Mullard

MASTER VALVE GUIDE

1935

Mullard
MASTER VALVE GUIDE

Issued by the Mullard Wireless Service Co., Ltd.

CONTENTS

Mullard

2-VOLT VALVES FOR BATTERY SETS

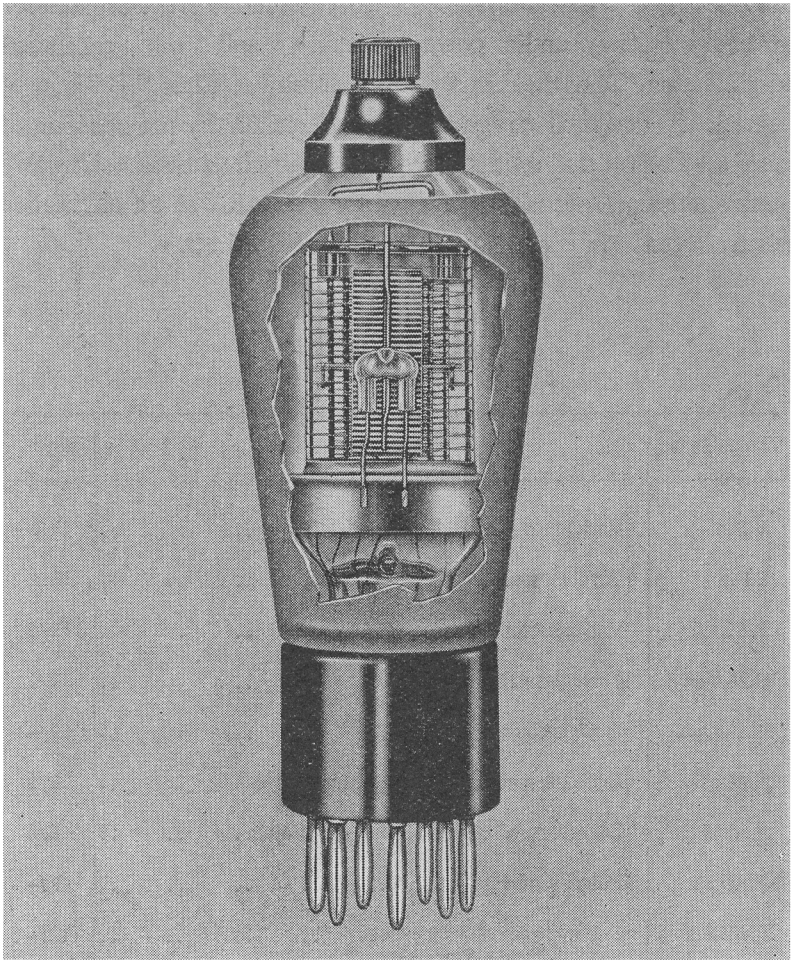
SINCE the last edition of the Mullard Valve Guide, very considerable developments have taken place in the design of battery valves, with the result that to-day, the performance of a modern battery-operated receiver closely approaches that of its all-mains counterpart.

The extent to which Mullard has contributed to this revolution in design and construction may be gauged from the range of valves described in the following pages.

The most important of the 1934/35 innovations are the new Mullard battery H.F. pentodes, types V.P.2 and S.P.2. Following upon the success of the Mullard mains H.F. pentodes, these additional types need little introduction. It can be said, however, that by reason of their high amplification factor and low internal capacity, they permit every advantage to be taken of the efficiency of modern coils, thus very greatly increasing the sensitivity of the 1935 battery receiver.

The introduction of a 2-volt Double - Diode - Triode, type T.D.D.2A, facilitates the application of A.V.C. to battery receivers.

Neither has the output side of the battery receiver been neglected, for the introduction of additional Mullard types



MULLARD

2-VOLT VARIABLE-MU H.F. PENTODE

Type V.P.2

provides interesting alternatives in high-efficiency audio power amplification. Thus the P.M.22C pentode is designed to give a large A.C. output with low mean anode current consumption when used in conjunction with a suitable H.T. economiser circuit; and the continued popularity of Class "B" output is catered for by the addition of the Mullard back-biassed valve type P.M.2BA as an alternative to type P.M.2B.

PRICE LIST

VALVE TYPE.	DESCRIPTION.	PRICE.
V.P.2	Variable-mu H.F. Pentode	13/6
S.P.2	H.F. Pentode	13/6
P.M.12M	Variable-mu Screened Grid	12/6
P.M.12A	Screened Grid	12/6
T.D.D.2A	Double-diode-triode	9/-
P.M.1HL	Detector and General Purpose Valve..	5/6
P.M.2DX	Detector and General Purpose Valve..	5/6
P.M.2A	Power Output	7/-
P.M.202	Super-power Output	12/-
P.M.22A	Pentode Output	13/6
P.M.22C	Pentode Output	13/6
P.M.2BA	Class "B" Output	14/-
P.M.2B	Class "B" Output	14/-

