INSTRUMENT CATHODE-RAY TUBE

14 cm diagonal, rectangular flat-faced oscilloscope tube with mesh and metal backed screen. The tube has side connections to the x- and y-plates, and is intended for use in transistorized oscilloscopes up to a frequency of 50 MHz.

QUICK REFERENCE DATA			
Final accelerator voltage	$V_{g8(\ell)}$	10	kV
Display area		100 x 80	mm^2
Deflection coefficient, horizontal	M_x	15.5	V/cm
vertical	M_y	4.2	V/cm

Blue Binder, Tab 4

SCREEN : Metal backed phosphor

	Colour	Persistence
D14-121GH	green	medium short
D14-120GM	pusplish blue	long
D14-120GP	bluish green	medium short

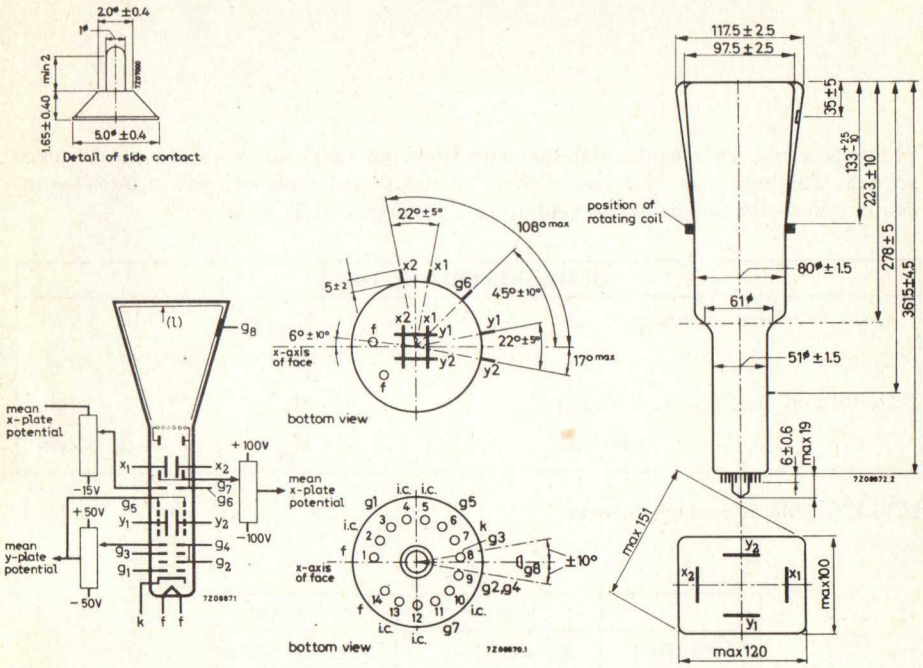
Useful screen dimensions	min.	100 x 80	mm^2
Useful scan at $V_{g8(\ell)}/V_{g2,g4} = 6.7$,			
horizontal	min.	100	mm
vertical	min.	80	mm
Spot eccentricity in horizontal and vertical directions		6	mm

→ **HEATING:** Indirect by A.C. or D.C.; parallel supply

Heater voltage	V_f	6.3	V
Heater current	I_f	300	mA

MECHANICAL DATA

Dimensions in mm



Mounting position: any

The tube should not be supported by the base alone and under no circumstances should the socket be allowed to support the tube.

Dimensions and connections

See also outline drawing

Overall length (socket included)	max.	385	mm
Face dimensions	max.	100 x 120	mm^2
Net weight	approx.	900	g
Base		14 pin, all glass	

Accessories

Socket (supplied with tube)	type 55566
Final-accelerator contact connector	type 55563
Mu-metal shield	type 55581A

CAPACITANCES

x_1 to all other elements except x_2	$C_{x_1(x_2)}$	5.5	pF
x_2 to all other elements except x_1	$C_{x_2(x_1)}$	5.5	pF
y_1 to all other elements except y_2	$C_{y_1(y_2)}$	4	pF
y_2 to all other elements except y_1	$C_{y_2(y_1)}$	4	pF
x_1 to x_2	$C_{x_1x_2}$	2.2	pF
y_1 to y_2	$C_{y_1y_2}$	1.7	pF
Control grid to all other elements	C_{g_1}	5.5	pF
Cathode to all other elements	C_k	4.5	pF

FOCUSING Electrostatic

DEFLECTION Double electrostatic

x-plates symmetrical

y-plates symmetrical

If use is made ot the full deflection capabilities of the tube the deflection plates will intercept part of the electron beam; hence a low impedance deflection plate drive is desirable.

