	
EY86	6.3	0.09	22,000	0.8	—	0.002	—	1.7	B9A	50
EDISWAN MAZDA										
Replacement Types										
U24	2.0	0.15	20,000	0.1	—	0.00025	15,000	1.3	IO	102
U24 Sine-wave operation			20,000	0.5	—	to 0.001	9,500	1.3		
Current Type										
U25	2.0	0.2	19,000	0.2	—	0.00025	16,000	0.6	Wires	
U25 Sine-wave operation			19,000†	0.5	—	to 0.001	9,500	0.6		
U26	2.0	0.35	23,500	0.2	—	0.00025 to 0.001	—	0.9	B9A	50
				† at <250 kcs.						
EMITRON										
Replacement Type										
SU25	2.0	0.5	25,000	1.0	100,000	0.1	—	—	IO	102
Current Type										
6W2	6.3	0.08	25,000	0.5	—	0.005	—	0.7	Wires	
FERRANTI										
Replacement Type										
HR1	0.65	0.055	12,500	0.05	2MΩ	0.002	—	0.7	B7G	1

(Continued)

Type	Heater Volts	Heater Amps	Peak Inverse Volts	Max. Rect. Current (mA)	Min. Effective Series R (Ω)	Recommended Reservoir Capacitance (μF)	D.C. Output Voltage	Capacitance a-k (pF)	Base Type	Ref.
FERRANTI *(Continued)*										
Current Types										
HR2	4.0	0.5	13,000	5.0	50,000	0.25	5,500	—	B7G	22
6W2	6.3	0.08	25,000	0.5	—	0.005	—	0.7	Wires	
EY51/6X2	6.3	0.09	17,000	0.35	—	0.005	—	0.8	Wires	
EY51/6X2 Sine-wave operation (10-500 kc/s)			17,000	0.5	—	0.01	—	0.8		
EY86/6S2	6.3	0.09	22,000	0.8	—	0.002	—	1.7	B9A	50
G.E.C.										
Current Types										
U37	1.4	0.155	15,000	2.0	—	0.001	7,500	0.45	Wires	
U47	2.0	0.2	20,000	0.2	—	0.00025	15,000	—	Wires	
U49	2.0	0.35	25,000	0.2	—	0.00005 to 0.001	—	—	B9A	50
U43	6.3	0.09	17,000	0.35	100,000	0.005	—	0.8	Wires	
U45	6.3	0.12	18,000	0.35	100,000	0.005	—	0.8	Wires	
MARCONI										
Obsolete Types										
U151	6.3	0.09	17,000	0.35	—	0.005	—	0.8	Wires	
U151 Sine-wave operation			17,000	0.5	—	0.01	—	0.8		
Current Types										
U37	1.4	0.14	15,000	2.0	—	0.001	7,500	0.65	Wires	
EY51/U43	6.3	0.09	17,000	0.35	100,000	0.005	—	0.8	Wires	
EY51/U43 Sine-wave operation	—		17,000	0.5	—	0.01	—	0.8	Wires	
U45	6.3	0.12	18,000	0.35	100,000	0.005	—	0.8	Wires	
6W2	6.3	0.08	25,000	0.5	—	0.005	—	0.7	Wires	
EY86	6.3	0.09	22,000	0.8	—	0.002	—	6.7	B9A	33
MULLARD										
Current Types										
EY51 Pulsed input	6.3	0.09	17,000	0.35	—	0.005	—	0.08	Wires	
EY51 Sine-wave operation (10,500 kc/s)			17,000	0.5	—	0.001	—	0.8		
EY86 Pulsed input	6.3	0.09	22,000	0.8	—	0.002	—	1.7	B9A	50
TY86F Pulsed input	7.4	0.077	Other data as EY86							
S.T.C.										
K8/80	—	—	6,400	0.1	—	0.005	5,600	—	(metal rectifier)	
K8/100	—	—	8,000	0.1	—	0.005	7,200	—	(metal rectifier)	
K8/120	—	—	9,600	0.1	—	0.005	8,600	—	(metal rectifier)	
K8/140	—	—	11,200	0.1	—	0.005	10,000	—	(metal rectifier)	
K8/180	—	—	14,400	0.1	—	0.005	12,900	—	(metal rectifier)	
K8/200	—	—	16,000	0.1	—	0.005	14,400	—	(metal rectifier)	
2T/270K	4.0	0.5	15,500	5.0	50,000	0.3	5,500	—	B7G	22
TUNGSRAM										
6X2	6.3	0.09	17,000	0.35	—	0.005	—	0.8	Wires	
6X2 Sine-wave operation (10-500 kc/s)			17,000	0.5	—	0.01	—	0.8	Wires	
EY86	6.3	0.09	22,000	0.8	—	0.002	—	1.7	B9A	33
WESTINGHOUSE										
Current Types										
39E10 Sine-wave operation			850	0.1	—	0.025	310	—	(metal rectifier)	
and intermediate types to										
39E60 Sine-wave operation			5,100	0.1	—	0.005	1,900	—	(metal rectifier)	
36EHT20 Sine wave operation			1,700	2.0	—	0.5	600	—	(metal rectifier)	
intermediate types to										
36EHT240 Sine-wave operation			20,400	2.0	—	0.05	7,900	—	(metal rectifier)	
39E20 and intermediate types to			1,450	0.1	—	—	1,310	—	(metal rectifier)	
39E60			4,350	0.1	—	—	3,430	—	(metal rectifier)	
36EHT20 and intermediate types to			1,450	0.1	—	—	1,310	—	(metal rectifier)	
36EHT240			17,400	0.1	—	—	15,700	—	(metal rectifier)	

CATHODE-RAY TUNING INDICATORS

Type	Heater		Target Volts	Target Current (mA)	Grid Voltage Change	Base	
	Volts	Amps				Type	Ref.
BRIMAR							
Replacement Types							
6U5/6G5	6.3	0.3	250	4.0	22	UX6	11
EM71	6.3	0.3	250	2.5	20	B8B	57
1629	12.6	0.15	250	4.0	8	IO	46
Current Types							
EM85	6.3	0.3	250	2.1	18	B9A	40
6U5G	6.3	0.3	250	4.0	22	IO	46
EM84	6.3	0.25	250	1.1 to 1.6	22	B9A	56
EM840	6.3	0.25	250	1.1 to 1.6	21	B9A	56
12U5	12.6	0.15	Other data as type 6U5G				
COSSOR							
Replacement Type							
63ME	6.3	0.3	250	4.5	22	IO	46
Current Types							
64ME	6.3	0.2	250	0.75	2.5 & 16.00	IO	48
65ME	6.3	0.3	250	2 to 2.3	15	B9A	41
EM81	6.3	0.3	250	2 to 2.3	9.5	B9A	41
EDISWAN MAZDA							
Obsolete Types							
AC/ME	4.0	0.5	250	1.5	22	B7	19
ME920	9.0	0.2	175	2.6	19	B7	19
Replacement Types							
ME41	4.0	0.5	250	1.16	22.5	MO	21
6M1	6.3	0.3	250	1.16	22.5	IO	46
ME91	9.0	0.2	175	2.7	19	MO	21
10M1	18.0	0.1	250	1.16	22.5	IO	46
Current Types							
1M1	1.4	0.025	90	0.25	13.5	B8D	9
			60	0.12	8.0		
6M2 (Dual sensitivity)	6.3	0.2	250	0.46	4 & 20	IO	135
10M2 (Dual sensitivity)	12.6	0.1	200	0.4	3 & 20	IO	136
EMITRON							
Current Type							
EM80	6.3	0.3	250	2.0	13	B9A	41
FERRANTI							
Obsolete Types							
VFT4	4.0	0.5	200–250	0.5	20.0	IO	46
FT4	4.0	0.5	200–250	0.5	6	IO	46
Replacement Types							
VFT6	6.3	0.3	200	4.5	22	IO	46
1629	12.6	0.15	250	2.0	7.5	IO	46
Current Types							
DM70/1M3	1.4*	0.025	85	0.17	10	B8D	9
			60	0.1	7		
EM80/6BR5	6.3	0.3	250	2.3	13	B9A	41
EM81	6.3	0.3	250	2.3	9.5	B9A	41
MARCONI							
Current Types							
EM80	6.3	0.3	250	2.0	13	B9A	41
EM81	6.3	0.3	250	2 to 2.3	−1 to −10.5	B9A	41
G.E.C.							
Obsolete Types							
Y64	6.3	0.3	80–250	4.5	22	IO	46
Y61	6.3	0.3	180–250	4.5	22	IO	46
Y62	6.3	0.3	80–250	4.5	22	IO	46
Y63	6.3	0.3	180–250	4.5	22	IO	46
Y65	6.3	0.3	180–250	4.5	11	IO	46
Current Types							
Y25	1.4	0.25	90	0.25	13.5	B8D	9
			60	0.12	8		
Y119	1.9	0.1	90–250	1.0	−1.3	B9A	—

(Continued)

Type	Heater		Target Volts	Target Current (mA)	Grid Voltage Change	Base	
	Volts	Amps				Type	Ref.
MULLARD							
Obsolete Types							
TV4	4.0	0.3	250	0.13	5	Ct8	9
EM1	6.3	0.2	250	0.13	5	Ct8	9
EM3	6.3	0.2	250	0.3	21	Ct8	9
EM4	6.3	0.2	250	0.75	5 & 16	Ct8	20
UM34	12.6	0.1	250	0.75	5 & 16	IO	48
Replacement Types							
EM34	6.3	0.2	250	0.75	5 & 16	IO	48
EM80	6.3	0.3	250	2.3	13	B9A	41
Current Types							
DM70	1.4*	0.025	85 60	0.17 0.1	10 7	B8D	9
EM81	6.3	0.3	250	2.3	9.5	B9A	41
EM84	6.3	0.27	250	1.6	22.0	B9A	55
UM4	12.6	0.1	200	1.4	4.2 & 12.5	IO	136
UM81	19.0	0.1	200	7.0	13.0	B9A	41
TUNGSRAM							
Obsolete Types							
VME4	4.0	0.5	250	2.0	22	B7	19
6G5G	6.3	0.3	250	2.0	22	IO	46
ME6-S	6.3	0.2	250	2.0	5	Ct8	9
EFM1	6.3	0.2	250	0.75	20	Ct8	18
EM1	6.3	0.2	250	0.7	5	Ct8	9
EM4	6.3	0.2	250	0.75	5 & 16	Ct8	20
Replacement Type							
EM34	6.3	0.2	250	0.75	5 & 16	IO	48
Current Types							
DM70	1.4*	0.025	85 60	0.17 0.10	10 7	B8D	9
6U5G	6.3	0.3	250	0.4	22	IO	46
EM80	6.3	0.3	250	2.3	13	B9A	41
EM81	6.3	0.3	250	2.3	9.5	B9A	41
AMERICAN							
2E5	2.5	0.3	250	4.0	7.5	UX6	11
2G5	2.5	0.8	250	4.0	22	UX6	11
6AB5 6N5	6.3	0.15	135	1.9	15.5	UX6	11
6AD6	6.3	0.15	150	3.0 & 1.2	3.0 & 50	IO	46
6AF6	6.3	0.15	135	1.5	81	IO	100
6AF7	6.3	0.3	—	—	—	IO	48
6AL7	6.3	0.15	—	—	—	IO	101
6E5	6.3	0.3	250	2.0	7.5	UX6	11
6G5 6H5 6U5	6.3	0.3	250	4.0	22	UX6	11
6T5	6.3	0.3	250	4.0	—	UX6	11
6X6	5.3	0.3	250	2.0	—	IO	46
1629	12.6	0.15	250	2.0	7.5	IO	46

BARRETTERS

Type	Stabilized Current (A)	Voltage Drop	Base	
			Type	Ref.
BRIMAR				
Replacement Type				
D15	0.15	90–140	IO	75
EDISWAN				
Current Types				
BU10	0.13	50–80	B4	13
BU29/4	0.285	2.5–6	IO Pins 2 & 7	
BU30/6	0.3	3–9	Edison Screw	
BU65/10	0.65	6–14	Edison Screw	
BU78/10	0.78	8–14	B4	20
BU115/22	1.15	11–31	B4	20
BU200/14	2.0	8–20	B4	20
BU280/20	2.8	10–30	B4	13
BU600/6	6.0	3–9	Edison Screw	
G.E.C.				
Replacement Type				
161	0.16	100–180	Edison Screw	
G.E.C. (*Continued*)				
Current Types				
301	0.3	138–221	Edison screw	
302	0.3	112–195	,,	,,
303	0.3	86–129	,,	,,
304	0.3	95–165	,,	,,
305	0.3	40–90	,,	,,
101	0.1	75–150	IO	75
HIVAC				
Current Types				
XB1	0.3	9–16	B7G	57
XB2	0.305	7.4–12.4	B7G	57
TUNGSRAM				
Obsolete Types				
BR201	0.2	90–230	B4	13
BR201S			Ct8	8
BR202	0.2	40–100	B4	13
BR202S			Ct8	8
BR300OC	3.0	7–18	Edison Screw	
BR300	0.3	90–230	,,	,,
BR1500	1.5	—	B4	13

VOLTAGE STABILIZERS

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA)		Regulation (volts)	Base	
			Min.	Max.		Type	Ref.
BRIMAR							
Current Types							
OA2	150	185	5	30	6.0	B7G	28
OB2	108	133	5	30	4.0	B7G	28
VR75/30	75	100	5	40	6.5	IO	74
VR105/30	105	135	5	40	4.0	IO	74
VR150/30	150	180	5	40	5.5	IO	74
6BD4	High vacuum stabilizer $V_h = 6.3$, $I_h = 0.6$A, V_a max = 20kV, I_a max = 1.5mA					IO	130
COSSOR							
Current Types							
S130	120	180	6	75	5	B4	12
S130P	120	135§	5	75	7.5	B4	15
150B3	153	170	2	20	5	B7G	40
EMITRON							
Replacement Types							
S130	120	180	6	75	5	B4	12
S130P	120	135§	5	75	7.5	B4	15

(*Continued*)

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA) Min.	Tube Current (mA) Max.	Regulation (volts)	Base Type	Base Ref.
ENGLISH ELECTRIC							
Current Types							
OA2(QS1207)	150	185	5	30	6.0	B7G	28
OA2WA(QS1210) (SQ)	150	165	5	30	5.0	B7G	28
OA3(QS1205)	75	105	5	40	6.5	IO	74
OB2(QS1208)	108	133	5	30	3.5	B7G	28
OB2WA(QS1211) (SQ)	108	133	5	30	3.0	B7G	28
OC3(QS1206)	108	133	5	40	4.0	IO	74
OD3(QS150/40)	150	180	5	40	5.5	IO	74
5651/QS1209	84	115	1	8	3.0	B7G	28
QS75/20	75	110	2	20	6.0	B7G	70
QS75/60	75	117	5	60	5.0	B8G	64
QS83/3	83	115	1	8	1.5	B7G	28
QS92/10	92	140	1	10	5.0	B4	12
QS95/10	95	110	2	10	5.0	B7G	40
QS108/45	108	120	5	45	5.0	B8G	55
QS150/15	150	170	2	15	5.0	B7G	40
QS150/45	150	170	5	45	5.0	B8G	55
QS1200	150	180	5	15	5.0	B7G	55
QS1201 (SQ)	75	110	2	15	4.5	B7G*	28
QS1202 (SQ)	108	133	2	15	3.0	B7G*	28
QS1203 (SQ)	150	180	2	15	4.5	B7G*	28
QS1204	108	133	5	25	3.0	B7G	28
QS1212 (SQ)	85	115	1	10	4.0	B7G	28
QS1213 (SQ)	85	115	1	10	4.0	B7G*	28
		* Flying leads.					
FERRANTI							
Current Types							
KD21	75	105	5.0	40	4.5	IO	74
KD24	105	135	5.0	40	4.0	IO	74
KD25	150	180	5.0	40	5.5	IO	74
KD60	62	80	0.1	2.5	0.4	Caps	
KD61	62	80	0.1	2.5	0.4	Wires	
KD63	62	100	0.2	2.5	0.5	Wires	
G.E.C.							
Obsolete Types							
QS105/45	105	130†	5	45	5	B8B	55
QS108/45	108	120†	5	45	5	B8B	55
S130	120	160	6	75	5	B4	12
Current Types							
QS70/20	70	95	2	20	6	B7G	53
QS95/10	95	110	2	15	5	B7G	40
QS150/15	150	177	2	10	5	B7G	40
QS150/40	150	180	5	40	5.5	IO	74
QS75/40	75	105	5	40	6.5	IO	74
S130P	120	135§	5	75	7.5	B4	15
QS150/45	150	170††	5	45	5	B8B	55
ST11	100	140	1	8	5	B4	12
QS83/3	83	130	1	5	—	B7G	52
STV280/40*	280	420	5	35	—	B5	15
STV280/80*	280	420	10	70	—	B5	15
MULLARD							
Obsolete Types							
13201A	100	135	15	200	5	B4	12
75B1	75	110	2	22	6	B7G	40
85A1	85	125	1	8	—	B8B	41
95A1	95	110	2	10	5	B7G	40
150B3	153	170	2	20	5	B7G	40
4687	100	130	10	40	6	Ct8	22
4687A	100	130	10	40	6	B4	12
7475	100	140	1	8	2	B4	12
Current Types							
75C1	78	115	2	60	<5	B7G	55
85A2 M8098 (SQ) M8142 (SQ)	85	115	1	10	3	B7G	28
85A3	86	125	0.5	3.5	3	Wires	

(Continued)

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA) Min.	Tube Current (mA) Max.	Regulation (volts)	Base Type	Base Ref.
MULLARD *(Continued*							
Current Types (Continued)							
90C1, M8206 (SQ)	90	115	1	40	14	B7G	28
5644	90	125	5	25	5	B8D	12
108C1	108	133	5	30	3.5	B7G	28
150C4	150	165	5	30	6	B7G	28
150B2, M8163 (SQ), M8208 (SQ)	150	180	5	15	5	B7G	55
150C2	150	185	5	30	6	B7G	28
S.T.C.							
Current Types							
G55/IK	55	90	2	30	5	B7G	28
G120/1B	55	120	2	30	4.7	B4	12
VR75/30	75	105	5	40	6.5	IO	74
G75/3G	75	115	5	60	6.5	B8B	58
VR105/30	108	127	5	40	4	IO	74
OB2	108	127	5	30	3.5	B7G	28
VR150/30	150	180	5	40	5.5	IO	74
OA2	150	180	5	30	6	B7G	28
G180/2G	150	180	5	45	5	B8B	55
G180/2M	150	180	5	45	5	B8B	Wires
G400/1K	306	400	2	4	3	B7G	62
G400/2G	306	400	2	4	3	B7G	62
TUNGSRAM							
Current Types							
VR105/30	105	135	5.0	40	4.0	IO	74
VR150/30	150	180	5.0	40	5.5	IO	74
AMERICAN							
0A2	150	155	5	30	—	B7G	28
0B2	108	133	5	30	—	B7G	28
1B47	82	225	1	2	—	B7G	28
1C21	—	180	—	0.1	—	IO	108
0A3	75	105	5	40	—	IO	74
0B3	90	125	5	40	—	IO	74
0C3	105	135	5	40	2	IO	74
0D3	150	185	5	40	4	IO	74

§ With primer taken to 190V through 50 kΩ.
† With primer taken to 150V through 40kΩ.
†† With primer taken to 200V through 80kΩ.
††† With primer taken to 200V through 100kΩ.
‡ With primer taken to 150V through 250kΩ.
‡‡ With primer taken to 150V through 100kΩ.
‡‡‡ With primer taken to 240V through 250kΩ.
* Multi-gap types.

THYRATRONS

Type	Heater Volts	Heater Amps	Max. Anode Volts	Max. Peak Current (mA)	Control Ratio	Valve Voltage Drop	Max. Frequency (c/s)*	Base Type	Base Ref.
BRIMAR									
Current Type									
2D21	6.3	0.6	650	500	250	8	—	B7G	51
COSSOR									
Replacement Types									
GDT4B	4	1.75	350	500	45	15–18	50,000	B5	9
GDT4C	4	1.75	350	1,000	40	15–18	10,000	B5	9

(Continued)

Thyratrons

Type	Heater		Max. Anode	Max. Peak Current (mA)	Control Ratio	Valve Voltage Drop	Max. Frequency (c/s)*	Base	
	Volts	Amps						Type	Ref.
EDISWAN MAZDA									
Obsolete Type									
T31	4.0	1.5	400	500	20	40	20,000	B5	9
Replacement Types									
T41	4.0	1.5	400	500	20	40	20,000	MO	16
6K25	6.3	0.95	400	500	20	40	20,000	IO	20
Current Types									
20A2	6.3	1.0	600	1,250	350	9	—	IO	113
20A3	6.3	0.6	650	500	250	8	—	B7G	46
FERRANTI									
Replacement Type									
GK3	Cold cathode		140	20	—	73	—	B4	18
Current Types									
EN30	Cold cathode		380	250A	—	20	—	IO	124
GN10	Cold cathode		550	250A	—	20	—	IO	123
GN20	Cold cathode		420	250A	—	20	—	IO	123
GK32	Cold cathode		140	20	—	80	—	Caps	
GK33	Cold cathode		140	20	—	80	—	Wires	
GK40	Cold cathode		150	20	—	73	—	Caps	
GK41	Cold cathode		150	20	—	73	—	Wires	
GK10	Cold cathode		150	30	—	70	—	B7G	56
GK20	Cold cathode		230	30	—	130	—	B7G	56
GL1	2.5	7.0	1,250	6,000	—	16	—	IO	125
GL2	2.5	3.2	1,250	2,500	—	16	—	IO	132
3C23	2.5	7.0	1,250	6,000	—	16	—	UX4	20
HIVAC									
Current Types									
XFG1	1.25	0.05	45	—	—	—	—	Wires	
XG2	6.3	0.150	500	100	200	10	200	B8D	10
XC13	Cold cathode		200	7.5	—	70	—	Wires	
XC18	Cold cathode		200	1.0	—	73	—	Wires	
XC22	Cold cathode		200	0.25	—	70	—	Wires	
MULLARD									
Replacement Types									
AN1	4.0	1.45	650	2,000	28	9	—	B5	1
EN31	6.3	1.3	1,000	750	35	33	150,000	IO	112
Current Types									
EN91	6.3	0.6	650	500	250	8	500	B7G	51
EN92	6.3	0.15	350	100	—	10	—	B7G	46
EN93	6.3	0.25	350	110	—	18	—	B7G	72
Z300T/1267	Cold cathode		225	100	—	70	—	IO	108
EN70	6.3	0.15	500	100	—	11	—	B8D	10
EN32	6.3	0.95	650	2,000	275	10	—	IO	126
Z800U	Cold cathode		275	10	—	110	—	B9A	58
Z801U	Cold cathode		170	10	—	105	—	B9A	57
Z803U	Cold cathode		290	50	—	105	—	B9A	51
Z900T	Cold cathode		200	100	—	62	—	B7G	71
Z804U	Cold cathode		400	125	—	112	—	B9A	59
S.T.C.									
Replacement Type									
4313C	Cold cathode		150	30	—	75	—	UX4	22
Current Types									
2D21	6.3	0.6	650	500	250	8	—	B7G	51
3D22	6.3	2.6	650	8,000	150	10	—	B7G	73
G150/2D	Cold cathode		150	50	—	60	—	IO	141
G240/2D	Cold cathode		240	50	—	90	—	IO	141
G1/236G	Cold cathode		235	1.5	—	70	—	Wires	
AMERICAN									
2B4	2.5	1.4	300	300	—	19	—	UX5	1
629	2.5	2.6	350	200	—	—	—	UX5	1
885	2.5	1.4	300	300	—	—	—	UX5	1
6Q5	6.3	0.6	300	300	—	19	—	IO	20
884	6.3	0.6	300	300	—	—	—	IO	20
5696	6.3	0.15	500	100	250	10	—	B7G	46

* For time-base use as a saw-tooth oscillator.

