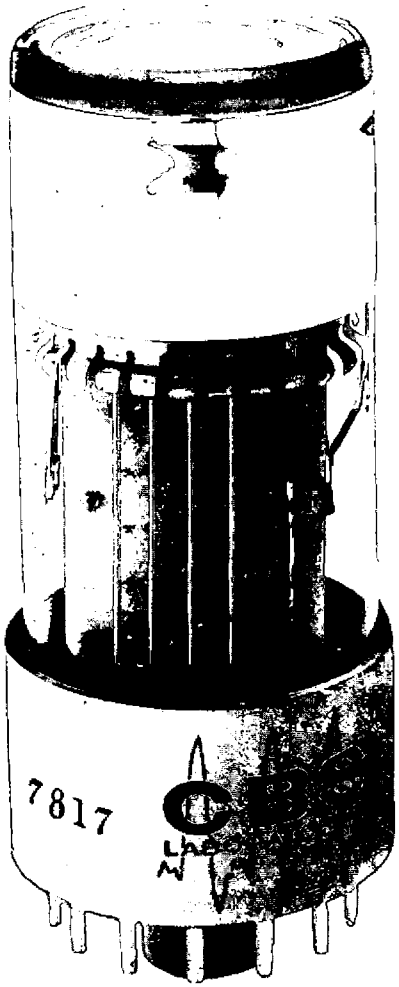
AUGUST 1960



7817

PHOTOMULTIPLIER

The CBS Type 7817 supersedes and is a direct replacement for CBS Type CL-1002. Type 7817 is a 10-stage, 2 inch diameter, end-on photomultiplier sensitive to the blue region of the spectrum. The faceplate is plano-concave with the photocathode deposited on the curved surface. This design insures excellent uniformity of response across the face of the tube. Use of the curved photocathode in conjunction with the linear multiplier structure provides short transit time spread. The tube utilizes silver magnesium dynodes. Type 7817 is intended for use in scintillation counting, spectroscopy, photometry and flying spot scanner applications.

GENERAL DATA

Spectral Response	S-11
Photocathode	Semi-transparent
Photocathode Window	Circular end-on type
Window Diameter	1.745 inches (min.)
Window Index of Refraction	1.51
Tube Diameter	2±1/16 inches
Overall Length	5-5/8±1/8 inches
Seated Height to Center of Window	4-7/8±1/8 inches
Mounting Position	Any
Weight (approximate)	179 gm.
Base	Medium shell diheptal 14 pin (JETEC No. B14-38) Non-Hygroscopic
Wavelength at Maximum Response	4400±500 angstroms
Wavelength at 10% of Maximum Response on Long Wavelength Side	6125±275 angstroms
Wavelength at 10% of Maximum Response on Short Wavelength Side	3250±250 angstroms

MAXIMUM RATINGS

		Units
Supply Voltage (DC or peak AC) between Anode and Cathode	2000	volts
Supply Voltage (DC or peak AC) between Last Dynode and Anode	250	volts
Supply Voltage (DC or peak AC) between Cathode and First Dynode	400	volts
Supply Voltage (DC or peak AC) between Cathode and Focusing Electrode (See Note 5)	400	volts
Average Anode Current (See Note 6)	5	ma
Average Anode Dissipation (See Note 6)	1	watt

Environmental Conditions (Non-operating):
Ambient Storage Temperature +75 °C
Shock: 40 g, 11 ms. duration (See Note 7)
Vibration: 0.35" double amplitude displacement: 0-25 cycles
10 g: 25-2000 cycles

(See Notes 7, 8)

CBS LABORATORIES
A division of Columbia Broadcasting System, Inc., High Ridge Road, Stamford, Conn.

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TYPE 7817

CHARACTERISTIC ELECTRICAL DATA

	Min.	Avg.	Max.	Units
Cathode Radiant Sensitivity at 4400 Å		.056		μa/μw
Cathode Luminous Sensitivity	50	80		μa/lumen
Anode Radiant Sensitivity at 4400 Å, 1250 volts between cathode and anode (See Note 3)		1.26×10^{-2}		amp/μw
Anode Luminous Sensitivity				
1250 volts between cathode and anode	4	13.5		amp/lumen
1750 volts between cathode and anode (See Notes 1, 3, 5)	30	120		amp/lumen
Last Dynode Luminous Sensitivity				
1250 volts between cathode and anode		9		amp/lumen
1750 volts between cathode and anode (See Notes 1, 3)		90		amp/lumen
Current Amplification				
1250 volts between cathode and anode		170,000		
1750 volts between cathode and anode (See Notes 3, 5)		2,000,000		
Equivalent Anode Dark Current Input (See Notes 1, 4)		2×10^{-10}	2×10^{-9}	lumen
Interelectrode Capacitances				
a) Anode to all other electrodes		3.2		μμf
b) Anode to last dynode		2.8		μμf
Time Jitter over Full Cathode (See Note 9)		3		mμs
Anode Pulse Rise Time				
With 1 mm diam. illuminated on tube face		2.5		mμs
With full cathode illuminated (See Note 10)		4		mμs

NOTES

Note 1: The light source is a tungsten filament lamp operated at a color temperature of 2870°K.