Angle between x and y traces 90 ± 1^o

Angle between x trace and the horizontal axis of the face max. 5^o [1])

LINE WIDTH

Mearured with the shrinking raster method under typical operating conditions, adjusted for optimum spot size at a beam current $I_\ell = 10\ \mu A$.

Line width screen centre	l.w.	0.40	mm
over the whole screen area	l.w.	av. < 0.45	mm

[1]) See page 5

TYPICAL OPERATING CONDITIONS

Final accelerator voltage	$V_{g_8(\ell)}$		10	kV
Geometry-control electrode voltage	V_{g_7}		1500 ± 100	V [2]
Post deflection and interplate shield voltage	V_{g_6}		1500	V
Background illumination control voltage	ΔV_{g_6}		0 to -15	V [2]
Deflection plate shield voltage	V_{g_5}		1500	V [3]
Focusing electrode voltage	V_{g_3}		250 to 350	V
First accelerator voltage	V_{g_2,g_4}		1500	V
Astigmatism control voltage	$\Delta V_{g_2,g_4}$		±50	V [4]
Control grid voltage for extinction of focused spot	V_{g_1}		-20 to -60	V
Grid drive for 10 μA screen current			approx. 12	V
Deflection coefficient, horizontal	M_x	av.	15.5	V/cm
		max.	16	V/cm
vertical	M_y	av.	4.2	V/cm
		max.	4.6	V/cm
Deviation of linearity of deflection		max.	2	% [5]
Geometry distortion			See note 6	
Useful scan, horizontal		min.	100	mm
vertical		min.	80	mm

LIMITING VALUES (Absolute max. rating system)

Final accelerator voltage	$V_{g_8(\ell)}$	max.	11	kV
		min.	9	kV
Post deflection and interplate shield voltage and geometry control electrode voltage	V_{g_7}, V_{g_6}	max.	2200	V
Deflection plate shield voltage	V_{g_5}	max.	2200	V
Focusing electrode voltage	V_{g_3}	max.	2200	V
First accelerator and astigmatism control electrode voltage	V_{g_2,g_4}	max.	2200	V
		min.	1350	V
Control grid voltage	$-V_{g_1}$	max.	200	V
		min.	0	V
Cathode to heater voltage	V_{kf}	max.	125	V
	$-V_{kf}$	max.	125	V
Voltage between astigmatism control electrode and any deflection plate	$V_{g_4/x}$	max.	500	V
	$V_{g_4/y}$	max.	500	V
Grid drive, average		max.	20	V
Screen dissipation	W_ℓ	max.	3	mW/cm²
Ratio $V_{g_8(\ell)}/V_{g_2,g_4}$	$V_{g_8(\ell)}/V_{g_2,g_4}$	max.	6.7	

For notes see page 5

D14-121..

Notes

1) In order to align the x-trace with the horizontal axis of the screen, the whole picture can be rotated by means of a rotation coil. This coil will have 50 amp. turns for the indicated max. rotation of 5° and should be positioned as indicated on the drawing.

2) This tube is designed for optimum performance when operating at a ratio $V_{g_8(\ell)}/V_{g_2,g_4} \leq 6.7$.
The geometry control voltage V_{g_7} should be adjusted within the indicated range (values with respect to the mean x-plate potential).
A negative control voltage on g_6 (with respect to the mean x-plate potential) will cause some pincushion distortion and less background light.
By the use of the two voltages, V_{g_6} and V_{g_7}, it is possible to find the best compromise between background light and raster distortion.

3) The deflection plate shield voltage should be equal to the mean y-plate potential. The mean x- and y-plate potentials should be equal for optimum spot quality.

4) The astigmatism control electrode voltage should be adjusted for optimum spot shape. For any necessary adjustment its potential will be within the stated range.