TELEVISION CATHODE-RAY TUBES

Type	Heater		kV (max.)		Final Anode μA* Max. Average	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
BRIMAR														
Obsolete Types														
C15B	2.0	2.5	14	—	150	−60 to −140	—	—	9	7	15	A	IO	112
C12E	6.3	0.6	8	—	150	−50	—	100	10	7	12	—	IO	112
Replacement Types														
C9A	2.0	1.4	6	—	150	−30	—	—	5	5	9	—	MO	24
C9B	2.0	2.5	8	—	150	−40 to −100	—	150	9	7	9	A	IO	112
C12A	2.0	1.4	6	—	150	−35	—	—	5	5	12	—	MO	24
C12B	2.0	2.5	12	—	150	−60 to −140	—	150	9	7	12	A, F	IO	112
C12D	2.0	2.5	7	—	150	−40 to −100	—	150	9	7	12	F	IO	112
C12FM	6.3	0.3	9	0.35	175	−40	63	150	7	5	12	IT, M	B12A	1
C14BM	6.3	0.6	14	—	250	−50 to −100	70	150	9	7	14††	A, M, R	B12A	5
C17BM	6.3	0.6	17.5	—	250	−50 to −100	70	150	9	7	17††	A, M, R	B12A	5
C17JM	6.3	0.6	17.5	0.41	250	−33 to −77	70	150	9	6	17††	A, M, E, R, IT	B12A	11
C21NM	6.3	0.3	18	0.5	250	−53 to −105	70	180	7	7	21††	A, M, R, IT	B12A	10
C21HM	6.3	0.6	18	0.5	250	−33 to −77	70	180	9	6	21††	A, M, R, IT	B12A	9
C14FM	12.6	0.3	14	0.41	250	−33 to −77	70	150	6	5	14††	A, M, R, IT	B12A	9
C17FM	12.6	0.3	17.5	0.41	250	−33 to −77	70	150	6	5	17††	A, M, R, IT	B12A	9
Current Type														
C14PM	6.3	0.3	18	0.5	250	−33 to −77	70	180	9	6	14††	IT, E, A, M, R,	B12A	11
C17LM	6.3	0.3	18	0.5	250	−33 to −77	70	180	7	5	17††	E, A, M, R	B12A	11
C17PM	6.3	0.3	18	0.5	250	−33 to −77	70	180	9	6	17††	E, IT, A, M, R,	B12A	11
C17SM	6.3	0.3	18	0.5	250	−33 to −77	90	180	9	6	17††	E, A, M, R	B12A	11
C21SM	6.3	0.3	18	0.5	250	−33 to −77	90	180	7	5	21††	E, A, M, R	B12A	11
C24KM	6.3	0.6	18	0.5	250	−33 to −77	70	180	9	6	24††	IT, A, M, R	B12A	9
C21TM	12.6	0.3	20	0.5	250	−30 to 72	90	180	8.5	6.5	21††	IT, A, M, R	B12A	9
CATHODEON														
Current Types														
C36-24	6.3	0.3	14	0.41	100	−44 to −99	65	150	6	4	14	M, R, IT	B12A	1
C17/1	6.3	0.3	16	0.41	100	−44 to −99	65	150	6	4	17	M, R, IT	B12A	1
C17/1A	6.3	0.3	16	0.41	100	−44 to −99	65	150	6	4	17	A, M, R, IT	B12A	1
C17/4A	6.3	0.3	16	0.41	100	−44 to −99	85	150	6	4	17	A, M, R, IT	B12A	1
C21/1A	6.3	0.3	18	0.41	100	−44 to −99	85	150	6	4	21	A, M, R, IT	B12A	1
C27/1A	6.3	0.3	20	0.41	100	−44 to −99	85	150	6	4	27	A, M, R, IT	B12A	1
COSSOR														
Replacement Types														
65K/2	4.0	1.1	7	—	100	−50 max.	39	50	8.0	—	15	IT	B4E	1
85K	6.3	0.55	10	—	100	−50 max.	48	200	9.0	—	15	IT	B4E	1
75K	6.3	0.55	7	—	100	−80 max.	48	200	6.0	—	10	IT	B4E	1
108K	6.3	0.55	9	—	100	−50 max.	48	200	9.0	—	10	IT	B4E	1
121K	6.3	0.3	9	—	100	−50 max.	52	150	10.0	5	12	IT	B12A	1
Current Type														
141K	6.3	0.3	14	—	150	−40	70	150	6.5	5.5	14††	IT, R	B12A	1
171K	6.3	0.3	14	—	150	−40	70	150	6.5	5.5	17††	IT, R	B12A	1
172K	6.3	0.3	16	—	150	−60	70	150	8.0	6	17††	IT, R	B12A	10
212K	6.3	0.3	18	0.5‡	—	−40 to −80	85	200	7	5	21††	IT, A, M, R	B12A	10
173K	6.3	0.3	16	0.41‡	150	−60	70	150	8.0	6	17††	IT, A, M R	B12A	10
EDISWAN MAZDA														
Obsolete Type														
CRM152A	2.0	1.3	13.0	—	100	−101	67	—	5.2	5.4	15	A	B12A	5
Replacement Types														
CRM71	2.0	1.3	4.0	—	100	−35	—	—	5	5'	7	—	MO	24
CRM91	2.0	1.3	6.0	—	100	−54	64	—	5	5	9	—	MO	24
CRM92	2.0	1.3	7	—	100	−56	57	—	5.2	5.4	9	—	MO	24
CRM92A	2.0	1.3	7	—	100	−56	57	—	5.2	5.4	9	—	MO	24
CRM121	2.0	1.3	7	—	100	−56	57	—	5.2	5.4	12	—	MO	24
CRM121A	2.0	1.3	7.5	—	100	−60	57	—	5.2	5.4	12	—	MO	24
CRM121B	2.0	1.3	10	—	100	−79	57	—	5.2	5.4	12	—	MO	24
CRM123	2.0	1.3	10	—	100	−79	57	—	5.2	5.4	12	A	MO	24
CRM151	2.0	1.3	13	—	100	−101	51	—	5.2	5.4	15	A	MO	24
CRM152B	2.0	1.3	13	—	100	−101	67	—	5.2	5.4	15	A	B12A	5
CRM122	7.3	0.3	7.5	—	100	−60	57	200	5.2	5.4	12	—	MO	24
CRM153	12.6	0.3	15	0.4	100	−51	67	—	8.5	6.5	15	IT, A, M	B12A	1
CRM141	12.6	0.3	14	0.4	100	−51	67	180	8.5	6.5	13.5	IT, A	B12A	1
CRM142	12.6	0.3	14	0.4	100	−51	67	180	8.5	6.5	13.5	IT, A	B12A	1
CRM143	12.6	0.3	14	0.4	100	−51	70	180	8.5	6.5	14††	IT, A, R	B12A	1
CRM171	12.6	0.3	16	0.4	100	−51	70	180	8.5	6.5	17††	IT, A, R	B12A	1

(Continued)

Type	Heater		kV (max.)		Final Anode μA* Max. Average	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
EDISWAN MAZDA (*Continued*)														
Current Types														
CME141	12.6	0.3	14ϕ	0.4	100	−51	70	180	8.5	6.5	14††	IT, A, M, R, E	B12A	2
CME1402	12.6	0.3	14ϕ	0.4	100	−51	90	180	8.5	6 5	14††	IT, A, M, R, E	B12A	2
CME1702	12.6	0.3	15ϕ	0.4	100	−51	90	180	8.5	6.5	17††	A, M, R, E	B12A	2
CRM93	12.6	0.3	9	0.4	100	−51	57	180	8.5	6 5	9	IT, A	B12A	1
CRM124	12.6	0.3	10	0.4	100	−51	57	180	8.5	6.5	12	IT, A, M	B12A	1
CRM144	12.6	0.3	14	0.4	100	−51	70	180	8.5	6 5	14††	IT, A, M, R	B12A	1
CRM172	12.6	0.3	16	0.4	100	−51	70	180	8.5	6.5	17††	IT, A, M, R	B12A	1
CRM173	12.6	0.3	16	0.4	100	−51	90	180	7.5	6.5	17††	IT, A, M, R	B12A	1
CRM211	12.6	0.3	18	0.4	100	−51	70	180	8.5	6 5	21††	IT, A, M, R	B12A	1
CRM212	12.6	0.3	20	0.4	100	−51	90	180	8.5	6.5	21††	IT, A, M, R	B12A	1
CRM241	12.6	0.3	20	0.4	100	−51	90	180	8.5	6.5	24††	IT, A, M, R	B12A	1
ϕ Maximum third anode voltage ±500V.														
EMISCOPE														
Obsolete Types														
3/3	4.0	1.3	3.5	—	—	−32	—	—	9	7.5	9	—	Special	
3/4	4.0	1.3	4.0	—	—	−32	—	—	9	7.5	10	A	,,	
3/5	4.0	1.3	4.0	—	—	−34	—	—	9	7.5	14	—	,,	
3/6A	4.0	1.3	4.0	—	—	−34	—	—	9	7.5	15	A	,,	
6/7	4.0	1.3	7.0	1.1	—	−25	—	—	10	7.5	12	—	,,	
4/13	8.0	0.3	15.0	0.4	300	−40	70	200	15	6.0	21	A	B7B	1
5/2	8.0	0.3	17.0	0.6	—	−33 to −77	70	200	15	6 0	14	A, R	B7B	3
5/3	8.0	0.3	17.0	0.6	—	−33 to −77	70	200	15	6.0	17	A, R	B7B	3
3/20	11.5	0.3	5.5	—	—	−35	—	—	10	6.0	10	—	B4E	1
Replacement Types														
3/1	4.0	1.3	2.7	—	—	−25	—	—	10	7.5	5	—	Special	
3/2	4.0	1.3	2.7	—	—	−30	—	—	9	7.5	7	—	,,	
6/5	4.0	1.3	5.0	0.9	—	−20	—	—	9	—	9	—	,,	
6/6	4.0	1.3	5.0	0 9		−20	—	—	9	—	12	—	,,	
Curren Types														
TA10	4.0	1.0	7.0	0.25	—	−34	—	—	12	6.0	10	A	B7B	1
TA15	4.0	1.0	7.0	0.25	—	−34	—	—	12	6.0	15	A	B7B	1
SE14/70	6.3	0.3	18.0	0.5	250	−30 to −77	70°	180	9	6.0	14††	IT, A, M, R, E	B12A	11
SE17/70	6.3	0.3	18.0	0.5	250	−33 to −77	70°	180	9	6.0	17††	IT, A, M, R, E	B12A	11
5/2T	8.0	0.3	17.0	0.6	—	−33 to −77	70	200	15	6.0	14	A, R, M, E	B7B	3
5/3T	8.0	0.3	17.0	0.6	—	−33 to −77	70	200	15	6.0	17	A, R, M, E	B7B	3
3/32	8.0	0.3	17.0	—	—	−20	—	—	10	6.0	15	A	B7B	2
3/16	8.0	0.3	7.0	—	—	−34	—	—	10	6.0	10	A	B7B	2
3/18	8.0	0.3	5.5	—	300	−34	50	200	10	6	12	A	B7B	2
3/31	8.0	0.3	9.0	—	150	−25	50	200	10	6	12	A	B7B	2
4/14	8.0	0.3	17.0	0.3	400	−33 to −77	70	200	15	6.0	14	A, R	B7B	1
4/15	8.0	0.3	17.0	0.3	400	−33 to −77	70	200	15	6.0	17	A, R	B7B	1
4/14TG	8.0	0.3	17.0	0.3	400	−33 to −77	70	200	15	6.0	14	A, R, M	B7B	1
4/15TG	8.0	0.3	17.0	0.3	400	−33 to −77	70	200	15	6.0	17	A, R, M	B7B	1
EMITRON														
Obsolete Types														
17ASP4	6.3	0.3	14	0.41	150	−60	70	150	6.5	5.5	17††	IT, M, R	B12A	9
12XP4	6.3	0.3	9	0.41	150	−60	60	150	6	5	12	IT, M	B12A	9
14KP4A	6.3	0.3	14	0.41	150	-60	70	150	6.5	5.5	14††	IT, M, R	B12A	9
Replacement Types														
85K	6.3	0.55	10	—	100	−50	52	50	9	9	15	IT	B4E	1
108K	6.3	0.55	9	—	100	−50	50	200	9	9	10	IT	B4E	1
15EP4	6.3	0.3	10	0.41	150	−60	52	150	6.5	5.5	15	IT, M	B12A	9
Current Types														
12XP4A	6.3	0.3	9	0.41	150	−60	60	200	6	5	12	IT, M	B12A	9
14LP4	6.3	0.3	14	0.41	150	−60	70	200	6.5	5.5	14††	IT, M, R	B12A	9
17AXP4	6.3	0.3	14	0.41	150	−60	70	200	6.5	5.5	17††	IT, M, R	B12A	9
ENGLISH ELECTRIC														
Obsolete Types														
T900	6.3	0.6	14	0.41	—	−33 to −77	53	125	6.5	5	16	IT	B12A	4
T901A	6.3	0.3	14	0.41	—	−33 to −77	70	200	6	5	16	IT, F	B12A	4
T908	6.3	0.3	16	0.41	—	−33 to −77	70	200	6	5	17††	IT, F, M, R	B12A	1
T909A	6.3	0.3	16	0.41	—	−33 to −77	70	200	9	15	21	IT, F	B12A	4
T914	6.3	0.3	16	0.41	—	−33 to −77	70	200	6	5	17	IT, F, R, M	B12A	9
T915	6.3	0.3	16	0.41	—	−33 to −77	70	200	9	15	21	IT, F	B12A	4

(*Continued*)

Type	Heater		kV (max.)		Final Anode μA* Max. Average	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
FERRANTI														
Obsolete Types														
T9/2	4.0	1.0	6	—	200	−50	48	50	10	10	9	—	IO	112
T12/2	4.0	1.0	7	—	200	−55	48	50	10	10	12	—	IO	112
T12/3	4.0	1.0	7	—	200	−50	48	50	10	10	12	—	IO	112
T12/54	4.0	0.95	8	—	200	−50	50	100	10	10	12	F, M	IO	112
T12/404	4.0	0.95	9	—	200	−55	50	100	5	6	12	A, F	IO	112
T12/449	4.0	0.95	9	—	200	−55	50	100	5	6	12	F	IO	112
T12/504	4.0	0.95	9	—	200	−55	50	100	5	6	12	A, F, M	IO	112
TR14/1	4.0	0.95	12	—	150	−55	65	100	8	7	14††	A, F	IO	112
TR17/1	4.0	0.95	15	—	150	−70	65	100	5	6.3	17††	A, R, F	IO	112
TR17/2	4.0	0.95	15	—	150	−70	65	100	5	6.3	17††	A, M, R, F	IO	112
TR14/2	4.0	0.95	12	—	150	−50	65	100	8	7	14††	A, F, M, R	IO	112
TR14/4	6.3	0.3	14	—	150	−50	65	150	5	6	14††	A, F, M, R	IO	112
T12/46	6.3	0.6	8	—	200	−50	48	100	10	10	12	F	IO	112
T12/56	6.3	0.6	8	—	200	−50	48	100	10	10	12	F, M	IO	112
T12/71U	8.0	0.3	10	—	200	−60	50	200	10	10	12	F	IO	112
T12/81U	8.0	0.3	10	—	200	−60	50	200	10	10	12	A, F	IO	112
T12/82U	8.0	0.3	10	—	200	−60	50	200	10	10	12	A, F, M	IO	112
Replacement Types														
T12/91	2.0	1.5	9	—	200	−70	50	100	5	6.2	12	F	IO	112
T12/92	2.0	1.5	9	—	200	−70	50	100	5	6.2	12	F, M	IO	112
T9/3	4.0	1.0	7	—	200	−60	48	50	10	10	9	—	IO	112
T9/5	4.0	1.0	7	—	200	−60	48	50	10	10	9	M	IO	112
T12/44	4.0	0.95	8	—	200	−50	50	100	10	10	12	F	IO	112
T12/549	4.0	0.95	9	—	200	−55	50	100	5	6	12	F, M	IO	112
T12/72U	6.3	0.3	10	—	200	−60	50	200	10	10	12	F, M	IO	112
TR14/8	6.3	0.3	14	—	150	−50	65	200	5	6	14††	A, F, M, R	B12A	1
TR14/13	6.3	0.3	15	0.25	200	−50	65	200	4	7	14††	A, F, M, R	B12A	9
TR14/15	6.3	0.3	15	0.25	200	−50	65	200	4	7	14††	A, F, M, R	B12A	9
TR17/8	6.3	0.3	16	0.25	200	−50	65	150	4	7	17††	A, F, M, R	B12A	9
TR17/10	6.3	0.3	16	0.25	200	−50	65	150	4	7	17††	A, F, M, R	B12A	9
Current Types														
MW31-74	6.3	0.3	9	0.41	100	−44 to −99	50.5	200	6	4	12	IT, M	B12A	1
T12/100	6.3	0.3	9	0.41	100	−44 to −99	50.5	200	6	4	12	IT, M	B12A	1
MW36-24	6.3	0.3	14	0.41	100	−33 to −72	65	200	6	4	14††	IT, M, R	B12A	1
TR14/21	6.3	0.3	15	0.25	100	−50	65	200	<8	<6	14††	IT, M, R	B12A	1
TR14/22	6.3	0.3	15	0.25	100	−50	65	200	<8	<6	14††	A, IT, M, R	B12A	1
TR17/21	6.3	0.3	16	0.25	100	−40 to −86	65	200	8	6	17††	IT, M, R	B12A	1
TR17/22	6.3	0.3	16	0.25	100	−40 to −86	65	200	8	6	17††	A, IT, M, R	B12A	1
MW43-64	6.3	0.3	14	0.41	100	−43 to −77	65	200	<8	<6	17††	IT, R, M	B12A	10
TR21/21	6.3	0.3	18	0.42	100	−60	85	200	8	6	21††	IT, M, R	B12A	1
TR21/22	6.3	0.3	18	0.42	100	−60	85	200	8	6	21††	IT, M, R	B12A	1
G.E.C.														
Obsolete Types														
6501	6.3	0.5	6	—	200	−42	50	150	15	10	9	F	IO	112
6502	6.3	0.5	7	—	200	−49	50	150	15	10	9	F, M	IO	112
6503	10.5	0.3	7	—	200	−49	50	150	15	10	9	F. M	IO	112
6504	6.3	0.5	7	—	200	−49	50	150	15	10	9	F. M	IO	112
6504A	6.3	0.5	7	—	100	−49	50	150	15	10	9	A, F, M	IO	112
6505	10.5	0.3	7	—	200	−49	50	150	15	10	9	F, M	IO	112
6505A	10.8	0.3	7	—	100	−49	50	150	15	10	9	A, F, M	IO	112
6703A	6.3	0.5	8	—	100	−56	50	150	15	10	12	A, M	IO	112
6704A	10.8	0.3	8	—	100	−56	50	150	15	10	12	A, M	IO	112
6705A	6.3	0.5	10	—	100	−49	50	150	15	10	12	A, F, M	IO	112
6706A	10.8	0.3	10	—	100	−49	50	150	15	10	12	A, F. M	IO	112
6801A	6.3	0.5	8	—	100	−49	50	150	15	10	14	A	IO	112
Replacement Types														
6506A	6.3	0.3	7	—	150	−49	55	150	15	10	9	F, M, A	IO	112
7101A	6.3	0.3	8	—	150	−48	50	200	8	8	12	A, M	IO	112
6802A	6.3	0.3	8	—	200	−53	55	150	15	10	14	A	IO	112
Current Types														
6901A	6.3	0.3	14	—	100	−70	70	150	8	8	16	A, F	B12A	5
7102A	6.3	0.3	10	—	100	−48	55	150	15	10	12	A, F, M	IO	112
7201A	6.3	0.3	14	—	150	−70	70	150	8	8	14††	A, F, R	B12A	5
7203A	6.3	0.3	14	—	250	−70	70	200	8	8	14††	A, F, M, R	B12A	5
7401A	6.3	0.3	16	—	250	−80	70	200	8	8	17††	A, F, M, R	B12A	5
7204A	12.6	0.3	14	0.4	100	−51	65	400 pk 180	8.5	6.5	14††	IT, A, M, R	B12A	4

(Continued)

Type	Heater		kV (max.)		Final Anode μA* Max. Average	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
G.E.C. (*Continued*)														
Current Types (Continued)														
7404A	12.6	0.3	16	0.4	100	−51	65	400 pk 180	8.5	6.5	16††	IT, A, M, R	B12A	4
7502A	12.6	0.3	20	0.4	100	−51	85	400 pk 180	8.5	6.5	21††	IT, A, M, R	B12A	4
7205A	12.6	0.3	14	0.4	100	−51	85	400 pk 180	8.5	6.5	14††	IT, A, M, R, E	B12A	19
MULLARD														
Obsolete Types														
MW22-7	6.3	0.6	7	0.4	100	−40	51	150	10	5	9	—	B8B	53
MW22-14	6.3	0.3	9	0.35	100	−40 to −99	51	150	>10	> 5	9	M	B8B	53
MW22-14C	6.3	0.3	9	0.35	100	−44 to −99	51	150	>10	> 5	9	—	B8B	53
MW22-18	6.3	0.3	9	0.41	100	−44 to −99	51	200	6	4	9	M	B12A	1
MW31-7	6.3	0.6	7	0.3	100	−40	50.5	150	10	5	12	—	B8B	53
MW31-14C	6.3	0.3	9	0.35	100	−44 to −99	50.5	150	>10	> 5	12	M	B8B	53
MW31-14	6.3	0.3	9	0.35	100	−44 to −99	50.5	150	>10	> 5	12	—	B8B	53
MW31-16	6.3	0.3	9	0.14	100	−44 to −99	50.5	200	6	4	12	IT, M	B12A	1
MW31-20	6.3	0.3	11	0.35	100	−44 to −99	50.5	150	>10	>10	12	A	B8B	53
MW31-21	6.3	0.3	11	0.35	100	−44 to −99	50.5	150	>10	>10	12	A, M	B8B	53
MW31-22	6.3	0.3	11	0.35	100	−44 to −99	50.5	150	>10	>10	12	A	B12A	1
MW31-23	6.3	0.3	11	0.35	100	−44 to −99	50.5	150	>10	>10	12	A, M	B12A	1
MW36-22	6.3	0.3	14	0.41	100	−33 to −72	65	200	6	4	14††	IT, R, M	B12A	1
MW22-17	6.3	0.3	9	0.41	100	−44 to −99	51	200	6	4	9	—	B12A	1
MW31-17	6.3	0.3	9	0.41	100	−44 to −99	50.5	200	6	4	12	—	B12A	1
MW31-18	6.3	0.3	9	0.41	100	−44 to −99	50.5	200	6	4	12	M	B12A	1
MW36-24	6.3	0.3	14	0.41	100	−33 to −72	65	200	6	4	14††	IT, M, R	B12A	1
MW43-64	6.3	0.3	16	0.41‡	100	−40 to −86	65	200	> 8	> 6	17††	IT, R, M	B12A	10
Replacement Types														
MW22-16	6.3	0.3	9	0.41	100	−44 to −99	50.5	200	6	4	9	IT, M	B12A	1
MW31-74	6.3	0.3	9	0.41	100	−44 to −99	50.5	200	6	4	12	IT, M	B12A	1
MW36-44	6.3	0.3	14	0.41‡	100	−33 to −72	65	200	7	5	14††	IT, M, R	B12A	10
MW41-1	6.3	0.3	14	0.41	100	−39 to −86	56	200	6	4	16	IT, F	B12A	1
MW43-43	6.3	0.3	14	0.41	100	−43 to −77	66	200	> 8	> 6	17††	IT, R	B12A	10
Current Types														
MW6-2	6.3	0.3	25	—	150	−40 to −90	30.5	125	6.3	6.3	2.5	A, M	5-pin side contact	
MW43-69	6.3	0.3	16	0.41‡	100	−40 to −86	65	100	> 8	> 6	17††	IT, A, M, R	B12A	10
MW53-20	6.3	0.3	18	0.5‡	—	−40 to −80	65	200	> 7	> 5	21††	IT, A, M, R	B12A	10
MW53-80	6.3	0.3	18	0.5‡	—	−40 to −80	85	200	7	5	21††	IT, A, M, R	B12A	10
MW43-80	6.3	0.3	16	0.41	100	−40 to −86	85	200	> 8	> 5	17††	IT, A, M, R,	B12A	10
AW36-20	6.3	0.3	14	0.41	100	−40 to −80	65	200	> 8	> 6	14††	IT, A, M, R, E	B12A	17
AW36-21	6.3	0.3	14	0.41	100	−40 to −80	65	200	> 8	> 6	14††	IT, M, R, E	B12A	17
AW36-80	6.3	0.3	14	0.5	100	−40 to −80	85	200	7	4	14††	IT, A, M, R, E	B12A	17
AW43-80	6.3	0.3	16	0.5	100	−40 to −80	85	200	7	4	17††	IT, A, M, R, E	B12A	17
AW53-80	6.3	0.3	16	0.5	100	−40 to −80	85	200	7	4	21††	IT, A, M, R, E	B12A	17

* For highlights.
† IT = ion trap; A = aluminizing; E = electrostatic focusing; F = flat screen; M = external conducting coating; R = rectangular screen.
†† Diagonal. ‡ Second anode 0V.

OSCILLOSCOPE CATHODE-RAY TUBES

(Including electrostatic-deflection television tubes and radar tubes)

Type	Heater		Anode Volts			Grid Volts (cut-off)	Deflection (mm per V/A_3)		Volts h-k (max.)	Capacitances (pF to Earth)		Screen		Length (mm)	Base	
	Volts	Amps	A_1 (max.)	A_2 (average)	A_3 (max.)	Avrge. for max. A_1	x plates	y plates		x plate	y plate	Colour Persist	Diam. (in.)		Type	Ref.
COSSOR																
Replacement Type																
09 (D)	4.0	1.0	1,200	300	1,200	− 30	560	370*	50	14	14	G or B M	4.5	375	B12B	2
26	4.0	1.0	1,200	300	1,200	− 30	490	490	50	14	14	„	4.5	375	B12B	3
Current Types																
23	4.0	1.1	—	$VA_3/6$	2,000	$VA_3/70$	170	170	—	15	15	G, S	2.36	200	B12A	3
88	6.3	0.6	2,000	350	2,000	− 50	750	1,150	200	16.5	13.5	Any	4.0	405	Special	

(*Continued*)

Type	Heater		Anode Volts			Grid Volts (cut-off)	Deflection (mm per V/A_3)		Volts h-k	Capacitances (pF to Earth)		Screen		Length	Base	
	Volts	Amps.	A_1 (max.)	A_2 (average)	A_3 (max.)	Avrge. for max. A_1	x plates	y plates	(max.)	x plate	y plate	Colour Persist	Diam. (in.)	(mm)	Type	Ref.
COSSOR (*Continued*)																
Current Types (*Continued*)																
89 (D)	6.3	0.6	2,000	350	2,000	− 50	825	650*	200	16.5	13.5	Any	4.0	405	Special	
91 (PDA)	6.3	0.55	5,000	1,500 (Max. VA_4=10,000V)	5,000	−150	520	870	250	4.3	3.0	G, M††	4.17	380	Special	
92 (PDA)	6.3	0.55	4,000	1,200 (max.) (Max. VA_4=8,000V)	4,000	−120	570	590	250	3.0	3.0	G, M††	4.17	380	Special	
1CP1	6.3	0.6	800	Self-focusing		− 32	90	110	250	8	4.5	G, S	1	100	B8B	56
EDISWAN																
Current Types																
30C4	2.0	1.4	10,000	—	—	− 62	Magnetic		—	—	—	B, S	5.5	373	MO	24
30B1 (F)	4.0	0.72	2,500	700	6,000	− 60	420	840	0	15	14.5	B/G, L	3.5	340	B12D	5
30C2 (F)	4.0	0.72	2,500	700	6,000	− 60	600	1,100	0	15	14.5	G, M	5.5	430	B12D	5
30C3 (F)	4.0	0.72	2,500	700	6,000	− 60	600	1,100	0	6	8.6	or	5.5	430	B12D	6
30C9	4.0	0.72	500	440	4,000	− 67	520	520	0	14.6 (X_1) 14.0 (X_2)	14.9 (Y_1) 13.8 (Y_2)	B, S	6.9	495	B12D	13
30D5	4.0	0.75	1,700	1,300	9,000	− 88	Magnetic		—	—	—	Y(Bf), L	9	462	IO	116
30E6	4.0	0.72	400	1,000	5,000	− 45	900	900	0	15	15	B/G, L	12	640	B12D	5
30E10	4.0	0.72	500	450	4,000	− 67	800	800	0	15.2 (X_1) 15.6 (X_2)	14.9 (Y_1) 15.6 (Y_2)	G, M or B, S	12	640	B12D	13
ENGLISH ELECTRIC																
Obsolete Types																
T921	4.0	1.2	1,450	1,300	9,000	−40 to −100	Magnetic		—	Radar		O, L	9	452	IO	116
T922	4.0	0.8	2,200	1,950	13,000	−70 to −120	Magnetic		—	Radar		O, L	12	545	IO	116
T923	6.3	0.3	500	11,000	—	−45 to −110	Magnetic		150	Radar		O, L	5	286	IO	127
T924	6.3	0.6	600	15,000	—	−30 to −90	Magnetic		—	Radar		O, L	12	520	B12A	1
ETEL																
Replacement Types																
88D, 88J, 88L	6.3	0.55	3,000	350	4,000	− 50	630	950	200	17.5	15	G, M, F	4.2	405	Special	
												B, S, F	4.2			
												Bf, Y, L, F	4.2			
12AEP26	6.3	0.55	600	15,000	—	− 60	Magnetic		250	—	—	O, L, MB, F	1.2	520	B12A	1
Current Types																
1CP1, 1CP11, 1CP15	6.3	0.55	Self focusing		1,000	− 35	95	110	±250	6.0	3.5	G, M	1.2	105	B8B	56
												B, S	1.2			
												G, S	1.2			
3AFP1, 3AFP7	6.3	0.55	—	400	1,500	− 70	510	870	—	5.8	3.5	G, M	2.8	257	B9G	9
												Bf, Y, L	2.8			
4EP1, 4EP7, 4EP11 (PDA)	6.3	0.55	5,000	1,250	5,000†††	−110	600	1,000□	250	3.7	3.0	G, M, F	4.2	392	B12F	1
							550	840⊿				Bf, Y, L, F	4.2			
												B, S, F	4.2			
5BKP1, 5BKP7, 5BKP11 (PDA)	6.3	0.55	1,500	520	‡‡‡ 2,000	− 72	680	⊿⊿ 1,300	250	3.6	1.7	G, M, MB, F	5.2	452	B12F	2
												Bf, Y, L, MB, F	5.2			
												B, S, MB, F	5.2			
5BUP1 (PDA)	6.3	0.55	5,000	1,250	5,000†††	−110	680	1,150⊿	250	3.6	3.0	G, M, F	5.2	462	B12F	1
5BVP1 (PDA)	6.3	0.55	5,000	1,250	5,000□□	−110	680	1,150⊿	250	3.6	3.0	G, M, MB, F	5.2	462	B12F	1
FERRANTI																
Obsolete Types																
O6/4P (F)	4.0	1.0	5,000	—	—	− 40	580	525	100	4.8	4.3	B, S	6	510	IO	112
S6/10A (F)	4.0	0.95	17,000	—	—	− 96	Magnetic		100	—	—	G, S	6	470	IO	112
S6/20A (F)	4.0	0.95	20,000	—	—	−110	Magnetic		150	—	—	G, S	6	495	IO	112
S6/30A (F)	4.0	0.95	22,000	—	—	−130	500	450	100	4.8	4.3	G, S	6	510	IO	112

* = each plate ; † = mm per V/A_2 ; D = double or split-beam tube ; 8 = eight-gun tube ; TV = electrostatic television tube ; F = flat screen ; L = long persistence ; M = medium persistence ; S = short persistence ; B = blue trace ; Bf = Blue flash ; G = green trace ; MB = metal backed ; R = rectangular ; S = square screen ; W = white trace ; Y = yellow trace ; O = orange trace ; Q = four guns ; PDA = post deflection acceleration ; ** A_4 = 4,000V ; *** A_6 = 12.5kV (max.) ; ‡ = post anode deflection ; †† = other screens available; ‡‡ = each gun ; ⊿ $VA_4 = 2 \times VA_3$; □ $VA_4 = VA_3$; ††† VA_4 (max.) = 10,000V ; ‡‡‡ VA_4 (max.) = 5,500V, VA_5 (max.) = 12,000V ; ⊿⊿ $VA_4 = 2.2VA_3$, $VA_5 = 5.5VA_3$; □□ VA_4 (max.) = 15,000V ; **** $VA_4 = 6VA_3$; †††† $VA_4 = 2.3VA_3$; ‡‡‡‡ **VA_6** = 10kV, VA_5 = 7.5kV, VA_4 = 5kV ; § $VA_2 + VA_1$.

