



CRT DATA

T5191

Revision C

1-15-65

DESCRIPTION

The T5191 is an aluminized, 5-inch, flat-faced cathode-ray tube designed for oscilloscope use. The T5191 has electrostatic focus and deflection, and a helical post accelerator.

ELECTRICAL DATA

Focusing method	Electrostatic
Deflecting method	Electrostatic
Direct interelectrode capacitance, approximate:	
Cathode to all other electrodes	4.4 pf
Grid no. 1 to all other electrodes	10.8 pf
D1 to D2	2.7 pf
D1 to all other electrodes	7.0 pf
D2 to all other electrodes	7.0 pf
Vertical deflector	
Characteristic impedance	125 Ω \pm 5 Ω
CRT risetime less than	0.35 nsec
Typical signal delay thorough deflector	2 nsec
Internal signal bypass capacitor (D4 vertical position electrode to D4 signal ground)	2500 pf min 3700 pf typical
Post-accelerator helix resistance	200 M Ω min

MECHANICAL DATA

Overall length ¹	22.697 \pm 0.032 inches
Greatest bulb diameter ^{1,2}	5.500 \pm 0.016 inches
Neck pin diameter	0.0385 \pm 0.001 inches
Minimum useful screen dimensions:	
Width	2.360 inches
Height	0.787 inches
Bulb number	Special
Bulb contact	J1-21
Base	Special
Basing	Special
Base alignment:	
Pin no. 2 aligns with D1-D2 trace	\pm 2 $^\circ$
Positive voltage on D1 deflects beam approximately toward pin no. 9	
Positive voltage on D3 deflects beam approximately toward pin no. 6	
Angle between D1-D2 and D3-D4 trace	90 $^\circ$ \pm 1 $^\circ$

RATINGS (absolute maximum values)³

Heater voltage	6.3 volts ac
Heater current at 6.3 volts	0.6 ±10% amp
Post-accelerator voltage	25000 volts dc max
Lower helix voltage	4500 volts dc max
D4 signal ground voltage	4500 volts dc max
Average horizontal deflection plate voltage	4500 volts dc max
Ratio of post-accelerator voltage to average voltage of deflection plates ⁴	6 max
Astigmatism electrode voltage	4500 volts dc max
Focusing electrode voltage	2500 volts dc max
Accelerator voltage	4500 volts dc max
Accelerator input	6 watts max
Grid no. 1 voltage:	
Negative-bias value	200 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 electrodes:	
Between isolation shield and any deflection electrode	500 volts dc max
D1 to D2	500 volts dc max
D3 to D4 (position)	200 volts dc max
D3 to D4 (signal ground)	200 volts dc max
D4 (position) to D4 (ground)	100 volts dc max
D1-D2 plates to lower helix	500 volts dc max
Between astigmatism and any deflection electrode ...	500 volts dc max