Mullard

VALVES FOR A.C. MAINS SETS

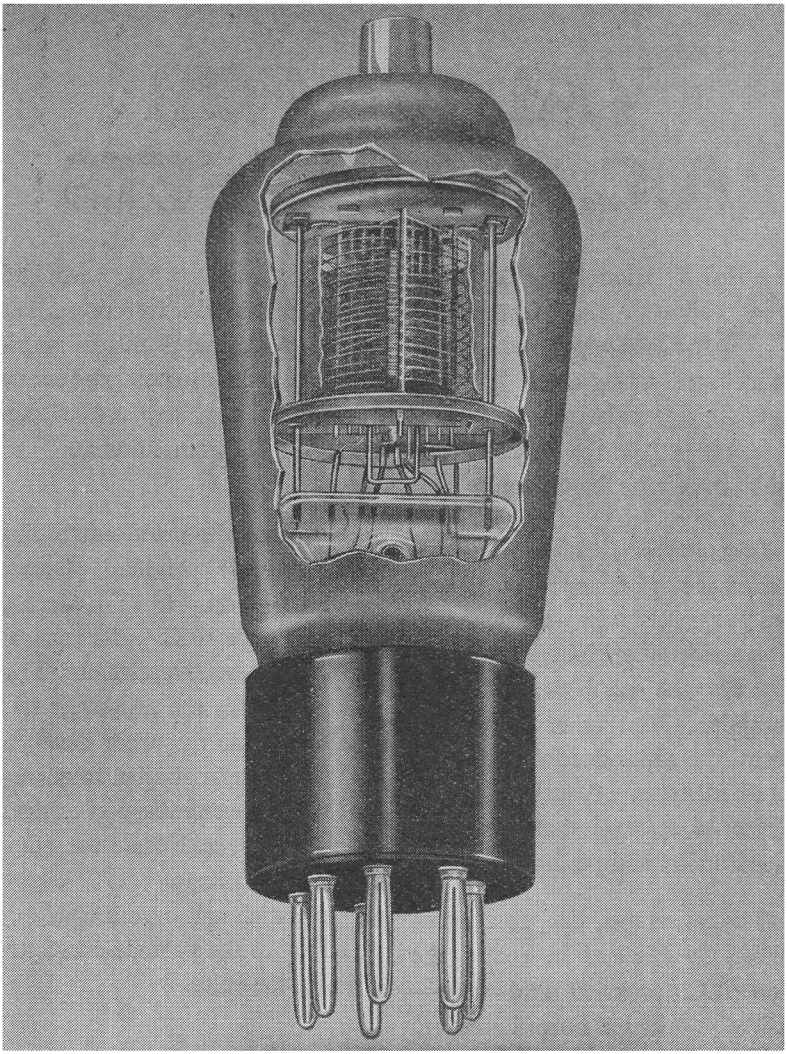
APART from their dependability, the feature of Mullard valves which has contributed most largely to their undoubted popularity is the steady progress in design which they embody, season by season.

In some years, it is true, development has not been spectacular, and has consisted in the normal advances which Mullard has made towards the perfection of radio reception. But other years have seen the introduction of new Mullard types of such advanced design as to revolutionise receiver construction and performance.

The power pentode, first introduced by Mullard in 1928; the first A.C. screened grid valve—valves regarded as normal standard practice to-day—were the starting points from which far-reaching lines of progress in valve design have radiated. The Mullard Screened Pentode, introduced last year, was another Mullard contribution to radio progress, and set up an entirely new standard of efficiency in H.F. amplification.

This year, the most outstanding valve is the Mullard Octode electron - coupled frequency changer, type F.C.4, for use in A.C. super-het. receivers. This valve possesses the advantage that the heterodyne frequency is superimposed upon the signal frequency *without the intermediary of external coupling coils*, and there are additional advantages of circuit simplification and overall efficiency attaching to the pentode characteristics of the valve.

The H.F. Pentodes of last season are augmented by the V.P.4A, a short grid-base valve



MULLARD

OCTODE FREQUENCY CHANGER

Type F.C.4

which offers special advantages in receivers employing the simplest forms of A.V.C. The introduction of double-diodes *without additional amplifying elements* facilitates the application of various forms of A.V.C. and of noise suppressor devices, and permits each process to operate at maximum efficiency.

The complete Mullard A.C. range is listed herein, including output valves up to 25 watts dissipation. Mullard output valves of still larger types are made for such purposes as public address work, talking picture installations and relay stations. Full details of these types will be provided on application.

PRICE LIST

VALVE TYPE.	DESCRIPTION.	PRICE.
F.C.4	Octode Frequency Changer	20/–
T.P.4	Triode-Pentode Frequency Changer	20/–
V.P.4	Variable-mu H.F. Pentode	17/6
V.P.4A	Variable-mu H.F. Pentode	17/6
S.P.4	H.F. Pentode	17/6
2.D.4	Double-diode	5/6
2.D.4A	Double-diode	5/6
T.D.D.4	Double-diode-triode	15/6
354V	Detector and General Purpose Valve	13/6
Pen.4VA	Pentode Output	18/6
P.M.24M	Pentode Output	18/6
A.C.044	Output Triode	16/6
D.O.24	High Voltage Output Triode	25/–
D.O.26	High Voltage Output Triode	25/–
D.W.2	Directly-heated full-wave rectifier	12/6
D.W.3	Directly-heated full-wave rectifier	15/–
D.W.4	Directly-heated full-wave rectifier	20/–
I.W.2	Indirectly-heated full-wave rectifier	12/6
I.W.3	Indirectly-heated full-wave rectifier	15/–
I.W.4	Indirectly-heated full-wave rectifier	20/–

Mullard

UNIVERSAL VALVES (A.C./D.C.)

THE valves described in the following section have been designed for use in receivers of the following types :

(*a*) " Universal " receivers which can be operated on either A.C. or D.C. mains.

