



ELECTRON TUBE DEPARTMENT ■ COMPONENTS DIVISION
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION, CLIFTON, NEW JERSEY

FW-227
IATRON *

T E N T A T I V E

DESCRIPTION:

THE FW-227 IS A 4 INCH IATRON (DIRECT VIEW STORAGE CATHODE-RAY TUBE) THAT PRODUCES A BRIGHT VISUAL DISPLAY OF ELECTRICALLY STORED INFORMATION.

THE TUBE INCORPORATES TWO WRITING GUNS, WHICH ARE ELECTROSTATICALLY FOCUSED AND DEFLECTED. THE TUBE DISPLAYS BRIGHT IMAGES ESPECIALLY SUITABLE FOR PHOTOGRAPHIC PURPOSES BECAUSE OF THE BLUE P-11 PHOSPHOR. THE ABILITY TO WRITE, STORE, AND ERASE INFORMATION AT WILL ARE FEATURES OF THE TUBE. GREY SHADES ARE PRODUCED IN ACCORDANCE WITH AMPLITUDE VARIATIONS OF THE INPUT SIGNALS. THE TUBE HAS THREE ELECTRON GUNS, TWO IDENTICAL WRITING GUNS, WHICH WRITE INPUT SIGNALS ON AN INSULATOR STORAGE MESH, AND A FLOOD GUN WHICH ILLUMINATES THE PHOSPHOR IN ACCORDANCE WITH THE STORED SIGNAL.

GENERAL:

DIMENSIONS

NOMINAL TUBE DIAMETER

MINIMUM USEFUL DISPLAY DIAMETER

PHOSPHOR

OPERATION POSITION

WEIGHT

CATHODE PRE-HEATING TIME

FOCUS METHOD

DEFLECTION METHOD

SEE OUTLINE ATTACHED

4 INCHES

3 INCHES

P-11 ALUMINIZED

ANY

2.8 POUNDS

30 SECONDS

ELECTROSTATIC

ELECTROSTATIC

MAXIMUM RATINGS:

FLOOD SECTION

VIEWING SCREEN

10 KV

BACKING ELECTRODE

25 V

COLLECTOR

250 V

ANODE #4

150 V

ANODE #3

150 V

ANODE #2

150 V

ANODE #1

80 V

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WRITE SECTION - EACH GUN

GRID #3	500 V	RESPECT WRITE CATHODE
GRID #2	150 V	RESPECT WRITE CATHODE
GRID #1	-150 V	RESPECT WRITE CATHODE
CATHODE	-1100 V	
PEAK VOLTAGE BETWEEN GRID #2 AND ANY DEFLECTING ELECTRODE OF CORRESPONDING GUN	$\pm$ 500 V	
HEATER-CATHODE VOLTAGE	$\pm$ 125 V	

TYPICAL OPERATING VALUES:

FLOOD SECTION

VIEWING SCREEN	4 KV	DC	1.2 MA	MAXIMUM
BACKING ELECTRODE	$\pm$ 10 VDC			
COLLECTOR	$\pm$ 180 VDC		2.0 MA	MAXIMUM
ANODE #4	$\pm$ 90 VDC		300 UA	MAXIMUM
ANODE #3	$\pm$ 20 VDC		500 UA	MAXIMUM
ANODE #2	$\pm$ 30 VDC		1.5 MA	MAXIMUM
ANODE #1	$\pm$ 60 VDC		2.0 MA	MAXIMUM
CATHODE	0 V		4.5 MA	MAXIMUM
HEATERS	6.3 V	AC OR DC	1.4 A	

WRITE SECTION - EACH GUN

HEATER	6.3 V	AC OR DC	.6 A
CATHODE	-1000 VDC		1 MA
GRID #1 (CUTOFF - NOTE 1)	-70 VDC		RESPECT WRITE CATHODE
GRID #2			INTERNALLY CONNECTED TO ANODE #2
GRID #3 (FOCUS)	$\pm$ 150		RESPECT WRITE CATHODE
DEFLECTION SENSITIVITY	60		VOLTS PER INCH, APPROXIMATELY

