



LITTON INDUSTRIES

SAN CARLOS, CALIFORNIA
U.S.A.

Reservation No.
Reservation Date 2-25-47

Manufacturer's Designation L-3000A
Data Bureau Designation 5607

UHF MAGNETRON

General Characteristics

Electrical

(a) Filament or Cathode	<u>Filament</u>	type
Voltage (approx.)	<u>5.6</u>	volts
Current	<u>17.2</u>	amps
Frequency (continuously tuned)	<u>2.5 to 3.55</u>	kMc
Loading	<u>Limited adjustment</u>	

Typical Operation - C.W or Modulated

Field Strength (approx.)	<u>2500</u>	gauss
Anode Voltage	<u>5000</u>	volts
Anode Current (average)	<u>.300</u>	amps
Power Output	<u>800</u>	watts

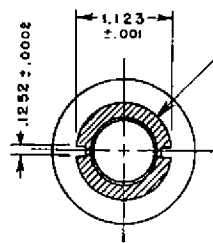
Mechanical

See Outline Drawing

Maximum Ratings

Anode Voltage	<u>6000</u>	volts
Anode Current (Peak)	<u>1.0</u>	amps
Anode Current (Average)	<u>0.4</u>	amps
Anode Dissipation	<u>1000</u>	watts
Anode Temperature	<u>120</u>	°C
Cooling	<u>Water-Air</u>	
Power Output	<u>1000</u>	watts

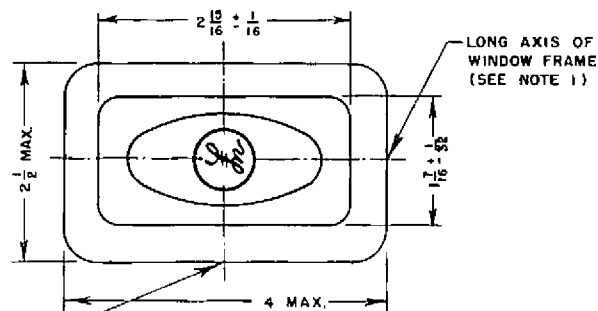
(a) Thoriated Tungsten



2 SLOTS. EACH .125 ± .001 DEEP

SECTION A-A

TUNING NUT
USE DOUBLE KEY CHUCK
FOR ENGAGEMENT WITH
THE TUNING NUT.
USE NO CLAMPS ON TUNING NUT.



LONG AXIS OF
WINDOW FRAME
(SEE NOTE 1)

NOTE 1: THE LONG AXIS OF THE WINDOW FRAME MUST BE
PARALLEL WITH THE AXIS OF THE BODY WITHIN 2°.

NOTE 2: THE SHORT AXIS OF THE WINDOW FRAME MUST BE
WITHIN 1/8 OF THE BODY Ø.

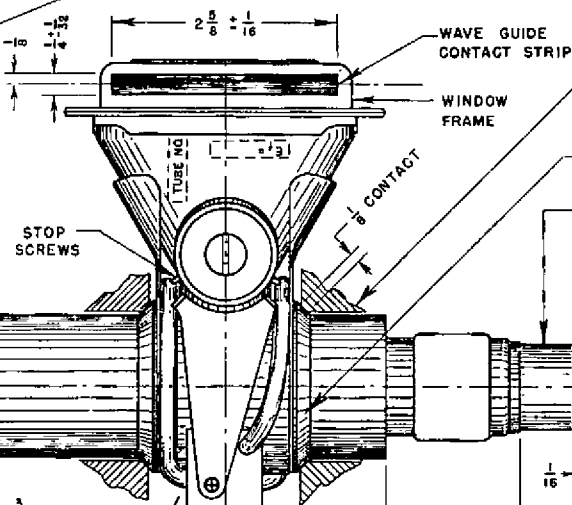
NOTE 3: MAKE NO ATTACHMENTS TO NECK OF TUBE FOR
TUNING OR ANY PURPOSE.

NOTE 4: MEASURE ECCENTRICITY OF FILAMENT TERMINALS
BY FILAMENT TERMINAL ECCENTRICITY GAUGE:

NOTE 5: MEASURE ECCENTRICITY OF DOUBLE FILAMENT
TERMINALS WITH RESPECT TO BODY USING V
BLOCK AND A 1.625 O.D. X 5/8 I.D. RING WHICH
MUST SLIP OVER 1/2 FILAMENT TERMINAL.

NOTE 6: MARK TUBE SERIAL NUMBER AND RECOMMENDED
FILAMENT VOLTAGE ON HORN IN POSITION SHOWN.

SHORT AXIS OF WINDOW FRAME
(SEE NOTE 2)



WAVE GUIDE
CONTACT STRIP

WINDOW
FRAME

STOP
SCREWS

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

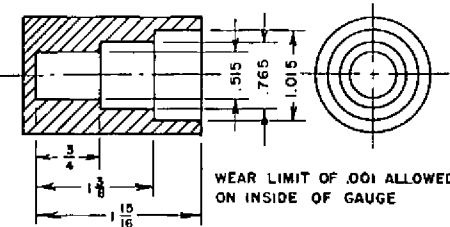
POLE PIECES OF ELECTRO-MAGNET (NOT FURNISHED WITH TUBE)
PROVIDING SEATS FOR NEOPRENE COLLARS WITH ELECTRO-
MAGNET POLE FACES AS SHOWN, TUBE SHALL BE HELD FIRMLY.

NEOPRENE OR EQUIVALENT COLLAR. SHORE DUROMETER
50 TO 60. FACE WITH ALUMINUM.

1.2 ± .005 FILAMENT TERMINAL

3/4 ± .005 FILAMENT TERMINAL

1/2 ± .005 FILAMENT CENTER TAP



FILAMENT TERMINAL ECCENTRICITY GAUGE

FLEXIBLE METAL HOSE

VARIES DURING
TUNING FROM
APPROX. 2 1/2 TO 2 3/4

7 1/8 ± 1/32

MINIMUM
RADIUS 1 3/4

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

1.625 ± .000 DIA.
(NOTE 5)

2 5/8 ± 1/16

3 7/8 ± 1/8

2 5/8 MAXIMUM
STRAIGHT LENGTH
(TO END OF SOLDER)

INTERNAL SPACING
BETWEEN POLE
PIECES .075

MINIMUM RADIUS 1 3/4

FLEXIBLE METAL HOSE

PLUGS TO FIT WIGGINS#179 BODY

PLUGS TO FIT WIGGINS#133 BODY

INLET

MOUNTING POSITION - AXIS OF BODY VERTICAL

D		SCALE: FULL		OUTLINE DRAWING-5607		DATE PRINTED	
C		MATERIAL:				IN PLACE BY: REL. APPROV.	
B		DRAWN: J. J. Tomlinson		50-9-47		LITTON ENGINEERING LABORATORIES	
A		CHECKED: J. J. Tomlinson		50-9-47		REDWOOD CITY, CALIFORNIA	
DATE		FROM		BY		L-3000-255	
CHANGED							

5767

6481

Up to 3.3 Gc
Low Internal Lead Inductance
Folded Discs

Litton Planar Triode Types 5767 and 6481 are intended primarily for use in microwave circuits as CW oscillators at frequencies up to 3.3 Gc. These planar-electrode disc-seal triodes may be used as integral parts of a tuned cavity. Their low internal lead inductance make these tubes well adapted to lumped constant circuits. The mechanical configuration was designed for use in butterfly type circuits, since it is easily clamped into the circuit by beryllium straps. The 5767 has a slightly lower anode-to-cathode capacitance which makes it perform well in broadband tunable oscillator circuits.

ABSOLUTE MAXIMUM PARAMETERS PER PARA. 6.5 MIL-E-1D

Heater Voltage (AC or DC)	7.0 V
Heater Current	0.45 A
Anode Voltage	350 Vdc
Anode Dissipation	5.0 W
Seal Temperature	200° C
Operating Frequency	3.3 Gc

DIRECT INTERELECTRODE CAPACITANCES

	5767	6481
Grid Anode	1.45	1.47 pf
Grid Cathode	1.30	1.27 pf
Anode Cathode	0.015	0.023 pf

TUBE CHARACTERISTICS (Typical)

Transconductance	4500 umhos
Amplification Factor	25
Grid Voltage for $I_b = 10 \text{ uAdc}$	-15 V
Above parameters measured at $E_f=6.3 \text{ V}$, $E_b=180 \text{ V}$, $R_k=400 \text{ ohms}$, and $I_b=12.0 \text{ mAdc}$.	