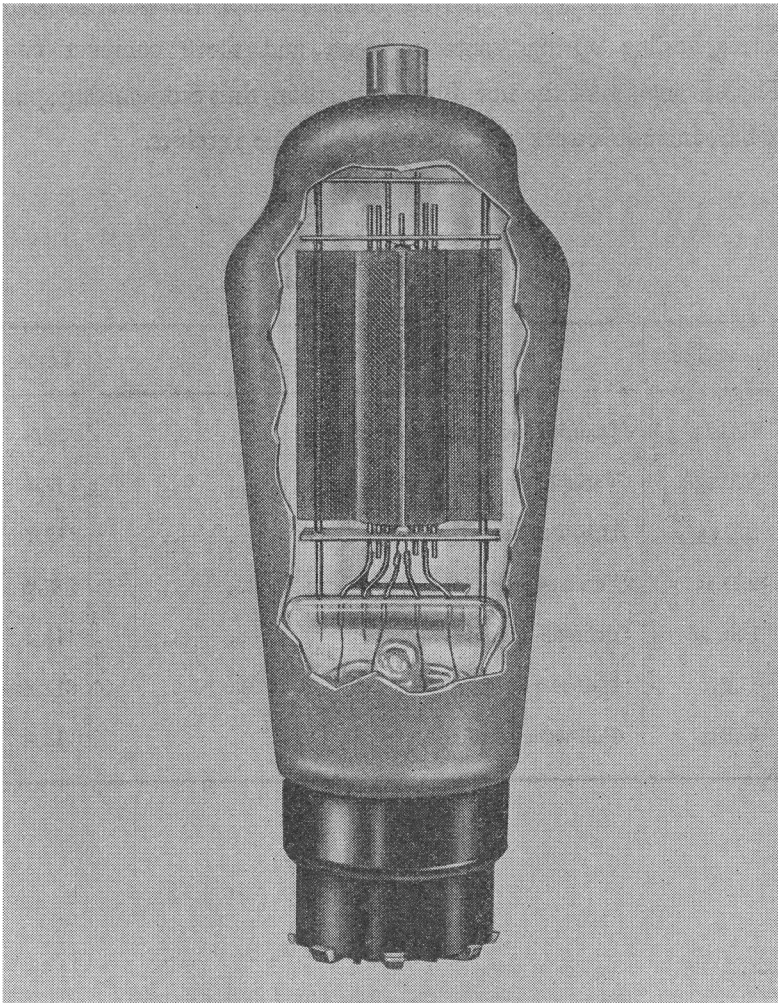
(*b*) A.C. mains receivers not employing a power transformer.

(*c*) Automobile receivers deriving L.T. supply from the 12V. car battery.

Mullard Universal valves are intended to be operated (in Mains receivers) with their heaters connected in series, and with a suitable barretter to maintain the heater current at exactly 0.2 amp.

The number of types has been limited to those representing the most recent practice in valve technique, the principal types being an Octode electron-coupled frequency-changer, variable-mu and " straight " H.F. pentodes, a double diode for use as detector, an output pentode, and suitable rectifying valves.

An important innovation is the Mullard " Universal " pin-less base, the valve electrodes being connected to silver-plated side contacts. A suitable form of



MULLARD

"UNIVERSAL" OUTPUT PENTODE

Type PEN. 26

valve holder is used, having corresponding spring contacts. The advantages of the new form of base include lower capacitative losses, better valve-holder contact, and more compact construction, thus economising space within the receiver.

PRICE LIST

VALVE TYPE.	DESCRIPTION.	PRICE.
F.C.13	Octode Frequency Changer	20/-
V.P.13A	Variable-mu H.F. Pentode	17/6
S.P.13	H.F. Pentode	17/6
2.D.13	Double-diode	5/6
Pen. 26	Pentode Output	18/6
U.R.1	Half-wave rectifier	12/6
U.R.2	Full-wave rectifier	15/-

CHARACTERISTICS
AND
OPERATING DATA

In the earlier part of this catalogue current types of Mullard receiving valves are listed.

The tables on the following pages are intended as a rapid guide, not only to the latest valves but also to earlier types which may be required for re-valving.

Mullard
THE · MASTER · VALVE

MULLARD 2-VOLT VALVES FOR BATTERY SETS

If = Filament or heater current.
ra = anode impedance.
m = amplification factor.
gm = mutual conductance.
Va = anode voltage
Vs = screen voltage
Vaux = Auxiliary Grid voltage.
Ia = Anode current.

Type.	Description.	Base.	Bulb Finish.	If	Characteristics at Va = 100; Vg = 0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	Price.
					ra	m	gm						
V.P.2	Variable-mu H.F. Pentode	7-pin	Met.	0.18	750,000	—	1.75 0.017	150 150	150 150	0 7.0	3.75 0.1	—	13/6
S.P.2	H.F. Pentode	7-pin	Met.	0.18	500,000	1,100	2.2 1.5	150 100	150 100	0 0	3.6 1.5	—	13/6
P.M.12A	Screened Grid	4-pin	Met. or Clear	0.18	330,000*	500*	1.5*	150 100	90 60	0 0	2.9 1.2	—	12/6
P.M.12	Screened Grid	4-pin	Met. or Clear	0.15	180,000†	200†	1.1†	150	75	—	4.25	—	12/6
P.M.12M	Variable-mu Screened Grid	4-pin	Met. or Clear	0.18	—	—	1.4‡ 0.014‡	150 150	90 90	0 7.0	2.5 0.1	—	12/6
P.M.12V	Variable-mu Screened Grid	4-pin	Met.	0.15	—	—	0.75 0.007	150 150	90 90	0 15.0	5.4 0.7	—	15/6
T.D.D.2A	Double-diode-triode ..	5-pin	Met.	0.1	21,400	30	1.4	100 150	— —	1.5 1.5–3.0	1.5 2.0	—	9/–
P.M.1A	R.C.C. Triode	4-pin	Clear	0.1	41,600	50	1.2	100 125 150	— — —	0.5 0.75 1.0	0.5 0.75 1.0	—	5/6
P.M.1H.F	H.F. or Detector	4-pin	Clear	0.1	22,500	18	0.8	100 125 150	— — —	1.5–3.0 3.0 3.0–4.5	0.9 1.2 1.5	—	5/6
P.M.1L.F.	Det. or L.F.	4-pin	Clear	0.1	12,000	11	0.9	100 125 150	— — —	4.5 6.0 7.5	2.2 2.8 3.4	—	5/6
P.M.1H.L	H.F. Det., or L.F. ..	4-pin	Met. or Clear	0.1	20,000	28	1.4	100 125 150	— — —	1.5 1.5–3.0 1.5–3.0	1.0 1.5 2.0	—	5/6