(*Continued*)

Type	Heater		Anode Volts			Grid Volts (cut-off)	Deflection (mm per V/A_2)		Volts b-k	Capacitances (pF to Earth)		Screen		Length	Base	
	Volts	Amps	A_1 (max.)	A_2 (average)	A_3 (max.)	Avrge. for max. A_1	x plates	y plates	(max.)	x plate	y plate	Colour Persist	Diam. (in.)	(mm)	Type	Ref.
FERRANTI (*Continued*)																
Replacement Types																
O6/3P (F)	4.0	1.0	15,000	—	—	−150	500	450	100	4.8	4.3	B, S	6	510	IO	112
9/01J	4.0	1.0	9,000	—	—	− 85	Magnetic		—	—	—	B/G, L	9	450	IO	112
Current Types																
3/02 (F)	6.3	0.3	1,250	1,000	7.000	− 60	Magnetic		—	—	—	B/G, V-S, O-L	3	300	IO	116
3/03 (F)	6.3	0.3	300	i.c.	±200	− 50	Magnetic		—	—	—	V, S or O, L	3	300	B12A	11
				VA_4 = 15,000V												
5/03TM	6.3	0.3	250	i.c.	±200	− 50	Magnetic		—	—	—	W, S	5	300	B12A	11
				VA_4 = 12,500V												
5/04	6.3	0.3	300	7,000	—	− 50	Magnetic		—	—	—	W, S or O, L	5	280	IO	127
5/52	6.3	0.3	i.c.	−100 to +200	12.500	− 80	Magnetic		—	—	—	O, L	5	205	B9A	55
5/61	6.3	0.3	4,000	800	4.000	−160	600	2.800	—	—	—	B, G-S	5	475	B14A	3
				VA_4 = 20,000V												
5/62	6.3	0.3	400	800	4000	−160	600	5.700	—	—	—	B/Y, L	5	475	B14A	3
				VA_4 = 20,000V												
5/63	6.3	0.3	2,000	300	1.200	− 50	320	7.500	—	—	—		5		B14A	3
				VA_4 = 20,000V												
6/02	4.0	1.0	1.250	1,000	7,000	− 60	Magnetic		—	—	—	O, Y, L	6	390	IO	116
6/22	6.3	0.3	22,000	—	—	−180	Magnetic		—	—	—	G, B, V-S	6	485	B12A	5
6/32PM	4.0	1.0	20,000	—	—	−165	500	450	—	—	—	B, S	6	520	IO	112
6/33AM	6.3	0.3	20,000	—	—	−165	500	450	—	—	—	G, S	6	490	B12A	5
6/71CM	6.3	0.3	2,000	25,000	—	−180	Magnetic		—	—	—	G, M	6	530	B12A	11
8/03 (R)	6.3	0.3	300	i.c.	±200	− 60	Magentic		—	—	—	W, V, S	8½ diag.	285	B12A	11
				VA_4 = 12,500V												
8/52	6.3	0.3	i.c.	−100 to ±200	12.500	− 80	Magnetic		—	—	—	W-S, G-M, O, L	8½ diag.	215	B9A	55
9/02HM	4.0	1.0	1,350	1,300	8.000	− 70	Magnetic		—	—	—	O, L	9	445	IO	112
9/03HB	6.3	0.3	300	i.c.	±200	− 50	Magnetic		—	—	—	O. L	9	400	B12A	11
				VA_4 = 12.500V												
9/22 (F)	6.3	0.3	22,000	—	—	−180	Magnetic		—	—	—	B, G, S	9	540	B12A	9
9/82	4.0	1.0	1,350	1,300	10.000	− 70	Magnetic		—	—	—	O, L	9	445	IO	139
				VA_4 = 20,000V												
9/83	6.3	0.3	300	i.c.	±200	− 50	Magnetic		—	—	—	O, L	9	400	B12A	17
				(VA_4 = 12,500V												
12/02HM	4.0	1.0	2,100	1,950	12.000	− 90	Magnetic		—	—	—	O, L	12	545	IO	116
12/03HB	6.3	0.3	300	i.c.	±200	− 50	Magnetic		—	—	—	O, L	12	478	B12A	11
				VA_4 = 12.500V												
12/04HM	6.3	0.3	300	15,500	—	− 60	Magnetic		—	—	—	O, L	12	510	B12A	9
12/04K	6.3	0.3	300	9.000	—	− 50	Magnetic		—	—	—	Y, M	12	463	B12A	11
12/44HM	6.3	0.3	800	10,000	—	− 85	Magnetic		—	—	—	O, L	12	488	B12A	1
12/82HM (PDA)	4.0	1.0	2,100	1.950	12.500	− 90	Magnetic		—	—	—	O. L	12	545	IO	139
				PDA = 25,000V												
12/83HM (PDA)	6.3	0.3	300	i.c.	±200	− 50	Magnetic		—	—	—	O, L	12	478	B12A	17
				VA_4 = 12,500V												
12/84HM	6.3	0.3	300	12,500	—	− 60	Magnetic		—	—	—	O, L	12	510	B12A	18
				PDA = 25,000V												
14/03QB	6.3	0.3	300	i.c.	±200	− 50	Magnetic		—	—	—	V, S	14 diag.	410	B12A	11
				VA_4 = 14,000V												
14/04PB	6.3	0.3	300	14.000	—	− 50	Magnetic		—	—	—	B, S	14 diag.	447	B12A	1
15/02HM	4.0	1.0	1,800	1,530*	10,000	−100	Magnetic		—	—	—	O, L	15	575	IO	116
15/03HM	6.3	0.3	300	i.c.	±200	− 60	Magnetic		—	—	—	O, L	15	600	B12A	11
				VA_4 = 75 000V												
16/03HB	6.3	0.3	300	i.c.	±200	− 60	Magnetic		—	—	—	O, L	16	485	B12A	11
				VA_4 = 15,000V												
16/04HM	6.3	0.3	300	15,000	—	− 50	Magnetic		—	—	—	O, L	16	512	B12A	1
17/03TB	6.3	0.3	300	i.c.	200	− 50	Magnetic		—	—	—	W, S	17 diag.	504	B12A	11
				VA_4 = 15,000V												

* = each plate ; † = mm per V/A_2 ; D = double or split-beam tube : 8 = eight-gun tube ; TV = electrostatic television tube ; F = flat screen ; L = long persistence ; M = medium persistence ; S = short persistence ; B = blue trace ; B.f. = Blue flash ; G = green trace ; MB = metal backed ; R = rectangular ; S = square screen ; W = white trace ; Y = yellow trace ; O = orange trace : Q = four guns ; PDA = post deflection acceleration ; ** A4 = 4,000V ; *** A_6 = 12.5kV (max.) ; ‡ = post anode deflection ; †† = other screens available; ‡‡ = each gun ; ⊿ VA4 = 2 × VA_3 ; □ VA_4 = VA_3 ; ††† VA_4 (max.) = 10,000V ; ‡‡‡ VA_4 (max.) = 5,500V, VA_5 (max.) = 12,000V ; ⊿⊿ VA_4 = 2.2VA_3, VA_5 = 5.5VA_3 ; □□ VA_4 (max.) = 15.000V ; **** VA_4 = 6VA_3 ; †††† VA_4 = 2.3VA_3 ; ‡‡‡‡ VA_6 = 10kV, VA_5 = 7.5kV, VA_4 = 5kV ; § VA_2 + VA_4.

(*Continued*)

Type	Heater		Anode Volts			Grid Volts (cut-off)	Deflection (mm per V/A_3)		Volts h-k	Capacitances (pF to Earth)		Screen		Length (mm)	Base	
	Volts	Amps.	A_1 (max.)	A_2 (average)	A_3 (max.)	Avrge. for max. A_1	x plates	y plates	(max.)	x plate	y plate	Colour Persist	Diam. (in.)		Type	Ref
G.E.C																
Replacement Types																
4301 (TV)	4.0	1.0	2,000	—	3,000	− 50	850	950	—	—	—	W, S	9	530	B12D	1
4602 (TV)	4.0	1.0	2,000	—	6,000	− 60	1,100	1,400	—	—	—	W, S	12	630	B12D	1
4603 (TV)	4.0	1.0	2,000	—	6,000	− 60	1,100	800	—	—	—	W, S	12	560	B12D	1
E4103/B/4	4.0	1.0	1,000	300	1,100	− 17	100	90	—	15	15	G, S††	1.5	155	B9	6
E4205/B/7	4.0	1.0	1,500	200	1,500	− 38	170	170	100	15	15	G, S††	2.75	200	B12B	1
E4412/B/9	4.0	1.0	2,500	670	4,000	− 75	350	800	100	25	25	G, S††	3.5	335	B12D	5
E4504/B/16	4.0	1.0	2,500	830	5,000	− 75	650	1,100	100	25	25	G, S††	6.0	421	B12D	5
1601ABC (F)	4.0	1.0	2,000	VA_3 ×0.16	5,000	$-VA_1/40$	660	1,100	100	<12.0	<10.0	G††	6.0	435	B12D	8
908BCC (F)	4.0	1.1	2,000	1,500	10,000	− 60	400	750	100	<12.0	<10.0	B, S††	3.5	335	B12D	8
908CARA (F)	4.0	1.1	2,000	240	4,000⊿	− 70	360	480⊿	100	<11.5	<17.5	—	3.5	335	B12D	15
958BCC (F)	4.0	1.0	2,000	VA_3 ×0.15	10,000 (7,000 min.)	$-VA_1/33$	400	750	100	<12.0	<10.0	B Aluminised	3.5	340	B12D	8
Current Types																
1601BCCA (F)	4.0	1.0	2,000	VA_3 ×0.16	VA_6 10,000 VA_5 7,500 VA_4 5,000 VA_3 3,500	$-VA_1/25$	0.15 mm/V	0.28 mm/V	100	<12.0	<10.0	G	6.0	435	B12D	10
1608BCCA (F)	4.0	1.0	2,000	VA_3 ×0.16	„	$-VA_1/25$	0.15 mm/V	0.28 mm/V	100	<12.0	<10.0	B	6.0	435	B12D	10
1696BCCA (F)	4.0	1.0	2,000	VA_3 ×0.16	„	$-VA_1/25$	0.15 mm/V	0.28 mm/V	100	<12.0	<10.0	L	6.0	435	B12D	10
1608CCHE (D,F)	4.0	1.05‡‡	2,000	VA_3 ×0.18	4,000	$-VA/25$	615	875	100	<15.0	<17.0	B	6.0	540	B12D plus IO	11 138
1601CCBD	4.0	1.0	2,000	VA_3 ×0.16	5,000	$-VA_1/29$	600 $z = 125$ †††	785 †††	100	<17.0	<17.0	G ††	6.0	430	B12D	12
401CAHA	4.0	1.1	1,500	75	1,500	− 80	135	150	—	12.0	12.0	G, M	1.6	178	B9G	11
1693HKM	4.0	1.0	—	—	7,000	− 70	Magnetic		100	Monoscope		—	6.0	390	IO	116
919HKM (F)	4.0	1.0	1,450	1,100	8,000	− 70	Magnetic		100	Radar		O/O, L††	3.5	300	IO	143
1658BCCA (F)	4.0	1.1	2,000	560	3,500‡‡‡	− 80	520	980‡‡‡	100	<12.0	<10.0	A,B,S††	6.4	435	B12D	7
1652HKM (F)	4.0	1.0	1,450	1,200	8,000	− 70	Magnetic		100	Radar		A,Y/Y††	6.4	390	IO	143
2218BRA (F)	4.0	1.0	2,000	950	6,000	− 60	1,150	1,950	100	25	25	W, S††	9.0	580	B12D	18
2273PTM (F)	6.3	0.6	500	0	14,000	− 80	Magnetic		150	Radar		A,L,O/O††	9.0	400	B12A	11
2273QTM (F)	6.3	0.3	—	—	15,000	− 70	Magnetic		150	Radar		A,L,O/O††	9.0	465	B12A	7
2269YMM (F)	6.3	0.5	—	—	15,000	−100	Magnetic		100	Radar		A,L,O/O††	9.0	470	B12A	6
3069QMM (F)	6.3	0.3	—	—	15,000	− 60	Magnetic		150	Radar		A,L,O/O††	12.0	520	B12A	5
3073QTM (F)	6.3	0.3	—	—	15,000	− 60	Magnetic		150	Radar		A,L,O/O††	12.0	478	B12A	7
3668QTM (F)	6.3	0.3	—	0	16,000	− 80	Magnetic		150T.U.	Monitor		W, S††	14.0	419	B12A	7
965HKMH (F)	6.3	0.5	1,450	1,100	8,000	− 70	Magnetic		100	Scanner		G, S	3.5	300	IO	143
4GP1 (F)	6.3	0.5	2,500	680	4,000⊿	− 88	620⊿	400⊿	150	8.0	7.5	G, M††	3.5	355	B14A	5
6EP1 (F)	6.3	0.5	2,500	680	4,000⊿	− 88	940⊿ 1,170□	710⊿ 860□	150	8.0	7.5	G, M††	6.4	500	B14A	5
5BHP1 (F)	6.3	0.6	2,000	460	2,000****	− 80	550****	2,560****	180	3.5	2.8	A,G,M††	5.25	464	B14A	3
3WP1 (F)	6.3	0.6	2,500	590	2,500	−100	560	810	180	7.2	4.8	G,M††	3.0	292	B12A	15
5ADP1 (F)	6.3	0.6	2,600	710	2,600	− 80	860⊿ 1,070□	1,100⊿ 1,350□	180	5.1	4.0	G,M††	5.25	425	B14A	4
1658XMM	6.3	0.5	—	—	25,000	$-VA/250$	—	—	100	—	—	B Aluminised	6.0	400	B12A	5
MULLARD																
Obsolete Types																
ECR30	4.0	1.0	800	135	800	− 18	170	170	50	15	15	G, M	2.75	205	B12B	1
ECR35 } ECR35P }	4.0	1.0	1,200	200	1,200	− 50	360	780	50	<25	<25	{ G, M B, L }	3.5	341	B12D	2

* = each plate ; † = mm per V/A_2 ; D = double or split-beam tube ; 8 = eight-gun tube ; TV = electrostatic television tube ; F = flat screen ; L = long persistence ; M = medium persistence ; S = short persistence ; B = blue trace ; B.f. = Blue flash ; G = green trace ; MB = metal backed ; R = rectangular ; S = square screen ; W = white trace ; Y = yellow trace ; O = orange trace ; Q = four guns ; PDA = post deflection acceleration ; ** A_4 = 4,000V ; *** A_6 = 12.5kV (max.) ; ‡ = post anode deflection ; †† = other screens available; ‡‡ = each gun ; ⊿ $VA_4 = 2 \times VA_3$; □ $VA_4 = VA_3$; ††† VA_4 (max.) = 10,000V ; ‡‡‡ VA_4 (max.) = 5,500V, VA_5 (max.) = 12,000V ; ⊿⊿ $VA_4 = 2.2VA_3$, $VA_5 = 5.5VA_3$; □□ VA_4 (max.) = 15,000V ; **** $VA_4 = 6VA_3$; †††† $VA_4 = 2.3VA_3$; ‡‡‡‡ VA_6 = 10kV, VA_5 = 7.5kV, VA_4 = 5kV ; § $VA_2 + VA_4$.

(Continued)

Type	Heater		Anode Volts			Grid Volts (cut-off)	Deflection (mm per V/A_3)		Volts h-k (max.)	Capacitances (pF to Earth)		Screen		Length (mm)	Base	
	Volts	Amps.	A_1 (max.)	A_2 (average)	A_3 (max.)	Avrge. for max. A_1	x plates	y plates		x plate	y plate	Colour Persist	Diam. (in.)		Type	Ref.
MULLARD (*Continued*)																
Obsolete Types (Continued)																
ECR60	4.0	1.0	2,000	300	2,000	−100	600	1,150	50	<25	<25	G, M	6.25	432	B12D	2
DG16-21	6.3	0.3	1,800	{600 / 700}	5,000	{−25 / −70}	925	1,000	150	4.5	5.3	G, M	{5.5 × 1.5}	430	B14A	1
DR7-5	6.3	0.3	250	800	—	−50	130†	210†	—	5, 5.4	4.8	B, L	2.75	160	B9G	7
DR7-6	6.3	0.3	250	800	—	−50	130†	210†	—	5, 5.4	4.8	B, L	2.75	160	B9G	7
DR13-2	6.3	0.3	2,000	550	2,000***	−100	600	700	150	9	7.8	B, L	5	435	B14A	1
Replacement Types																
MF31-22	6.3	0.3	300	9,000	—	−32 to −81	Magnetic		150	—	—	O/O, L	12	471	B12A	1
ML31-22	6.3	0.3														
Current Types																
AF22-10 / AL-2210	6.3	0.3	500	14,000	Var.§	−30 to −70	Magnetic		150	Radar		O, L	8	400	B12A	11
AL13-36	6.3	0.3	500	14,000	Var.§	−30 to −70	Magnetic		150	Radar		O, L	5	300	B12A	11
AF31-10 / AL31-10	6.3	0.3	500	14,000	Var.§	−30 to −70	Magnetic		150	Radar		O, L	10	478	B12A	11
AW13-36	6.3	0.3	500	14,000	Var.§	−30 to −70	Magnetic		125	Viewfinder		W	4	300	B12A	11
AW17-20	6.3	0.3	350	12,000	Var.§	−30 to −80	Magnetic		200	T.V. Monitor		W	6	339	B12A	11
AW22-10	6.3	0.3	500	14,000	Var.§	−30 to −70	Magnetic		200	T.V. Monitor		W	9	400	B12A	11
AW36-48	6.3	0.3	500	15,000	Var.§	−30 to −70	Magnetic		200	T.V. Monitor		W	14	447	B12A	11
DB4-1 / DG4-1 / DP4-1	6.3	0.3	250	800	—	−25	130†	210†	0	4.5	5.3	{B, S / G, M / B, L}	1.75	160	B9G	7
DB4-2 / DG4-2 / DP4-2	6.3	0.3	250	800	—	−25	130†	210†	0	4.5	5.3	{B, S / G, M / B, L}	1.75	160	B9G	7
DB7-5 / DG7-5	6.3	0.3	250	800	—	−25	130†	210†	0	4.5	5.3	{B, S / G, M}	2.75	160	B9G	7
DP7-5	6.3	0.3	250	800	—	−25	130†	210†	150	4.5	5.3	B/G, L	1.75	160	B9G	7
DB7-6 / DG7-6	6.3	0.3	250	800	—	−25	130†	210†	0	4.5	5.3	{B, S / G, M}	2.75	160	B9G	7
DP7-6	6.3	0.3	250	800	—	−25	130†	210†	150	4.5	5.3	B/G, L	2.75	160	B9G	7
DB13-2 / DG13-2	6.3	0.3	2,000	550	2,000**	−75	600	700	150	{5.5 / >20}	{4.7 / >16}	{B, S / G, M}	5	435	B14A	1
DP13-2	6.3	0.3	2,000	550	2,000**	−75	600	700	150	5.5	4.7	B/G, L	5	435	B14A	1
DG7-32	6.3	0.3	500	0-120	500	−40 to −90	125	195	195	3.7	3.0	G, M	3	172	B12A	14
DG7-36	6.3	0.3	1,500	249-395	1,500	−40 to −80	540	795	180	6.0	5.8	G, M	3	296	B12A	15
MC13-16	6.3	0.3	—	—	25,000	−50 to −100	Magnetic		200	Scanner		B	5	365	B12A	16
MF13-1	6.3	0.3	250	7,000	—	−28 to −63	Magnetic		150	Radar		O/O, L	5	287	IO	127
MF31-55	6.3	0.3	300	15,000	—	−30 to −90	Magnetic		150	Radar		O/O, L	12	520	B12A	1
MF41-10	6.3	0.3	300	14,000	—	−30 to −70	Magnetic		150	Radar		O, L	16	512	B12A	9
MF41-15	6.3	0.3	300	12,000	—	−30 to −70	Magnetic		150	Radar		O, L	16	515	B12A	9
MW13-35	6.3	0.3	500	7,000	—	−30 to −70	Magnetic		200	Viewfinder		W	5	287	IO	127
MW22-22	6.3	0.3	300	9,000	—	−30 to −70	Magnetic		200	T.V. Monitor		W	9	380	B12A	1
MW36-67	6.3	0.3	300	14,000	—	−30 to −70	Magnetic		200	T.V. Monitor		W	14	457	B12A	1
MW43-67	6.3	0.3	300	14,000	—	−30 to −60	Magnetic		200	T.V. Monitor		W, S	17	509	B12A	9
DH3-91	6.3	0.55	1,000	0	1,000	−8 to −27	95	110	250	< 7.2	< 4.7	G, M	1	105	B8B	65
DH7-91	6.3	0.55	1,500	320	1,500	−26 to −65	510	920	—	< 7.3	< 4.2	G, M	2.75	257	B9G	9
DH10-94	6.3	0.55	5,000	530	5,000†††	−28 to −60	600□	1,000□	250	< 4.4	< 3.6	G, M	4	392	B12F	1
DH13-97	6.3	0.55	1,500	560	2,000‡‡‡	−45 to −90	684 ⊿⊿	1,440 ⊿⊿	250	3.6	1.7	G, M	5	452	B12F	2
S.T.C.																
Current Types																
VLS492AB	2.0	1.8	200	1,000	—	−25	110†	120†	100	6.6	6.0	B, S	1.5	171	IO	115
VLS492AG	2.0	1.8	200	1,000	—	−25	110†	120†	100	6.6	6.0	G, L	1.5	171	IO	115
C10SS/2G	2.0	1.7	250	2,000	—	−30	140†	140†	—	3.6	3.7	G, M	2.75	180	B10A/A	1

* = each plate ; † = mm per V/A_2 ; D = double or split-beam tube ; 8 = eight-gun tube ; TV = electrostatic television tube ; F = flat screen ; L = long persistence ; M = medium persistence ; S = short persistence ; B = blue trace ; B.f. = Blue flash ; G = green trace ; MB = metal backed ; R = rectangular ; S = square screen ; W = white trace ; Y = yellow trace ; O = orange trace ; Q = four guns ; PDA = post deflection acceleration ; ** A4 = 4,000V ; *** A_6 = 12.5kV (max.) ; ‡ = post anode deflection ; †† = other screens available; ‡‡ = each gun ; ⊿ VA4 = 2 × VA_3 ; □ VA_4 = VA_3 ; ††† VA_4 (max.) = 10,000V ; ‡‡‡ VA_4 (max.) = 5,500V, VA_5 (max.) = 12,000V ; ⊿⊿ VA_4 = 2.2VA_3 VA_5 = 5.5VA_3 ; □□ VA_4 (max.) = 15,000V : **** VA_4 = 6VA_3 ; †††† VA_4 = 2.3VA_3 : ‡‡‡‡ VA_6 = 10kV. VA_5 = 7.5kV VA_4 = 5kV : § VA_2 + VA_4.

