

# Cathode-ray Tube Data

## Characteristics of some Ex-Service Surplus Types

Compiled by D. W. Thomasson

THE following list gives some of the more important data on some of the C.R. tubes now available in the surplus market. All the types given have 4-V heaters, taking about 1 A, and are of the electrostatic focus and deflection type. The figures given are average values, but considerable variation may be

Type	Screen	Base	Size		Operating Conditions					Sensitivity	
			L	D	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>max</sub>	I <sub>b</sub>	X-axis	Y-axis
NC1	G. M.	9.1	160	25	0.8	0.135	0.8	—	3	100	90
NC6	G. —	12.1	350	75	1.45	0.6	3	4	10	320	480
NC7	G. S.	12.2	630	230	1.7	1	6	6	40	1490	1270
NC12	G. S.	12.3	420	160	1.8	0.8	5	6	3	550	1000
NC14	B. —	12.3	420	160	2	0.35	2	2.5	20	600	1140
NC16	G. M.	12.4	200	70	0.8	0.12	0.8	1.5	3	150	150
NC19	G. M.	9.1	160	25	0.8	0.135	0.8	—	3	100	90
VCR97	— —	12.3	420	160	2	0.35	2	2.5	20	600	1140
VCR138	G. S.	12.3	340	85	2	0.35	2	2.5	—	750	350
VCR139A	G. M.	12.4	200	70	1.5	0.25	1.5	1.5	3	170	170
VCR522	G. M.	9.1	160	25	0.8	0.135	0.8	—	3	100	90

NOTES.—Screen type; G = Green, B = Blue, M = Medium persistence, S = Short persistence.

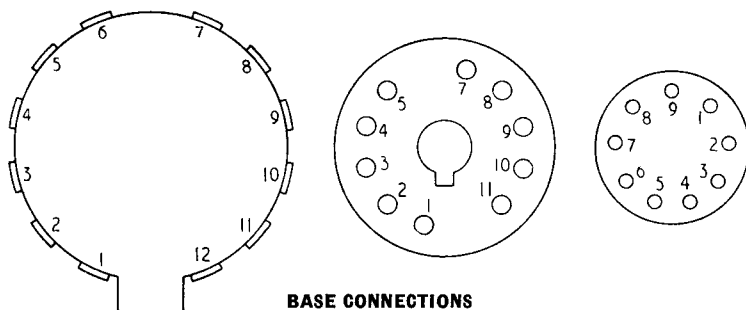
The connections given in the lists of bases are liable to alteration. The effective connections will usually be as shown, however, as the changes usually involve taking two leads to a common connection to avoid the necessity of strapping them externally. The addition of a suffix letter is sometimes used to indicate more extensive changes.

The dimensions given are the overall length and the effective screen diameter (mm). Symbols: V<sub>1</sub> = first anode, V<sub>2</sub> = focus anode, V<sub>3</sub> = final anode, V<sub>max</sub> = maximum final anode potential in kilovolts; I<sub>b</sub>, beam current (μA). The sensitivities are given in mm/V.

12-WAY S.C.

12-PIN SPIGOT

BRITISH 9-PIN



BASE CONNECTIONS

British Standard 9-pin Base

	1	2	3	4	5	6	7	8	9
9.1	X <sub>1</sub>	Y <sub>1</sub>	A <sub>2</sub>	H C	H	M	A <sub>1</sub>	X <sub>2</sub>	Y <sub>2</sub>

Standard 12-way side contact (G.E.C. type)

	1	2	3	4	5	6	7	8	9	10	11	12	Caps	
12.1	M	—	H C	H	A <sub>1</sub>	A <sub>2</sub>	Coa.	X <sub>2</sub>	—	A <sub>3</sub>	—	X <sub>1</sub>	Y <sub>1</sub>	Y <sub>2</sub>
12.2	M	—	H C	H	A <sub>1</sub>	A <sub>2</sub>	Coa.	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	—	—
12.3	M	C	H	H	A <sub>1</sub>	A <sub>2</sub>	Coa.	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	—	—

12-pin spigot-type base

	1	2	3	4	5	6	7	8	9	10	11	12
12.4	C	M	H	H	A <sub>2</sub>	—	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	—

SYMBOLS: M = Modulator (grid); H = Heater; C = Cathode; Coa. = Coating; X<sub>1</sub>, X<sub>2</sub> = X-axis deflector plates; Y<sub>1</sub>, Y<sub>2</sub> = Y-axis deflector plates; A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub> = Anodes numbered from the cathode. (Anodes one and three may be strapped internally, the A<sub>1</sub> connection being omitted. X<sub>1</sub> and Y<sub>1</sub> may be similarly treated. These variations are unpredictable.)

experienced between different tubes of the same type.