OPERATING CHARACTERISTICS (Typical)

- (1) UHF Oscillator CW¹

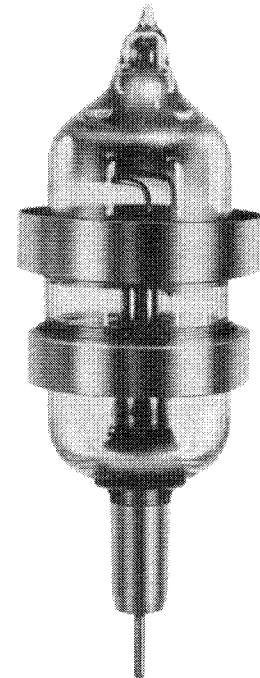
Anode Voltage	200 Vdc
Anode Current	35 mAdc
Frequency	1.0 Gc
Power Output	2.0 W
Heater Voltage	6.3 Vac
- (2) UHF Oscillator CW¹

Anode Voltage	200 Vdc
Anode Current	25 mAdc
Frequency	3.3 Gc
Power Output	400 mw
Heater Voltage	6.3 Vac
- (3) UHF Oscillator CW Tunable

Anode Voltage	325 Vdc
Anode Current	40 ma
Frequency	200-900 Mc
Power Output	300 mw
Heater Voltage	6.3 Vac

NOTE:

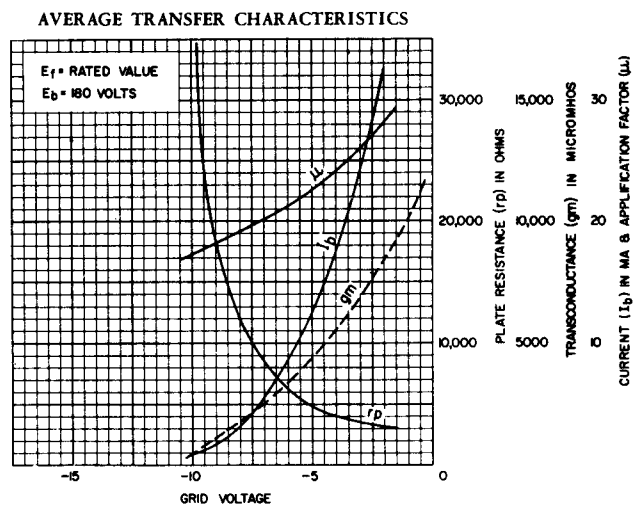
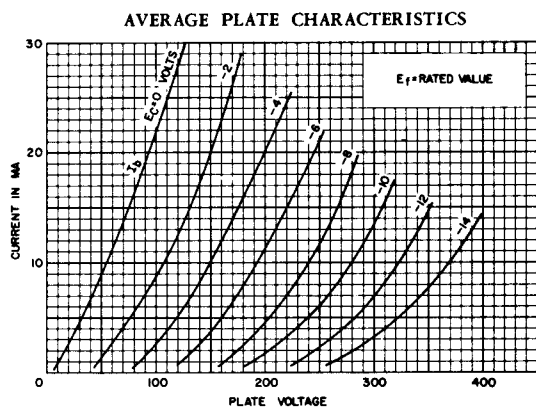
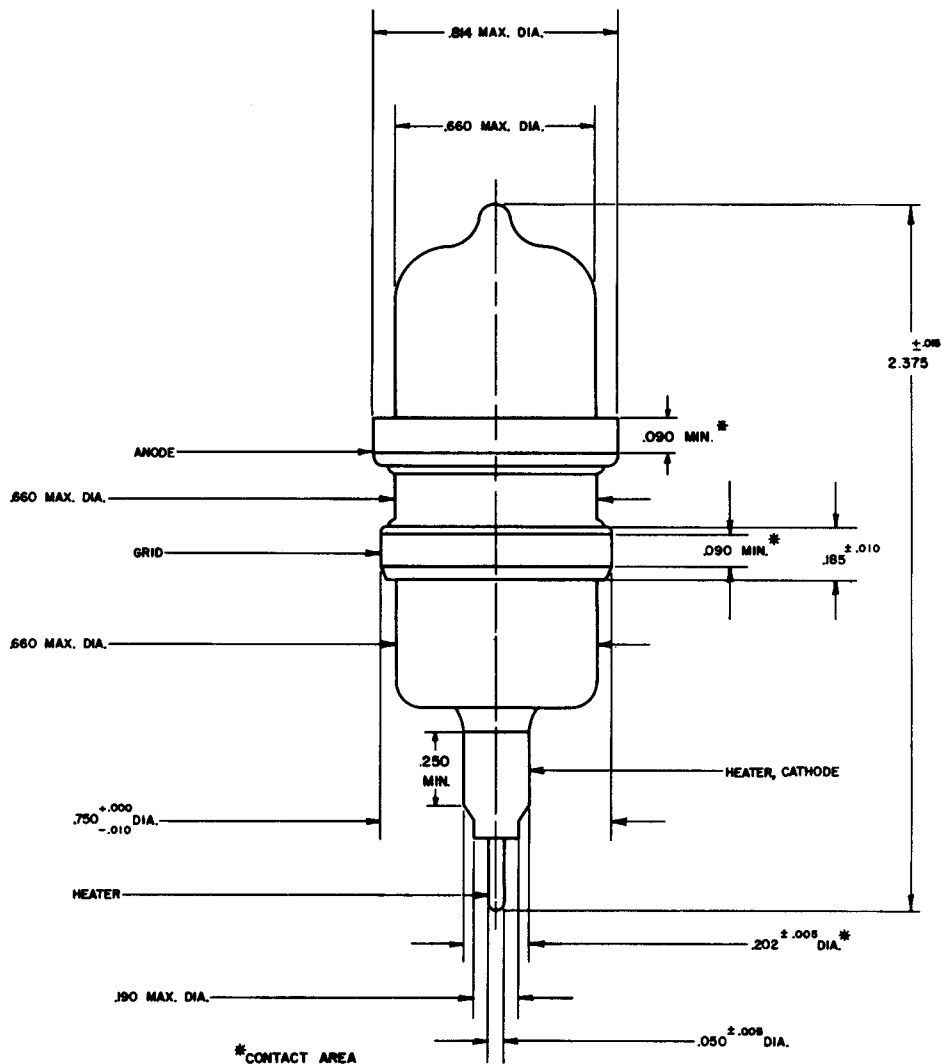
1. In a tunable cavity designed for the indicated frequency ranges.



PLANAR TUBE

5767

6481

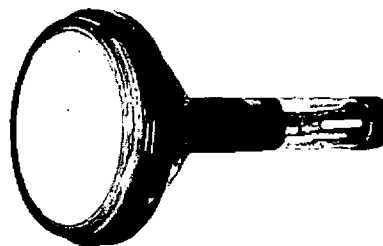


LITTON INDUSTRIES

ELECTRON TUBE DIVISION—ELECTRONIC DISPLAY LABORATORY

1475 66TH STREET • EMERYVILLE, CALIFORNIA • OLYMPIC 8-3831

5CGP29 CHROMATRON



SINGLE-GUN COLOR TUBE
GLASS ENVELOPE
TWO-COLOR PERSISTENT PHOSPHORS
PHOSPHORS ON FLAT FACE
ALUMINIZED SCREEN
ACTIVE SCREEN AREA $4\frac{1}{4}$ " DIAMETER
SCREEN VOLTAGE UP TO 18,000 VOLTS

High resolution is afforded by phosphor strips of approximately 11 mils width on $12\frac{1}{2}$ mil centers, or 80 color strips per inch. Simple circuitry is adequate for power supplies and color switching. Post-acceleration, inherent in post-deflection focusing (PDF) produces high deflection sensitivity. Color convergence is inherent in the tube, independent of circuit adjustment.

APPLICATIONS

Suggested applications include: target identification, moving target identification (MTI), IFF, anti-jamming, navigational beacons, terrain clearance, plane elevation indicator, collision course indicator, etc.

DATA

GENERAL

Heater voltage (AC or DC) 6.3 volts
Heater current 0.6 amperes
Direct Interelectrode Capacitances:
Grid #1 to all other electrodes 6 uuf
Cathode to all other electrodes 4 uuf
Color selectors to each other 880 uuf
Phosphors (long persistence) P-25 orange
P-2 green
Focusing Method Magnetic
Color Selector Method Electrostatic
Deflection Method Magnetic
Deflection Angle (Approx.) 53°
Length $11\frac{1}{8}$ in.
Weight $1\frac{1}{2}$ lb.

