CRT DATA

T5650

1-15-65

DESCRIPTION

The T5650 is an aluminized, 5-inch, flat-faced, dual gun cathode ray tube designed for oscilloscope use. The T5650 has electrostatic focus and deflection. It is available either with or without a lighted internal graticule.

ELECTRICAL DATA[1]

Focusing method	Electrostatic
Deflecting method	Electrostatic
Direct interelectrode capacitance, approximate:	
Cathode to all other electrodes	4.7 pf
Grid no. 1 to all other electrodes	5.8 pf
D1 to D2	2.5 pf
D3 to D4	1.2 pf
D1A to all other electrodes	6.3 pf
D2A to all other electrodes	6.9 pf
D1B to all other electrodes	6.9 pf
D2B to all other electrodes	6.3 pf
D3 to all other electrodes	3.1 pf
D4 to all other electrodes	3.1 pf
B2 to all other electrodes	8.2 pf

MECHANICAL DATA

Overall length[2]	18-15/16 ±3/16 inches
Greatest bulb diameter[3]	5-1/4 ±1/16 inches
Minimum useful screen diameter	4-1/2 inches
Bulb number	J42ZE1A
Base	B14-38
Basing	Special
Base alignment:	
Base keyway aligns with D3-D4 trace	±10°
Positive voltage on D1 deflects beam approximately toward pin no. 4	
Positive voltage on D3 deflects beam approximately toward pin no. 1	
Angle between D1-D2 and D3-D4 trace	90° ±1°
Gun to graticule alignment[2]	±3°

RATINGS (absolute maximum values)[4]

Heater voltage	6.3 volts ac
Heater current at 6.3 volts (A and B guns together)	1.2 ±10% amp
Screen voltage	5000 volts dc max
Intergun shield voltage	5000 volts dc max
Isolation shield voltage	5000 volts dc max
Average deflection plate voltage	5000 volts dc max

Astigmatism electrode voltage	5000 volts dc max
Focusing electrode voltage	3000 volts dc max
Accelerator voltage	5000 volts dc max
B2 blanking plate voltage	5000 volts dc max
Accelerator input	8 watts max
Grid no. 1 voltage:	
Negative-bias value	150 volts dc max
Positive-bias value	0 volts dc max
Positive-peak value	2 volts dc max
Peak heater-cathode voltage:	
Heater negative to cathode:	
During warm-up period not to exceed 15 seconds	180 volts dc max
After equipment warm-up period	125 volts dc max
Heater positive to cathode	125 volts dc max
Peak voltage between astigmatism and/or any deflection electrode	500 volts dc max

TYPICAL OPERATING CONDITIONS[4]

Screen voltage[5]	4025 to 4200 volts dc
Intergun shield voltage[6]	4025 to 4200 volts dc
Isolation shield voltage[5]	4025 to 4200 volts dc
Average deflection plate voltage	4100 volts dc
Astigmatism electrode voltage[7]	3900 to 4200 volts dc
Focusing electrode voltage[7]	700 to 1200 volts dc
Accelerator and B1 blanking plate voltage	4025 volts dc
Grid no. 1 voltage[8]	-60 to -90 volts dc
Deflection factors:	
D1 and D2	22.2 to 24.6 volts dc/cm
D3 and D4	17.6 to 19.4 volts dc/cm
Useful scan D1-D2[9]	10 cm
Useful scan D3-D4[9]	8 cm
Blanking plate voltage (B1-B2)	
For visual cut-off at I_k = 200 μa	±100 volts dc max
Focusing electrode current for any operating condition	-10 μa to +10 μa
Spot position (undeflected)[10]	5 mm from geometric center
Pattern distortion at 100% useful scan[11]	1.3% max