* At Va = 125; Vs = 75; Vg = 0. † At Va = 150; Vs = 75; Vg = 0. ‡ At Va = 150; Vs = 90. § At Va = 120; Vg = 0.

MULLARD 2-VOLT VALVES FOR BATTERY SETS CONTD.

If = Filament or heater current.
ra = anode impedance.
m = amplification factor.
gm = mutual conductance
Va = anode voltage
Vs = screen voltage
Vaux = Auxiliary Grid voltage.
Ia = Anode current.

Type.	Description.	Base.	Bulb Finish.	If	Characteristics at Va = 100 ; Vg = 0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	Price.
					ra	m	gm						
P.M.2D.X	Det. or L.F.	4-pin	Met. or Clear	0.1	12,000	18	1.5	100 125 150	— — —	1.5–3.0 3.0 3.0–4.5	2.0 3.0 4.0	—	5/6
P.M.2A	Power	4-pin	Clear	0.2	3,600	12.5	3.5	100 125 150	— — —	4.0 5.0 7.0	4.0 5.0 6.0	7,000	7/–
P.M.2	Power	4-pin	Clear	0.2	4,400	7.5	1.7	100 125 150	— — —	7.5 9.0–10.5 12.0	4.0 5.3 6.6	9,000	7/–
P.M.202	Super-power	4-pin	Clear	0.2	2,000	7.0	3.5	100 125 150	— — —	7.5 9.0–10.5 12.0–15.0	10.0 14.0 14.0	3,700	12/–
P.M.252	Super-power	4-pin	Clear	0.4	1,900	7.0	3.7	100 125 150	— — —	6.0 7.5–9.0 9.0–12.0	11.0 14.0 17.0	4,500	12/–
P.M.22	Super-power Pentode ..	4-pin or 5-pin	Clear	0.3	—	—	1.3	100 125 150	100 125 150	6.0 8.0 10.0	9.0 12.0 15.0	8,000	16/6
P.M.22A	Output Pentode	4-pin or 5-pin	Clear	0.2	—	—	2.5	100 150	100 150	3.0 4.5	4.5 9.5	15,000	13/6
P.M.22C	Super-power Pentode ..	5-pin	Clear	0.3	—	—	3.0	—	—	—	—	8,000	13/6
P.M.2B	Class " B " Output ..	7-pin	Clear	0.2	—	—	2.5§	150	—	—	—	14,000	14/–
P.M.2B.A	Class " B " Output ..	7-pin	Clear	0.2	—	—	2.15	150	—	4.5	—	14,000	14/–

§ At Va = 120 ; Vg = 0.

MULLARD 4-VOLT VALVES FOR BATTERY SETS

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va=100; Vg=0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
P.M.14	Screened Grid	4-pin	Clear	0.075	230,000	200	0.87	150	75	0	2.75	—	20/-
P.M.3	H.F. Det. or L.F. ..	4-pin	Clear	0.075	13,000	14	1.05	100 125 150	— — —	3.0 4.5 6.0	1.6 2.2 2.8	—	8/6
P.M.4D.X	Det. or L.F.	4-pin	Clear	0.1	7,500	15	2.0	100 125 150	— — —	1.5–3.0 3.0–4.5 4.5–6.0	1.5 2.0 2.5	—	8/6
P.M.4	Power	4-pin	Clear	0.1	4,000	8	2.0	100 125 150	— — —	5.0 7.0 8.0	5.5 7.5 10.0	9,000	10/6
P.M.254	Super-power	4-pin	Clear	0.2	2,150	6.5	3.0	100 150 200	— — —	9.0 15.0 21.0	6.0 10.0 15.0	6,000	13/6
P.M.24	Output Pentode	4-pin or 5-pin	Clear	0.15	—	—	1.75	100 125 150	100 125 150	6.0 9.0 11.0	12.0 16.0 20.0	8,000	17/6

MULLARD 6-VOLT VALVES FOR BATTERY SETS

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va=100; Vg=0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
P.M.16	Screened Grid	4-pin	Clear	0.075	200,000	200	1.0	150	75	—	3.5	—	20/-
P.M.5X	H.F. Det. or L.F.	4-pin	Clear	0.075	14,700	17.5	1.2	100 125 150	— — —	1.5–3.0 3.0 3.0–4.5	1.2 1.6 2.0	—	8/6
P.M.6D	Det. or L.F.	4-pin	Clear	0.1	9,000	18.0	2.0	100 125 150	— — —	1.5–3.0 3.0–4.5 4.5	1.5 2.0 2.5	—	8/6
P.M.6	Power	4-pin	Clear	0.1	3,550	8.0	2.25	100 125 150	— — —	6.0 7.5 9.0	4.5 7.0 9.5	8,000	10/6
P.M.256	Super-power	4-pin	Clear	0.25	1,850	6.0	3.25	100 150 200 250	— — — —	7.5–9.0 10.5–13.5 18.0–21.0 27.0	6.0 10.0 15.0 20.0	6,000	13/6
P.M.26	Output Pentode	4-pin	Clear	0.17	—	—	2.0	100 125 150	100 125 150	9.0 12.0 15.0–17.5	9.0 11.5 15.0	8,000	17/6

