

Display-Storage Tube

5-Inch Diameter

High Display Uniformity

Improved Collimation System Design

Typical Luminance of 1300 Footlamberts

For use in radar and other information-handling systems requiring bright non-flickering displays of stored information, including half-tones, for relatively long periods.

The 7183A is Directly Interchangeable with Type 7183.

GENERAL

	Writing Section	Viewing Section	
Heater, for Unipotential			
Cathode:			
Voltage (AC or DC)	6.3 ± 10%	6.3 ± 10%	V
Current at 6.3 volts	0.6	0.6	A
Cathode Heating Time			
(Minimum) before other electrode voltages are applied	—	60	s
Direct Interelectrode			
Capacitances:			
Grid No.1 to all other electrodes	7	—	pF
Cathode to all other electrodes	5	—	pF
Backplate to all other electrodes	—	100	pF
Focusing Method	Electro- static	—	
Deflection Method	Magnetic	—	
Phosphor.	—	P20, Aluminized	
Minimum Useful Viewing Diameter			4"
Maximum Overall Length			11.62"
Maximum Seated Length			11.25"
Maximum Diameter (Excluding Screen Connector Assembly)			5.06"
Bases:			
Writing Gun	Small-Button Neoditetrar 8-Pin (JEDEC No.E8-49)		
Viewing Gun	Small-Button Miniature 7-Pin (JEDEC No.E7-1)		
Bulb Terminals (Five)	Recessed Small Cavity (JEDEC No.J1-21)		

7183A

Screen Connector Assembly Aircraft-Marine
 Products, Inc.,^a Type LGH,
 Part No.832692^b, or equivalent

Operating Position Any

Weight (Approx.) 1-3/4 lb

ABSOLUTE MAXIMUM AND MINIMUM RATINGS

*All voltages are shown with respect to the cathode
 of the viewing gun unless otherwise specified*

	Minimum	Maximum	
Screen Voltage:			
Peak	0	10,000	V
DC	0	9,000	V
Backplate Voltage:			
Peak	0	30	V
DC	-30	10	V
Collector (Viewing-Grid- No.5) Voltage	180	300	V
Collimator (Viewing-Grid- No.4) Voltage	50	150	V
Viewing-Grid-No.3 Voltage, Writing-Grid-No.4 and Writing-Grid-No.2 Voltage ^d . .	10	150	V
Viewing-Grid-No.2 Voltage . . .	100	150	V
Viewing-Grid-No.1 Voltage . . .	0	-100	V
Viewing-Gun Heater-to- Cathode Voltage	-125	125	V
Writing-Grid-No.3 Voltage ^e . . .	0	1200	V
Writing-Grid-No.1 Voltage ^e . . .	-200	(f)	V
Writing-Gun Cathode Voltage . .	-2750	145	V
Writing-Gun Heater-to- Cathode Voltage	-125	125	V
Series Current-Limiting Resistor (Unbypassed) in Screen Circuit	1	-	MΩ
Series Current-Limiting Resistor (Unbypassed) in Collector (Viewing-Grid- No.5) Circuit	0.005	-	MΩ

RECOMMENDED OPERATING VALUES

*All voltages are shown with respect to the cathode
 of the viewing gun unless otherwise specified*

Screen Voltage	8500	V
Backplate Voltage ^g	0	V
Collector Voltage	250	V
Collimator Voltage ^h	40 to 115	V

Viewing-Grid-No.3 Voltage ^{d,h}	10 to 40	V
Viewing-Grid-No.2 Voltage	100	V
Viewing-Grid-No.1 Voltage ^h	-40 to 0	V
Writing-Grid-No.3 Voltage ⁱ	-1925 to -1675	V
Writing-Grid-No.1 Voltage	(f,k)	V
Writing-Gun Cathode Voltage	-2500	V

Circuit Values:

Grid-No.1 circuit resistance (Either gun)	1 max.	MΩ
Backplate-circuit resistance	0.005 max.	MΩ
Series current-limiting resistor (Unbypassed) in screen circuit	1	MΩ
Series current-limiting resistor (Unbypassed) in collector (Viewing-grid-No.5) circuit	0.01	MΩ

