G.E.C. CATHODE RAY TUBES

DUAL TRACE OSCILLOSCOPE TUBE

1300S series

ISSUE 1

BRIEF DATA

A 13cm (5 in) diameter, flat faced, split beam dual trace oscilloscope tube with distributed p.d.a. and side connections to the deflector plates. This tube incorporates deflection blanking and is intended for use in general purpose dual trace oscilloscopes.

Final anode voltage (p.d.a.)	3.5	kV
Display area	6 × 10	cm
y Deflection factor (D_y)	< 11.25	V/cm
x Deflection factor (D_x)	< 16.5	V/cm

HEATER

V_h	6.3	V
I_h	0.3 (approx.)	A

RATINGS (Absolute)

	Max.	Min.	
V_{a4}	5.0	2.0	kV
V_{a3}	2.0	0.65	kV
Ratio (V_{a4}/V_{a3})	3.5	-	-
V_{a2}	1.5	-	kV
V_{a1}	1.2	0.55	kV
$-V_{g1}$	200	1	V
V_{g2-a1}	±200	-	V
V_{h-k} Cathode positive			
d.c.	200	-	V
pk.	300	-	V
Cathode negative			
d.c.	125	-	V
pk.	250	-	V
V_{y-a3}	250	-	V
V_{x-a3}	500	-	V
I_k	500	-	μA
R_{g1-k}	1.0	-	MΩ
R_{y-a3}	100	-	kΩ
R_{x-a3}	1.0	-	MΩ
R_{h-k}	100		kΩ

Voltage ratings are to cathode unless otherwise shown.

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SCREEN

Fluorescence :	Green	White	Blue
Phosphorescence :	Green	Yellowish-green	Blue
Persistence :	1-5ms	10-60s	1-5ms
E.I.A. phosphor code :	P31	P7	P11
G.E.C. phosphor code :	24	46	08

CAPACITANCES

C_k-all	5.0	pF
C_{g1}-all	9.0	pF
C_{g2}-all	7.5	pF
$C_{y1'}$-all	4.5	pF
$C_{y2'}$-all	5.0	pF
$C_{y1''}$-all	5.0	pF
$C_{y2''}$-all	4.5	pF
$C_{y1'}$-$y2'$	1.0	pF
$C_{y1''}$-$y2''$	1.0	pF
C_{x1}-all	6.0	pF
C_{x2}-all	6.0	pF
C_{x1}-$x2$	4.0	pF

EQUIPMENT DESIGN RANGE

	Max.	Min.	
V_{a2} (for focus)	200	100	V/kV_{a3}
$-V_{g1}$ (for cut-off)	95	40	V/kV_{a1}
$-V_{g3}$ (for blanking) (w.r.t. a_1)	45	-	V/kV_{a1}
Deflection factor D_y	11.25	9.0	$V/cm/kV_{a3}$
Deflection factor D_x	16.5	13.5	$V/cm/kV_{a3}$
V_{a3} (astigmatism correction)	±40		V/kV_{a3}
V_{s1} (pattern correction)	±80		V/kV_{a3}
p.d.a. spiral current	33		$\mu A/kV_{a3-a4}$

TYPICAL OPERATION (all operating potential are with respect to cathode)

V_{a4}	3.5	kV
V_{a3}	1.0	kV
V_{a2} (for focus)	100 - 200	V
V_{a1}	1.0	kV
$-V_{g1}$ (for cut-off)	40 - 95	V
V_{g2} (nom)	1.0	kV
V_{s1} (nom)	1.0	kV
D_y (max.)	11.25	V/cm
D_x (max.)	16.5	V/cm
*Line width	0.75	mm
" by shrinking raster	0.30 est	

*Measured by means of microscope at the geometric centre of the faceplate, at a total beam current of 10μA.

Minimum scanned area

x	10	cm
y (each beam)	6	cm
y (overlap)	5	cm

Beam Blanking

At 10μA total beam current (i.e. 5μA each beam) a potential of $45V/kV_{a3}$, negative with respect to a1, applied to the blanking electrode g2 will completely cut off both beams. This electrode should not be used as a brightness control.

Beam Equality

The brightness of the traces may be equalised at low level by means of a suitable horizontally orientated lateral magnetic field, applied in the region between grid (g1) and first anode (a1). A suitable magnet may be obtained from Electro Acoustic Industries Ltd. under Type No. BC 13.

Astigmatism Correction

Adjustment of the potential on a3 relative to the y deflector plate mean potential may be used for the purpose of astigmatism correction. A range of adjustment of ±40 V/kVa3 should be allowed for this purpose.

Pattern Correction

Barrel or pincushion distortion may be minimised by the application of the appropriate potential on s1 relative to the x plate mean potential. A range of adjustment of ±80 V/kVa3 should be allowed for this purpose.

