Valves and Semiconductors for the Radio Amateur

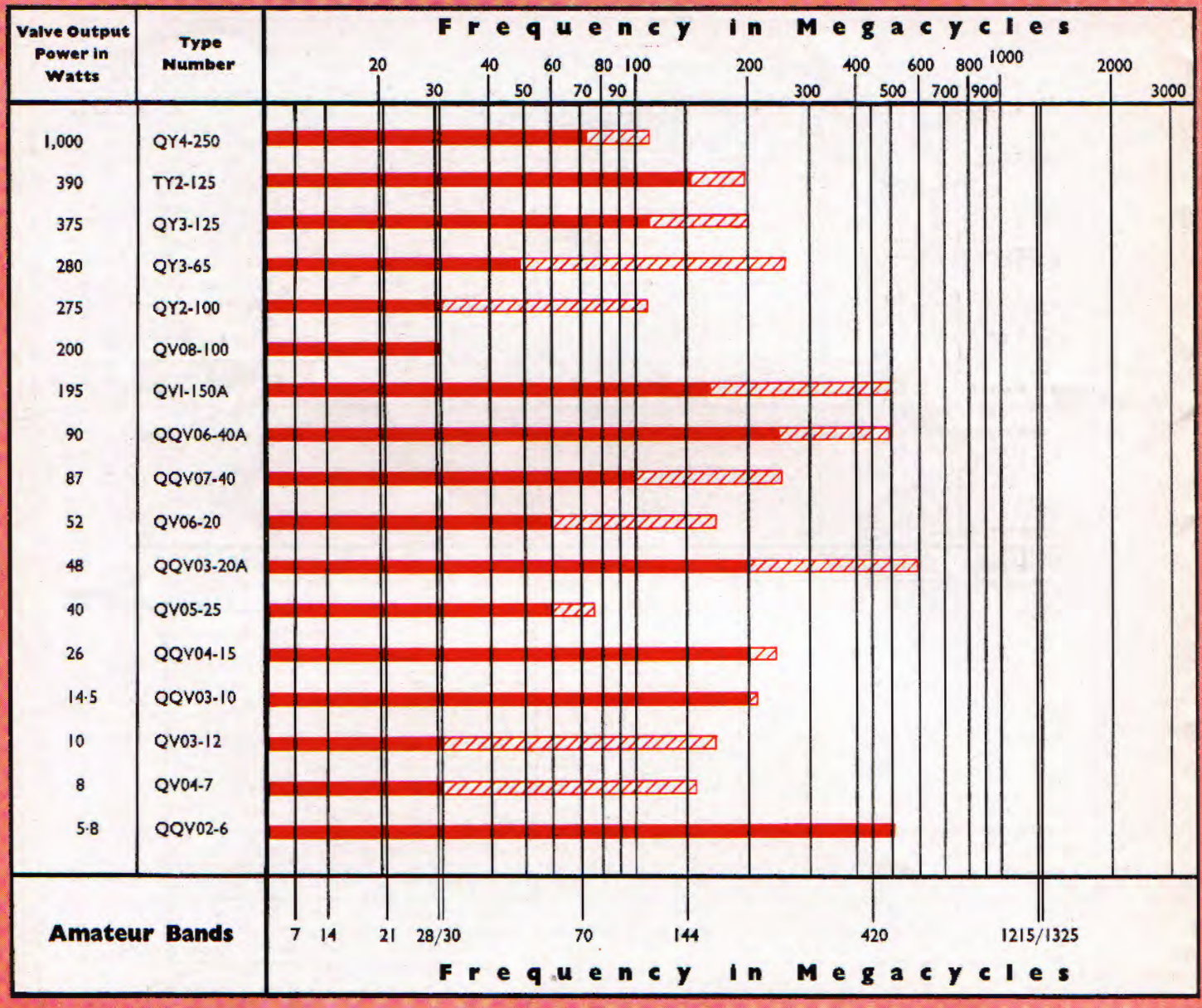
Mullard

MULLARD TRANSMITTING VALVE CHART

This chart has been compiled to acquaint amateurs with the range and scope of Mullard transmitting valves available for communication purposes, and to facilitate the selection of suitable types for given applications.