Continued

Type	Heater		Anode Volts			Grid Volts (cut-off)	Deflection (mm per V/A$_2$)		Volts h-k	Capacitances (pF to Earth)		Screen		Length	Base	
	Volts	Amps	A$_1$ (max.)	A$_2$ (average)	A$_3$ (max.)	Avrge. for max. A$_1$	x plates	y plates	(max.)	x plate	y plate	Colour Persist	Diam. (in.)	(mm)	Type	Ref.
20th CENTURY																
Current Types																
S4 (F)	6.3	0.5	2,000	700	5,000	− 50	400	700	100	17	7.5	B, S—G, M—G, S—Y, L—B/G, L—O, L—††	4	390	B12D	5
S6R-110 (R)	6.3	0.5	2,500	780	6,000	− 62.5	925	1,000	100	10	8		6 × 2½	430	B14A	2
S6Sq (SF)	6.3	0.5	2,000	700	5,000	− 50	770	1,150	100	17	7.5		5 × 5	480	B12D	5
S6-160 (F)	6.3	0.5	2,000	700	5,000	− 50	875	875	100	7.5	5		6¼	480	B12D	9
S6 (F)	6.3	0.5	2,000	700	5,000	− 50	770	1,150	100	17	7.5		6¼	480	B12D	5
S10	6.3	0.5	2,000	750	5,000	− 50	900	1,500	100	17	7.5		10	560	B12D	5
S10-140	6.3	0.5	2,000	850	5,000	− 50	2 000	2 000	100	18	15.5		10	634	B12D	4
D4 (DF)	6.3	1.0	2,000	650	5,000	− 50	520	520	100	16.5	5		4	390	B12D	3
D6S-222 (DSF)	6.3	1.0	2,500	750	5,000	− 62.5	780	750	100	8	9		5 × 5	430	24-pin special	
D6Sq (DSF)	6.3	1.0	2,000	680	5,000	− 50	825	825	100	16.5	5		5 × 5	480	B12D	3
D6 (DF)	6.3	1.0	2,000	680	5,000	− 50	825	825	100	16.5	5		6¼	480	B12D	3
D6-251 (DF)	6.3	1.0	2,000	1,700	10,000	− 50	825	825	100	5	5		6¼	480	B12D	16
D10 (D)	6.3	1.0	2,000	710	5,000	− 50	1,050	1,050	100	16.5	5		10	560	B12D	3
Q6 (QF)	6.3	2.0	2,000	700	5,000	− 50	700	670	100	7	6		6¼	480	B12D	6
E5-270 (8F)	6.3	4.0	2,000	500	5,000	− 50	870	870	100	5.5	5.5		5 × 5	490	24-pin special	
S3A (F)	4.0	0.8	2,000	250	4 000	− 50	470	500	100	5	14		3.5	340	B12D	15
				PDA = 8,000			365	420								
S4A-120 (F)	6.3	0.5	2,000	750	5 000	− 50	900	1,140	100	7.5	8		4¼	390	B14A	2
				PDA = 10,000			700	950								
S4A-123 (F)	6.3	0.5	2,000	1,100	7,500	− 50	900	1,140	100	5	5		4⅛	354	B12F	1
				PDA = 15,000			700	950								
S5A-120 (F)	6.3	0.5	2,000	750	5,000	− 50	1,100	1,540	100	7.5	8		5¼	435	B14A	2
				PDA = 10,000			875	1,300								
S5A-123 (F)	6.3	0.5	2,000	1,100	7,500	− 50	1,140	1,540	100	5	5		5¼	404	B12F	1
				PDA = 15,000			875	1 300								
S5A-180 (F)	6.3	0.5	2,600	625	2,600	− 78	1,050	1,350	100	6	5		5¼	430	B14A	4
				PDA = 6,000			775	1,050								
S5A-510 (F)	6.3	0.5	2,000	250	2,000	− 50	1,100	4,000	100	5	5		5¼	480	B14A	3
				PDA = 12,000			610	2 250								
S6SA-120 (SF)	6.3	0.5	2,000	700	5 000	− 50	770	1,150	100	17	13		5 × 5	480	B12D	4
				PDA = 10,000			625	1 025								
S6A-171 (F)	6.3	0.5	2,000	1,450	10 000	− 50	1,000	1,900	100	8	8.5		6¼	480	B12D	10
				PDA = 30,000			715	1,350								
D3A-214 (DF)	4.0	1.6	2 000	425	2,000	− 50	500	400	100	9	5	R, S—G, M, G, S—Y, L—B/G, L—O, L—††	3½	340	B12D	17
				PDA = 8,000			400	365								
D5A-600 (DF)	6.3	1.0	2,000	750	5 000	− 50	1,100	4,000	100	4.5	5		5¼	480	24-pin special	
				PDA = 12,000			850	3,250								
D6A-240 (DF)	6.3	1.0	2,000	750	5,000	− 50	850	800	100	5	5			480	B12D	16
				PDA = 10,000			725	640					6¼			
M5R-321 (RF)	6.3	0.5	10,000	0	10,000	− 62		Magnetic	100	—	—	B, S—G, M—G, S—Y, L—B/G, L—O, L—††	5 × 3⅛	315	B12A	20
M5R-312 (RF)	6.3	0.5	25,000	—	—	−155		Magnetic	250	—	—		5 × 3⅛	355	B12A	5
M6-302 (F)	6.3	0.5	15,000	0	15,000	− 93		Magnetic	100	—	—		6¼	356	B12A	20
M6S-303 (SF)	6.3	0.5	10,000	0	10,000	− 62		Magnetic	100	—	—		5 × 5	356	B12A	20
M6-311 (F)	6.3	0.5	25,000	—	—	−155		Magnetic	250	—	—		6¼	394	B12A	5
M6S-312 (SF)	6.3	0.5	25,000	—	—	−155		Magnetic	250	—	—		5 × 5	394	B12A	5
M7-313 (F)	4.0	0.8	18,000	—	—	− 96		Magnetic	265	—	—		7¼	510	IO	112

* = each plate ; † = mm per V/A$_2$; D = double or split-beam tube ; 8 = eight-gun tube ; TV = electrostatic television tube ; F = flat screen ; L = long persistence ; M = medium persistence ; S = short persistence ; B = blue trace ; B.f. = Blue flash ; G = green trace ; MB = metal backed ; R = rectangular ; S = square screen ; W = white trace ; Y = yellow trace ; O = orange trace ; Q = four guns ; PDA = post deflection acceleration ; ** A$_4$ = 4,000V ; *** A$_6$ = 12.5kV (max.) ; ‡ = post anode deflection ; †† = other screens available; ‡‡ = each gun ; ⊿ VA$_1$ = 2 ⁄ VR$_3$; □ VA$_4$ = VA$_3$; -††† VA$_4$ (max.) = 10,000V ; ‡‡‡ VA$_4$ (max.) = 5,500V, VA$_5$ (max.) = 12,000V ; ⊿⊿ VA$_1$ = 2.2VR , VA$_5$ = 5.5VQ$_2$; □□ VA$_4$ (max.) = 15,000V : **** VA$_1$ = 6VQ$_3$; †††† VA$_1$ = 2.3VΩ$_3$; ‡‡‡‡ VA$_3$ = 10kV, VA$_5$ = 7.5kV, VA$_4$ = 5kV ; § VA$_2$ ⊥ VA$_4$.

EFFICIENCY DIODES

(For television line scan)

Type	Heater		Peak Inverse Volts*	Peak Anode Current (mA)	Max. Rect. Current (mA)	Peak Cathode Potential		Capacitance (pF) h-k	Base	
	Volts	Amps				h(−) to k*	h(+) to k		Type	Ref.
BRIMAR										
Obsolete Type										
25U4GT	25.0	0.3	3,850	660	133	3,850	385	6.5	IO	109

(Continued)

Type	Heater Volts	Heater Amps	Peak Inverse Volts*	Peak Anode Current (mA)	Max. Rect. Current (mA)	Peak Cathode Potential h(−) to k*	Peak Cathode Potential h(+) to k	Capacitance (pF) h-k	Base Type	Base Ref.
BRIMAR (*Continued*)										
Replacement Type										
PY81 17Z3	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
Current Types										
6U4	6.3	1.2	3,850	660	138	3,850	110	8.5	IO	109
EY83	6.3	1.0	5,000	500	175	5,000	—	2.1	B9A	34
PY83	20.0	0.3	Other data as Type EY83							
COSSOR										
Current Types										
17Z3	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
EDISWAN MAZDA										
Replacement Types										
U281	28.0	0.2	3,000	600	120	1,000	—	12.5	IO	55
U282	28.0	0.2	4,500	600	120	1,000	—	12.5	IO	121
U403	40.0	0.2	1,500	—	—	—	—	11	MO	18
Current Types										
U191	19.0	0.3	4,500	600	120	4,500	—	—	IO	128
U251	25.0	0.3	7,000	720	120	7,500	—	3.2	B9A	34
U301	28.0	0.2	4,500	600	120	4,500	—	—	IO	128
U801	80.0	0.2	1.500	—	—	—	—	14	IO	117
EMITRON										
Current Types										
PY81/17Z3	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
PY80/19X3	19.0	0.3	4,000	400	180	650	—	—	B9A	18
G.E.C.										
Current Types										
U339	19.0	0.3	4,500	—	120	—	—	—	IO	128
U309	20.0	0.3	4,000	1,000	170	700	—	—	B9A	18
U329	25.0	0.3	7,000	720	120	7,500	—	3.2	B9A	34
MARCONI										
Obsolete Type										
U152	19.0	0.3	4,000	400	180	650	160	—	B9A	18
Current Types										
PY81/U153	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
PY80/U309	20.0	0.3	4,000	1,000	170	700	—	—	B9A	18
U329	25.0	0.3	7,000	720	120	7,500	—	3.2	B9A	34
MULLARD										
Replacement Types										
PY31	17.0	0.3	1,500	—	125	300	—	—	IO	55
PY80	19.0	0.3	4,000	400	180	650	—	—	B9A	18
PZ30	52.0	0.3	1,500**	—	200	650	—	—	IO	52
Current Type										
PY81	17.0	0.3	4,500	450	150	4,500	—	3.6	B9A	34
TUNGSRAM										
Current Type										
17Z3	17.0	0.3	4,500	450	150	4,500	—	3.6	B9A	34
WESTINGHOUSE										
Current Types										
14D19	—	—	320	unlimited	—	—	—	—	(metal rectifier)	
14D24	—	—	400	,,	—	—	—	—	,,	,,
14D28	—	—	480	,,	—	—	—	—	,,	,,
14D134	—	—	1,260	,,	—	—	—	—	,,	,,
14D148	—	—	560	,,	—	—	—	—	,,	,,
14D36	—	—	640	,,	—	—	—	—	,,	,,

* For 10μsec. pulse duration. ** Anode connected to pin 5.

EXPLANATION OF VALVE-BASE CONNECTIONS

The following pages of valve-base diagrams show all the sets of base connections that are necessary to cover the valves listed in the tables of characteristics. They are grouped into sections according to the base designations (B7G, B8A, B9A, etc.), and within a section each diagram has a code number to the bottom right of it which identifies that particular set of connections.

Thus to find the base connections of a valve listed in the tables, it is first of all necessary to look up the designation in the " Base Type " column, which gives the right section of diagrams, and then the number in the " Base Ref." column, which gives the code number of a particular diagram in that section. For example, to obtain the connections of the 6F33 valve, one would have to turn to the section of diagrams headed " B7G " and then look for diagram No. 21.

British and American bases which are not interchangeable are given their standard designations. American bases which are interchangeable with British are in some cases given the British designations. Thus, B7G is used to cover both British and American miniature 7-pin bases and B9A for the British 9-pin and the American Noval. The term International Octal (IO) is used to cover both the British B8-O designation and the American standard Octal.

The designation B8B is now actually out of date but it is used here to cover the British B8G base and the American Loctal and Lock-in types. None of these is identical but the differences are so slight that all will fit the same valveholder. The differences are concerned chiefly with minor points about the spigot material, spigot taper and so on.

Three British bases are given arbitrary designations because there are no standard ones short enough. They are the small 4- and 5-pin (Sm4 and Sm5) bases fitted to some hearing-aid valves and the side-contact base (Ct8) of Continental origin and now obsolete.

Care must be taken to distinguish between the IO and MO bases, particularly as the latter is sometimes called the British Octal and is now designated B8-MO. The two differ in pin spacing and in spigot size and are *not* interchangeable. The MO is used by one manufacturer only and has the larger diameter spigot of the two.

The B12A and B12B bases used on cathode-ray tubes are rather similar in appearance, but they can be distinguished by the slightly larger spigot of the B12A.

The abbreviations used for the connections are substantially in accordance with British Standards Specification BS1409. Some additional abbreviations, however, have had to be introduced.

Similar electrodes which operate in turn on the same electron stream are numbered in order from the cathode, the numbers being appended as subscripts to the electrode symbols.

Similar electrode systems in multiple valves are distinguished by a single tick (′) for the first electrode system, by a double tick (″) for the second, and so on, the ticks being appended to the appropriate electrode symbols.

Dissimilar electrode systems in multiple valves are distinguished by additional letter subscripts appended to the symbols for the less complex electrode structures.

A number against a pin indicates that it is joined internally to the pin of that number.

Where more than one electrode is joined internally to the same pin only the electrode of major importance is usually designated. Thus, the suppressor grid of a pentode is not always shown when it is joined internally to cathode or filament negative. An exception is made when it may be important to the user to know precisely which electrodes are joined to it.

No distinction is normally made between valves with and without external metal screens. The base connections show an " M " for such a screen in cases where all or only some valves have it, but others with the same code reference may have no such screen or an internal screen. The " M " pin should, therefore, normally be earthed.

Abbreviations

for Valve-base Connections

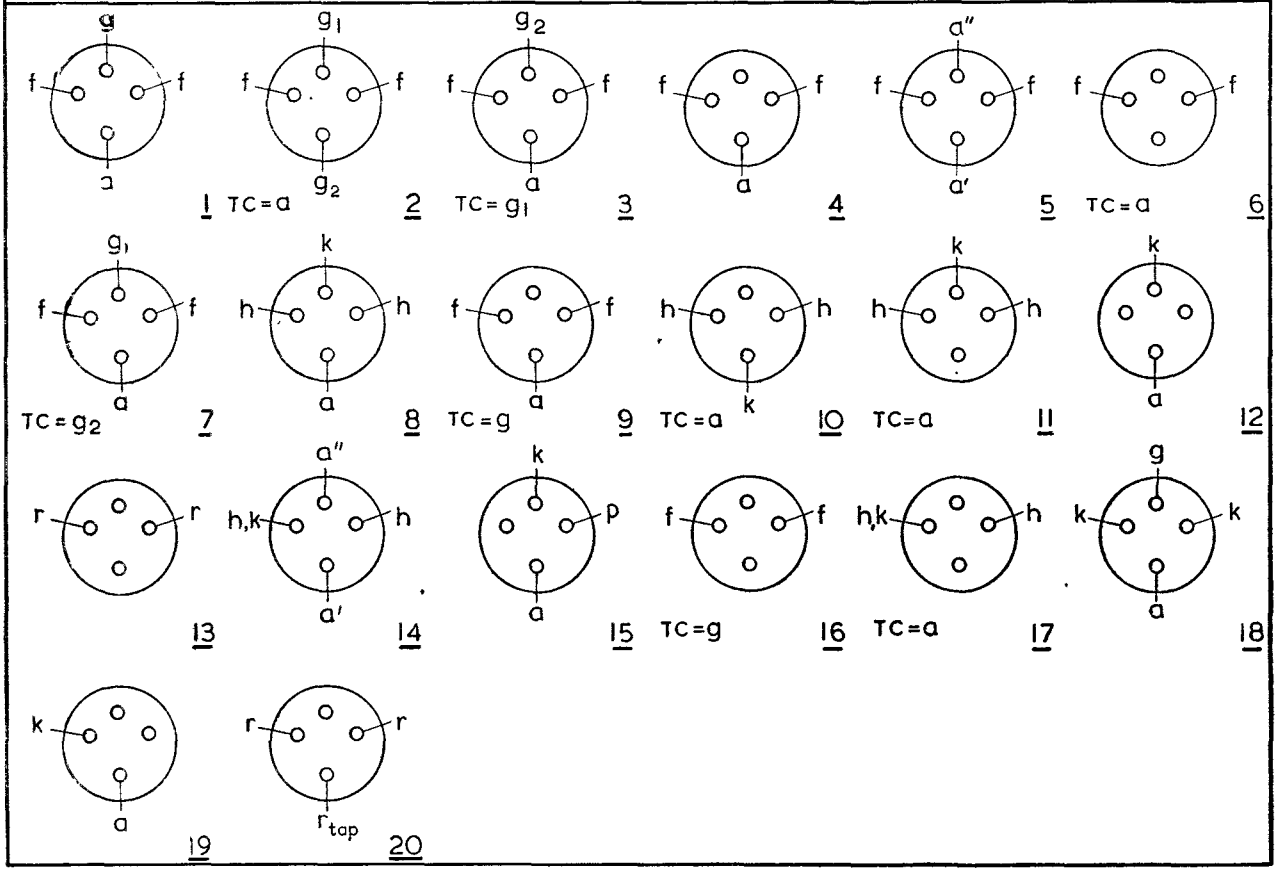
MAIN SYMBOLS

a	= anode
bp	= beam plates
ce	= control electrode
f	= filament
g	= grid
h	= heater
ic	= internal connection (no external connection must be made to a pin so designated)
jp	= jumper
k	= cathode
M	= external conducting coating
m	= internal conducting coating
p	= priming electrode
r	= resistance
s	= internal shield
st	= spark trap
t	= target
tr	= trigger
x	= X deflection plate
y	= Y deflection plate
TC	= top cap
SC	= side cap

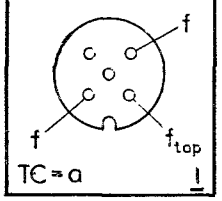
SUBSCRIPT SYMBOLS

d	= diode
p	= pentode
r	= rectifier
t	= triode
tap	= filament or heater tapping
(+)	= positive
(−)	= negative

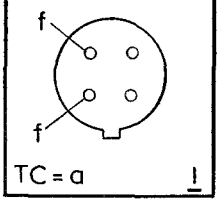
B 4



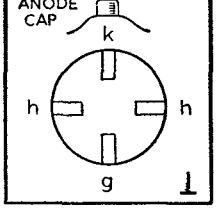
B4A



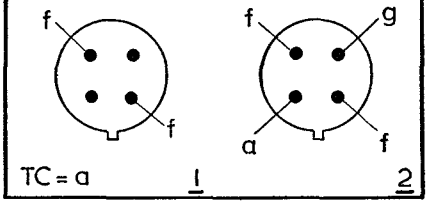
B4D



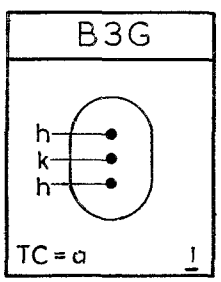
B 4E



B4F

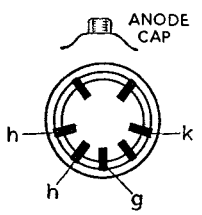


B3G



EMI C.R.T. BASE

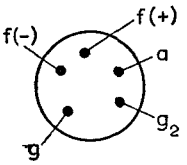
TYPE 3/3
3/4
3/5
3/6A



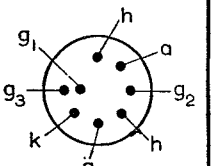
MULLARD TYPES

WITH WIRE CONNECTING LEADS

DF70
DL 71
DL 72

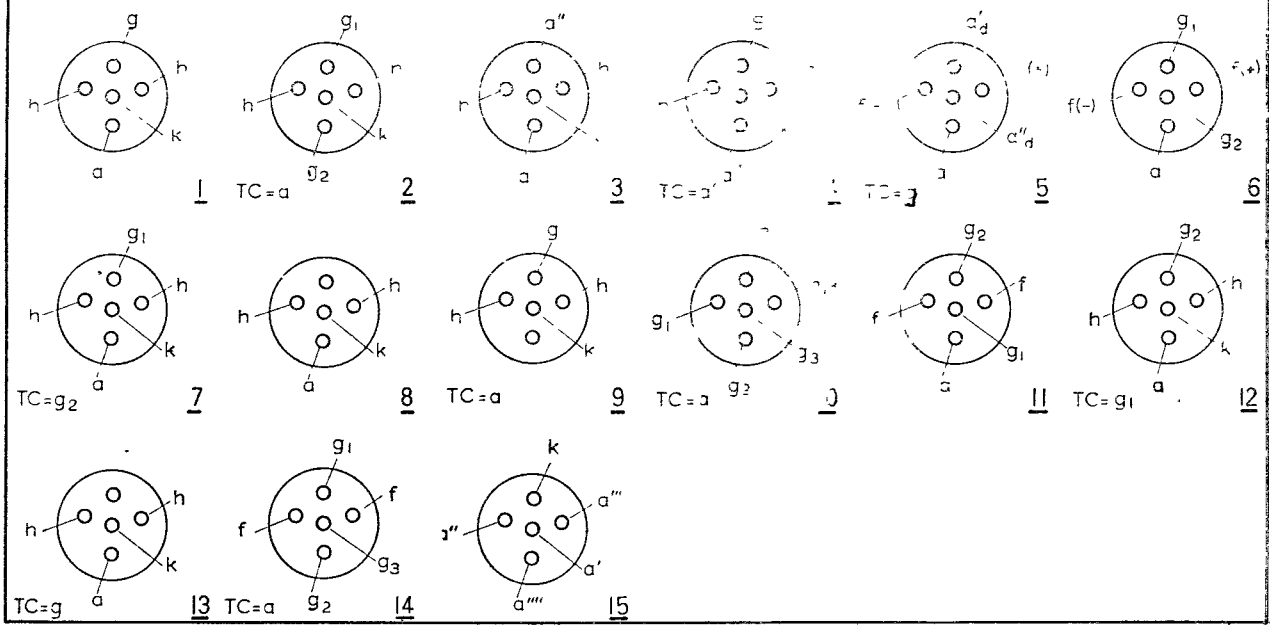


ANODE: COLOURED SPOT



EF74

B5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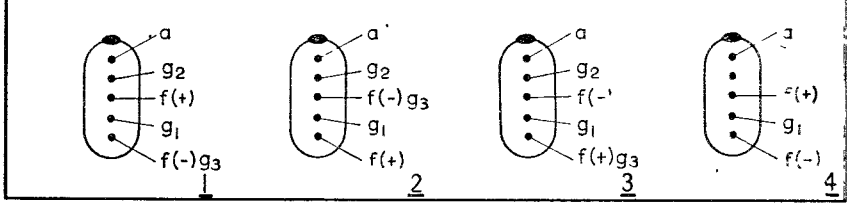
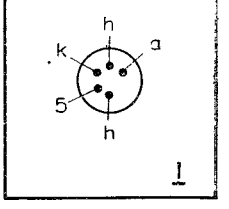
TC=a
2
3
TC=a
4
5
6
TC=g2
7
8
TC=a
9
TC=a
10
11
TC=g1
12
TC=g
13
TC=a
14
15

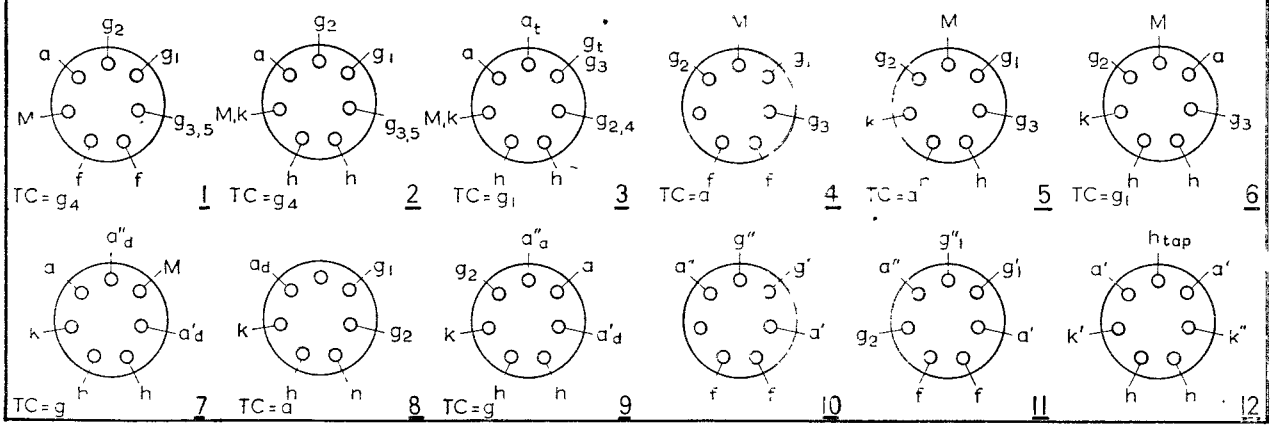
B5A


a
g2
f(+)
g1
f(-)g3
1
a
g2
f(-)g3
g1
f(+)
2
a
g2
f(-)
g1
f(+)g3
3
a
f(+)
g1
f(-)
4

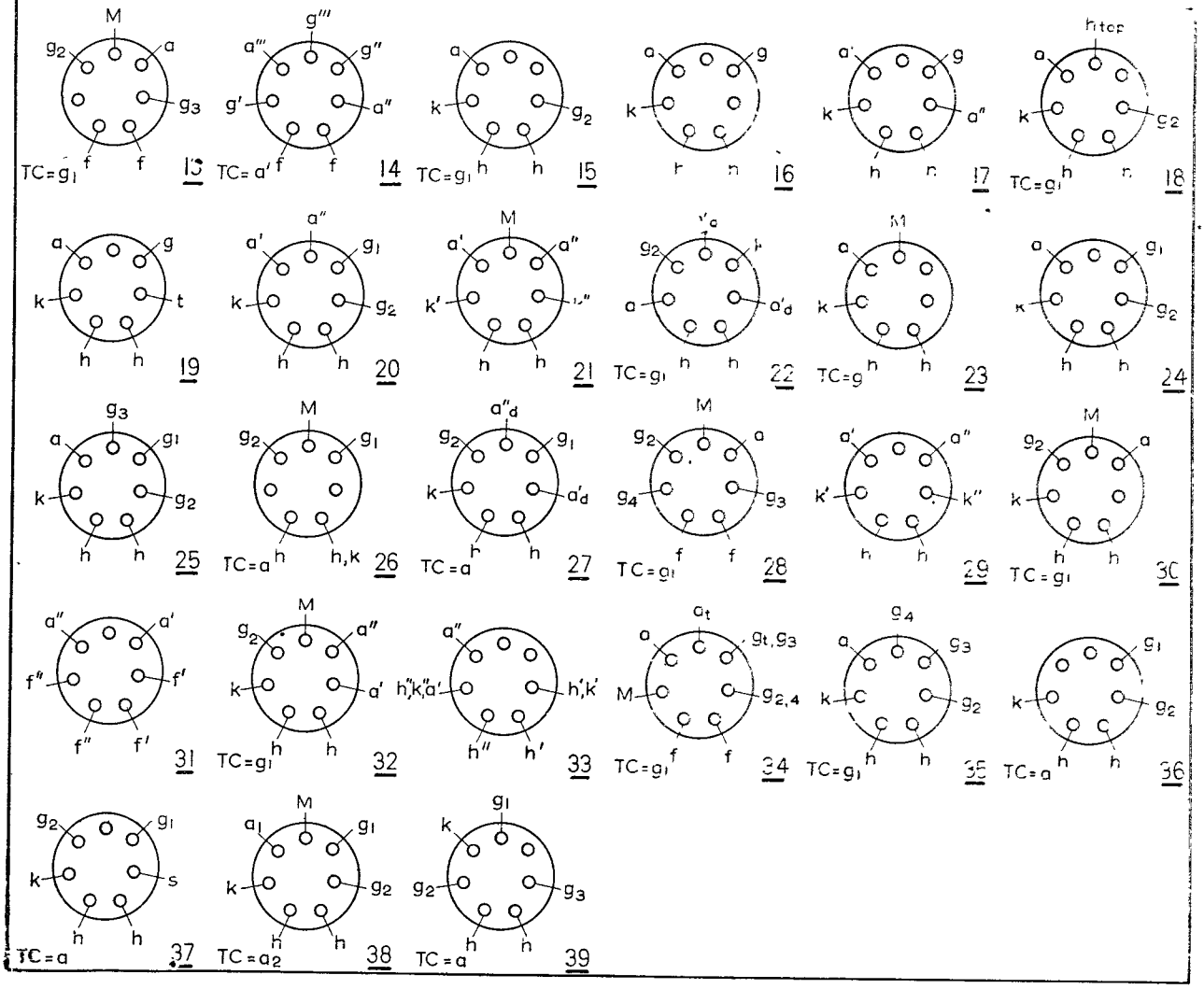
B5B


h
k
a
5
h
1

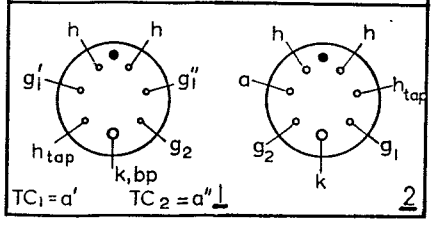
B7


g2
a
g1
M
g3,5
f
f
TC=g4
1
g2
a
g1
M,k
g3,5
h
h
TC=g4
2
at
gt
g3
a
M,k
g2,4
h
h
TC=g1
3
M
g2
g1
g3
f
f
TC=a
4
M
g2
g1
k
g3
h
TC=a
5
M
g2
a
k
g3
h
h
TC=g1
6
a"d
a
M
k
a'd
h
h
TC=g
7
ad
g1
k
g2
h
h
TC=a
8
a"a
g2
a
k
a'd
h
h
TC=g
9
g"
a'
g'
a'
f
f
10
g"1
a"
g'1
g2
a'
f
f
11
htap
a'
a'
k'
k"
h
h
12

