

February 4, 1955

Technical Data
Hughes Aircraft Company
6 4 9 8

M E M O T R O N *

5-Inch Bright Display Cathode-Ray-Type Storage Tube

GENERAL:

Heaters (two) for Unipotential Cathodes	
Voltage	6.3 ± 10 percent ac or dc volts
Current (each heater)	0.6 amp
Phosphor	
Fluorescence and Phosphorescence	Green P1
Persistence of Phosphorescence	Medium
Focusing Method	Electrostatic
Deflection Method	Electrostatic
Over-all Length	18-3/4" ± 1/2"
Greatest Diameter of Bulb	5-5/8" Maximum
Useful Screen Diameter	4" Minimum
Mounting Position	Any
Base	Small-Shell Diheptal 14-Pin (JETEC No. B14-45)
Pin 1	Heater (Writing Gun)
Pin 2	First Anode (Writing Gun)
Pin 3	Control Grid (Writing Gun)
Pin 4	Deflecting Electrode D ₂
Pin 5	Deflecting Electrode D ₁
Pin 6	Deflecting Electrode D ₃
Pin 7	Deflecting Electrode D ₄
Pin 8	Second Anode (Both Guns)
Pin 9	Cathode (Writing Gun)
Pin 10	Heater (Flood Gun)
Pin 11	Heater, Cathode (Flood Gun)
Pin 12	Control Grid (Flood Gun)
Pin 13	Control Grid (Writing Gun)**
Pin 14	Heater (Writing Gun)

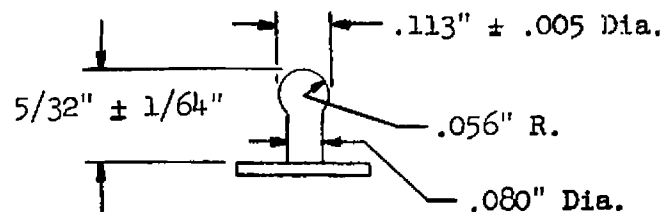
D₁ and D₂ are nearer the base.
D₃ and D₄ are nearer the screen.

Terminals on Bulb

- Cap No. 1 Viewing Screen
- Cap No. 3 Third Anode
- Cap No. 4 Ion Repeller Mesh
- Cap No. 5 Collector Mesh
- Cap No. 6 Storage Mesh

Cap No. 1 is not recessed.
Caps Nos. 3, 4, 5 and 6 are partially recessed.

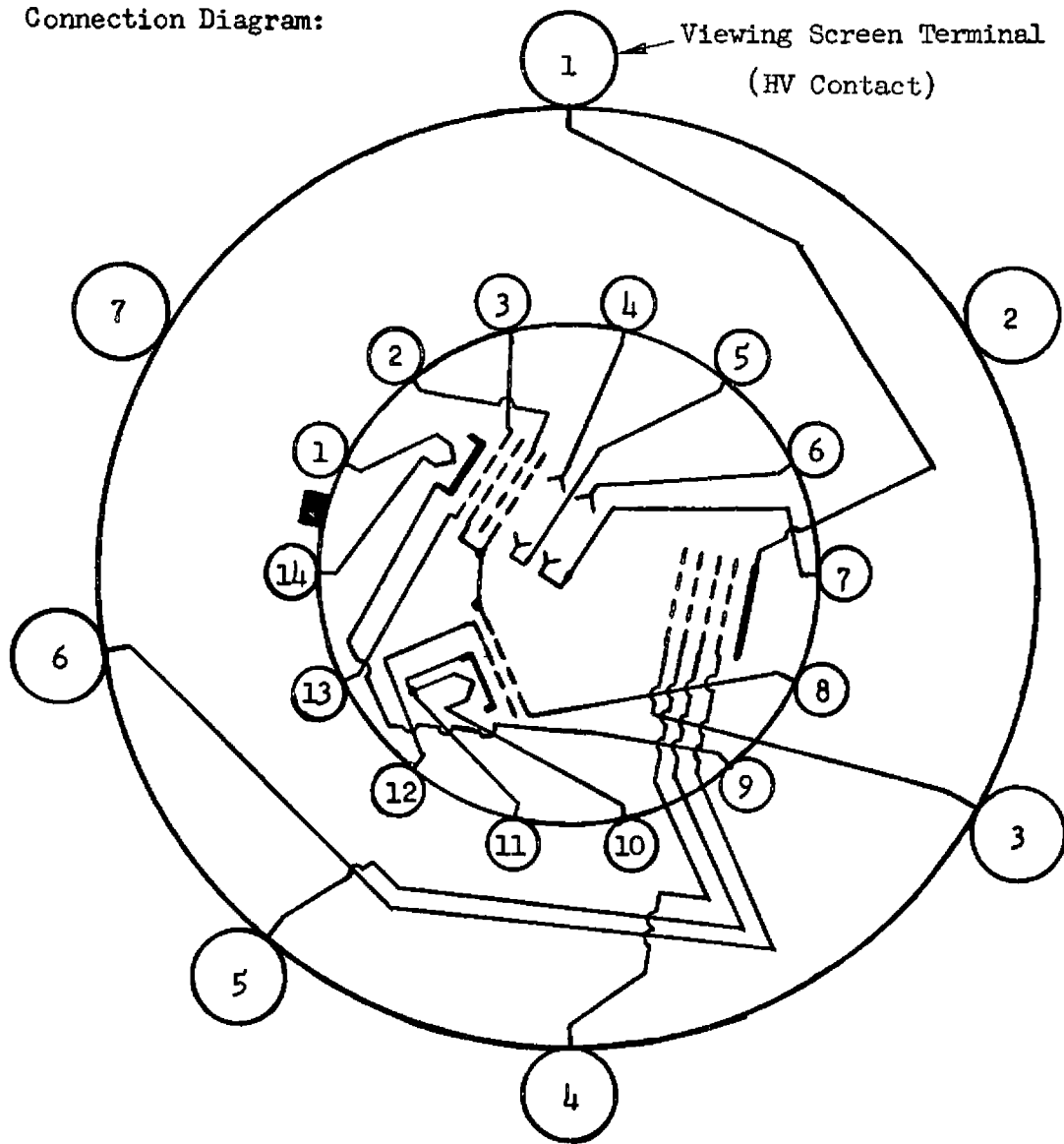
Small Ball Cap (see sketch below)



