ING WAVE TUBES • SUPER
KLYSTRONS • PULSE MAG
S • MONITOR DIODES • BA
NS • BACKWARD WAVE OS
RS • DISPLAY DEVICES • B
ND KLYSTRON AMPLIFIE
IATURE MAGNETRONS • R
KLYSTRONS • SWITCH TUB
SSED FIELD FORWARD W
PLIFIERS • MILLIMETER
BES • MICROTRON • C W M
ONS • PLANAR TRIODE TU
CROWAVE TUBE ACCESSO
PMENT • FLOATING DRIFT
LYSTRON OSCILLATORS • T
KLYSTRON AMPLIFIERS
ING WAVE TUBES • SUPER
KLYSTRONS • PULSE MAG
S • MONITOR DIODES • BA
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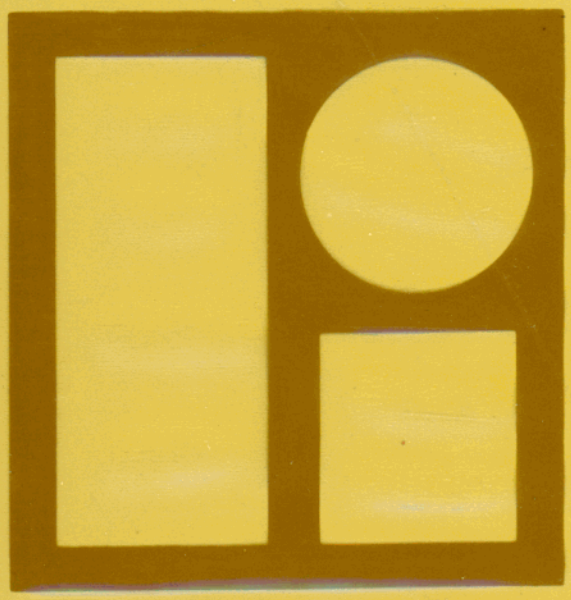
BES • MICROTRON • C W M
ONS • PLANAR TRIODE TU

DATA/LOG

VOLUME II



ELECTRON TUBE DIVISION
OF LITTON INDUSTRIES
SAN CARLOS, CALIFORNIA

This

LITTON INDUSTRIES

Electron Tube Division

DATA/LOG No. 2052

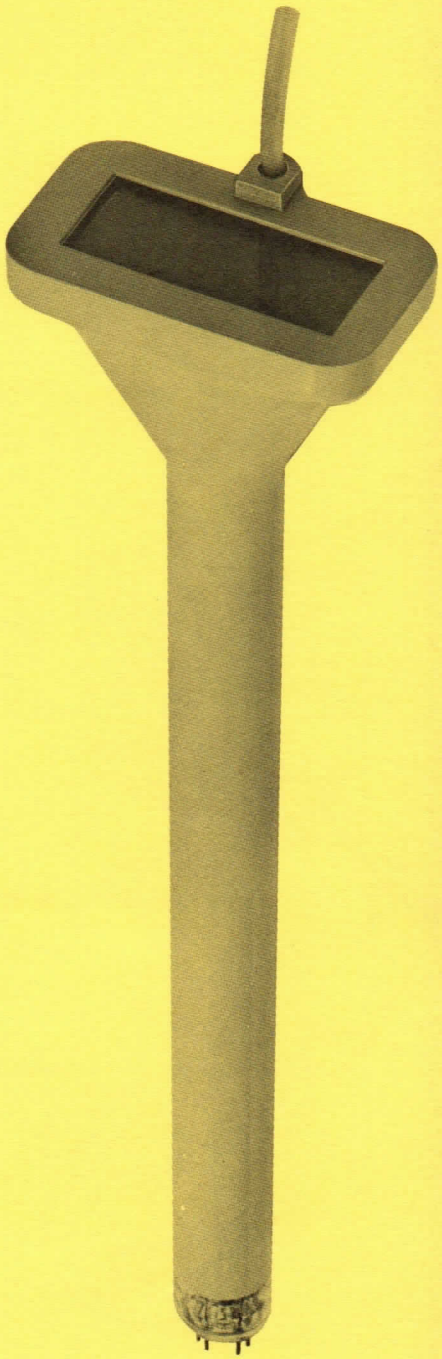
has been registered to

This second edition of the Litton color-coded catalog has been prepared for your convenience to use as a guide in selecting microwave power tubes. New and revised color-coded DATA/LOG sheets will be mailed periodically.

CATHODE RAY TUBE

L-4103

C2A11A



Micropix® Miniature Rectangular High Resolution CRT

The Litton L-4103 has been designed to provide high resolution performance in a relatively small cathode ray tube package. This tube features a reduced diameter neck for miniaturization, plus a geometrically efficient rectangular phosphor screen. In addition, all the high performance features found in the larger MICROPIX® CRTs are incorporated in the design. This device is particularly useful in minimum volume high performance photographic and other scanning applications.

ELECTRICAL DATA:

Heater Potential	6.3 Volts
Heater Current	0.3 Amperes
Focusing and Deflection Method	Magnetic

MECHANICAL DATA:

Dimensions	See Outline Drawing
Mounting Position	Any
Base	E 9-1
Min. Useful Screen Area	¾″ x 2″
Anode Connection	Insulated Lead 36″
Front Mounting Face	Machined Flat

OPTICAL DATA:

Face Panel	Clear, Flat
Phosphor (Note 1) (Blue Medium Short Persistence)	P11

MAXIMUM RATINGS:

Max. Anode Voltage	15,000 Volts dc
Max. Grid 2 Voltage	1,000 Volts dc
Grid 1 Voltage:	
Max. Negative Bias Value (Steady State)	200 Volts
Min. Bias Value (Steady State)	−1.0 Volt
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Megohms

TYPICAL OPERATION:

Anode Voltage	12,000 Volts dc
Grid 2 Voltage (Note 2)	600 Volts dc
Grid 1 Voltage (Note 3)	−50 to −100 Volts dc
Line Width (Note 4)	0.0009″

Note 1: Other phosphors available.

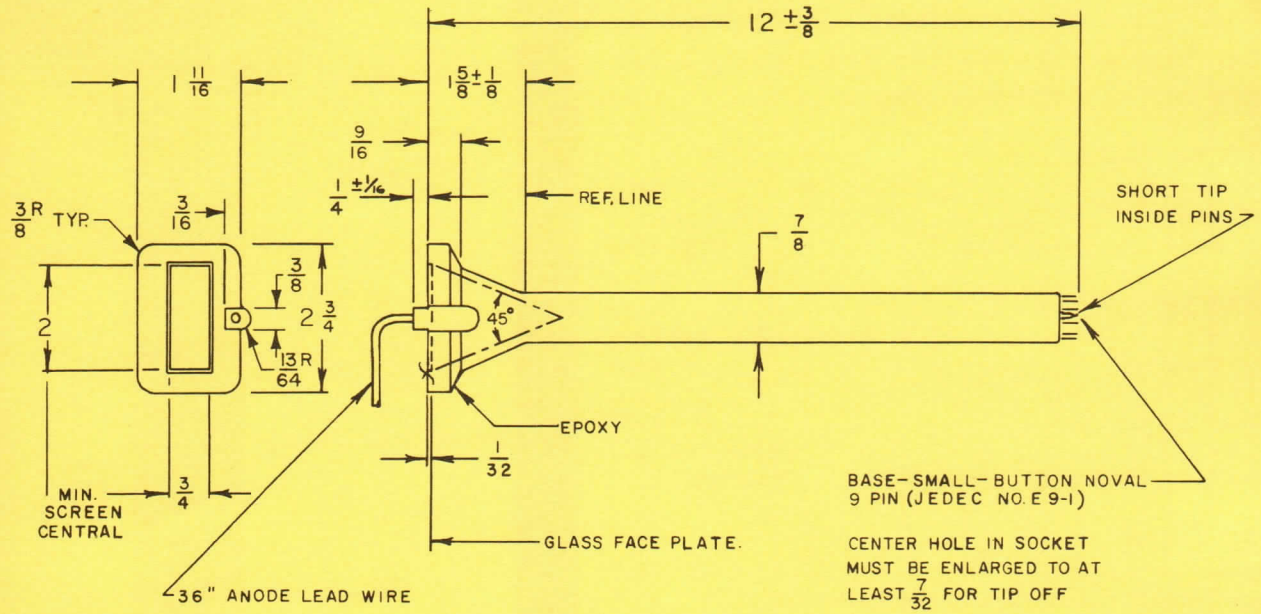
Note 2: Power supply impedance for this electrode should not exceed 10,000 ohms.

Note 3: For visual extinction of a focused raster.

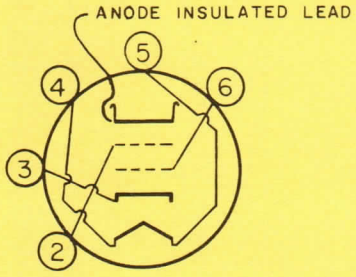
Note 4: Line width is measured by the shrinking raster technique at the center of the screen with a 525 line interlaced raster.

CATHODE RAY TUBE

L-4103



BASE DIAGRAM



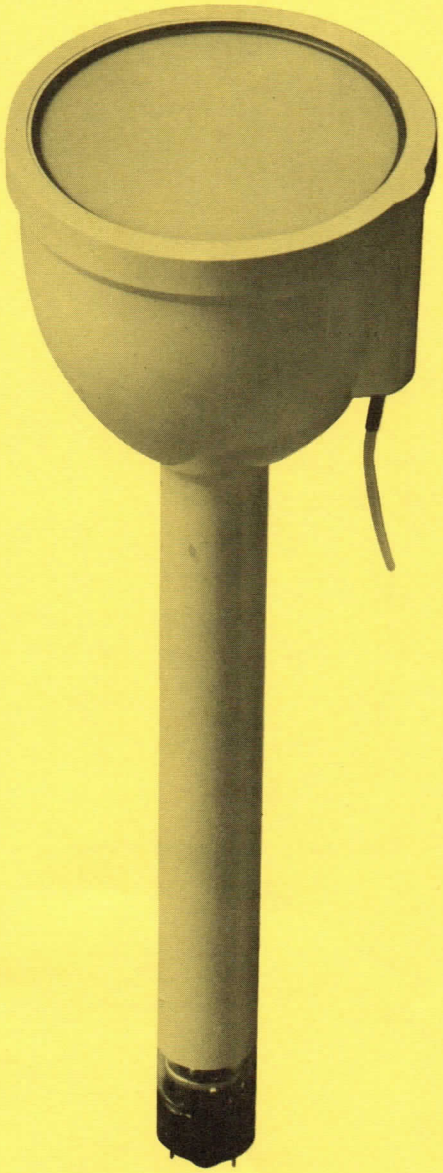
PIN 2 — GRID NO. 2
PIN 3 — CATHODE
PIN 4 — HEATER
PIN 5 — HEATER
PIN 6 — GRID NO. 1
H.V. WIRE—ANODE

CATHODE RAY TUBE

L-4119

MICROPIX® High Definition Cathode Ray Tube

The L-4119 is another member of the MICROPIX® series of high performance cathode ray tubes. These tubes are built with an exceptionally uniform, fine grain, low noise phosphor screen on an optical quality faceplate. The L-4119 with P24R phosphor has been further refined to provide high, broad spectrum, light output for color flying spot scanning. The screen thickness has been tailored to a greater than normal light output for high resolution applications. Special emphasis has been placed on providing maximum power from the red component. Screen quality specifications are the highest known in the industry. The electron gun is a slightly modified version of the high current "A" gun used in the L-4108. The basic L-4119 structure can be ordered in a precision mounted and/or ruggedized version for extreme environmental conditions such as those encountered in airborne applications.



ELECTRICAL DATA

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to all others	10 pfd
Cathode to all others	6.0 pfd
Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle (nominal)	40°

MECHANICAL DATA

Overall Length	17¾" ±¼"
Maximum Diameter	5¼" ±1/16"
Mounting Position	Any
Base	B7-51
Minimum Useful Screen Diameter	4¼"
Anode Connection	7" Insulated Lead plus Alden 8111M Connector

OPTICAL DATA

Face Panel
Clear, Non-Browning, Flat, Ground and Polished

Phosphor (Note 1):
P24R . . . . . Broad Spectrum, short persistence

Metalized Screen

MAXIMUM RATINGS

Maximum Anode Voltage	32,000 Volts
Maximum Grid 2 Voltage	1,000 Volts
Grid 1 Voltage:	
Maximum Negative Bias Value (Steady State)	200 Volts
Minimum Bias Value (Steady State)	−1.0 Volt
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Megohms

TYPICAL OPERATION

Anode Voltage	30 kv dc
Grid 2 Voltage (Note 2)	450 Volts dc
Grid 1 Voltage (Note 3)	−60 to −100 Volts dc
Line Width (Note 4)	30 microns
Light Output (@ 1_A=40μA, Note 5)	275 foot lamberts

NOTES:

1—Other phosphors available.

2—Power supply impedance for this electrode should not exceed 10,000 ohms.

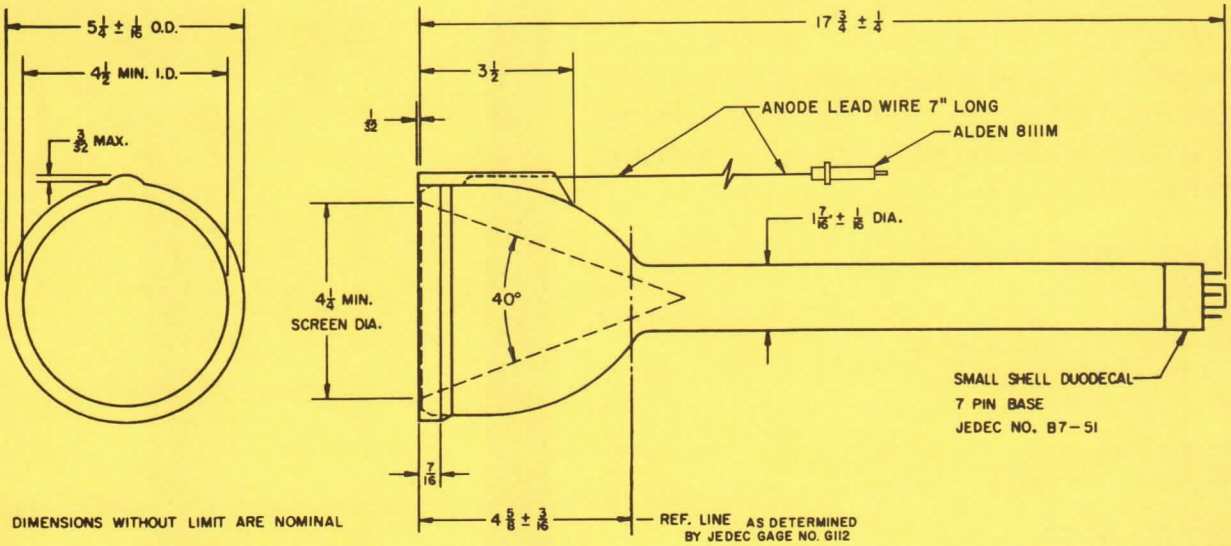
3—For visual extinction of a focused raster.

4—Line width is measured by the shrinking raster technique at the center of the screen, with a 525 line non-interlaced raster.

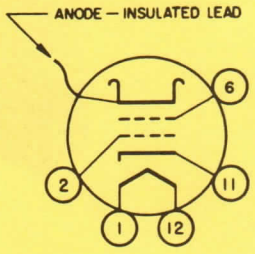
5—Measured with a 2" square standard 525 line raster.

CATHODE RAY TUBE

L-4119



DIMENSIONS WITHOUT LIMIT ARE NOMINAL



BOTTOM VIEW

PIN 1 — HEATER
PIN 2 — GRID NO. 1
PIN 6 — GRID NO. 2
PIN 11 — CATHODE
PIN 12— HEATER
H.V. WIRE-ANODE

CATHODE RAY TUBE

L-4120

MICROPIX® High Resolution CRT

The L-4120 is a high resolution five inch cathode ray tube with characteristics similar to the Litton tube type L-4108. The unique feature of this tube is a special integral mounting ring which is machined to close tolerances after tube assembly. This insures accurate alignment and perpendicularity of the tube face with respect to the centerline of an optical system. This machined mount is drilled and tapped so the tube may be bolted to the customer's equipment, thus eliminating movement caused by the use of resilient mounting materials. The rugged nature of the assembly makes the L-4120 particularly useful in airborne applications.

This unique MICROPIX® cathode ray tube features a high performance gun and a fine grain phosphor screen on a faceplate made from a special optical melt.

The P16 version of this tube is well suited for critical flying spot scanning applications. The special mount may be ordered as an option on most standard Litton five inch high resolution tubes. For instance, the ultra-high resolution L-4123 is available utilizing this structure.

ELECTRICAL DATA

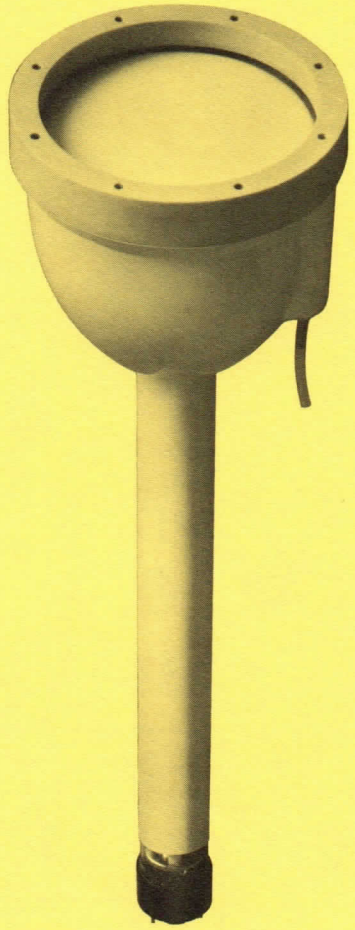
Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to all others	10 pfd
Cathode to all others	6.0 pfd
Focusing and Deflection Method	Magnetic
Deflection Angle (nominal)	40°

MECHANICAL DATA

Dimensions	See Outline Drawing
Mounting Position	Any
Mounting Face (machined, with tapped bolt holes)	
Parallel to tube face	±0.001"
Tube Neck Alignment	
Concentric to mounting ring	<0.030" TIR
Useful Screen Diameter	4¼" min.
Anode Connection	Insulated Lead 24"
Base	B7-51

OPTICAL DATA

Faceplate Glass Specifications:	
Glass	Optical Quality, Clear, Non-Browning, made from special melt
Phosphor (Note 1)	
P11	Blue, Medium Short Persistence
P16	Ultraviolet, Very Short Persistence
Metalized Screen	



MAXIMUM RATINGS

Maximum Anode Voltage	30,000 Volts
Maximum Grid 2 Voltage	700 Volts
Grid 1 Voltage	
Max. Neg. Bias Value (Steady State)	200 Volts
Min. Bias Value (Steady State)	−1.0 Volt
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Megohms

TYPICAL OPERATION

Anode Voltage	25 kv dc
Grid 2 Voltage (Note 2)	450 Volts dc
Grid 1 Voltage (Note 3)	−60 to −150 Volts dc
Line Width (Note 4)	25 Microns
Light Output (P11 at 1_A=40ua, Note 5)	200 foot lamberts

Note 1: Other phosphors available.

Note 2: Power supply impedance for this electrode should not exceed 10,000 ohms.

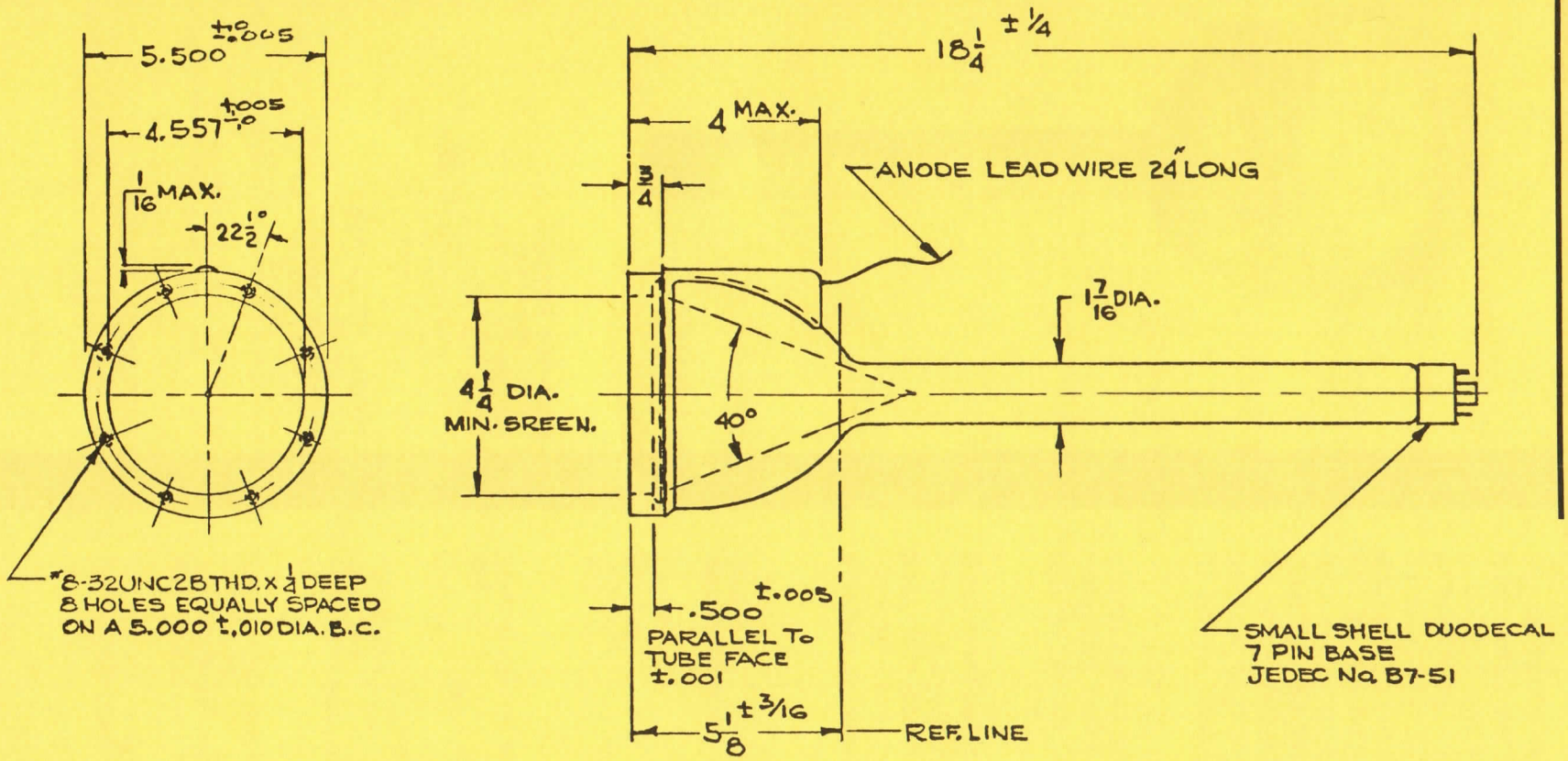
Note 3: For visual extinction of a focused raster.

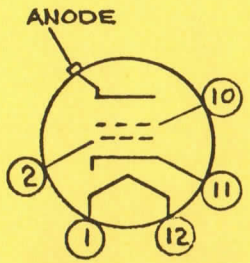
Note 4: Line width is measured by the shrinking raster technique at the center of the screen with a 525 line interlaced raster.

Note 5: Measured in accordance with MIL-E-1, Paragraph 4.12.5.2 with standard 525 line interlaced raster.

L-4120

CATHODE RAY TUBE





BOTTOM VIEW

PIN 1 - HEATER
PIN 2 - GRID No. 1
PIN 10 - GRID No. 2
PIN 11 - CATHODE
PIN 12 - HEATER
ANODE - INSULATED WIRE

LITTON INDUSTRIES • ELECTRON TUBE DIVISION • SAN CARLOS, CALIFORNIA

CATHODE RAY TUBE

L-4129

C21A4

MICROPIX® High Definition Cathode Ray Tube

The L-4129 is a large area, high resolution, high brightness, rectangular CRT, which employs the high performance Litton MICROPIX® electron gun and special uniformly deposited phosphor screens. The tube is magnetically focused and deflected and is especially useful in radar, monitor, or readout applications where high resolution is essential. The L-4105 version provides auxiliary electrostatic deflection, thus allowing character generation for insertion into the display or alphanumeric information readout, such as from a computer. This device is normally furnished with a P4 phosphor. However, all standard phosphors can be supplied. In addition, tubes are available with other screen sizes and/or a special high voltage connection for high altitude airborne use.

ELECTRICAL DATA:

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to All Others	10.0 uuf
Cathode to All Others	6.0 uuf
Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle	90°

MECHANICAL DATA:

Dimensions	See Outline Drawing
Mounting Position	Any
Useful Screen Dimensions:	
Height	15 1/16" Min.
Width	19 1/16" Min.
Diagonal	20 1/4" Min.
Anode Terminal	J1-21

MAXIMUM RATINGS:

Maximum Anode Voltage	30,000 Volts dc
Maximum Grid 2 Voltage	700 Volts dc
Grid 1 Voltage:	
Maximum Negative Bias Value**	200 Volts
Minimum Bias Value**	−1.0 Volt
Positive Peak Value	0 Volts
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Megohms

TYPICAL OPERATION:

Anode Voltage	25,000 Volts dc
Grid 2 Voltage (Note 1)	450 Volts dc
Grid 1 Voltage (for Visual Extinction of Focused Spot)	−60 to −115 Volts
Line Width (Note 2)	0.005"

**Steady State Condition

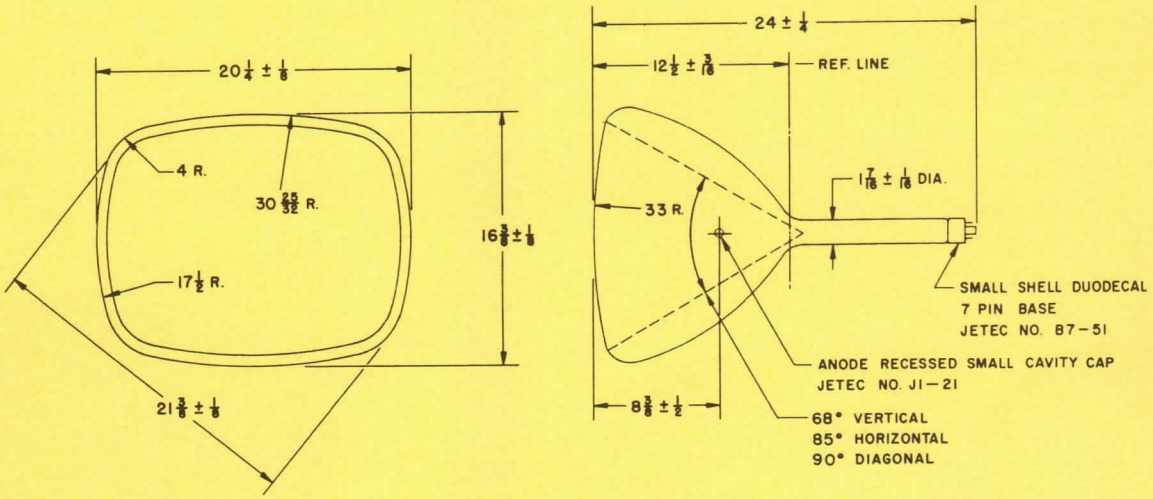
Note 1: For best performance, the effective power supply impedance for this electrode should not exceed 10,000 ohms.

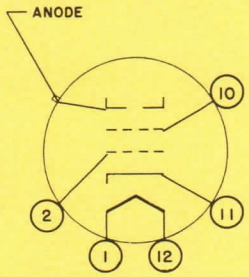
Note 2: Line width is measured by the shrinking raster technique at the center of the screen with a 525 line interlaced raster.

CATHODE RAY TUBE

L-4129

C21A4





BOTTOM VIEW

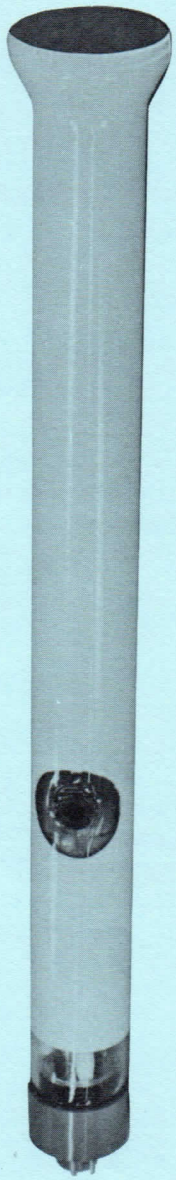
PIN 1 — HEATER
PIN 2 — GRID NO. 1
PIN 10 — GRID NO. 2
PIN 11 — CATHODE
PIN 12 — HEATER
BUTTON ANODE

BASING DIAGRAM

LITTON INDUSTRIES • ELECTRON TUBE DIVISION • SAN CARLOS, CALIFORNIA

FIBER OPTIC CRT

L-4188



PIPIX® High Resolution Fiber Optic CRT

The L-4188 is one of a family of fiber optic faceplate cathode ray tubes which features a high energy ultraviolet output phosphor and high resolution capability. The tube is especially useful for direct exposure of film; that is, the film may be placed in contact with the special fiber optic faceplate.

Millions of individual 6 to 8 micron diameter light pipes conduct the image, placed on the phosphor by the electron beam, to the film plane with high energy transmission efficiency and little or no spreading. An optional radius on the inside of the faceplate corrects display linearity and cuts down on deflection defocusing.

Among applications for the PIPIX® CRT is the exposure of fast dry-process films such as Kalvar. The PIPIX® CRT may also be used with photochromic film, a self developing UV sensitive medium which is reversible. This latter application allows real time large screen projection of video information. In addition, the tube works well with certain sensitized direct print papers.

The PIPIX® CRT may be furnished with faceplates of several different sizes and numerical apertures. Face coatings, such as a dichroic, can be provided on special order.

ELECTRICAL DATA

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to all others	10 pfd
Cathode to all others	6.0 pfd
Focusing Method	Magnetic
Deflection Method	Magnetic

OPTICAL DATA

Face Panel	Fiber Optic
Inside Radius	Optional
Fiber Size	6 to 8 Microns
Phosphor (Note 1):	
P16	Ultraviolet, Very Short Persistence
Metalized Screen	

MECHANICAL DATA

Dimensions	See Outline Drawing
Mounting Position	Any
Base	B7-51
Minimum Useful Screen Area	1⅝" dia.
Anode Connection	J1-21 Button

FIBER OPTIC CRT

L-4188

MAXIMUM RATINGS

Maximum Anode Voltage . . . . . 40,000 Volts
Maximum Grid 2 Voltage . . . . . 700 Volts
Grid 1 Voltage:
  Maximum Neg. Bias Value (Steady State) . . . . 200 Volts
  Minimum Bias Value (Steady State) . . . . . 1.0 Volt
Peak Heater-Cathode Voltage . . . . . 150 Volts
Grid 1 Circuit Resistance . . . . . 1.5 Megohms

TYPICAL OPERATION (Note 2)

Anode Voltage . . . . . 30 kv dc
Grid 2 Voltage (Note 3) . . . . . 450 Volts dc
Grid 1 Voltage (Note 4) . . . . . —60 to —140 Volts dc
Line Width (Note 5) . . . . . 25 Microns

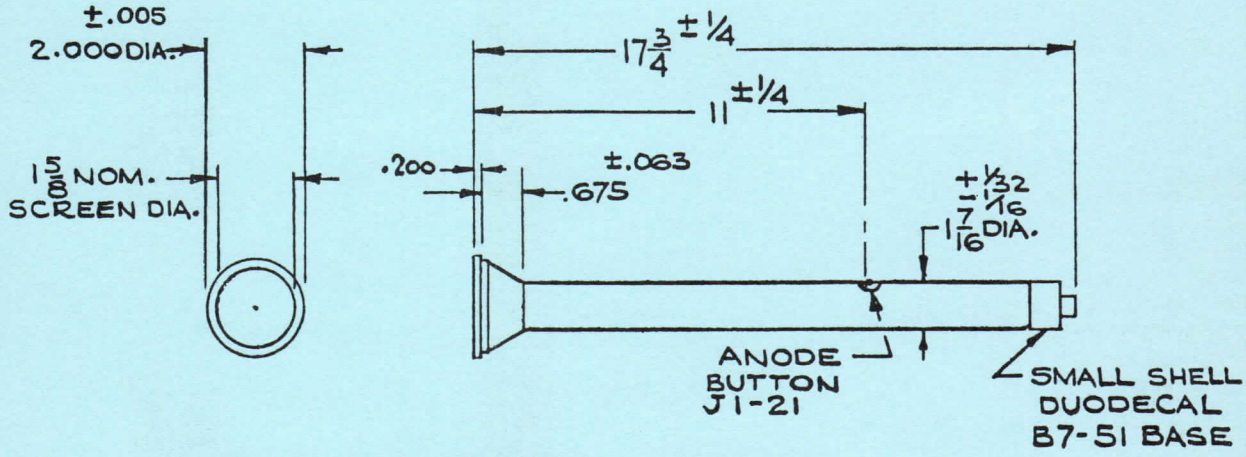
Note 1: All other standard phosphors are available.

Note 2: The L-4188 is designed to operate with the faceplate at ground potential and the cathode depressed. The Litton 1059 (A116) Isolated Video Amplifier/Gun Supply is recommended for this purpose.

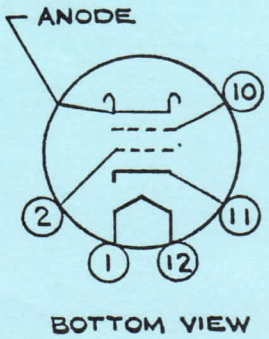
Note 3: Power Supply impedance for this electrode should not exceed 10,000 ohms.

Note 4: For visual extinction of a focused raster.

Note 5: Line width is measured by the shrinking raster technique at the center of the screen with a standard 525 line non-interlaced raster.



DIMENSIONAL OUTLINE



BOTTOM VIEW

PIN 1 HEATER
PIN 2 GRID No.1
PIN 10 GRID No.2
PIN 11 CATHODE
PIN 12 HEATER
BUTTON ANODE

BASING DIAGRAM

FIBER OPTIC CRT

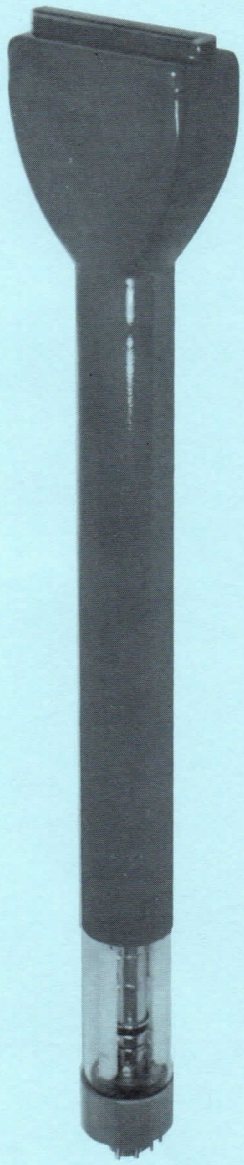
L-4196

High Resolution Fiber Optic Cathode Ray Tube

For high resolution line scan applications, the Litton L-4196 cathode ray tube offers the inherent advantages of magnetic focus and fiber optic coupling to provide one of the highest performance cathode ray tube recorders in the industry. The rugged minimum volume tube envelope makes the L-4196 ideal for airborne applications. When used to expose photographic film the special blemish free high resolution screen allows clean recordings. The useful phosphor area is directed toward use with 70mm film and an optional cylindrical grind on the face eases the problem of maintaining film contact.

Variations of the basic tube such as flying leads, ruggedized gun, and complete potted package including focus and deflection components are available.

A wide range of physical and mechanical fiber optic specifications is also available.



ELECTRICAL DATA

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to All Others	10 pfd
Cathode to All Others	6.0 pfd
Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle (Nominal)	36°

MECHANICAL DATA

Dimensions	See Outline Drawing
Mounting Position	Any
Base	B7-51
(Flying leads on special order)	
Useful Screen Dimensions	$2\frac{7}{16}$" x $\frac{3}{16}$"
Anode Connection	J1-21

OPTICAL DATA

Face Plate	Fiber Optic 0.66 N.A.
(Other N.A. Available)	
Cylindrical exterior grind for contact film recording available	
Phosphor (Note 1):	
P-11	Blue, Medium short persistence
P-16	Ultra Violet, Very short persistence
Metalized Screen	

MAXIMUM RATINGS

Max. Anode Voltage	30,000 Volts
Max. Grid 2 Voltage	2,500 Volts
Grid 1 Voltage:	
Max. Negative Bias Value (Steady State)	200 Volts
Min. Bias Value (Steady State)	−1.0 Volts
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Megohms

TYPICAL OPERATION

Anode Voltage (Note 2)	25 kv dc
Grid 2 Voltage (Note 3)	2,000 Volts dc
Grid 1 Voltage (Note 4)	−50 to −130 Volts dc
Line Width (Note 5)	20 microns

NOTES:

Note 1: Other phosphors available.

Note 2: Fiber optic tubes are designed to run grounded anode. The Litton Model 1059 Isolated Gun Supply Video Amplifier is recommended for use with this tube.

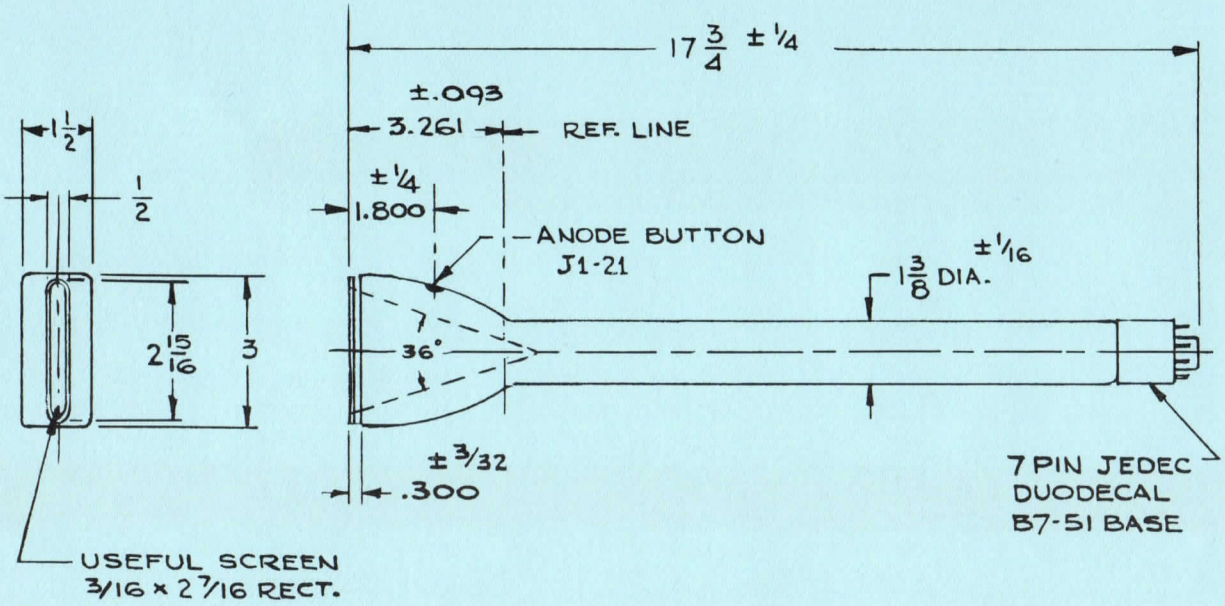
Note 3: Power supply impedance for this electrode should not exceed 10,000 ohms.