PERFORMANCE DATA AND CHARACTERISTICS

	Min.	Typ.	Max.	
Useful Viewing Diameter	4.0	—	—	in
Luminance (Brightness) ^m	—	1300	—	fL
Viewing Duration ⁿ	10	—	—	s
Erase Time ^p	—	35	200	ms
Erasing Uniformity Factor:				
For 4"-diameter area ^q	—	—	0.35	
Resolution ^r	50	—	—	lines/ in
Undelected Spot Position	—	—	(s)	
Screen Current ^m	—	300	750	μA
Viewing-Gun Grid-No.5 Current ^t	—	1.0	2.4	mA
Maximum Viewing-Gun Cathode Current ^u	—	2.5	4	mA
Maximum Writing-Gun Cathode Current ^v	—	2.5	5.0	mA

^a Aircraft-Marine Products, Inc., Capatron Division, 155 Park St., Elizabethtown, Pa.

^b This part mates with Aircraft-Marine Products, Inc., Part No. AMP833589, ceramic terminal, or equivalent.

^d Grids No.4 and No.2 of Writing Gun and grid No.3 of Viewing Gun are connected within the tube.

^e Voltages are shown with respect to cathode of Writing Gun.

^f The writing-gun grid No.1 should never be more positive than necessary to write the display to saturated brightness

for a given scanning and drive condition. In no case should the writing-gun grid-No.1 voltage have a value greater than zero with respect to the writing-gun cathode.

- g Dynamic erasure and bright-ring elimination circuitry are recommended. Dynamic erasure is accomplished by a series of rectangular pulses. The backplate should be maintained at zero volts between erase pulses. Bright-ring elimination is accomplished by connecting an 0.1 μ F, 200 VDC capacitor between the backplate electrode and the collimator electrode.
- h Adjusted for brightest, most uniform, full-size pattern.
- i Adjusted for the smallest, most circular spot.
- k The maximum bias-voltage value for writing-beam cutoff is -130 volts with respect to writing-gun cathode.
- m Luminance (Brightness) and screen current are measured after the entire display is written to saturated brightness, the writing gun has been turned off, and with no erasing pulse applied.
- n The time required for any 1.5-inch diameter area of the useful 4-inch diameter viewing area to spontaneously rise (with no writing or erasing) from zero brightness (viewing-beam cutoff) to 10% of saturated brightness.
- p With the display at saturated brightness, a series of rectangular pulses 5 milliseconds in width and at a repetition frequency of 2 pps is applied to the backplate. The number of pulses required to just erase completely the center of the display is noted. This number is multiplied by 5 milliseconds to obtain the erase time. The amplitude of the erase pulses is adjusted to obtain the minimum erase time.
- q Determined as follows: With no erasing pulse, overscan the storage surface with writing beam to obtain maximum pattern brightness. Then cut off writing beam and adjust erasing pulse to obtain complete erasure in approximately 10 seconds. Measure time (t_1) from start of erasing to the instant at which any area within the 4" diameter is reduced to background-brightness level, and time (t_2) from start of erasing to the instant at which the entire area within the 4" diameter area is reduced to background-brightness level. The erasing-uniformity factor is defined as $(t_2 - t_1) / t_2$.
- r Measured by shrinking-raster method at a display brightness of 50% of saturated brightness and with grids No.2 and No.4 of Writing Gun at about +2500 volts with respect to cathode of Writing Gun.

- ^s The undeflected spot position must fall within a circle having a 5/16-inch radius (maximum), 1-3/4-inches from the geometric center of the tube face, on the radius passing through the center of the neck of the writing gun.
- [†] With writing gun turned off, with no erasing pulse applied, and display erased to cutoff.
- ^u Measured with viewing-gun grid No.1 at zero volts and with all other electrodes at voltages shown under *Recommended Operating Values*.
- ^v Measured with writing-gun grid No.1 at zero volts while writing an overscanned TV-type raster.

