JOINT ELECTRON TUBE ENGINEERING COUNCIL

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Announcement
of
Electron Device Type Registration

Release No. 1426

March 7, 1955

The Joint Electron Tube Engineering Council announces the registration of the following tube type designation

6498

according to the ratings and characteristics found on the attached data sheets on the application of

Hughes Aircraft Company
Culver City, California

February 4, 1955

Technical Data

Hughes Aircraft Company

6498

MEMOTRON *

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

GENERAL:

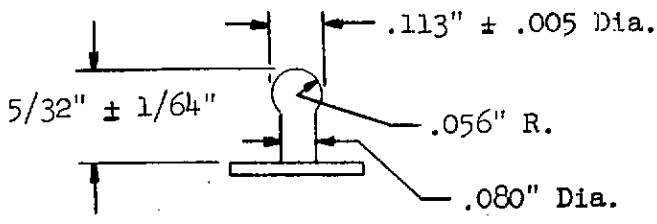
Heaters (two) for Unipotential Cathodes	
Voltage	6.3 ± 10 percent ac or dc volts
Current (each heater)	0.6 amp
Phosphor	Green P1
Fluorescence and Phosphorescence	Medium
Persistence of Phosphorescence	Electrostatic
Focusing Method	Electrostatic
Deflection Method	18-3/4" ± 1/2"
Over-all Length	5-5/8" Maximum
Greatest Diameter of Bulb	4" Minimum
Useful Screen Diameter	Any
Mounting Position	(JETEC No. B14-45)
Base Small-Shell Diheptal 14-Pin	
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)	

D_1 and D_2 are nearer the base.
D_3 and D_4 are nearer the screen.

Terminals on Bulb — Small Ball Cap (see sketch below)

- 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.



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

** Use Pin 3 for Control Grid socket connection.

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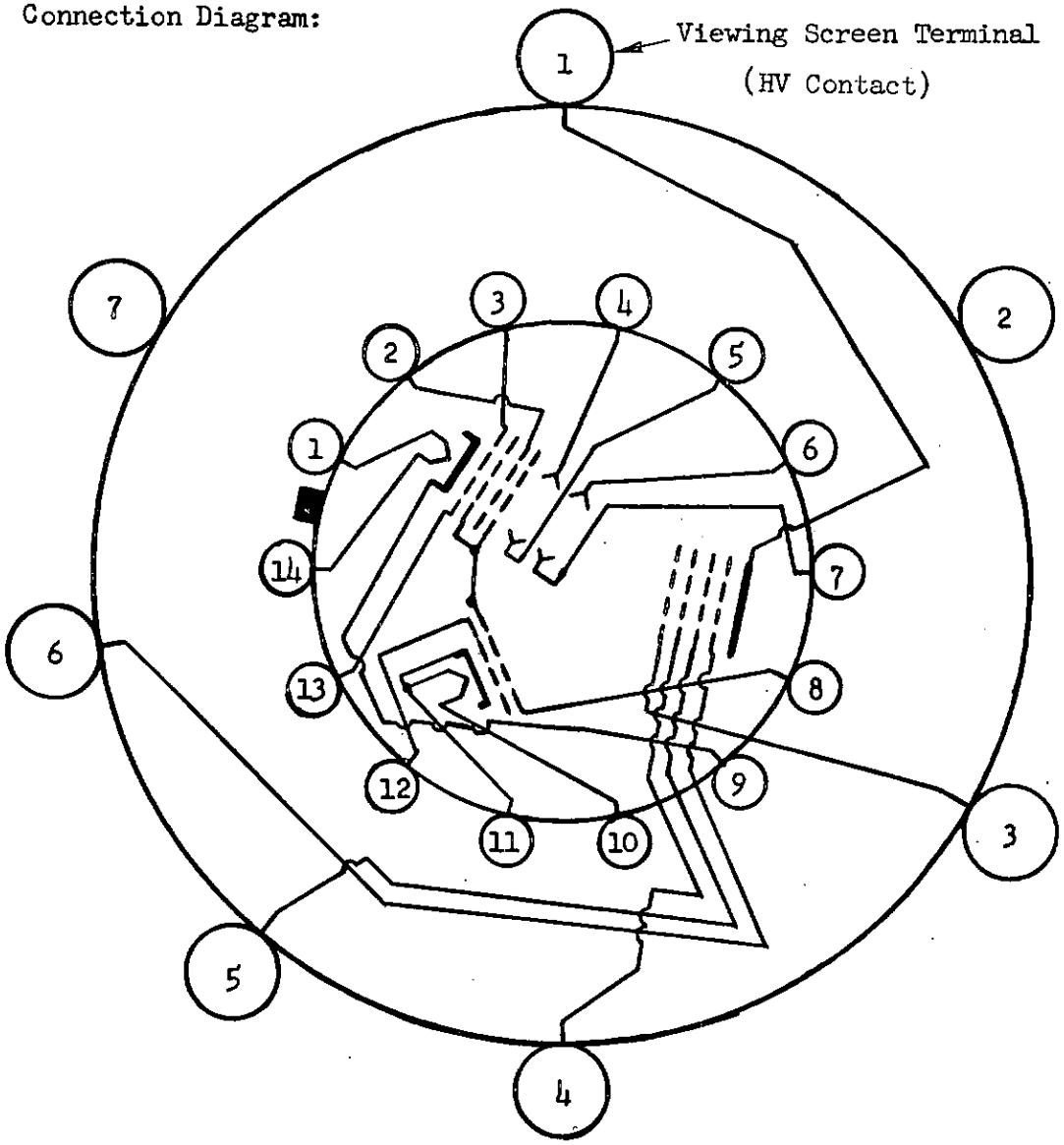
Connection Diagram:



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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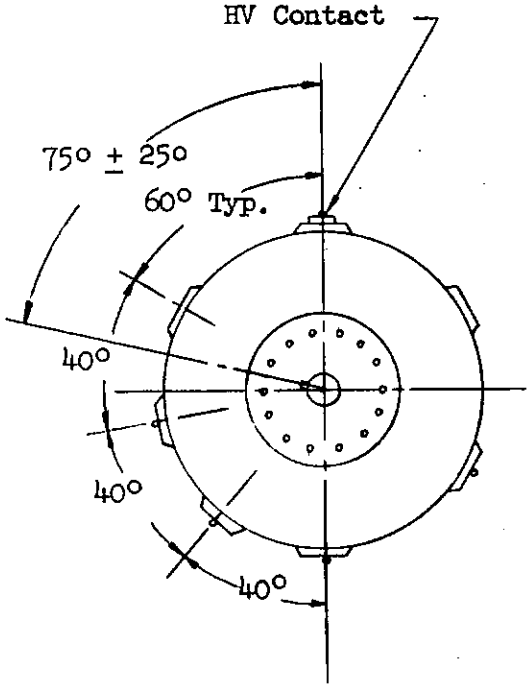
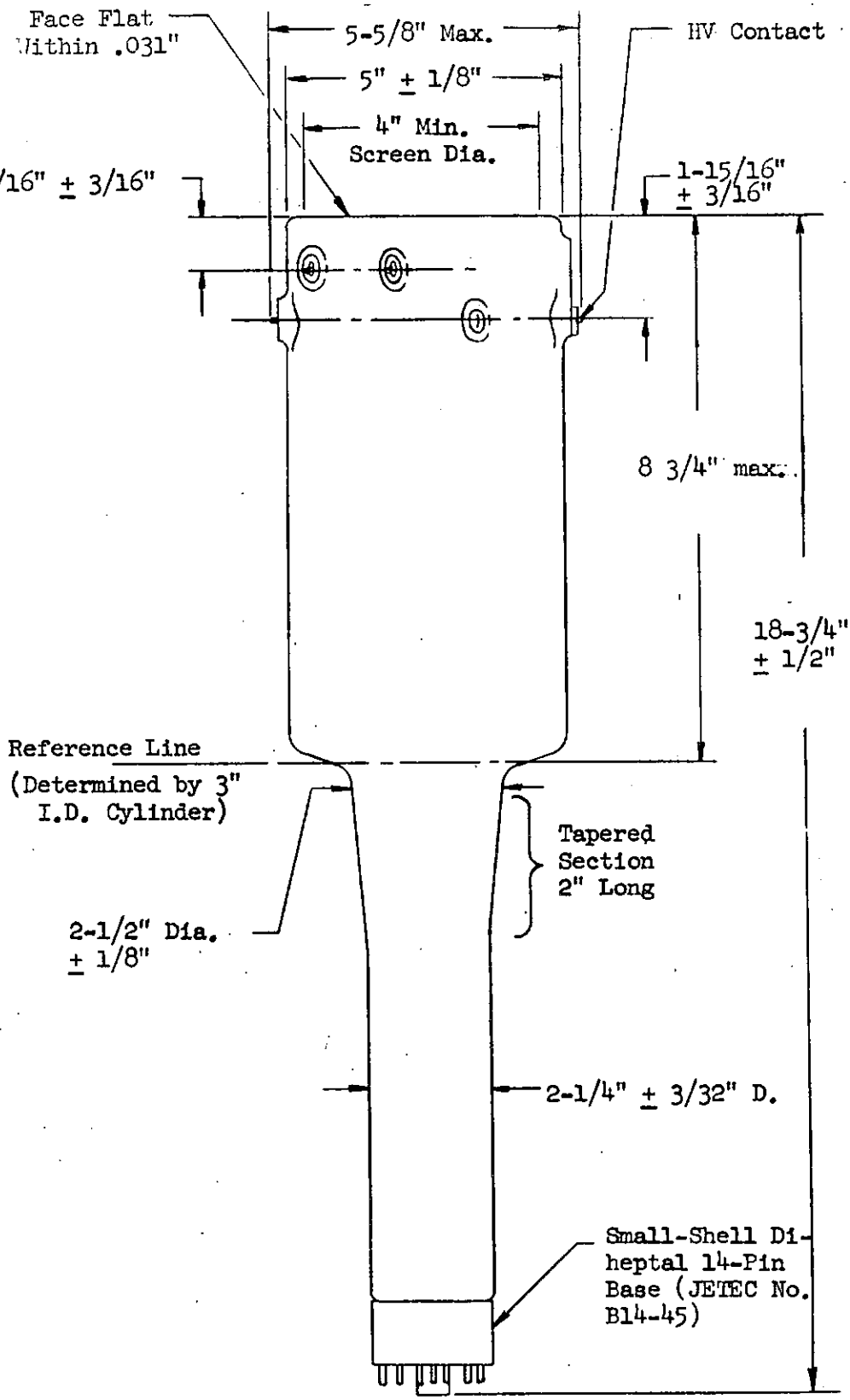
Outline Drawing:



BOTTOM VIEW



VIEW OF PIN 14 SIDE OF TUBE

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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 Undeflected Focused Spot	-40 to	-80	volts
Viewing Screen Current	0 to	300	μa
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	μa
Cathode (Writing Gun) Current	0 to	1000	μa
Storage Mesh Current	-15 to	+15	μa

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* 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 microcculombs, a resistance not less than the value given below shcuild 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.

Electrode	Maximum Short Circuit Current	Minimum Resistance
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 for a Beam Current of 20 μa and Collector at Operating Level — 35,000 in./sec. minimum

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

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 at 0 volts on the Storage Mesh and 5000 volts on the Viewing Screen — 20 foot-lamberts minimum

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

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

LSY/z