MULLARD INDIRECTLY-HEATED A.C. MAINS VALVES

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va = 100 ; Vg = 0			(*a*) Va	(*b*) Vs or Vaux	(*c*) Vg for (*a*) or (*b*)	Ia for (*c*)	Optimum Load.	PRICE.
					ra	m	gm						
F.C.4	Octode Frequency Changer	7-pin	Met.	0.65	—	—	1.0	250	85	1.5	—	—	20/–
T.P.4	Triode-pentode	9-pin	Met.	1.25	—	—	2.25§§	250	150	5.0	—	—	20/–
V.P.4	Variable-mu H.F. Pentode	5-pin or 7-pin	Met.	1.0	—	—	2.5* 0.025*	200 200	100 100	1.5 22.0	6.0 0.25	—	17/6
V.P.4A	Variable-mu H.F. Pentode	5-pin or 7-pin	Met.	1.2	—	—	3.27*	200	100	1.5	5.0	—	17/6
S.P.4	H.F. Pentode	5-pin 7-pin	Met. or Clear Met.	1.0	900,000*	2,700*	3.0*	200	100	1.5	4.5	—	17/6
M.M.4V	Variable-mu Screened Grid	5-pin	Met.	1.0	—	—	2.5† 0.01†	200 200	110 110	1.5 40.0	6.0 0.15	—	17/6
V.M.4V	Variable-mu Screened Grid	5-pin	Met.	1.0	—	—	1.2* 0.005*	200 200	100 100	0 40.0	8.5 0.025	—	17/6
S.4V	Screened Grid	4-pin or 5-pin	Clear	1.0	909,000	1,000	1.1	200	75	1.0	1.5	—	17/6
S.4VA	Screened Grid	5-pin	Met. or Clear	1.0	500,000†	1,000†	2.0†	200	110	1.5	2.75	—	17/6
S.4VB	Screened Grid	5-pin	Met. or Clear	1.0	300,000†	750†	2.5†	200	110	1.5	5.0	—	17/6
2D.4	Double-diode	5-pin & top cap	Met.	0.65	—	—	—	—	—	—	—	—	5/6
2D.4A	Double-diode	5-pin	Met.	0.65	—	—	—	—	—	—	—	—	5/6
S.D.4	Diode-Tetrode	7-pin	Met.	1.0	—	—	3.0*	200	100	—	—	—	20/–

* At Va = 200 ; Vs = 100. † At Va = 200 ; Vs = 110. §§ At Va = 250 ; Vaux = 150.

MULLARD INDIRECTLY-HEATED A.C. MAINS VALVES CONTD.

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va=100; Vg=0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
T.D.D.4	Double-diode-triode ..	7-pin	Met.	1.2	15,000	30	2.0	100	—	1.5	1.5	—	15/6
								150	—	2.5	2.5		
								200	—	3.5	3.5		
994V	High Magn. Detector ..	5-pin	Met.	1.0	35,000	125	3.6	200	—	1.5	1.35	—	13/6
904V	Det. or L.F.	5-pin	Met. or Clear	1.0	34,000	75	2.2	150	—	1.5	1.4	—	13/6
								200	—	2.0	1.8		
484V	Det. or L.F.	5-pin	Met.	1.0	21,800	48	2.2	200	—	3.0	2.8	—	13/6
354V	Det. or L.F.	5-pin	Met. or Clear	1.0	12,000	36	3.0	100	—	2.0	2.0	—	13/6
								150	—	3.0	3.0		
								200	—	4.0	4.0		
244V	Det. or L.F.	5-pin	Met.	1.0	9,000	25	2.8	100	—	3.0	3.0	—	13/6
								150	—	4.0	4.0		
								200	—	5.5	5.5		
164V	L.F.	5-pin	Clear	1.0	4,850	16	3.3	100	—	4.5	4.5	—	14/–
								150	—	6.5	6.5		
								200	—	8.5	8.5		
154V	L.F.	4-pin	Clear	1.0	7,500	15	2.0	200	—	6.0–7.5	9.0	—	14/–
104V	L.F. and Output	5-pin	Clear	1.0	3,000	12	4.0	100	—	5.0	10.0	6,000	14/–
								150	—	8.5	13.0		
								200	—	12.0	17.0		
054V	Output Triode	5-pin	Clear	1.0	1,250	5	4.0	100	—	14.0	20.0	4,000	16/6
								150	—	18.0	30.0		
								200	—	28.0	30.0		
Pen.4VA	Output Pentode	5-pin or 7-pin	Clear	1.5	—	—	3.5	150	150	12.0	20.0	6,000	18/6
								200	200	18.0	25.0		
								250	250	22.0	32.0		