ENVIRONMENTAL TESTS

The 7183A is designed to withstand the following environmental tests:

Vibration parallel to each of the three orthogonal axes shown in *Fig.1*, and as specified in the schedule below:

Axis of Vibration	Double Amplitude inches	Frequency in Hz	Cycle Duration minutes
X	0.08	30	30
Y	0.08	30	30
Z	0.08	30	30

High and Low Temperature Storage for at least 24 hours at a temperature of +100° C and for at least 24 hours at a temperature of -65° C.

Temperature and Low Pressure (Altitude) in three concurrent phases as specified below:

Phase 1. Storage for one hour at a temperature of -40° C followed by tube operation for five minutes under the conditions shown under *Recommended Operating Values*.

Phase 2. Temperature is increased from -40°C at a rate of 2°C per minute until a temperature of $+86^{\circ}\text{C}$ is reached. Following one hour storage at $+86^{\circ}\text{C}$, the tube is operated for five minutes under the conditions shown under *Recommended Operating Values*.

Phase 3. Barometric pressure is next reduced until a pressure equivalent to an altitude of 20,000 feet is attained. The tube is then operated for five minutes under the conditions shown under *Recommended Operating Values*. Upon completion of the third phase of this test, pressure is increased and temperature decreased, at a rate of 2°C per minute, until ambient pressure-temperature conditions are reached.

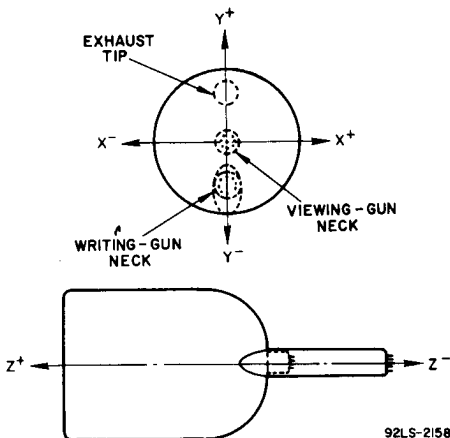
PRECAUTIONS

The following operating precautions must be followed to protect the 7183A from inadvertent damage –

1. Do not exceed maximum ratings.
2. Be sure to include the screen resistor.
3. Be sure to include the collector resistor.
4. Do not apply excessive writing-beam current density.
5. Protect against scanning failure.
6. Protect against loss of bias.
7. Apply voltages to tube in correct order.
8. Never write unless viewing beam is on.
9. Stay within recommended viewing-grid voltage ranges.

SCHEMATIC DIAGRAM

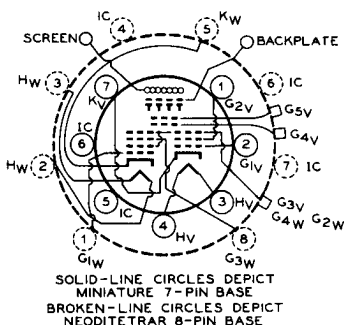
Showing Orthogonal Axes of 7183A
Used during Environmental Tests



92LS-2158

Fig.1

TERMINAL DIAGRAM (Bottom View)



VIEWING SECTION

Small-Button Miniature 7-Pin Base

Pin 1: Grid No.2

Pin 2: Grid No.1

Pin 3: Heater

Pin 4: Heater

Pin 5: Internal Connection—
Do Not UsePin 6: Internal Connection—
Do Not Use

Pin 7: Cathode

Flexible Lead (Large):
ScreenFlexible Lead (Small):
Backplate

Recessed Cavity Caps:

Collector (Grid No.5) —
Located 1.25" from tube
face; 15° from center
line through writing and
viewing gun necks away
from screen connector.Collimator (Grid No.4) —
located 3" from tube
face; 15° from center
line through writing and
viewing gun necks away
from screen connector.Located near viewing gun—
Grid No.3 and Grids No.4
& No.2 of writing gun.