*MAXIMUM RATINGS

Screen (ultor) voltage (Note 1) 18,000 DC
Grid #3 voltage 12,000 DC
Grid #2 voltage 600 DC
Color selector voltage 400 peak
Color grid to phosphor plate 8,000 DC
Seeker voltage (Note 2) 350 DC

Grid #1 voltage:

Negative bias value 200 DC
Positive bias value 0
Positive peak value 2 DC

Peak heater — cathode voltage:

Heater neg. with respect to cathode
during equip. warm-up period not to
exceed 15 seconds 410 DC
After equip. warm-up 180 DC
Heater pos. with respect to cathode 180 DC

*design-center values

TYPICAL OPERATION

Screen (ultor) voltage 16,000 DC
Grid #3 voltage (Note 3) 9,000 to 12,000 DC
Color selector voltage 300 peak
Seeker voltage 100 to 300 DC
Grid #2 voltage 300 DC
Grid #1 voltage (Note 4) -50 to -105 DC
Focusing coil current (Note 5) 60 to 80 ma DC
Circuit values:
Grid #1 circuit resistance 1.5 megs. max.

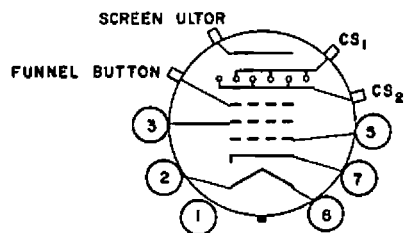
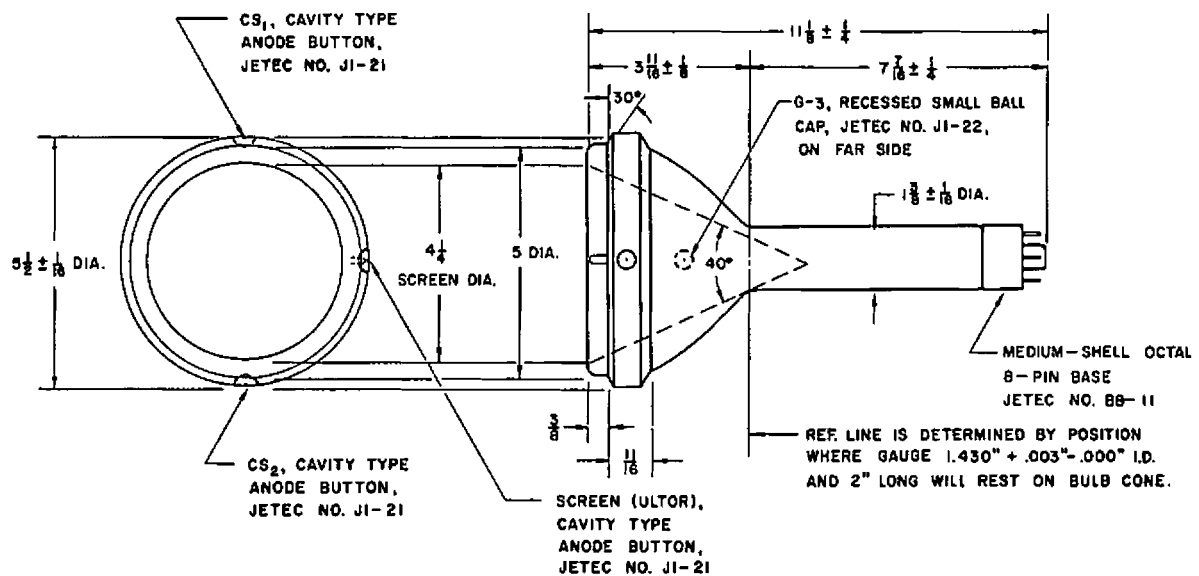
NOTES

1. Screen (ultor) voltage is defined as the total accelerating DC potential between the cathode and the phosphor plate. This anode voltage provides the high potential necessary for the function of post-deflection focusing.
2. Seeker voltage is defined as the DC potential between the color selectors and Grid #3. This voltage is such that the color selectors are negative with respect to Grid #3, and is adjusted for optimum color purity.
3. Color purity is determined by the optimum ratio of the screen voltage to the Grid #3 voltage, seeker voltage, and focus coil positioning.
4. For visual extinction of focused spot.
5. With the JETEC focus coil #109 located so that the center of the focus coil gap is located four inches behind the yoke reference line.

CHROMATRON® 5CGP29

LICENSED UNDER U.S. PATENTS OF CHROMATON TELEVISION LABORATORIES, INC.

DIMENSIONAL OUTLINE



BOTTOM VIEW

- | | |
|---|-----------------|
| PIN 2 - HEATER | PIN 7 - CATHODE |
| PIN 3 - GRID NO. 2 | PIN 8 - HEATER |
| PIN 5 - GRID NO. 1 | |
| CS ₁ , CS ₂ - COLOR SELECTORS | |

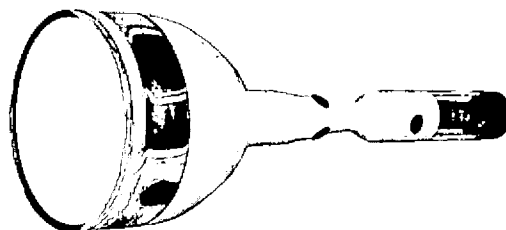
LITTON INDUSTRIES

ELECTRON TUBE DIVISION—ELECTRONIC DISPLAY LABORATORY

1476 66TH STREET • EMERYVILLE, CALIFORNIA • OLYMPIC 8-3831



5CHP11 CHARACTER WRITING CRT



ELECTROSTATIC DEFLECTION FOR CHARACTER WRITING
EQUAL DEFLECTION SENSITIVITY ON EACH AXIS
ELECTROMAGNETIC DEFLECTION FOR CHARACTER
POSITIONING
COMMON DEFLECTION ZONES FOR BOTH SYSTEMS
METALLIZED HIGHLY ACTINIC PHOSPHOR SCREEN
ACTIVE SCREEN AREA $4\frac{1}{4}$ " DIAMETER
SCREEN VOLTAGE UP TO 30,000 VOLTS

APPLICATIONS

Suggested applications include: high speed display of characters by beam writing techniques, especially for computer read-out photographic applications, electronic character forming, etc.

DATA

GENERAL

Heater voltage (AC or DC) 6.3 volts
Heater current 0.6 amperes
Direct Interelectrode Capacitances:
Grid #1 to all other electrodes 8 uuf
Cathode to all other electrodes 5 uuf
Phosphor Screen
Aluminized, controlled micro particle size... P-11
Fluorescence blue
Phosphorescence blue
Decay rate fast
Focusing Method Magnetic
Deflection Method Magnetic
Deflection Angle (Approx.) 40°
Auxiliary Deflection Method Electrostatic
Auxiliary Deflection Angle (Approx.) 10°
Overall Length $14\frac{3}{8}" \pm \frac{1}{8}"$
Bulb Diameter, max. $5" \pm \frac{1}{8}"$

Minimum Useful Screen Diameter $4\frac{1}{4}"$
Mounting Position Any
Caps — recessed small cavity (JETEC No. J1-21)
Base — small shell duodecal 7-pin
(JETEC No. B7-51)

*MAXIMUM RATINGS

Screen (ultor) voltage 27,000 DC
Grid #2 voltage 700 DC
Grid #1 voltage:
Negative bias value 200 DC
Positive bias value -1 DC
Positive peak value 0

Peak heater — cathode voltage:

Heater negative with respect to cathode
during equipment warm-up period not
to exceed 15 seconds 410 DC
After equipment warm-up 150 DC
Heater pos. with respect to cathode 150 DC

Electrostatic Deflection System:

Sensitivity (equal deflection in the x and y axis)
20 KV anode Approx. $0.375"/1000$ volts
(± 500 volts from anode)

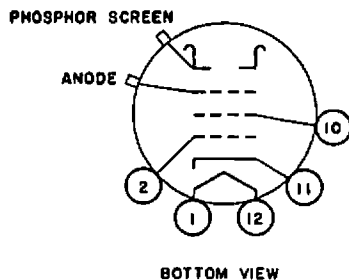
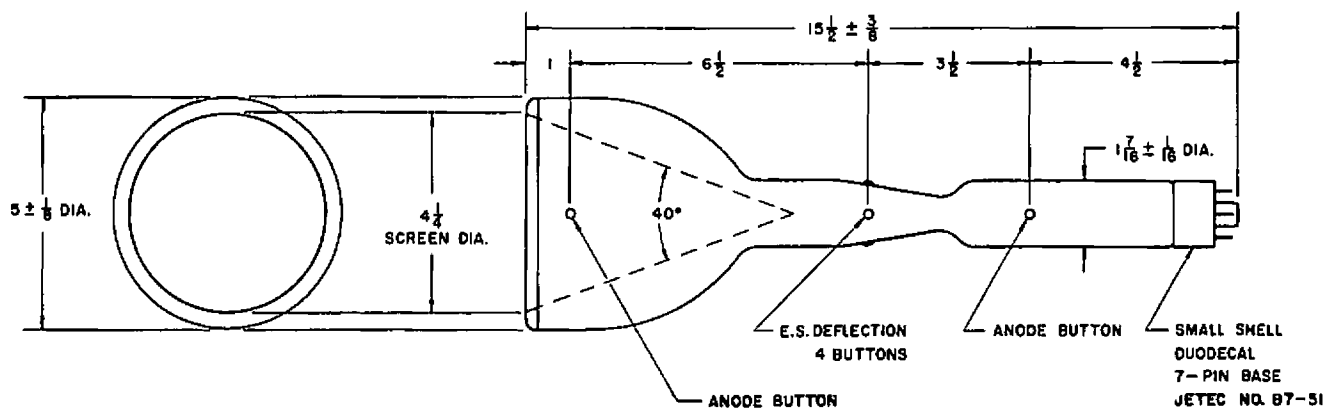
*design-center values

TYPICAL OPERATION

Ultor voltage 27,000 DC
Grid #2 voltage 500 DC
Grid #1 voltage for visual extinction
of focused spot -110 DC
Circuit values:
Grid #1 circuit resistance 1.5 megs. max.