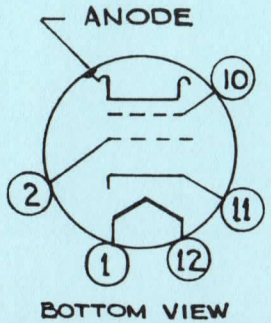
Note 4: For visual extinction of a focused raster.

Note 5: Line width is measured by the shrinking raster technique at the center of the screen with a standard 525 line non-interlaced raster.

L-4196

FIBER OPTIC CRT





PIN 1 — HEATER
PIN 2 — GRID No.1
PIN 10 — GRID No.2
PIN 11 — CATHODE
PIN 12 — HEATER
BUTTON—ANODE

BASING DIAGRAM

LITTON INDUSTRIES • ELECTRON TUBE DIVISION • SAN CARLOS, CALIFORNIA

FIBER OPTIC CRT

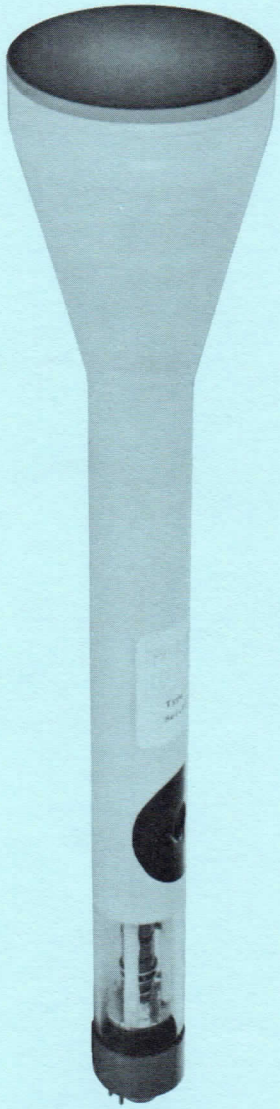
L-4198

PIPIX® High Energy Fiber Optic Cathode Ray Tube

The L-4198 is one of a family of fiber optic faceplate cathode ray tubes which features a high energy ultraviolet output phosphor and high resolution capability. The Litton L-4198 CRT was designed for direct contact, full frame exposure, of 70 mm size film.

Millions of individual 6 to 8 micron diameter light pipes conduct the image placed on the phosphor by the electron beam to the film plane with relatively low loss in energy and no spreading. One outstanding application is the use of the PIPIX® CRT with fast dry process films such as photochromic and Kalvar. Use of the PIPIX® CRT with these films make possible real time large area projected displays.

A special feature of the L-4198 is a fiber optic faceplate radiused on the inside to the radius of deflection. This provides inherent geometrical linearity correction and reduces deflection defocusing of the electron beam. Special coatings such as dichroics are available.



ELECTRICAL DATA

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to all others	10 pfd
Cathode to all others	6.0 pfd
Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle (diagonal)	30°

OPTICAL DATA

Face Panel	Fiber Optic with inside radius
Fiber Size	6-8 Microns
Phosphor (Note 1)	P16 (Ultraviolet, very short persistence)
Metalized Screen	

MECHANICAL DATA

Dimensions	See Outline Drawing
Mounting Position	Any
Base	B7-51
Min. Useful Screen Area	2¼" sq.
Anode Connection	J1-21 Button

MAXIMUM RATINGS

Max. Anode Voltage	40,000 Volts
Max. Grid 2 Voltage	700 Volts
Grid 1 Voltage:	
Max. Neg. Bias Value (Steady State)	200 Volts
Min. Bias Value (Steady State)	1.0 Volt
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Meg.

TYPICAL OPERATION (Note 2)

Anode Voltage	30 kv dc
Grid 2 Voltage (Note 3)	450 Volts dc
Grid 1 Voltage (Note 4)	−60 to −140 Volts dc
Line Width (Note 5)	25 Microns

Note 1: All other standard phosphors are available.

Note 2: The L-4198 is designed to operate with the faceplate at ground potential and the cathode depressed. The Litton Model 1059 Isolated Video Amplifier/Gun Supply is recommended for this purpose.

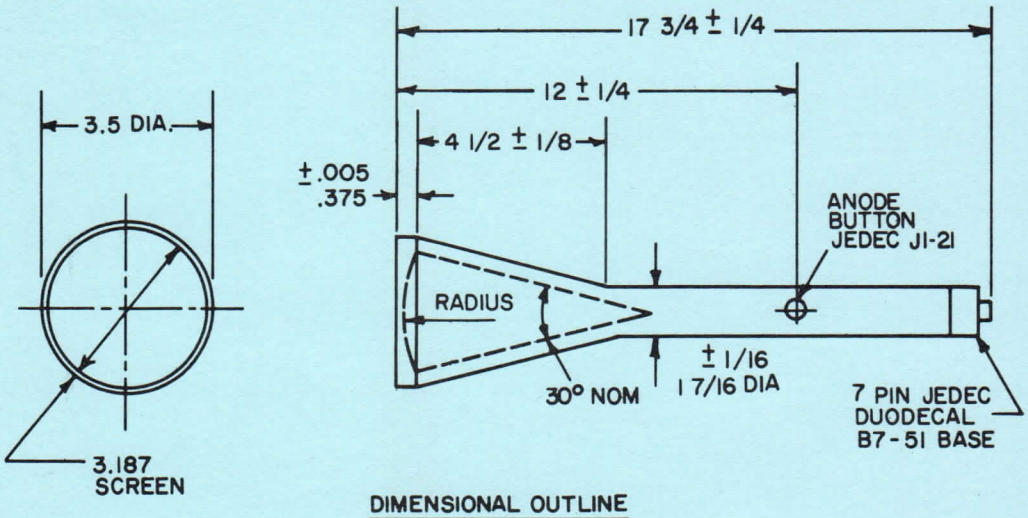
Note 3: Power Supply impedance for this electrode should not exceed 10,000 ohms.

Note 4: For visual extinction of a focused raster.

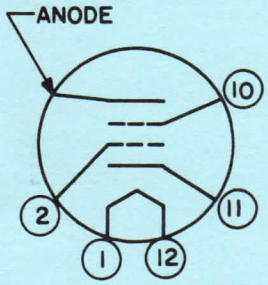
Note 5: Line width is measured by the shrinking raster technique at the center of the screen with a standard 525 line interlaced raster.

FIBER OPTIC CRT

L-4198



DIMENSIONAL OUTLINE

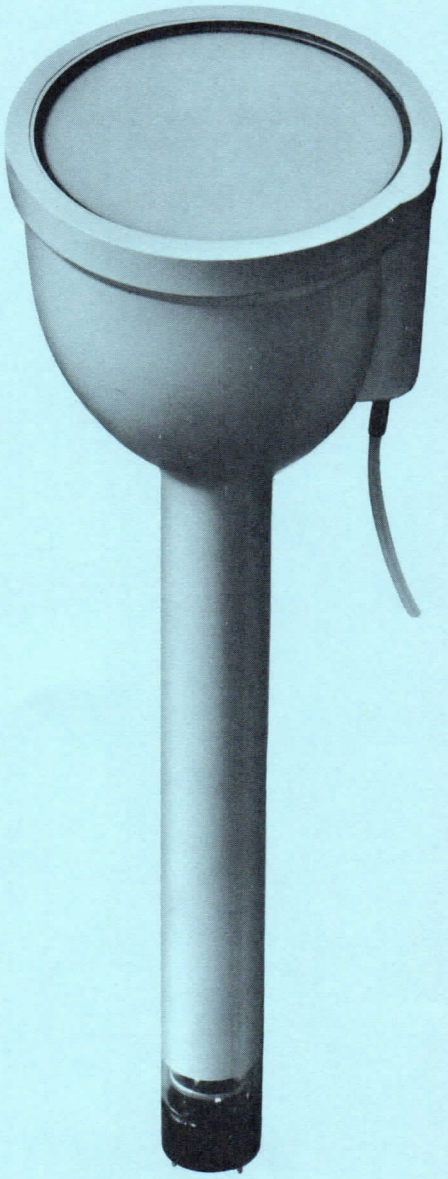


BOTTOM VIEW

PIN 1 HEATER	PIN 11 CATHODE
PIN 2 GRID NO.1	PIN 12 HEATER
PIN 10 GRID NO.2	BUTTON ANODE

FIBER OPTIC CRT

L-4221



PIPIX® High Resolution Fiber Optic CRT

The L-4221 is one of a family of fiber optic faceplate cathode ray tubes which can be supplied with a high energy ultra-violet output phosphor for contact exposure of dry process films.

Millions of individual light pipes conduct the image, placed on the phosphor by the electron beam, to the film plane with high energy transmission efficiency and little or no spreading. An optional radius on the inside of the faceplate corrects display linearity and cuts down on deflection defocusing.

The L-4221 CRT is often used with photochromic film; a self-developing UV sensitive medium which is reversible. This application allows real time large screen projection of video information. In addition, the tube works well with other dry process films such as Kalvar. When used as a scanning CRT, the fiber optic face eliminates halo. If the film is in direct contact with the face, a high signal-to-noise ratio results.

The L-4221 may be furnished with faceplates of several different fiber sizes and numerical apertures. Face coatings, such as a dichroic, can be provided on special order.

ELECTRICAL DATA

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 to all others	10 pfd
Cathode to all others	6.0 pfd
Focusing Method	Magnetic
Deflection Method	Magnetic

OPTICAL DATA

Face Panel	Fiber Optic
Inside Radius	Optional
Phosphor (Note 1):	
P16	Ultraviolet, Very Short Persistence
Metalized Screen	

MECHANICAL DATA

Dimensions	See Outline Drawing
Mounting Position	Any
Base	B7-51
Minimum Useful Screen Area	4¼" dia.
Anode Connection	J1-21 Button

NOTE: Tube illustrated has optional potting around faceplate

FIBER OPTIC CRT

L-4221

MAXIMUM RATINGS

Maximum Anode Voltage . . . . . 35,000 Volts
Maximum Grid 2 Voltage . . . . . 700 Volts
Grid 1 Voltage:
  Maximum Neg. Bias Value (Steady State) . . . . 200 Volts
  Minimum Bias Value (Steady State) . . . . . 1.0 Volt
Peak Heater-Cathode Voltage . . . . . 150 Volts
Grid 1 Circuit Resistance . . . . . 1.5 Megohms

TYPICAL OPERATION (Note 2)

Anode Voltage . . . . . 30 kv dc
Grid 2 Voltage (Note 3) . . . . . 450 Volts dc
Grid 1 Voltage (Note 4) . . . . . —60 to —140 Volts dc
Line Width (Note 5) . . . . . 30 Microns

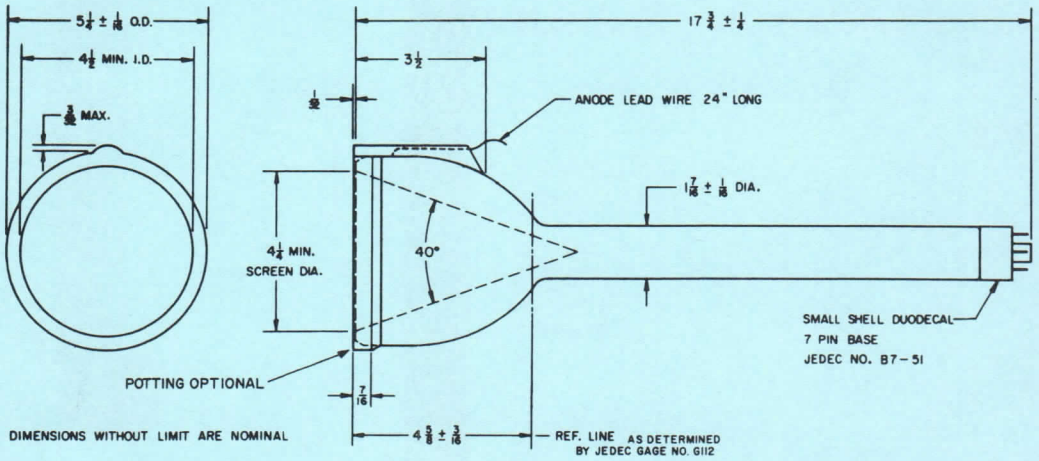
Note 1: All other standard phosphors are available.

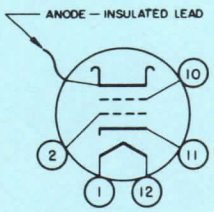
Note 2: The L-4221 is designed to operate with the faceplate at ground potential and the cathode depressed. The Litton 1059 Isolated Video Amplifier/Gun Supply is recommended for this purpose.

Note 3: Power Supply impedance for this electrode should not exceed 10,000 ohms.

Note 4: For visual extinction of a focused raster.

Note 5: Line width is measured by the shrinking raster technique at the center of the screen with a standard 525 line non-interlaced raster.





BOTTOM VIEW

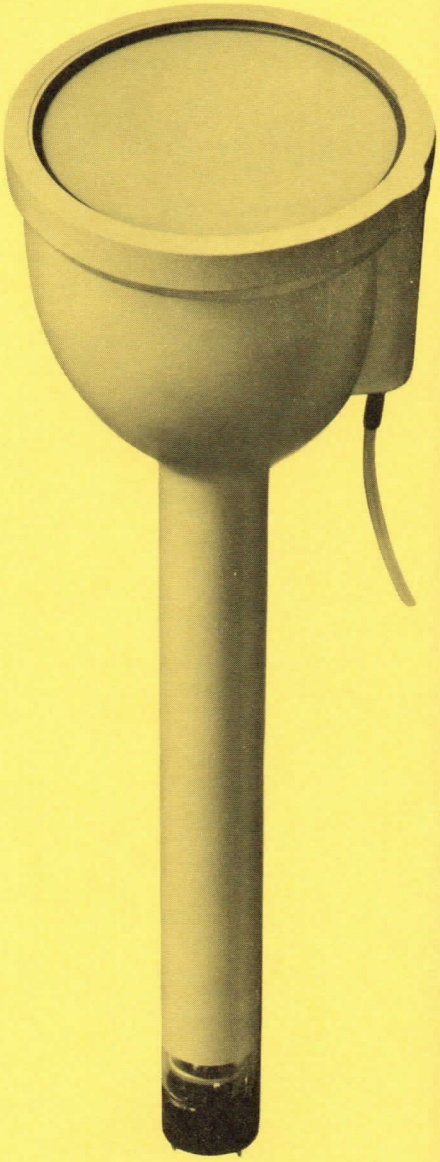
PIN 1 — HEATER
PIN 2 — GRID NO. 1
PIN 10 — GRID NO. 2
PIN 11 — CATHODE
PIN 12 — HEATER
H.V. WIRE-ANODE

CATHODE RAY TUBE

L-4238

Micropix® Ultra-High Definition CRT

The L-4123 will furnish light output and small spot size beyond the capabilities of standard high resolution cathode ray tubes. This ultra-high resolution cathode ray tube employs the Litton "SS" type electron gun and an exceptionally uniform, efficient, low noise phosphor screen deposited on a faceplate made from a special optical glass melt. Tubes in this ultra-high resolution MICROPIX® series are available utilizing most standard phosphor types. Examples are the Litton P-11 for high resolution photographic recording and the Litton P-16 for high resolution flying spot scanning. In addition, the basic MICROPIX® gun to screen structure can be ordered in a precision mounted and/or ruggedized version for extreme environmental conditions such as those encountered in airborne applications.



ELECTRICAL DATA

Heater Potential	6.3 Volts
Heater Current	0.6 Amperes
Direct Interelectrode Capacitance:	
Grid 1 To All Others	10 pfd
Cathode To All Others	6.0 pfd
Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle (Nominal)	40°

MECHANICAL DATA

Dimensions	See Outline Drawing
Mounting Position	Any
Base	B7-51
Useful Screen Diameter	4¼" Min.
Anode Connection	Insulated Lead 24"

OPTICAL DATA

Face Panel . . Clear, Non-Browning, Flat, Ground and Polished

Phosphor (Note 1):	
P-11	Blue, Medium short persistence
P-16	Ultra Violet, Very short persistence
P-24	Broad Spectrum, short persistence

Metalized Screen

MAXIMUM RATINGS

Maximum Anode Voltage	30,000 Volts
Maximum Grid 2 Voltage	2,500 Volts
Grid 1 Voltage:	
Maximum Negative Bias Value (Steady State)	200 Volts
Minimum Bias Value (Steady State)	—1.0 Volt
Peak Heater-Cathode Voltage	150 Volts
Grid 1 Circuit Resistance	1.5 Megohms

TYPICAL OPERATION

Anode Voltage	25 kv dc
Grid 2 Voltage (Note 2)	2,000 Volts dc
Grid 1 Voltage (Note 3)	—50 to—130 Volts dc
Spot Size	
Shrinking Raster Measurement	14 microns (0.55 mil)
Two Slit Analyzer (50% Amplitude)	18 microns (0.7 mil)

Note 1: Other phosphors available.

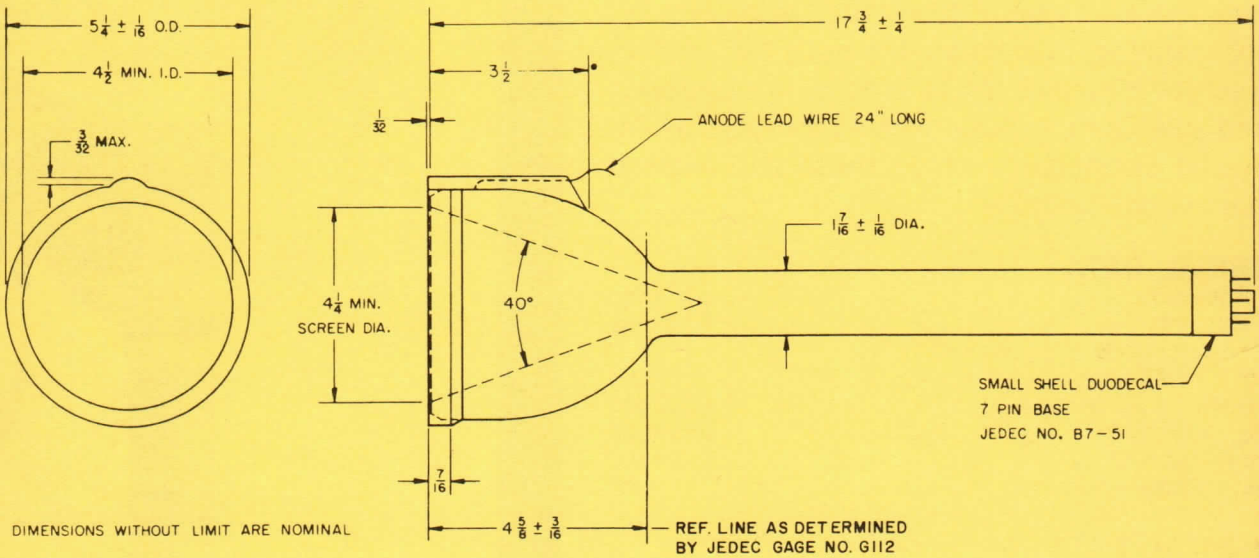
Note 2: Power supply impedance for this electrode should not exceed 10,000 ohms.

Note 3: For visual extinction of a focused raster.

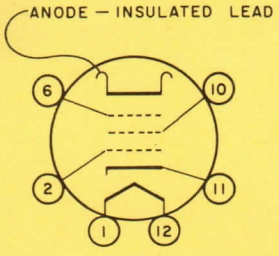
Note 4: For further application information call (415) 591-8411.

CATHODE RAY TUBE

L-4238



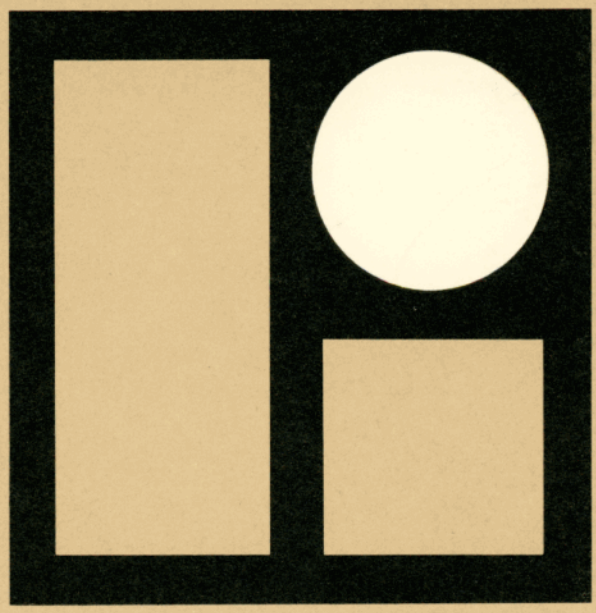
DIMENSIONS WITHOUT LIMIT ARE NOMINAL



BOTTOM VIEW

PIN 1 — HEATER
PIN 2 — GRID NO. 1
PIN 6 — FOCUS
PIN 10 — GRID NO. 2
PIN 11 — CATHODE
PIN 12 — HEATER

H.V. WIRE — ANODE



PLANAR TUBES

VOLUME II

The Litton DATA/LOG

Refer to Volume I for data sheets covering the following tube families.

PULSE MAGNETRONS

CW MAGNETRONS

BACKWARD WAVE OSCILLATORS

CROSSED FIELD AMPLIFIERS

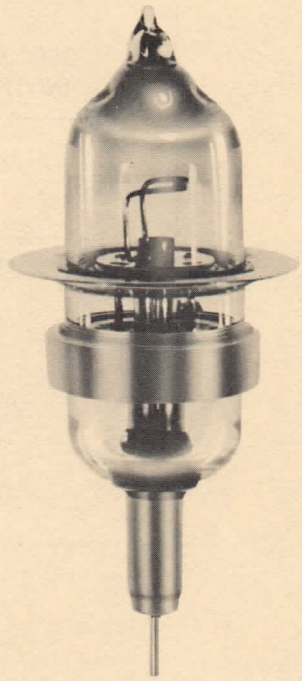
PLANAR TUBE

2C36

Up to 4 Gc
Internal Feedback
Pulse and CW

UHF PLANAR TRIODE OSCILLATOR

The Litton Type 2C36 is designed for use as a CW and pulse-modulated oscillator at frequencies up to 4.0 Gc. The 2C36 has a built-in internal feedback circuit between cathode and anode and fits into a coaxial circuit. A small amount of adjustable, external feedback may be necessary in order to obtain optimum power output at any given frequency. A feedback probe between the output and input lines may be utilized to provide the necessary feedback. With plate-pulse modulation the grid may be operated at zero bias, eliminating the necessity of insulating the cathode from the grid in the input-line plunger.



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 (Pulsed)	2.2 kv
Anode Dissipation (Oscillating)	5.0 W*
Seal Temperature	200° C
Operating Frequency	4.0 Gc

*May be exceeded under certain optimum cavity conditions.

DIRECT INTERELECTRODE CAPACITANCES (Typical)

Grid-Anode	1.90 pf
Grid-Cathode	1.20 pf
Anode-Cathode	0.38 pf

TUBE CHARACTERISTICS (Typical)

Transconductance	4500 umhos
Amplification Factor	25
Grid Voltage for Ib = 10 uAdc	−15 V

Above parameters measured at Ef=6.3 V, Eb=180 V, Rk=400 Ohms, and Ib=12.0 mAdc.

OPERATING CONDITIONS (Typical)

In a tunable cavity designed for the indicated frequency range, utilizing the internal feedback in the 2C36.

UHF Oscillator	CW	Plate Pulse Modulated	
Frequency	1.0	1.0	3.0 Gc
Heater Voltage	6.3	6.3	6.3 V
Peak Anode Voltage	190	1400	1700 V
Peak Anode Current	47 mA (Avg.)	1.2	2.7 A
Grid Voltage	0	0	0
Pulse Repetition Frequency	—	1000	1000 prr
Pulse Width	—	1.0	1.0 usec.
Peak Power Output	1.0 mW (Avg.)	1000	1000 W

PLANAR TUBE

2C36

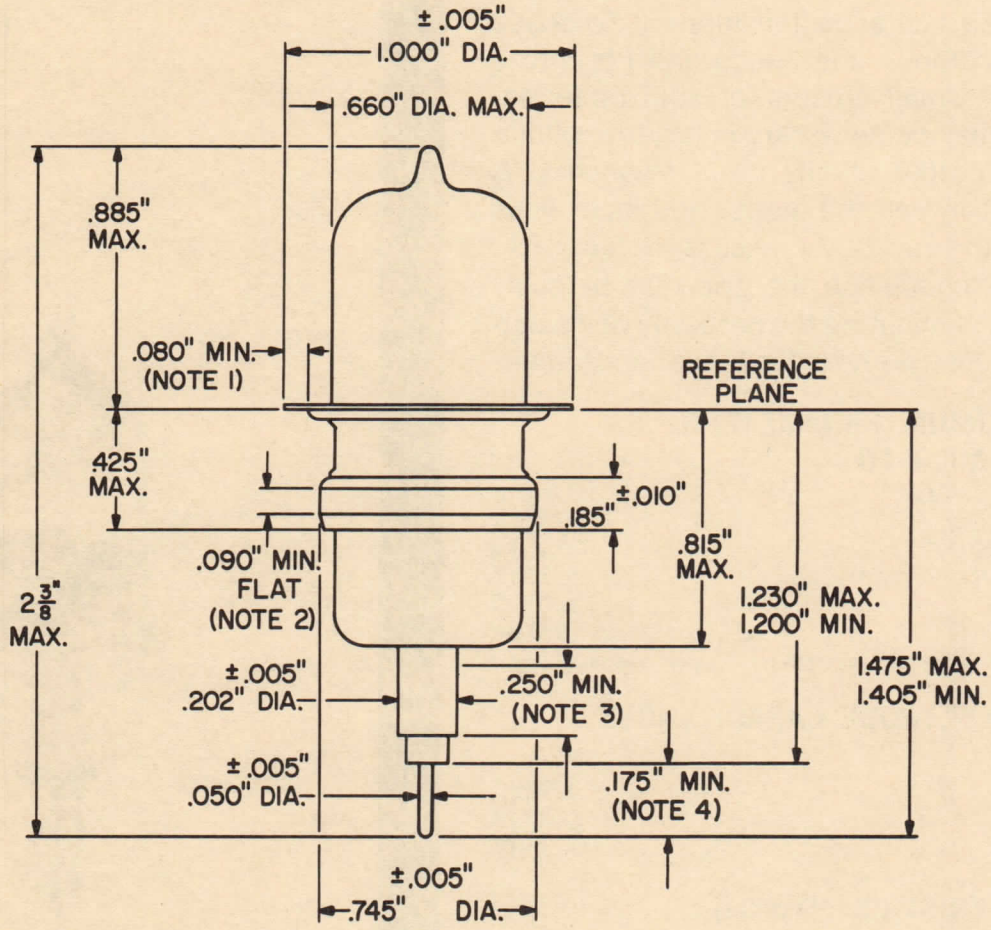
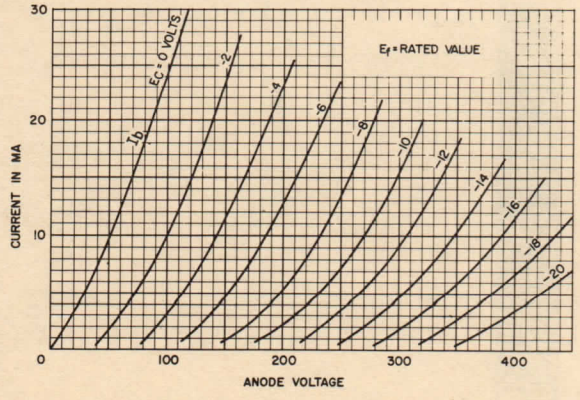


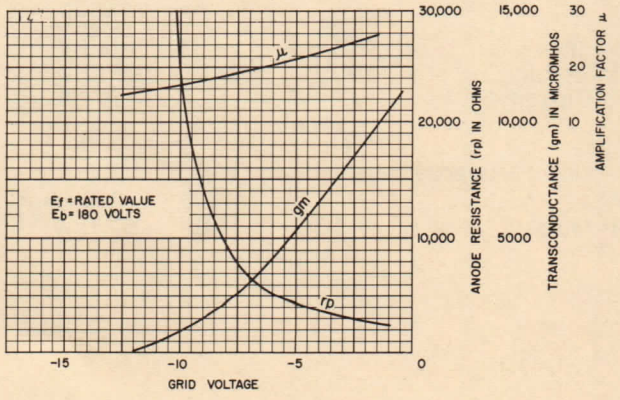
DIAGRAM NOTES:

1. *Anode contact area.*
2. *Grid contact area.*
3. *Cathode and heater contact area.*
4. *Heater contact area.*

AVERAGE ANODE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS



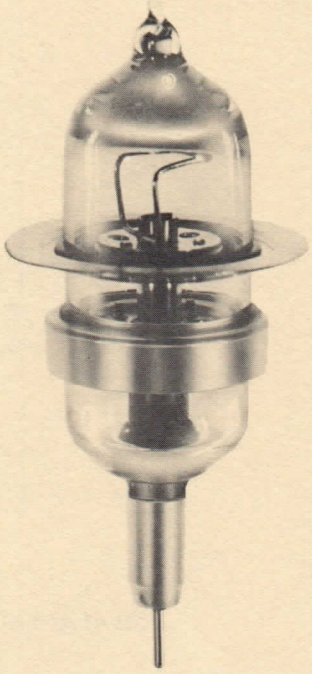
PLANAR TUBE

2C37

Up to 3.3 Gc
CW Oscillator
Low Internal Lead Inductance

UHF GENERAL PURPOSE TRIODE

The Litton Type 2C37 is designed primarily for use in a cavity as a microwave oscillator, at frequencies up to 3.3 Gc. This planar-electrode, disc-seal triode has low internal lead inductance. In a properly designed cavity, it can also function as a tunable stable local oscillator. Similar to 2C36 except no internal feedback. Used as CW oscillator, frequency multiplier, and stalo.



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

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

*May be exceeded under certain optimum cavity conditions.

DIRECT INTERELECTRODE CAPACITANCES (Typical)

Grid-Anode	1.45 pf
Grid-Cathode	1.30 pf
Anode-Cathode	0.015 pf

TUBE CHARACTERISTICS (Typical)

Transconductance	4500 umhos
Amplification Factor	23
Grid Voltage for Ib = 10 uadc	−15 V

Above parameters measured at Ef=6.3 V, If=0.4 A, Eb=180 Vdc, Ib=12 mAdc, Rk=400 ohms.

OPERATING CONDITIONS (Typical)

(1) UHF Oscillator CW

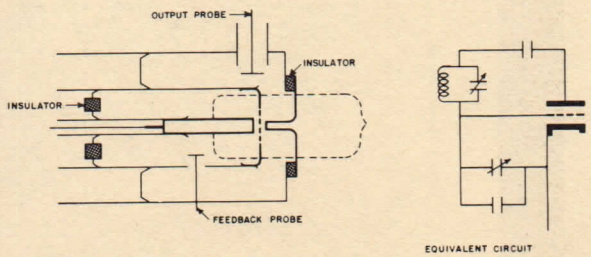
Anode Voltage	210 Vdc
Anode Current	35 mAdc
Cathode Resistor**	100 Ohms
Grid Resistor	100 Ohms
Frequency	1.0 Gc
Power Output	2.0 W

(2) UHF Oscillator CW

Anode Voltage	200 Vdc
Anode Current	37 mAdc
Grid Resistor	100 Ohms
Cathode Resistor**	100 Ohms
Frequency	3.3 Gc
Power Output	600 mW

**Adj. for rated anode current.

APPLICATION DATA



The Type 2C37 in a typical wave concentric line circuit. An external probe may be used to provide the feedback necessary for oscillation.

PLANAR TUBE

2C37

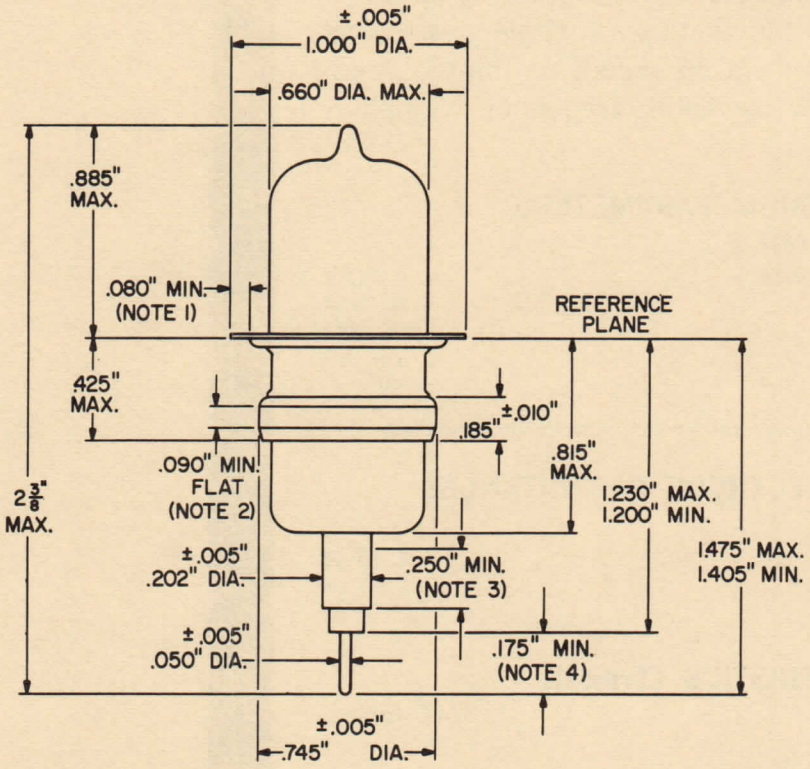
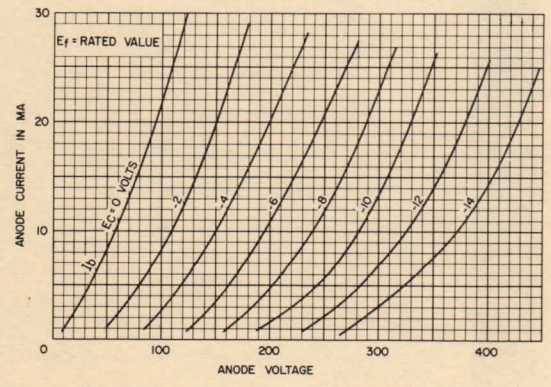


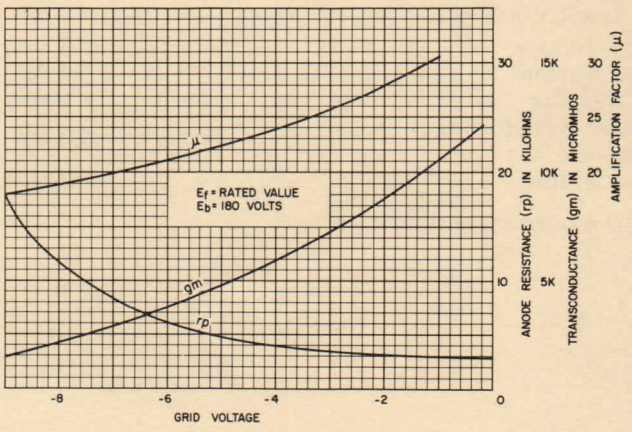
DIAGRAM NOTES:

1. *Anode contact area.*
2. *Grid contact area.*
3. *Cathode and heater contact area.*
4. *Heater contact area.*

AVERAGE ANODE CHARACTERISTICS



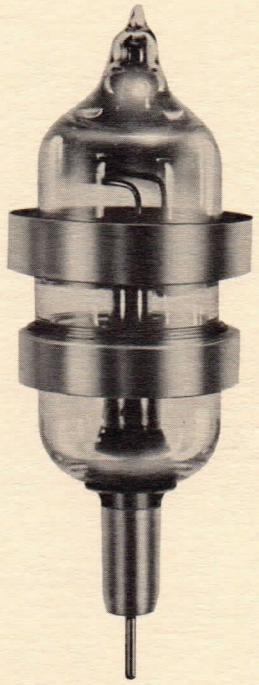
AVERAGE TRANSFER CHARACTERISTICS



PLANAR TUBE

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 Ib = 10 uAdc	−15 V

Above parameters measured at Ef=6.3 V, Eb=180 V, Rk=400 ohms, and Ib=12.0 mAdc.