DISPLAY CHARACTERISTICS

Pattern Distortion

For both beams simultaneously with no pattern correction applied, the edges of each test raster will lie between two concentric rectangles of 100mm × 60mm and 97.3mm × 58mm. The concentric rectangles are centred about the geometric vertical axis of the screen and 5mm above the geometric horizontal axis to accommodate the y' test raster and 5mm below the axis to accommodate the y" test raster. The angle between x and y axes (each beam) will be 90°± 1°, and the angle between the two y axes (beams superimposed) will be 0°±1.5°.

Deflection linearity

The deflection factor for a deflection of less than 75% of the useful scan will not differ from that for a deflection of 25% by more than 2%.

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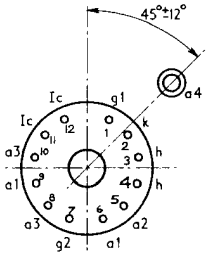
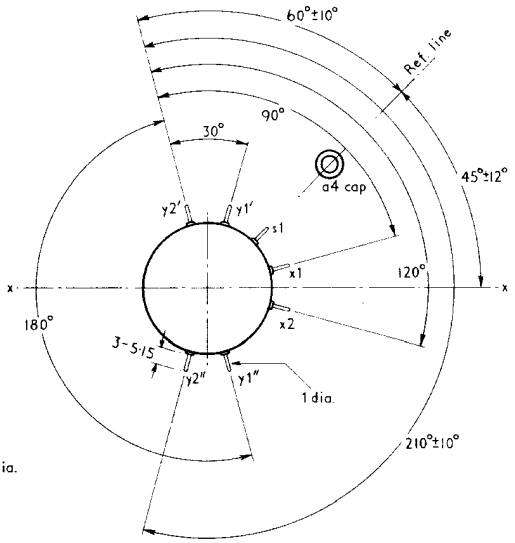
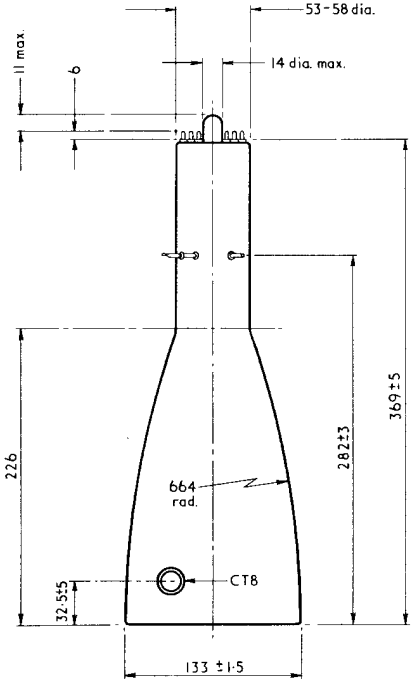
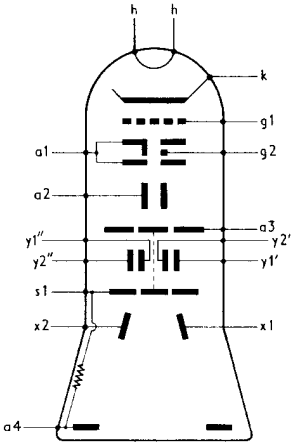


B12F base



View looking onto neck pins from base





904

All dimensions are in millimetres

Printed in England

Spot Position

The focused and undeflected spots will fall within a rectangle 1.2cm × 2.0cm centred at the geometric centre of the faceplate, the greater dimension being aligned in the x axis. The maximum displacement between the spots in the y direction will be 5mm.

Orientation

Looking at the screen with pins 1 and 12 uppermost, a positive potential applied to x_1 will deflect the beam to the left and a positive potential applied to y_1' or y_1'' will deflect the appropriate beam upwards.

MOUNTING

The tube may be mounted in any position but should not be supported by the base alone. It should preferably be held in a suitable rubber mask at the screen and by a clamp around the magnetic shield near the base. The socket should have sufficient freedom of movement to accommodate the maximum overall tube length and base orientation tolerances.

SE CONNECTIONS

Base: B12F

Pin 1:	gl	Pin 7:	g2 (blanking)
2:	k	8:	a3
3:	h	9:	al
4:	h	10:	a3
5:	a2 (focus)	11:	IC
6:	al	12:	IC

Side contact: (CT8): a4

Side pin connections as viewed from the base and reading clockwise from base pin 12:-

y2' y1' s1 (astigmatism) x1 x2 y1" y2"

NOTE: External connection should be made between pin 8 and pin 10 and between pin 6 and pin 9.

WEIGHT

The weight of the tube alone is 2.1/8lb (0.97kg).

ACCESSORIES

Part	Manufacturer	Type No
Base sockets	Carr Fastener	77/
CT8 connector	" "	77/699
Side pin connector	A.E.I. Harwin.	WS1 W3000
Magnetic shield	Magnetic Shields Ltd.	
Beam equalising magnet	Electro-Acoustic Industries Ltd.	BC 13