5CHP11 CHARACTER WRITING CRT

DIMENSIONAL OUTLINE



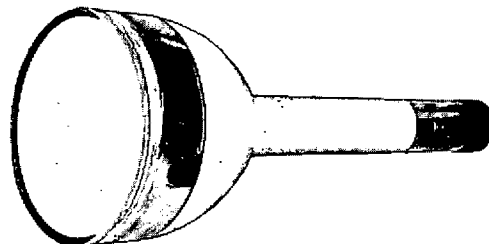
PIN 1 - HEATER	PIN 11 - CATHODE
PIN 2 - GRID NO. 1	PIN 12 - HEATER
PIN 10 - GRID NO. 2	ANODE - TWO BUTTONS USED

NOTE: FOUR SYMMETRICALLY POSITIONED BUTTONS IN NECK CONNECT TO ELECTROSTATIC DEFLECTION PLATES.

LITTON INDUSTRIES

ELECTRON TUBE DIVISION—ELECTRONIC DISPLAY LABORATORY

1476 66TH STREET • EMERYVILLE, CALIFORNIA • OLYMPIC 8-3831

**5CJP11 HIGH DEFINITION CRT**

3000 TV LINE RESOLUTION
 FLAT FACE PLATE
 METALLIZED HIGHLY ACTINIC PHOSPHOR SCREEN
 ACTIVE SCREEN AREA $4\frac{1}{4}$ " DIAMETER
 SCREEN VOLTAGE UP TO 30,000 VOLTS

APPLICATIONS

This tube uses "micro-selected" P-11 phosphor, and is especially designed for photographic applications such as side looking radar, transparency reproduction, and high definition TV recording. With other specialized phosphors the same generic tube may be used as a very high definition flying spot scanner, monitor, and radar type CRT.

DATA**GENERAL**

Heater voltage (AC or DC) 6.3 volts
 Heater current 0.6 amperes
 Direct Interelectrode Capacitances:
 Grid #1 to all other electrodes 8 uuf
 Cathode to all other electrodes 5 uuf
 Phosphor Screen:
 Aluminized, controlled particle size P-11
 Fluorescence blue
 Phosphorescence blue
 Decay Rate fast
 Focusing Method Magnetic
 Deflection Method Magnetic
 Deflection Angle 40°

Overall Length $14\frac{3}{8}" \pm \frac{3}{8}"$
 Bulb Diameter, max. $5" \pm \frac{1}{8}"$
 Minimum Useful Screen Diameter $4\frac{1}{4}"$
 Mounting Position Any
 Cap — recessed small cavity (JETEC No. J1-21)
 Base — small shell duodecal (JETEC No. B7-51)

***MAXIMUM RATINGS**

Screen (ultor) voltage 27,000 DC
 Grid #2 voltage 700 DC
 Grid #1 voltage:
 Negative bias value 200 DC
 Positive bias value -1 DC
 Positive peak value 0 volts
 Peak heater — cathode voltages:
 Heater negative with respect to cathode 150 DC
 Heater positive with respect to cathode 150 DC
 Focus coil current

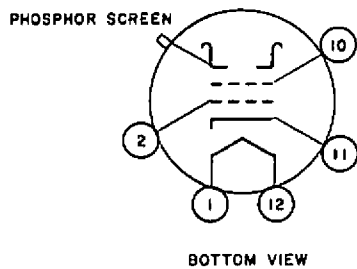
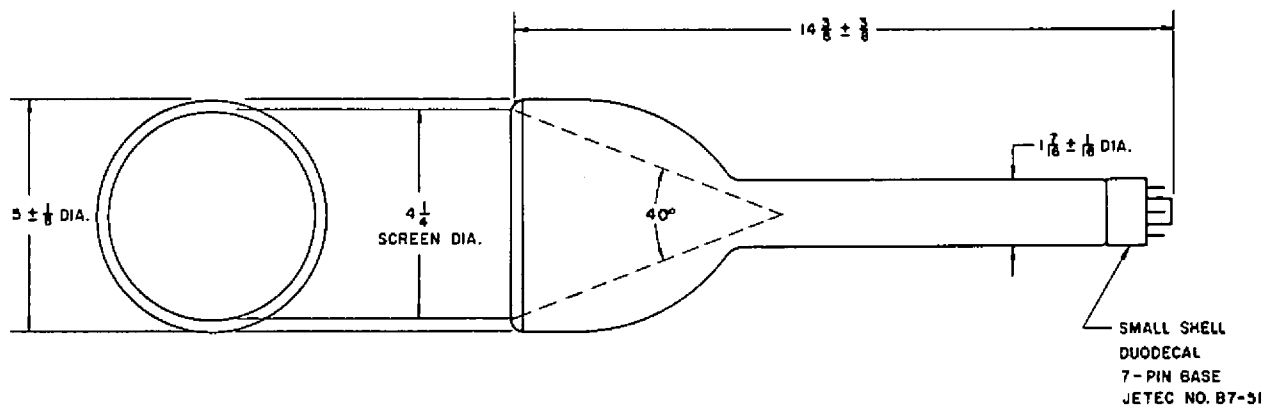
*design-center values

TYPICAL OPERATION

Ultor voltage 27,000 DC
 Grid #2 voltage 500 DC
 Grid #1 voltage for visual extinction
 of focused spot -110 DC
 Circuit values:
 Grid #1 circuit resistance 1.5 megs. max.

5CJP11 HIGH DEFINITION CRT

DIMENSIONAL OUTLINE



PIN 1 - HEATER
PIN 2 - GRID NO. 1
PIN 10 - GRID NO. 2

PIN 11 - CATHODE
PIN 12 - HEATER
BUTTON - ANODE

UHF MAGNETRON

RTMA Designation 6233
Manufacturer's Designation L-3023

General Characteristics

Electrical

Filament or Cathode Unipotential type
(oxide coated)
Voltage 6.3 volts
Current (approx.) 1.0 amps
Frequency (adjustable) 9310 Mc

Typical Operation-Pulse

Field Strength(approx) Packaged
Anode Voltage 5800 volts
Anode Current(average) .0077 amps
Power Output(average) 14 watts
Duty Cycle .002

Mechanical

See Outline Drawing

Maximum Ratings

Anode Voltage 6000 volts
Anode Current (Peak) 4 amps
Anode Current (average) .012 amps
Anode Dissipation 50 watts
Anode Temperature 150 °C
Cooling Air
Power Output 21 watts

Description: Magnetron, tunable, pulse type, with integral magnet.