OPERATING CHARACTERISTICS (Typical)

(1) UHF Oscillator CW[1]

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 CW[1]

Anode Voltage	200 Vdc
Anode Current	25 mAdc
Frequency	3.3 Gc
Power Output	400 mw
Heater Voltage	6.3 Vac

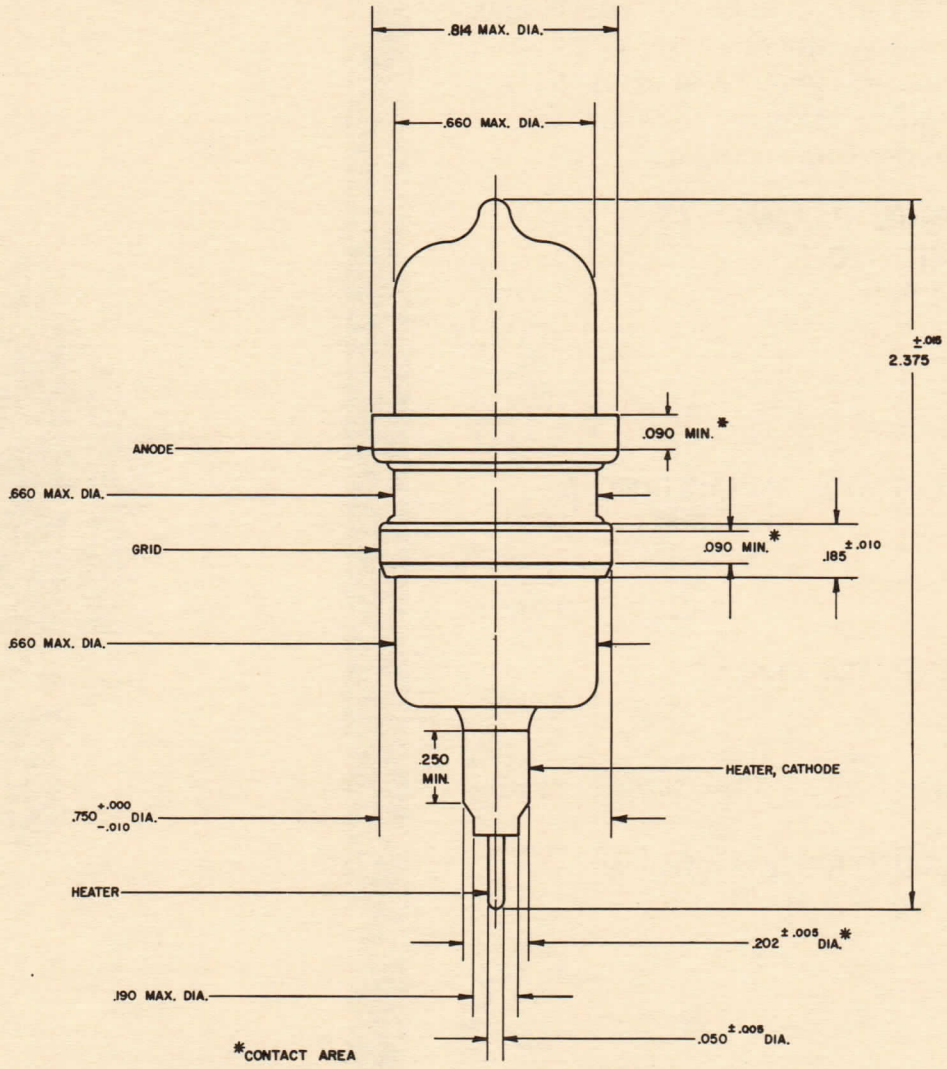
(3) UHF Oscillator CW Tunable

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

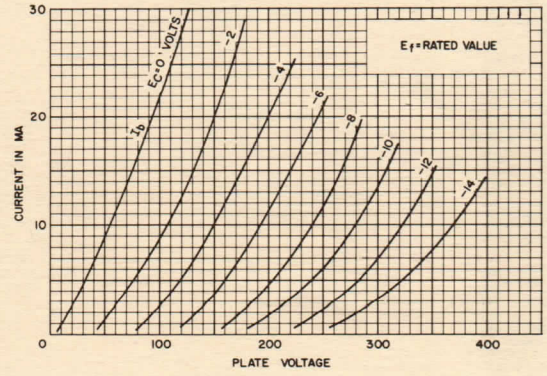
NOTE:
1. In a tunable cavity designed for the indicated frequency ranges.

PLANAR TUBE

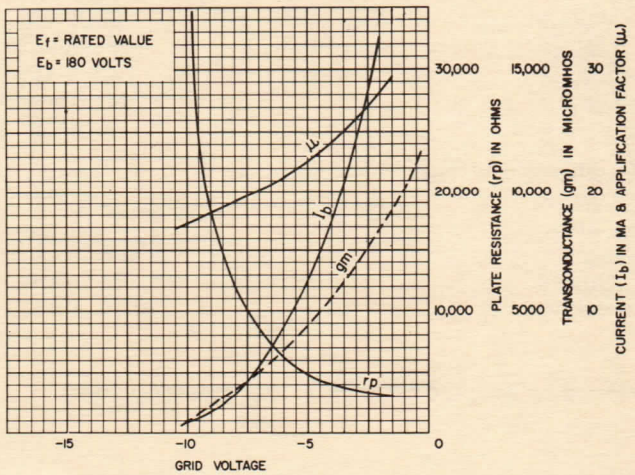
5767
6481



AVERAGE PLATE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS



PLANAR TUBE

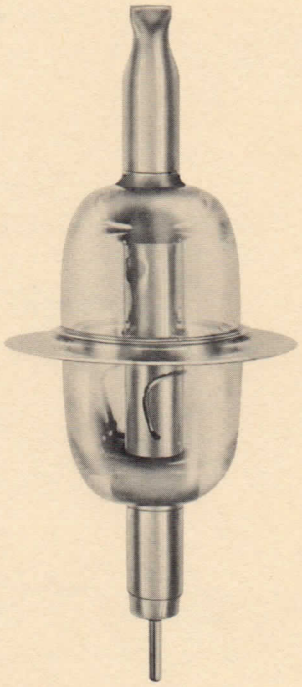
5768

1.0 to 3.3 Gc
CW Amplifier
High Mu Planar

UHF PLANAR TRIODE AMPLIFIER

The Litton Type 5768 is designed for service as a grounded grid amplifier at frequencies up to 3.3 Gc and may be used with a tuned or untuned input and tuned coaxial line output. Frequency ratios of about 4 to 1 (250-1000 Mc) for continuous tuning can be obtained up to 1000 Mc with no dead spots throughout the range. Ratios of about 3 to 1 can likewise be obtained up to 3.3 Gc.

The 5768 planar triode features a disc-seal type of construction that satisfied the requirements for low lead inductance. The mechanical configuration provides maximum isolation between input and output 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	250 V
Anode Current	12.5 Ma
Seal Temperature	200° C
Plate Dissipation	4.0 W
Frequency	3.3 Gc

DIRECT INTERELECTRODE CAPACITANCES (Nominal)

Grid-Anode	1.25 pf
Grid-Cathode	1.55 pf
Anode-Cathode	0.015 pf

TUBE CHARACTERISTICS (Average)

Transconductance	9600 umhos
Amplification Factor	88
Plate Resistance	9150 Ohms

Measured at Eb=150 V with Cathode Resistor of 100 Ohms. Anode Current=9 mAdc.

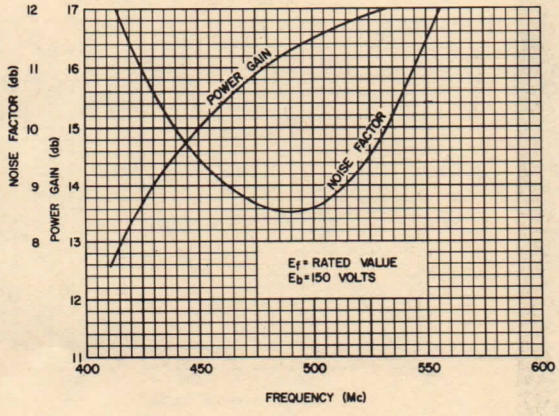
OPERATING CONDITIONS (Typical)

Grounded Grid Amplifier at 500 Mc.

Anode Voltage	150 V
Anode Current	7.0 mAdc
Transconductance	9000 umhos
Amplification Factor	90
Cathode Resistor	100 Ohms
Noise Factor[1]	9.0 db
Power Gain[1]	16 db

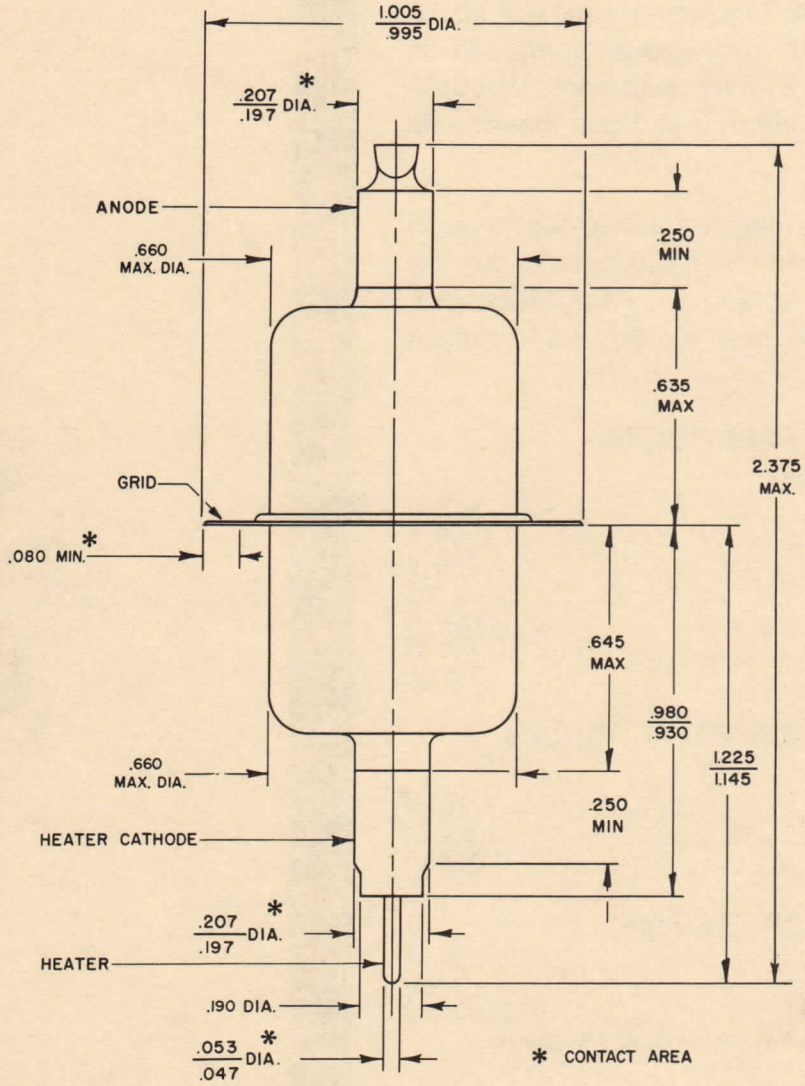
NOTE:
1. In a tunable cavity designed for a nominal indicated frequency range.

AVERAGE TRANSFER CHARACTERISTICS

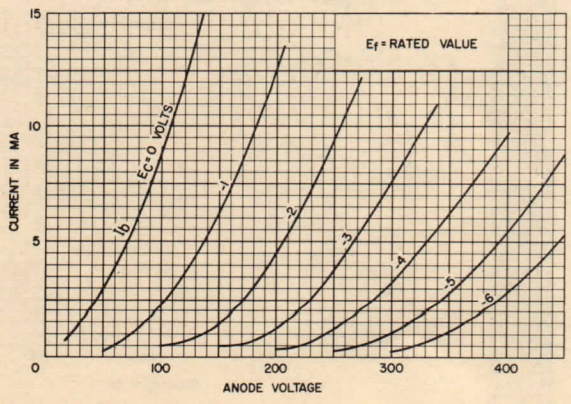


PLANAR TUBE

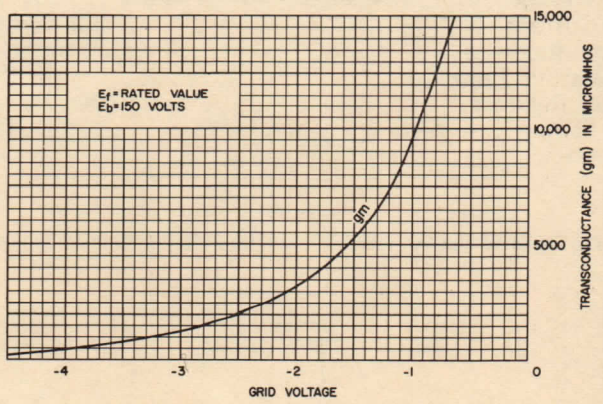
5768



AVERAGE ANODE CHARACTERISTICS



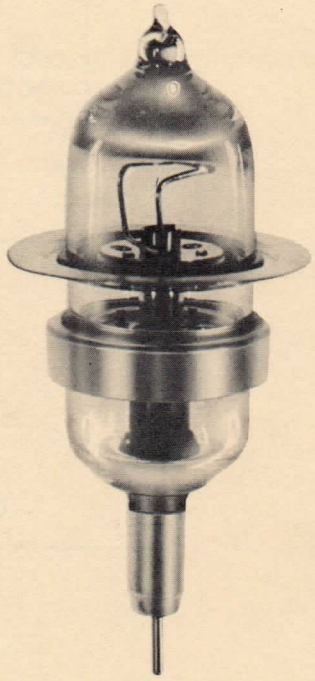
AVERAGE TRANSFER CHARACTERISTICS



PLANAR TUBE

6503

Up to 5.75 Gc
Pulse and CW
Low Internal Lead Inductance



UHF PLANAR TRIODE OSCILLATOR

The Litton Type 6503 is designed primarily for use in microwave circuits as a CW and pulsed oscillator at frequencies up to 5.75 Gc. This planar-electrode, disc-seal triode may be used as an integral part of a tuned cavity. Its low internal lead inductance also makes this tube well adapted to lump-constant circuits. It functions as an extremely stable prime signal source or stalo. The output may be frequency modulated by inserting a varactor into the cavity between the grid and anode cylinders. The tube will withstand shock of 40 g's at 6 msec in a properly designed cavity. On vibration of 20-2000 cps at 20 g's on three orthogonal planes, the unit F. M.'s less than ± 1 Mc.

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 (Pulsed)	2.2 kv
Anode Dissipation (Oscillating)	5.0 W*
Seal Temperature	200° C
Operating Frequency	5.75 Gc

*May be exceeded under certain optimum cavity conditions.

DIRECT INTERELECTRODE CAPACITANCES (Typical)

Grid-Anode	1.47 pf
Grid-Cathode	1.27 pf
Anode-Cathode	0.023 pf

TUBE CHARACTERISTICS (Typical)

Transconductance	4500 umhos
Amplification Factor	17
Grid Voltage for Ib = 10 uAdc	−15 V

Above parameters measured at Ef=6.3 V, Eb=180 V, Rk=400 Ohms, and Ib=12.0 mAdc.

OPERATING CONDITIONS (Typical)[1]

UHF Oscillator	CW	FM	PPM
Frequency	5.5	4.5	5.5 Gc
Heater Voltage	6.3	7.0	7.0 V
Peak Anode Voltage	190	200	2100 V
Peak Anode Current	33 mA (Avg.)	47 mA (Avg.)	2.2 A
Pulse Repetition Frequency	—	—	1000 prr
Pulse Width	—	—	1.0 usec.
Peak Power Output	25 mW (Avg.)	30 mW (Avg.)	1000 W
F.M. Deviation[2]	—	10	— Mc

NOTE:

1. In a tunable cavity designed for the nominal indicated frequency range.
2. Dependent on Varactor used.

PLANAR TUBE

6503

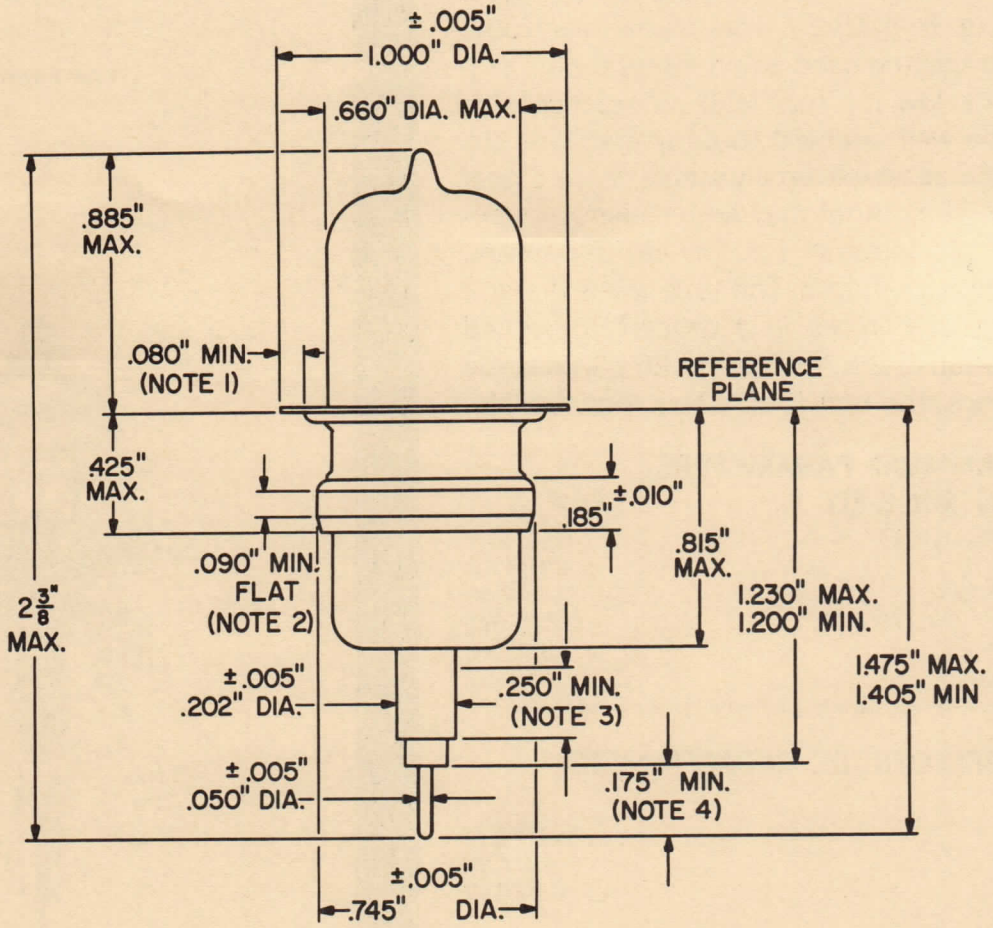
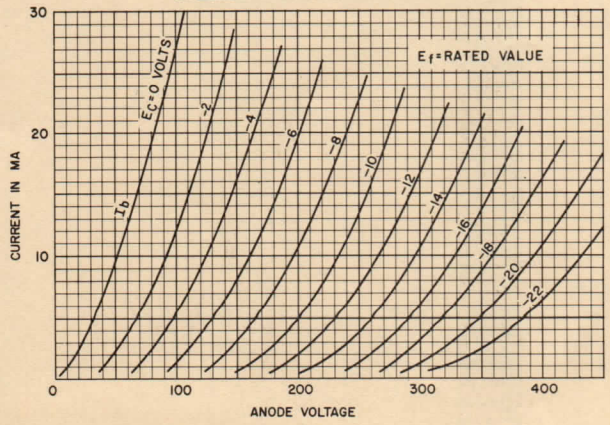


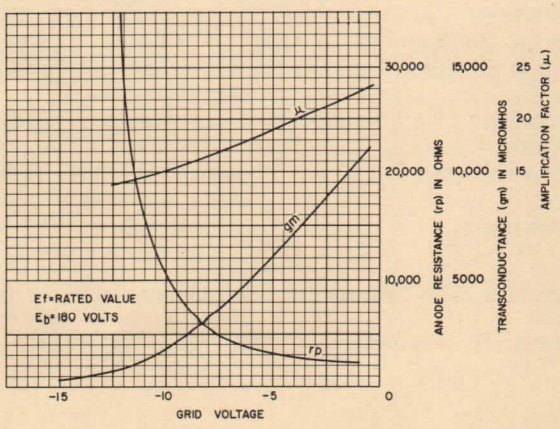
DIAGRAM NOTES:

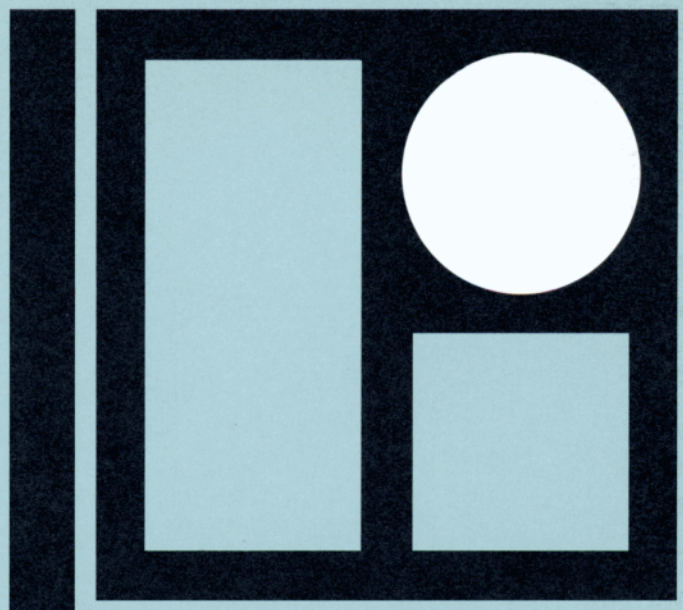
1. *Anode contact area.*
2. *Grid contact area.*
3. *Cathode and heater contact area.*
4. *Heater contact area.*

AVERAGE ANODE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS





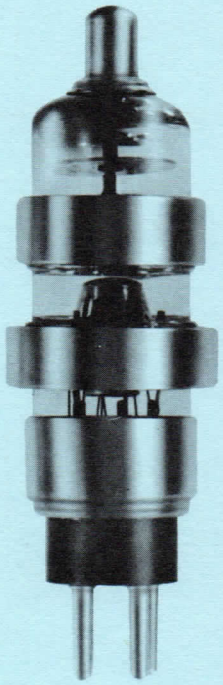
KLYSTRONS

REFLEX KLYSTRON

6BL6

1400 to 5000 Mc
100 mW CW Power Output
Meets MIL-E-1/745

The Litton 6BL6 is a disc-seal type, broadband reflex klystron designed for CW operation. In conjunction with a tunable external cavity, this tube operates over the frequency range from 1400 to 5000 Mc in three modes. The 6BL6 is particularly adapted for use in signal generators, spectrum analyzers, and other local oscillator applications where broadband frequency coverage is needed.



HEATER CHARACTERISTICS

Voltage	6.3 ±8% V
Current (at 6.3 V)	0.6 to 0.75 A

RATINGS (Absolute Values)

Resonator Voltage	350 Vdc
Cathode Current	35 mAdc
Reflector Voltage	−15 to −700 Vdc
Control Electrode Voltage	+1 to −500 Vdc
Heater-Cathode Voltage	±45 Vdc
Power Input	12 W
Seal Temperature	175° C

ELECTRICAL DATA — GENERAL

Reflector Mode	1¾	2¾	3¾	
Frequency	4000	4600	5000	Mc
	1400	2100	3000	Mc

TYPICAL OPERATION

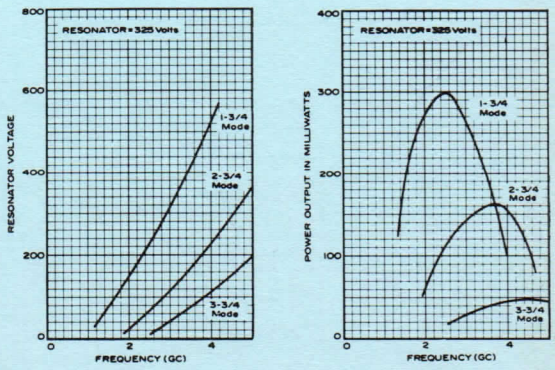
CW Oscillator

Reflector Mode	1¾	2¾	3¾	
Cavity Mode	¾	¾	⅝	
Frequency	2500	3200	5000	Mc
Resonator Voltage	325	325	325	Vdc
Cathode Current	28	26	25	mAdc
Reflector Voltage (Approx.)	−230	−140	−200	Vdc
Power Output (Average)	300	150	45	mW
Power Output (Min.)	200	100	25	mW
Electronic Tuning Range (Between Half Power Points)	6.0	6.0	6.0	Mc
Modulation Sensitivity	100	250	300	Kc/V

MECHANICAL DATA

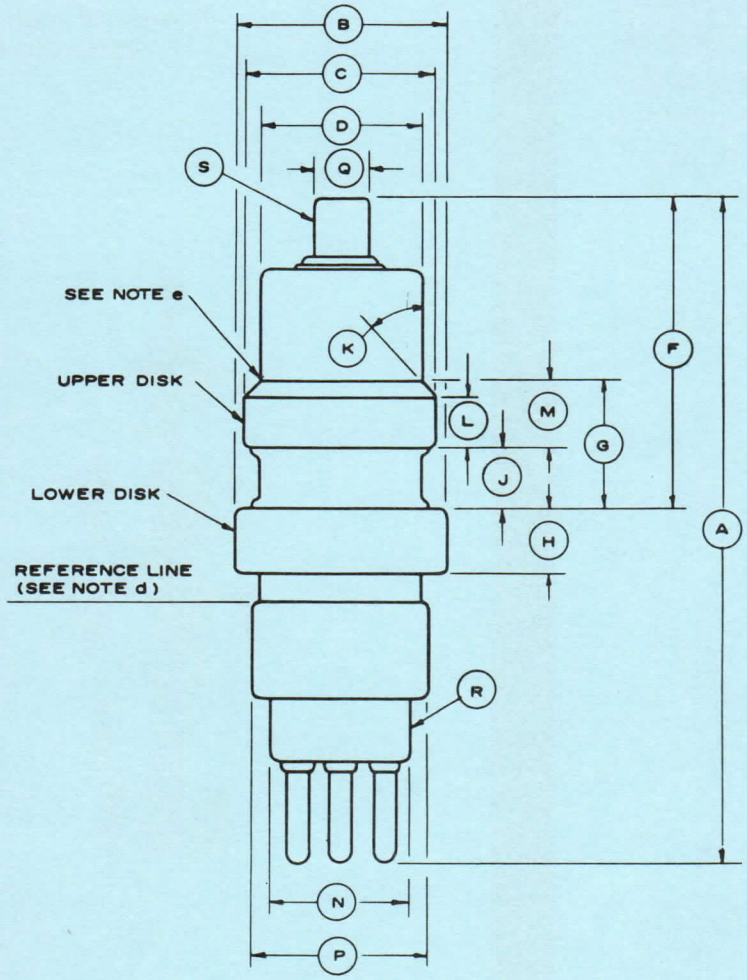
Base	A4-76, Peewee 4 Pin
Cap	C1-3, Skirted Miniature
Cooling	Convection and Conduction
	Contact Rings are to make Direct Peripheral Contact with Metallic Parts of the External Cavity
Mounting Position	Any

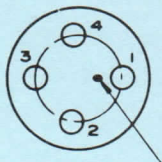
AVERAGE CHARACTERISTICS



REFLEX KLYSTRON

6BL6





Dot Designates Pin 1
(Control Electrode — See Note h)

CONNECTIONS

Pin 1 — Control Electrode
Pin 2 — Heater
Pin 3 — Cathode
Pin 4 — Heater
Lower Contact Ring — 1st Resonator
Upper Contact Ring — 2nd Resonator
Cap — Reflector

LIMITS

DIM.	Min.	Max.
A	2.969	3.219
B	0.990 dia	1.000 dia
C	0.880 dia	0.890 dia
D	——	0.750 dia
F	1.375	1.500
G	0.560	0.610
H	0.250	0.312
J	0.257	0.287
K	25°	35°
L	0.250 nom.	
M	0.303	0.323
N	0.610 dia	0.656 dia
P	0.807 dia	0.822 dia
Q	0.245 dia	0.255 dia
R	Base: A4-76 (see note c)	
S	Cap: C1-3 (see note c)	

NOTES:

a. All dimensions in inches, unless otherwise specified.
b. Dimensions without tolerances are for information and are not required for inspection purposes.
c. Refers to Specification MIL-E-1.
d. For dimensions below reference line refer to base A4-76.
e. Space between glass and upper disc edge or backing ring shall be 0.030 maximum.
f. Diameters B and C shall be concentric within 0.025 TIR and shall form circular cylinder within a range of 0.006. Allowable radius at ends of cylinder shall be 0.030 maximum.
g. Tube shall be tested in concentricity gage specified on Drawing 199-JAN. Gage readings on diameters shall be as follows:

Diameter	Eccentricity
D	*0.050 max*
N	*0.060 max*
P	*0.060 max*
Q	*0.040 max*

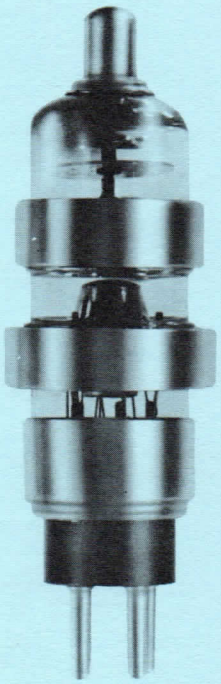
h. Pin No. 1 shall be identified by an index mark (colored dot or other).

REFLEX KLYSTRON

6BM6

550 to 3800 Mc
70 mW CW Power Output
Meets MIL-E-1/744

The Litton 6BM6 is a disc-seal type, broadband reflex klystron designed for CW operation. In conjunction with a tunable external cavity, this tube operates over the frequency range from 550 to 3800 Mc in three modes. The 6BM6 is particularly adapted for use in signal generators, spectrum analyzers, and other local oscillator applications where broadband frequency coverage is needed.



HEATER CHARACTERISTICS

Voltage	6.3 ±8% V
Current (at 6.3 V)	0.5 to 0.75 A

RATINGS (Absolute Values)

Resonator Voltage	350 Vdc
Cathode Current	29 mAdc
Reflector Voltage	−15 to −700 Vdc
Control Electrode Voltage	+1 to −500 Vdc
Heater-Cathode Voltage	±45 Vdc
Power Input	10 W
Seal Temperature	175° C

ELECTRICAL DATA — GENERAL

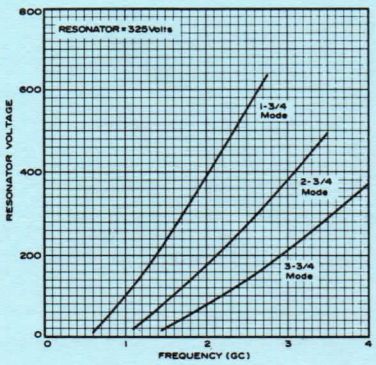
Reflector Mode	1¾	2¾	3¾	
Frequency	2300	3000	3800	Mc
	550	1100	1500	Mc

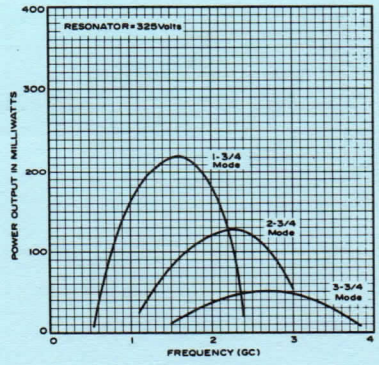
TYPICAL OPERATION

CW Oscillator

Reflector Mode	1¾	2¾	3¾	
Cavity Mode	¾	¾	⅝	
Frequency	1500	2220	3000	Mc
Resonator Voltage	325	325	325	Vdc
Cathode Current	18	18	18	mAdc
Reflector Voltage (Approx.)	−235	−220	−210	Vdc
Power Output (Average)	220	125	45	mW
Power Output (Min.)	125	50	25	mW
Electronic Tuning Range (Between Half Power Points)	6.0	6.0	6.0	Mc
Modulation Sensitivity	250	350	600	Kc/V

AVERAGE CHARACTERISTICS



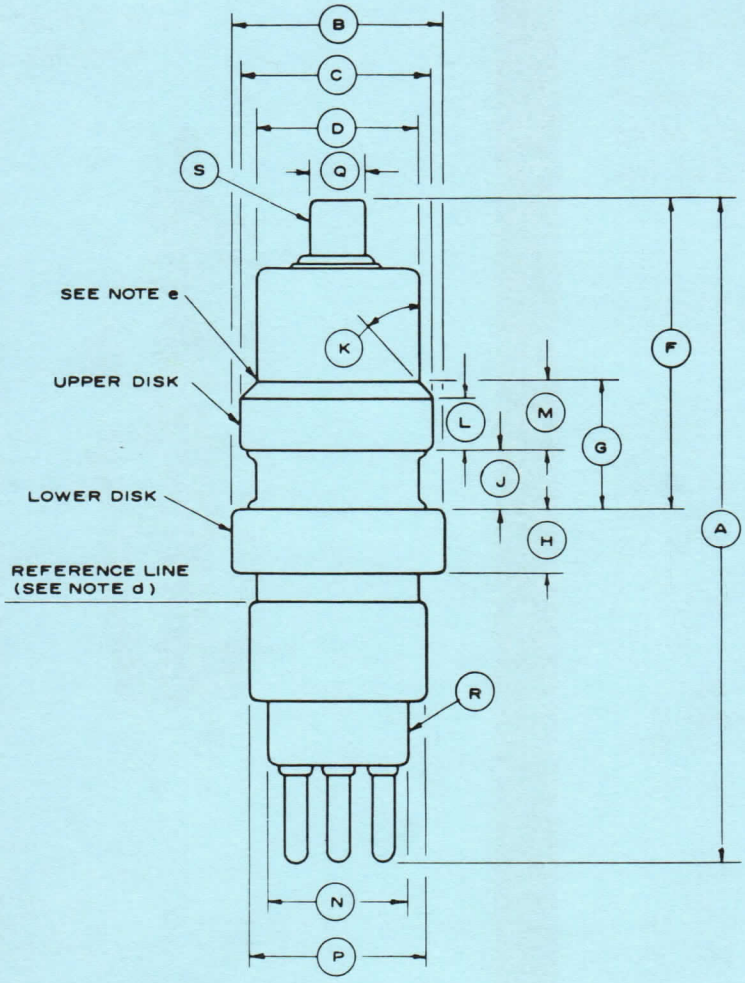


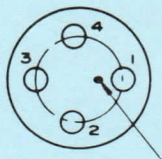
MECHANICAL DATA

Base	A4-76, Peewee 4 Pin
Cap	C1-3, Skirted Miniature
Cooling	Convection and Conduction
	Contact Rings are to make Direct Peripheral Contact with Metallic Parts of the External Cavity
Mounting Position	Any

REFLEX KLYSTRON

6BM6





Dot Designates Pin 1
(Control Electrode — See Note h)

CONNECTIONS

Pin 1 — Control Electrode
Pin 2 — Heater
Pin 3 — Cathode
Pin 4 — Heater
Lower Contact Ring — 1st Resonator
Upper Contact Ring — 2nd Resonator
Cap — Reflector

LIMITS

DIM.	Min.	Max.
A	2.969	3.219
B	0.990 dia	1.000 dia
C	0.880 dia	0.890 dia
D	——	0.750 dia
F	1.375	1.500
G	0.560	0.610
H	0.250	0.312
J	0.257	0.287
K	25°	35°
L	0.250 nom.	
M	0.303	0.323
N	0.610 dia	0.656 dia
P	0.807 dia	0.822 dia
Q	0.245 dia	0.255 dia
R	Base: A4-76 (see note c)	
S	Cap: C1-3 (see note c)	

NOTES:

a. All dimensions in inches, unless otherwise specified.
b. Dimensions without tolerances are for information and are not required for inspection purposes.
c. Refers to Specification MIL-E-1.
d. For dimensions below reference line refer to base A4-76.
e. Space between glass and upper disc edge or backing ring shall be 0.030 maximum.
f. Diameters B and C shall be concentric within 0.025 TIR and shall form circular cylinder within a range of 0.006. Allowable radius at ends of cylinder shall be 0.030 maximum.
g. Tube shall be tested in concentricity gage specified on Drawing 199-JAN. Gage readings on diameters shall be as follows:

Diameter	Eccentricity
D	*0.050 max*
N	*0.060 max*
P	*0.060 max*
Q	*0.040 max*

h. Pin No. 1 shall be identified by an index mark (colored dot or other).

REFLEX KLYSTRON

6BM6A

550 to 3800 Mc
CW or Pulsed Operation
Meets MIL-E-1/746

The Litton 6BM6A is a broadband reflex Klystron designed for CW or pulsed operation. In conjunction with a tunable external cavity, this tube operates over the range from 550 to 3800 Mc in three modes. The 6BM6A is particularly adapted for use in signal generators, spectrum analyzers, and other local oscillator applications where broadband frequency coverage is needed. This tube is a disc-seal type which operates at 70 mW CW power output. The 6BM6A is specially manufactured to give a narrow cathode current range in operation (15 to 24 mAdc).

HEATER CHARACTERISTICS

Voltage	6.3 ±10% V
Current (at 6.3 V)	0.5 to 0.75 A

RATINGS (Absolute Values)

Resonator Voltage	350 Vdc
Cathode Current	29 mAdc
Reflector Voltage	−15 to −700 Vdc
Control Electrode Voltage	+1 to −500 Vdc
Heater-Cathode Voltage	±45 Vdc
Power Input	10 W
Seal Temperature	175° C

ELECTRICAL DATA — GENERAL

Reflector Mode	1¾	2¾	3¾	
Frequency	2300	3000	3800	Mc
	550	1100	1500	Mc

TYPICAL OPERATION

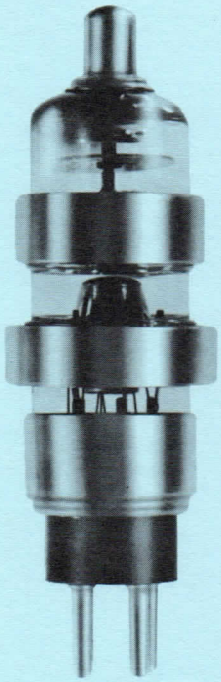
CW Oscillator

Reflector Mode	1¾	2¾	3¾	
Cavity Mode	¾	¾	⅝	
Frequency	1500	2200	3000	Mc
Resonator Voltage	325	325	325	Vdc
Cathode Current	18	18	18	mAdc
Reflector Voltage (Approx.)	−235	−220	−210	Vdc
Control Electrode Voltage (Full Power Output)	0	0	0	V
(Power Output Cutoff)	−150	−150	−150	Vdc
Cathode Current (at Cutoff)	>5	>5	>5	mAdc
Power Output (Average)	220	125	45	mW
Power Output (Min.)	125	50	25	mW
Electronic Tuning Range (Between Half Power Points)	6.0	6.0	6.0	Mc
Modulation Sensitivity	250	350	600	Kc/V

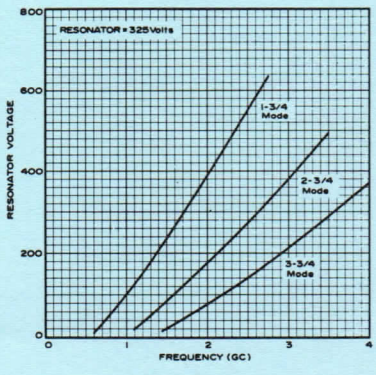
Pulse Modulated Oscillator

For pulse operation, the general conditions are the same except as noted below. The peak power output with the tube modulated by the control electrode is not more than 1.5 db below the CW output within the rated frequency range.