The power quoted is the maximum valve output available with class C telegraphy operation up to the frequency indicated by the junction of the solid and shaded lines. The extent to which a valve may be used at higher frequencies with reduced ratings or output is given by the shaded line.

More detailed information may be obtained from individual data sheets which are available on request.



TYPE	DESCRIPTION AND SERVICE		CHARACTERISTICS									
			P_a max. (W)	V_a max. (V)	V_{g2} max. (V)	I_k max. (mA)	Max. freq. at full ratings (Mc/s)	Approx. output at full ratings (W)	Max. freq. at reduced ratings (Mc/s)	V_h (V)	I_h (A)	BASE
QQV02–6	V.H.F. Double Tetrode	C.C.S. I.C.A.S.	2×3·0 2×3·75	250 250	200 200	2×48 2×54	500 500	5·8 7·2	— —	6·3 12·6	0·6 0·3	B9A
QQV03–10	V.H.F. Double Tetrode	C.C.S. I.C.A.S.	2×5·0 2×7·0	300 300	200 200	2×50 2×65	200 200	14·5 18·5	— —	6·3 12·6	0·83 0·42	B9A
QQV03–20A	V.H.F. Double Tetrode	C.C.S.	2×10	600	300	2×55	200	48	600	6·3 12·6	1·3 0·65	B7A
QQV04–15	V.H.F. Double Tetrode	C.C.S.	2×7·5	750	250	2×55	200	26	250	6·3 12·6	1·6 0·8	B7A
QQV06–40A	V.H.F. Double Tetrode	C.C.S.	2×20	750	300	2×120	250	90	500	6·3 12·6	1·8 0·9	B7A
QQV07–40	V.H.F. Double Tetrode	C.C.S.	2×20	750	225	2×145	100	87	250	6·3 12·6	2·5 1·25	B7A
QV03–12	V.H.F. Tetrode	C.C.S.	12	300	250	70	50	10	175	6·0	0·75	B9A
QV04–7	R.F. Tetrode	C.C.S.	7·5	400	250	50	150	8	—	6·3	0·6	B9G
QV05–25	R.F. Tetrode	C.C.S.	25	600	300	150	60	40	75	6·3	0·9	American Medium 5-pin
QV06–20	V.H.F. Tetrode	C.C.S. I.C.A.S. S.S.B.	20 25 20	600 750 600	250 250 250	160 170 135	60 60 60	52 70 46	175 175 —	6·3	1·25	Octal
QV08–100	R.F. Beam Tetrode	C.C.S. S.S.B.	100 100	825 1000	300 250	450 450	30 30	200 220	— —	6·3	3·9	B5F
QV1–150A	U.H.F. Tetrode	C.C.S. S.S.B.	150 150	1250 1250	300 300	250 250	165 165	195 172	500 —	6·0	2·6	B8F
QY2–100	R.F. Tetrode	C.C.S.	100	2000	400	225	30	275	120	10	5·0	B7D
QY3–65	V.H.F. Tetrode	C.C.S.	65	3000	400	230	50	280	250	6·0	3·5	B7A
QY3–125	V.H.F. Tetrode	C.C.S. S.S.B.	125 125	3000 3000	400 660	300 320	120 120	375 228	200 —	5·0	6·5	B5F
QY4–250	V.H.F. Tetrode	C.C.S. S.S.B.	250 250	4000 4000	600 600	420 450	75 75	1000 454	120 —	5·0	14·1	B5F
TY2–125	V.H.F. Triode	C.C.S.	135	2500	—	250	150	390	200	6·3	5·4	B5F