Ratings:	Ef	epy	ib	pi	Pi	tk	Du	tp	Anode	rrv
Absolute	V	kv	a	kv	W	Sec	--	us	°C	
Maximum	7.0	7.0	5	35	75	---	.003	1.0	+150	
Minimum	---	---	--	--	--	180	----	---	-55°	Note 9

Ref:	Test	Conditions	Min.	Max.
D-2	Type Approval:	Required for JAN Marking		
E-4d	**Salt Spray Corrosion:	Omit		
F-2	Electrode Insulation:	Omit		
F-3	Holding Period:	T = 168 hours		
F-6a	Drop:	Note 1		
F-6b(1)	*Vibration:	No voltage; t = 60; F = 25; Note 1		
F-6b(2)	**Vibration:	No voltage; t = 60; F = 50; G = 10		
F-5d	Dimensions:	Per Litton Industries Outline Drawing No. L-3023-5		
E-7c	Markings:			
F-10c	**Cooling:	Air, forced - Note 2	---	125°C
F-10d	**Cathode:	Unipotential, oxide coated		
F-5a	Pressurizing:	None		
F-6i	Heater current:	Ef = 6.3 V	If 0.90	1.10A
F-10e	<u>Oscillation (1):</u>			
F-10e(1)	Magnetic field:	Integrally attached permanent magnet		

LITTON INDUSTRIES TUBE L-3098

<u>Ref:</u>	<u>Test</u>	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>
F-10e(2)	Heater:	tk = 180 sec. (Max.) at Ef = 5.7 V min. Note 5, Note 7		
F-10e(3)	Pulse Characteristics:	tp = 0.45 to 0.55 us; trv = 0.2 us (max.) Du = 0.003		
F-10e(4)	Average anode current Anode temperature Standing wave ratio	Ib = 11.5 mA. dc. T = 125°C Max. σ = 1.05 Max.		
F-10e(5)	Pulse voltage		epy: 5.5	6.0 kv
F-10e(6)	Power Output:	Method A; t = 300 sec. (Max.)	Po: 21	W
F-10e(7)	Frequency:	F: 9310 ± 1.5 Mc/s		
F-10e(8)	R.F. Bandwidth:	Ib = 10 to 12 mA. dc. Bandwidth:		3 Mc/s
F-10K	Pulling factor		PF:	20 Mc/s
	Stability	Note 3, Note 10		
F-10e	<u>Oscillation (2):</u>			
F-10e(1)	Magnetic Field:	Integrally attached permanent magnet		
F-10e(2)	Heater:	tk = 120 sec. (Max.) for Ef = 6.3V		
F-10e(3)	Pulse characteristics:	tp = 0.45 to 0.55 us; trv = 0.2 us (Max.) Du = .001 T = 25°C		
	Average Anode Current	3.8 mA. dc.		
	Frequency tuning band:	Note 4, Note 8	9290- $\frac{PF}{2}$	9335+ $\frac{PF}{2}$
F-5p	**Thermal factor:	Oscillation (1) ΔF:		0.2 Mc/s/°C
F-5q	**Low Temperature operation	tk - 180 sec. (Max.) Oscillation (1)		
F-5m	Low pressure operation:	Omit		
F-4	Life Test:	Group D: Du = .002; tp = 0.5 us trv = 0.2 us (Max.) Ib = 7.7 mA. dc.; T = 150°C Max. Note 5	T; 500	Hrs.
F-4b	Life test end point:		Po: 11	W
		Bandwidth:	-----	6.0 Mc/s

LITTON INDUSTRIES TUBE L-3023

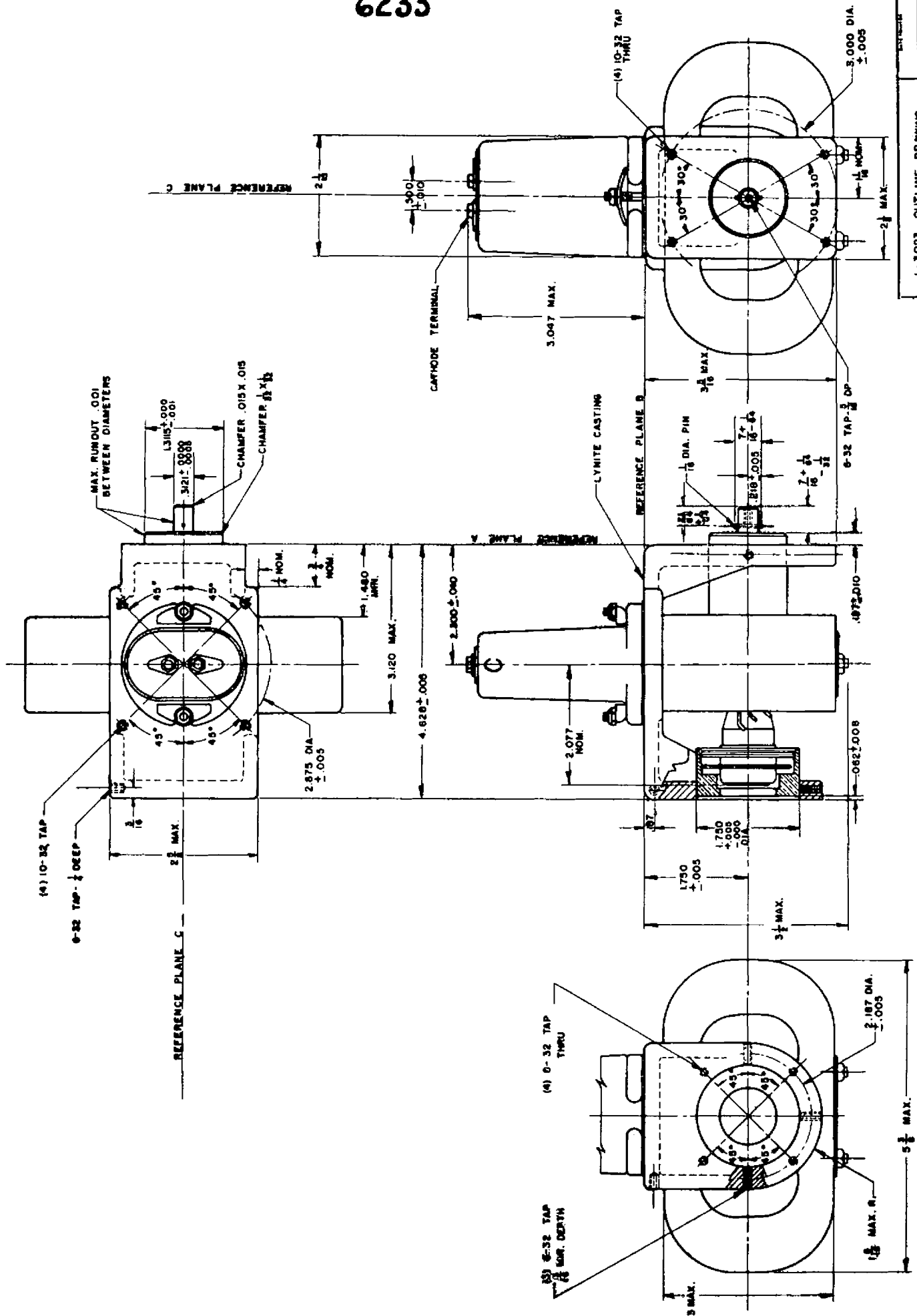
- Note 1: On evidence of satisfactory quality, the inspector may limit this test to ten tubes per month when the tube is in continuous production.
- Note 2: Cooling air must be supplied to the tube in the amount which will maintain the anode at 125°C or below, up to the maximum duty cycle.
- Note 3: The tube shall be considered stable when the number of missing pulses is a maximum of 0.5 percent of the total number of pulses during a five minute test period. A missing pulse is defined as any pulse containing less than 90 percent of the energy at the pi mode operating frequency contained in a normal pulse.
- Note 4: At an anode temperature of 25°C, the tube shall tune to $9290 \pm \frac{17}{2}$ mc/s or lower in frequency, and to $9355 \pm \frac{17}{2}$ mc/s or higher in frequency, for 2.33 turns of the external tuner shaft.
- Note 5: It is necessary to lower the heater voltage to 4.5 volts for operation at 0.002 duty or greater.
- Note 6: Tube must withstand storage temperature of -65°C under non-operating conditions.
- Note 7: Heater Supply Frequency: 360 - 1000 cps.
- Note 8: Tuner torque shall be less than 10 oz. - in over a temperature range of -30°C to +25°C.
- Note 9: In equipment application the rate of rise of applied voltage pulse shall be sufficiently slow that the rate of rise of rf shall be limited by the rate of rise of applied voltage pulses.
- Note 10: This test shall be the first test performed after the specified holding period. The counting period shall be any five minutes, at the discretion of the manufacturer, of a 15 minute operating period immediately following the shelf period.

LITTON INDUSTRIES
SAN CARLOS, CALIFORNIA

August 19, 1952
L-3023-D-9
Issue D

RTMA NUMBER 0235

6233



L-3023 - OUTLINE DRAWING

LITTON INDUSTRIES
SAN CARLOS, CALIFORNIA

L-3023 - 1

6543A

65 Kilowatts Minimum Peak Power
Tunable Frequency 8500 to 9600 mcs

The 6543 and the 6543A tunable pulse magnetrons are recommended in all new systems requiring a nominal power output of 80 kW and where tunability is a prime requisite. Extensive life testing demonstrates that these tubes are among the most reliable magnetrons available today.

The LT-6543A magnetron is selected for low frequency and time jitter characteristics and is recommended for use in those systems where tunable moving target indicator performance is required.