MULLARD DIRECTLY-HEATED OUTPUT VALVES FOR A.C. SETS

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va=100; Vg=0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
A.C.104	Triode	4-pin	Clear	1.0	2,850	10	3.5	150 175 200	— — —	10.0 12.0 14.0	8.5 9.75 11.0	6,000	16/–
A.C.064	Triode	4-pin	Clear	1.0	2,000	6.0	3.0	150 175 200	— — —	14.0 17.5 21.0	16.0 18.0 20.0	5,000	16/–
A.C.044	Triode	4-pin	Clear	1.0	950	6.4	6.8	150 200 250	— — —	16.0 22.0 29.0	33.0 40.0 48.0	2,500	16/6
P.M.24A	Pentode	5-pin	Clear	0.275	—	—	2.0	300	100 150 200	9.0 15.0 22.5	10.0 15.0 20.0	10,000	18/6
P.M.24M	Pentode	5-pin	Clear	1.0	—	—	3.0	250	150 200 250	9.0 12.0 18.0	20.0 30.0 30.0	8,000	18/6
P.M.24B	Pentode	5-pin	Clear	1.0	—	—	2.1	250 300 400	250 300 300	33.0 35.0 40.0	25.0 40.0 30.0	8,000	22/6
P.M.24C	Pentode	5-pin	Clear	1.0	—	—	3.0	400	200	28.0	30.0	12,000	22/6
P.M.24D	Pentode	5-pin	Clear	2.0	—	—	4.0	250 500	200 200	25.0 35.0	70.0 50.0	7,000	45/–
D.O.10	Triode	4-pin	Clear	6.0V 0.85A	2,850	2.4	0.85	200 300 400	— — —	60 90 130	17.0 25.0 25.0	6,000	25/–
D.O.20	Triode	4-pin	Clear	7.5V 1.1A	2,000	5.0	2.5	350 400 425	— — —	52.5 61.5 66.0	34.0 38.0 40.0	5,000	30/–

MULLARD DIRECTLY-HEATED OUTPUT VALVES FOR A.C. SETS

CONTD.

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va = 100 ; Vg = 0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
D.O.24	Triode	4-pin	Clear	2.0	1,390	9.0	6.5	200 300 400	— — —	13.0 24.0 34.0	40.0 50.0 63.0	4,000	25/-
D.O.25	Triode	4-pin	Clear	6.0V 1.1A	800	3.0	3.75	200 300 400	— — —	45.0 78.0 112.0	60.0 60.0 63.0	4,000	30/-
D.O.26	Triode	4-pin	Clear	2.0	600	3.8	6.3	200 300 400	— — —	40.0 63.0 92.0	38.0 50.0 63.0	4,000	25/-

MULLARD FULL-WAVE RECTIFIERS

TYPE.	DESCRIPTION.	Base	Vf	If	Max. Va (r.m.s.)	Max. Rectified Output (mA)	PRICE.
D.W.2	Directly-heated F.W. Rectifier ..	4-pin	4.0	1.0	250–0–250	60	12/6
D.W.3	„ „ „ „ ..	4-pin	4.0	2.0	350–0–350	120	15/-
D.W.4	„ „ „ „ ..	4-pin	4.0	2.0	500–0–500	120	20/-
I.W.2	Indirectly-heated F.W. Rectifier ..	4-pin	4.0	1.2	250–0–250	60	12/6
I.W.3	„ „ „ „ ..	4-pin	4.0	2.4	350–0–350	120	15/-
I.W.4	„ „ „ „ ..	4-pin	4.0	2.4	500–0–500	120	20/-

MULLARD D.C. MAINS VALVES (DIRECTLY-HEATED)

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va = 100 ; Vg = 0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
P.M.13	Screened Grid	4-pin 5-pin	Clear Met.	0.1	360,000	250	0.7	200	100	0	4.0	—	20/-
P.M.4D.X	Detector	4-pin	Clear	0.1	7,500	15	2.0	100 125 150	— — —	1.5–3.0 3.0–4.5 4.5–6.0	1.5 2.0 2.5	—	8/6
P.M.25	Output Pentode	4-pin	Clear	0.1	—	—	1.6	150	150	15.0	10.0	8,000	17/6

Page Nineteen

MULLARD D.C. MAINS VALVES (INDIRECTLY-HEATED)

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	If	Characteristics at Va = 100 ; Vg = 0			(a) Va	(b) Vs or Vaux	(c) Vg for (a) or (b)	Ia for (c)	Optimum Load.	PRICE.
					ra	m	gm						
V.P.20	Variable-mu H.F. Pentode	5-pin	Met.	0.18	—	—	2.5*	200	100	1.5	4.5	—	17/6
S.P.20	H.F. Pentode	5-pin	Met. or Clear	0.18	—	—	2.7*	200	100	1.5	4.5	—	17/6
S.G.20	Screened Grid	5-pin	Met.	0.18	375,000	750	2.0*	200	100	1.5	3.0	—	17/6
S.D.20	Diode-Tetrode	7-pin	Met.	0.18	—	—	3.0	200	100	1.5	5.0	—	20/-
T.D.D.25	Double-diode-triode ..	7-pin	Met.	0.18	15.000	30	2.0	100 150 200	— — —	2.0 3.0 4.0	2.0 3.0 4.0	—	15/6
H.20	Detector	5-pin	Met.	0.18	—	—	2.6	100 200	— —	0.75 1.5	0.75 1.0	—	13/6
H.L.20	Detector	5-pin	Met.	0.18	14,000	35	2.5	150 200	— —	2.5 3.5	2.5 3.5	—	13/6
Pen.20	Output Pentode	5-pin or 7-pin	Clear	0.18	—	—	2.5	200	200	15.0	25.0	8,000	18/6

* Va = 200 ; Vs = 100 ; Vg = 1.5.

MULLARD UNIVERSAL (A.C./D.C.) VALVES

P Base = 8-contact. V Base = 5-contact.