VOLTAGE AMPLIFYING PENTODES

TYPE	DESCRIPTION	BASE	CHARACTERISTICS								
			V_h (V)	I_h (mA)	V_a (V)	V_{g2} (V)	V_{g1} (V)	I_a (mA)	I_{g2} (mA)	g_m (mA/V)	r_a (MΩ)
E180F	High slope r.f. pentode	B9A	6·3	300	180	150	−1·3	13	3·3	15·9	0·09
EF86	Low noise a.f. pentode	B9A	6·3	200	250·	140	−2·0	3·0	0·6	2·0	2·5
EF89	Variable-mu r.f. pentode	B9A	6·3	200	250	100	−2·0	9·0	3·0	3·6	1·0
EF91	High slope r.f. pentode	B7G	6·3	300	250	250	−2·0	10	2·6	7·6	0·5
EF92	Variable-mu r.f. pentode	B7G	6·3	200	200	200	−2·5	8·25	2·1	2·45	0·9
EF93	Variable-mu r.f. pentode	B7G	6·3	300	250	100	−1·0	11	4·2	4·4	1·5
EF95	High slope v.h.f. pentode	B7G	6·3	175	180	120	−2·0	7·7	2·4	5·1	0·4
EF183	Frame-grid variable-mu r.f. pentode	B9A	6·3	300	200	90	−2·0	12	4·5	12·5	0·5
EF184	Frame-grid high-slope r.f. pentode	B9A	6·3	300	200	200	−2·5	10	4·1	15	0·38
6AS6	Dual control pentode	B7G	6·3	175	120	120	−2·0* −2·0	3·5 5·1	4·8 3·5	2·0 3·2	— 0·15

*V_{g3} = −3V

OUTPUT PENTODES

TYPE	DESCRIPTION	BASE	CHARACTERISTICS								
			V_h (V)	I_h (A)	$V_a = V_{g2}$ (V)	V_{g1} (V)	I_a (mA)	I_{g2} (mA)	g_m (mA/V)	P_{out} (W)	R_a (kΩ)
EL34	Output pentode (P_a max. = 25W)	Octal	6·3	1·5	250	−12·2	100	15	11	11	2·0
EL84	Output pentode (P_a max. = 12W)	B9A	6·3	0·76	250	−7·3	48	5·5	11·3	5·7	5·2
EL85	A.F. or r.f. output pentode (P_a max. = 6W)	B9A	6·3	0·2	225	−10·8	26	4·1	3·2	2·6	9·0
EL90	Output pentode (P_a max. = 12W)	B7G	6·3	0·45	250	−12·5	45	4·5	4·1	4·5	5·0
EL91	Output pentode (P_a max. = 4W)	B7G	6·3	0·2	250	−13·5	16	2·3	2·5	1·4	16
EL821	Video output pentode (P_a max. = 12W)	B9A	6·3	0·75	250	−4·5	40	6·0	11	—	—
EL822	Video output pentode (P_a max. = 12W)	B9A	6·3	0·75	250	−7·0	42·5	4·8	12·5	—	—

TRIODES AND DOUBLE TRIODES

TYPE	DESCRIPTION	BASE	CHARACTERISTICS							
			V_h (V)	I_h (mA)	V_a (V)	V_g (V)	I_a (mA)	μ	g_m (mA/V)	r_a (kΩ)
EC90	R.F. power triode	B7G	6·3	150	250	−8·5	10·5	17	2·2	7·7
EC91	Grounded grid triode amplifier	B7G	6·3	300	250	−1·5	10	90	8·5	10·5
ECC81	R.F. double triode with separate cathodes	B9A	6·3 12·6	300 150	250	−2·0	10	60	5·5	11

TRIODES AND DOUBLE TRIODES—cont.]