OPERATING CONDITIONS

Heater Voltage.....	12.6 V
Heater Current.....	2.2 A
Preheat Time.....	Min. 180 sec.
Pulse Voltage.....	13.5 to 16.5 kVdc
Pulse Current.....	15 A
Rate of Rise of Voltage.....	Max. 160 kv/us
Anode Cathode Capacitance.....	Max. 12 uufd

ABSOLUTE MAXIMUM RATINGS

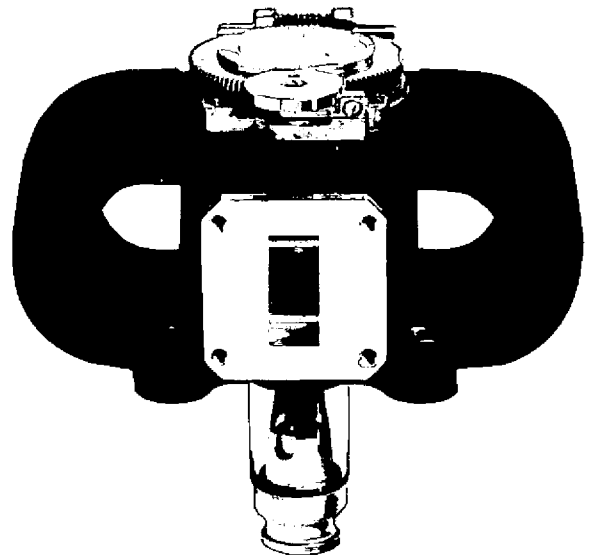
Heater Voltage.....	13.7 V
Heater Surge Current.....	10 A
Pulse Current.....	18 A
Pulse Length.....	5.0 us
Average Input Power.....	350 W
Duty Cycle.....	0.001
Anode Temperature.....	150° C
Cathode Temperature.....	175° C
VSWR.....	1.5:1 Ratio
Altitude.....	552 mmHg

PERFORMANCE CHARACTERISTICS

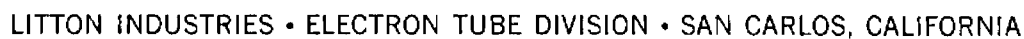
Peak Power.....	Min. 65 kW
Tunable Frequency.....	8500 to 9600 mcs
Pulling Factor (1.5:1 VSWR).....	Max. 15 mcs
Missing Pulses.....	Max. 1 Percent
Side Lobes.....	Min. 8 db
Bandwidth.....	Max. 2.0/tpc. mcs
Anode Temperature Co-efficient.....	Max. 0.25 mc/°C
Vibration (5 to 500 cps).....	0.01 Da or 5 G
Shock (11 m s).....	15 G
Rated Cycle Life.....	400 hrs.
6543A Only—Frequency Jitter.....	Max. 60 kc
Time Jitter.....	Max. 1.4 mus
Amplitude Jitter.....	Max. 0.02 db

MECHANICAL RATINGS

Mounting Position.....	Any
Weight.....	6 1/8 lbs.
Mating Mounting Flange.....	UG-52A/U
Anode Cooling.....	Forced Air
Output Pressurization.....	Max. 45 lbs./sq. in.
Cathode Pressurization.....	Max. 45 lbs./sq. in.



6543A





LITTON INDUSTRIES

SAN CARLOS, CALIFORNIA
U.S.A.

Reservation No. 5288
Reservation Date 3-14-45

Manufacturer's Designation L-3000
Data Bureau Designation 6J21

UHF MAGNETRON

General Characteristics

Electrical

(a) Filament or Cathode	Filement	type
Voltage (approx.)	5.6	volts
Current	17.2	amps
Frequency (continuously tuned)	2.5 to 3.55	kMc

Typical Operation - C.W. or Modulated

Field Strength (approx.)	2500	gauss
Anode Voltage	5000	volts
Anode Current (average)	300	amps
Power Output	800	watts

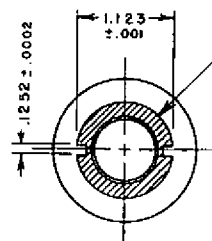
Mechanical

See Outline Drawing

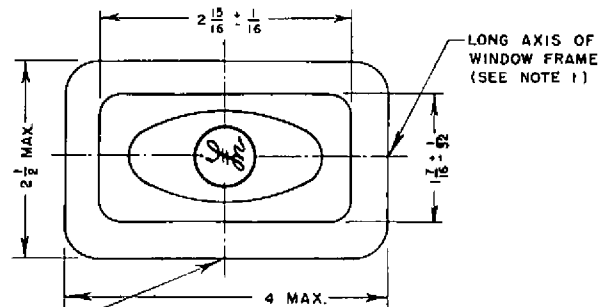
Maximum Ratings

Anode Voltage	6000	volts
Anode Current (Peak)	1.0	amps
Anode Current (Average)	0.4	amps
Anode Dissipation	1000	watts
Anode Temperature	120	°C
Cooling	Water-Air	
Power Output	1000	watts

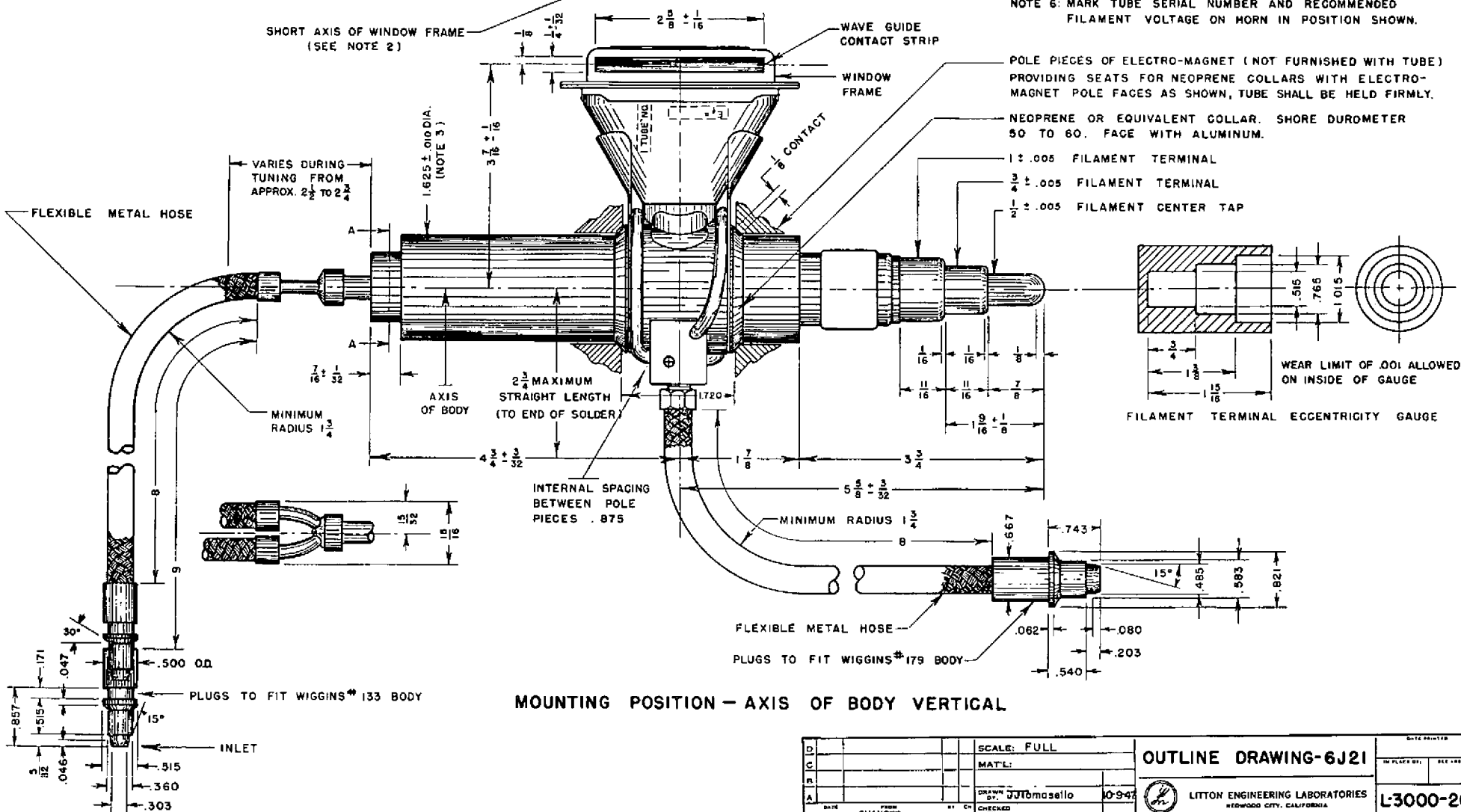
(a) Thoriated Tungsten



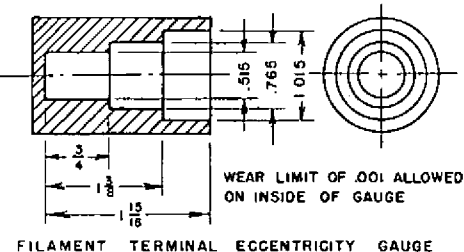
2 SLOTS. EACH .125 ± .001 DEEP
SECTION A-A