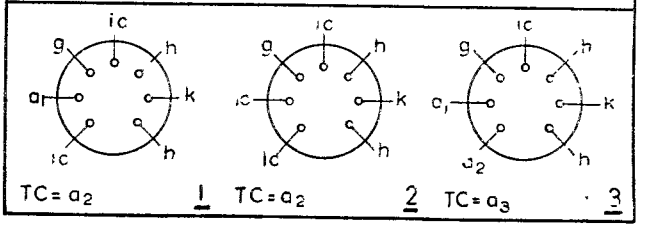
B 7 (Continued)



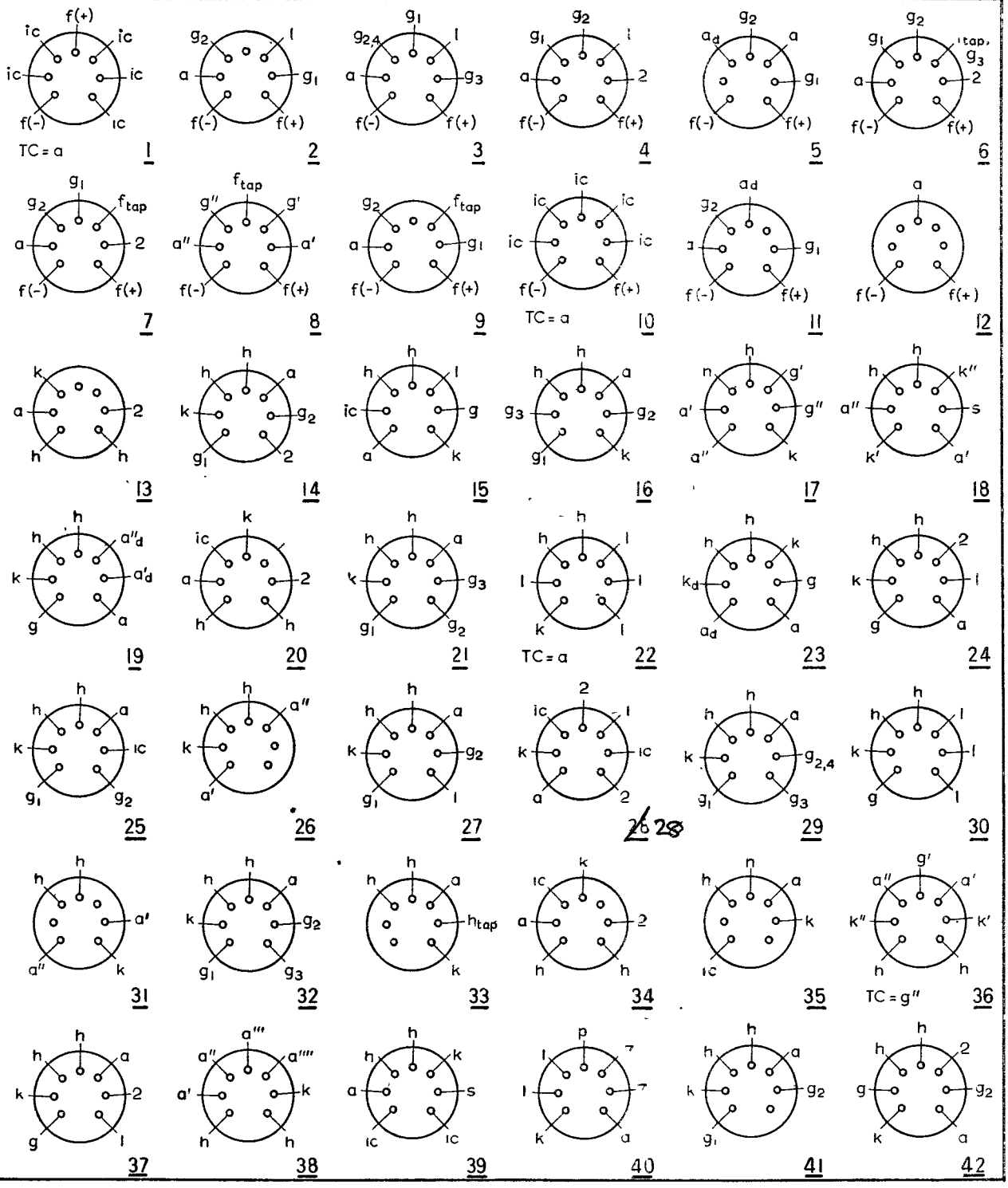
B7A



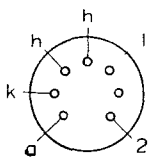
B7B



B 7G

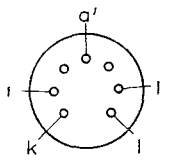

1 TC = a
2
3
4
5
6
7
8
9
10 TC = a
11
12
13
14
15
16
17
18
19
20
21
22 TC = a
23
24
25
26
27
28
29
30
31
32
33
34
35
36 TC = g''
37
38
39
40
41
42

B 7G (Continued)



43

TC = a''



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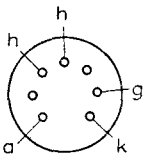

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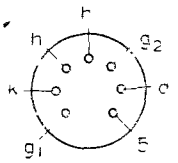
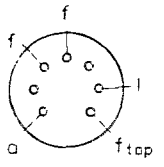


46



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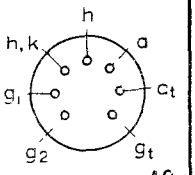

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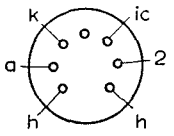

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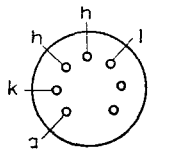

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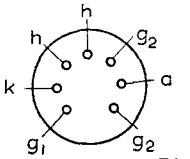

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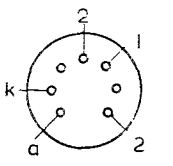

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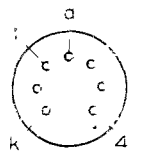

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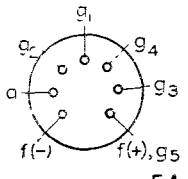

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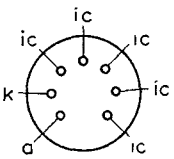

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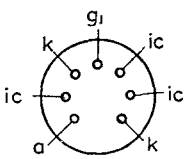

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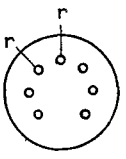

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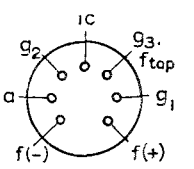

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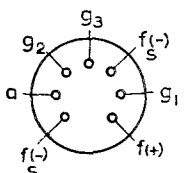

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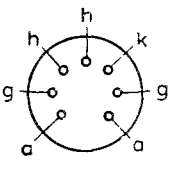

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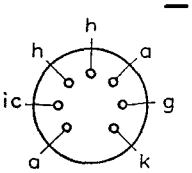

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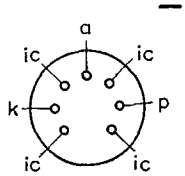
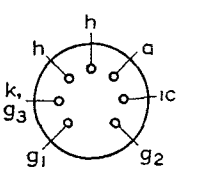


62



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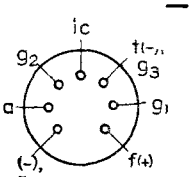

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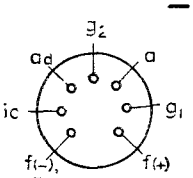

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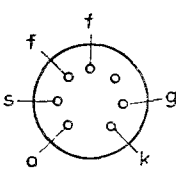

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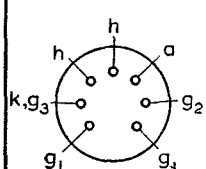

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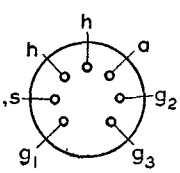

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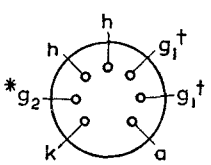

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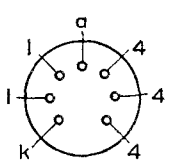

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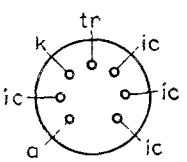

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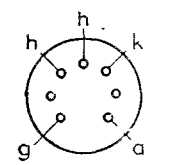
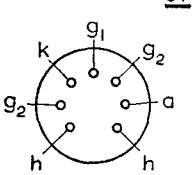


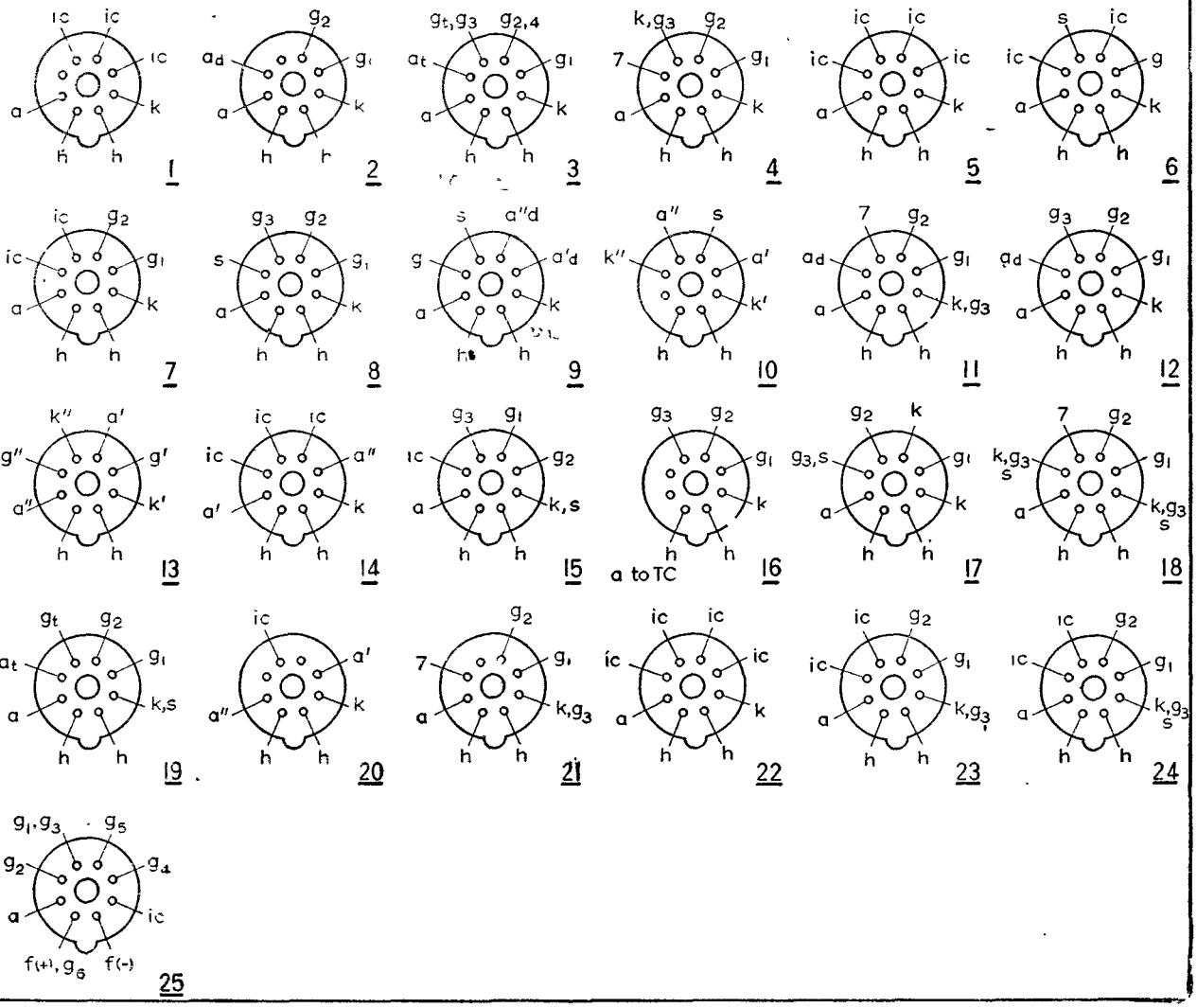
72

†† space charge grids
* control grid

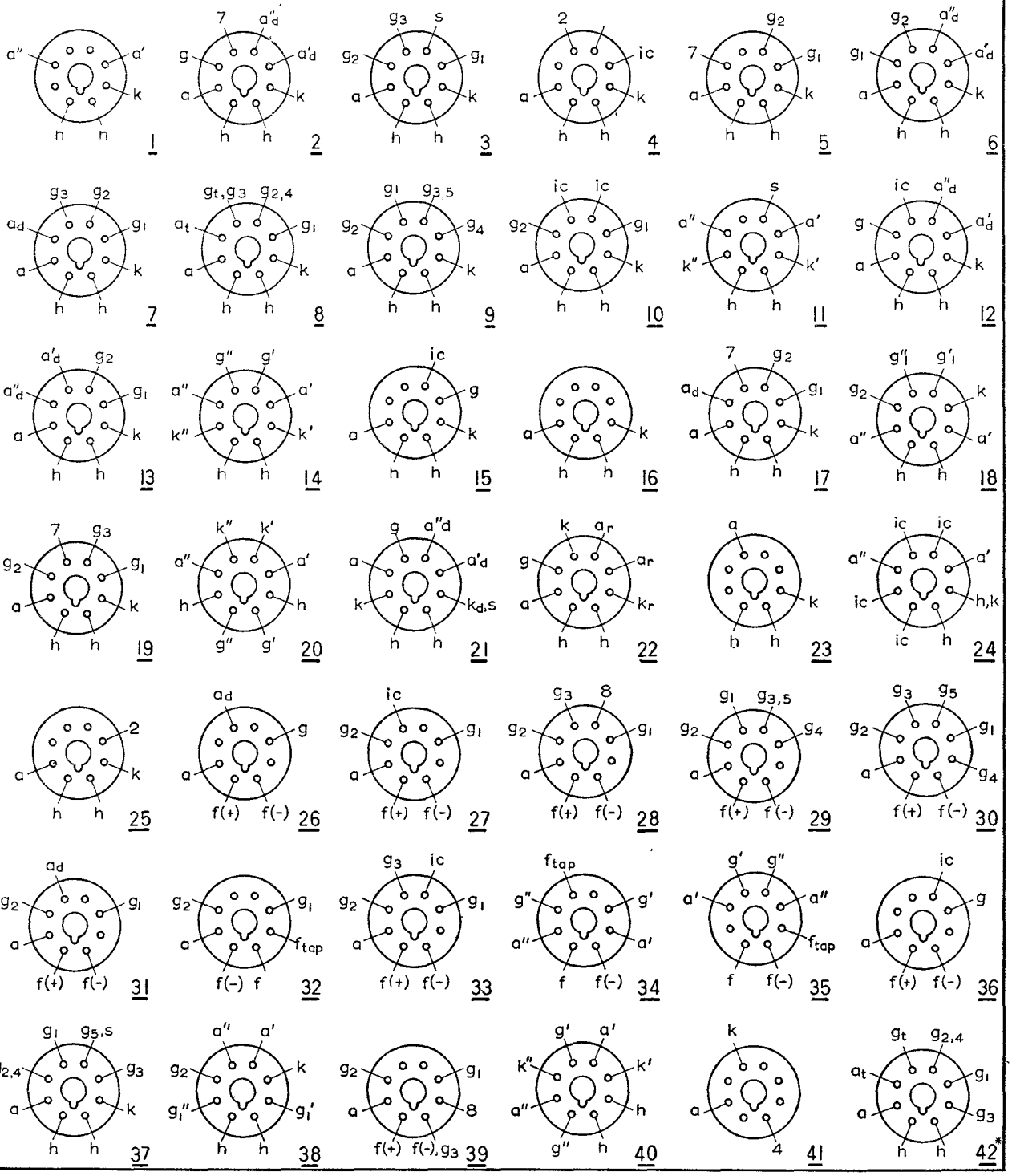


73

B8A

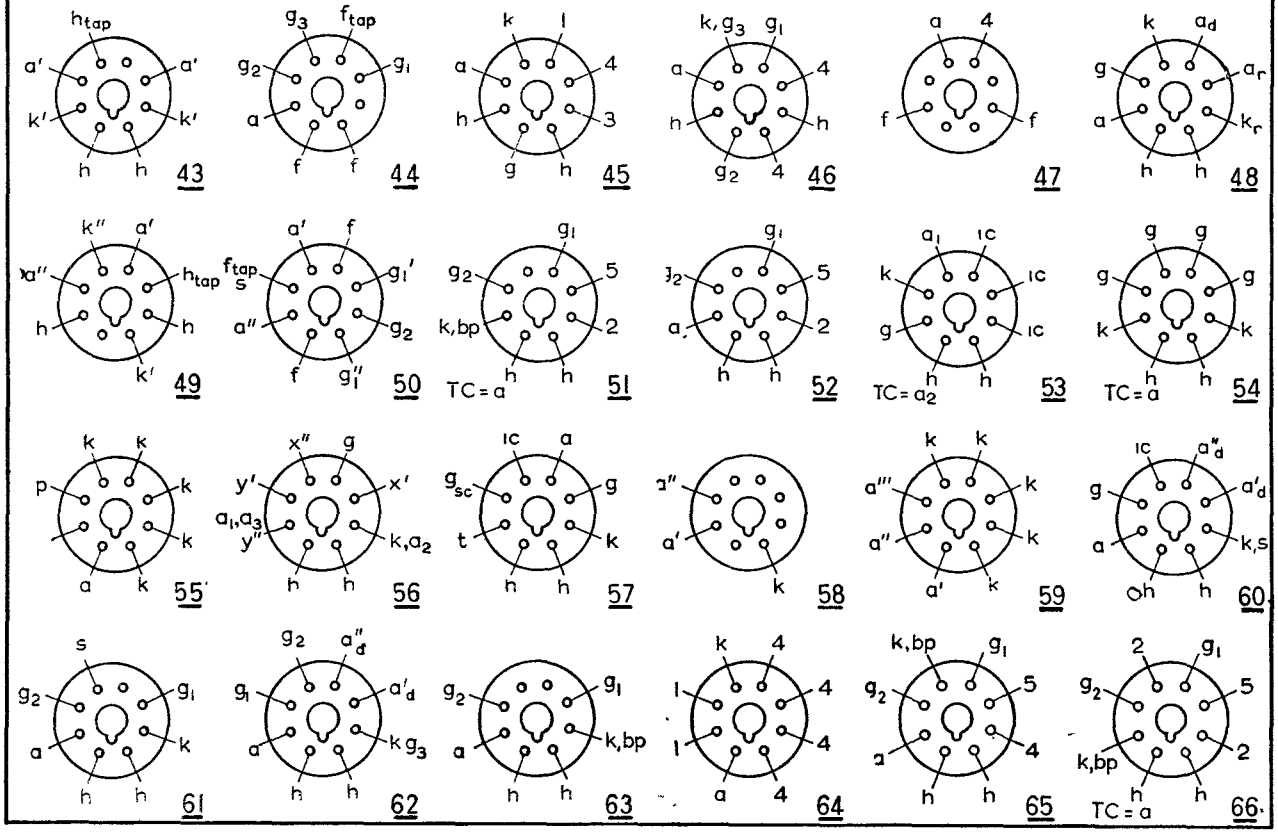

1 ic ic ic a k h h
2 g2 ad g1 a k h h
3 gt,g3 g2,4 at g1 a k h h
4 k,g3 g2 7 g1 a k h h
5 ic ic ic ic a k h h
6 s ic ic g a k h h
7 ic g2 ic g1 a k h h
8 g3 g2 s g1 a k h h
9 s a"d g a'd a k h h
10 a" s k" a' k' h h
11 7 g2 ad g1 a k,g3 h h
12 g3 g2 ad g1 a k h h
13 k" a' g" g' a" k' h h
14 ic ic ic a" a' k h h
15 g3 g1 ic g2 a k,s h h
16 g3 g2 g1 a k h h a to TC
17 g2 k g3,s g1 a k h h
18 7 g2 k,g3 s g1 a k,g3 s h h
19 gt g2 at g1 a k,s h h
20 ic a' a" k h h
21 g2 7 g1 a k,g3 h h
22 ic ic ic ic a k h h
23 ic g2 ic g1 a k,g3 h h
24 ic g2 ic g1 a k,g3 s h h
25 g1,g3 g5 g2 g4 a ic f(+),g6 f(-)

B 8 B (LOCTAL)

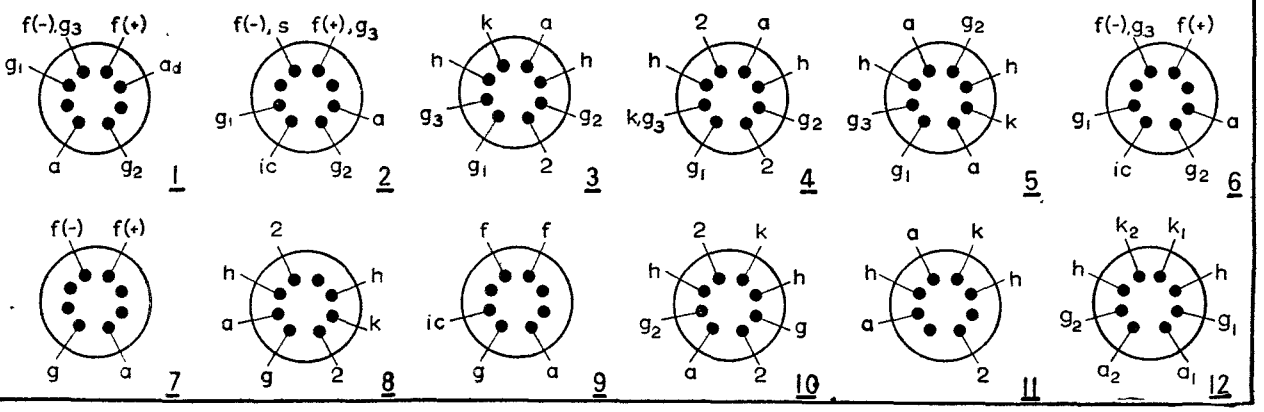


*k and g_5 to centre spigot

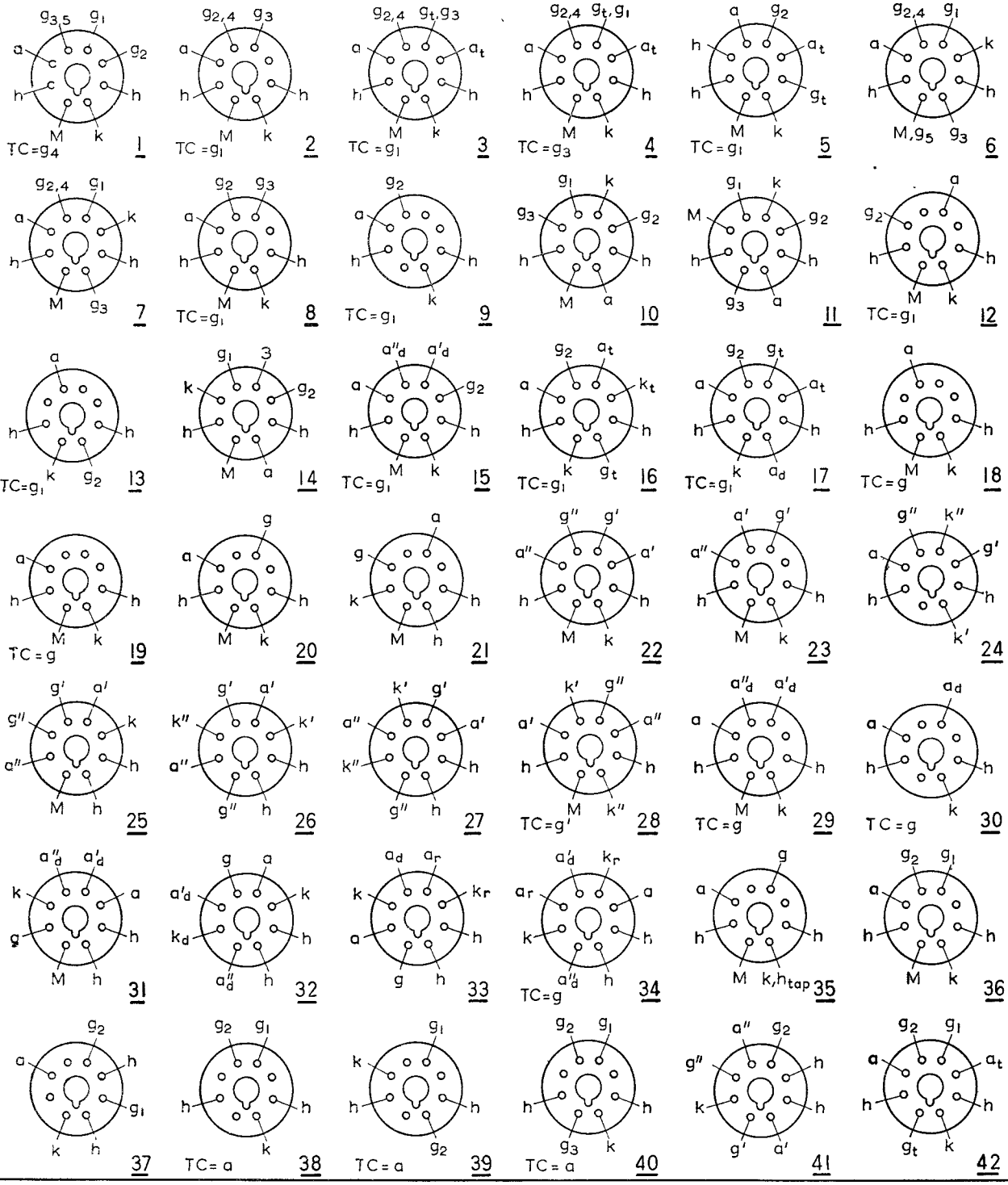
B8B (Continued)