TYPE	DESCRIPTION	BASE	CHARACTERISTICS V_h (V)	I_h (mA)	V_a (V)	V_g (V)	I_a (mA)	μ	g_m (mA/V)	r_a (kΩ)
ECC82	Low μ double triode with separate cathodes	B9A	6·3 / 12·6	300 / 150	250	−8·5	10·5	17	2·2	7·7
ECC83	High μ double triode with separate cathodes	B9A	6·3 / 12·6	300 / 150	250	−2·0	1·2	100	1·6	62·5
ECC84	R.F. double triode with separate cathodes	B9A	6·3	330	90	−1·5	12	24	6·0	4·0
ECC85	R.F. double triode with separate cathodes	B9A	6·3	435	250	−2·3	10	57	5·9	9·7
ECC88	Frame-grid double triode with separate cathodes	B9A	6·3	365	90	−1·3	15	33	12·5	2·6
ECC189	Variable-μ, v.h.f. frame grid double triode	B9A	6·3	365	90	−1·2	15	34	12·5	2·7
6080	Low μ power double triode	Octal	6·3	2500	100	−30	100	2·0	6·5	0·3

RECTIFIERS

TYPE	DESCRIPTION	BASE	CHARACTERISTICS V_h or V_f (V)	I_h or I_f (A)	LIMITING VALUES V_a (r.m.s.) (V)	I_{out} max. (mA)	P.I.V. max. (kV)	V_{h-k} (pk) max. (V)
EY84	Indirectly heated half-wave rectifier	B9A	6·3	1·0	†625 / 500	†125 / 150	2·0	650
EZ80	Indirectly heated full-wave rectifier	B9A	6·3	0·6	†2 × 350	†90	—	500
EZ81	Indirectly heated full-wave rectifier	B9A	6·3	1·0	†2 × 350	†150	1·3	500
EZ90	Indirectly heated full-wave rectifier	B7G	6·3	0·6	†2 × 325	†70	1·25	450
GZ32	Indirectly heated full-wave rectifier	Octal	5·0	2·3	2 × 400	300	—	—
GZ33	Indirectly heated full-wave rectifier	Octal	5·0	3·0	†2 × 500	†250	1·4	*
GZ34	Indirectly heated full-wave rectifier	Octal	5·0	1·9	†2 × 450	†250	1·5	*
RG1-240A	Half-wave mercury-vapour rectifier	British 4-pin	4·0	2·7	2220	250	6·5	—
RG3-250A	Half-wave mercury-vapour rectifier	Medium 4-pin	2·5	5·0	3500	250	10	—
RR3-250	Half-wave inert-gas-filled rectifier	Medium 4-pin	2·5	5·0	1750 / 3500	500 / 250	5·0 / 10	— / —

† Capacitor input. * Heater connected to cathode.

FREQUENCY CHANGERS

Type	Description	Base	V_h (V)	I_h (mA)	TYPICAL OPERATING CONDITIONS V_a (V)	$V_{g2}+g^4$ (V)	V_{g1} (V)	I_a (mA)	$I_{g2}+g^4$ (mA)	g_c (mA/V)	r_a (kΩ)
ECF80	Triode pentode with separate cathodes	B9A	6·3	430	250	200	−3·2	7·0	1·8 (I_{g2})	2·1	1500
ECF82	Triode pentode with separate cathodes	B9A	6·3	450	*250 / †135	117 (V_{g2}) / —	0 / —	5·2 / 5·7	1·9 (I_{g2}) / —	1·9 / 4·0	— / —
ECH81	Triode heptode	B9A	6·3	300	*250 / †100	103 / —	−2·0 / 0	3·25 / 4·5	6·7 / —	0·775 / 0·65	1000 / —
EK90	Heptode	B7G	6·3	300	250	100	−1·5 (V_{g3})	3·0	7·1	0·475	1000

* Mixer section. † Triode section.