Control Electrode Voltage	−300
Pulse Modulation Voltage	+300 V
Pulse Repetition Rate	40-4000
Minimum Pulse Duration	0.5 us
Rise Time	0.1 us
Decay Time	0.1 us
Jitter	0.15 us



AVERAGE CHARACTERISTICS

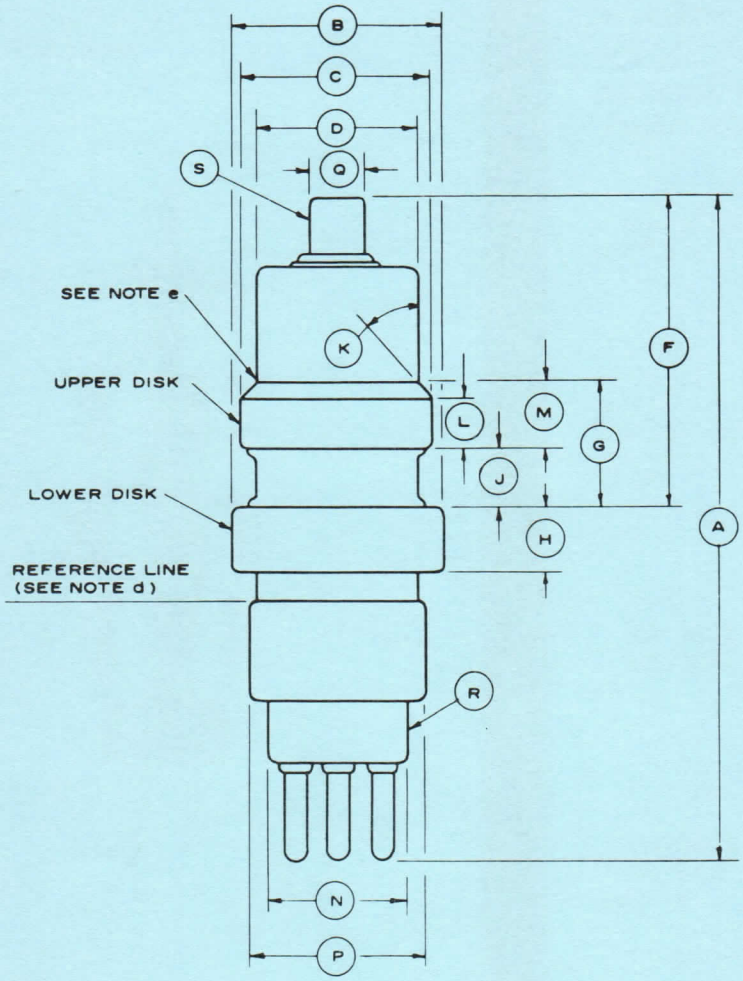


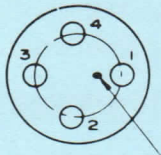
MECHANICAL DATA

Base	A4-76, Peewee 4 Pin
Cap	C1-3, Skirted Miniature
Cooling	Convection and Conduction
	Contact Rings are to make Direct Peripheral Contact with Metallic Parts of the External Cavity
Mounting Position	Any

REFLEX KLYSTRON

6BM6A





Dot Designates Pin 1
(Control Electrode — See Note h)

CONNECTIONS

Pin 1 — Control Electrode
Pin 2 — Heater
Pin 3 — Cathode
Pin 4 — Heater
Lower Contact Ring — 1st Resonator
Upper Contact Ring — 2nd Resonator
Cap — Reflector

LIMITS

DIM.	Min.	Max.
A	2.969	3.219
B	0.990 dia	1.000 dia
C	0.880 dia	0.890 dia
D	——	0.750 dia
F	1.375	1.500
G	0.560	0.610
H	0.250	0.312
J	0.257	0.287
K	25°	35°
L	0.250 nom.	
M	0.303	0.323
N	0.610 dia	0.656 dia
P	0.807 dia	0.822 dia
Q	0.245 dia	0.255 dia
R	Base: A4-76 (see note c)	
S	Cap: C1-3 (see note c)	

NOTES:

a. All dimensions in inches, unless otherwise specified.
b. Dimensions without tolerances are for information and are not required for inspection purposes.
c. Refers to Specification MIL-E-1.
d. For dimensions below reference line refer to base A4-76.
e. Space between glass and upper disc edge or backing ring shall be 0.030 maximum.
f. Diameters B and C shall be concentric within 0.025 TIR and shall form circular cylinder within a range of 0.006. Allowable radius at ends of cylinder shall be 0.030 maximum.
g. Tube shall be tested in concentricity gage specified on Drawing 199-JAN. Gage readings on diameters shall be as follows:

Diameter	Eccentricity
D	*0.050 max*
N	*0.060 max*
P	*0.060 max*
Q	*0.040 max*

h. Pin No. 1 shall be identified by an index mark (colored dot or other).

Known as L3035/7504

KLYSTRON TYPE

L-3035

The L-3035 is an L-band pulsed amplifier klystron capable of producing a peak power output of 2.2 megawatts at a .003 duty cycle.

TYPICAL OPERATION

Frequency	1300 Mc
Peak Power Output	2.2 Mw
Average Power Output	6.6 kW
Gain	36 db
Pulse Width	8.0 us
Duty	0.003
Beam Voltage	115 kv
Beam Current, peak	78 a

ABSOLUTE RATINGS

Heater Voltage, Ef	17 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	125 kv
Anode Voltage, inverse, epx	30 kv
Cathode Current, peak, ik	87 a
Beam Input Power, peak, pi	9.5 Mw
Beam Input Power, average, Pi	27.5 kW
Pulse Length, tp (epy)	9.0 us
R-F Input Power, peak, pd	1.0 kw
R-F Input Power, average, Pd	100 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	20 min.
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	75 psig
Coolant Outlet Temperature	70° C
Tuner Torque	125 oz./in.

ELECTRICAL DATA—GENERAL

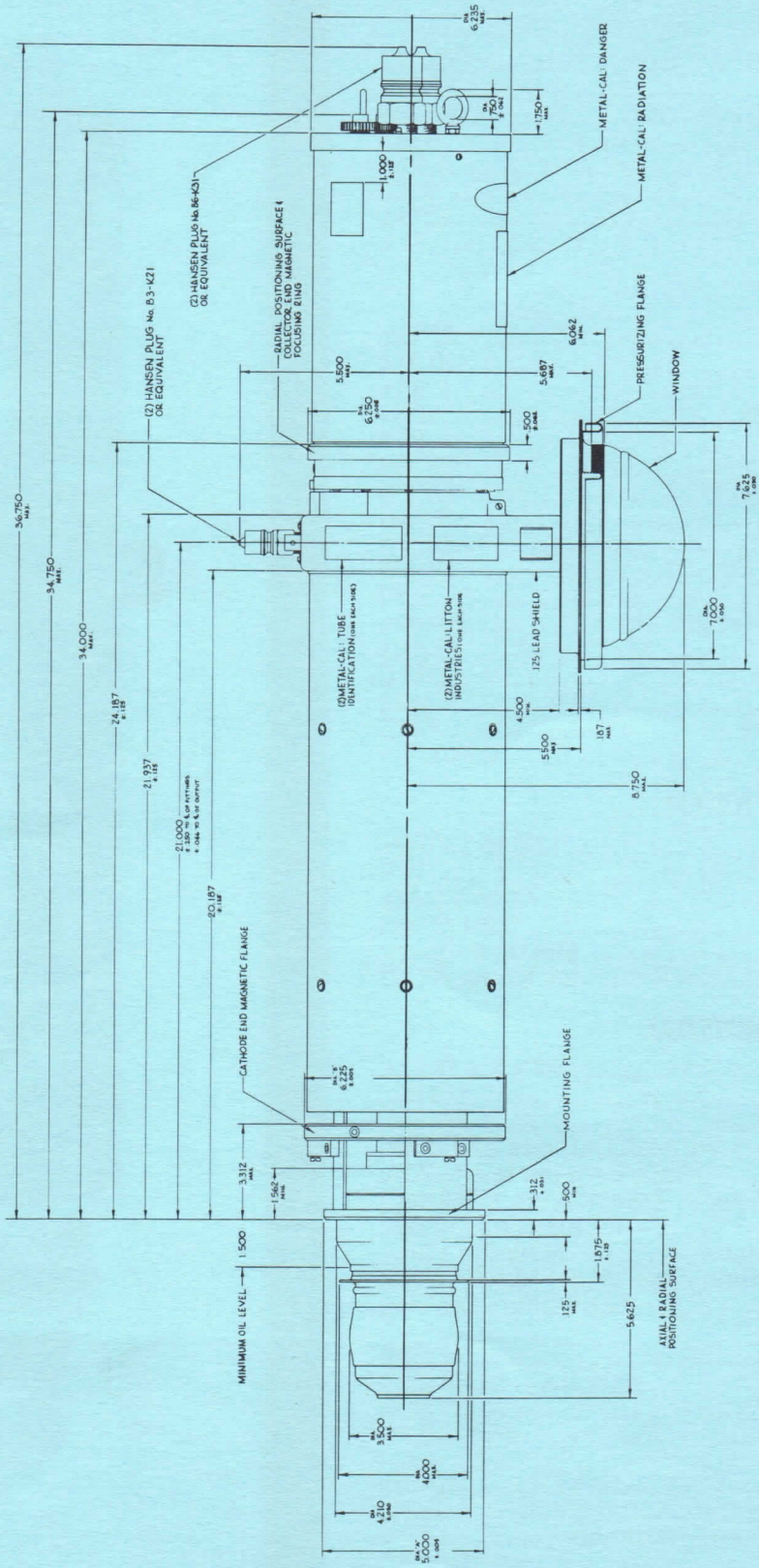
Frequency Range	1240 to 1360 Mc
Heater Voltage (ac)	16 V
Heater Current at 16 Volts	7.0 to 9.5 Aac
Heater Cold Resistance	0.261 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 201377

MECHANICAL DATA—GENERAL

Physical Dimensions	42 x 8 x 14.5 in.
Klystron Weight	110 lbs.
Solenoid Weight	325 lbs.
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG568/u mates to UG573/u
R-F Output Connector	Special Transition to RG69/u or RG103/u waveguide
Cathode and Heater Connector	Mates to Litton Industries Model 10,400 Socket
Coolant Connectors	See Outline Drawing
Cooling, Water	
Collector, flow	7.5 gpm
Body, flow	1.5 gpm
Solenoid, flow	1.0 gpm
Pressure Drop	50 psi
Cooling, Forced Air	
Output Window, flow	10 cfm
Output Window, pressurization, minimum	5.0 psig
Window Seal Temperature, maximum	125° C

KLYSTRON TYPE

L-3035



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KLYSTRON TYPE

L-3250

The L-3250 is an L-band pulsed amplifier klystron capable of producing a peak power output of 10 megawatts at a .0015 duty cycle.

TYPICAL OPERATION

Frequency	1300 Mc
Peak Power Output	10 Mw
Average Power Output	15 kW
Gain	36 db
Pulse Width	6.0 us
Duty	0.0015
Beam Voltage	185 kv
Beam Current, peak	163 a

ABSOLUTE RATINGS

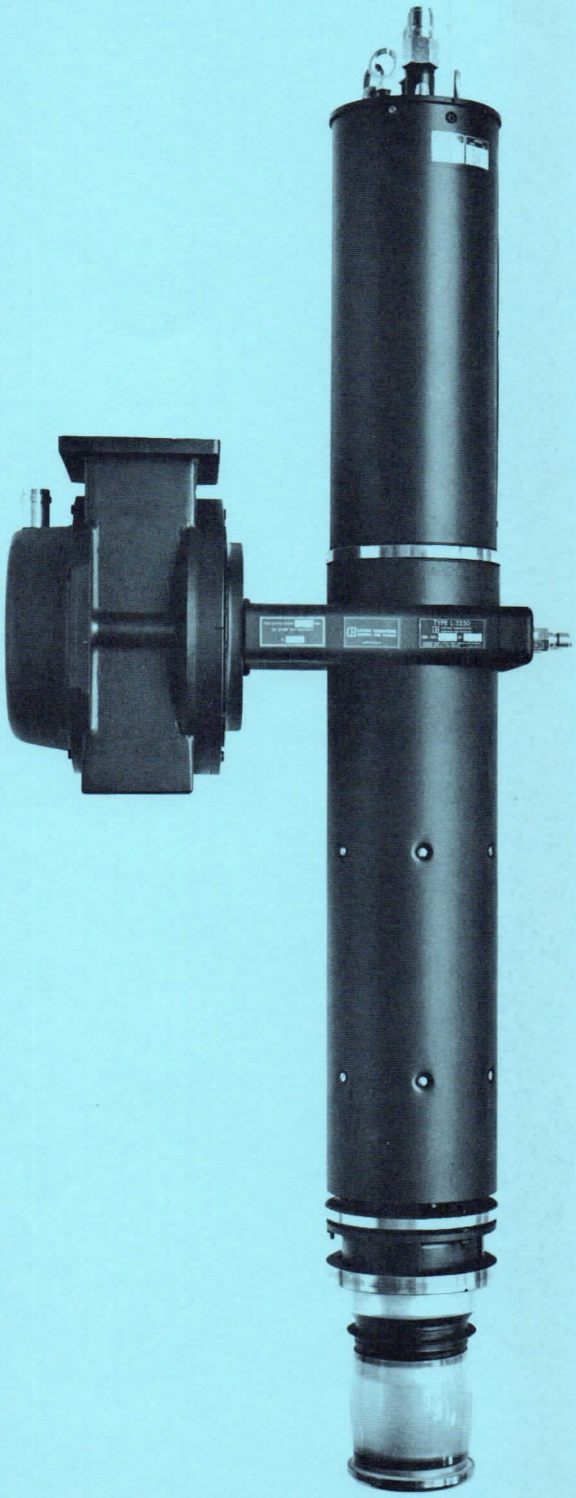
Heater Voltage, Ef	17 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	250 kv
Anode Voltage, inverse, epx	60 kv
Cathode Current, peak, ik	200 a
Beam Input Power, peak, pi	35 Mw
Beam Input Power, average, Pi	60 kW
Pulse Length, tp (epy)	7.0 us
R-F Input Power, peak, pd	10 kw
R-F Input Power, average, Pd	100 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	20 min.
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	200 psig
Coolant Outlet Temperature	70° C
Tuner Torque	180 oz./in.

ELECTRICAL DATA—GENERAL

Frequency Range	1250 to 1350 Mc
Heater Voltage (ac)	16 V
Heater Current at 16 Volts	7.0 to 9.5 Aac
Heater Cold Resistance	0.261 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 46

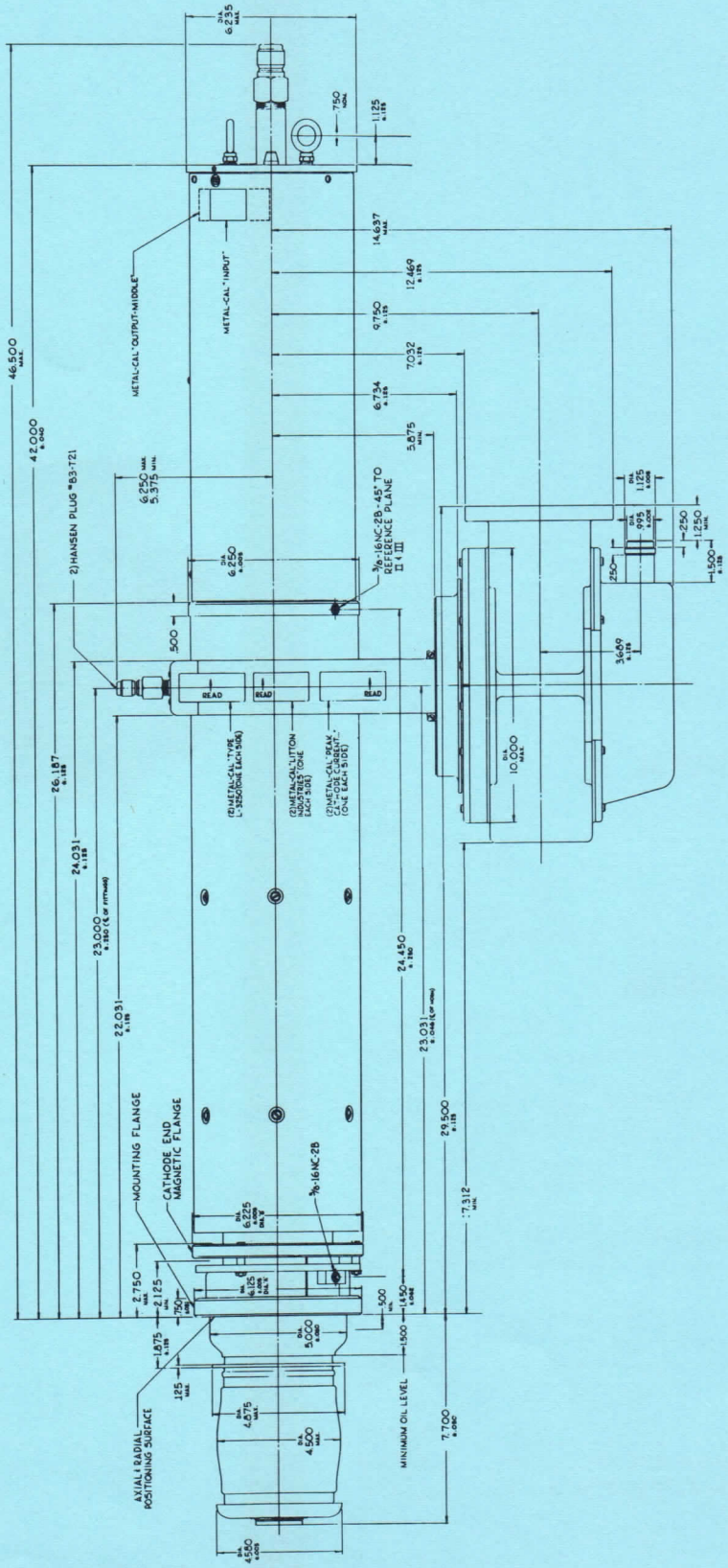
MECHANICAL DATA—GENERAL

Physical Dimensions	54.5 x 10 x 21 in.
Klystron Weight	200 lbs.
Solenoid Weight	467 lbs.
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG61B/u mates to UG59B/u
R-F Output Connector	CPR-650 flange (RG103/u waveguide)
Cathode and Heater Connector	Mates to Litton Industries Model 10,401 Socket
Coolant Connectors	See Outline Drawing
Cooling, Water	
Collector, flow	23 gpm
Body, flow	4.0 gpm
Solenoid, flow	1.5 gpm
Pressure Drop	50 psi
Cooling, Forced Air	
Output Window, flow	20 cfm
Output Window, pressurization, minimum	20 psig
Window Seal Temperature, maximum	125° C



KLYSTRON TYPE

L-3250



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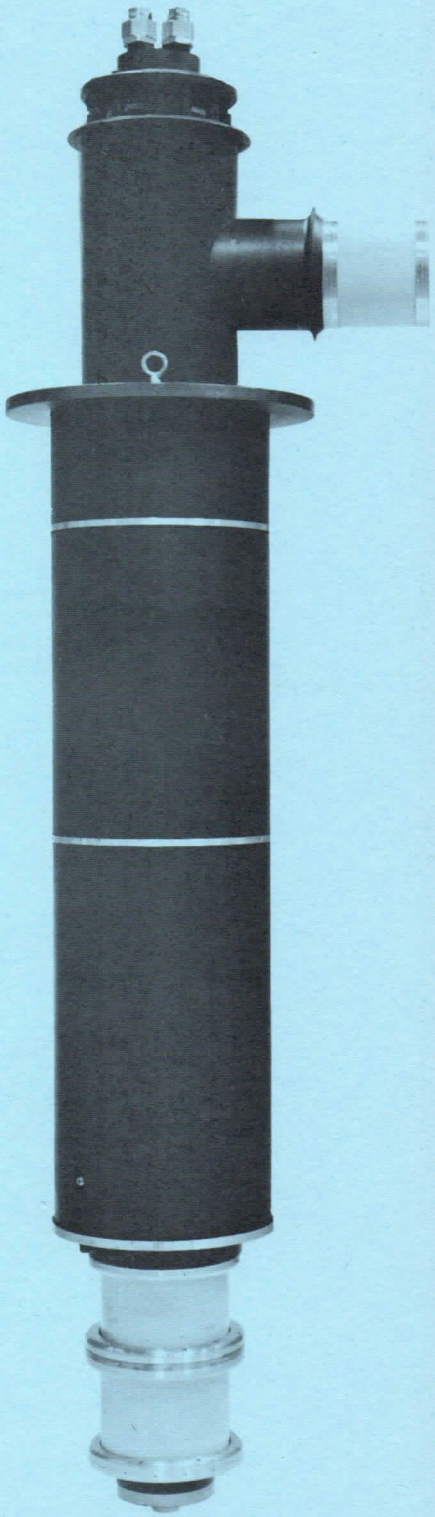
KLYSTRON TYPE

L-3403

1

The L-3403 is a UHF, modulating anode, amplifier klystron capable of producing a peak power output of 1.25 megawatts at a .06 duty cycle.



TYPICAL OPERATION

Frequency	400 MHz
Peak Power Output	1.25 Mw
Average Power Output	75 kW
Gain	35 dB
Pulse Width	2000 μs
Duty	0.06
Beam Voltage	110 kv
Beam Current, peak	32.5 a
Modulating Anode Voltage, peak	55 kv

ABSOLUTE RATINGS

Heater Voltage, Ef	32 Vac
Heater Current, If (Surge)	22.5 Aac
Anode Voltage, epy	120 kv
Anode Voltage, inverse, epx	60 kv
Cathode Current, peak, ik	37 a
Beam Input Power, peak, pi	4.0 Mw
Beam Input Power, average, Pi	240 kW
Pulse Length, tp(epy)	2100 μs
R-F Input Power, peak, pd	0.4 kw
R-F Input Power, average, Pd	24 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	15 min.
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	125 psig
Coolant Outlet Temperature	70° C

ELECTRICAL DATA—GENERAL

Frequency Range	400 to 450 MHz
Heater Voltage (ac)	27 V
Heater Current at 30 Volts	12.9 Aac
Heater Cold Resistance	0.26 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 190

MECHANICAL DATA—GENERAL

Physical Dimensions	120 x 24 x 33 in.
Klystron Weight	950 lbs.
Solenoid Weight	1450 lbs.
Mounting Position	Vertical, Cathode end down
R-F Input Connector	Mates to UG21/u
R-F Output Connector	Coaxial, WR2100 waveguide
Cathode and Heater Connector	Mates to Litton Industries Model 206 Socket
Coolant Connectors	See Outline Drawing
Coolant, Water	
Collector, flow	50 gpm
Body, flow	7.0 gpm
Tuners, flow	1.0 gpm
Solenoid, flow	4.5 gpm
Pressure Drop, each flow	50 psi
Cooling, Forced Air	
Output Window, flow	250 cfm
Window Seal Temperature, maximum	125° C

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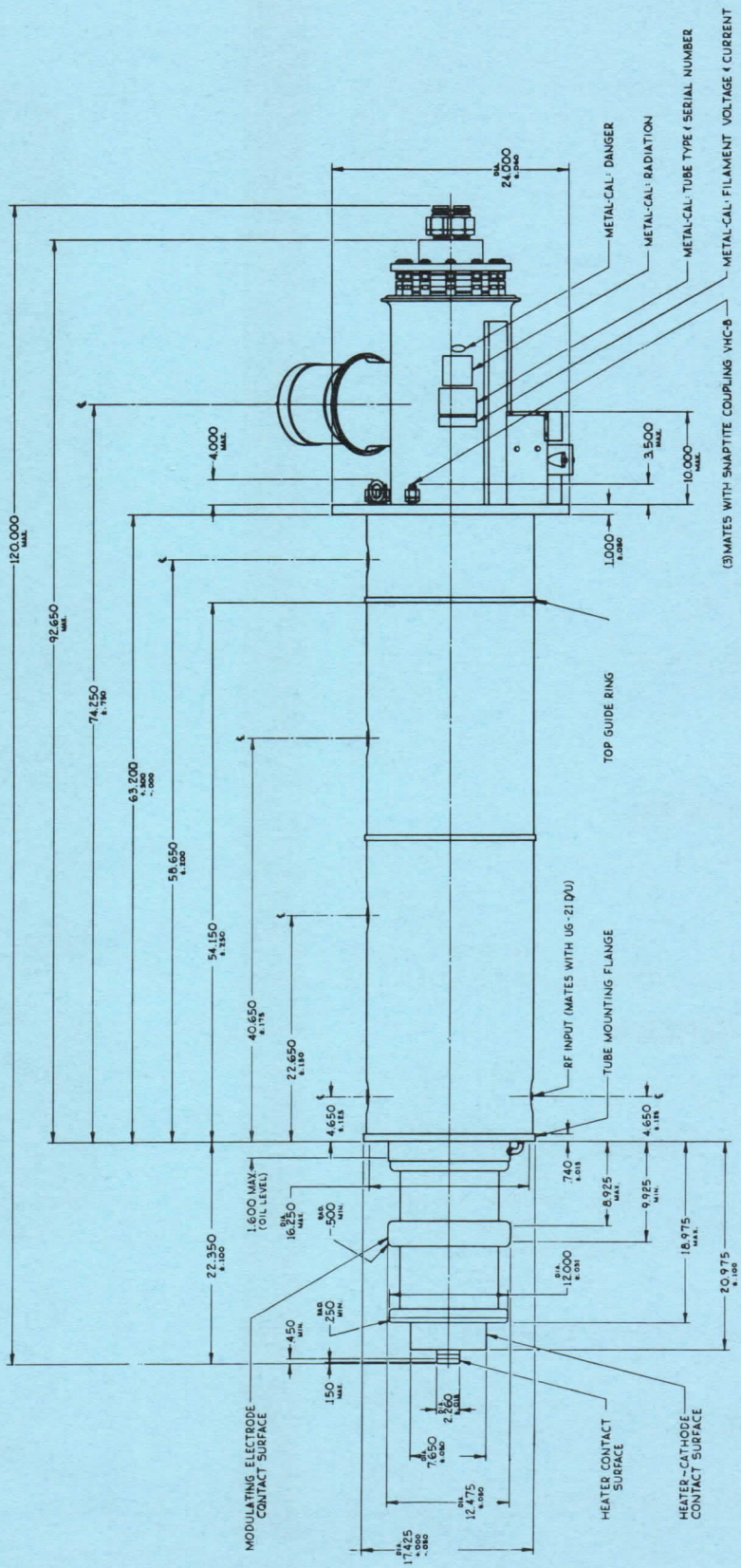
KLYSTRON TYPE

L-3403

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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KLYSTRON TYPE

L-3660

1

The L-3660 is an L-band pulsed amplifier klystron capable of producing a peak power output of 10 megawatts at a 0.002 duty cycle.

TYPICAL OPERATION

Center Frequency	1300 Mc
Peak Power Output	10 Mw
Average Power Output	20 kW
Gain	33 db
Pulse Width	15 us
Duty	0.002
Beam Voltage	175 kv
Beam Current, peak	171 a

ABSOLUTE RATINGS

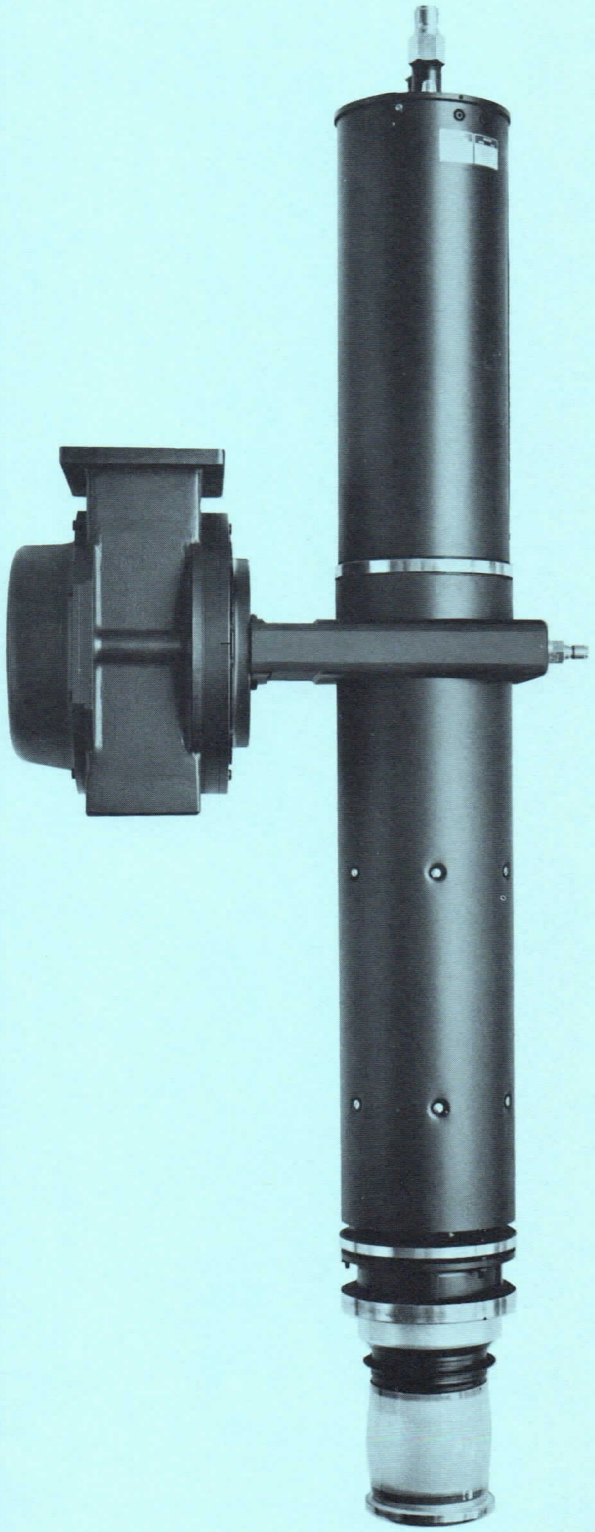
Heater Voltage, Ef	17 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	190 kv
Anode Voltage, inverse, epx	60 kv
Cathode Current, peak, ik	185 a
Beam Input Power, peak, pi	35 Mw
Beam Input Power, average, Pi	65 kW
Pulse Length, tp (epy)	18 us
R-F Input Power, peak, pd	10 kw
R-F Input Power, average, Pd	20 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	20 min.
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	200 psig
Coolant Outlet Temperature	70° C

ELECTRICAL DATA — GENERAL

Frequency Range, tunable	1250 to 1350 Mc
Heater Voltage (ac)	16 V
Heater Current at 16 Volts	12.5 to 14.2 Aac
Heater Cold Resistance	0.261 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 200

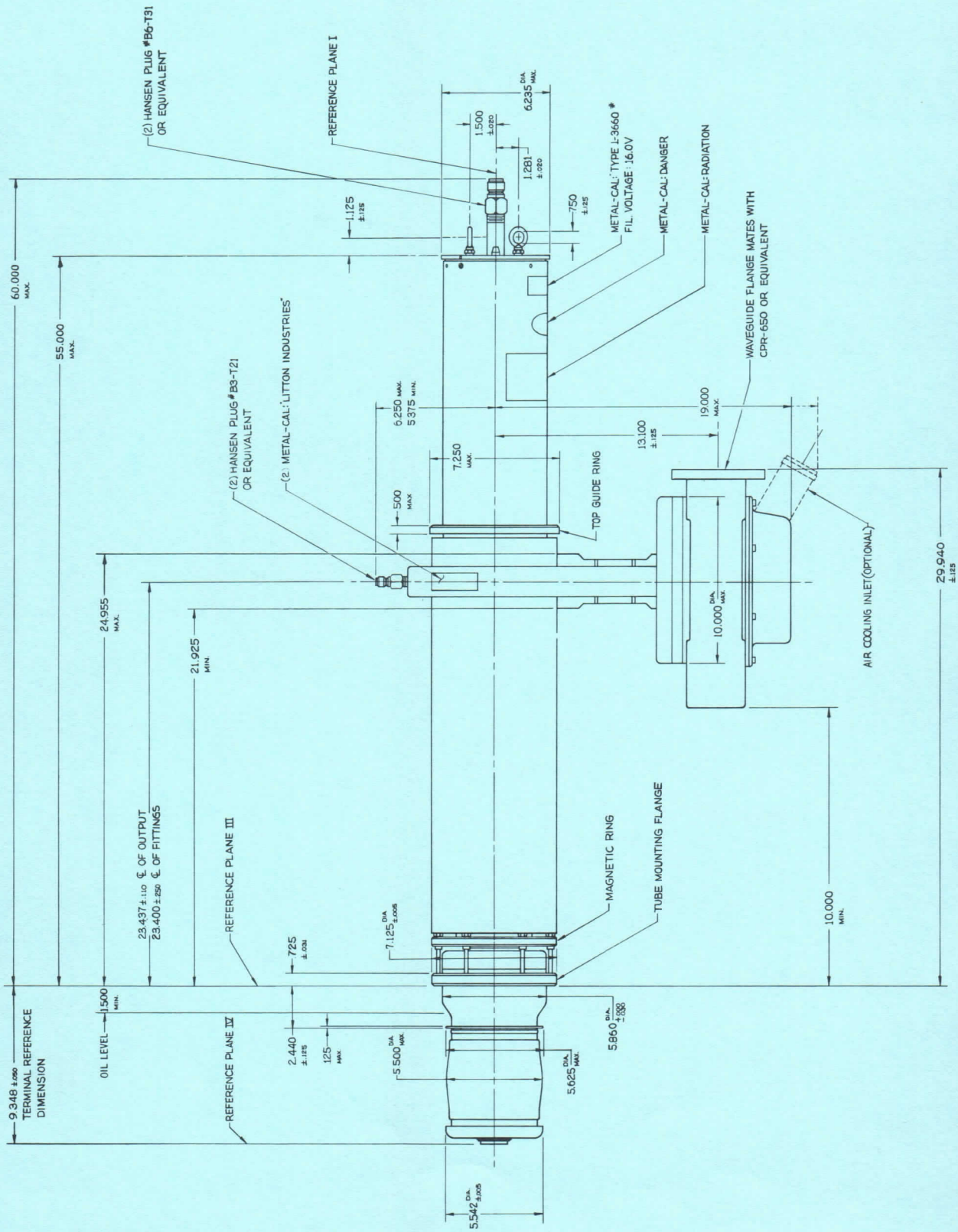
MECHANICAL DATA — GENERAL

Physical Dimensions	See outline drawing
Klystron Weight	200 lbs.
Solenoid Weight	580 lbs.
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG61B/U mates to UG59B/U
R-F Output Connector	CPR-650F flange (RG-103/U waveguide)
Cathode and Heater Connector	Mates to Litton Industries Model 10,404 Socket
Cooling, Water	
Collector, flow	30 gpm
Body, flow	5.0 gpm
Solenoid, flow	1.5 gpm
Pressure Drop	50 psi
Cooling, Forced Air	
Output Window, pressurization, minimum (Freon-12)	15 psig
Window Seal Temperature, maximum	125° C



KLYSTRON TYPE

L-3660



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KLYSTRON TYPE

L-3661

2

The L-3661 is an L-band, fixed frequency, pulsed amplifier klystron capable of producing a peak power output of 20 megawatts at a 0.0015 duty cycle.