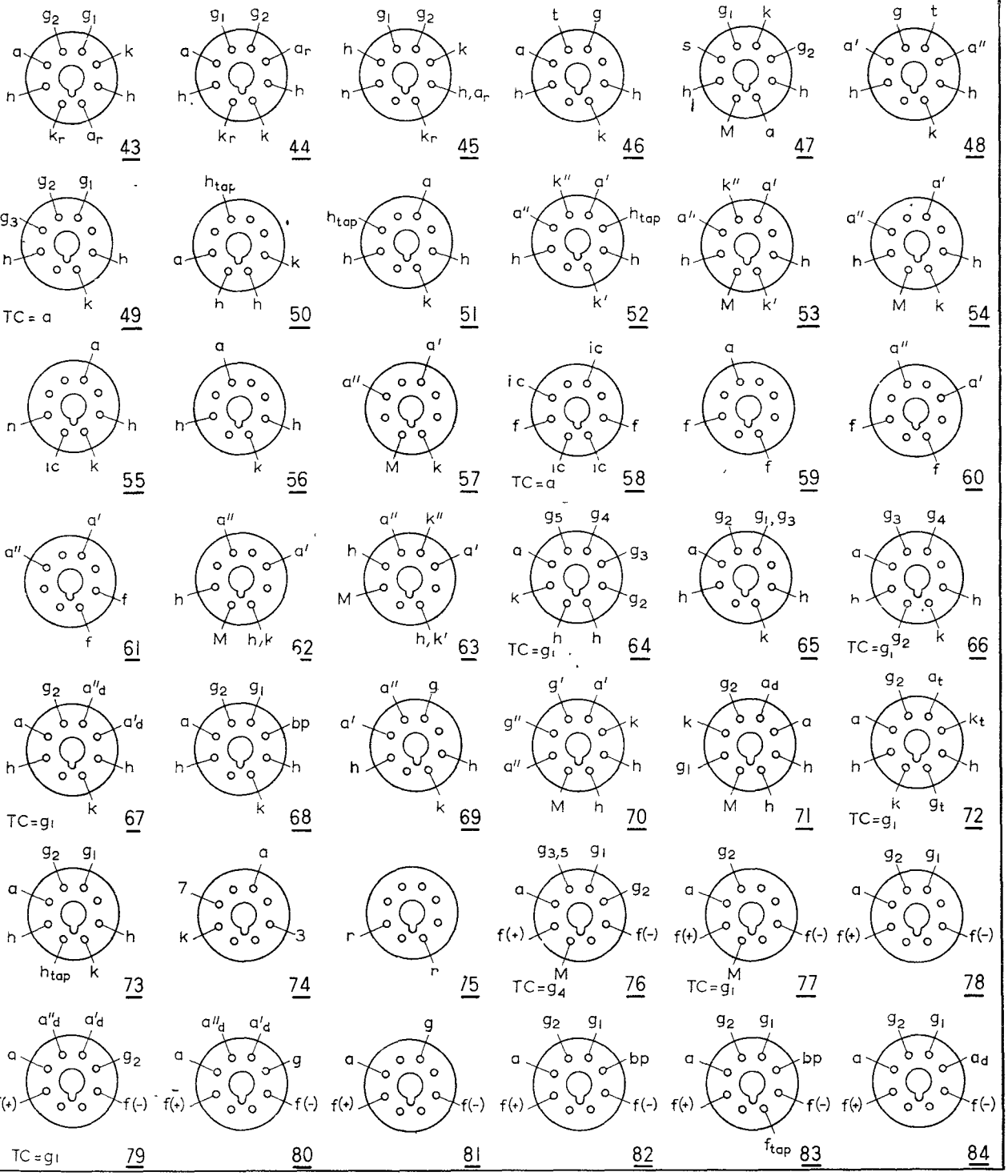
B8D



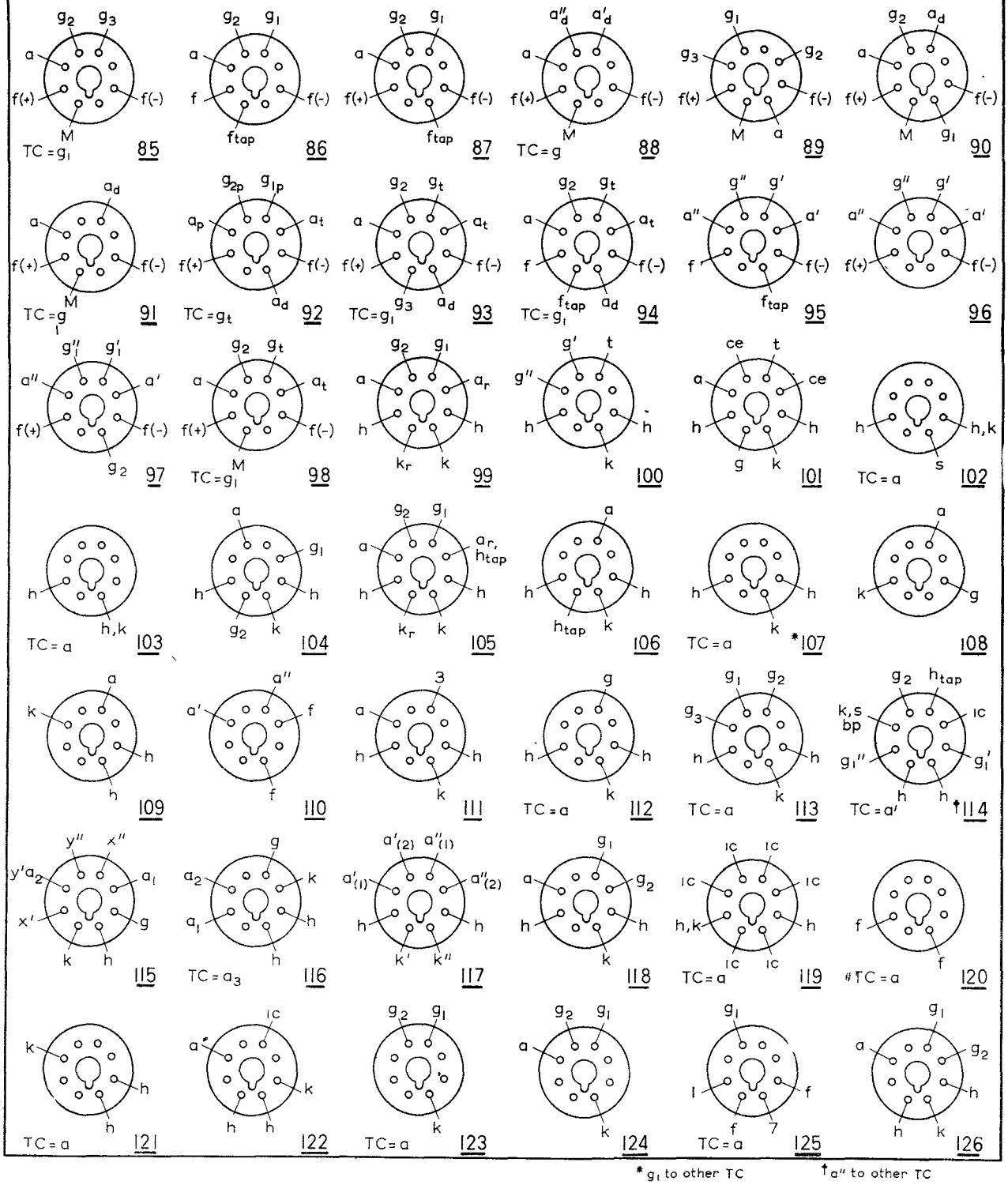
10 (INTERNATIONAL OCTAL)



10 (Continued)



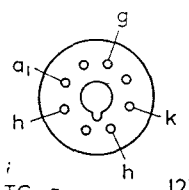
10 (continued)



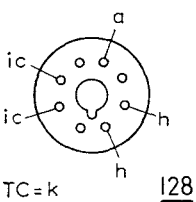
*g_1 to other TC

†a'' to other TC

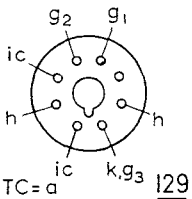
10 (continued)



TC = a_2 127



TC = k 128



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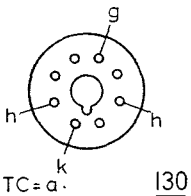
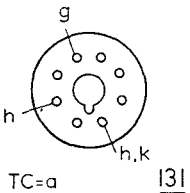
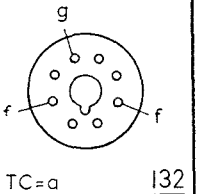


TC = a 130



TC = a 131



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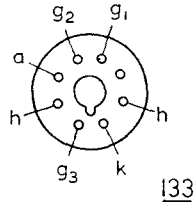
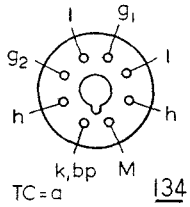
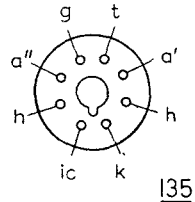


133



TC = a 134



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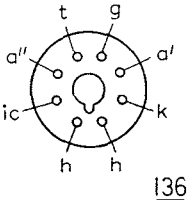

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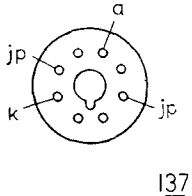

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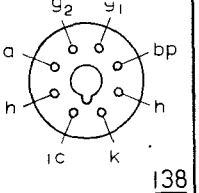
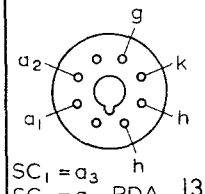
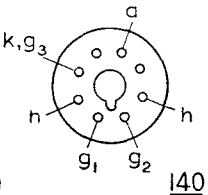


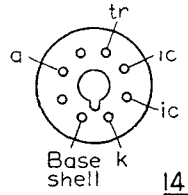
138



$SC_1 = a_3$
$SC_2 = a_4$, PDA 139



140



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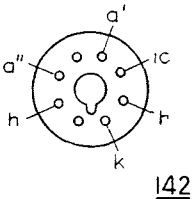

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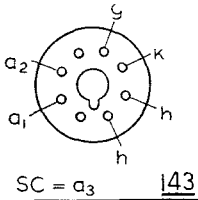
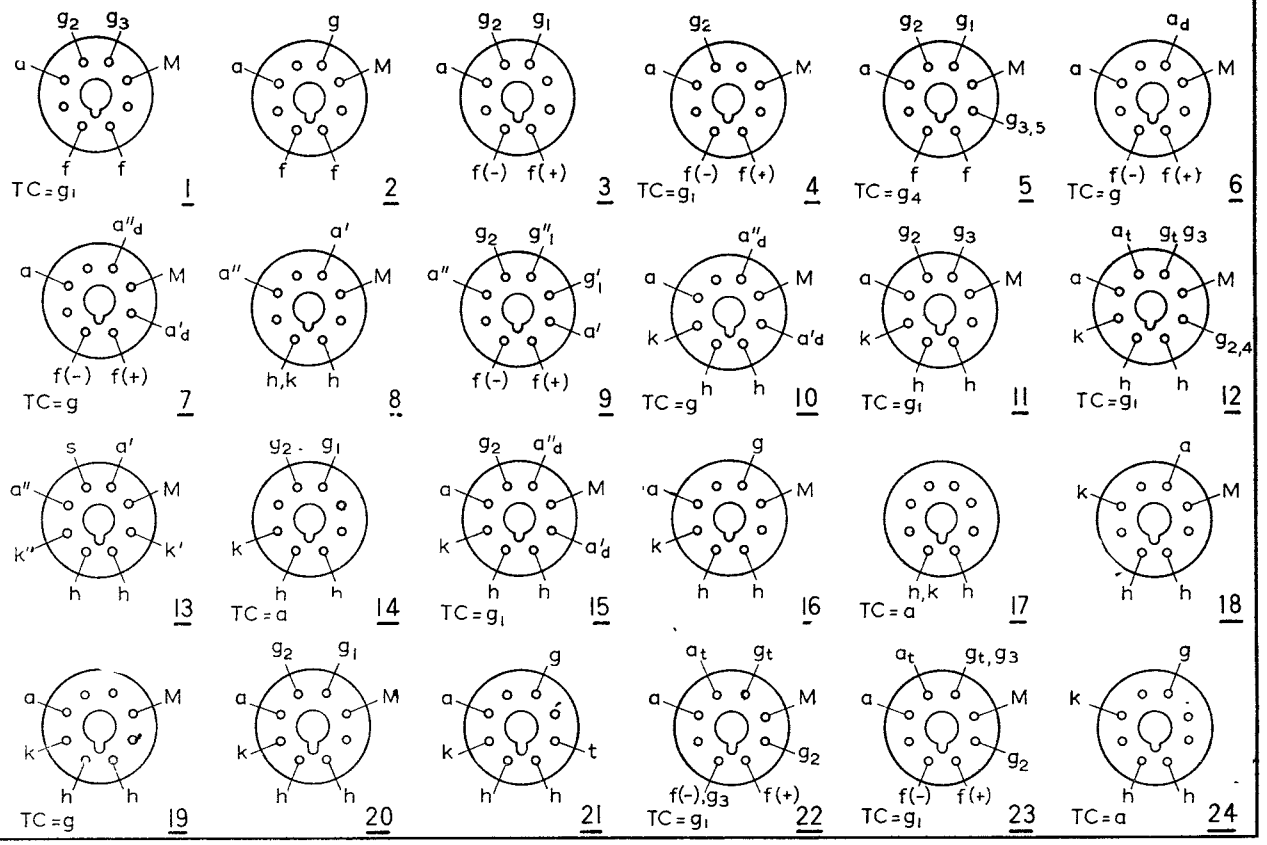
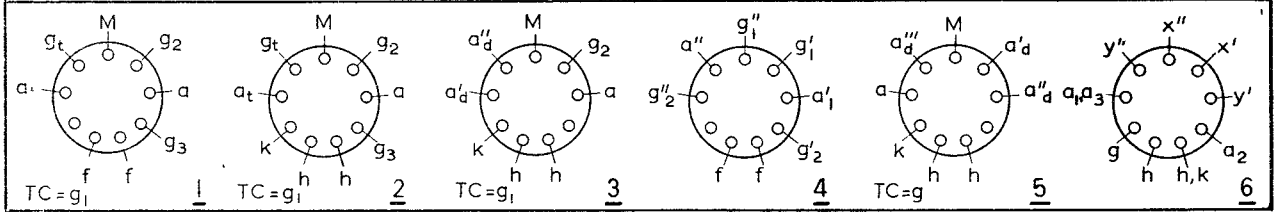


SC = a_3 143

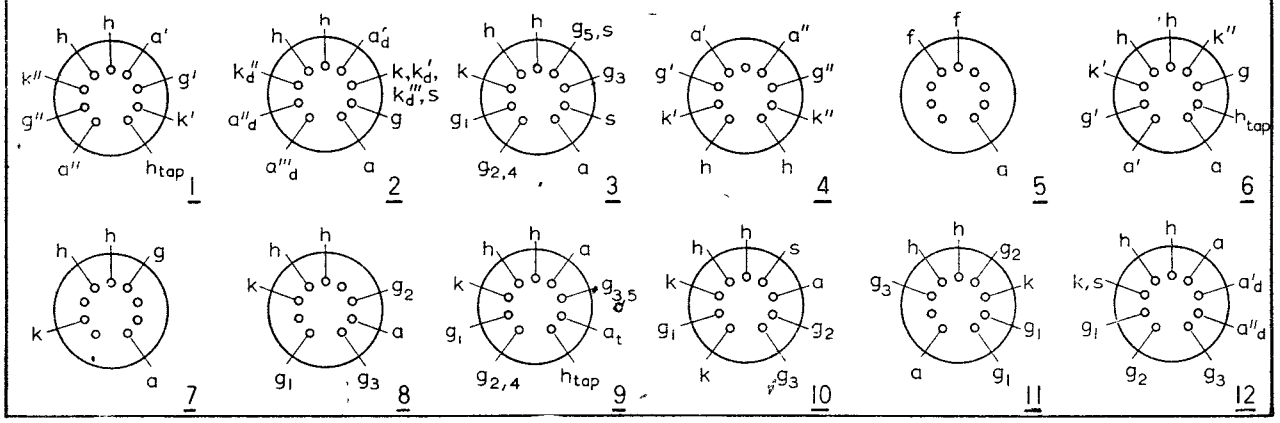
MO (MAZDA OCTAL)



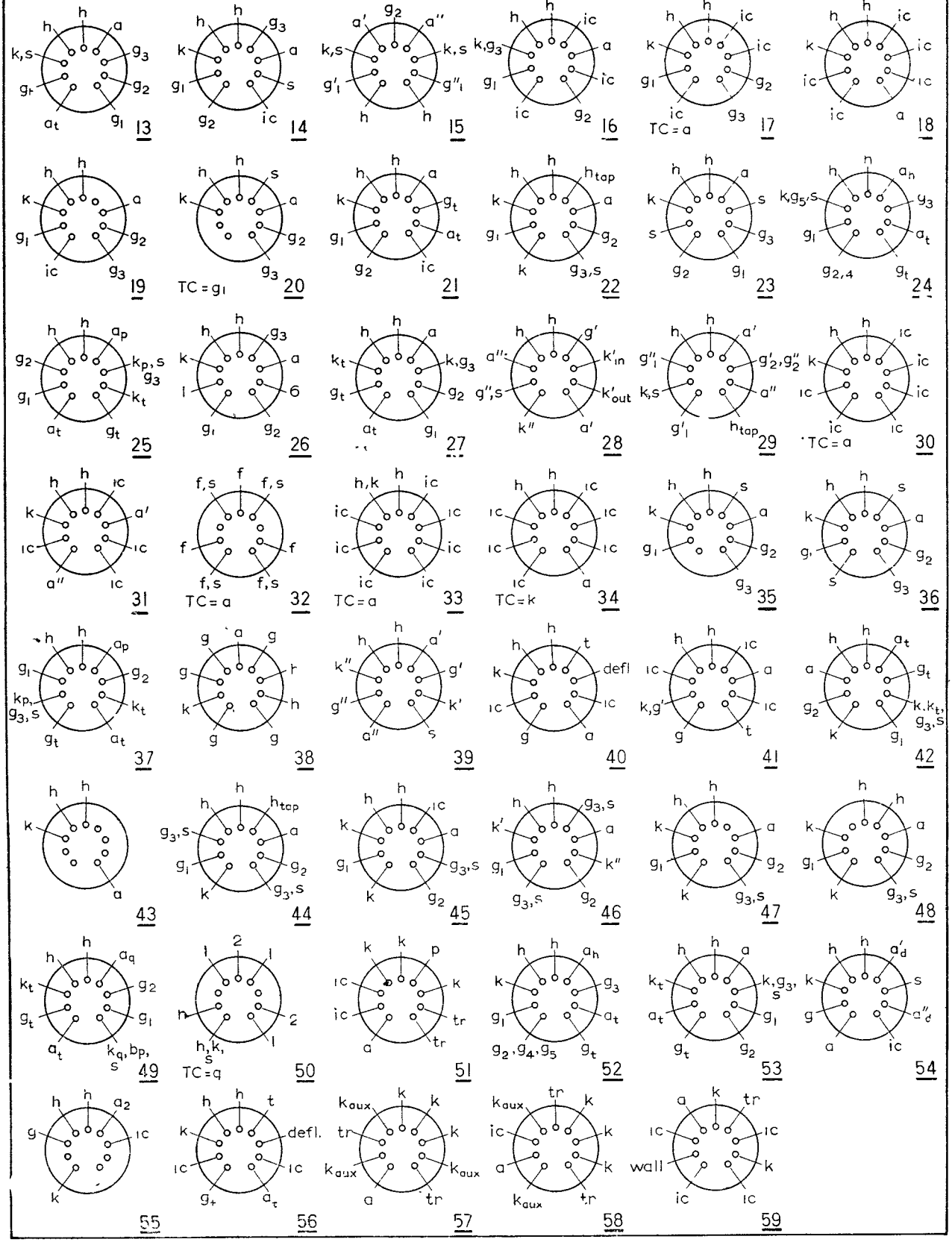
B9



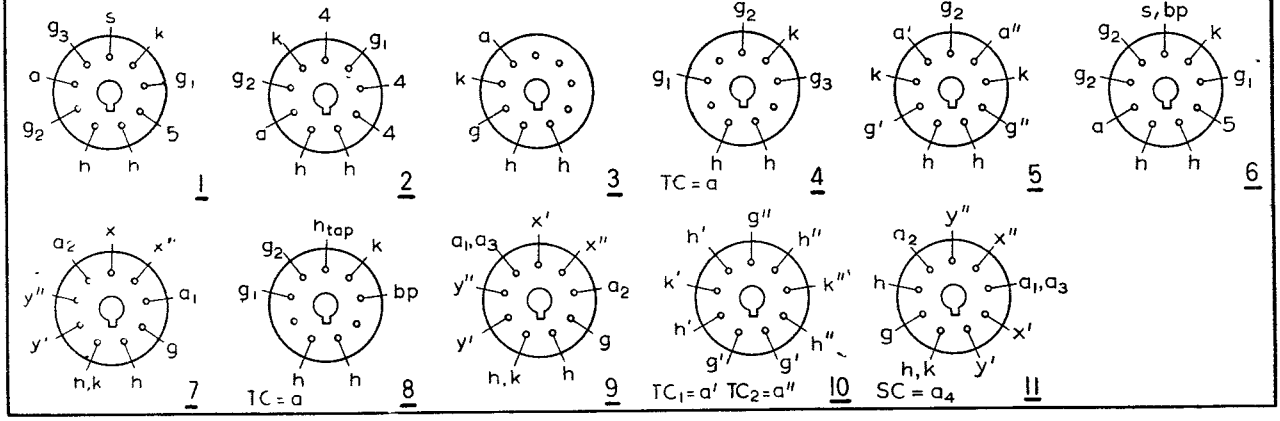
B9A (NOVAL)



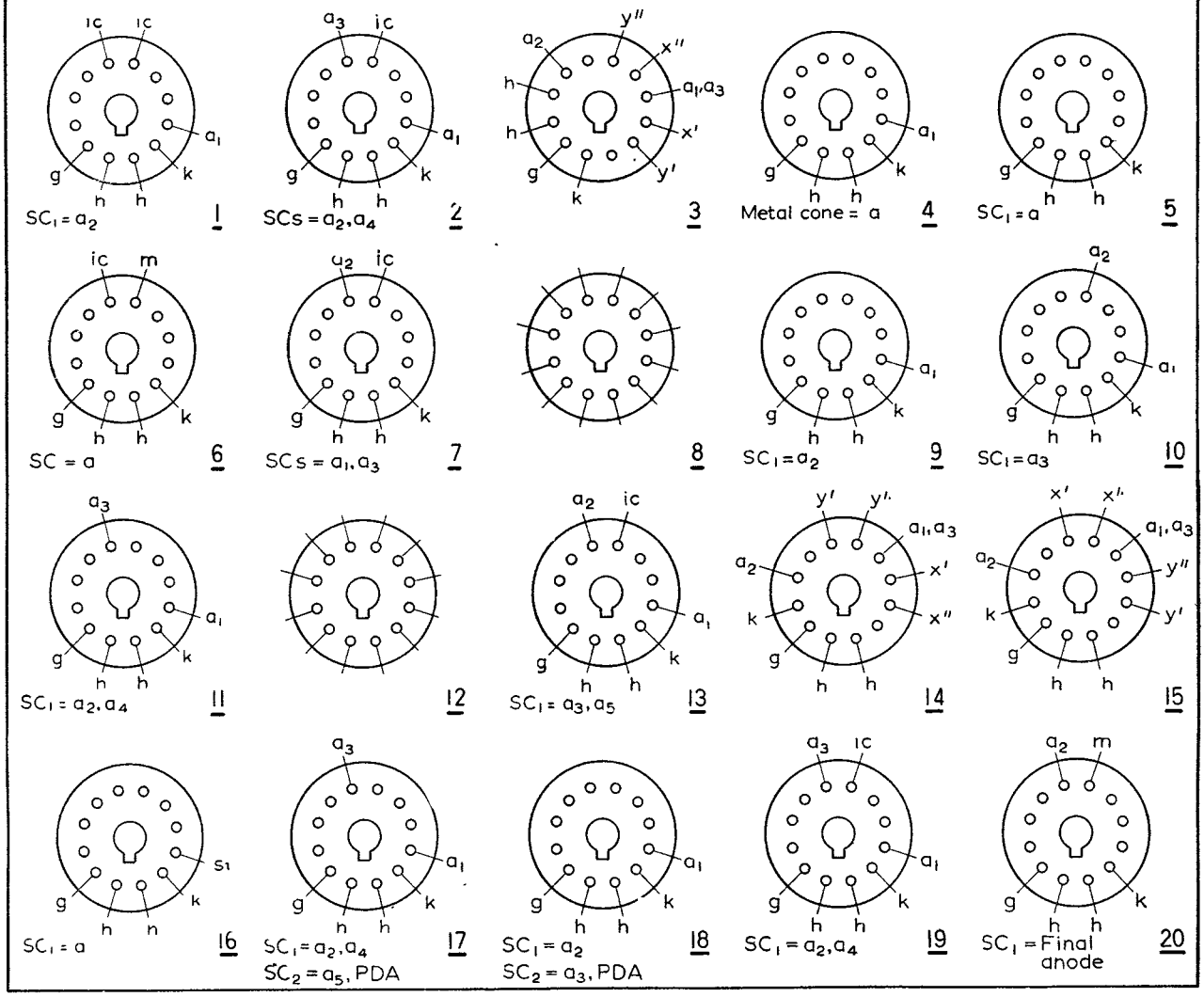
B9A (Continued)



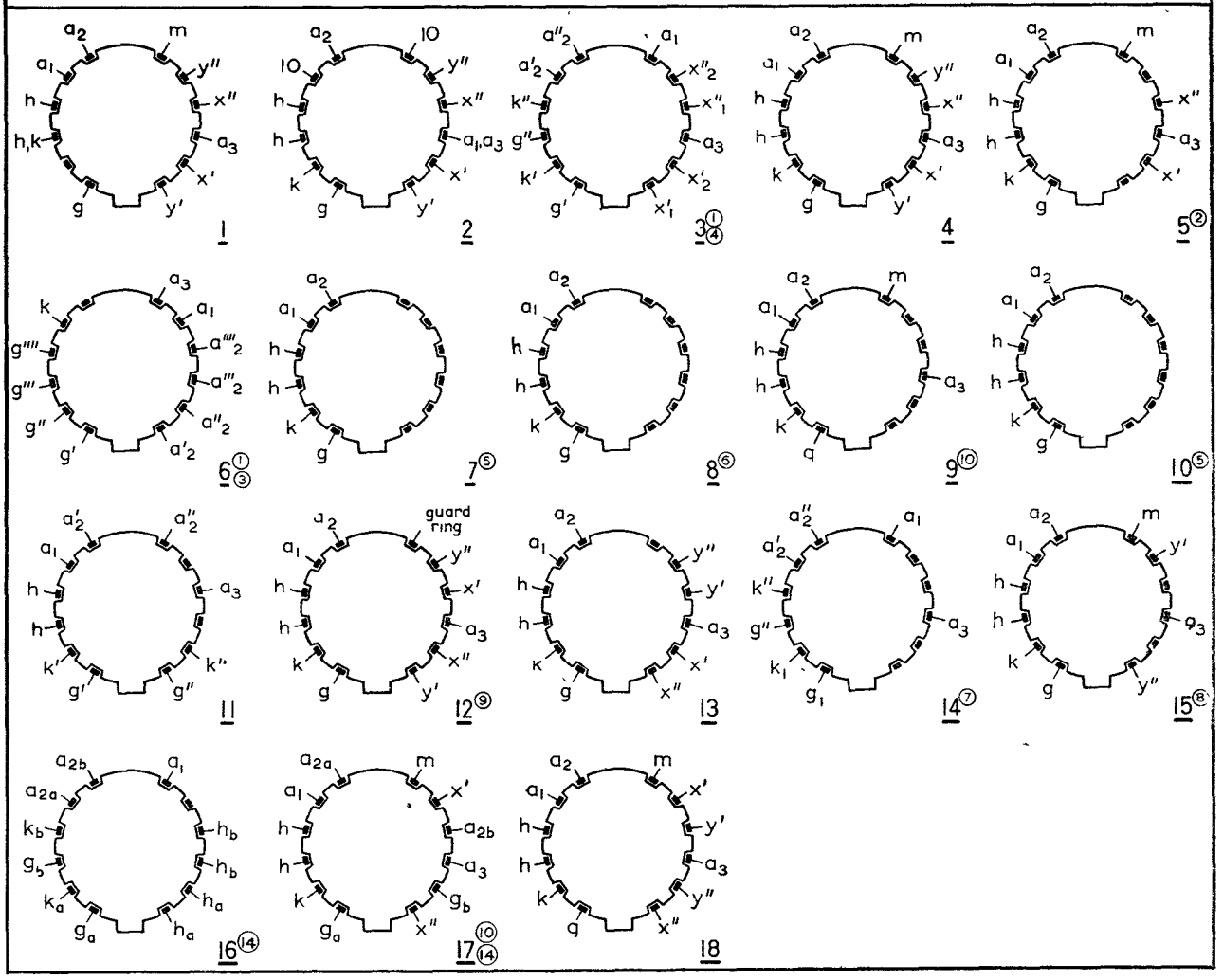
B9G


1
2
3
TC = a
4
5
6
7
TC = a
8
9
TC1 = a' TC2 = a''
10
SC = a4
11

B12A

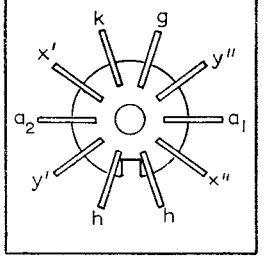

SC1 = a2
1
SCs = a2, a4
2
3
Metal cone = a
4
SC1 = a
5
SC = a
6
SCs = a1, a3
7
8
SC1 = a2
9
SC1 = a3
10
SC1 = a2, a4
11
12
SC1 = a3, a5
13
14
15
SC1 = a
16
SC1 = a2, a4
SC2 = a5, PDA
17
SC1 = a2
SC2 = a3, PDA
18
SC1 = a2, a4
19
SC1 = Final anode
20