SHORT AXIS OF WINDOW FRAME
(SEE NOTE 2)



- NOTE 1: THE LONG AXIS OF THE WINDOW FRAME MUST BE PARALLEL WITH THE AXIS OF THE BODY WITHIN 2°.
- NOTE 2: THE SHORT AXIS OF THE WINDOW FRAME MUST BE WITHIN 1/8 OF THE BODY.
- NOTE 3: MAKE NO ATTACHMENTS TO NECK OF TUBE FOR TUNING OR ANY PURPOSE.
- NOTE 4: MEASURE ECCENTRICITY OF FILAMENT TERMINALS BY FILAMENT TERMINAL ECCENTRICITY GAUGE.
- NOTE 5: MEASURE ECCENTRICITY OF DOUBLE FILAMENT TERMINALS WITH RESPECT TO BODY USING V BLOCK AND A 1.625 O.D. X 5/8 I.D. RING WHICH MUST SLIP OVER 1/2 FILAMENT TERMINAL.
- NOTE 6: MARK TUBE SERIAL NUMBER AND RECOMMENDED FILAMENT VOLTAGE ON HORN IN POSITION SHOWN.



MOUNTING POSITION - AXIS OF BODY VERTICAL

D		SCALE: FULL		OUTLINE DRAWING-6J21	
C		MATERIAL:		IN PLACE BY: SEE ORDER	
R		DRAWN BY: J. J. Tomassello		LITTON ENGINEERING LABORATORIES	
A		CHECKED BY:		REDWOOD CITY, CALIFORNIA	
DATE: 10-9-47		FROM: - CHANGED -		L3000-200	

7504

klystron

The 7504 is a pulsed amplifier klystron capable of producing a peak power output of 2.2 megawatts at a .003 duty cycle. It has three integral cavities which can be mechanically tuned to cover the frequency band from 1240-1360 mcs. The ability to operate at pulse lengths up to 9 μ s and to provide a gain of 36 db makes it ideally suited for use in ground based radar systems.

The unique high temperature processing used in all Litton Industries' tubes permits the 7504 klystron to provide reliable, long-life operation.

ELECTRICAL DATA — GENERAL

Heater Voltage (ac)	16 volts
Heater Current at 16 Volts	7.0-9.5 amps
Heater Cold Resistance	0.261 ohms
Input Connector	Type C
Output Connection	Special transition to RG-69/U or RG-103/U Waveguide

MECHANICAL DATA — GENERAL

Base and Physical Dimensions	See Outline Drawing
Mounting Information	Any Position
Cooling Data, Water	

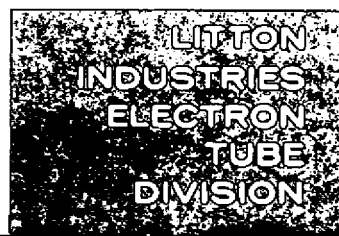
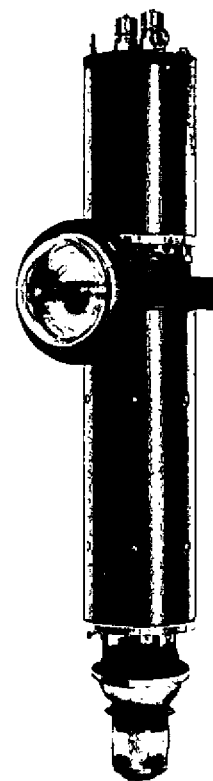
	COLLECTOR	BODY
Flow	7.5 gpm	1.5 gpm
Pressure drop	50 psi	50 psi
Net Weight		Approx. 110 lbs.

ABSOLUTE RATINGS

	MIN.	MAX.
Heater Voltage, E_r	15	17 Volts ac
Heater Current, I_r (surge)		20 amps
Anode Voltage, e_{py}		125 KV
Anode Voltage, e_{px}		30 KV
Cathode Current, Peak I_k		87 amps
Cathode Current Avg. I_k		260 ma
Peak Power Input		9.5 MW
Average Power Input		27.5 KW
Frequency	1240	1360 Mcs
Pulse Length, t_p (epy)		9 μ s
R-F Input Power, Peak		1 KW
R-F Input Power, avg.		100 W
Load VSWR		1.5:1
Cathode Heating Time	20	minutes
Window Pressure		50 psia
Cathode Seal Temp		175°C
Window Seal Temp		125°C
Hydrostatic Pressure		75 psig
Tuner Torque		500 in/oz.
Fluid Coolant Outlet Temp		70°C

TYPICAL OPERATION

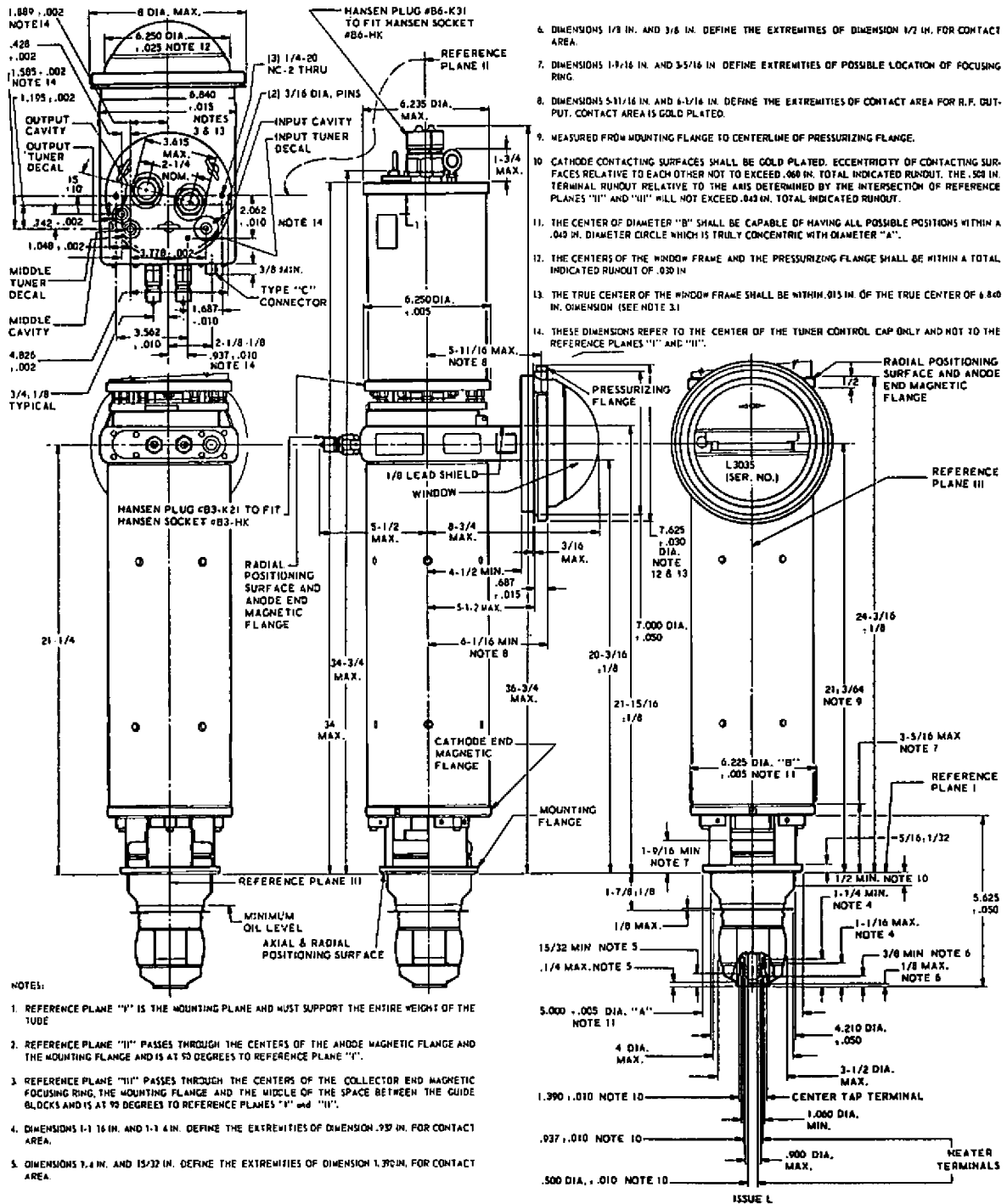
Peak Voltage	115 KV
Peak Current	78 a
Pulse Width	8 μ s
Duty	0.003
Peak Power Output	2.2 MW
Gain	36 db
Time Jitter, rms	5 m μ s
Phase Jitter, rms	0.5°