5) The sensitivity at a deflection of less than 75% of the useful scan will not differ from the sensitivity at a deflection of 25% of the useful scan by more than the indicated value.

6) A graticule, consisting of concentric rectangles of 95 mm x 75 mm and 93 mm x 73.6 mm is aligned with the electrical x axis of the tube. With optimum correction potentials applied a raster will fall between these rectangles.

INSTRUMENT CATHODE-RAY TUBE

development sample data

14 cm diagonal, rectangular flat-faced oscilloscope tube with mesh and metal backed screen. The tube has side connections to the x- and y-plates, and is intended for use in transistorized oscilloscopes up to a frequency of 50 MHz.

QUICK REFERENCE DATA			
Final accelerator voltage	$V_{g_8(\ell)}$	10	kV
Display area		100 x 80	mm^2
Deflection factor, horizontal	M_x	15.5	V/cm
vertical	M_y	4.2	V/cm

SCREEN : Metal backed phosphor

	Colour	Persistence
D14-121GH	green	medium short

Useful screen dimensions min. 100 x 80 mm^2

Useful scan at $V_{g_8(\ell)}/V_{g_2,g_4} = 6.7$,

horizontal min. 100 mm

vertical min. 80 mm

Spot eccentricity in horizontal and vertical directions. 6 mm

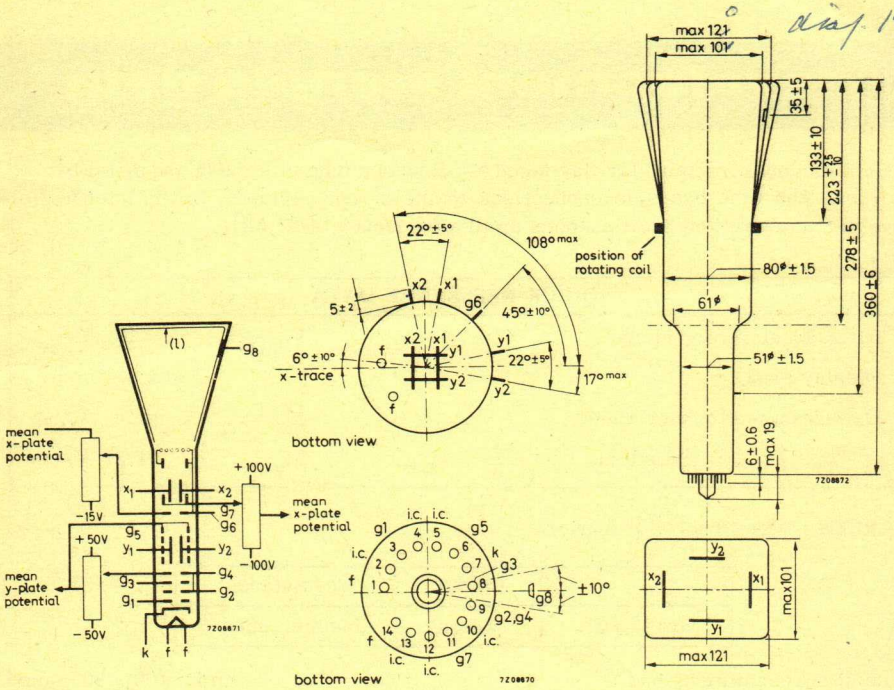
HEATING: Indirect by A.C. or D.C.; parallel supply

Heater voltage	V_f	6.3	V
Heater current	I_f	300	mA

These data, based on the specifications and measured performance of development samples, afford a preliminary indication of the characteristics to be expected of the described product. Distribution of development samples implies no guarantee as to the subsequent availability of the product

MECHANICAL DATA

Dimensions in mm



Mounting position: any

The tube should not be supported by the base alone and under no circumstances should the socket be allowed to support the tube.