B12D

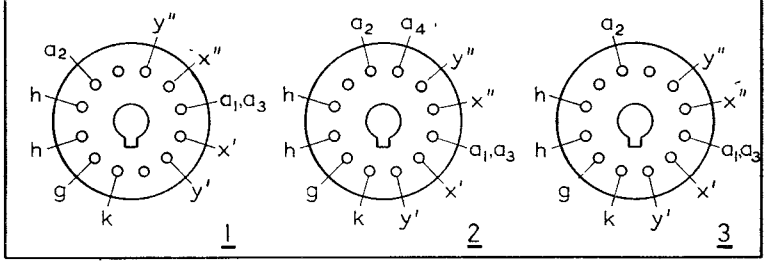


① h_1', h_1'', h_2' and h_2'' to four 4-mm sockets
② y′ to TC_3, y″ to TC_4
③ 8 pairs deflection plates to SCs
④ 2 pairs Y deflection plates to SCs
⑤ X and Y deflection plates and a_3, a_4, a_5 and a_6 to SCs
⑥ X and Y deflection plates and a_3 to SCs
⑦ 4 pairs deflection plates to SCs
⑧ X deflection plates and a_4 to SCs
⑨ 2 radial deflection electrodes
⑩ deflection plates to SCs
⑭ PDA to SCs

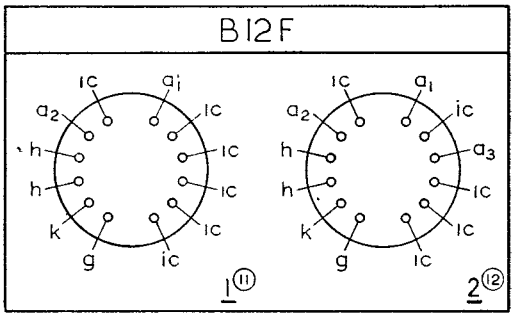
B10A/A



B12B

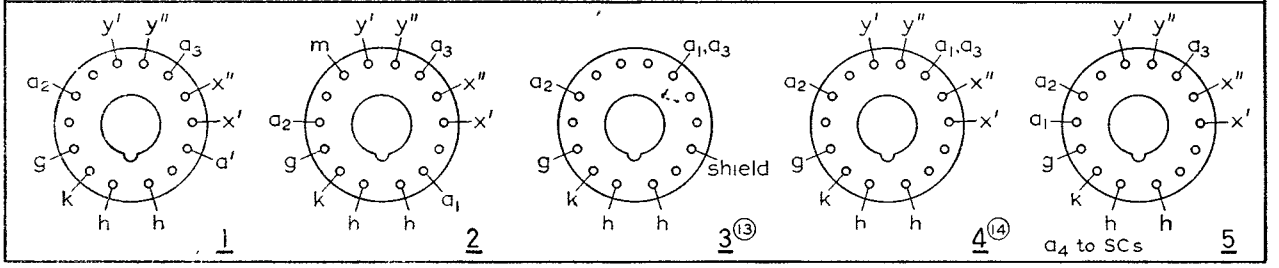


B12F

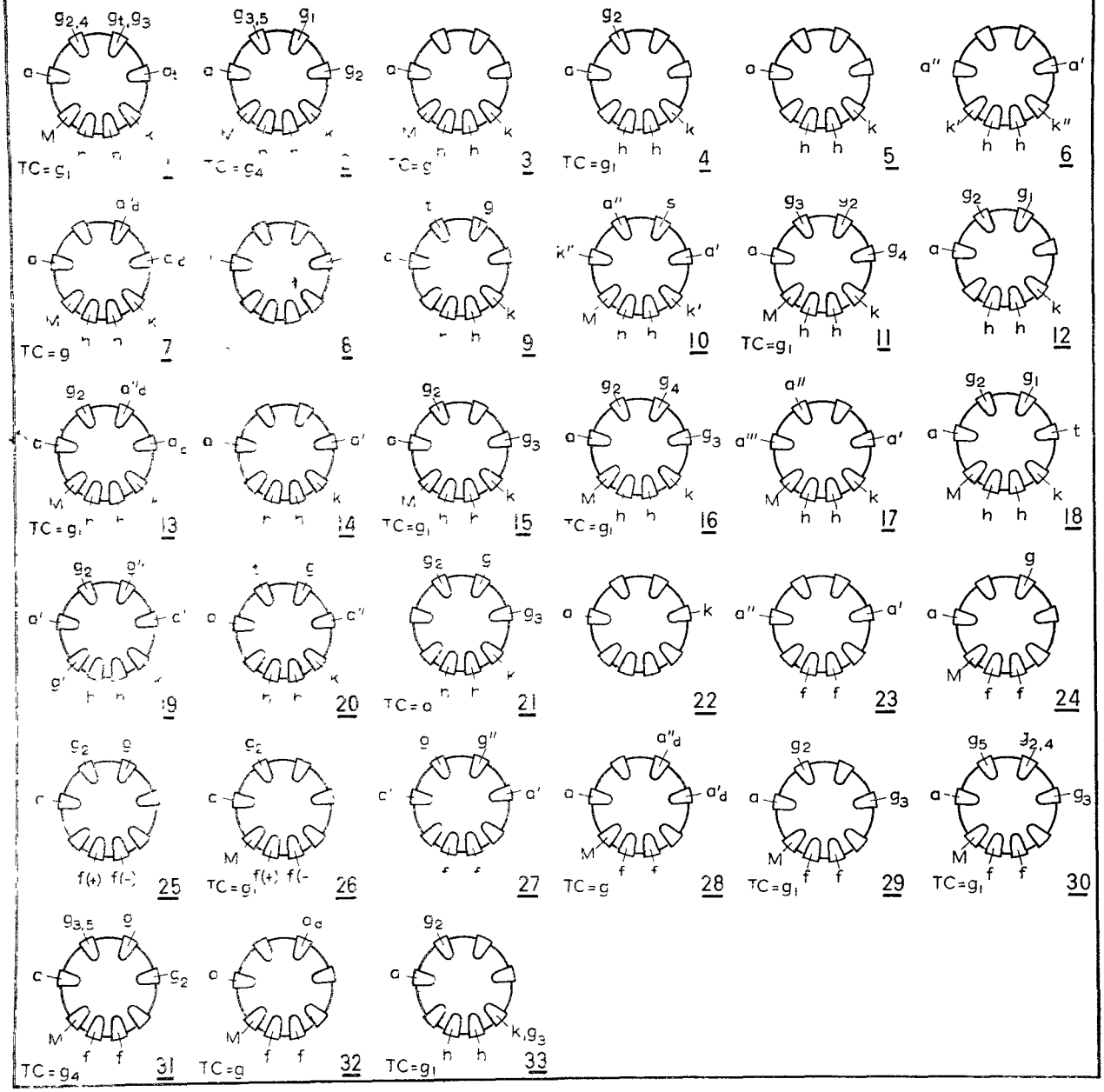


⑪ x', x'', y', y'', a_3 and a_4 to SCs
⑫ deflection plates, a_4 and a_5 to SCs
⑬ X and Y deflection plates, interplate shield contacts and a_4 to SCs
⑭ PDA to SCs

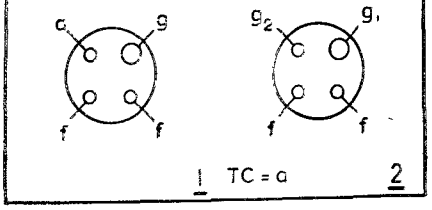
B14A



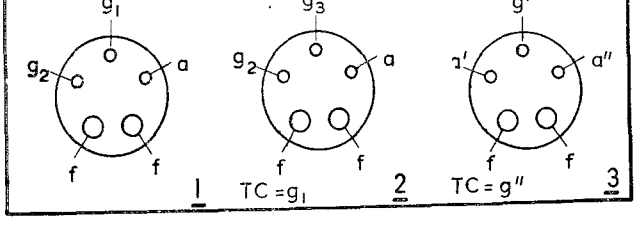
Ct 8 (SIDE CONTACT)



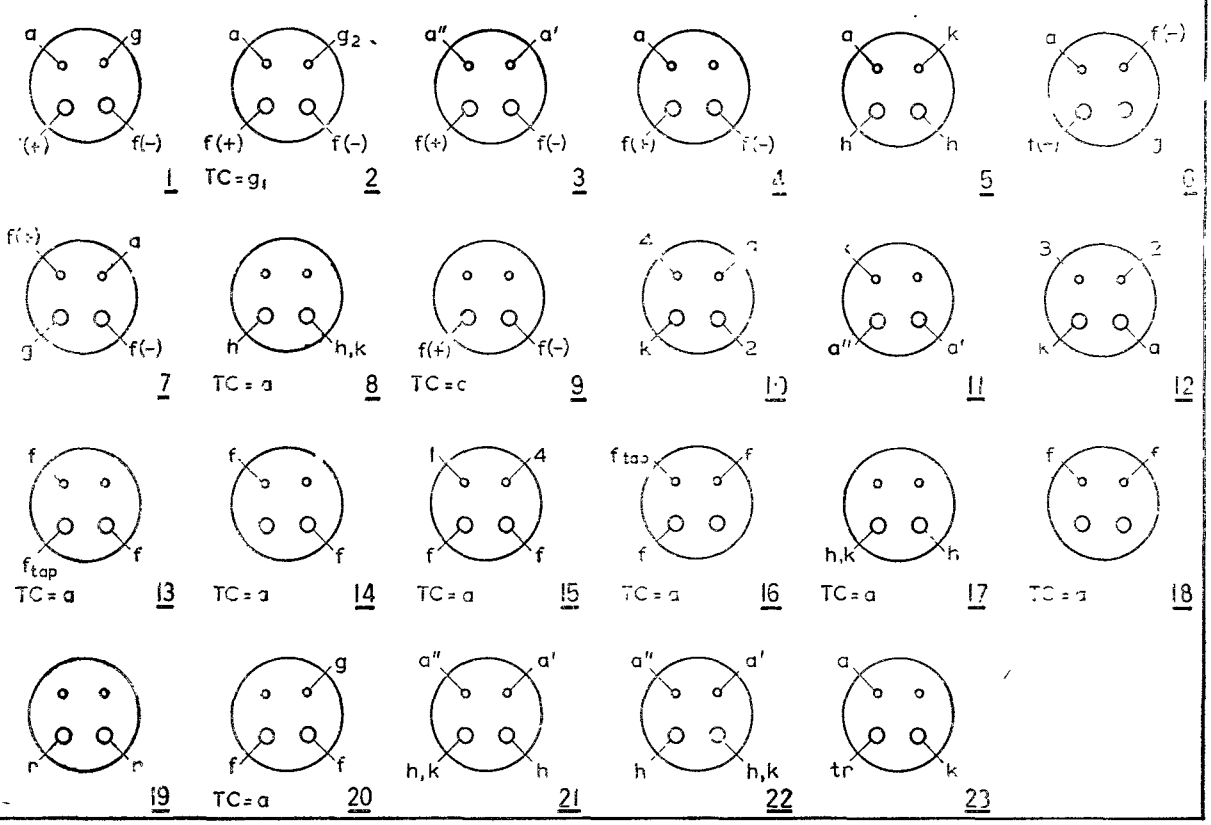
Sm4



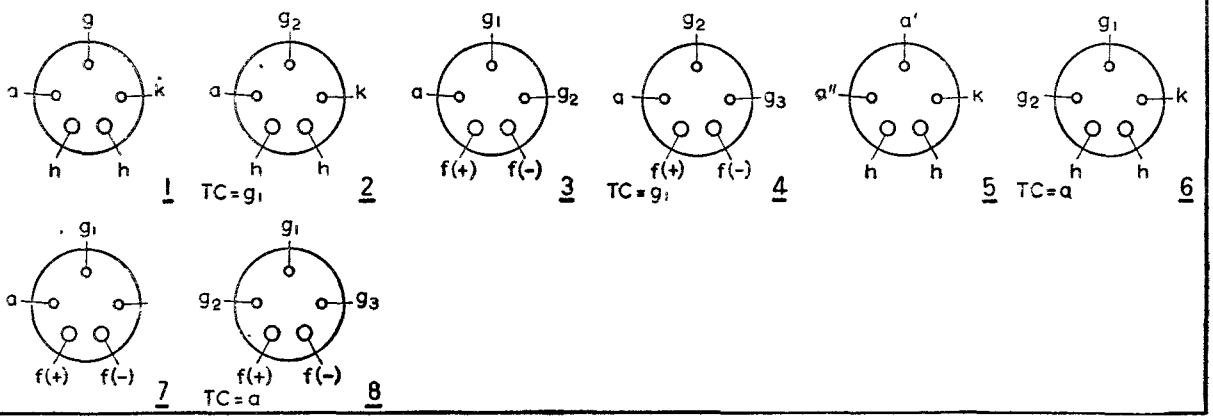
Sm5



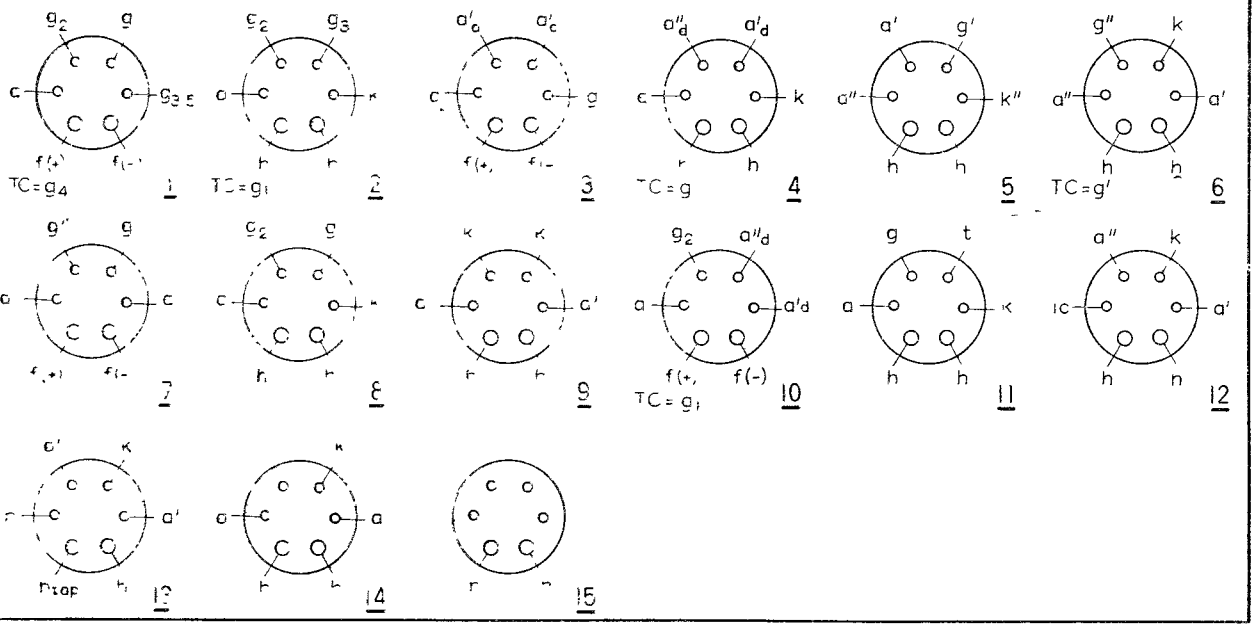
U X 4


a
g
f(+)
f(-)
1
a
g2
f(+)
f(-)
TC=g1
2
a''
a'
f(+)
f(-)
3
a
f(+)
f(-)
4
a
k
h
h
5
a
f(-)
6
f(+)
a
g
f(-)
7
h
h,k
TC=a
8
f(+)
f(-)
TC=c
9
4
k
2
10
a''
a'
11
3
2
k
a
12
f
f
f tap
TC=a
13
f
f
TC=a
14
1
4
f
f
TC=a
15
f tap
f
f
TC=a
16
h,k
h
TC=a
17
f
f
TC=a
18
g
f
f
TC=a
20
a''
a'
h,k
h
21
a''
a'
h
h,k
22
a
tr
k
23

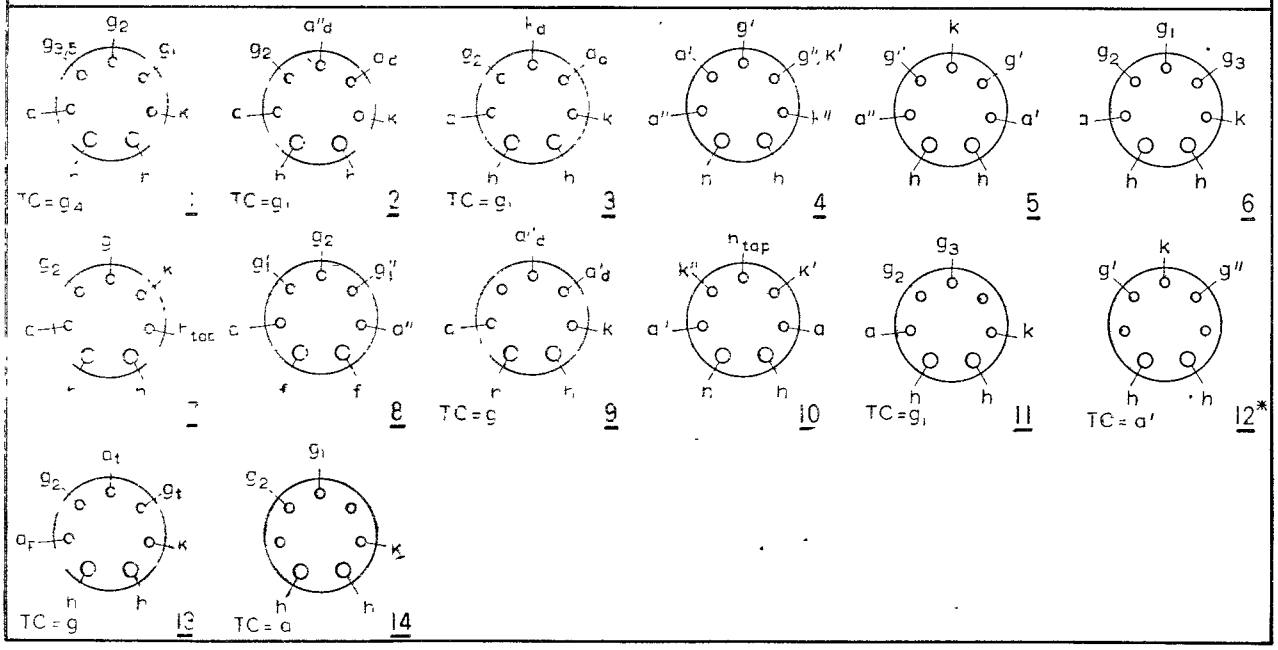
U X 5


g
a
k
h
h
1
g2
a
k
h
h
TC=g1
2
g1
a
g2
f(+)
f(-)
3
g2
a
g3
f(+)
f(-)
TC=g1
4
a'
a''
k
h
h
5
g1
g2
k
h
h
TC=a
6
g1
a
f(+)
f(-)
7
g1
g2
g3
f(+)
f(-)
TC=a
8

UX6



UX7



* a'' to other TC

TRADE NAMES AND MANUFACTURERS' ADDRESSES

BRIMAR	Standard Telephones & Cables, Ltd., Footscray, Sidcup, Kent.
B.T-H.	British Thomson-Houston Co., Ltd., Rugby.
CATHODEON .. .	Cathodeon Electronic, Ltd., Bircham Road, Southend-on-Sea, Essex.
COSSOR	Cossor Radio & Television, Ltd., Cossor House, Highbury Grove, London, N.5.
EDISWAN MAZDA ..	Siemens Edison Swan, Ltd., 155 Charing Cross Road, London, W.C.2.
EMISCOPE . ..	E.M.I. Sales & Service, Ltd., Hayes, Middx.
EMITRON, ETEL . ..	Electronic Tubes, Ltd., Kingsmead Works, High Wycombe, Bucks.
ENGLISH ELECTRIC..	English Electric Valve Co., Ltd., Waterhouse Lane, Chelmsford, Essex.
FERRANTI	Ferranti Ltd., Gem Mill, Chadderton, Oldham, Lancs.
G.E.C.	General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.
HIVAC	Hivac, Ltd., Stonefield Way, Victoria Road, South Ruislip, Middx.
MARCONI	E.M.I. Sales & Service, Ltd., Hayes, Middx.
MULLARD	Mullard, Ltd., Mullard House, Torrington Place, London, W.C.1.
NEWMARKET-PYE ..	Newmarket Transistor Co., Ltd., Exning Road, Newmarket, Suffolk.
SEMICONDUCTORS ..	Semiconductors, Ltd., Cheney Manor, Swindon, Wilts.
S T C	Standard Telephones & Cables, Ltd., Connaught House, 63, Aldwych, London, W.C.2.
TEXAS	Texas Instruments, Ltd., Dallas Road, Bedford.
TUNGSRAM	British Tungsram Radio Works, Ltd., West Road, Tottenham, London, N.17.
20th CENTURY ..	20th Century Electronics, Ltd., King Henry's Drive, New Addington, Croydon, Surrey.
WESTINGHOUSE ..	Westinghouse Brake & Signal Co., Ltd., 82 York Way, Kings Cross, London, N.1.

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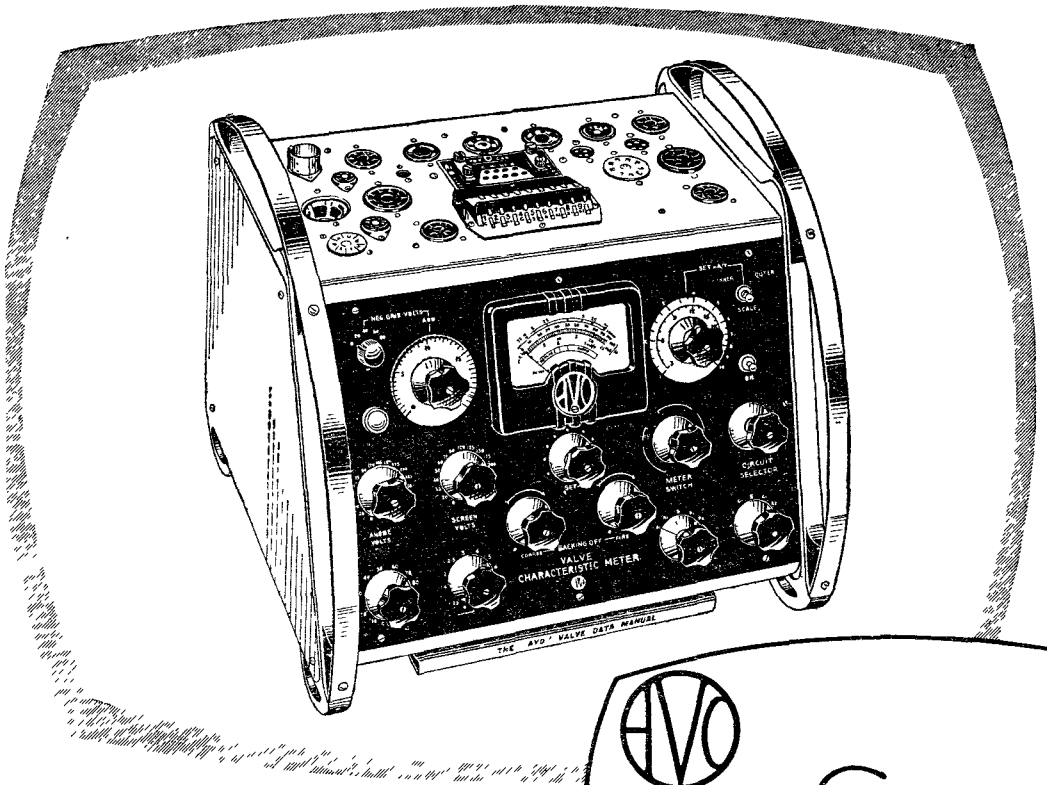


AVO VALVE Characteristic METER Mk III

The AVO Valve Characteristic Meter Mark III offers the Radio Engineer far more than is generally implied by the words "a valve tester."

This compact and most comprehensive Meter sets a new high standard for instruments of its type. It will quickly test any standard receiving or small transmitting valve on any of its normal characteristics under conditions corresponding to a wide range of D.C. electrode voltages.

A new method of measuring mutual conductance ensures that the instrument can deal adequately with modern valves of high slope and short grid-base such as are commonly used in T.V. receivers.

PROVIDES all necessary data to enable Ia Va, Ia/Vg, Ia Vs, etc., curves to be drawn.

MEASURES mutual conductance up to 30mA V.

DETERMINES inter-electrode insulation with heater both hot and cold.

GIVES direct measurement of "gas" current.

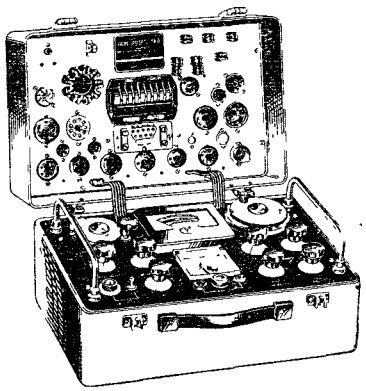
TESTS rectifying and signal diodes under reservoir load conditions.

COVERS all normal heater voltages up to 117V.

CIRCUIT improvements provide accurate setting and discrimination of grid voltage over the full range to 100V negative.

A relay protects the instrument against damage through overloading the H.T. circuits and also affords a high measure of protection to the valve under test.

The instrument is fitted with a hinged fold-over lid which protects the valve holders when not in use.



The AVO VALVE TESTER Type 160 is a portable panclimatic instrument which meets the requirements of the British inter-service specifications K.114 and R.C.S. 1,000 drawn up by the Radio Component Standardisation Committee of the British Ministry of Supply.