It may be noted that, while some of the types given are closely similar as far as the quoted characteristics are concerned, they

are not equivalents. This may be due to different minimum spot sizes or similar factors relatively unimportant for many applications, but is often a matter of construction.

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# More Cathode-ray Tube Data

## Further Notes on Ex-service Types

THE following list has been compiled in response to a number of requests for an extension of the original list given in the December, 1947, issue.

A number of correspondents were anxious to have details of C.R. tubes suitable for use in television receivers, but a careful search has revealed only one type with white

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trace, large screen (12in) and magnetic deflection. This tube, the CV274, has not been seen in the surplus market as yet, and it seems that television experimenters must

either put up with a green or blue trace and electrostatic deflection or buy in the civilian market.

There are a good many tubes for magnetic deflection, but they are mostly of the "afterglow" type, and useless for television. It is useful to note that such screens can generally be identified by the greenish tint of the screen caused by

Type	Screen	Base	Size		Operating Conditions					Sensitivity		Remarks
			L	D	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>max</sub>	I <sub>b</sub>	X	Y	
ACR1	W	—	495	136	3	0.6	3	4	15	600	675	
ACR2	As ACR1,	but less stringent specification.										
ACR8	W or G	—	136	0.15	0.56	3	3	20	870	500		
ACR10	G	12.4	205	70	0.45	0.07	0.45	1	2	170	170	= VCR139A
ACR11	As ACR8,	but with metallized outer coating.										
ACR12	G	—	620	295	4	0.8	4	5	—	650	650	
ACR13	G	—	431	160	2	0.48	3	5	15	620	1160	
NC2	G	8.1	414	136	Gas Focus	—	—	1.5	—	450	450	0.6 V Htr.
NC3	G	9.1	203	71	—	—	—	0.8	—	120	150	
NC4	B/G	Otherwise as NC2.										0.6 V Htr.
NC5	W	6.1	495	136	3	0.55	3	4	—	600	675	
NC8	Red	—	—	Gas focus	—	—	1.5	—	—	—	—	= 32E
NC9	B	12.5	380	114	—	—	—	2	—	490	490	
NC10	W	6.1	495	136	3	0.55	3	4	—	600	675	
NC11	G	12.3	420	160	1.8	0.8	5	6	3	550	1000	Obsolete.
NC13	G	12.3	495	175	0.45	0.44	2.2	4	—	520	520	
NC15	G	12.6	380	116	1.2	0.35	1.2	2	—	530	370	= VCR518
NC17	D	8.2	393	90	Mag. Focus	—	—	15	—	Mag. Defl.	—	Skiatron
NC18	Y	12.3	431	160	2	0.8	5	6	—	620	1160	= CV966
NC20	G	12.5	585	300	4	0.8	4	5	20	900	900	
VCR84	A	12.7	685	305	1.8	0.65	3.5	4	—	1175	550	Obsolete.
VCR85	A	12.7	660	300	1.8	1.6	6	7	—	1345	1300	
VCR86	A	12.7	570	160	1.8	0.97	5	5.5	—	900	700	Obsolete.
VCR87	A	12.7	512	160	3	0.7	3	5.5	—	700	750	
VCR112	G or W	—	495	135	0.2	0.56	3	3.5	—	870	500	
VCR131	G	12.7	585	300	4	0.8	4	5	—	900	900	
VCR138	G	12.3	340	90	1.2	0.2	1.2	2.5	—	357	780	
VCR138A	G	12.3	340	90	1.2	0.2	1.2	5	—	357	780	Larger screen than VCR138
VCR139A	G	12.4	205	70	0.8	0.135	0.8	1	3	170	170	
VCR140	A	8.2	587	306	Mag. Focus	—	5.5	6.5	—	Mag. Defl.	—	
VCR511	A	12.7	585	300	4	0.8	4	6.5	—	1000	1000	{ 2 screen variants A & B.
VCR514	G	12.3	370	90	0.8	0.28	2	2.5	—	380	580	
VCR515	B or G	—	384	90	0.2	1.2	—	1.5	—	480	400	2 anodes
VCR516	A	8.2	452	230	Mag. Focus	—	4	5	—	Mag. Defl.	—	
VCR517	A	12.3	431	160	2	0.5	3	6	—	720	880	5 screen variants A-E
VCR518	B } G }	12.6	380	116	1.2	0.35	1.2	2	—	530	370	Double Beam.
VCR519	G	—	640	312	0.5	0.5	2.2	4	—	720	720	Compass.
VCR520	A	8.2	393	885	Mag. Focus	—	10	15	—	Mag. Defl.	—	
VCR521	A	12.3	340	92	1.8	0.7	4	5	—	357	780	
VCR522A	G	9.1	145	39	0.8	0.135	0.8	1	—	90	90	
VCR523	G	12.7	660	295	1.8	1.6	6	7	—	1345	1300	Similar to VCR85.