TYPICAL OPERATING CONDITIONS³

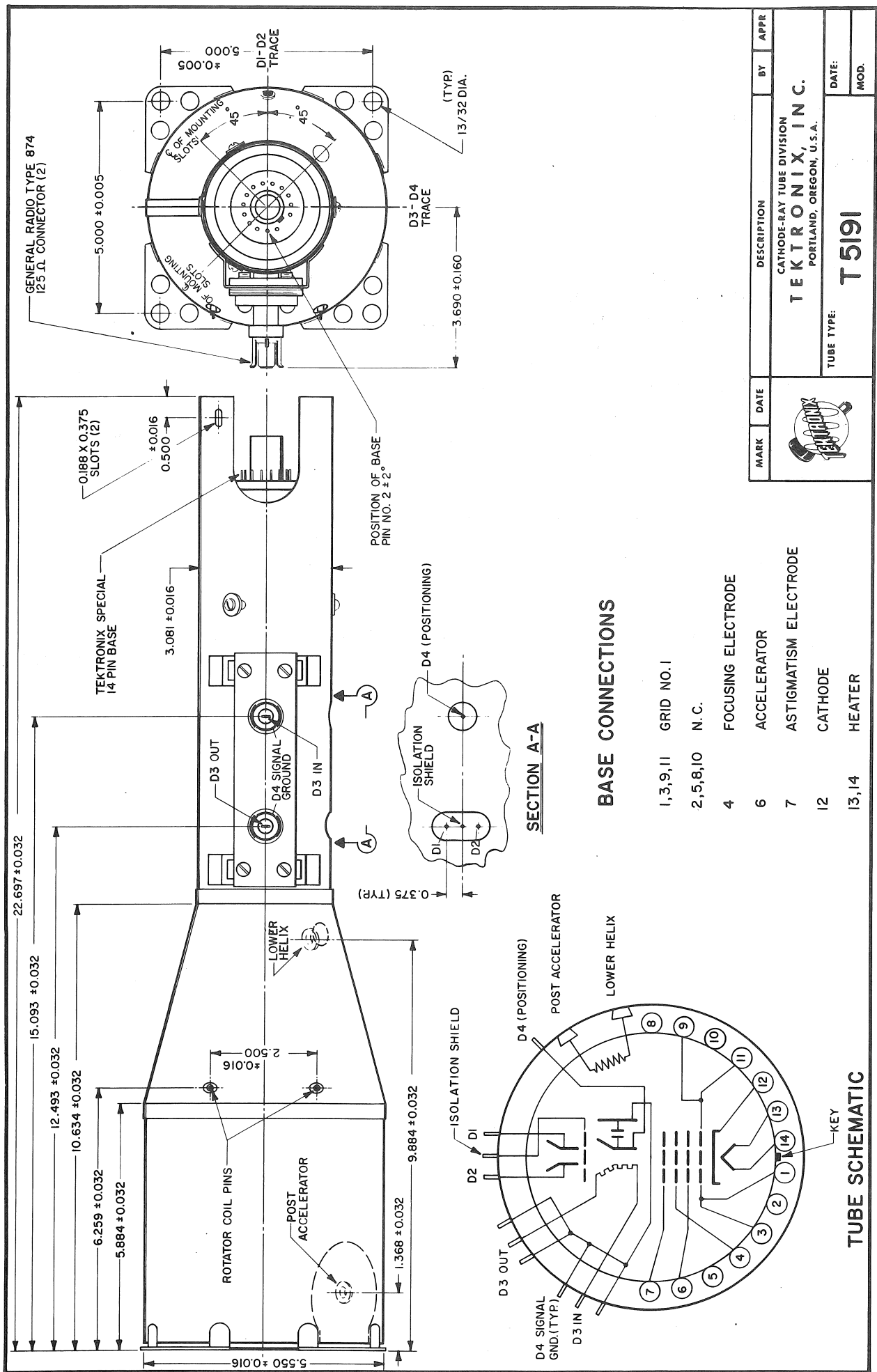
Post-accelerator voltage	24110 volts dc
Lower helix voltage ⁵	3885 to 4335 volts dc
D4 signal ground voltage ⁶	4110 volts dc
Average horizontal deflection plate voltage	4110 volts dc
Astigmatism electrode voltage ⁷	3885 to 4335 volts dc
Focusing electrode voltage ⁷	500 to 1900 volts dc
Accelerator voltage ⁶	4110 volts dc
Grid no. 1 voltage ⁸	-80 to -100 volts dc
Deflection factors:	
D1 and D2	32 to 38 volts dc/cm
D3 and D4	8 to 10 volts dc/cm
Useful scan D1-D2 ⁹	6 cm
Useful scan D3-D4	2 cm
Focusing electrode current for any operating condition	-10 µa to +10 µa
Spot position (undeflected) ¹⁰	3 mm from geometric center
Pattern distortion at 100% useful scan ¹¹	2% max

MAXIMUM CIRCUIT VALUES

Grid no. 1 circuit resistance 1.5 M Ω max

NOTES

1. Including the magnetic shield. See outline drawing.
2. Not including mounting hardware. See outline drawing.
3. All voltages taken with respect to cathode except as noted. Includes 110 volt unblanking pulse on cathode.
4. This tube is designed for optimum performance when operating at a ratio of 6. Operation at other ratios may result in changes in deflection uniformity, pattern distortion, and/or useful scan.
5. Pattern distortion is minimized by proper adjustment of this potential.
6. This voltage provides the recommended compromise between overshoot and minimum risetime.
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.
11. With a 2 x 6 cm rectangular raster centered on the face of the tube, the raster edges will not deviate from straight parallel lines by more than 0.4 mm total on the left and right edges, nor by more than 0.4 mm total at the top and bottom.



MARK	DATE	DESCRIPTION	BY	APPR
		CATHODE-RAY TUBE DIVISION TEKTRONIX, INC. PORTLAND, OREGON, U.S.A.		
		TUBE TYPE: T 5191		
			DATE:	MOD.