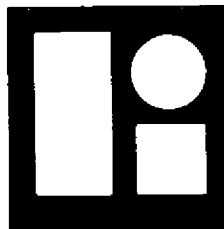
960 INDUSTRIAL ROAD, SAN CARLOS, CALIF.

from JEDEC release #2560, Aug. 17, 1959

7504



**LITTON
INDUSTRIES
ELECTRON
TUBE
DIVISION**



960 INDUSTRIAL ROAD, SAN CARLOS, CALIF.

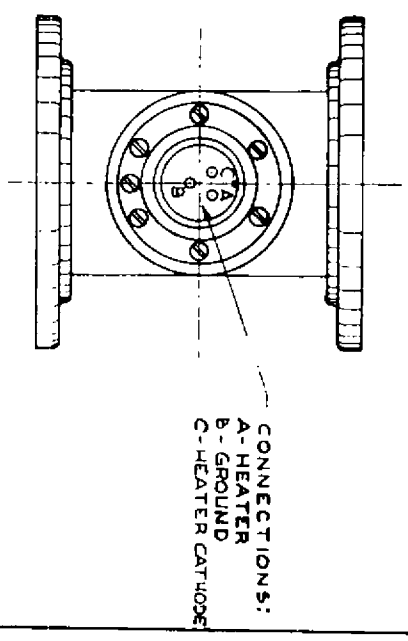
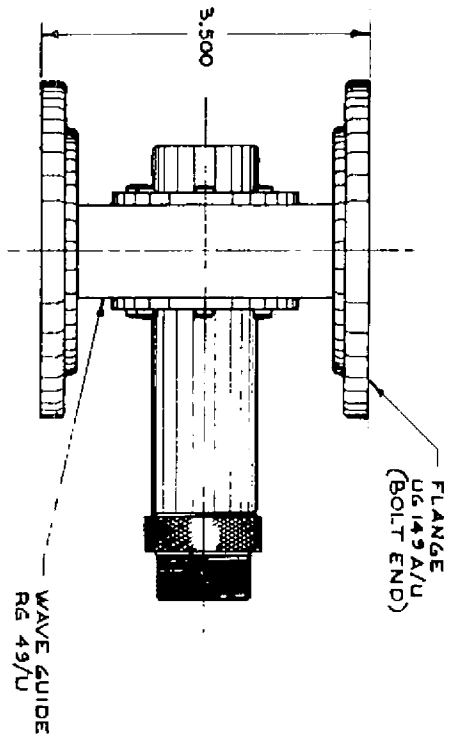
SPECIFICATIONS FOR ELECTRON TUBE TYPE USAF 7686/L-2001

1. Frequency Range: The Thermal Noise Generator must meet all requirements of this specification when operated at any frequency from 5,400 to 5,900 megacycles.
2. Voltage Standing Wave Ratio: The VSWR must not exceed 1.15 over the specified frequency range with the Thermal Noise Generator unfired.
3. Insertion Loss: The insertion loss must not exceed 0.2 DB over the specified frequency range with the Thermal Noise Generator unfired.
4. Power Capacity: The Thermal Source Generator shall be capable of continuous operation at "RF" power levels of 50 milliwatts average and 33 watts peak.
5. Noise Output: The noise output shall be 13 DB nominal. The output at 5650 megacycles shall be determined to within 0.25 DB and marked on each unit. The output shall not vary from the marked value by more than 0.5 DB over the specified frequency range.
6. Operating Voltages & Currents: The Thermal Noise Generator shall provide the specified noise output when operated as follows:
 - A. Starting voltage 700 volts D.C. maximum
 - B. Operating voltage 60 volts D.C. maximum
 - C. Operating current 150 milliamperes maximum
 - D. The filament shall be 6.3 volts A.C. @ 1.25 amps
7. Life: The assembly shall be capable of continuous operation for at least 5000 hours energized for 50 micro seconds every 3000 micro seconds.
8. Temperature: Must meet all requirements specified when subject to ambient temperatures from -54°C to + 71°C non-operating & -54°C to + 60°C when operating per Spec. Mil-E-4158.
9. Salt Spray: Must be mechanically & electrically operative after 50 hours min. Salt Spray per Spec. Mil-E-005272.
10. Humidity: Must suffer no damage or degradation in performance when subjected to relative humidities up to 100% at 100°F min. condensation due to temperature changes when operating or non-operating per Spec. Mil-E-4158 & Mil-Std-170.
11. Shock & Drop: Must be mechanically & electrically operative after shock test per Method 2A and drop test per Method 3A per Spec. Mil-T-4807.
12. Vibration: Must suffer no damage or degradation in performance after vibration per Spec. Mil-T-4807 Method 1A.
13. All metallic parts which are not corrosion resistant shall have a protective finish in accordance with Mil-P-14072.
14. Finish:
 - Step 1 - The flange faces and waveguide interior shall be silver plated M311 per Spec. Mil-P-14072
 - Step 2 - The flange faces and waveguide interior shall be rhodium flashed to a thickness of 5 to 10 millionths of an inch.
 - Step 3 - Mask all indicated areas.
 - Step 4 - Paint finish to be in accordance with Spec. Mil-E-15090, Class 2 Type III

15. The ionization time shall be under 1 micro second. The deionization time shall be 20 micro seconds max.
16. The anode of the gas tube shall be case grounded.
17. The tube holder and flanges shall be silver soldered to waveguide per Spec. QQ-S-561 Class 2.

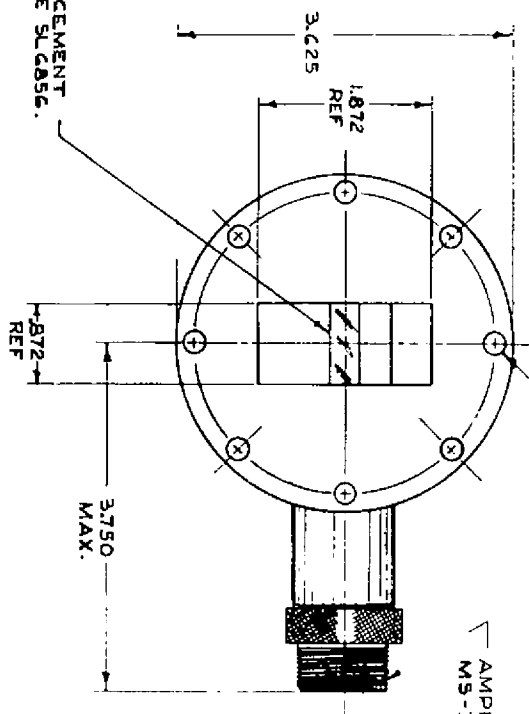
Footnotes: These additional specifications apply for the tubes ordered by the Avco Crosley Corp.

1. For Crosley the noise output will be marked on each unit per Crosley Spec. ES-701
2. Finish: Step 4 - Paint finish to be in accordance with Crosley Spec. ES-511.
3. Marking - Part to be marked "CSY 743002" per Crosley Spec. ES-701 approximately where shown.
4. Test per Crosley Spec. ES-108.402.



8 HOLES $\frac{3}{16}$ DIA SPACED EQUALLY ON 3.250 DIA. HOLE CIRCLE

AMPHENOL CONNECTOR MS-3102A-16-10P



PERFORMANCE CHARACTERISTICS

FREQUENCY RANGE-MEGACYCLES: 5400-5900
EXCESS NOISE RATIO-DB: 13 $\pm$ 0.5
APPLICATION: DOUBLE ENDED

ELECTRICAL SPECIFICATIONS

FILAMENT VOLTAGE-VOLTS AC: 6.3
FILAMENT CURRENT-AMPERES AC: 1.25
FIRING VOLTAGE-VOLTS: 700 MAX.
OPERATING ANODE VOLTAGE-VOLTS: 60V. MAX.
POSITIVE: 60V. MAX.
OPERATING CURRENT-DC MILLIAMPERES: 150 MAX.
CAUTION: DC CURRENT LIMITING RESISTOR REQUIRED

MECHANICAL SPECIFICATIONS

VIBRATION: MIL-T-4807 METHOD 1A
TEMPERATURE: MIL-E-4158-54 TO +71°C.
NON-OPERATING: -54 TO 60°C OPERATING.
SHOCK AND DROP: MUST BE MECHANICALLY AND ELECTRICALLY OPERATIVE AFTER SHOCK TEST PER METHOD 2 A AND DROP TEST PER METHOD 3A PER SPEC. MIL-T-4807

REFERENCE ONLY

DATE PRINTED		DATE	
REV. 00000			
TENTATIVE OUTLINE DRAWING 7686/L2001			
LITTON INDUSTRIES ELECTRONIC DIVISION LITTON INDUSTRIES 			