NOTES: The screen type is given by the following symbols: A = Afterglow; (long persistence); B = Blue; B/G = Blue-Green; D = Dark Trace; G = Green; W = White; Y = Yellow.

The size is given in mm, L being the overall length, and D the diameter. The operating voltages are given in kilovolts, and the beam current in  $\mu$ A.

V<sub>1</sub> = 1st anode; V<sub>2</sub> = 2nd anode voltage; V<sub>3</sub> = 3rd anode voltage;

V<sub>max</sub> = maximum final anode voltage; I<sub>b</sub> = beam current. The sensitivities are given in mm/V/V.

**More Cathode-ray Tube Data—**  
phosphorescence. After exposure to sunlight, the screen glows plainly when shaded again. This will not,

of course, identify a tube with a "dark-trace" screen.  
All but two of the tubes listed are 4-V heater types, the current drawn

being of the order of 1 A. The deflection and focus are generally electrostatic, the exceptions being noted.

**BASE TYPES**

There are a large number of variations between tubes of a given type, but the connection lists are framed to cover these as far as possible.

	1	2	3	4	5	6	7	8	9	10	11	12	Side Caps
6.1	K	G	H	H	A <sub>2</sub>	A <sub>1</sub>	—	—	—	—	—	—	A <sub>3</sub> ; Y <sub>1</sub> ; Y <sub>2</sub> ; X <sub>1</sub> ; X <sub>2</sub> . 6-clip type.
8.1	A	Y <sub>1</sub>	F	X <sub>1</sub>	G	Y <sub>2</sub>	F	X <sub>2</sub>	—	—	—	—	— — — — — 8-pin spigot.
8.2	—	H	—	—	G	—	H	K	—	—	—	—	A — — — — — Int. Octal.
9.1	X <sub>1</sub>	Y <sub>1</sub>	A <sub>2</sub>	H,K	H	G	A <sub>1,3</sub>	X <sub>2</sub>	Y <sub>2</sub>	—	—	—	— — — — — Brit. 9-pin.
12.1	G	—	H,K	H	A <sub>1</sub>	A <sub>2</sub>	Coa	X <sub>2</sub>	—	A <sub>3</sub>	—	X <sub>1</sub>	Y <sub>1</sub> ; Y <sub>2</sub> . — — — — — 12-way S.C.
12.2	G	—	H,K	H	A <sub>1</sub>	A <sub>2</sub>	Coa	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	— — — — — 12-way S.C.
12.3	G	K	H	H	A <sub>1</sub>	A <sub>2</sub>	Coa	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	— — — — — 12-way S.C.
12.4	K	G	H	H	A <sub>2</sub>	—	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	—	— — — — — 12-pin Spigot.
12.5	K	G	H	H	—	A <sub>2</sub>	—	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	— — — — — 12-pin Spigot.
12.6	K	G	H	H	—	A <sub>2</sub>	A <sub>1</sub>	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	— — — — — 12-pin Spigot.
12.7	K	G	H	H	A <sub>1</sub>	A <sub>2</sub>	Coa	Y <sub>2</sub>	X <sub>2</sub>	A <sub>3</sub>	X <sub>1</sub>	Y <sub>1</sub>	— — — — — 12-way S.C.

SYMBOLS: G = Grid (Modulator); H = Heater; K = Cathode; Coa = Coating (Internal); X<sub>1</sub>, X<sub>2</sub>, Y<sub>1</sub>, Y<sub>2</sub> = X- and Y-axis deflector plates  
A<sub>1</sub> = 1st anode; A<sub>2</sub> = 2nd anode; A<sub>3</sub> = 3rd anode; A<sub>4</sub> = Splitter plate in double-beam tubes.  
The probable variations are: Coating and A<sub>1</sub> to A<sub>3</sub>, K to H, and X<sub>1</sub>, Y<sub>1</sub> to A<sub>3</sub>.