TYPICAL OPERATION

Frequency	1300 MHz
Peak Power Output	20 Mw
Average Power Output	20 kW
Gain	36 dB
Pulse Width	10 μs
Duty	0.0015
Beam Voltage	220 kv
Beam Current, peak	255 a

ABSOLUTE RATINGS

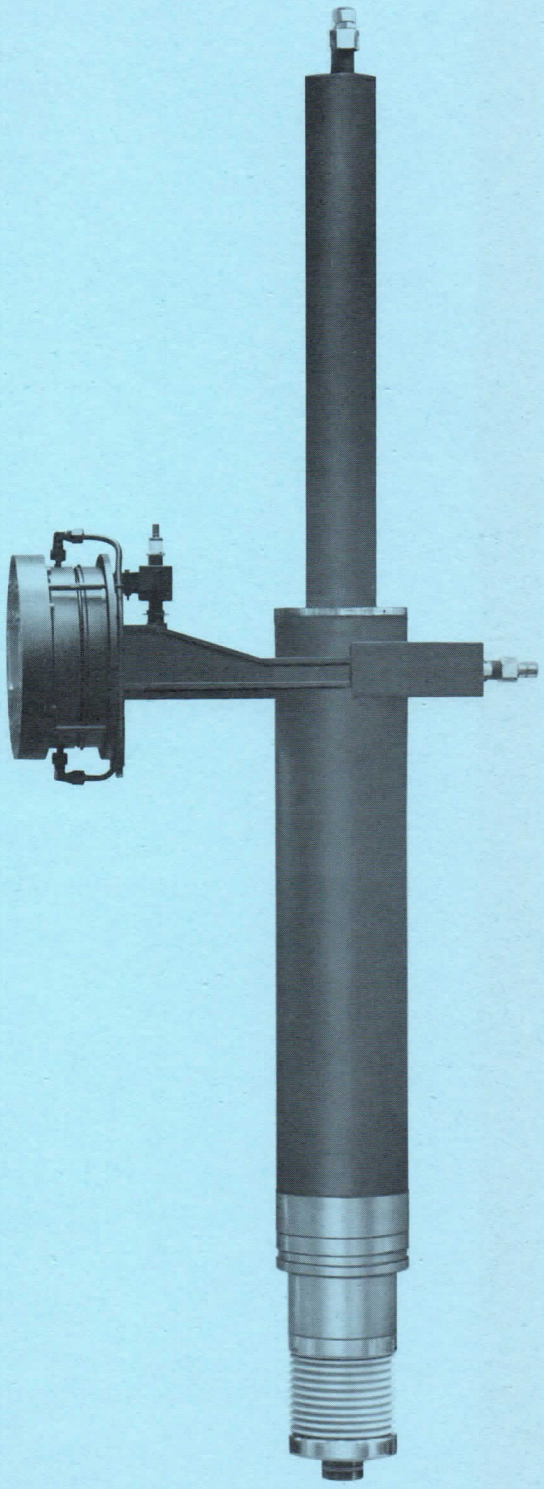
Heater Voltage, Ef	17 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	230 kv
Anode Voltage, inverse, epx	60 kv
Cathode Current, peak, ik	270 a
Beam Input Power, peak, pi	60 Mw
Beam Input Power, average, Pi	90 kW
Pulse Length, tp (epy)	12 μs
R-F Input Power, peak, pd	10 kw
R-F Input Power, average, Pd	100 W
Load VSWR (non-failure)	1.5 : 1
Cathode Heating Time, minimum, tk	20 min.
Window Pressure	70 psia
Cathode Seal Temperature	175°C
Hydrostatic Pressure	200 psig
Coolant Outlet Temperature	70°C

ELECTRICAL DATA — GENERAL

Frequency Center	1300 MHz
Bandwidth (1.0 db points)	6.0 MHz
Heater Voltage (ac)	16 V
Heater Current at 16 Volts	13.5 Aac
Heater Cold Resistance	0.165 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 215

MECHANICAL DATA — GENERAL

Physical Dimensions	See Outline Drawing
Klystron Weight	250 lbs
Solenoid Weight	960 lbs
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG61/u mates to UG59/u
R-F Output Connector	CPR-650 Flange (RG103/u waveguide)
Cathode and Heater Connector	Mates to Litton Industries Model 212A Socket
Cooling, Water	
Collector, flow	45 gpm
Body, flow	4.0 gpm
Solenoid, flow	1.5 gpm
Pressure Drop	50 psi
Waveguide Pressurization, Gas (Freon-12)	
Output Window, pressurization, minimum	15 psig
Window Seal, Temperature, maximum	125°C



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KLYSTRON TYPE

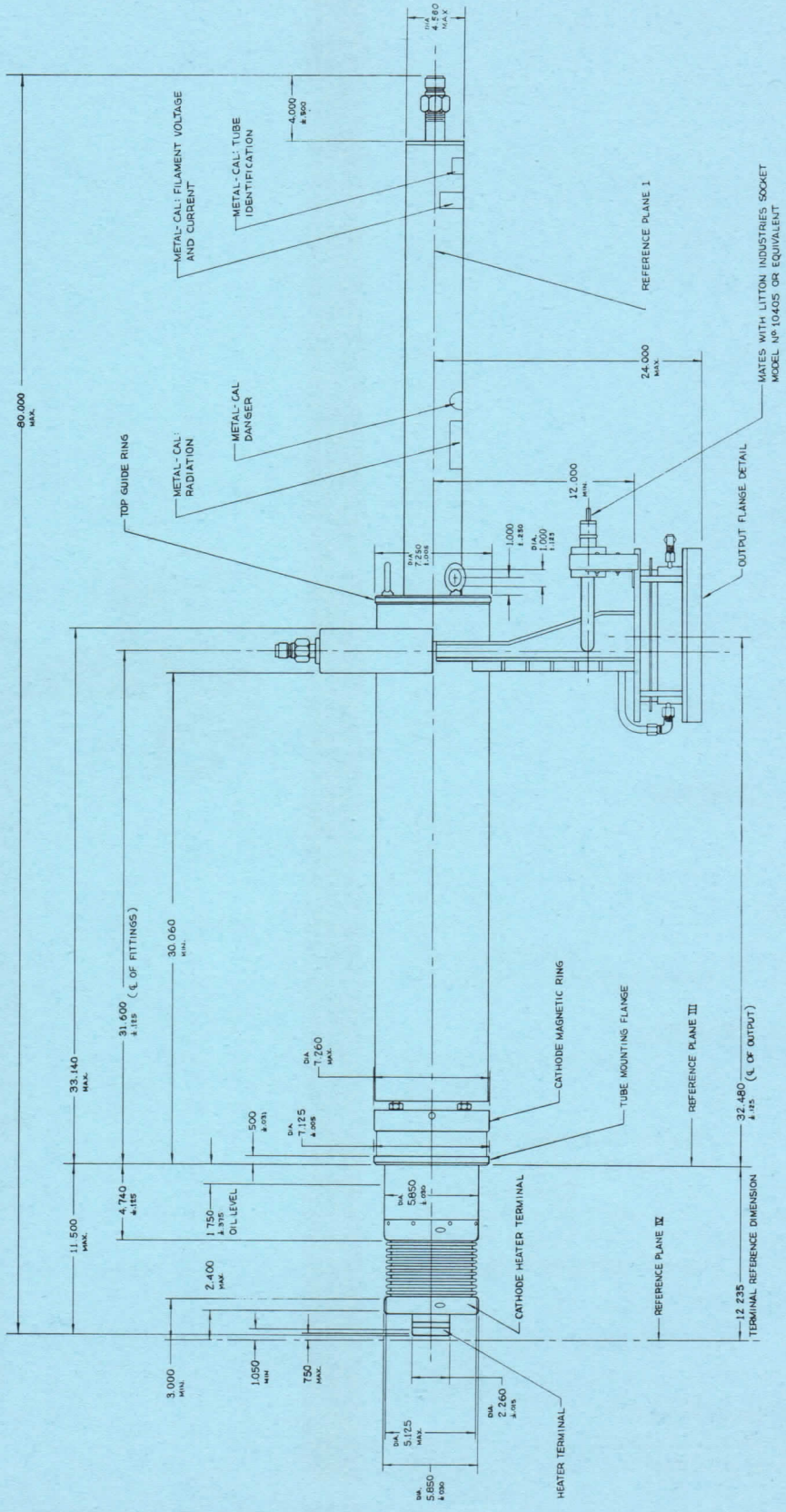
L-3661

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



NOTE: X RADIATION SHIELDING NOT PROVIDED

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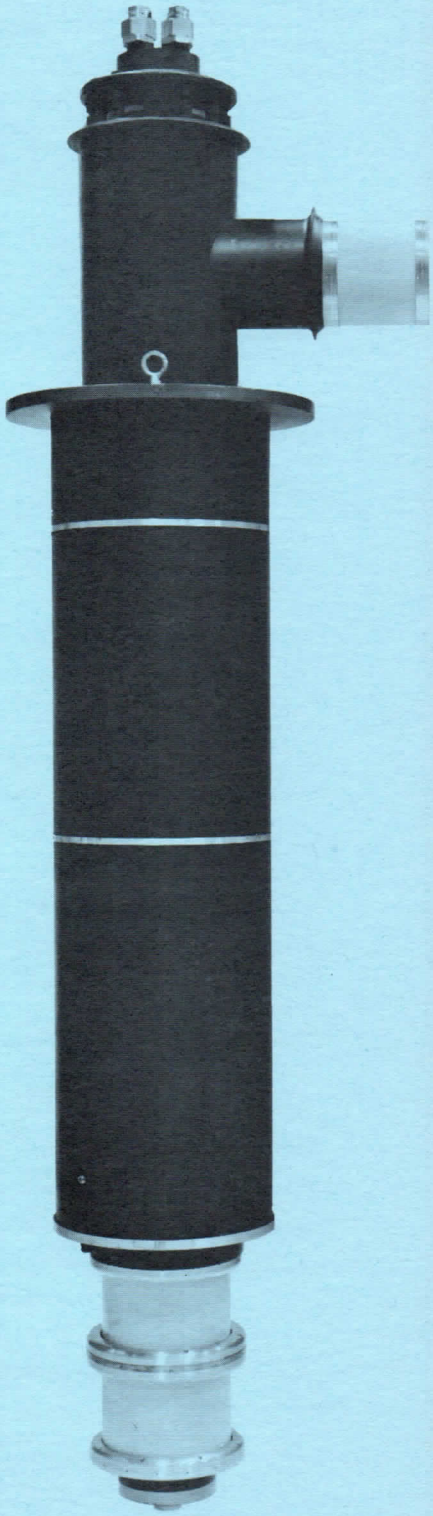
KLYSTRON TYPE

L-3694

1

The L-3694 is a UHF, tunable, modulating anode, broadband, amplifier klystron capable of producing a peak power output of 1.25 megawatts at a .06 duty cycle.



TYPICAL OPERATION

Frequency	425 MHz
Bandwidth (1 db points)	2.0 MHz
Peak Power Output	1.25 Mw
Average Power Output	75 kW
Gain	35 dB
Pulse Width	2000 μs
Duty	0.06
Beam Voltage	115 kv
Beam Current, peak	34 a
Modulating Anode Voltage, peak	55 kv

ABSOLUTE RATINGS

Heater Voltage, Ef	32 Vac
Heater Current, If (Surge)	22.5 Aac
Anode Voltage, epy	120 kv
Anode Voltage, inverse, epx	60 kv
Cathode Current, peak, ik	37 a
Beam Input Power, peak, pi	4.0 Mw
Beam Input Power, average, Pi	250 kW
Pulse Length, tp(epy)	2100 μs
R-F Input Power, peak, pd	0.5 kw
R-F Input Power, average, Pd	30 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	15 min.
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	125 psig
Coolant Outlet Temperature	70° C

ELECTRICAL DATA—GENERAL

Frequency Range	400 to 450 MHz
Heater Voltage (ac)	27 V
Heater Current at 30 Volts	13.5 Aac
Heater Cold Resistance	0.26 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 190

MECHANICAL DATA—GENERAL

Physical Dimensions	120 x 24 x 33 in.
Klystron Weight	950 lbs.
Solenoid Weight	1450 lbs.
Mounting Position	Vertical, Cathode end down
R-F Input Connector	Mates to UG21/u
R-F Output Connector	Coaxial, WR2100 waveguide
Cathode and Heater Connector	Mates to Litton Industries Model 206 Socket
Coolant Connectors	See Outline Drawing
Coolant, Water	
Collector, flow	50 gpm
Body, flow	7.0 gpm
Tuners, flow	1.0 gpm
Solenoid, flow	4.5 gpm
Pressure Drop	50 psi
Cooling, Forced Air	
Output Window, flow	250 cfm
Window Seal Temperature, maximum	125° C

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San Carlos, California

KLYSTRON TYPE

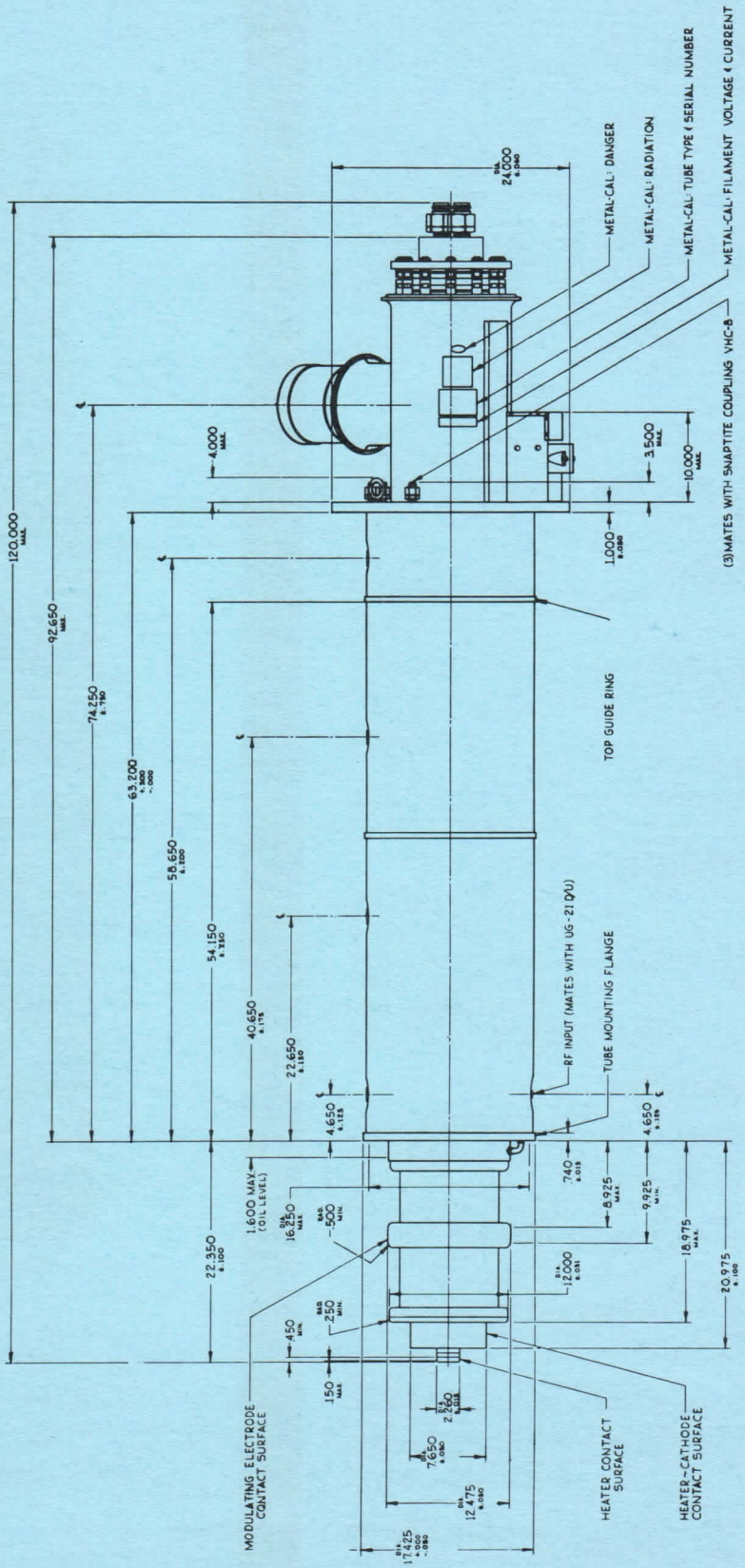
L-3694

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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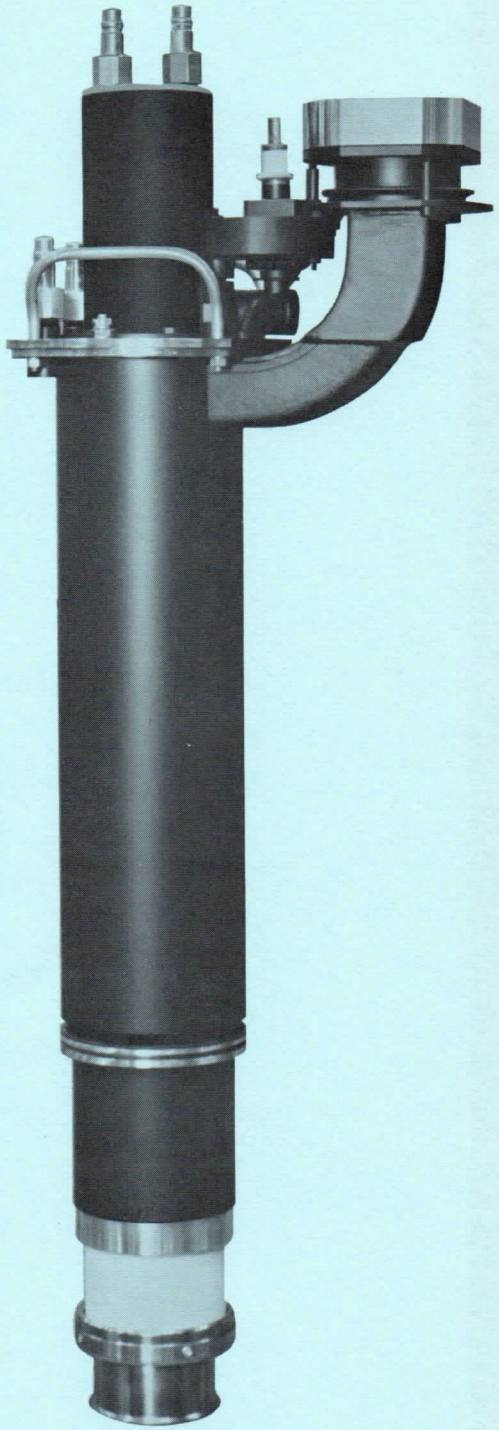
KLYSTRON TYPE

L-3742

The L-3742 is a broad-band, S-band pulsed amplifier klystron capable of producing a peak power output of 1.0 megawatts at a .004 duty cycle over a 120 megacycle bandwidth.



TYPICAL OPERATION

Frequency	2980-3100 Mc
Bandwidth to 1.5 db points	120 Mc
Peak Power Output, minimum	1.0 Mw
Average Power Output	4.0 kW
Gain, minimum	35 db
Pulse Width, R.F.	10 us
Duty	0.004
Beam Voltage	90 kV
Beam Current, peak	54 a

ABSOLUTE RATINGS

Heater Voltage, Ef	7.88 Vac
Heater Current, If (surge)	54 Aac
Anode Voltage, epy	105 kV
Anode Voltage, inverse, epx	30 kV
Cathode Current, peak, ik	68 a
Beam Input Power, peak, pi	6.0 Mw
Beam Input Power, average, Pi	24 kW
Pulse Length, tp (epy)	11 us
R-F Input Power, peak, pd	2.0 kw
R-F Input Power, average, Pd	10 W
Load VSWR (non-failure)	2.5:1
Cathode Heating Time, minimum, tk	12 min
Window Pressure	40 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	200 psig
Coolant Outlet Temperature	85° C

ELECTRICAL DATA—GENERAL

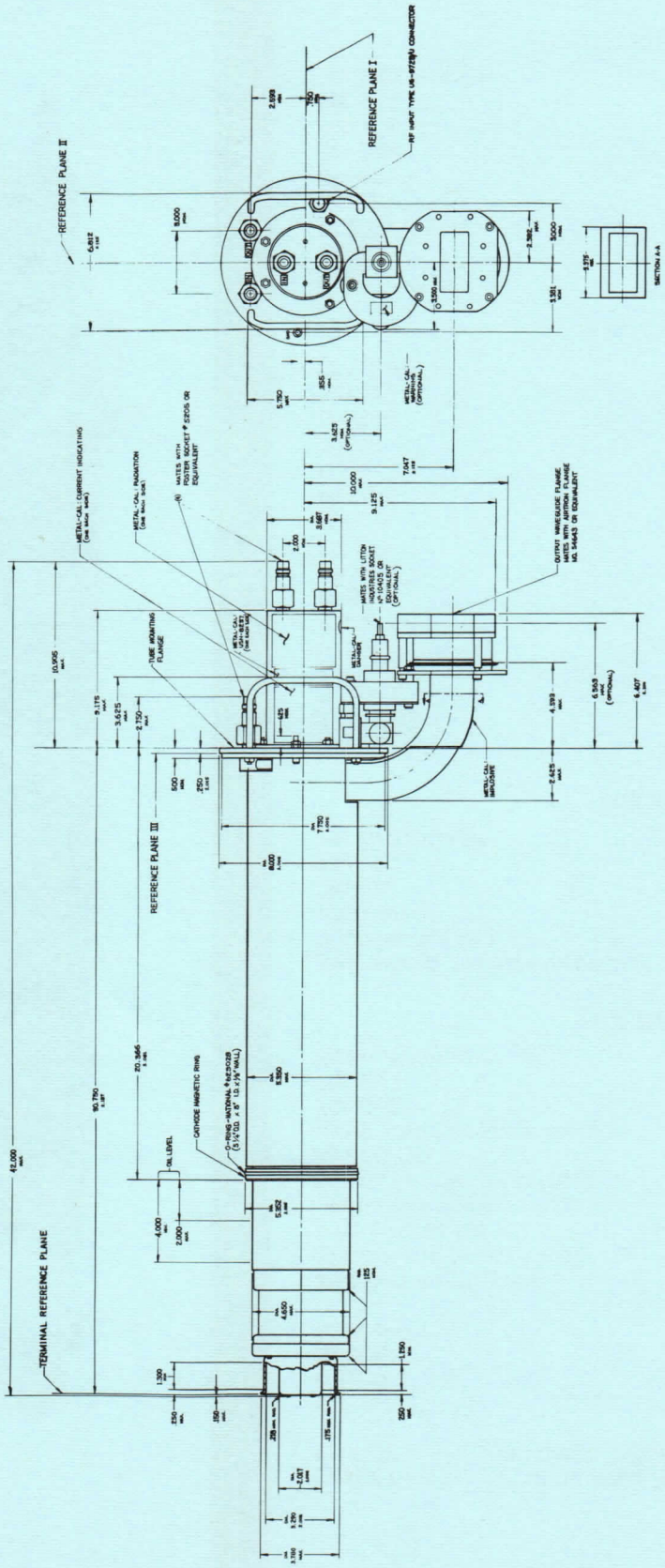
Frequency Range	2980-3100 Mc
Heater Voltage (ac)	7.5 Vac
Heater Current at 7.5 Volts	30 Aac
Heater Cold Resistance	0.03 Ohm
Focusing	Electromagnetic
Solenoid	Litton Industries Model 288

MECHANICAL DATA—GENERAL

Physical Dimensions	See Outline Drawing
Klystron Weight	110 lbs
Solenoid Weight	300 lbs
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG-972/u
R-F Output Connector	S-band waveguide flange Airtron #54643 or equiv.
Cathode and Heater Connector	Mates to Litton Industries Model 507 Socket
Coolant Connectors	See Outline Drawing
Cooling, Water	
Collector, flow	4.0 gpm
Body, flow	1.0 gpm
Solenoid	1.0 gpm
Pressure Drop	20 psi
Output Window	
Output Window, pressurization, minimum	30 psia
Window Seal Temperature, maximum	125° C

KLYSTRON TYPE

L-3742



KLYSTRON TYPE

L-3943

1

The L-3943 is a fixed-tuned, L-band, pulsed amplifier klystron capable of producing a peak power output of 5 megawatts at a .002 duty cycle.

TYPICAL OPERATION

Frequency	1300 Mc
Peak Power Output	5 Mw
*Average Power Output	10 kW
Gain	33 db
Pulse Width, R.F.	6.25 us
*Duty	.002
Beam Voltage	155 V
Beam Current, peak	93 a

ABSOLUTE RATINGS

Heater Voltage, Ef	17 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	215 kV
Anode Voltage, inverse, epx	60 kV
Cathode Current, peak, ik	200 a
Beam Input Power, peak, pi	20 Mw
Beam Input Power, average, Pi	40 kW
Pulse Length, tp (epy)	9.0 us
R-F Input Power, peak, pd	5 kw
R-F Input Power, average, Pd	10 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	20 min
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	200 psig
Coolant Outlet Temperature	70° C

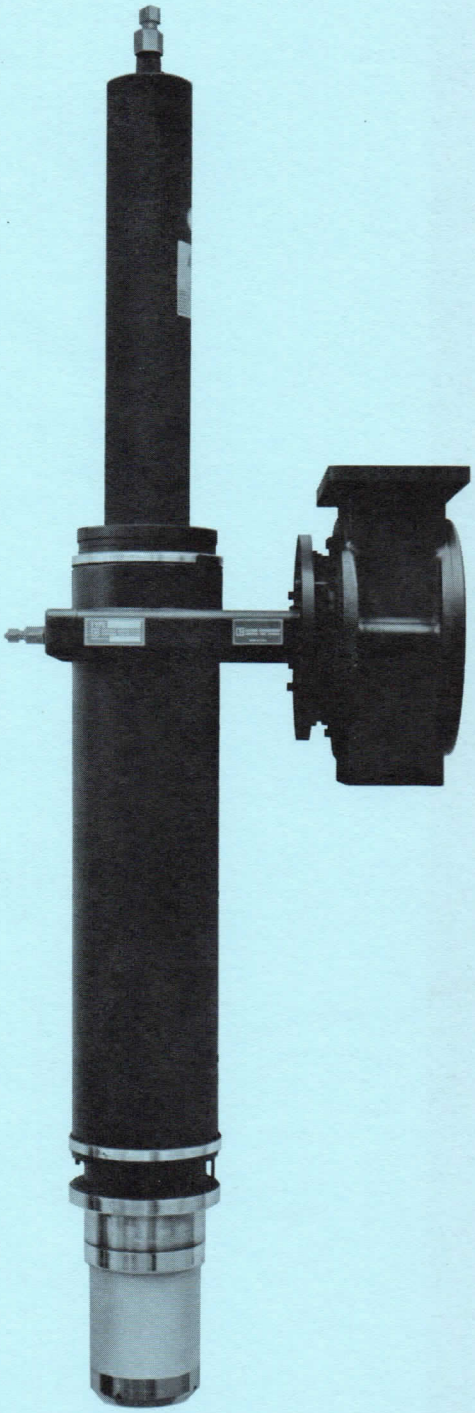
ELECTRICAL DATA—GENERAL

Frequency Range	1290-1310 Mc
Heater Voltage (ac)	16 Vac
Heater Current at 16 volts	7.6 Aac
Heater Cold Resistance	.261 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 46, 205 or 206

MECHANICAL DATA—GENERAL

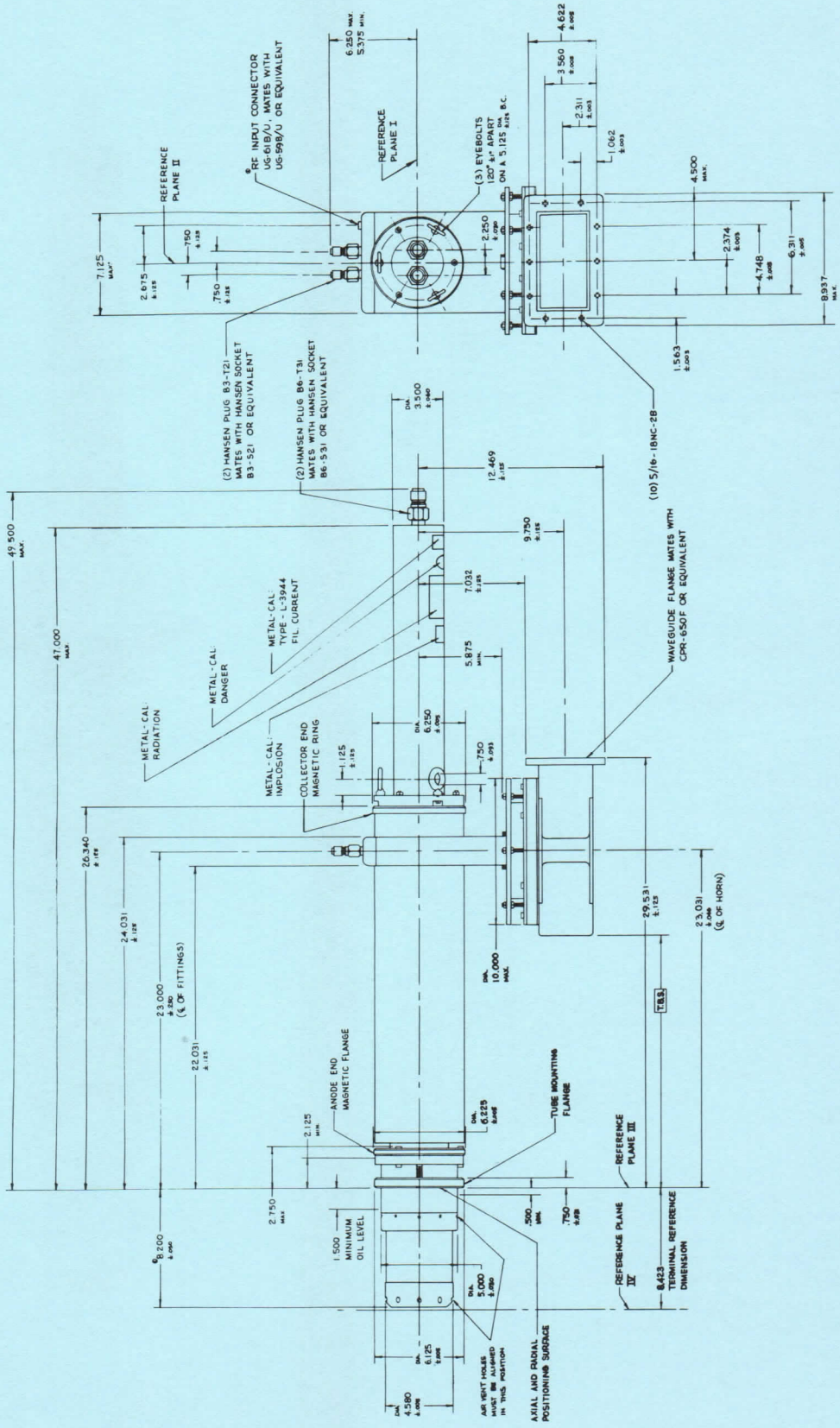
Physical Dimensions	See Outline Drawing
Klystron Weight	200 lbs
Solenoid Weight	467 lbs
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG61B/u mates to UG59B/u
R-F Output Connector	CPR-650 Flange
Cathode and Heater Connector	Mates to Litton Industries Model 379 Socket
Coolant Connectors	See Outline Drawing
Cooling, Water	
Collector, flow	23 gpm
Body, flow	4.0 gpm
Solenoid	1.5 gpm
Pressure Drop	50 psi
Output Window	
Output Window, pressurization, minimum, dry air	20 psig
Window Seal Temperature, maximum	125° C

*Higher average power available on request



KLYSTRON TYPE

L-3943



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KLYSTRON TYPE
L-3944

The L-3944 is a fixed tuned L-band pulsed amplifier klystron capable of producing a peak power output of 10 megawatts at a 0.0015 duty cycle.

TYPICAL OPERATION

Frequency	1300 Mc
Peak Power Output	10 Mw
Average Power Output	15 kW
Gain	36 db
Pulse Width, R. F.	6.25 us
Duty, R. F.	0.0015
Beam Voltage	210 kv
Beam Current, peak	150 a

ABSOLUTE RATINGS

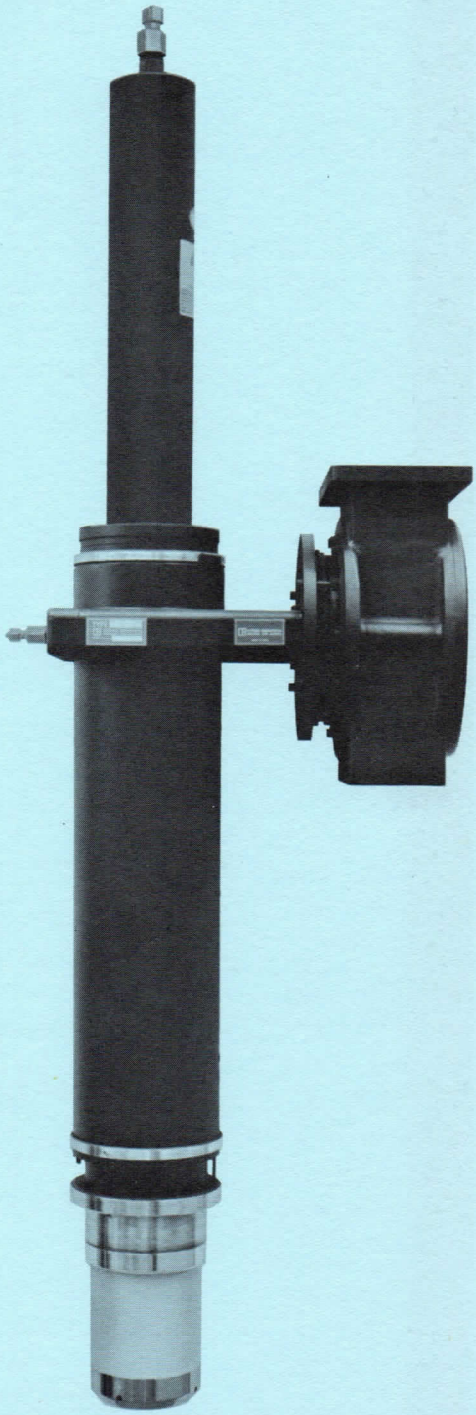
Heater Voltage, Ef	17 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	250 kv
Anode Voltage, inverse, epx	100 kv
Cathode Current, peak, ik	175 a
Beam Input Power, peak, pi	35 Mw
Beam Input Power, average, Pi	63 kW
Pulse Length, tp (epy)	7.5 us
R-F Input Power, peak, pd	5 kw
R-F Input Power, average, Pd	7.5 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	20 min.
Window Pressure	40 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	125 psig
Coolant Outlet Temperature	70° C

ELECTRICAL DATA — GENERAL

Frequency (Fixed tuned to a point within this range)	1290-1310 Mc
Heater Voltage (ac)	16 V
Heater Current at 16 Volts	7.6 Aac
Heater Cold Resistance	0.261 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 46, 205 or 206

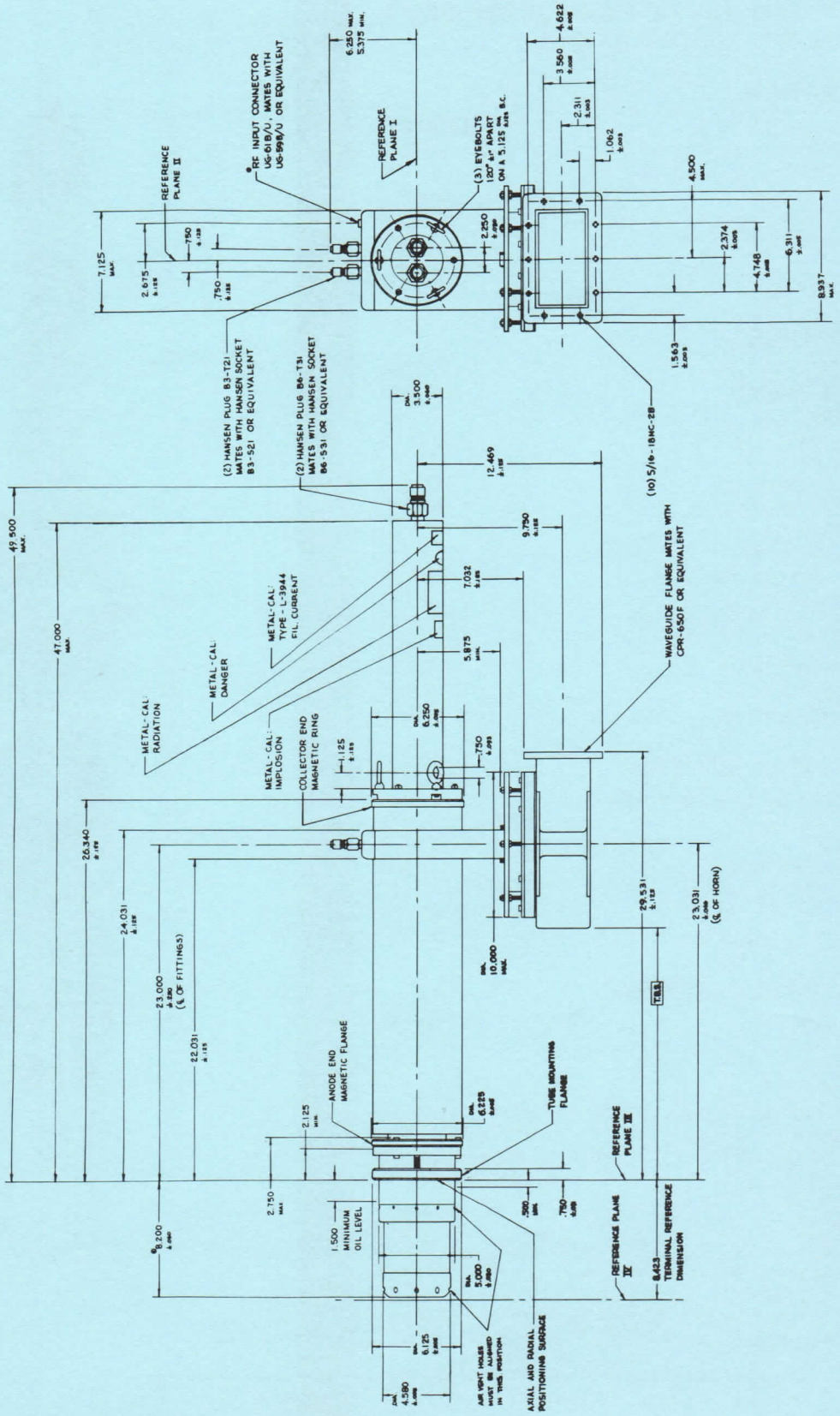
MECHANICAL DATA — GENERAL

Physical Dimensions	See Outline Drawing
Klystron Weight	200 lbs.
Solenoid Weight	467 lbs.
Mounting Position	Any
R-F Input Connector	UG 61B/U mates to UG 59B/U
R-F Output Connector	CPR-650 flange
Cathode and Heater Connector	Mates to Litton Industries Model 379 Socket
Cooling, Water	
Collector, flow	23 gpm
Body, flow	4.0 gpm
Solenoid pressure drop at rated flow	1.5 gpm
Pressure Drop	50 psi
Output Window, pressurization, minimum, Dry Air	20 psig
Window Seal Temperature, maximum	125° C



KLYSTRON TYPE

L-3944



KLYSTRON TYPE

L-5096

The L-5096 is a tunable, L-band pulsed amplifier klystron capable of producing a peak power output of 2.2 megawatts at a .003 duty cycle.