Note 2: Measured at 0 cps with 210 volts applied between cathode and all other electrodes connected together.

Note 3: The applied voltage, V, is distributed in the following manner: 1/6 of V between cathode and dynode 1, 1/12 of V between succeeding dynodes, 1/12 of V between dynode 10 and anode. Improved pulse energy resolution and gain stability can be obtained if voltage between cathode and dynode 1 is set at four times that between succeeding stages; this mode of operation is recommended for all scintillation spectrometry work.

Note 4: Measured at 25°C with supply voltage adjusted to give an anode luminous sensitivity of 20 amperes per lumen.

Note 5: The focusing electrode should be varied between photocathode and dynode 1 potentials for optimum photoelectron collection efficiency. Best gain and pulse energy resolution are usually obtained with shield potential above cathode 80% of cathode — dynode 1 potential.

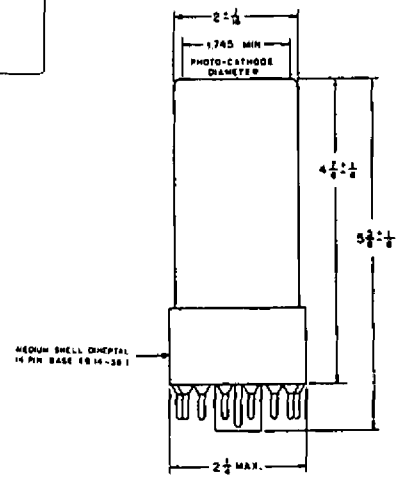
Note 6: Average over a 30 second interval maximum.

Note 7: Test performed, with no voltage applied, in each of three orthogonal axes. Reference axis is through Pins 2 and 9 on tube base.

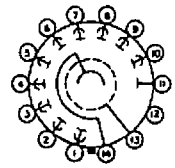
Note 8: Test performed, with no voltage applied, through three complete cycles at three minutes per cycle in each of three orthogonal axes. Reference axis is through Pins 2 and 9 on tube base.

Note 9: Jitter is greatest delay between anode pulses due to position from which electrons are simultaneously released within a circle on tube face of specified diameter.

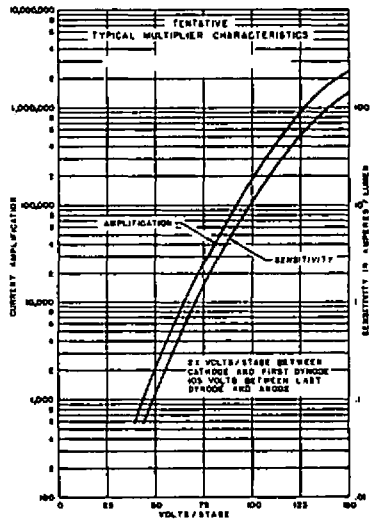
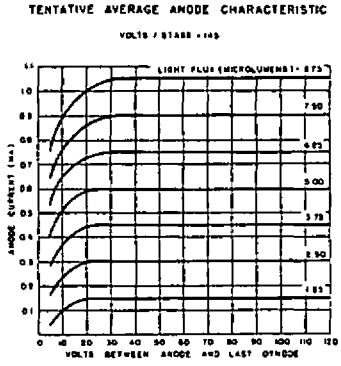
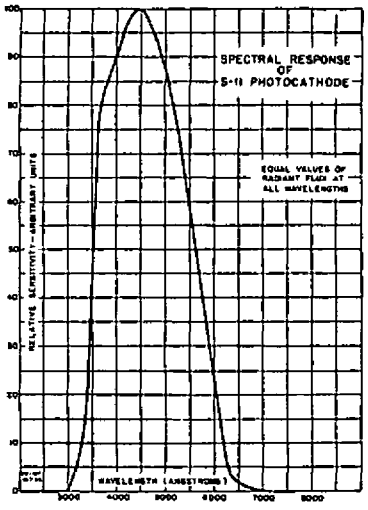
Note 10: Measured between 10% and 90% of anode pulse height.



14AA



BOTTOM VIEW

PIN NO.	ELEMENT
1	DYNODE NO. 1
2	DYNODE NO. 2
3	DYNODE NO. 3
4	DYNODE NO. 4
5	DYNODE NO. 5
6	DYNODE NO. 6
7	DYNODE NO. 7
8	DYNODE NO. 8
9	DYNODE NO. 9
10	DYNODE NO. 10
11	ANODE
12	INTERNAL CONNECTION
13	FOCUSING ELECTRODE
14	CATHODE

NOTE: DIRECTION OF LIGHT INTO END OF BULB