RANGE OF OPERATING ADJUSTMENTS:

ANODE #2	$\pm$ 25 TO $\pm$ 50	VDC	ADJUST FOR BEST COLLIMATION
ANODE #3	$\pm$ 15 TO $\pm$ 40	VDC	ADJUST FOR BEST COLLIMATION
GRID #1 CUTOFF	-55 TO -110	VDC	RESPECT WRITE CATHODE, EACH GUN
GRID #3 FOCUS	$\pm$ 130 TO $\pm$ 330	VDC	RESPECT WRITE CATHODE, EACH GUN

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TYPICAL PERFORMANCE:

RESOLUTION (NOTE 2)	
10% OF FULL BRIGHTNESS	100 LINES PER INCH
50% OF FULL BRIGHTNESS	50 LINES PER INCH
BRIGHTNESS	200 FT. LAMBERTS
WRITING SPEED (EACH GUN)	
28 VOLTS DRIVE WRITING TO 180 FT. LAMBERTS	11000 INCHES PER SECOND
ERASE TIME	5 MILLISECONDS
VIEWING TIME	NO VISIBLE DEGRADATION OF A SIGNAL STORED AT 90% BRIGHTNESS FOR AT LEAST 1 SECOND WITH NO ERASE APPLIED.

ENVIRONMENTAL DATA:

HIGH TEMPERATURE	MIL-E-5272A PROCEDURE I
LOW TEMPERATURE	MIL-E-5272A PROCEDURE II
TEMPERATURE-SHOCK	MIL-E-5272A PROCEDURE I, EXCEPT HIGH TEMPERATURE TO BE 160°F AND LOW TEMPERATURE TO BE -65°F
ALTITUDE	70000 FT.
VIBRATION	6G 10-150 CPS 2G 150-500 CPS
SHOCK (3 AXES)	
OPERATING	15G FOR 32 MS, 18 IMPACTS
NON-OPERATING (CRASH SAFETY)	30G FOR 11 MS, 18 IMPACTS

NOTES:

1. VISUAL CUTOFF OF THE STATIONARY WRITING BEAM IS TO BE DETERMINED IN A DARKENED ROOM. THE WRITING BEAM SHOULD BE FOCUSED AND THE BACKING ELECTRODE VOLTAGE REDUCED TO -20 VOLTS.
2. RESOLUTION MEASURED BY THE SHRINKING RASTER METHOD AT THE CENTER OF THE VIEWING SCREEN.
3. ERASE TIME IS THE SHORTEST TIME THAT INFORMATION CAN BE REMOVED AFTER BEING STORED AT 100% BRIGHTNESS.

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SPECIAL PRECAUTIONS:

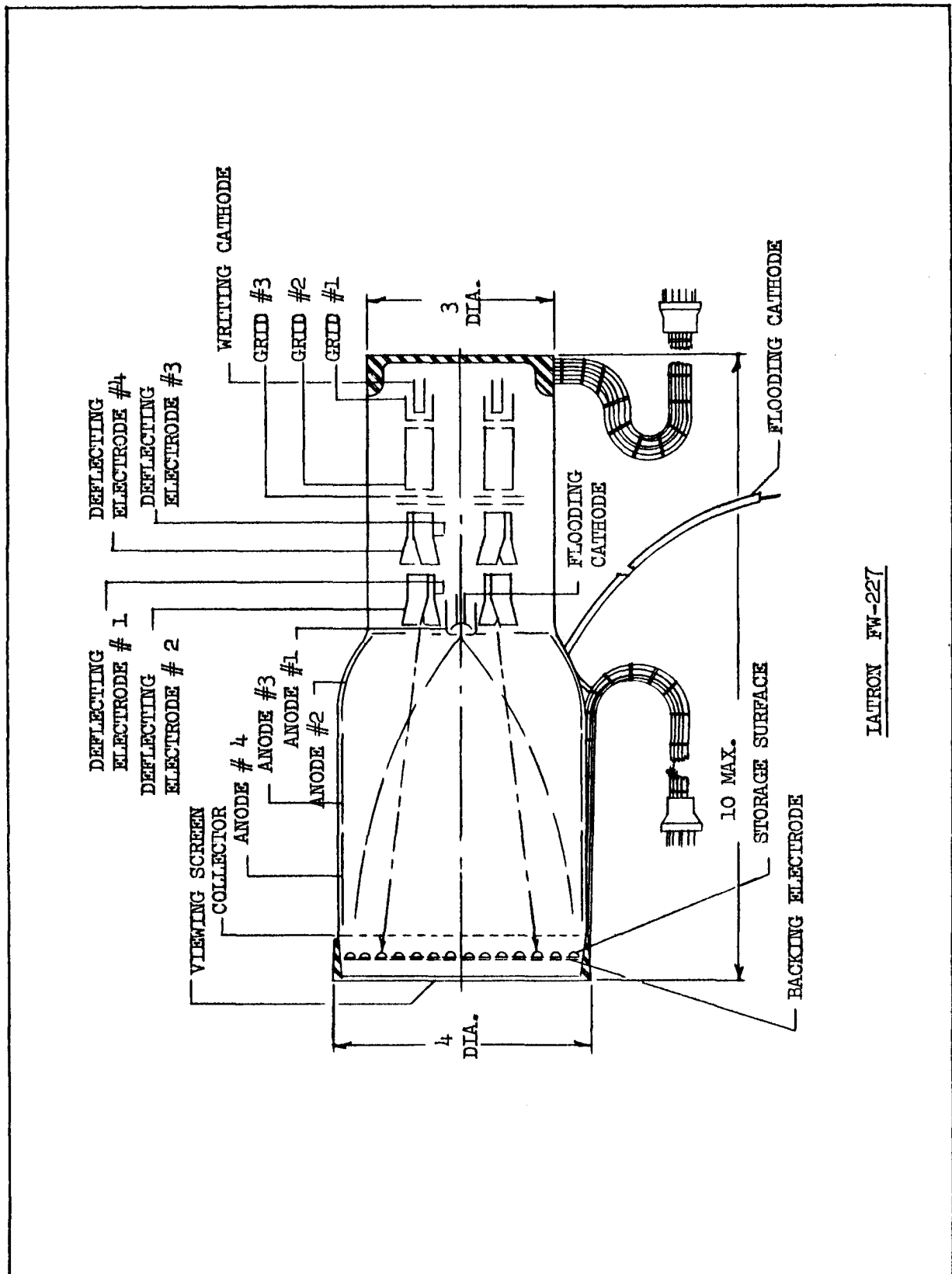
OBSERVE MAXIMUM RATINGS TO AVOID POSSIBLE DAMAGE TO THE TUBE. IN PARTICULAR THE VIEWING SCREEN VOLTAGE SHOULD BE LIMITED SO AS TO NEVER EXCEED 10 KV. THE FULL VOLTAGE SHOULD NOT BE APPLIED TO THE VIEWING SCREEN INSTANTANEOUSLY. AN ORDINARY RC FILTER AT THE OUTPUT OF THE POWER SUPPLY WILL PROVIDE ADEQUATE ASSURANCE THAT THE VOLTAGE BUILD UP WILL NOT BE TOO ABRUPT. THE VIEWING SCREEN POWER SUPPLY SHOULD HAVE A SERIES RESISTOR OF AT LEAST 1 MEG OHM.

REPEATED BOMBARDMENT WITH A HIGH CURRENT FOCUSED BEAM ON A SMALL AREA OF THE STORAGE SURFACE CAN BURN A DARK AREA INTO THE DISPLAY, WHICH MAY REMAIN FOR SEVERAL HOURS OR EVEN PERMANENTLY. THEREFORE, THE DEFLECTION VOLTAGES SHOULD BE APPLIED BEFORE OPERATING THE WRITING BEAM.

ADDITIONAL INFORMATION FOR SPECIFIC APPLICATIONS CAN BE OBTAINED FROM THE

ELECTRON TUBE APPLICATIONS SECTION
ITT COMPONENTS DIVISION
POST OFFICE BOX 412
CLIFTON, NEW JERSEY

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