TYPICAL OPERATION

Frequency	1500 Mc
Bandwidth to 1.5 db points	2 Mc
Peak Power Output	2.2 Mw
Average Power Output	6.6 kW
Gain	37 db
Pulse Width, R.F.	8.0 us
Duty	.003
Beam Voltage	115 kV
Beam Current, peak	78 a

ABSOLUTE RATINGS

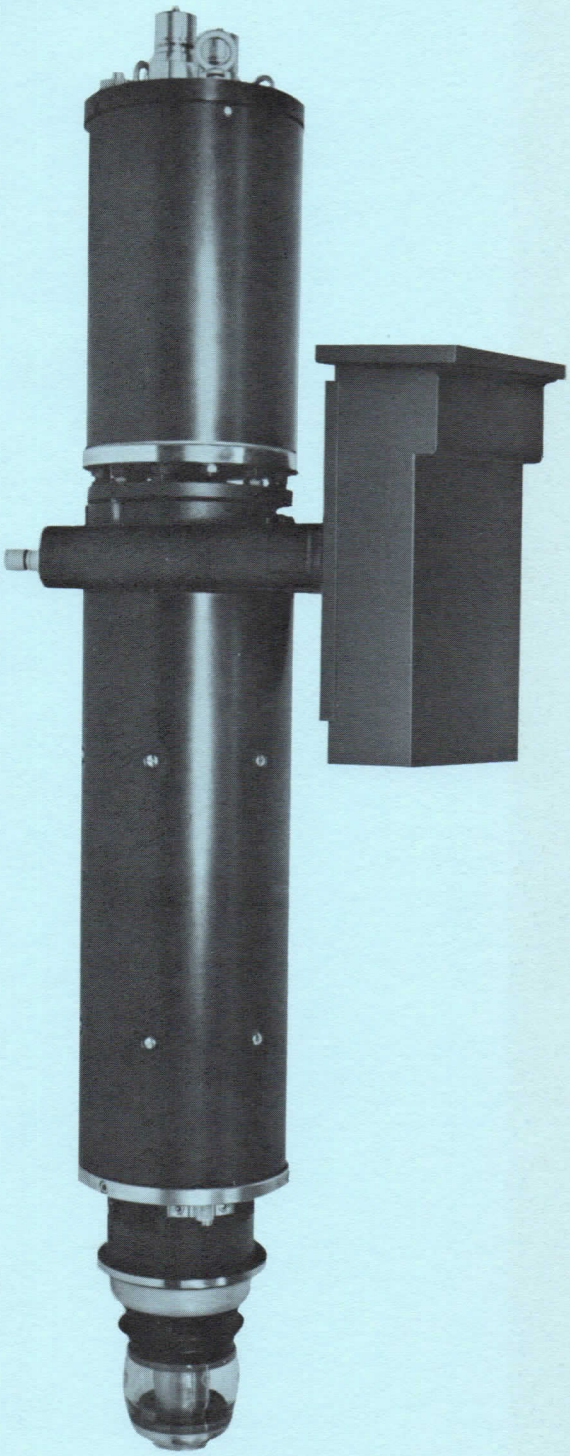
Heater Voltage, Ef	7 Vac
Heater Current, If (surge)	20 Aac
Anode Voltage, epy	125 kV
Anode Voltage, inverse, epx	30 kV
Cathode Current, peak, ik	87 a
Beam Input Power, peak, pi	9.5 Mw
Beam Input, Power, average, Pi	27.5 kW
Pulse Length, tp (epy)	9.0 us
R-F Input Power, peak, pd	1.0 kw
R-F Input Power, average, Pd	100 W
Load VSWR (non-failure)	1.5:1
Cathode Heating Time, minimum, tk	20 min
Window Pressure	50 psia
Cathode Seal Temperature	175° C
Hydrostatic Pressure	75 psig
Coolant Outlet Temperature	70° C

ELECTRICAL DATA—GENERAL

Frequency Range	1450-1550 Mc
Heater Voltage (ac)	16.0 V
Heater Current at 16 Volts	7.0-9.5 Aac
Heater Cold Resistance	0.261 Ohms
Focusing	Electromagnetic
Solenoid	Litton Industries Model 201377

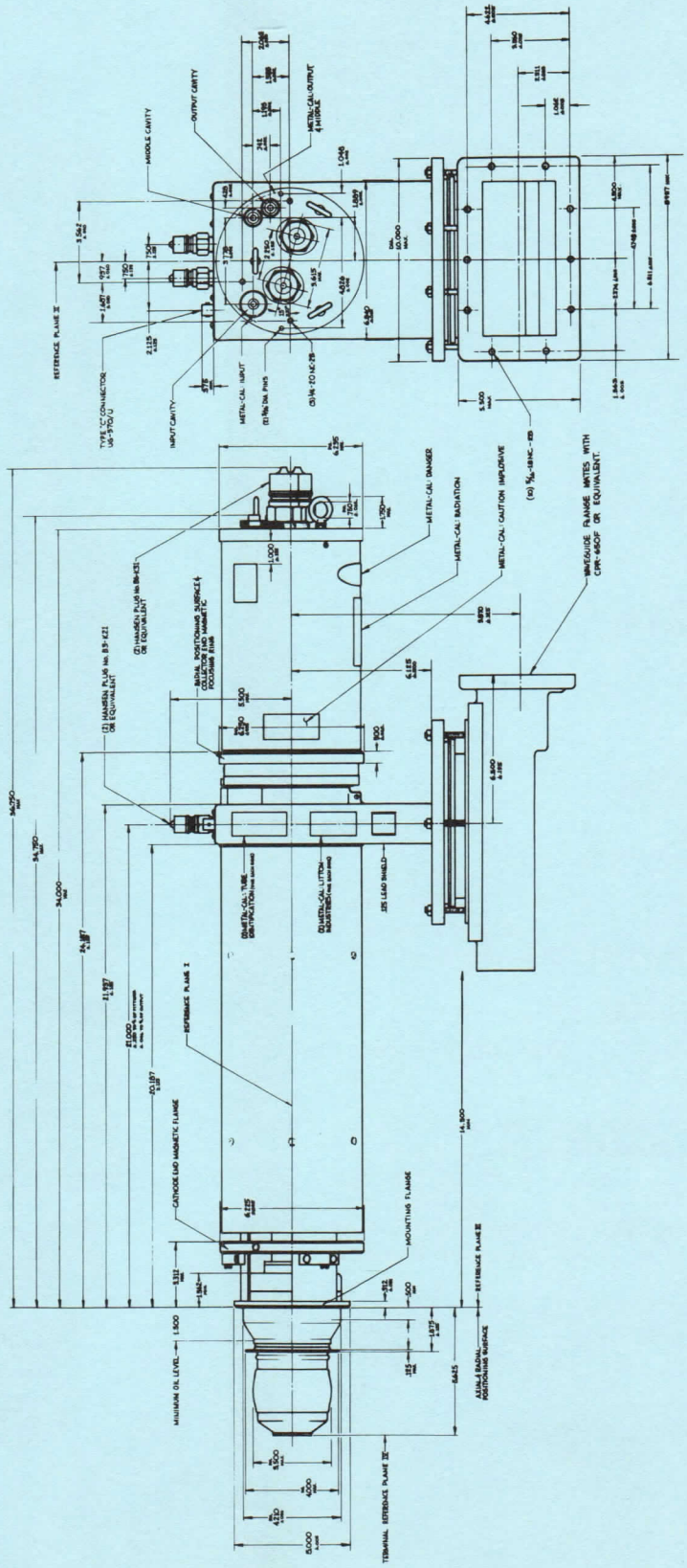
MECHANICAL DATA—GENERAL

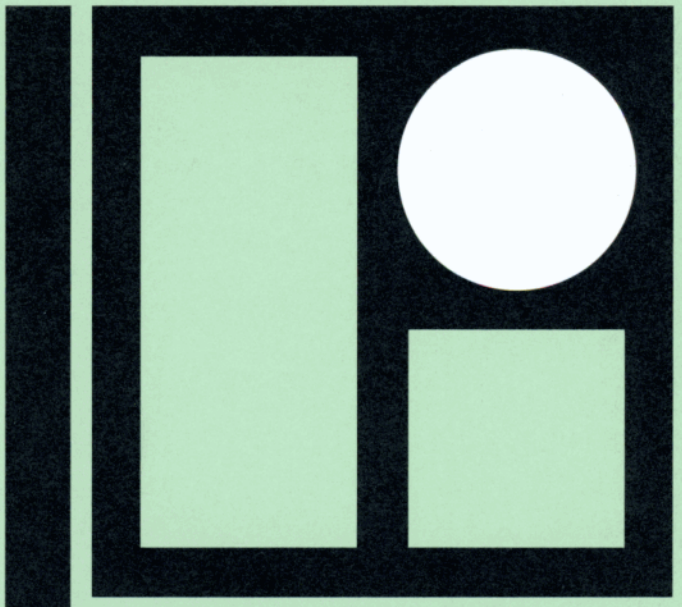
Physical Dimensions	See Outline Drawing
Klystron Weight	125 lbs
Solenoid Weight	325 lbs
Mounting Position	Vertical, Cathode end down
R-F Input Connector	UG568/u mates to UG573/u
R-F Output Connector	CPR-650 Flange
Cathode and Heater Connector	Mates to Litton Industries Model 10400 Socket
Coolant Connectors	See Outline Drawing
Cooling, Water	
Collector, flow	7.5 gpm
Body, flow	1.5 gpm
Solenoid	1.0 gpm
Pressure Drop	50 psi
Output Window	
Output Window, pressurization, minimum	5.0 psig
Window Seal Temperature, maximum	125° C



KLYSTRON TYPE

L-5096





TRAVELING WAVE TUBES

TRAVELING WAVE TUBE

L-2335

5.0 to 10.0 GHz
2 Watt CW
Low Noise

The L-2335 is the C-X-band member of a family of miniature low noise, PPM focused TWTs covering the range of 1.0 to 18.0 GHz, with a minimum of 1 W output and the lowest available noise figure at this power level. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	5.0 to 10.0 GHz
Duty Cycle	CW
Output Power, Saturated	2.0 W, min.
Gain, Small Signal	45 dB min.
Noise Figure	18 dB max.
Attenuation, Cold (input to output)	70 dB min.
Focus	PPM
VSWR (beam off)	
Input	2.5:1
Output	2.5:1

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +71°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

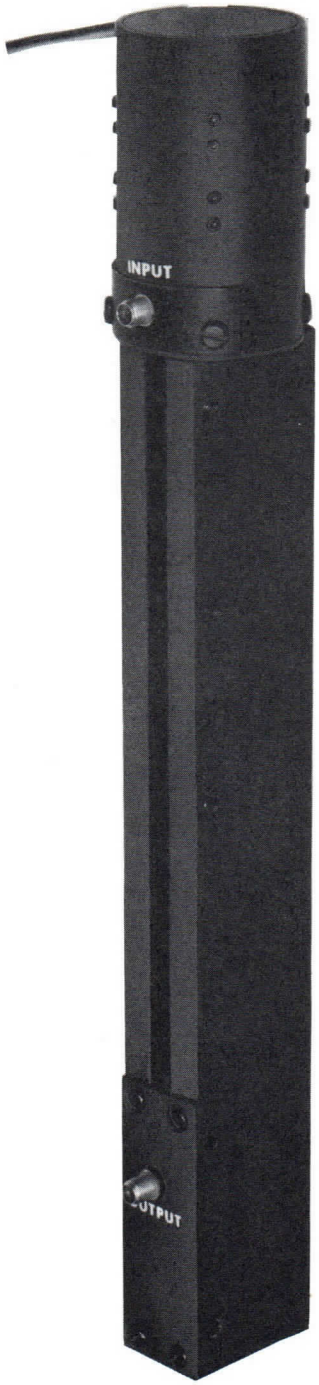
Size	See outline drawing
Weight (approx.)	3.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Leads	Flexible cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	1000V	25.0mA
Helix	1500 to 1800V	4.0mA
Grid 1	−500 to −100V	0.5mA
Grid 2	0 to 600V	0.5mA
Grid 3	0 to 500V	0.5mA
Grid 4	200 to 700V	0.5mA
Cathode	0V	25.0mA
Heater	6.3V ±3%	0.9A

NOTES:

1. All tube electrode voltages are with respect to the cathode. Tube operates with collector grounded.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

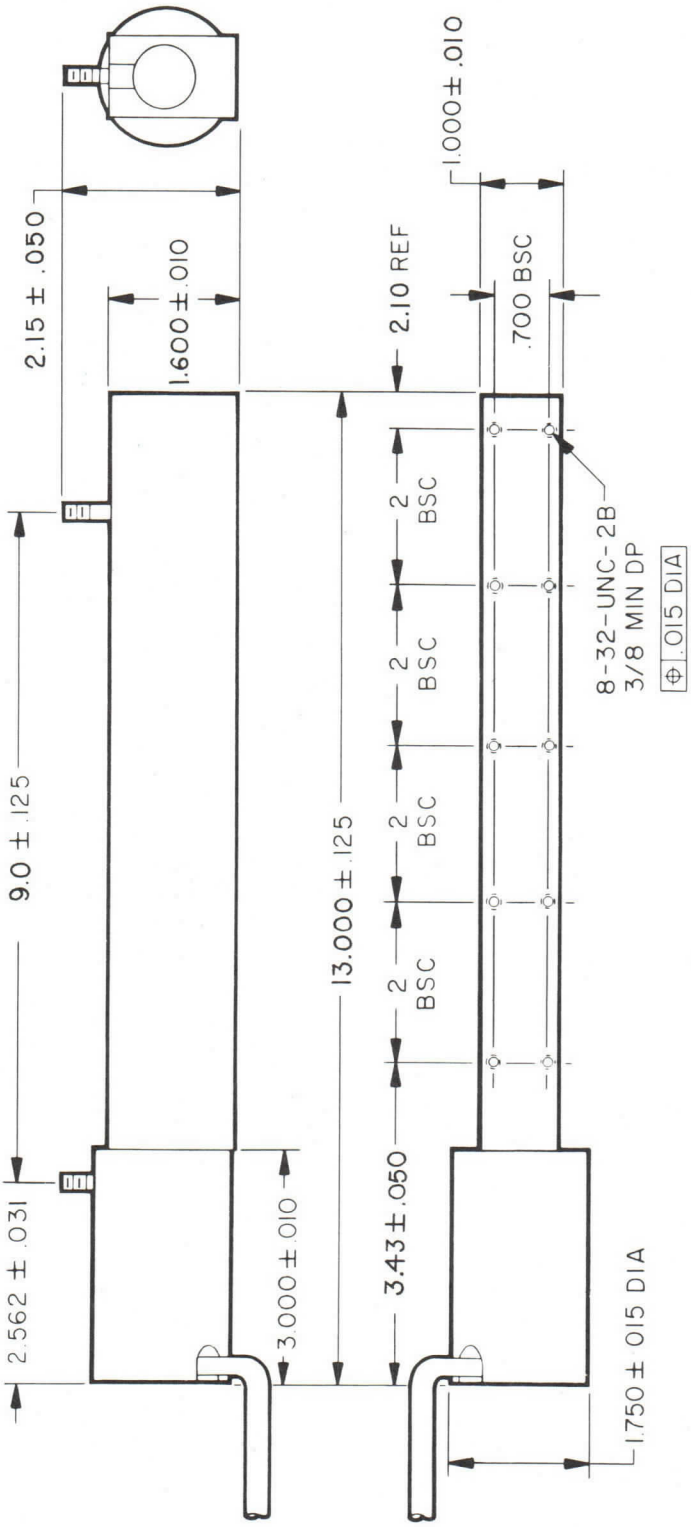


TRAVELING WAVE TUBE

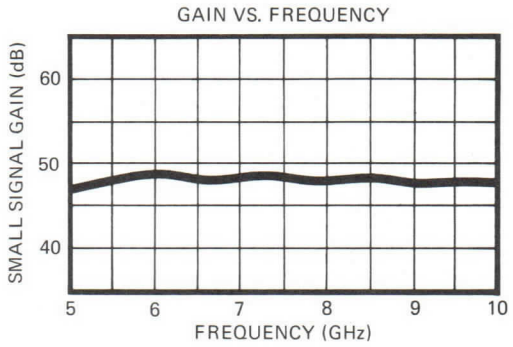
L-2335

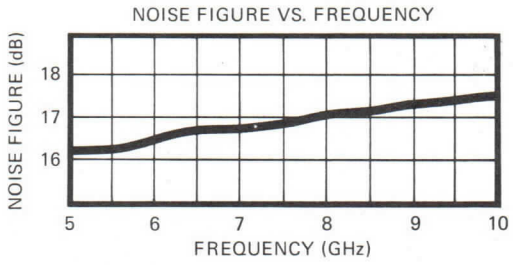
CAUTION
MICROWAVE RADIATION

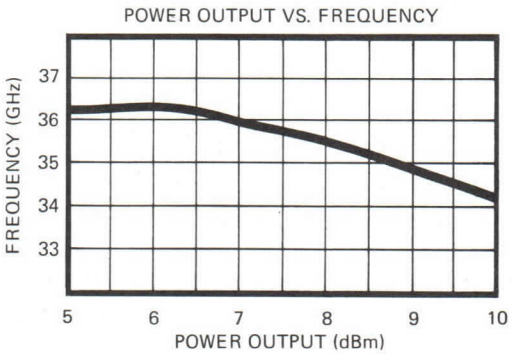
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



TYPICAL PERFORMANCE







The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-2335-16

1 Watt CW
4.8 to 9.6 GHz
Low Noise

The L-2335-16 is a member of Litton's family of 1 watt, low noise traveling wave tubes available in the 1 to 18 GHz frequency range, and is designed to operate in shipboard or airborne environments. It is ideally suited to most radar, ECM and communications systems which require a combination of light weight, low noise figure and a minimum output power of 1 watt over an octave bandwidth.

ELECTRICAL CHARACTERISTICS

Frequency Range	4.8 to 9.6 GHz
Output Power, Saturated	1.0 W min.
Gain, Small Signal	35 dB min.
Noise Figure	17 dB max.
Attenuation, Cold (input to output)	70 dB min.
VSWR (beam off)	
Input	2.0:1
Output	2.0:1
Focus	PPM

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	3.0 lbs.
RF Connectors	
Input	SMA (Female)
Output	SMA (Female)
Power Leads	Flexible Cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	1100 V	25.0 mA
Helix	1500 to 1800 V	4.0 mA
Grid 1	−500 to −100 V	0.05 mA
Grid 2	0 to 600 V	0.05 mA
Grid 3	0 to 500 V	0.05 mA
Grid 4	200 to 700 V	0.05 mA
Cathode	0 V	25.0 mA
Heater	6.3 V ±3%	0.9 A

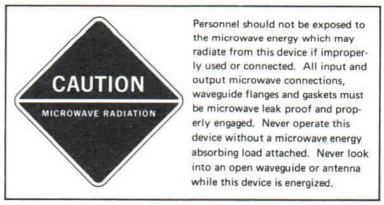
NOTES:

1. All tube electrode voltages are with respect to the cathode. Collector is grounded to the shell of the tube. The tube can be supplied with insulated collector for grounded helix operation.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

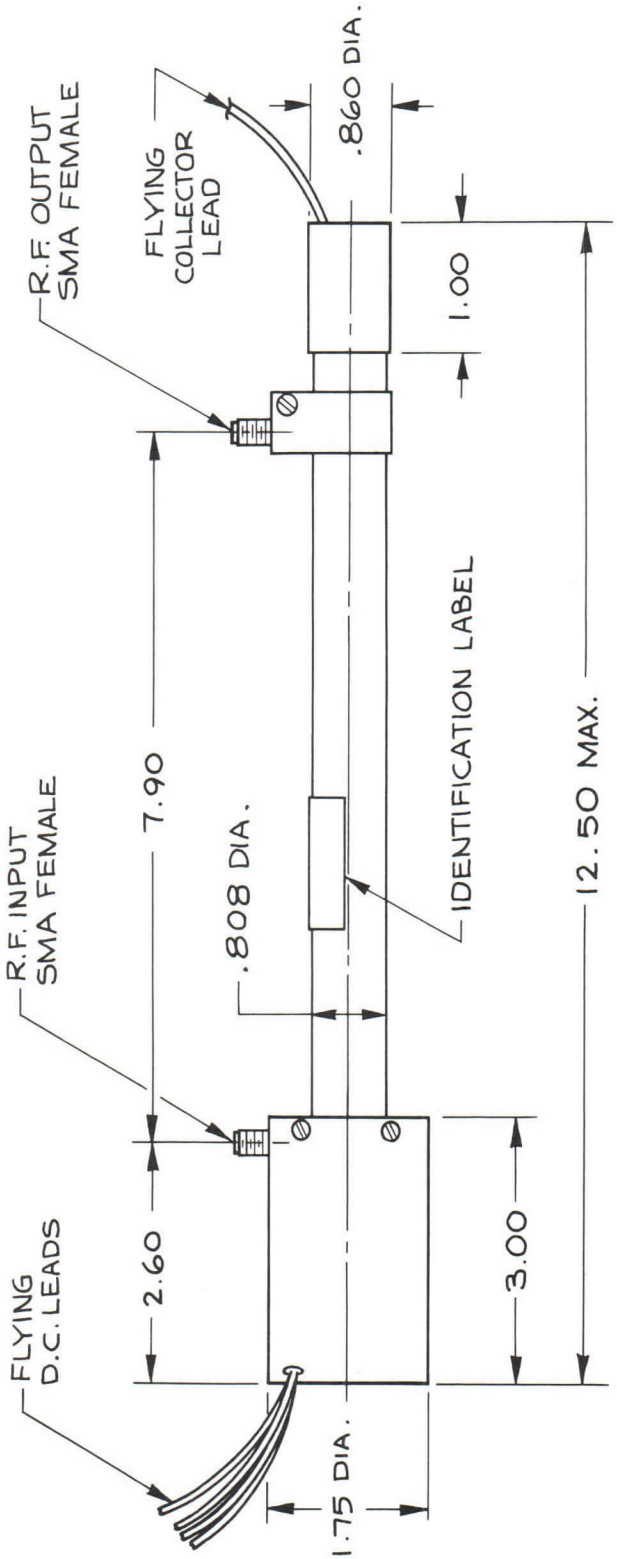
Litton
ELECTRON TUBE DIVISION
San Carlos, California

TRAVELING WAVE TUBE

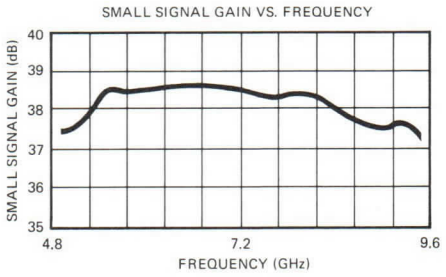
L-2335-16

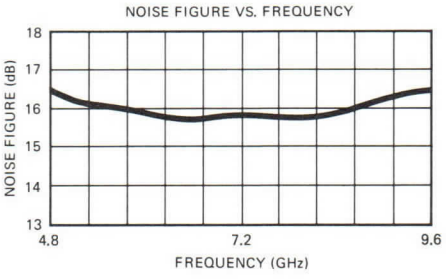


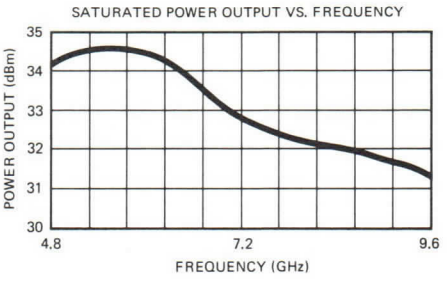
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



TYPICAL PERFORMANCE







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Current detailed outline drawings are available on request.

Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

TRAVELING WAVE TUBE

L-2335-17

1 Watt CW
4 to 8 GHz
Low Noise

The L-2335-17 is a member of Litton's family of low noise, PPM focused traveling wave tubes available in the 1 to 18 GHz frequency range. It provides a minimum output power of 1 watt, and a noise figure which is the lowest available at that power level. This combination makes the L-2335-17 an ideal candidate for receiver service in radar, ECM and communications systems.

ELECTRICAL CHARACTERISTICS

Frequency Range	4.0 to 8.0 GHz
Output Power, Saturated	1.0 W min.
Gain, Small Signal	35 dB min.
Noise Figure	17 dB max.
Attenuation, Cold (input to output)	70 dB min.
VSWR (beam off)	
Input	2.5:1
Output	2.5:1
Focus	PPM

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	3.0 lbs.
RF Connectors	
Input	SMA (Female)
Output	SMA (Female)
Power Leads	Flexible Cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	1100 V	25.0 mA
Helix	1500 to 1800 V	4.0 mA
Grid 1	−500 to −100 V	0.05 mA
Grid 2	0 to 600 V	0.05 mA
Grid 3	0 to 500 V	0.05 mA
Grid 4	200 to 700 V	0.05 mA
Cathode	0 V	25.0 mA
Heater	6.3 V ±3%	0.9 A

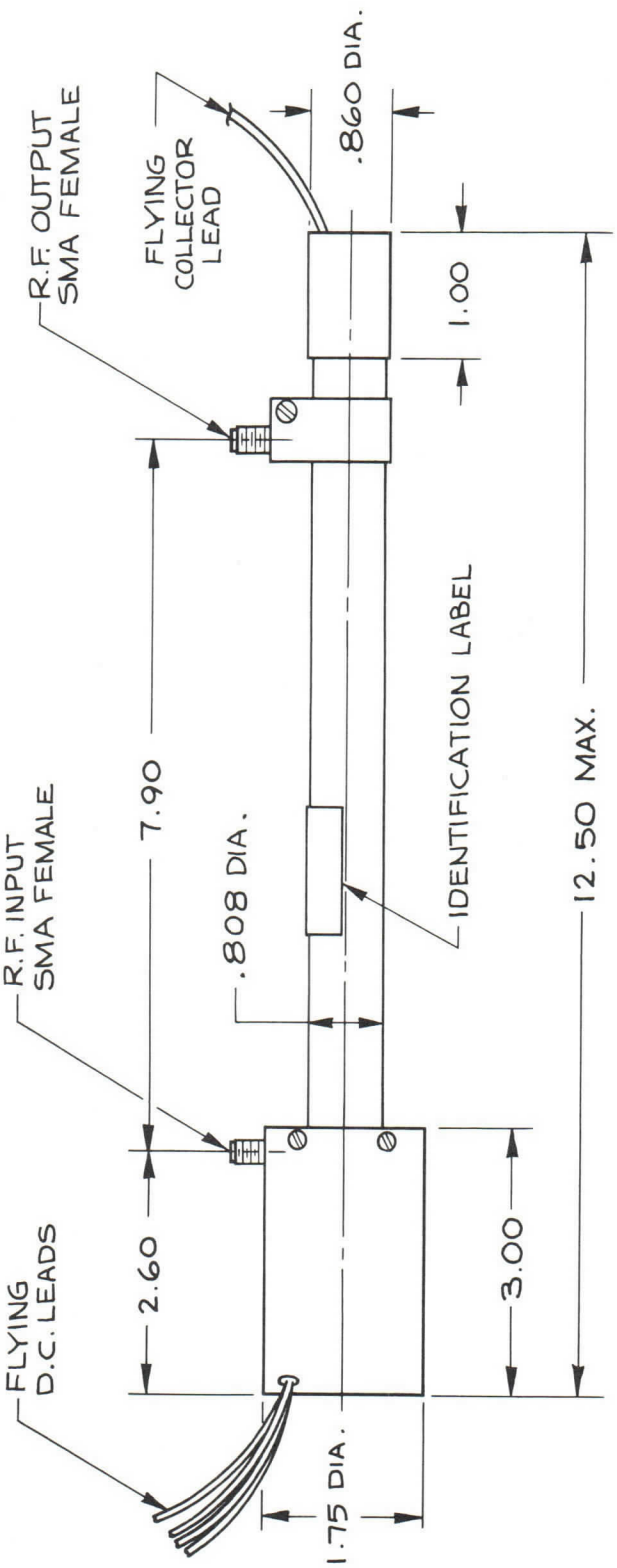
NOTES:

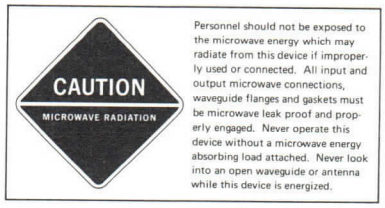
1. All tube electrode voltages are with respect to the cathode. Collector is grounded to the shell of the tube. The tube can be supplied with insulated collector for grounded helix operation.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

Litton
ELECTRON TUBE DIVISION
San Carlos, California

TRAVELING WAVE TUBE

L-2335-17

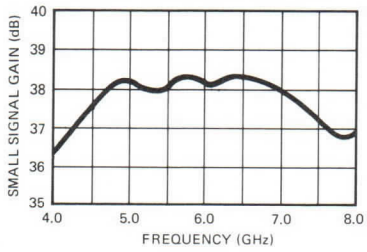




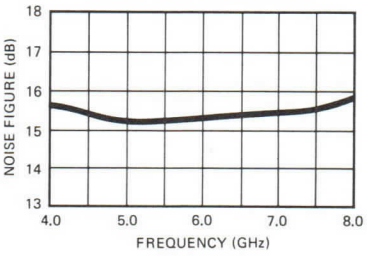
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

TYPICAL PERFORMANCE

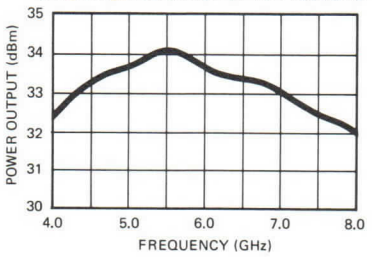
SMALL SIGNAL GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



SATURATED POWER OUTPUT VS. FREQUENCY



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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

TRAVELING WAVE TUBE

L-2337

7.0 to 11.0 GHz
10 mW CW
Low Noise

The L-2337 is the X-band member of a family of miniature low noise, PPM focused TWTs covering the range of 1.0 to 18.0 GHz, with a minimum of 10mW output. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Duty Cycle	CW
Output Power, Saturated	10 mW min.
Gain, Small Signal	37 dB min.
Noise Figure	12 dB max.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
VSWR (beam off)	
Input	2:1 max.
Output	2:1 max.

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +71°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

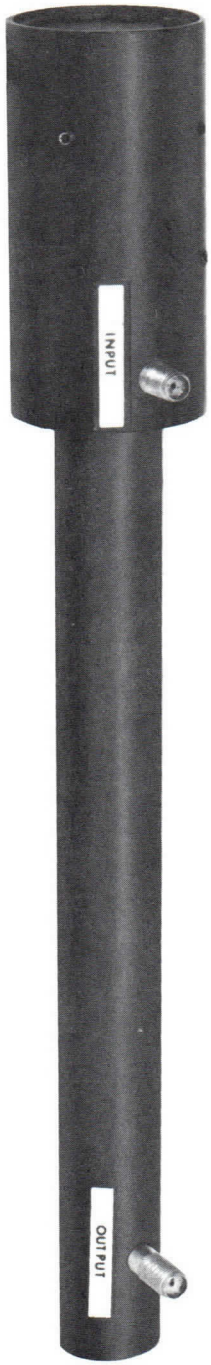
Size	See outline drawing
Weight (approx.)	2.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Leads	Flexible cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	900 to 1100 V	1.5mA
Helix	900 to 1100 V	0.5mA
Grid 1	0 to −50 V	.05mA
Grid 2	0 to 150 V	.05mA
Grid 3	0 to 300 V	.05mA
Grid 4	0 to 300 V	.05mA
Grid 5	400 to 1100 V	.05mA
Cathode	0 V	2.0mA
Heater	6.3 V ± 3%	0.3A

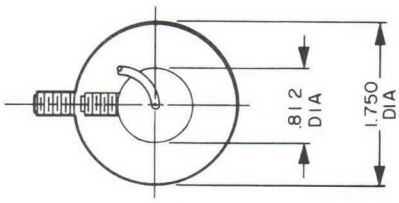
NOTES:

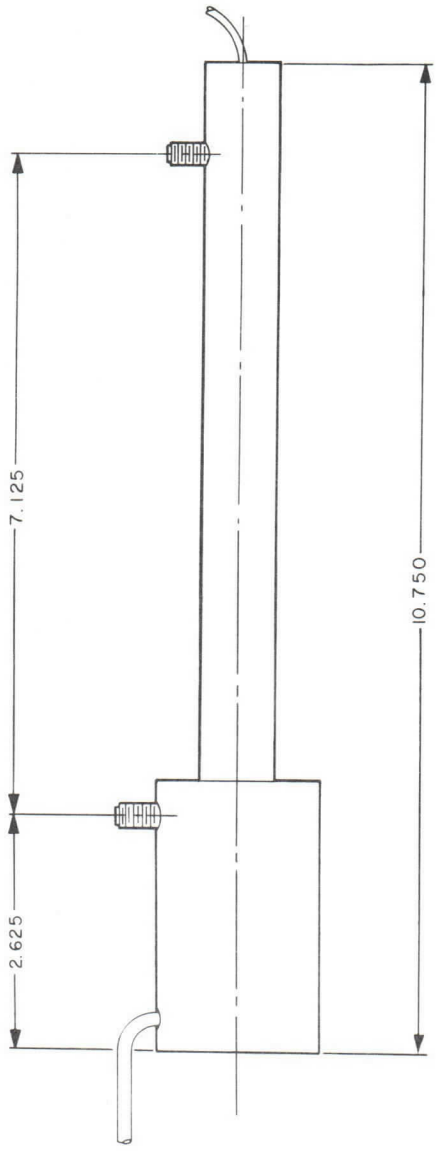
1. All tube electrode voltages are with respect to the cathode. Any element in the tube can be operated at ground potential if desired.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.



TRAVELING WAVE TUBE

L-2337





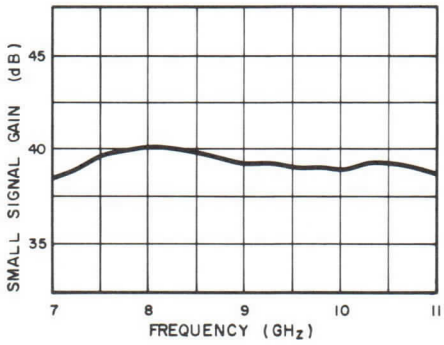
CAUTION

MICROWAVE RADIATION

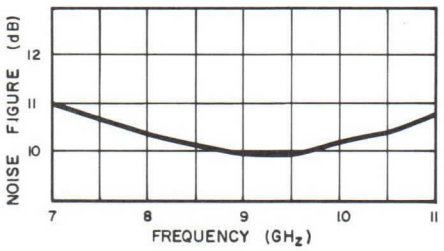
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

TYPICAL PERFORMANCE

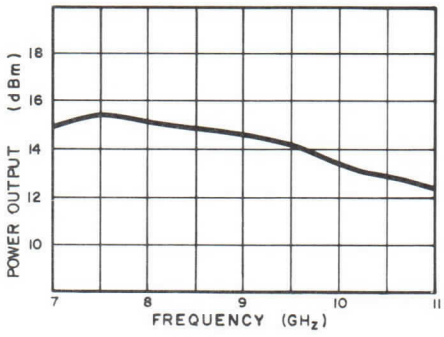
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



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TRAVELING WAVE TUBE

L-2338

7.0 to 11.0 GHz
2 Watt CW
Low Noise

The L-2338 is the X-band member of a family of miniature low noise, PPM focused TWTs covering the range of 0.5 to 12.4 GHz, with a minimum of 1 W output and the lowest available noise figure at this power level. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Duty Cycle	CW
Output Power, Saturated	2.0 W, min.
Gain, Small Signal	45 dB min.
Noise Figure	18 dB max.
Attenuation, Cold (input to output)	70 dB min.
Focus	PPM
VSWR (beam off)	
Input	2.5:1
Output	2.5:1

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +71°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	2.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Leads	Flexible cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	1300V	15.0mA
Helix	2000 to 2500V	2.0mA
Grid 1	−500 to −100V	0.5mA
Grid 2	0 to 600V	0.5mA
Grid 3	0 to 500V	0.5mA
Grid 4	200 to 700V	0.5mA
Cathode	0V	15.0mA
Heater	6.3V ±3%	0.9A

NOTES:

1. All tube electrode voltages are with respect to the cathode. Any element in the tube can be operated at ground potential if desired.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
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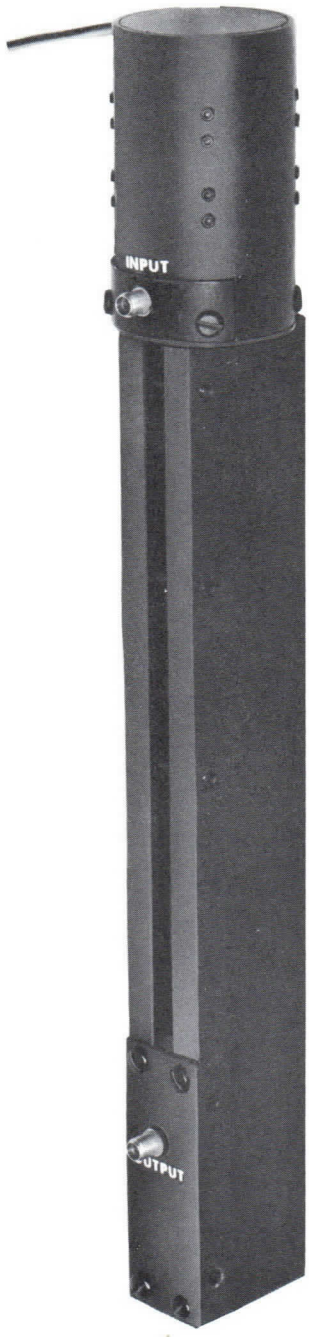
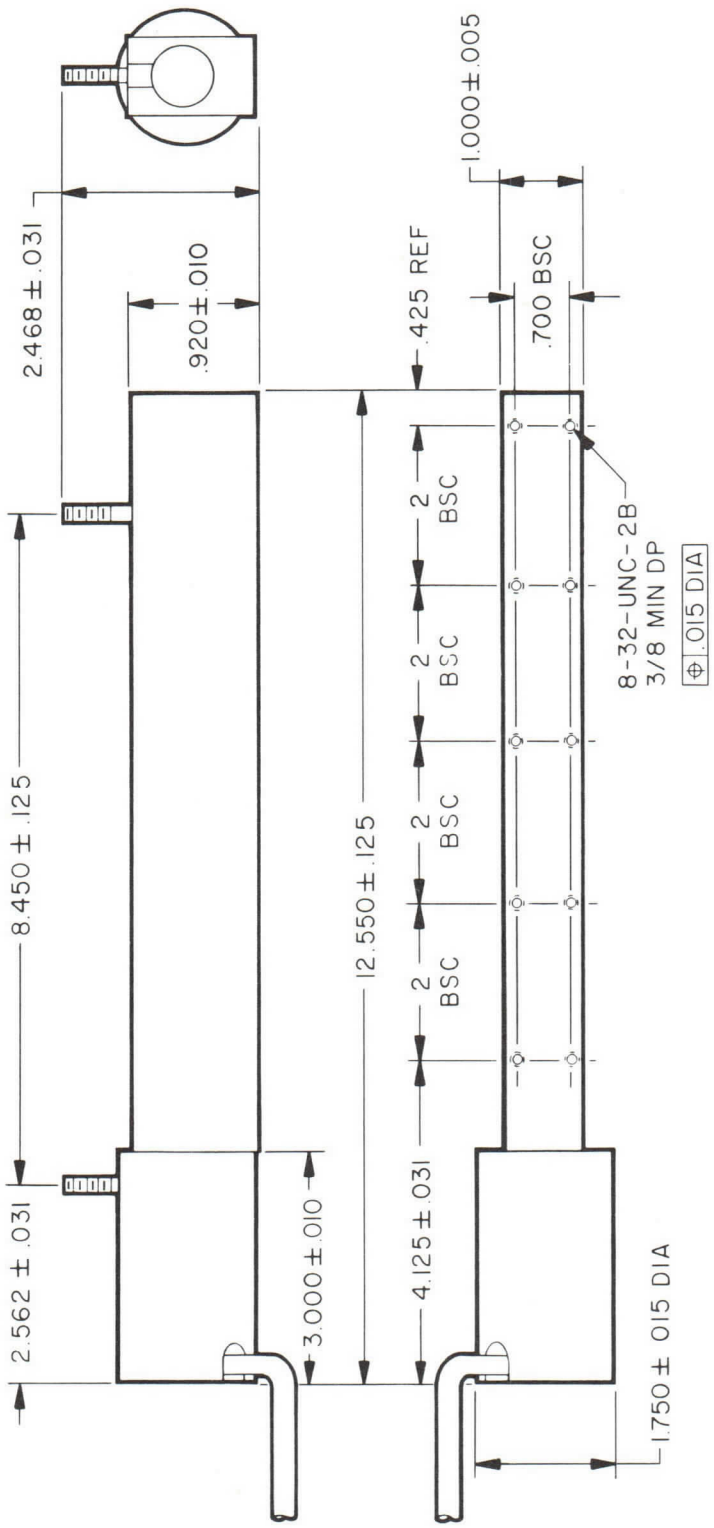


TRAVELING WAVE TUBE

L-2338



CAUTION
MICROWAVE RADIATION

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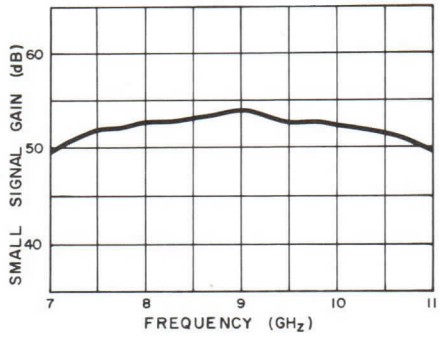
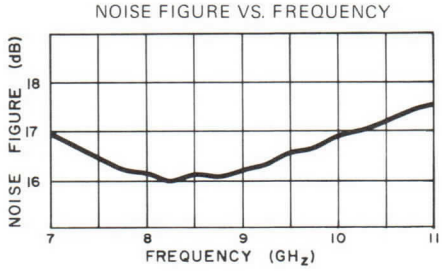
TYPICAL PERFORMANCE

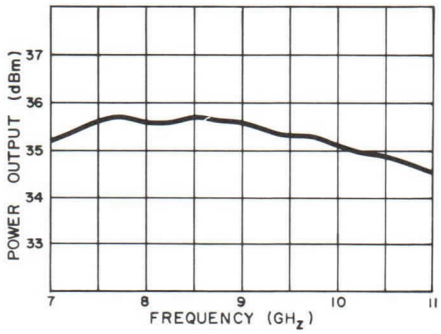
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-2357

5.0 to 10.0 GHz
50 mW CW
Low Noise

The L-2357 is the C-X-band member of a family of miniature low noise, PPM focused TWTs covering the range of 1.0 to 18.0 GHz, with a minimum of 10mW output. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	5.0 to 10.0 GHz
Duty Cycle	CW
Output Power, Saturated	50 mW min.
Gain, Small Signal	33 dB min.
Noise Figure	14 dB max.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
VSWR (beam off)	
Input	2:1 max.
Output	2:1 max.