* Hughes Aircraft Company registered trademark for direct-reading bright display storage tube.

** Use Pin 3 for Control Grid socket connection.

Connection Diagram:

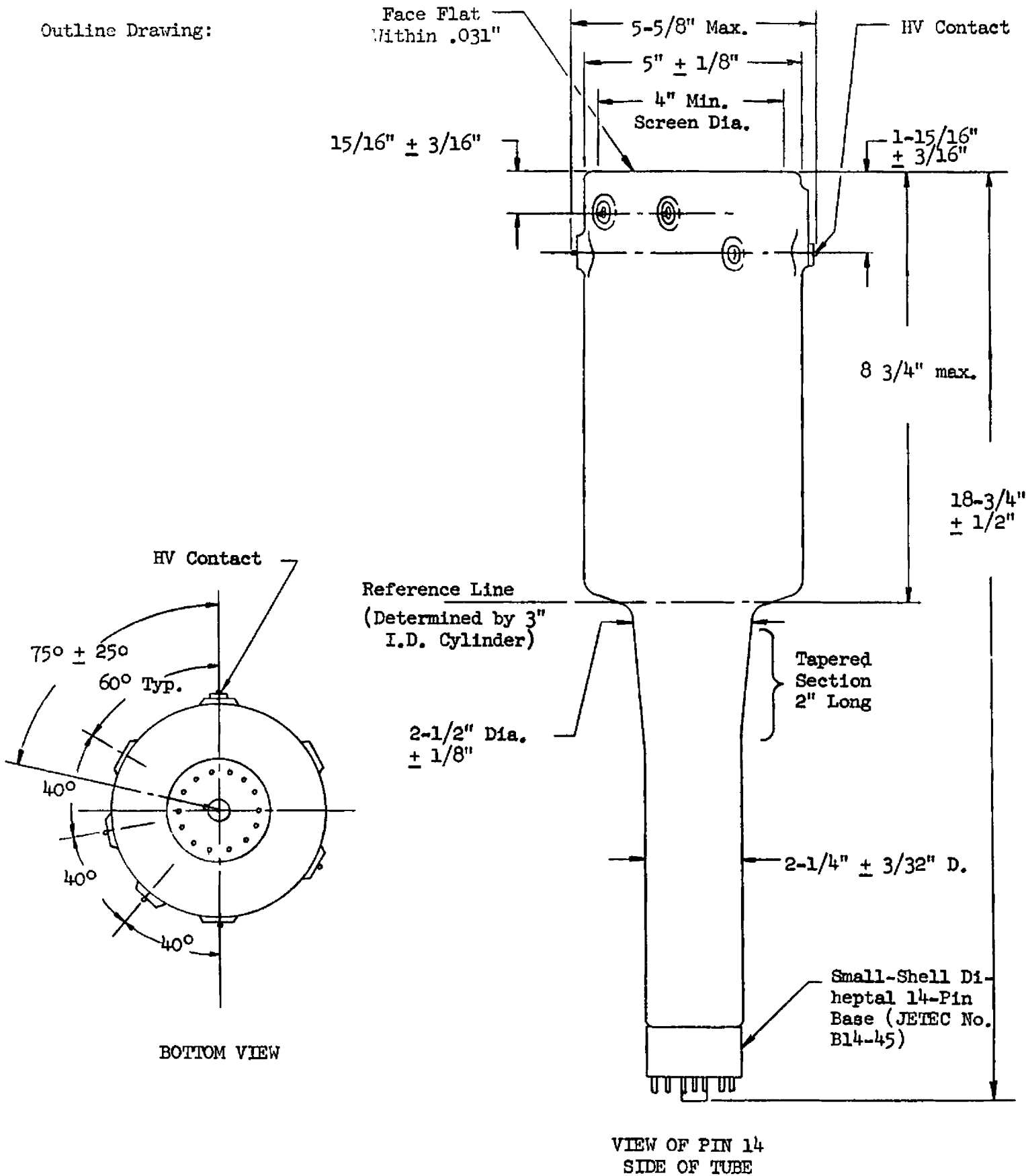


BOTTOM VIEW

With D_1 positive with respect to D_2 , the spot is deflected toward Pin 7. With D_3 positive with respect to D_4 , the spot is deflected toward Pin 4.