DOUBLE DIODE

Type	Description	Base	DESIGN CENTRE RATINGS (each section) V_h (V)	I_h (mA)	P.I.V. max. (V)	I_a max. (mA)	V_{h-k} (pk) max. (V)
EB91	Double diode with separate cathodes	B7G	6·3	300	420	9·0	330

TUNING INDICATORS

Type	Description	Base	V_h (V)	I_h (mA)	V_b (V)	V_t (V)	R_a (kΩ)	R_{g-k} (MΩ)	TYPICAL OPERATING CONDITIONS V_g (V)	I_a (mA)	I_t (mA)	L (mm)
EM81	Tuning indicator for use in f.m. or a.m. receivers and in tape recorders	B9A	6·3	300	250	250	500	3·0	−1·0 / −10·5	0·370 / 0·020	2·0 / 2·3	—
EM84	Tuning indicator for use in broadcast receivers and tape recorders	B9A	6·3	210	250	250	470	3·0	0 / −22	0·450 / 0·060	1·0 / 1·8	21 / 0
EM87	Tuning indicator with overlap for use in tape recorders	B9A	6·3	300	250	250	100	3·0	0 / −15	2·0 / 0·1	1·0 / 2·0	21 / 1·5

VOLTAGE STABILISERS

Type	Description	Base	ABSOLUTE MAXIMUM RATINGS Minimum ignition voltage (V)	Burning current (mA) Max.	Burning current (mA) Min.	Maintaining voltage (V) Max.	Maintaining voltage (V) Min.	Max. negative anode voltage (V)
75C1	Gas-filled voltage stabiliser	B7G	115	60	2·0	81	75	50
108C1	Gas-filled voltage stabiliser	B7G	133	30	5·0	114	101	75
150C2	Gas-filled voltage stabiliser	B7G	185	30	5·0	165	142	125

VALVE EQUIVALENTS

Type Number	Mullard Equivalent	Type Number	Mullard Equivalent
B152	ECC81	6AQ4	EC91
B309	ECC81	6AQ5	EL90
B329	ECC82	6AQ8	ECC85
B339	ECC83	6BA6	EF93
B719	ECC85	6BE6	EK90
D77	EB91	6BL8	ECF80
D152	EB91	6BN5	EL85
DD6	EB91	6BQ5	EL84
DP61	EF95	6BW4	EZ81
ESU101	RG1–240A	6C4	EC90
ESU866	RG3–250A	6CA4	EZ81
GD150M/S	150C2	6CA7	EL34
GU50	RG1–240A	6CH6	EL821
L77	EC90	6CJ6	EL81
N77	EL91	6CQ6	EF92
N144	EL91	6CW7	ECC84
N709	EL84	6D2	EB91
N727	EL90	6DA5	EM81
QS1208	108C1	6DA6	EF89
R18	EY84	6ES8	ECC189
SP6	EF91	6F12	EF91
TT20	QQV03–20A	6F21	EF92
		6FG6	EM84
U78	EZ90	6HU6	EM87
U709	EZ81	6L13	ECC83
VP6	EF92	6L34	EC91
W77	EF92	6P17	EL91
W727	EF93	6U8	ECF82
X77	EK90	6V4	EZ80
X719	ECH81	6X4	EZ90
X727	EK90	7D9	EL91
Z77	EF91	8D3	EF91
Z729	EF86	9D6	EF92
		12AT7	ECC81
0A2	150C2	12AU7	ECC82
0B2	108C1	12AX7	ECC83
IN87	OA70		
IN476	OA81		
IN542	2–OA79		
2C46	TD05–12	807	QV05–25
2N115	OC16	813	QY2–100
2N279	OC70	829B	QQV07–40
2N280	OC71	832A	QQV04–15
2N281	OC72	866A	RG3–250A
2V/400A	RG3–250A	5763	QV03–12
3B28	RR3–250	5866	TY2–125
4–65A	QY3–65	5894	QQV06–40A
4X150A	QV1–150A	6146	QV06–20
		6155	QY3–125
5AQ4	GZ32	6156	QY4–250
5AR4	GZ34	6252	QQV03–20A
6AJ8	ECH81	6267	EF86
6AK5	EF95	6360	QQV03–10
6AL5	EB91	6374	EY84
6AM5	EL91	6688	E180F
6AM6	EF91	6922	E88CC
		6939	QQV02–6