TYPE.	DESCRIPTION.	Base.	Bulb Finish.	Vf	If	Characteristics at Va = 100 ; Vg = 0. ra	m	gm	(a) Va	(b) Vs or Vaux.	(c) Vg for (a) or (b)	Ia	Optimum Load.	PRICE.
F.C.13	Octode Frequency Changer	P	Met.	13	0.2	1,500,000	—	—	250	90	2	—	—	20/-
V.P.13A	Variable-mu H.F. Pentode	P	Met.	13	0.2	1,000,000	2,200	2.2	200	100	2	4.0	—	17/6
S.P.13	H.F. Pentode	P	Met.	13	0.2	1,300,000	3,000	2.2	200	100	2	3.5	—	17/6
2D.13	Double-diode	V	Met.	13	0.2	—	—	—	—	—	—	—	—	5/6
Pen.26	Output Pentode	P	Clear	24	0.2	—	—	8.0	100	100	15	50	9,000	18/6
									200	100	19	40		

						Max. Anode Volts (r.m.s.)	Max. Rectified Output (mA)	
U.R.1	Half-wave Rectifier ..	P	Clear	20	0.2	250	75	12/6
U.R.2	Full-wave Rectifier ..	P	Clear	30	0.2	250–0–250	120	15/-

MULLARD EQUIVALENTS

While all the equivalents listed have similar characteristics, they are not absolutely identical in every case. The Mullard Technical Service Department, however, will be pleased to recommend the best Mullard combinations for any receivers in which you are interested.

2-VOLT VALVES

Cossor.	Marconi-Osram.	Mazda.	**MULLARD.**	Six-Sixty.	Ferranti.	Micro-Mesh.
210 V.P.T.	V.P.21	V.P.215	**V.P.2**	218 V.P.	—	—
210 S.P.T.	—	S.P.215	**S.P.2**	218 H.P.	—	—
220 V.S.	V.S.24	S.215V.M.	**P.M.12M**	218 V.S.G.	V.S.2	—
220 V.S.G.	V.S.2	—	**P.M.12V**	215 V.S.G.	—	—
220 S.G.	S.22; S.24	S.215B	**P.M.12A**	218 S.G.	—	5 B.1
215 S.G.	S.215; S.23; S.21	S.215A; S.G.215	**P.M.12**	215 S.G.	—	—
210 R.C.	H.2	H.210; H.2	**P.M.1A**	210 R.C.	—	—
210 H.F.	H.L.210	—	**P.M.1H.F**	210 H.F.	—	—
210 H.L.	H.L.2	H.L.210; H.L.2	**P.M.1H.L**	210 H.L.	—	1 H.L.B.1
210 L.F.	L.210	—	**P.M.1L.F**	210 L.F.	—	—
—	H.D.21	L.2/DD	**T.D.D.2A**	210 D.D.T.	H.2D	—
210 Det.	L.2/B; L.21	L.210; L.2	**P.M.2D.X**	210 D.	—	—
220 P.A.	L.P.2	P.220	**P.M.2A**	220 P.A.	L.2	P.B.1
220 P.	P.215	P.215	**P.M.2**	220 P.	—	—
215 P.	L.P2/C					
—	P.2	P.220A	**P.M.202**	220 S.P.	—	—
230 X.P.	P.240	P.240	**P.M.252**	240 S.P.	—	—
220 H.P.T.	P.T.2	Pen.220	**P.M.22A**	220 Pen.	—	Pen.B.1
230 P.T.	P.T.240	Pen.230	**P.M.22**	230 Pen.	—	—
230 H.P.T.						
220 P.T.	—	Pen.220A	**P.M.22C**	—	—	—
220 B.	—	P.D.220	**P.M.2B**	220 B.	H.P.2	—
240 B.						
—	B.21	P.D.220A	**P.M.2B.A**	—	—	—

MULLARD EQUIVALENTS CONTD.

4-VOLT VALVES

COSSOR.	MARCONI-OSRAM.	MAZDA.	MULLARD.	SIX-SIXTY.	FERRANTI.	MICRO-MESH.
410 S.G.	S.410	—	P.M.14	4075 S.G.	—	—
410 R.C.	H.410	—	P.M.3A	4075 R.C.	—	—
410 H.F.	H.L.410	—	P.M.3	4075 H.F.	—	—
410 L.F.	L.410	—	P.M.4D.X	410 D.	—	—
410 P.	P.410	—	P.M.4	410 P.	—	—
425 X.P. / 415 X.P.	P.415 / P.425	P.425	P.M.254	420 S.P.	—	—
415 P.T. / 410 P.T	425 P.T.	Pen.425	P.M.24	415 P.P.	—	—

6-VOLT VALVES

COSSOR.	MARCONI-OSRAM.	MAZDA.	MULLARD.	SIX-SIXTY.	FERRANTI.	MICRO-MESH.
610 S.G.	S.610	—	P.M. 16	6075 S.G.	—	—
610 H.F.	H.L.610	H.L.610	P.M.5X / P.M.5D	6075 H.F.	—	—
610 L.F.	L.610	—	P.M.6D	610 D.	—	—
610 P.	P.610	—	P.M.6	610 P.	—	—
625 P.	P.625	P.625B	P.M.256	625 S.P.	—	—
610 X.P.	P.625A	P.625A	P.M.256A	625 S.P.A.	—	—
615 P.T.	P.T.625	—	P.M.26	617 P.P.	—	—

MULLARD EQUIVALENTS CONTD.