Dimensions and connections

See also outline drawing

Overall length (socket included)	max. 385	mm
Face dimensions	max. 101 x 121	mm^2
Net weight	approx. 900	g
Base	14 pin, all glass	

Accessories

Socket (supplied with tube)	type 55566
Final-accelerator contact connector	type 55563
Mu-metal shield	type 55581A

CAPACITANCES

x_1 to all other elements except x_2	$C_{x_1(x_2)}$	5.5	pF
x_2 to all other elements except x_1	$C_{x_2(x_1)}$	5.5	pF
y_1 to all other elements except y_2	$C_{y_1(y_2)}$	4	pF
y_2 to all other elements except y_1	$C_{y_2(y_1)}$	4	pF
x_1 to x_2	$C_{x_1x_2}$	2.5	pF
y_1 to y_2	$C_{y_1y_2}$	2	pF
Control grid to all other elements	C_{g_1}	6	pF
Cathode to all other elements	C_k	5	pF

FOCUSING Electrostatic

DEFLECTION Double electrostatic

x-plates symmetrical

y-plates symmetrical

If use is made of the full deflection capabilities of the tube the deflection plates will intercept part of the electron beam; hence a low impedance deflection plate drive is desirable.

Angle between x and y traces 90 ± 1^o

Angle between x trace and the horizontal axis of the face max. 5^o [1])

LINE WIDTH

Measured with the shrinking raster method in the centre of the screen under typical operating conditions, adjusted for optimum spot size at a beam current I_f = 10 μA.

Line width l.w. approx. 0.40 mm

[1]) See page 5

TYPICAL OPERATING CONDITIONS

Final accelerator voltage	$V_{g8(\ell)}$		10	kV
Geometry-control electrode voltage	V_{g7}		1500 ± 100	V 2)
Post deflection and interplate shield voltage	V_{g6}		1500	V
Background illumination control voltage	ΔV_{g6}		0 to 15	V 2)
Deflection plate shield voltage	V_{g5}		1500	V 3)
Focusing electrode voltage	V_{g3}	approx.	310	V
First accelerator voltage	$V_{g2,g4}$		1500	V
Astigmatism control voltage	$\Delta V_{g2,g4}$		±50	V 4)
Control grid voltage for extinction of focused spot	V_{g1}	approx.	-60	V
Deflection factor, horizontal	M_x	approx.	15.5	V/cm
vertical	M_y	approx.	4.2	V/cm
Useful scan, horizontal		min.	100	mm
vertical		min.	80	mm

LIMITING VALUES (Absolute max. rating system)

Final accelerator voltage	$V_{g8(\ell)}$	max.	11	kV
		min.	9	kV
Post deflection and interplate shield voltage and geometry control electrode voltage	V_{g7}, V_{g6}	max.	2200	V
Deflection plate shield voltage	V_{g5}	max.	2200	V
Focusing electrode voltage	V_{g3}	max.	2200	V
First accelerator and astigmatism control electrode voltage	$V_{g2,g4}$	max.	2200	V
		min.	1350	V
Control grid voltage	$-V_{g1}$	max.	200	V
		min.	0	V
Cathode to heater voltage	V_{kf}	max.	125	V
	$-V_{kf}$	max.	125	V
Voltage between astigmatism control electrode and any deflection plate	$V_{g4/x}$	max.	500	V
	$V_{g4/y}$	max.	500	V
Grid drive, average		max.	20	V
Screen dissipation	W_ℓ	max.	3	mW/cm^2
Ratio $V_{g8(\ell)}/V_{g2,g4}$	$V_{g8(\ell)}/V_{g2,g4}$	max.	6.7	

For notes see page 5

Notes

1) In order to align the x-trace with the horizontal axis of the screen, the whole picture can be rotated by means of a rotation coil. This coil will have 50 amp. turns for the indicated max. rotation of 5^{o} and should be positioned as indicated on the drawing.

2) This tube is designed for optimum performance when operating at a ratio $V_{g8(\ell)}/V_{g_2,g_4} \leq 6.7$.
The geometry control voltage V_{g_7} should be adjusted within the indicated range (values with respect to the mean x-plate potential).
A negative control voltage on g_6 (with respect to the mean x-plate potential) will cause some pincushion distortion and less background light.
By the use of the two voltages, V_{g_6} and V_{g_7}, it is possible to find the best compromise between background light and raster distortion.

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4) The astigmatism control electrode voltage should be adjusted for optimum spot shape. For any necessary adjustment its potential will be within the stated range.

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