SEMICONDUCTOR DATA

GERMANIUM DIODES		BASE	Max. reverse voltage		Max. forward current		Ambient temperature	
TYPE	DESCRIPTION		Peak (V)	*Average (V)	Peak (mA)	*Average (mA)	Max. (°C)	Min. (°C)
OA70	Germanium diode for use as a video signal detector at frequencies up to 100Mc/s	Wired in	22·5	15	150	50	+75	—50
OA79	Germanium diode	Wired in	45	30	100	4·0	+60	—50
2-OA79	Matched pair of OA79 germanium diodes for use in ratio detector circuits							
OA81	Germanium point contact diode having a high back resistance	Wired in	115	90	150	50	+75	—50

*Averaged over any 50 ms period or d.c. component, at 25°C

SILICON JUNCTION DIODE		BASE	ABSOLUTE MAXIMUM RATINGS			
TYPE	DESCRIPTION		Max. recurrent P.I.V. (V)	Max. av. forward current (mA)	Max. forward voltage (At forward current = 5·0A) (V)	Max. reverse current (At reverse voltage = 800V) (μA)
BY100	Silicon diffused junction rectifier for use as a mains rectifier in television receivers	Wired in	800	550 (T_{amb} = 50°C)	1·5 (T_{case} = 25°C)	10 (T_{case} = 25°C)

GERMANIUM JUNCTION TRANSISTORS		BASE	†Max. collector voltage	‡Max. collector dissipation	Max. collector current		Current amplification factor
TYPE	DESCRIPTION		(V)	(mW)	Peak (mA)	Average* (mA)	h_{fe}
OC16	High power germanium p-n-p junction transistor for use in a.f. amplifiers and d.c. convertors	Stud mounting	—16 (<200Ω)	5000 (4·3°C/W)	3000	1500	16 to 90 (I_C = 300mA)
OC44	Germanium p-n-p junction transistor for use in r.f. applications f_{hfb}=15 Mc/s	Wired in	—10 (<1kΩ)	43	10	5·0	40 to 225 (I_C = 1mA)
OC45	Germanium p-n-p junction transistor for use in i.f. amplifier stages f_{hfb}= 6 Mc/s	Wired in	—10 (<1kΩ)	43	10	5·0	25 to 125 (I_C = 1mA)
OC70	Germanium p-n-p junction transistor for use in a.f. amplifiers	Wired in	—20 (<500Ω)	75	50	10	20 to 40 (I_C = 0·5mA)
OC71	Germanium p-n-p junction transistor for use in a.f. amplifiers	Wired in	—20 (<500Ω)	75	50	10	30 to 75 (I_C = 3mA)
OC72	Germanium p-n-p junction transistor for use in class B applications in matched pairs 2—OC72	Wired in	—16 (<1kΩ)	75 (no fin) 100 (0·3°C/mW)	250	125	45 to 120 (I_C = 10mA)
OC170	Germanium p-n-p junction transistor for use as mixer oscillator or i.f. amplifier in short wave receivers	Wired in	—20	50	10	10	20 to 100 (I_C = 1mA)

† The values apply to grounded base connection, and also to grounded emitter connection, providing the external base to ground circuit impedance does not exceed the value shown in brackets.

‡ These figures apply at 45°C ambient. The figures in brackets refer to the thermal resistance of the heat sink, where one is used.

* Averaged over any 20ms period.