Detailed specifications for both these instruments are available on request.

A comprehensive Instruction Book and a Valve Data Manual are provided for each instrument, giving test data for approximately 8,000 valves.

AVO LTD AVOCET HOUSE . 92-96 VAUXHALL BRIDGE ROAD · LONDON · S.W.1

Telephone: VICtoria 3404 (9 lines)

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VALVES

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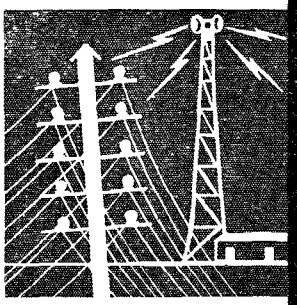

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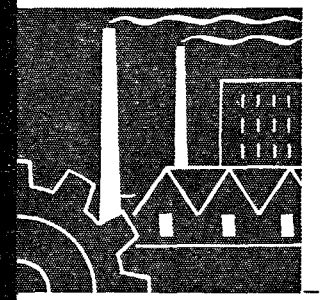

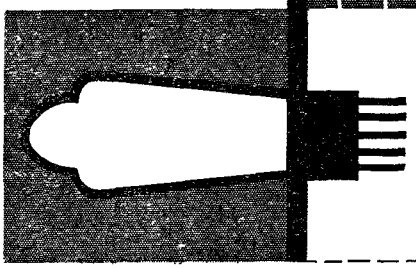

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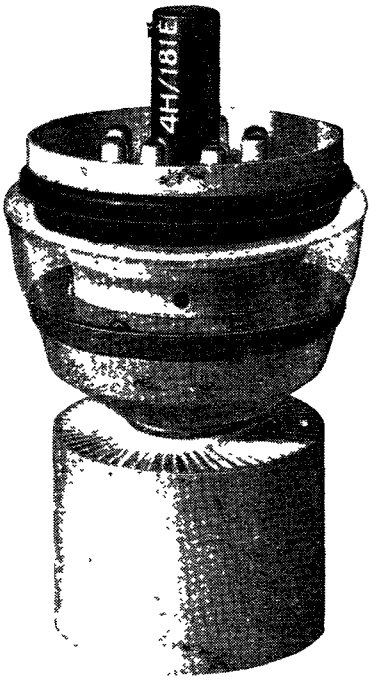

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5750	B7G-29	7	
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5840	B8D-1	21	
5965	B9A-1	49	
6021	B8D-15	54	
6057	B9A-1	49	
6058	B7G-18	41	
6059	B9A-35	15	

G.E.C. electronic devices

Transmitting Valves
Industrial Valves
"Special Service" Valves
Cathode Ray Tubes
Geiger Müller Tubes
Voltage Stabiliser Tubes

Transistors
Semi-Conductor Diodes
Photoelectric Cells
Miniature Neon Indicators
Barretters

THE GENERAL ELECTRIC CO. LTD · MAGNET HOUSE · KINGSWAY · LONDON · W.C.2

Valve	Base	Pages	Equivalents
6060	B9A-1	49	
6061	B9A-19	26	
6062	B9A-11	25, 57	
6063	B7F-31	59	
6064	B7G-21	15	
6065	B7G-21	15	
6066	B7G-19	49	
6067	B9A-1	49	
6132	B9A-19	25	
6146	IO-134	57	
6157	B9A-30	59	
6158	B9A-1	49	
6164	IO-134	25	
6267	B9A-23	22	EF81
6443	B9A-30	59	
6501	IO-112	79	
6502	IO-112	79	
6503	IO-112	79	
6504	IO-112	79	
6504A	IO-112	79	
6505	IO-112	79	
6505A	IO-112	79	
6506A	IO-112	79	
6703A	IO-112	79	
6704A	IO-112	79	
6705A	IO-112	79	
6706A	IO-112	79	
6801A	IO-112	79	
6802A	IO-112	79	
6870	B9A-44	15, 57	
6901A	B12A-5	79	
7032	B7G-29	15	
7101A	IO-112	79	
7102A	IO-112	79	
7201A	B12A-5	79	
7203A	B12A-5	79	
7204A	B12A-4	79	
7205A	B12A-19	80	
7401A	B12A-5	79	
7404A	B12A-4	80	
7475	B4-12	74	ST11
7502A	B12A-4	80	
8718	B8D-16	54	
1320A	B4-12	74	
9649776	—	67	
9749730	—	67	
A241	B8A-26	63	
A1834	IO-26	28	6AS7
A2134	B7G-33	28, 37	
AC/2HL	B5-1	50	
AC/2Pen	B7-24	27	7A3, 420T, PT4, KT41, PenA4, APP4B
AC/Pen	B7-24	27	7A2
AC/2Pen-DD	B7-9	27	420TDD, PT4D, DN41, DDPP4B
AC/4Pen	B7-24	27	Pen4B, APP4E
AC/5Pen	B7-24	27	
AC/5Pen-DD	B7-9	27	
AC/6Pen	B7-36	40	
AC/DD	B5-3	41	D41
ACDD	B5-3	42	
ACDDT	B7-7	52	
ACHL	B5-1	52	
AC/HL	B5-1	50	MH4, AC/HL
AC/HLDD	B7-7	50	MHD4
AC/HL/DDD	B9-5	50	

Valve	Base	Pages	Equivalents
ACL	B5-1	29	
AC/ME	B7-19	71	
ACO42	B4-1	30	
ACO44	B4-1	30	4XP, LP4 PX4, PP3/250, P12/250
AC/P	B5-1	26	
ACP1	B5-1	26	
AC/P4	B5-9	50	
AC/Pen	B7-24	27	MKT4/7
ACQ	B7-24	29	
AC/SIVM	B5-2	16	VPT4
AC/S2	B5/2	16	MS4B, SPT4A
AC/S2Pen	B7-5	16	
AC/SG	B5-2	16	
AC/SG/VM	B5-2	16	
AC/SP1	B7-5	16	
AC/SP3	B7-6	16	
AC/THI	B7-3	8	20A1, 41STH, X41, TH4B, TH4/A/B
AC/THIA	MO-12	8	
AC/TP	B9-2	8	
ACVH	B5-2	19	
ACVP	B5-2, B7-5	19	VPT4B
AC/VP1	B7-5	16	9A1, MVS-Pen, VPT4, VMP4G, HP4106C
AC/VPZ	B7-6	16	MVSPenB, VPT4B, W42
ACVPB	B7-6	19	
ACY	B5-7, B7-24	29	
ACZ	B5-7, B7-24	29	PT4
ACZDD	B7-9	29	PT4D
AF22-10	B12A-11	84	
AF31-10	B12A-11	84	
AL13-36	B12A-11	84	
AL22-10	B12A-11	75	
AL31-10	B12A-11	84	
AL-2210	B12A-11	84	
AN1	B5-1	76	
APP4A	B5-7, B7-24	32	7A2, MKT4, ACPen, Pen4VA, MKT4/7
APP4B	B7-24	32	7A3, 42MP-Pen, PT4, KT41, AC2Pen, PenA14
APP4E	B7-25	32	PenB4
APP4G	B7-5	32	
APV4	B4-14	64	R3, 431U, R42, MU14, UU5, 1W4/350
AR2	—	66	
AS4120	B5-2	22	MS4B, SPT4A
AS4125	B5-2	22	
AW13-36	B12A-11	84	
AW17-20	B12A-11	84	
AW22-10	B12A-11	84	
AW36-20	B12A-17	80	
AW36-21	B12A-17	80	
AW36-48	B12A-11	84	

Valve	Base	Pages	Equivalents
AW36-80	B12A-17	80	
AW43-80	B12A-17	80	
AW53-80	B12A-17	80	
AX50	B4-5	62	
AZ31	IO-60	62, 63, 64	
B18-1-1RW	—	67	
B18-14-1RW	—	67	
B25-1-1W	—	67	
B25-14-1RW	—	67	
B35-1-1W	—	60	
B36	IO-26	52, 53	12SN7
B45-1-1W	—	67	
B65	IO-26	52, 53	6SN7
B152	B9A-1	47	ECC81, B309 12AT7
B230	B7-10	37	
B309	B9A-1	52	12A77, ECC81 B152
B310	B9A-28	52	PCC84, 30L1, 7AN7, 30C1
B329 12AU7	B9A-1	52	12AU7, ECC82
B339/12AX7	B9A-1	52	12AX7
B719 ECC85	B9A-39	52, 53	6AQ8, ECC85
BA40-1-1W	—	61	
BR201	B4-13	73	
BR201S	Ct8-8	73	
BR202	B4-13	73	
BR202S	Ct8-8	73	
BR300	Screw	73	
BR1500	B4-13	73	
BR300OC	Screw	73	
BU10	B4-13	73	
BU29/4	IO-75	73	
BU130/6	Screw	73	
BU165/10	Screw	73	
BU78/10	B4-20	73	
BU115/22	B4-20	73	
BU200/14	B4-20	73	
BU280/20	B4-13	73	
BU600/6	Screw	73	
C1	Ct8-8	66	
C1C	B4-13	66	
C2	Ct8-8	66	
C2C	B4-13	66	
C2D	—	65, 67	
C2H	—	66, 67	
C2V	—	66, 67	
C3B	—	65, 67	
C3H	—	66, 67	
3CV	—	66, 67	
C9	Ct8-8	66	
C9A	MO-24	77	CRM92, CRM9
C9B	IO-112	77	
C10SS/2G	B10A/A-1	84	
C12A	MO-24	77	CRM121
C12B	IO-112	77	12MW3A
C12D	IO-112	77	12MW3, 1012/4
C12E	IO-112	77	

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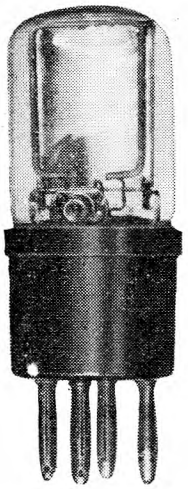
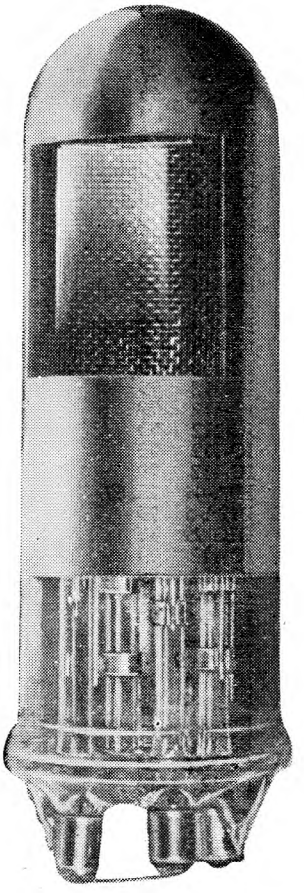
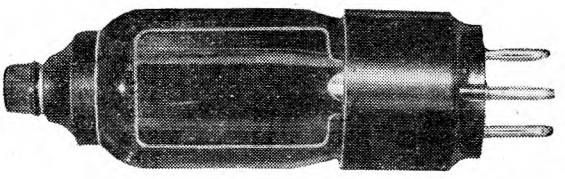


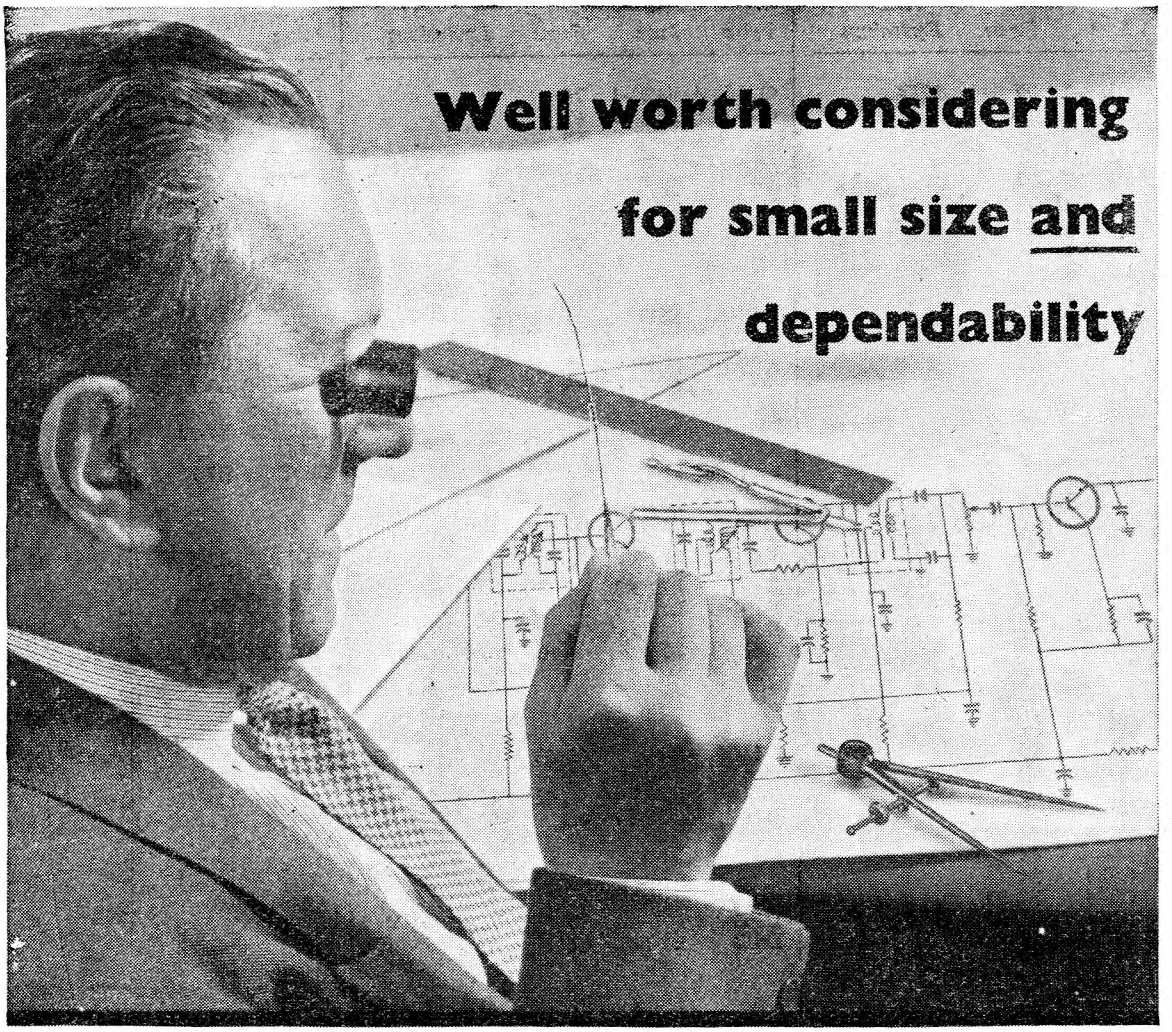




WORSLEY BRIDGE ROAD · LONDON SE 26
A Company within the Rank Organisation Ltd.
HITHER GREEN 4600

CINTEL

Valve	Base	Pages	Equivalents
C12FM	B12A-1	77	121K, 12XPA, MW31-16
C14BM	B12A-5	77	
C14FM	B12A-9	77	
C14PM	B12A-11	77	
C15B	IO-112	77	15MW3A
C17/1	B12A-1	77	
C17/1A	B12A-1	77	
C17/44	B12A-1	77	
C17BM	B12A-5	77	
C17FM	B12A-9	77	
C17JM	B12A-11	77	
C17LM	B12A-11	77	
C17PM	B12A-11	77	
C17SM	B12A-11	77	
C21HM	B12A-9	77	
C21KM	B12A-9	70	
C21/1A	B12A-1	77	
C21NM	B12A-10	77	
C21QM	B12A-11	70	
C21SM	B12A-11	77	
C21TM	B12A-9	77	
C24KM	B12A-9	77	
C27/1A	B12A-1	77	
C36-24	B12A-1	77	
CB215	B7-10	38	
CB215S	Ct8-28	38	
CB220	B7-10	38	
CBL1	Ct8-13	31	
CBL31	IO-15	31, 33	
CCH35	IO-3	13	
CG1E	—	43	
CG4E	—	43	
CG6-E	—	43	
CG10-E	—	43	
CG12-E	—	43	
CL4	Ct8-4	31	
CL6	Ct8-4	32, 38	
CL33	IO-36	31, 33	332Pen
CME141	B12A-2	78	
CME1402	B12A-2	78	
CME1702	B12A-2	78	
CR1	—	66	
CR1A	—	66	
CR2	—	67	
CR2A	—	67	
CR2B	—	67	
CRM71	MO-24	77	MW18-2
CRM91	MO-24	77	C9A,MW22-3
CRM92	MO-24	77	C9A,MW22-3
CRM92A	MO-24	77	C9A,MW22-3
CRM-93	B12A-1	78	
CRM121	MO-24	77	C12A
CRM-121A	MO-24	77	C12A
CRM-121B	MO-24	77	C12A
CRM122	MO-24	77	
CRM123	MO-24	77	
CRM124	B12A-1	78	
CRM141	B12A-1	77	
CRM142	B12A-1	77	
CRM143	B12A-1	77	
CRM144	B12A-1	78	
CRM151	MO-24	77	
CRM-152A	B12A-5	72	
CRM-152B	B12A-5	77	
CRM153	B12A-1	77	
CRM171	B12A-1	77	
CRM172	B12A-1	78	
CRM173	B12A-1	78	
CRM211	B12A-1	78	
CRM212	B12A-1	78	
CRM241	B12A-1	78	
CS2-A	B12A-1	43	
CS3-A	—	43	
CS3-B	—	43	
CS4-B	—	43	
CY1	Ct8-5	64	
CY31	IO-55	63, 64	
CY32	IO-53	62	
D1	B3G-1	41	TD4
D3/2/1Y	—	66	
D3A-214	B12D-17	85	
D4	B5-1	51	HLA2, 41MTL, MH4, ACHL, 334V
D5A-600	Special	85	
D6	B12D-3	85	
D6-251	B12D-16	85	
D6A-240	B12D-16	85	
D6S-222	Special	85	
D6Sq	B12D-3	85	
D10	B12D-3	85	
D15	IO-75	73	
D41	B5-3	41, 42	DDLA, SD, V914, 2D4A, DD4, AC/DD
D42	B4-8	41, 42	DDL4, D400
D43	B4-1	42	
D63	IO-53	41, 42	6H6
D77	B7G-18	41	DAL5, DD6, 6D2,ED91, D152, 6AL5, EB91
D152	B7G-18	42	6AL5, EB91
D418	B4-10	42	EB91, 6AL5, D77, 6D2, DD6
DA	B7-23	51	4D1,HL1320, HL13
DA1	SM4-1	53	
DA2	SM4-1	53	
DA3	SM4-1	53	
DA30	B4-1	29	
DA41	UX4-20	41	TZ49
DA42	—	37	
DA90	B7G-13	42	
DAC1	Ct8-32	53	
DAC32	IO-91	54	1H5
DAF70	B8D-1	20	
DAF91/ ZD17	B7G-5	20, 21	1S5, ZD17, IFD9
DAF96	B7G-5	16, 20, 21	IFD1, IP1
DAF96/ 1AH5	B7G-5	15, 18	
DB4-1	B7G-7	84	
DB4-2	B7G-7	84	
DB7-5	B9G-7	84	
DB7-6	B9G-7	84	
DB13-2	B14A-1	84	
DC70	B8D-7	57	
DCC90	B7G-8	54	
DD4	B5-3	41, 42	DDL4, SD, D41, V914, 2D4A
DD4D	B7-21	42	
DD6	B7G-18	41, 42	6AL5, D77, 6D2, EB91
DD6G	B7G-18	42	
DD13	B5-3	42	
DD41	MO-13	41	
DD101	MO-13	41	
DD207	B4-5	41	
DD465	B5-4	42	
DD620	B5-3	41	10D1, 220DD ZD
DD818	B5-4	42	
DDL4	B5-3	41	D41, V914, 2D4A A20B
DDP4B	B7-9	32	
DDP4M	B7-22	32	
DDPP6B	B7-9	32	
DDPP39	B7-9	32	
DDPP39-M	B7-22	32	
DDT	B7-7	50	11A2, H4D, MHD4, ACHLDD, TDD4
DDT2	B5-5	55	H2D
DDT2B	B5-5	55	
DDT2BS	Ct8-28	55	
DDT4	B7-7	55	MHD4
DDT13	B7-7	52, 55	TDD13C
DDT13S	Ct8-7	55	
DET18	UX4-20	57	
DET19	UX7-12	57	4074A
DET20	IO-107	57	
DET22	Co-axial	57	
DET24	Co-axial	57	
DF1	Ct8-26	20	
DF33	IO-77	20	1N5
DF61	B5A-3	21	
DF62	B5A-2	21	
DF64	B5A-3	20	
DF66	B5A-1	20	
DF70	B8D-6	20	
DF72	B8D-2	20	
DF73	B8D-2	20	
DF91	B7G-2	20, 21	1T4, W17, 1F3, W17
DF92	B7G-2	21	1L4, 1F2
DF96/ 1AJ4	B7G-2	16, 20, 21	1F1
DF97	B7G-2	15, 18	
DG4-1	B9G-7	84	
DG4-2	B9G-7	84	
DG7-5	B9G-7	84	
DG7-6	B9G-7	84	
DG7-32	B12A-14	84	
DG7-36	B12A-15	84	
DG13-2	B14A-1	84	
DG16-21	B14A-1	84	
DH3-91	B8B	65, 84	
DH7-91	B9G-9	84	
DH10-94	B12F-1	84	
DH13-97	B12F-2	84	
DH30	B7-7	52, 53	HSD
DH42	B7-7	52, 53	11A2, DDT, M4D, MHD4, ACHLDD, TDD4, DDT4
DH63	IO-29	52, 53	6Q7, OM4, 6H6
DH76	IO-29	52, 53	12Q7
DH77/ 6AT6	B7G-19	52, 53	EBC90, 6AT6
DH81	B8B-12	52, 53	7B6
DH101	B8B-12	52, 53	
DH107	B7G-19	52, 53	
DH109	B9A-2	52	



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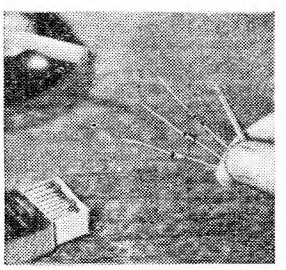
Only $\frac{1}{4}$ in. long, yet their miniature size is combined with high performance and complete dependability! They offer the following outstanding characteristics:

- HIGH TEMPERATURE STABILITY
- ABILITY TO WITHSTAND TROPICAL CONDITIONS
- SMALLER DIMENSIONS
- VERY LONG LIFE

RATINGS: CONTINUOUS OPERATION AT 25°C. (77°F.)

TYPE	PEAK INVERSE VOLTAGE† V	MAX. INPUT CURRENT mA	MAX. RESISTANCE at + 1 volt ohms	MIN. RESISTANCE at — 50 volts kilohms
CV 448*	80	30	333	500
CG41-H	65	30	250	50
CG42-H	100	30	500	1,000
CG44-H	80	30	333	500
CG50-H	100	30	500	200

*Type CV 448 has been granted 'type approval'. †Corresponds to 1·2 mA inverse current.



B T-H

BRITISH THOMSON-HOUSTON

THE BRITISH THOMSON-HOUSTON CO·LTD·LINCOLN·ENGLAND

an A.E.I. Company

A 5162

Valve	Base	Pages	Equivalents
DH118	B8A-9	52	
DH142	B8A-9	47	10LD3, UBC41
DH147	IO-29	47	OM4, EBC33, 6Q7G
DH149/ 7C6	B8B-60		7C6
DH150	B8A-9	47	62DDT, 6LD3, EBC41
DH718	B8A-9	52	
DH719/ EABC80	B9A-2	52, 53	6AK8, EABC80
DK1	Ct8-31	11	
DK32	IO-76	11	1A7 X14
DK40	B8A-25	12	
DK91/ X17	B7G-3	12	X17/1R5. 1C1
DK92	B7G-54	12	1AC6, X18, 1C2, DK96
DK96/ 1AB6	B7G-54	8, 12	1C3
DK96/ X109	B9A-21	17	
DL2	Ct8-25	30	
DL33	IO-87	31	3Q5. N16
DL35	IO-78	31	1C5, N14
DL63	IO-29	53	OR7
DL64	B5A-3	31	
DL66	B5A-1	30	
DL68	B5A-1	30	
DL69	B5A-3	31	
DL70	B8D-6	31, 57	
DL71	B8D-6	30	
DL72	B8D-6	30	
DL73	B8D-6	31, 57	
DL75	B8D-6	30, 38	
DL82	B8D-12	52, 53	1B6
DL92	B7G-6	31, 38	3S4, N17, 1P10
DL93	B7G-7	31, 57	3A4
DL94	B7G-9	31	3V4, N19, 1P11
DL96	B7G-9	26, 30, 31, 38	1P1, 3C4
DL96/ 3C4	B7G-9	25, 27, 35, 36	
DL145	B8A-9	53	
DL620	B5A-1	31	
DM70/ 1M3	B8D-9	71, 72	
DN41	B7-9	28, 30	DDPP4B. PT4D
DN143/ EBL21	B8B-62	30	EBL21
DO24	B4-1	30	PX25, PP5/400 P27/500, LP25
DO26	B4-1	30	PX25, PP5/400 P27/500
DO30	B41	30, 38	DA30, P30/500
DP4-1	B9G-7	84	
DP4-2	B9G-7	84	
DP7-5	B9G-7	84	
DP7-6	B9G-7	84	
DP13-2	B14A-1	84	
DP61	B7G-14	18	
DR7-5	B9G-7	84	
DR7-6	B9G-7	84	
DR13-2	B14A-1	84	
DRM1B	—	66, 67	
DRM2B	—	66, 67	
DRM3B	—	67	
DRM35	—	66	
DW2	B4-5	62	R1, 431U, U10, UU5 PV295
DW4-350	B4-5	63	R3, 431U, U14, UU5 RV120/ 350, R4 350,R4,R43
DW4-500	B4-5	63	R3, 431U, U14, UU5, RV120/500
DY70	Wires	63	
E5-270	Special	85	
E88CC	B9A-39	54	
E90CC	B7G-17	54	
E180F	B9A-45	16, 21	
E4103/B/4	B9-6	83	
E4205/B/7	B12B-1	83	
E4412/B/9	B12D-5	83	
E4504/ B/16	B12D-5	83	
EA50	B3G-	42	SD61, 6D1
EA76	B5B-1	42	2S/140G
EAB1	Ct8-17	42	
EABC80	B9A-2	51, 54	DH719/ EABC80, 6T8, 6AK8 6LD12
EABC80/ 6AK8	B9A-2	49, 51	
EAC91	B7G-23	54	
EAF41	B8A-11	20	
EAF42	B8A-12	21	
EAF42/ 6CT7	B8A-12	18	
EB4	Ct8-IO	42	
EB34	IO-53	42	6H6
EB41	B8A-10	41, 42	
EB91	B7G-18	42	6AL5, DD6, D152, 6D2 D77
EBC3	Ct8-7	53, 55	
EBC33/ DH147	IO-29	53, 54, 55	OM4, DH63, 6Q7G
EBC41/ DH150	B8A-9	51, 54	DH150, 6LD3, 62DDT
EBC81	B9A-54	54, 55	6CV7
EBC90	B7G-19	54	DH77/6AT6
EBC91	B7C-19	54	
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