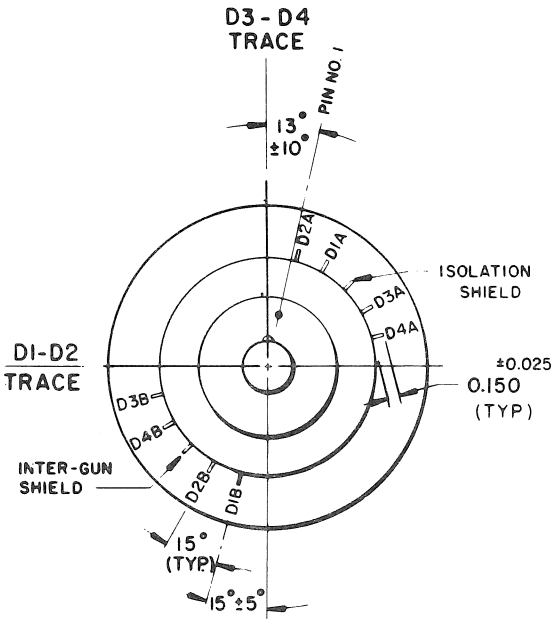
MAXIMUM CIRCUIT VALUES

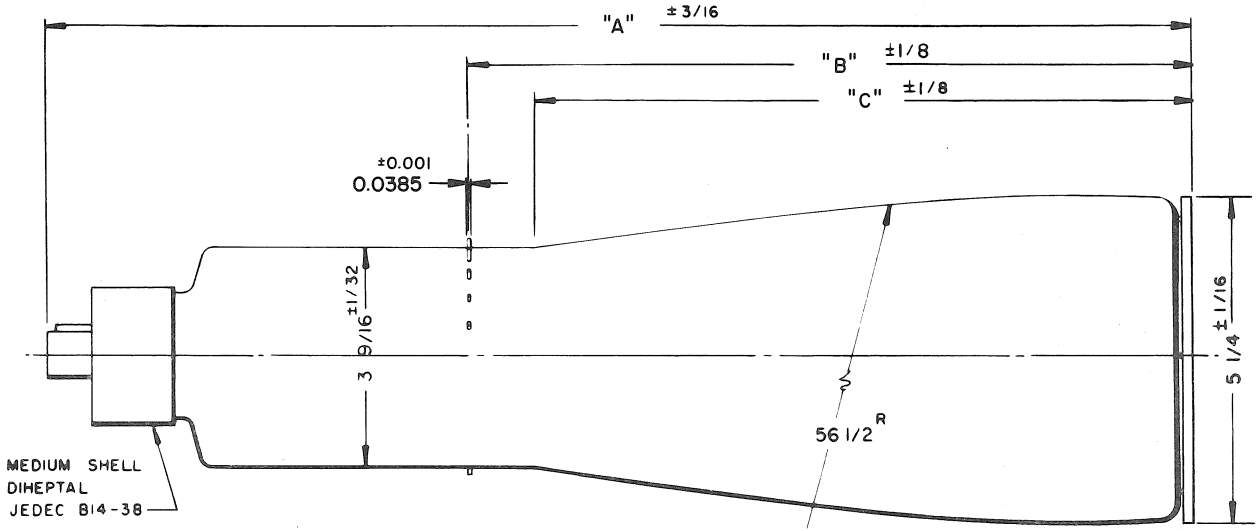
Grid no. 1 circuit resistance	1.5 MΩ max

NOTES

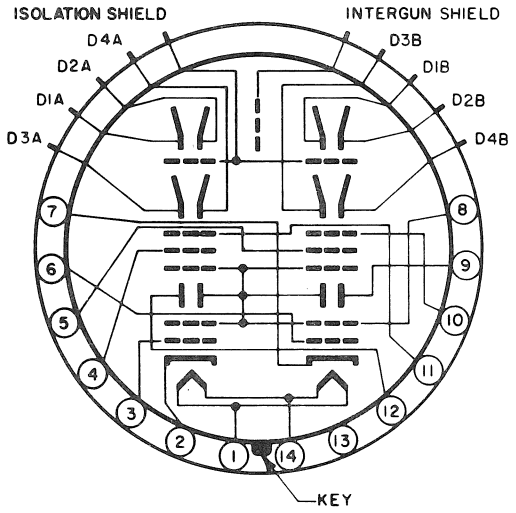
1. Data applies to A and B guns separately unless otherwise stated.
2. Internal graticule tubes only. See outline drawing.
3. Not including graticule lighting hardware. See outline drawing.
4. All voltages taken with respect to cathode.

5. The isolation shield and the conductive wall coating are connected internally. This adjustment controls the geometry of the display at the outer edges of the display.
6. Adjustment of this potential controls the geometry of the display at the center of the tube.
7. Recommended range. Adjust for best overall focus.
8. Visual extinction of undeflected spot.
9. The deflection plates intercept part of the electron beam near the edge of scan; therefore, a low-impedance deflection drive is desirable.
10. Connect free deflection electrodes to accelerator. Horizontal scan is centered about the geometrical center of the tube. Vertical scan is offset 1 cm from geometrical tube center giving 2 cm total separation between A and B guns.
11. With a 8 x 10 cm rectangular raster centered about the electrical center of each gun, the raster edges will not deviate from straight parallel lines by more than 1 mm total on the left and right edges, nor by more than 1 mm total at the top and bottom.





TYPE	"A"	"B"	"C"
T5650-1 INT. GRATICULE	18 15/16	11 7/8	10 13/16
T5650 NON INT. GRATICULE	18 3/4	11 11/16	10 5/8



TUBE SCHEMATIC

BASE CONNECTIONS

1, 14	HEATER - COMMON
2	CATHODE - "A"
3	GRID NO. 1 "A"
4	FOCUSING ELECTRODE "A"
5	FOCUSING ELECTRODE "B"
6	GRID NO 1 "B"
7	CATHODE - "B"
8	COMMON ACCELERATOR B 1 BLANKING PLATE RETURN
9	B2 BLANKING PLATE "B"
10	ASTIGMATISM ELECTRODE "B"
11	ASTIGMATISM ELECTRODE "A"
12	B2 BLANKING PLATE "A"
13	N C

MARK	DATE	DESCRIPTION	BY	APPR

CATHODE-RAY TUBE DIVISION
TEKTRONIX, INC.
PORTLAND, OREGON, U.S.A.

TUBE TYPE: T5650, 5650-1

DATE: 10-29-64

MOD. B