ALLOY-DIFFUSED JUNCTION TRANSISTORS		BASE	Max. collector voltage	Max. collector dissipation at T_{amb}=45°C	Max. collector current	Current amplification factor (V_{CE}=6V I_C=1 mA)	Power gain
TYPE	DESCRIPTION		(V)	(mW)	(mA)	(h_{fe})	(dB)
AF114	An alloy-diffused p-n-p junction transistor for use as an r.f. amplifier at 100 Mc/s in f.m. receivers	Wired in	20	50	10	150	14 (f = 100 Mc/s)
AF115	An alloy-diffused p-n-p junction transistor for use as a mixer oscillator in f.m. and short wave a.m. receivers	Wired in	20	50	10	150	12 (f = 100 Mc/s)
AF116	An alloy-diffused p-n-p junction transistor for use as an i.f. amplifier in f.m./a.m. receivers	Wired in	20	50	10	150	25 (f = 10·7 Mc/s)
AF117	An alloy-diffused p-n-p junction transistor for use in r.f., i.f. and mixer oscillator stages of long and medium wave receivers	Wired in	20	50	10	150	42 (f = 450 kc/s)

VALVE TYPE NOMENCLATURE

TRANSMITTING AND LARGE INDUSTRIAL VALVES

The type nomenclature for the larger Mullard Transmitting and Industrial Valves generally consists of two or more letters followed by two sets of figures. These symbols provide information concerning the principal uses and ratings of the valves according to the following code. It is pointed out, however, that in a very few instances it has not been possible to adhere strictly to this code.

The first letter indicates the general functional class of valve:

B—Backward wave oscillator
J—Magnetron
K—Klystron
L—Forward wave amplifier
M—L.F. amplifying or modulator triode
P—R.F. power pentode
Q—R.F. power tetrode
R—Power rectifier
T—R.F. power triode
X—Large thyratron. (All hydrogen thyratrons and other thyratrons having max. mean anode current of 500mA or more.)

Note: For valves having dual electrode systems, the code letters for both systems are used, e.g. 'QQ' for a double tetrode.

The second letter indicates some structural property in each class of valve:

(a) *For transmitting valves and vacuum rectifiers*, the type of cathode.
(b) *For thyratrons and gas-filled rectifiers*, the type of gas present.
(c) *For microwave devices*, a basic structural feature.
A—Outputs up to 1W } In backward wave tubes
B—Outputs of 1W and over } and forward wave amplifiers
D—Disc-seal construction
G—Mercury-vapour filled
H—Hydrogen-filled
N—External magnet required (in magnetrons)
P—Packaged construction (in magnetrons)
R—Inert-gas filled
S—Reflex (single resonator) construction (in klystrons)
T—Multiple resonator construction (in klystrons)
V—Indirectly heated oxide-coated cathode
X—Directly heated tungsten filament
Y—Directly heated thoriated-tungsten filament
Z—Directly heated oxide-coated filament

The third letter

Transmitting valves with a silica envelope have a third letter 'S'.
Thyratrons with a shield grid (tetrode construction) have a third letter 'Q'.
Microwave devices that are tunable have a third letter 'T'.

The first group of figures, immediately following the letters, indicates:

(a) The approximate anode voltage in kV for *transmitting valves and rectifiers:*

Thus 05 represents 0·5kV = 500V
2 represents 2kV = 2000V

For *valves intended for pulse operation* this figure is the peak anode voltage in kV.

(b) The approximate peak inverse voltage in kV for *thyratrons.*
(c) The approximate frequency of operation in Gc/s for *magnetrons, klystrons, backward wave tubes and forward wave amplifiers:*

Thus 9 represents Gc/s = 9000Mc/s.