WRITING SECTION

Small-Button Neoditetrar 8-Pin Base

Pin 1: Grid No.1

Pin 2: Heater

Pin 3: Heater

Pin 4: Internal Connection—
Do Not Use

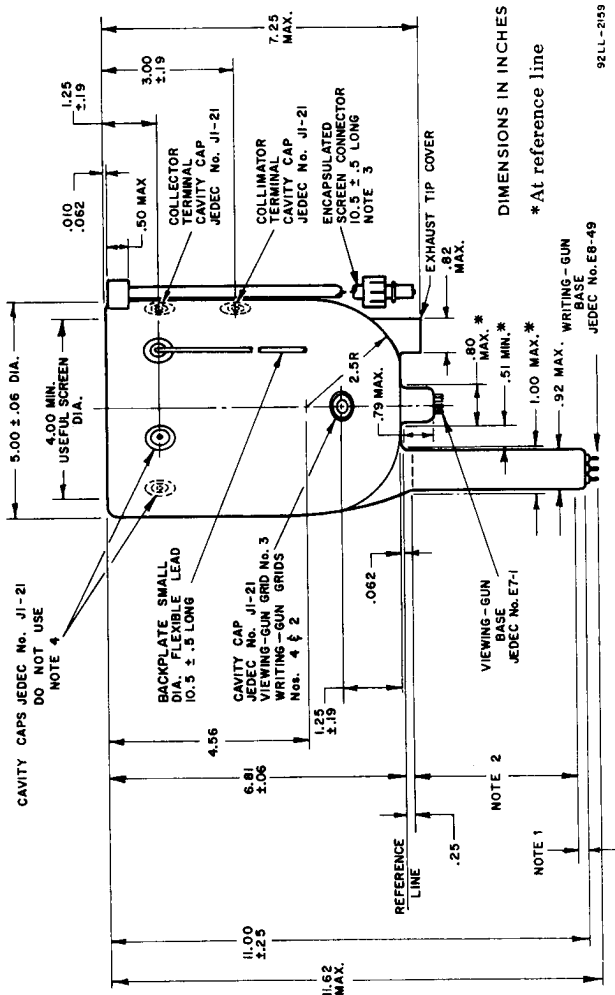
Pin 5: Cathode

Pin 6: Internal Connection—
Do Not UsePin 7: Internal Connection—
Do Not Use

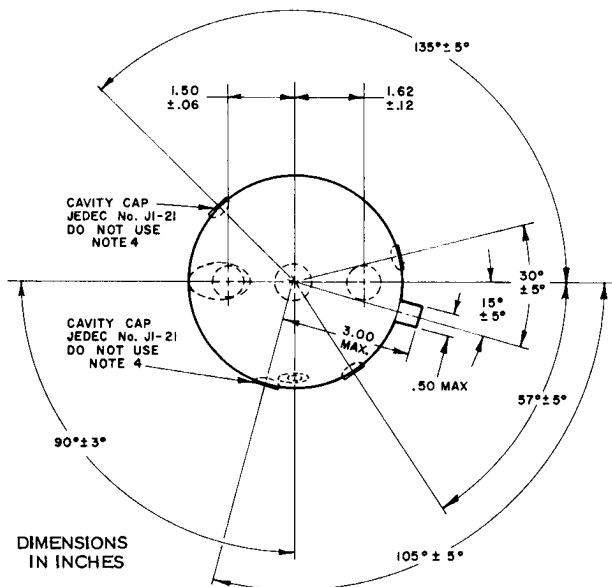
Pin 8: Grid No.3

Note : Grids No.4 & No.2 are connected
internally to Grid No.3 of viewing gun

DIMENSIONAL OUTLINE (Front View)



DIMENSIONAL OUTLINE (Top View)



NOTES FOR DIMENSIONAL OUTLINE

Note 1: Within this distance, neck diameter is .920" max.

Note 2: Within this distance, neck diameter is .950" max.

Note 3: Aircraft-Marine Products, Inc., type LGH Part No. 832692, or equivalent. This part mates with Aircraft-Marine Products, Inc., Part No. AMP833589, ceramic terminal, or equivalent.

Note 4: Do not use these cavity caps for connection. The caps are connected internally and may be at a potential which could constitute a shock hazard. It is recommended that these caps be covered with electrical insulation.