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +71°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	2.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Leads	Flexible cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	700 to 900 V	3.0mA
Helix	700 to 900 V	0.5mA
Grid 1	0 to −50V	.05mA
Grid 2	0 to 150V	.05mA
Grid 3	0 to 300V	.05mA
Grid 4	100 to 400 V	.05mA
Grid 5	200 to 700 V	.05mA
Cathode	0V	3.0mA
Heater	6.3V ±3%	0.3A

NOTES:

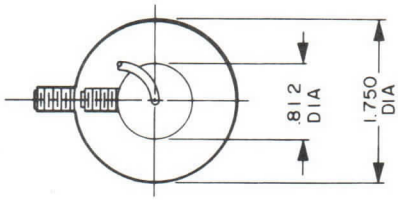
1. All tube electrode voltages are with respect to the cathode. Any element in the tube can be operated at ground potential if desired.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

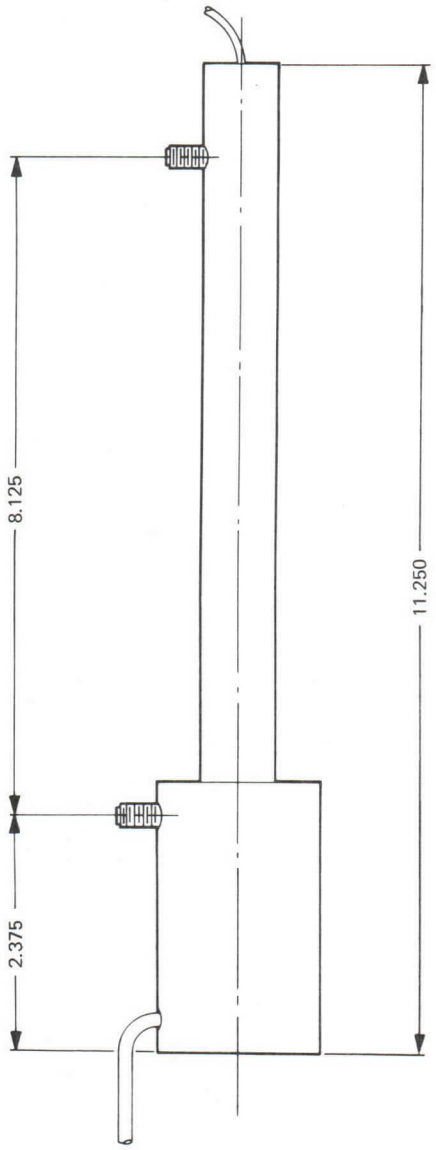
TRAVELING WAVE TUBE

L-2357

CAUTION
MICROWAVE RADIATION

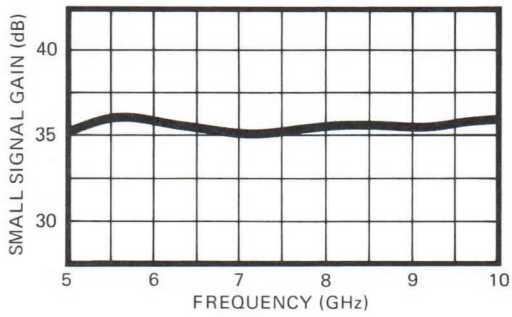
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



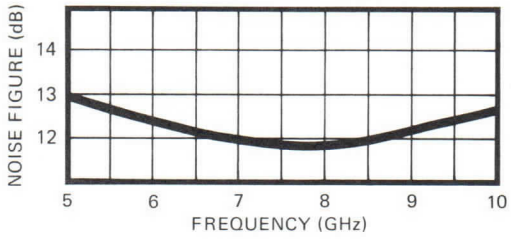


TYPICAL PERFORMANCE

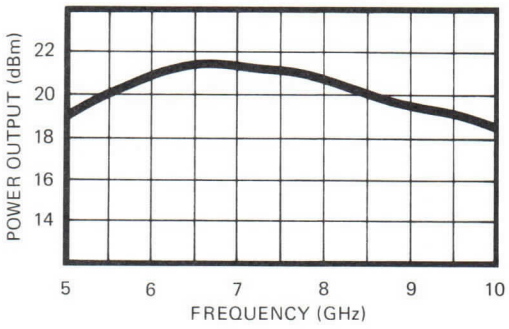
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-2357-04

40 mW CW
4.8 to 9.6 GHz
Low Noise

The L-2357-04 is a member of Litton's family of low noise, PPM focused traveling wave tubes available in the 1 to 18 GHz frequency range. This tube's low noise figure makes it an ideal candidate for receiver service in radar, communications and ECM systems and general broadband amplifier applications.

ELECTRICAL CHARACTERISTICS

Frequency Range	4.8 to 9.6 GHz
Output Power, Saturated	40 mW min.
Gain, Small Signal	33 dB min.
Noise Figure	14 dB max.
Attenuation, Cold (input to output)	60 dB min.
VSWR (beam off)	
Input	2.0:1
Output	2.0:1
Focus	PPM

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Convection

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	2.0 lbs.
RF Connectors	
Input	SMA (Female)
Output	SMA (Female)
Power Leads	Flexible Cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	700 to 900 V	3.0 mA
Helix	700 to 900 V	0.5 mA
Grid 1	0 to −100 V	0.05 mA
Grid 2	0 to 150 V	0.05 mA
Grid 3	0 to 150 V	0.05 mA
Grid 4	100 to 400 V	0.05 mA
Grid 5	200 to 700 V	0.05 mA
Cathode	0 V	3.0 mA
Heater	6.3 V ±3%	0.3 A

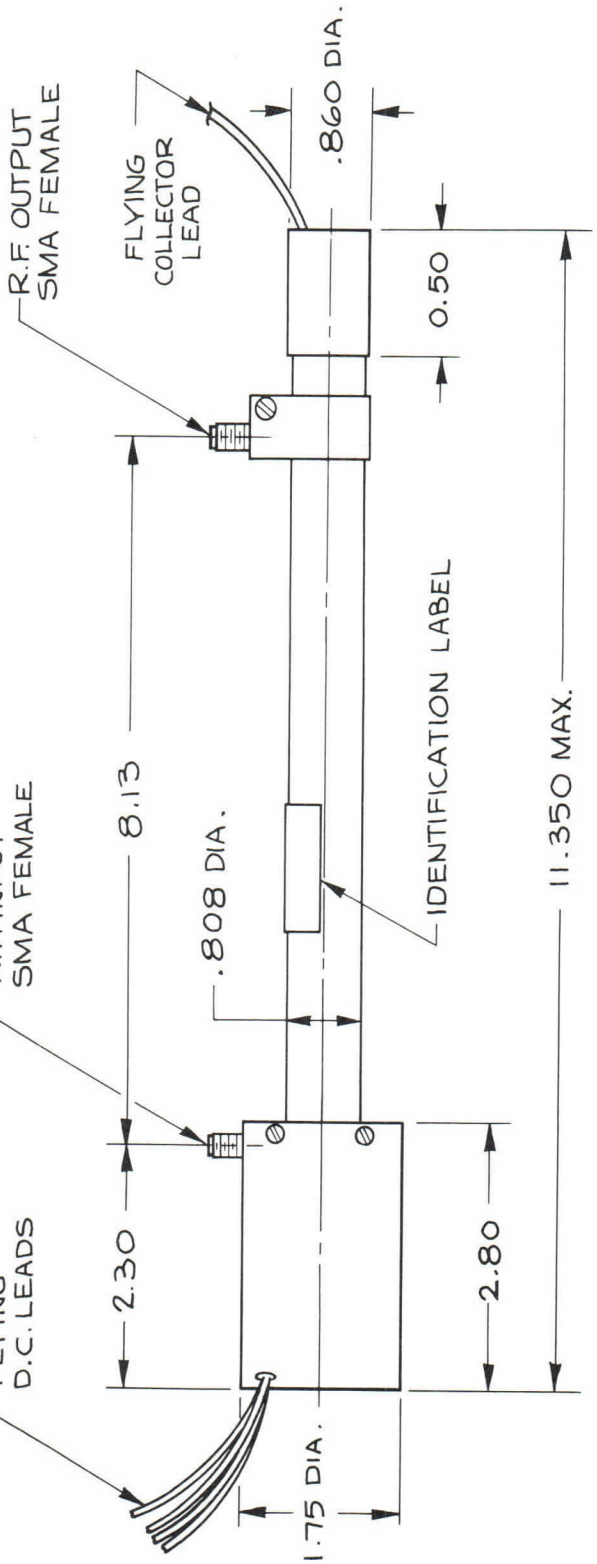
NOTES:

1. All tube electrode voltages are with respect to the cathode. Any element in the tube can be operated at ground potential if desired.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

Litton **ELECTRON TUBE DIVISION**
San Carlos, California

TRAVELING WAVE TUBE

L-2357-04

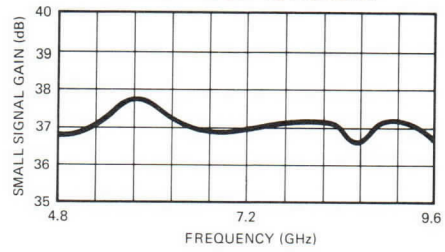


CAUTION
MICROWAVE RADIATION

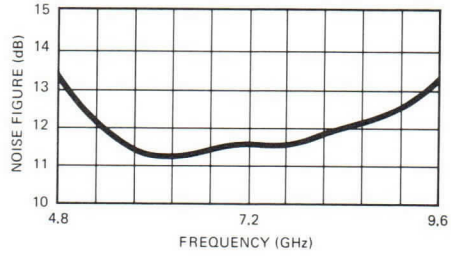
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

TYPICAL PERFORMANCE

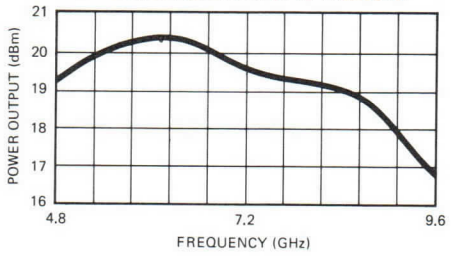
SMALL SIGNAL GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



SATURATED POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

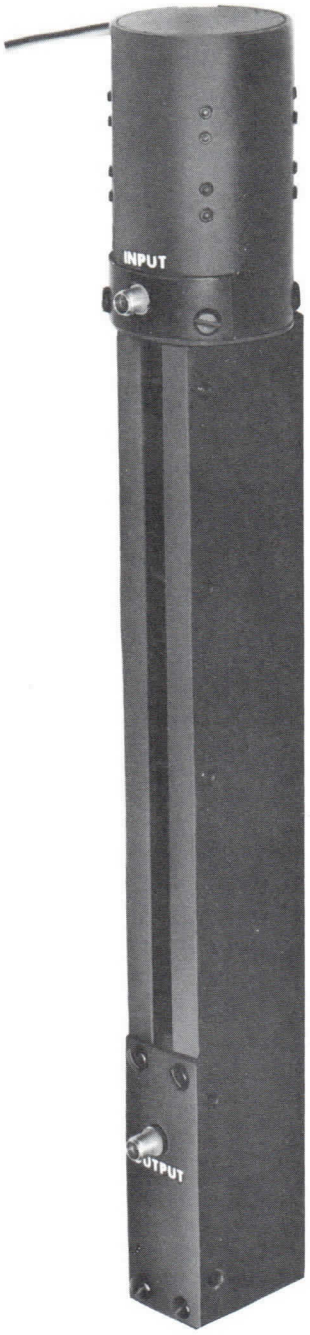
3MJA474

TRAVELING WAVE TUBE

L-2364

1 Watt CW
X-Ku-Band
Low Noise

The L-2364 is a low noise medium power TWT, primarily designed for driver applications. This tube is designed for airborne environments where size and weight are of prime importance. The power output with low noise figure give this tube exceptional dynamic range making it ideal for electronic warfare applications. The rugged PPM structure is well able to meet demanding airborne or shipboard requirements.



ELECTRICAL CHARACTERISTICS

Frequency Range	8.0 to 16.0 GHz
Duty Cycle	CW
Output Power, Saturated	1 W min.
Gain, Small Signal	35 dB min.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
Noise Figure	22 dB max.
VSWR (beam off)	
Input	2.0:1
Output	2.0:1

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +110°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz 5 G, 500 to 2000 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	2 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Leads	Flexible cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

Element	Voltage Range	Current, Max.
Collector	1500V	15.0mA
Helix	2700 to 3100V	2.0mA
Grid 1	0 to −300V	.05mA
Grid 2	0 to 600V	.05mA
Grid 3	200 to 500V	.05mA
Grid 4	500 to 1000V	.05mA
Cathode	0 V	15.0mA
Heater	6.3V ±3%	0.9A

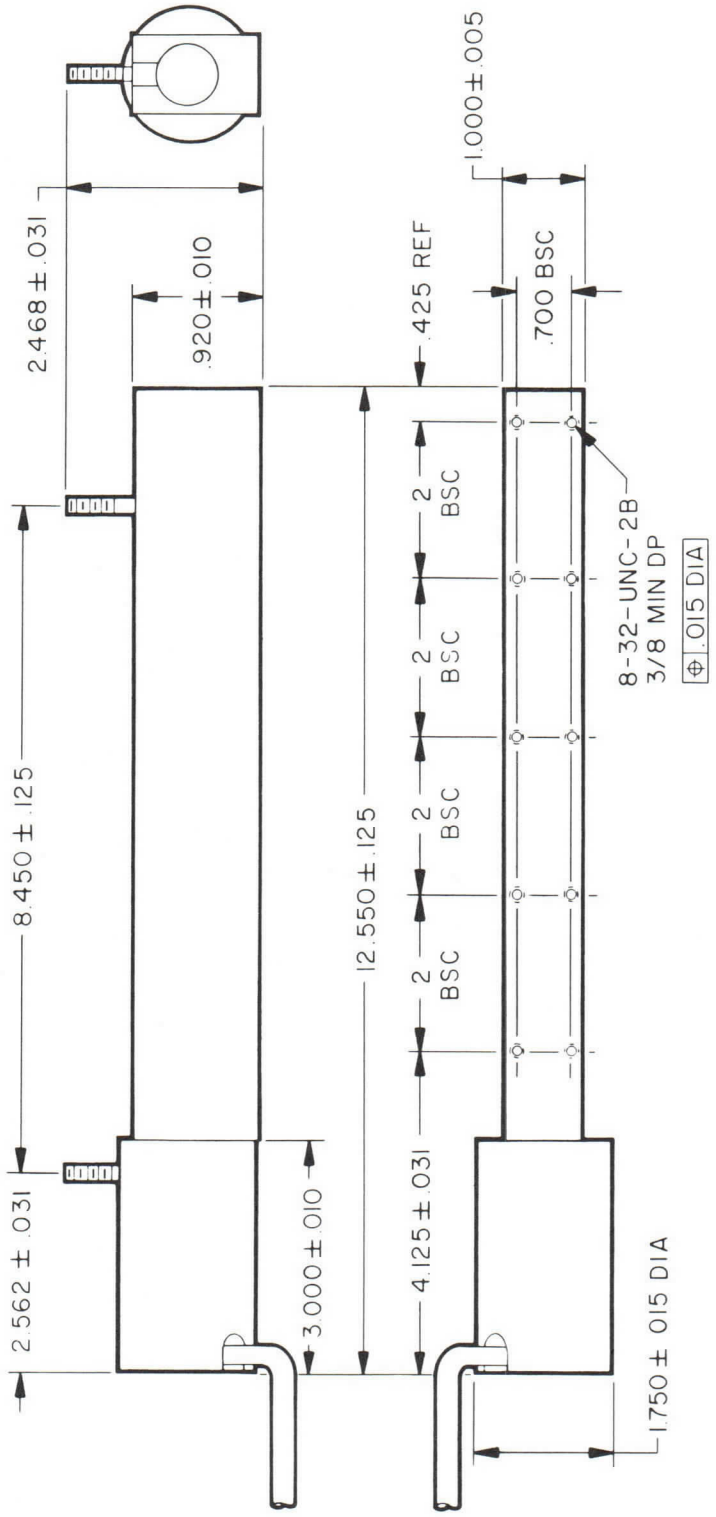
NOTES:

1. All tube electrode voltages are with respect to the cathode. Any element in the tube can be operated at ground potential if desired.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

TRAVELING WAVE TUBE

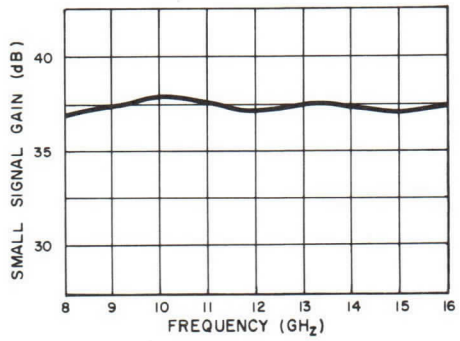
L-2364

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

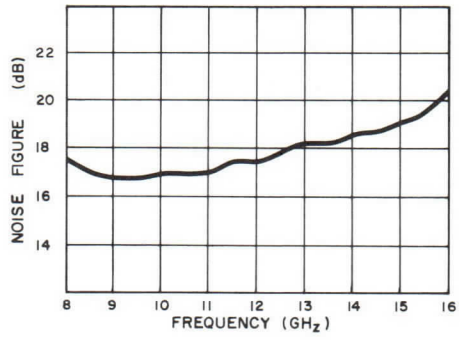


TYPICAL PERFORMANCE

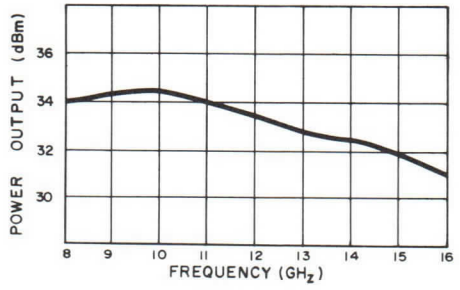
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-2365

20 mW CW
X-Ku-Band
Low Noise

The L-2365 is the X-Ku-band member of a family of miniature low noise, PPM focused TWTs covering the range of 1.0 to 18.0 GHz, with a minimum of 10mW output. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	8.0 to 16.0 GHz
Duty Cycle	CW
Output Power, Saturated	20 mW min.
Gain, Small Signal	33 dB min.
Noise Figure	14 dB max.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
VSWR (beam off)	
Input	2:1 max.
Output	2:1 max.

ENVIRONMENTAL CHARACTERISTICS

Ambient Temperature	−54°C to +110°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	2.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Leads	Flexible cable
Mounting Position	Any

POWER SUPPLY REQUIREMENTS

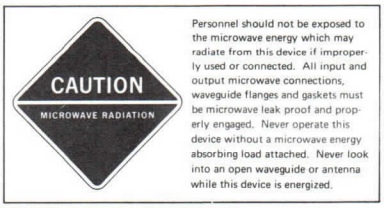
Element	Voltage Range	Current, Max.
Collector	1450 to 1650 V	1.5mA
Helix	1450 to 1650 V	0.5mA
Grid 1	0 to −50 V	.05mA
Grid 2	0 to 150 V	.05mA
Grid 3	0 to 300 V	.05mA
Grid 4	50 to 300 V	.05mA
Grid 5	200 to 900 V	.05mA
Cathode	0 V	2.0mA
Heater	6.3 V ±3%	0.3A

NOTES:

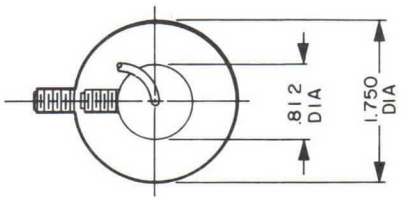
1. All tube electrode voltages are with respect to the cathode. Any element in the tube can be operated at ground potential if desired.
2. Lower noise figure can be achieved by optimizing the tube for narrow band operation.
3. Grid 2 is the control grid and may be used for gating.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. Data contained in this bulletin subject to modification and should not be used for final equipment design.

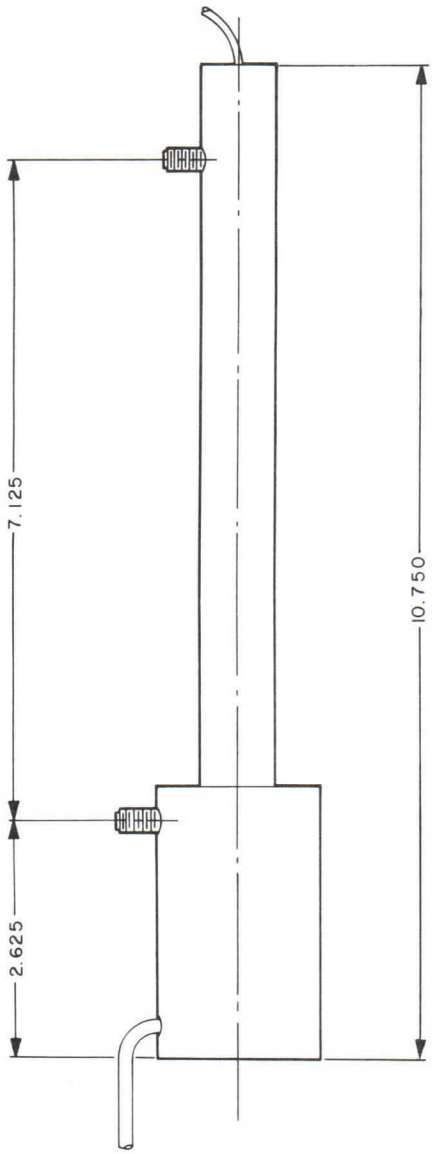
TRAVELING WAVE TUBE

L-2365



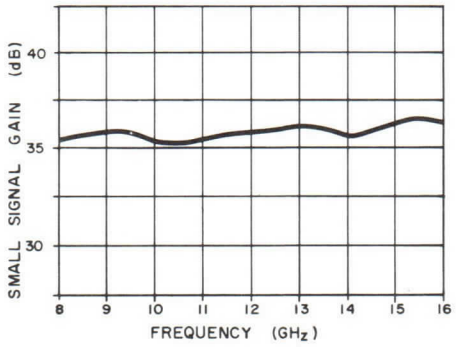
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



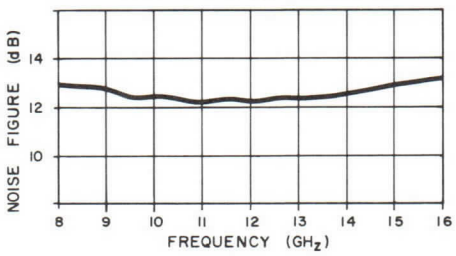


TYPICAL PERFORMANCE

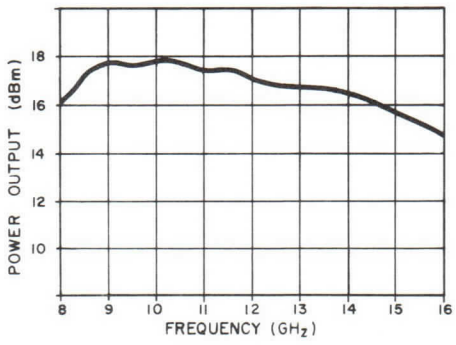
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY

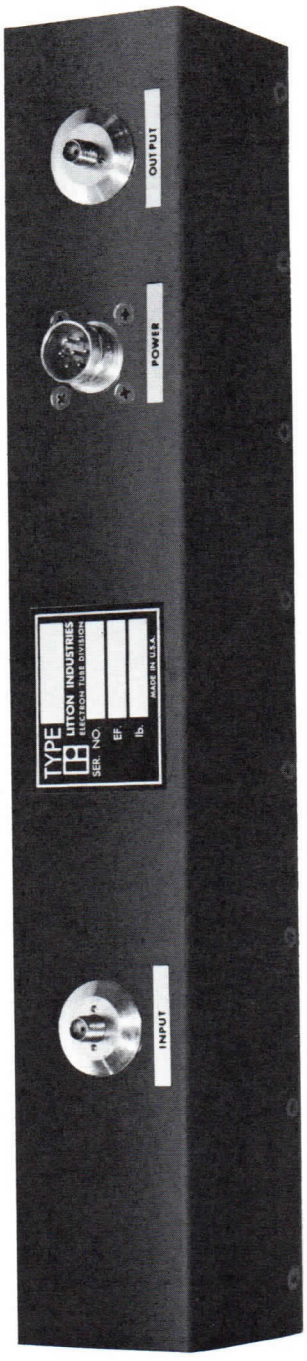


The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE AMPLIFIER

L-2782

7.0 to 11.0 GHz
10 mW CW
Low Noise



The L-2782 is the X-band member of a family of miniature low noise, PPM focused TWTA's covering the range of 1.0 to 18.0 GHz, with a minimum of 10mW output. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Duty Cycle	CW
Output Power, Saturated	10 mW min.
Gain, Small Signal	37 dB min.
Noise Figure	12 dB max.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
VSWR (beam off)	
Input	2:1 max.
Output	2:1 max.

ENVIRONMENTAL CHARACTERISTICS

Baseplate Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	5.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Connector	DM 9606-7P
Mounting Position	Any

POWER REQUIREMENTS

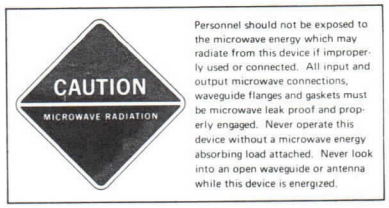
Voltage	115 V ±10%, Single Phase
Frequency	60-400 Hz
Power	20 watts, max.

NOTES:

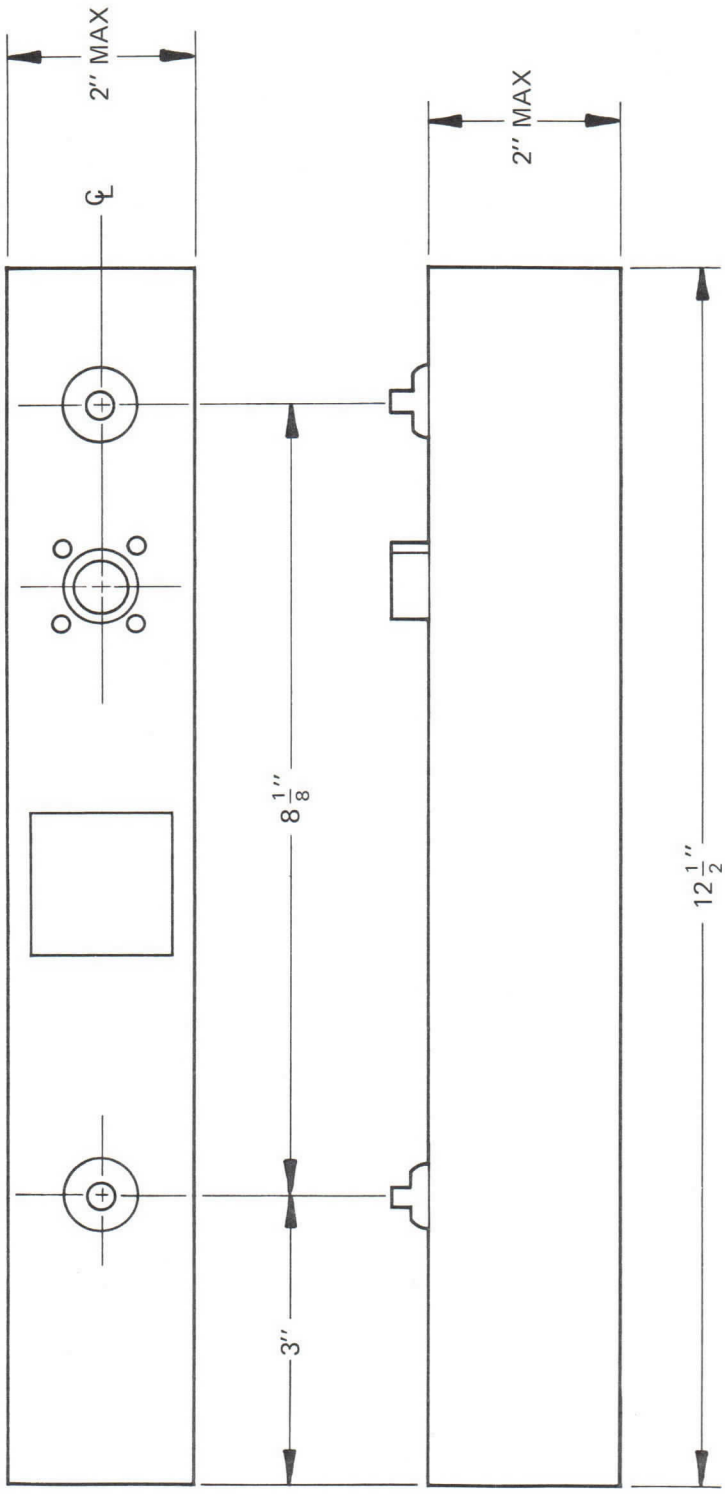
1. Amplifiers to operate from 28 volt dc are available.
2. Remote control or monitoring circuits may be incorporated.
3. Amplifiers may be provided with lower noise figure, when optimized over a narrower band than the full octave.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. High speed rf blanking circuits are also available.
6. Data contained in this bulletin subject to modification and should not be used for final equipment design.

TRAVELING WAVE TUBE AMPLIFIER

L-2782

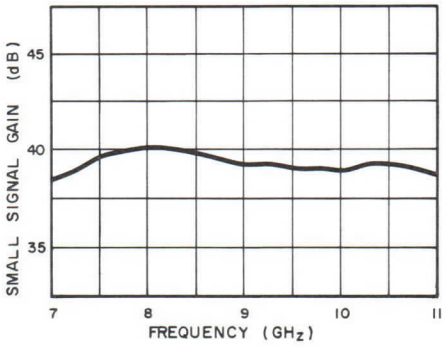


Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

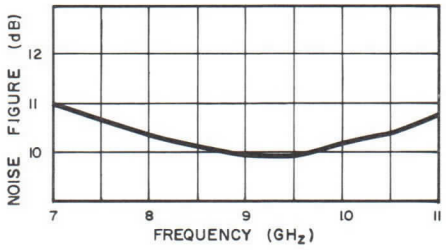


TYPICAL PERFORMANCE

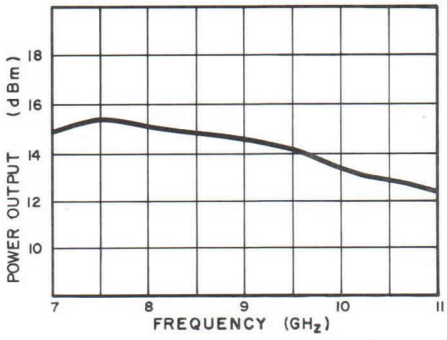
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



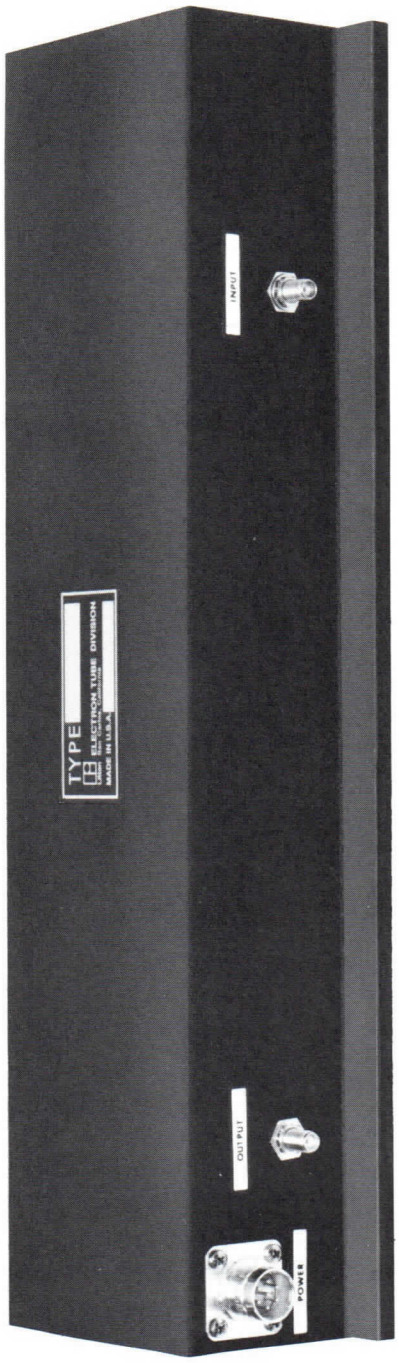
The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE AMPLIFIER

L-2785

7.0 to 11.0 GHz
2 Watt CW
Low Noise

The L-2785 is the X-band member of a family of miniature low noise, PPM focused TWTA's covering the range of 1.0 to 18.0 GHz, with a minimum of 1 W output and the lowest available noise figure at this power level. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.



ELECTRICAL CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Duty Cycle	CW
Output Power, Saturated	2.0 W, min.
Gain, Small Signal	45 dB min.
Noise Figure	18 dB max.
Attenuation, Cold (input to output)	70 dB min.
Focus	PPM
VSWR (beam off)	
Input	2.5:1
Output	2.5:1

ENVIRONMENTAL CHARACTERISTICS

Baseplate Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	9.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Connector	DM 9606-7P
Mounting Position	Any

POWER REQUIREMENTS

Voltage	115 V ± 10%, Three Phase
Frequency	60-400 Hz
Power	60 watts, max.

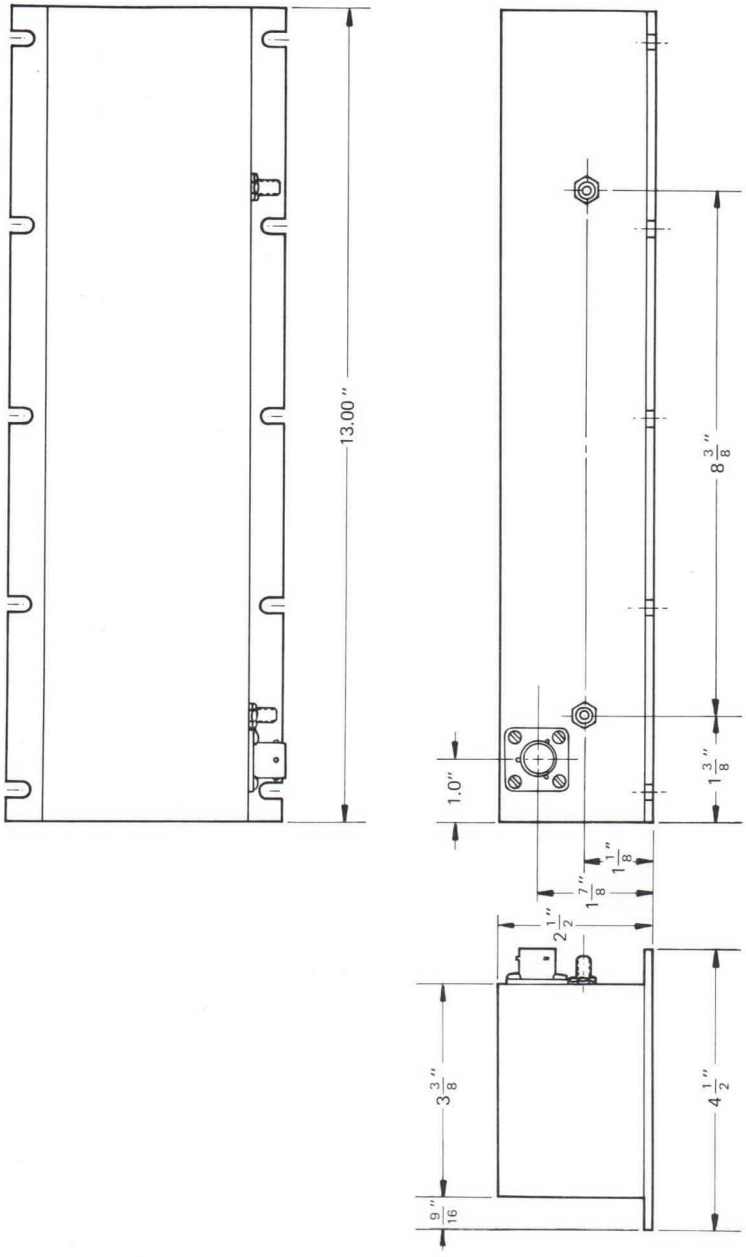
NOTES:

1. Amplifiers to operate from 28 volt dc are available.
2. Remote control or monitoring circuits may be incorporated.
3. Amplifiers may be provided with lower noise figure, when optimized over a narrower band than the full octave.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. A serrodyne amplifier may be incorporated to provide 360° phase shift with a maximum input signal of 5 volts, peak-to-peak.
6. Single phase power supplies are available.
7. Data contained in this bulletin subject to modification and should not be used for final equipment design.