INDIRECTLY-HEATED A.C. MAINS VALVES

COSSOR.	MARCONI-OSRAM.	MAZDA.	MULLARD.	SIX-SIXTY.	FERRANTI.	MICRO-MESH.
41 M.P.G.	M.X.40	—	F.C.4	—	V.H.T.4	15 A.2
—	—	A.C./T.P.	T.P.4	—	—	—
M.V.S./PEN.	V.M.P.4	A.C./V.P.1	V.P.4	H.P.2A.C.	V.P.T.4	9A.1
M.S./PEN.A.	M.S.P.4	A.C./S.2PEN.	S.P.4	H.P.1A.C.	S.P.4 S.P.T.4	8A.1
M.S./V.G.	V.M.S.4; V.M.S. 4B.	A.C./S.G.V.M.	M.M.4V.	4M.M.A.C.	—	V.S.G. A.1
—	—	—	V.M.4V.	—	V.S.4	—
M.S.G./H.A.	—	A.C./S.2	S.4V.A.	4X.S.G.A.C.	—	S.G.A.1
41 M.S.G.	—	—	S.4V.	—	—	—
M.S.G./L.A.	M.S./4/B.	A.C./S.G.	S.4.V.B.	4Y.S.G.A.C.	—	S.G.A.1
—	—	—	2 D.4	—	—	—
D.D.4	—	V.914; A.C./D.D.	2 D.4A.	—	—	D.D.A.1
D.D.T.	M.H.D.4	A.C./H.L.D.D.	T.D.D.4.	4 D.D.T. A.C.	H.4D	11 A.1 11 A.2
—	—	—	994V	—	—	H.L.A.1
41 M.H.	M.H.41	A.C.2/H.L.	904V	4 D.X.A.C.	—	—
—	—	—	604V	—	—	H.L.A.2
41 M.R.L.	—	—	484V	—	—	—
41 M.H.F.	M.H.4	A.C./H.L.	354V	4 G.P.A.C.	D.4	—
41 M.H.L.	M.H.L.4	—	244V	4 H.L.A.C.	—	—
41 M.L.F.	M.H.L.4/C.	—	164V	4 L.A.C.	—	—
41 M.P.	M.L.4	A.C.P.	104V	4 P.A.C.	—	—
41 M.X.P.	—	A.C./P.1	054V	—	—	P.A.1
M.P.PEN.A.	M.P.T.4 M.P.T.41 M.P.T.42	A.C.PEN.	PEN.4V.A.	4 PEN.A.A.C.	—	7 A.2
M.P.PEN.	—	—	PEN.4V.	4 PEN.A.C.	—	—

MULLARD EQUIVALENTS CONTD.

DIRECTLY-HEATED A.C. OUTPUT VALVES

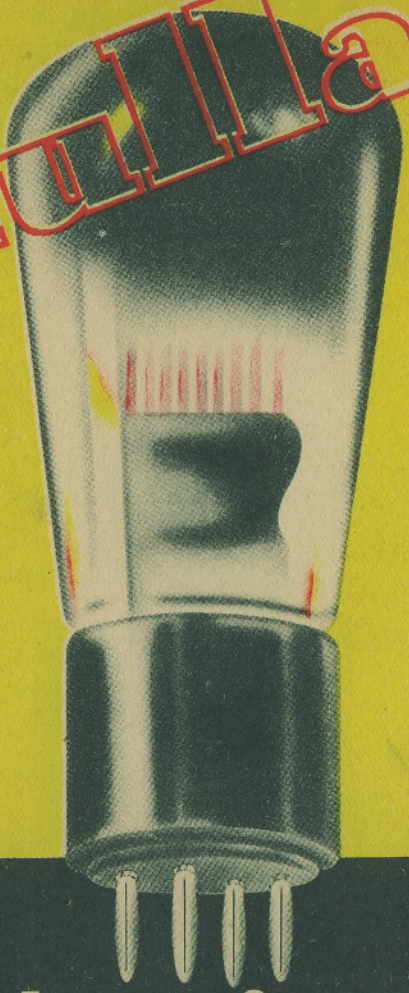
COSSOR.	MARCONI-OSRAM.	MAZDA.	MULLARD.	SIX-SIXTY.	FERRANTI.	MICRO-MESH.
—	—	—	A.C.064	H.V.4/1	P.4	—
4 X.P.	P.X.4	P.P.3/250	A.C.044	H.V.4/2	L.P.4	—
—	P.X.25	P.P.5/400	D.O.24	—	—	—
620 T.	L.S.6A	—	D.O.25	H.V.6/5	—	—
—	—	—	D.O.26	—	—	—
—	—	—	P.M.24A	4 PEN.S.P.	—	—
P.T.41	P.T.4	—	P.M.24M	4 PEN.M.	—	PEN.A.1
P.T.41B	—	—	P.M.24B	—	—	—
—	P.T.25	—	P.M.24D	—	—	—
660 T.	D.A.60	—	D.O.60	—	—	—

FULL-WAVE RECTIFIERS

COSSOR.	MARCONI-OSRAM.	MAZDA.	MULLARD.	SIX-SIXTY.	FERRANTI.	MICRO-MESH.
408 B.U. 506 B.U.	U.10	U.U.4 U.U.3	D.W.2	W.462	—	—
442 B.U.	U.12	U.U.120/350	D.W.3	W.120/350	R.4	—
460 B.U.	U.14	U.U.120/500	D.W.4	W.120/500	R.4A	—
—	—	U.U.2 U.U.60/250	I.W.2	W.60/250	—	R.1
—	M.U.12	—	I.W.3	1H.120/350	—	R.2; 1A.7
—	M.U.14	—	I.W.4	—	—	R.3
825 B.U.	U.8	—	D.W.30	—	—	—
—	—	—	D.W.8	—	R.5	—

[SECOND EDITION]

Mullard



The valves of tomorrow for the sets of to-day