The second group of figures indicates:

(a) For *transmitting valves*, the maximum permissible anode dissipation in W. For dissipations of 10kW or more the dissipation in kW is given.
(b) For *transmitting valves primarily intended for pulse operation* this group is prefixed by the letter 'P' and the figures indicate the maximum peak current in amps.
(c) For *backward wave tubes and forward wave amplifiers*, the output power in mW or W depending on the second letter ('A' or 'B').
(d) For *magnetrons*, the pulse power output in kW.
(e) For *klystrons*, the power output in mW.
(f) For *rectifiers*, the approximate rectified output current in mA.
(g) For *thyratrons*, the approximate maximum permissible mean anode current in mA. This group consists of at least three digits, the first one being 0 if the current is between 10 and 100mA. For currents of 10A or more the current in amps is given.

Thus 045 represents 45mA
6400 represents 6400mA = 6·4A
12 represents 12A

A final letter occasionally follows the second group of figures.

This is usually a serial letter to denote a particular design or development. Types designed for water cooling are indicated by the letter 'W' and if these types also have a forced air-cooled version this is indicated by the letter 'A'.

Examples:

JP9-7	Magnetron with packaged construction for operation at a frequency of approximately 9000Mc/s with pulse power output of 7kW.
KS9-20	Klystron of reflex construction for operation at a frequency of approximately 9000Mc/s with a power output of 20mW.
LA4-250	Forward wave amplifier for operation at a frequency of approximately 4000Mc/s with an output of 250mW.
QQV03-10	Double beam tetrode with indirectly heated oxide-coated cathode. Rated to work at 300V and to dissipate 10W continuously (5W at each anode).
QV20-P18	R.F. power tetrode with indirectly heated oxide-coated cathode. Designed for pulse operation with maximum peak anode voltage of 20kV and maximum peak anode current of 18A.
RG3-250	Mercury-vapour rectifier rated to work at 3kV and to give a maximum rectified output of 250mA.
XG5-500	Mercury-vapour thyratron having a rated peak inverse voltage of approximately 5kV and a maximum permissible mean anode current of approximately 500mA.

RECEIVING VALVES

The type nomenclature for Mullard receiving and amplifying valves and small thyratrons generally consists of two or more letters followed by two or three figures. These symbols provide information concerning the principal uses of the valves, the heater or filament rating, and the type of base, according to the following code. In some special valves for 'professional' applications the figures follow the first letter and precede the second and subsequent letters.

The first letter indicates the filament or heater voltage or current:

A—4·0V filament
C—200mA heater
D—0·5V to 1·5V filament
E—6·3V heater
G—5·0V heater
H—150mA heater
K—2·0V filament
P—300mA heater
U—100mA heater

The second and subsequent letters indicate the general class of valve:

A—single diode
B—double diode
C—triode
D—output triode
E—tetrode
F—voltage amplifying pentode
H—hexode or heptode
K—heptode or octode
L—output pentode
M—electron beam indicator
N—thyratron
*P—secondary emission valve
Q—nonode
T—miscellaneous
X—full-wave gas-filled rectifier
Y—half-wave rectifier
Z—full-wave rectifier

* Used as a third letter only.

Note: Two or three of the above letters may be combined, e.g., BC—double diode triode.

The first figure indicates the type of base:

2—B8G (Loctal) base
3—Octal base
4—B8A base
5—Miscellaneous bases
6 & 7—Subminiature bases
8—B9A (Noval) base
9—B7G base

Note: In types with three figures, if the first figure is 1 then the second figure indicates the type of base, e.g., E180F - B9A base.

The second and third figures are serial numbers indicating a particular design or development.

Examples:

E90CC	E 6·3V heater	9 B7G base	0 serial number	C triode	C triode	
	(for professional applications)					
EL821	E 6·3V heater	L output pentode	8 B9A base	21 serial number		
PABC80	P 300mA heater	A single diode	B double diode	C triode	8 B9A base	0 serial number
UCH42	U 100mA heater	C triode	H hexode	4 B8A base	2 serial number	

Mullard

MULLARD LTD., MULLARD HOUSE, TORRINGTON PLACE, LONDON W.C.1

Printed in England 2366/C91/10M/762