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Outline Drawing:



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MAXIMUM RATINGS:*

Viewing Screen	6000 volts
Ion Repeller Mesh	350 volts
Second Anode	300 volts
Deflection Plates, Average Potential	300 volts
Collector Mesh	250 volts
Third Anode	250 volts
Storage Mesh	-50 volts
First Anode	-3300 volts
Cathode, Writing Gun	-3300 volts

TYPICAL OPERATING VOLTAGES** AND CURRENTS:

Viewing Screen Voltage	5000 volts
Ion Repeller Mesh Voltage	250 volts
Second Anode Voltage	200 volts
Collector Mesh Voltage, Operating Level***	150 to 200 volts
Third Anode Voltage	150 volts
Control Grid (Flood Gun) Voltage, Operating Bias****	-50 to -200 volts
Storage Mesh Voltage	0 volts
First Anode (Writing Gun) Voltage for Focus**	450 to 1050 volts
Cathode (Writing Gun) Voltage	-3000 volts
Control Grid (Writing Gun) Voltage** for Visual Extinction of Undelected Focused Spot	-40 to -80 volts
Viewing Screen Current	0 to 300 μ a
Ion Repeller Mesh Current	0 to 4 ma
Second Anode Current	0 to 3 ma
Collector Mesh Current	-0.5 to +4 ma
Third Anode Current	-0.5 to +2 ma
First Anode (Writing Gun) Current	-15 to +15 μ a
Cathode (Writing Gun) Current	0 to 1000 μ a
Storage Mesh Current	-15 to +15 μ a

* All maximum ratings are given with respect to the flood gun cathode potential and represent the absolute maximum departure from this potential.

** All voltages are given with respect to flood gun cathode potential, except the control grid (writing gun) voltage, and the first anode (writing gun) voltage, which are given with respect to the writing gun cathode potential.

*** The collector mesh operating level, by definition, is 15 volts above the lowest voltage at which written information remains visible indefinitely on all parts of the viewing screen. This latter voltage has been named the retention threshold.

**** Adjust for complete coverage of the viewing screen.

PROTECTIVE CIRCUITRY:

Power supplies should be of the limited-energy type with inherent regulation to limit the continuous short circuit currents to the values tabulated below. If the effective output capacitance is capable of storing more than 10 microcoulombs, a resistance not less than the value given below should be provided between the electrode and the output of the power supply. The 100,000 ohms resistance in series with the storage mesh should be provided regardless of output capacitance.

<u>Electrode</u>	<u>Maximum Short Circuit Current</u>	<u>Minimum Resistance</u>
Storage Mesh	3 ma	100,000 ohms
Collector Mesh	6 ma	200 ohms
Viewing Screen	1 ma	100,000 ohms
Writing Gun Cathode	3 ma	10,000 ohms

PERFORMANCE CHARACTERISTICS: (Average Values)

Writing Speed 35,000 in./sec. minimum
 for a Beam Current of 20 μ a
 and Collector at Operating
 Level

In general, writing speed increases with beam current and with collector mesh voltage; therefore, a writing speed considerably greater than the above value is usually possible by raising the collector mesh voltage to the maximum stable voltage and using the maximum beam current consistent with the resolution requirements of the application.

Resolution 50 lines/in. minimum
 at 0 volts on the Storage
 Mesh and 5000 volts on the
 Viewing Screen

Resolution of the written information is somewhat deteriorated by varying the storage mesh voltage in the negative direction. Resolution increases with viewing screen voltage; however, this effect is slight, above 3000 volts.

Brightness of Written Information 20 foot-lamberts minimum
 at 0 volts on the Storage Mesh
 and 5000 volts on the Viewing
 Screen

Contrast Ratio 3:1 minimum
 at 0 volts on the Storage Mesh
 and 5000 volts on the Viewing
 Screen

The ratio of brightness of written information to ~~that~~ of the background can be increased by lowering the storage mesh voltage below zero volts, however, this improvement is made with some sacrifice of resolution and brightness of the written information. Contrast can be enhanced without sacrifice of brightness and resolution by applying a positive pulse to both the storage mesh and collector mesh having a 10 to 30-volt amplitude, 1000-cycle repetition rate, and 1% duty cycle.

Erase Time 200 milliseconds maximum

Erasure is accomplished by momentarily lowering the collector mesh voltage below the retention threshold. The most effective portion of this erasure pulse is ~~the~~ the positive slope returning to operating level. The ideal pulse, therefore, is triangular with a steep descent, and a slow ascent occupying most of the total pulse width.

Deflection Factor	D_1 and D_2	85 to 115 volts/inch
at 3.2 KV Cathode-to-Second Anode voltage	D_3 and D_4	85 to 115 volts/inch

LSY/z