TRAVELING WAVE TUBE AMPLIFIER

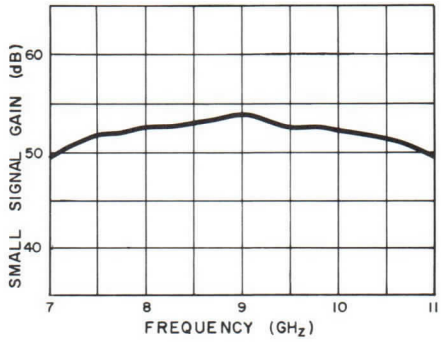
L-2785

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

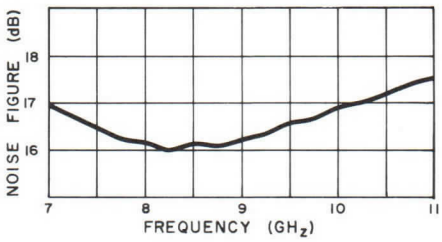


TYPICAL PERFORMANCE

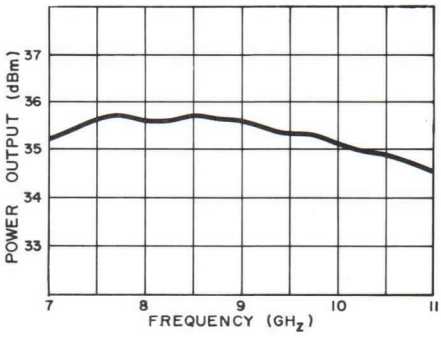
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE AMPLIFIER

L-2795

8.0 to 16.0 GHz
1 Watt CW
Low Noise

The L-2795 is a low noise medium power TWTA, primarily designed for driver applications. The tube is designed for airborne environments where size and weight are of prime importance. The power output with low noise figure give the tube exceptional dynamic range making it ideal for electronic warfare applications. Narrow band versions are available for communications purposes.

ELECTRICAL CHARACTERISTICS

Frequency Range	8.0 to 16.0 GHz
Duty Cycle	CW
Output Power, Saturated	1 W min.
Gain, Small Signal	35 dB min.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
Noise Figure	22 dB max.
VSWR (beam off)	
Input	2.0:1
Output	2.0:1

ENVIRONMENTAL CHARACTERISTICS

Baseplate Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

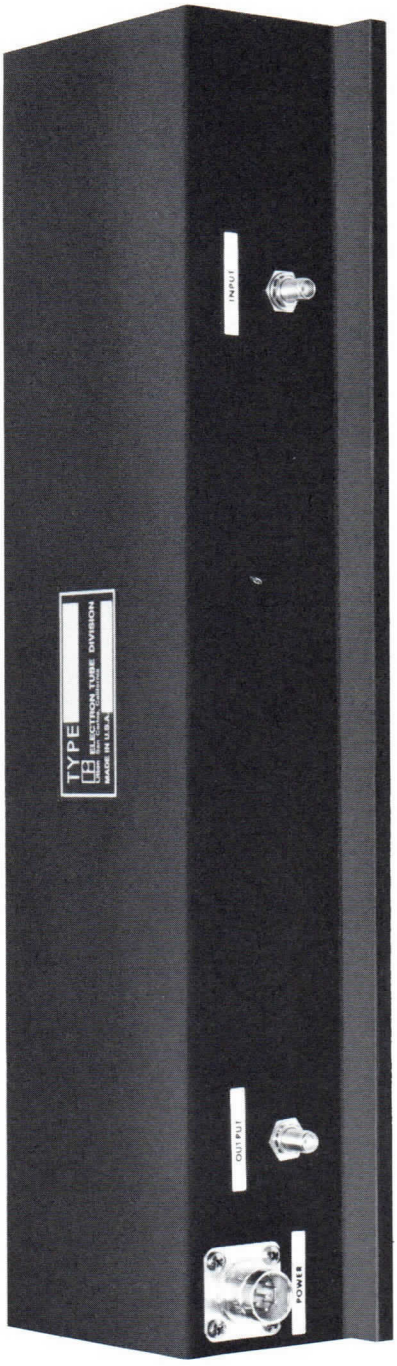
Size	See outline drawing
Weight (approx.)	9.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Connector	DM 9606-7P
Mounting Position	Any

POWER REQUIREMENTS

Voltage	115 V ± 10%, Three Phase
Frequency	60-400 Hz
Power	70 watts, max.

NOTES:

1. Amplifiers to operate from 28 volt dc are available.
2. Remote control or monitoring circuits may be incorporated.
3. Amplifiers may be provided with lower noise figure, when optimized over a narrower band than the full octave.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. A serrodyne amplifier may be incorporated to provide 360° phase shift with a maximum input signal of 5 volts, peak-to-peak.
6. Single phase power supplies are available.
7. Data contained in this bulletin subject to modification and should not be used for final equipment design.

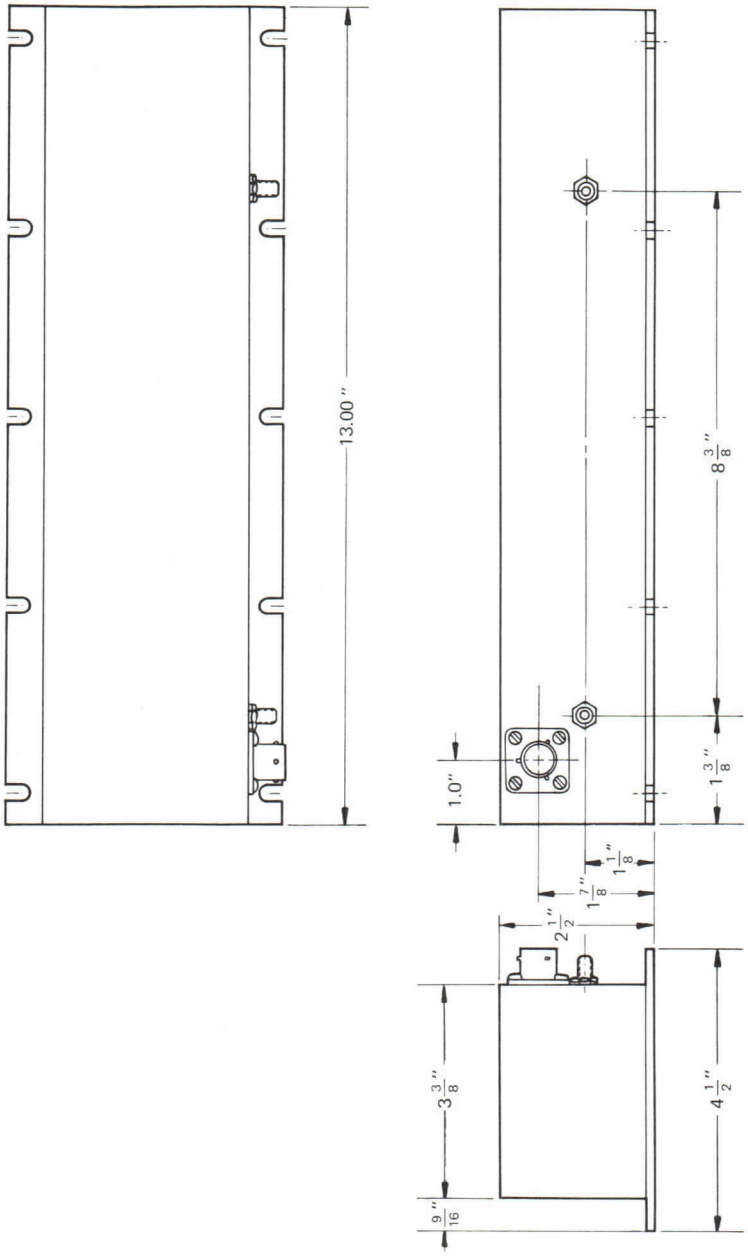


TRAVELING WAVE TUBE AMPLIFIER

L-2795

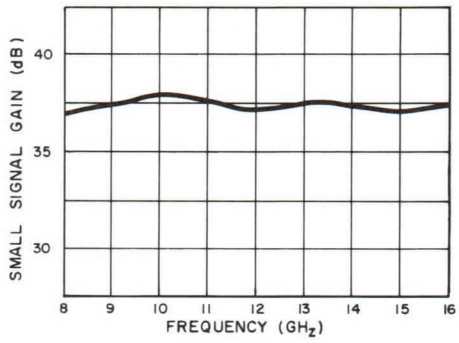
CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

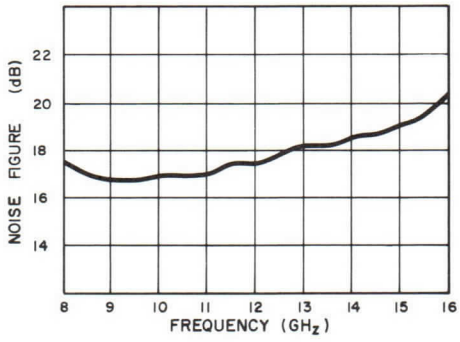


TYPICAL PERFORMANCE

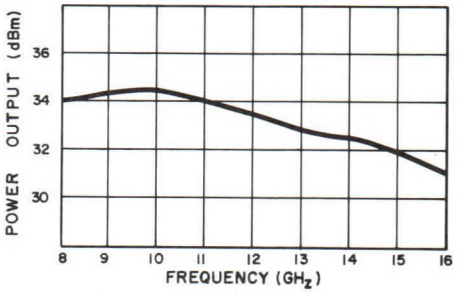
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE AMPLIFIER

L-2798

8.0 to 16.0 GHz
20 mW CW
Low Noise

The L-2798 is the X-Ku-band member of a family of miniature low noise, PPM focused TWTA's covering the range of 1.0 to 18.0 GHz, with a minimum of 10mW output. The low noise figure of the tube makes it ideally suited for receiver service in radar, ECM, or communications systems and for general wide band amplifier service.

ELECTRICAL CHARACTERISTICS

Frequency Range	8.0 to 16.0 GHz
Duty Cycle	CW
Output Power, Saturated	20 mW min.
Gain, Small Signal	33 dB min.
Noise Figure	14 dB max.
Attenuation, Cold (input to output)	60 dB min.
Focus	PPM
VSWR (beam off)	
Input	2:1 max.
Output	2:1 max.

ENVIRONMENTAL CHARACTERISTICS

Baseplate Temperature	−54°C to +100°C
Altitude	0 to 70,000 ft.
Humidity	100% with condensation
Vibration	10 G, 5 to 500 Hz
Shock	15 G for 11 ms
Cooling	Conduction

MECHANICAL CHARACTERISTICS

Size	See outline drawing
Weight (approx.)	5.0 lbs.
RF Connectors	
Input	SMA
Output	SMA
Power Connector	DM 9606-7P
Mounting Position	Any

POWER REQUIREMENTS

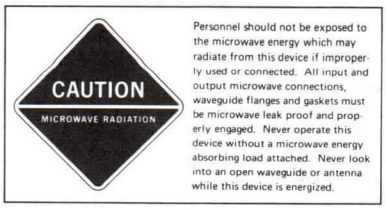
Voltage	115 V ±10%, Single Phase
Frequency	60-400 Hz
Power	20 watts, max.

NOTES:

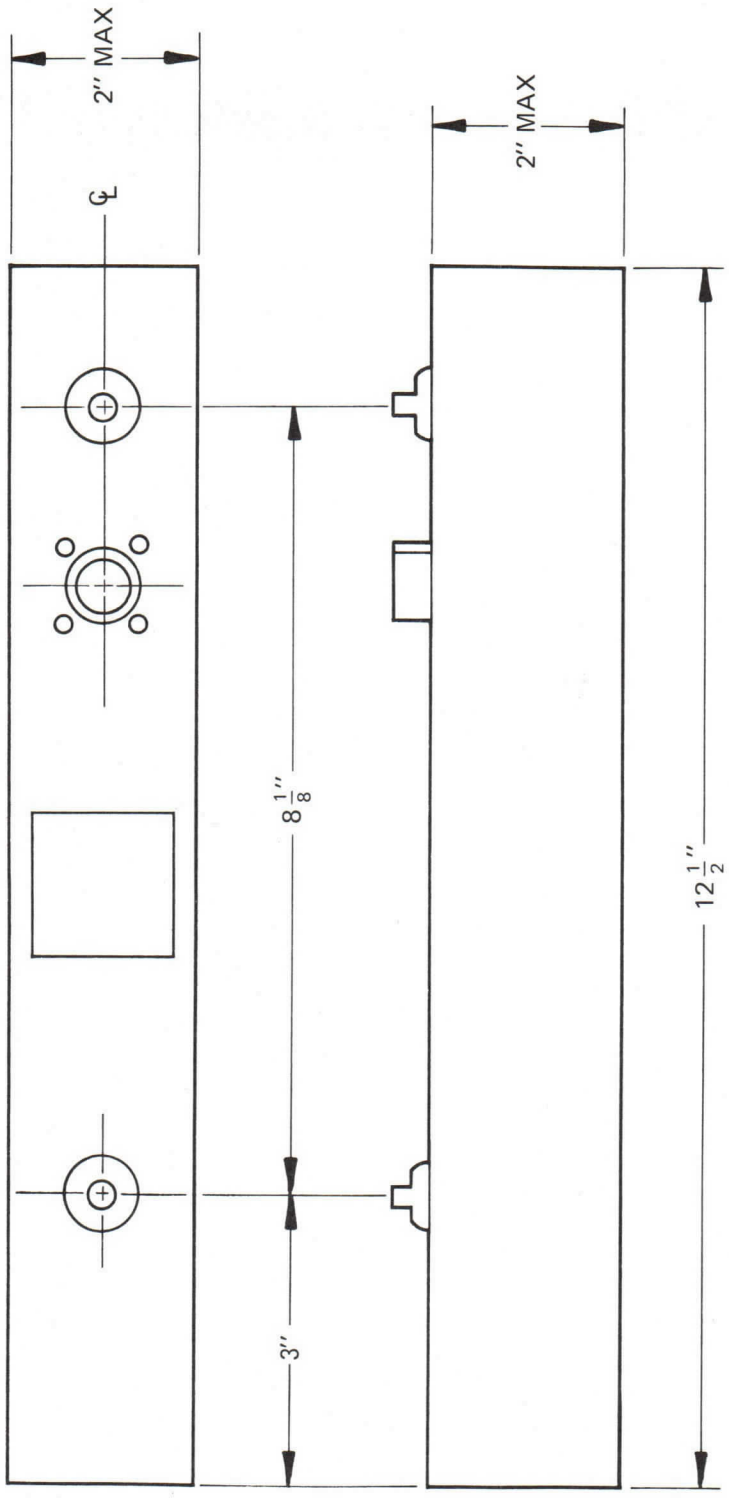
1. Amplifiers to operate from 28 volt dc are available.
2. Remote control or monitoring circuits may be incorporated.
3. Amplifiers may be provided with lower noise figure, when optimized over a narrower band than the full octave.
4. Other types of dc input, and/or RF input or output connectors can be provided to mate with system requirements.
5. High speed rf blanking circuits are also available.
6. Data contained in this bulletin subject to modification and should not be used for final equipment design.

TRAVELING WAVE TUBE AMPLIFIER

L-2798

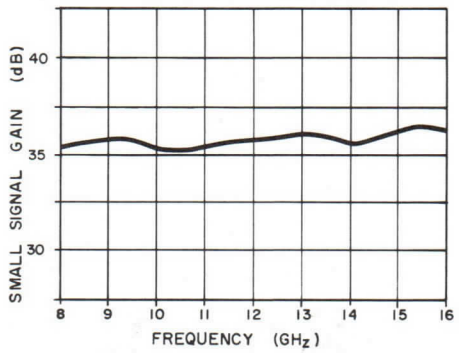


Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

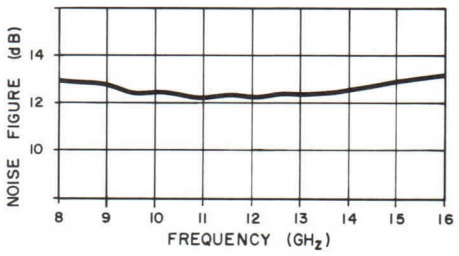


TYPICAL PERFORMANCE

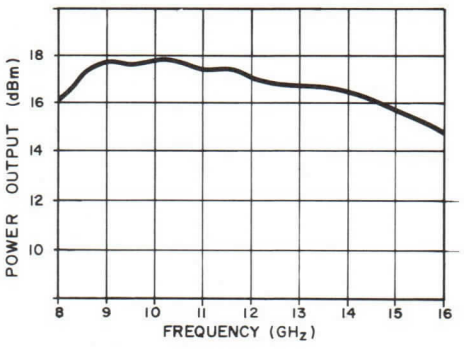
GAIN VS. FREQUENCY



NOISE FIGURE VS. FREQUENCY



POWER OUTPUT VS. FREQUENCY



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-3611

The L-3611 is a broadband traveling wave amplifier having a minimum power output of 20 milliwatts over the frequency range of 7,000 to 11,000 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1100 Vdc (Negative)
Cathode Current	2.5 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	40 Volts (Positive)
Filament Voltage	6.3 Volts
Filament Current	0.7 Ampere

PERFORMANCE CHARACTERISTICS

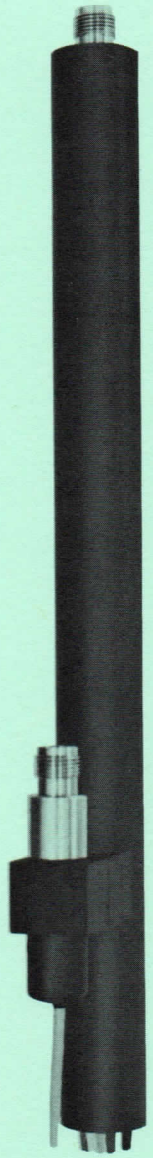
Frequency Range	7,000 to 11,000 Mc
Power Output	20 mW minimum
Small Signal Gain	36 db minimum

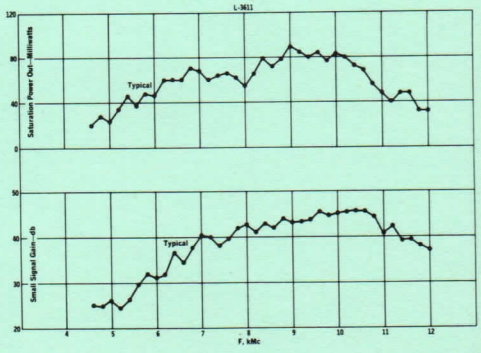
MAXIMUM RATINGS

Duty	CW
Cathode Voltage	1.5 kVdc
Grid Voltage (With respect to cathode)	100 Volts
Helix Current	1.0 mA
Collector Temperature	125° C

MECHANICAL DESCRIPTION

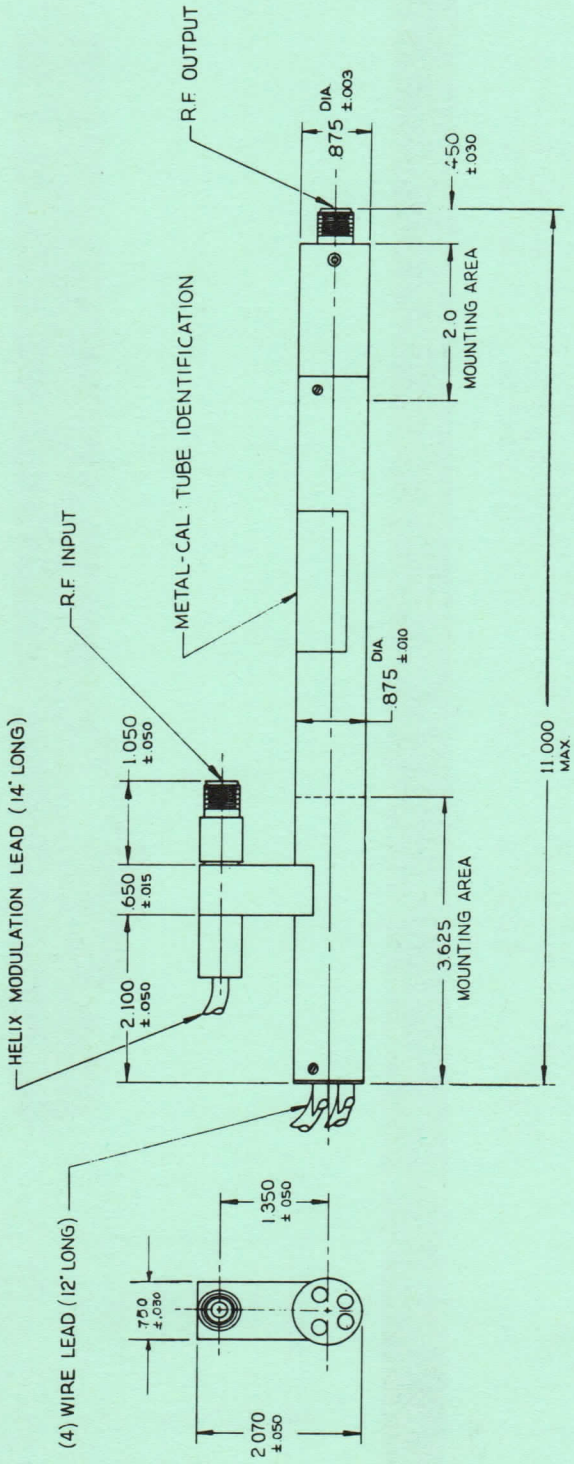
Dimensions	See Outline Drawing
Weight	1.1 lbs. Max.
Cooling	None required in normal environments
Mounting Position	Any

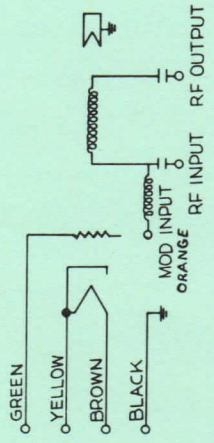




TRAVELING WAVE TUBE

L-3611





TRAVELING WAVE TUBE

L-3928*

2

7.0 to 11.0 GHz

10 watts min.

40 db gain

PPM Focused

The L-3928 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 7,000 to 11,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2950 Vdc (Neg.)
Cathode Current	60 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	60 Volts (Positive)
Filament Voltage	6.3 V
Filament Current	1.3 A

PERFORMANCE CHARACTERISTICS

Frequency Range	7,000 to 11,000 MHz
Power Output	Min. 10 Watts
Small Signal Gain	Min. 40 db

MAXIMUM RATINGS

Duty	CW
Helix Current	7.0 mA
Collector Temperature	125° C
Tube Heat Sink Temperature	100°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.1 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	50 G
Vibration	20 G
Ambient Temperature	−54° C to +85° C
Altitude	Any

POWER SUPPLY REQUIREMENTS

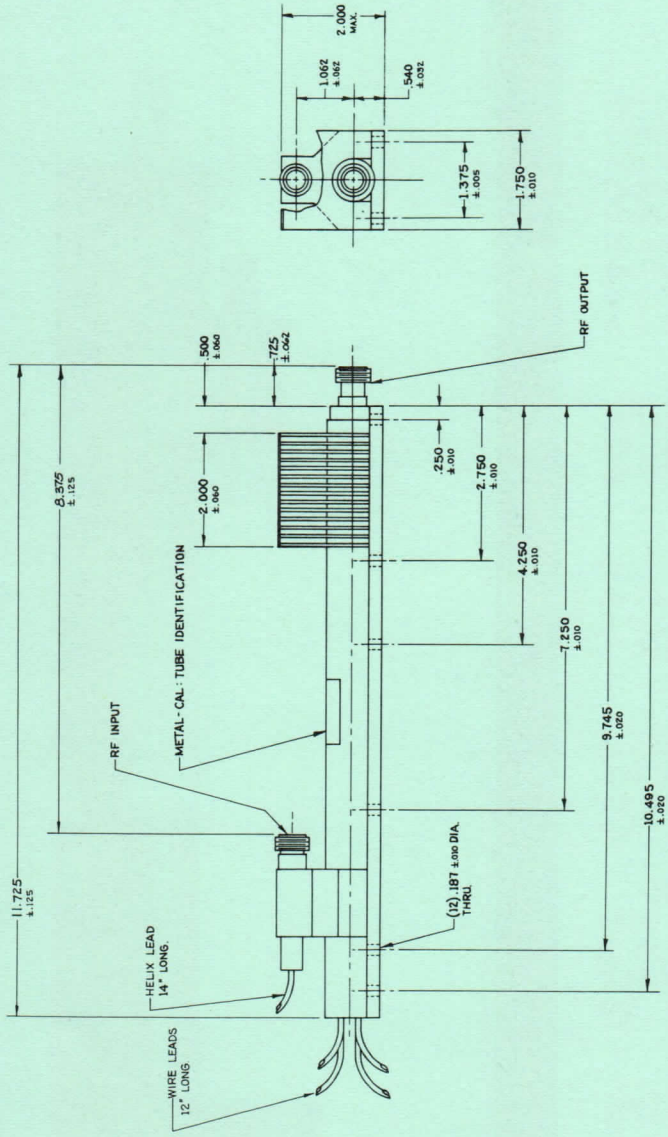
Cathode Voltage Range	−2850 to −3100 Vdc
Cathode Current (Maximum)	
Not including Grid Current	80.0 mA
Grid Voltage Range	
(with respect to cathode)	+30 to +100 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	12.0 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	0.9 to 1.5 A

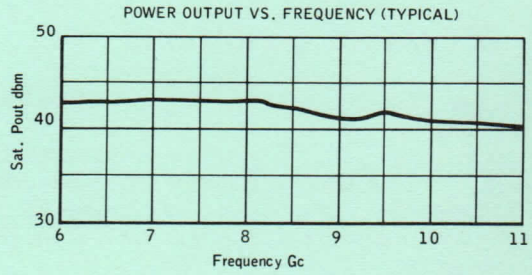
*NOTE: When Tube is to be supplied with High Mu Grid specify type L-3928-50.

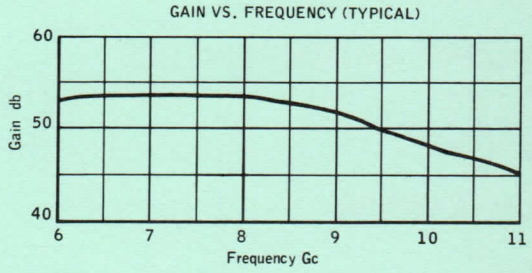
TRAVELING WAVE TUBE

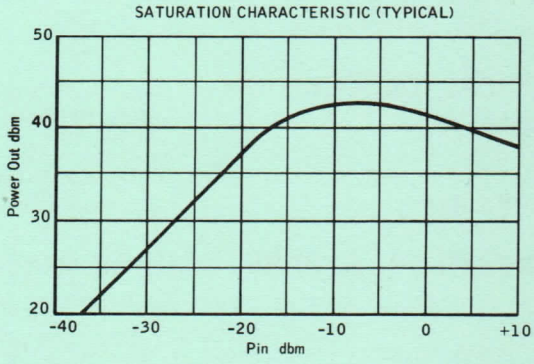
L-3928

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.









NOTES:

1. Available with high mu grid.
2. Helix isolated for modulation.
3. Available with higher power for narrow band applications.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-3957

The L-3957 is a high gain, broadband traveling wave amplifier having a minimum power output of two watts over the frequency range of 5,400 to 10,700 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2,150 Vdc (Neg.)
Cathode Current	32 mA
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Filament Voltage	6.3 V
Filament Current	0.8 A

PERFORMANCE CHARACTERISTICS

Frequency Range	5,400 to 10,700 Mc
Power Output	Min. 2.0 W
Small Signal Gain	Min. 60 db

MAXIMUM RATINGS

Duty	CW
Cathode Voltage (Range)	2,050 to 2,300 Vdc
Cathode Current	40 mA
Collector Temperature	125° C

MECHANICAL DESCRIPTION

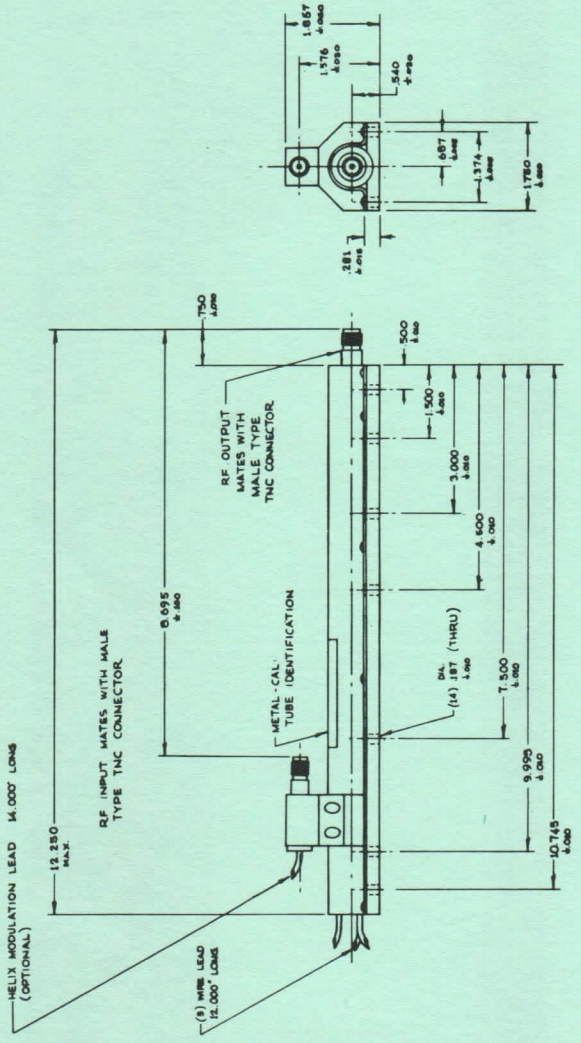
Dimensions	See Outline Drawing
Weight	Max. 1.5 lbs.
Cooling	Conduction
Mounting Position	Any

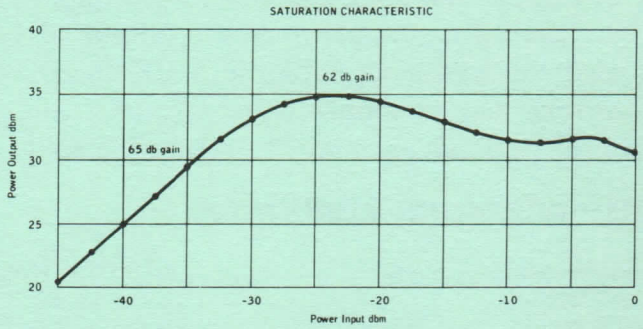
ENVIRONMENTAL CAPABILITY

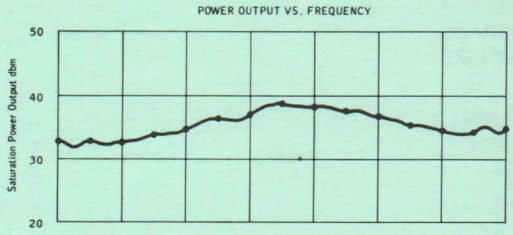
Shock	100 G
Vibration	20 G
Ambient Temperature	−54° C to +85° C
Altitude	Any

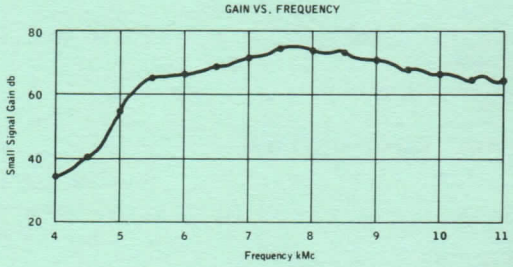
TRAVELING WAVE TUBE

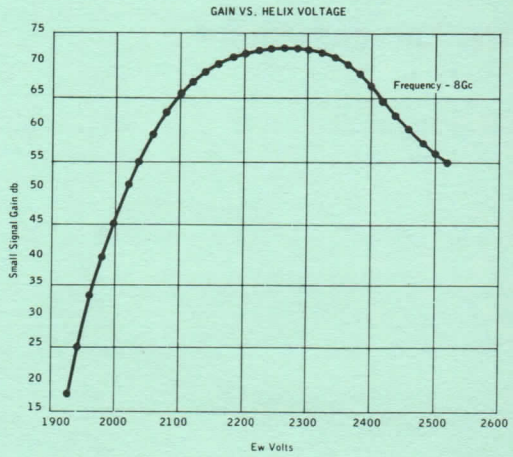
L-3957











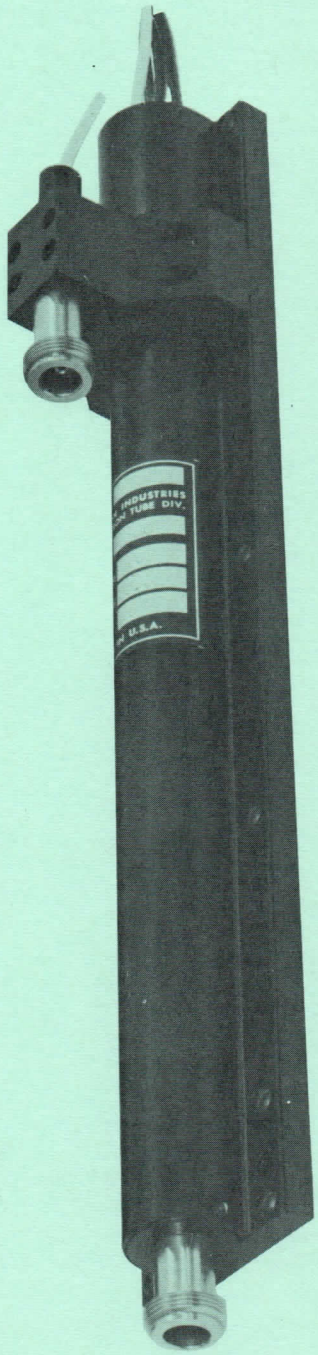
TRAVELING WAVE TUBE

L-3971*

2

2.0 to 4.0 GHz
2.0 watts min.
50 db gain
High mu grid

The L-3971 is a high gain, broadband, traveling wave amplifier with a high mu grid. Two watts of RF power is available over the complete frequency range of 2,000 to 4,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	850 Vdc (Neg.)
Cathode Current	30 mA
Helix Voltage	Ground potential (Can be modulated)
Grid Voltage (With respect to cathode)	40 V
Grid Current	2.0 mA
Collector Voltage	Ground potential
Filament Voltage	6.3 V
Filament Current	0.9 A

PERFORMANCE CHARACTERISTICS A

Frequency Range	2,000 to 4,000 MHz
Power Output	Min. 2.0 W
Small Signal Gain	Min. 50 db

PERFORMANCE CHARACTERISTICS B

Frequency Range	2,400 to 3,600 MHz
Power Output	Min. 2.0 W
Small Signal Gain	Min. 60 db

MAXIMUM RATINGS

Duty	CW
Collector Temperature	125° C
Helix Current	5.0 mA

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	Max. 1.75 lbs.
Cooling	Conduction
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	100 G
Vibration	20 G
Ambient Temperature	−54° C to +85° C
Altitude	Any

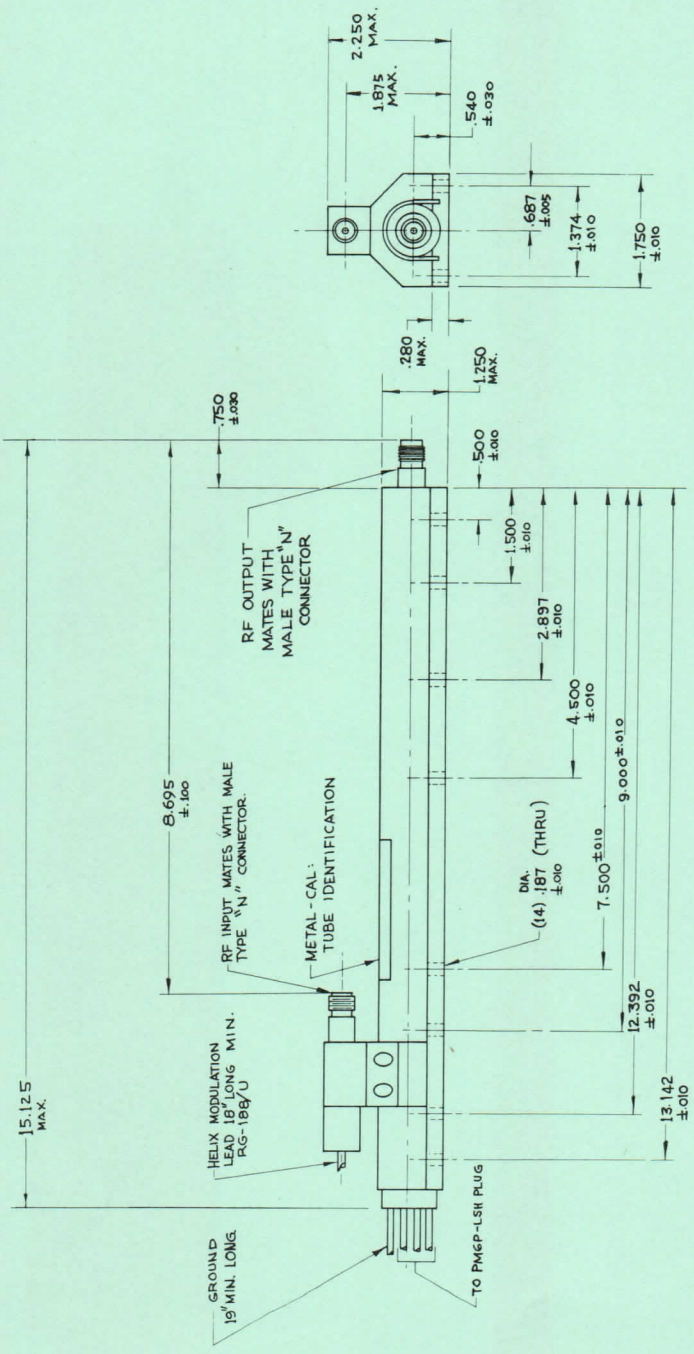
POWER SUPPLY REQUIREMENTS

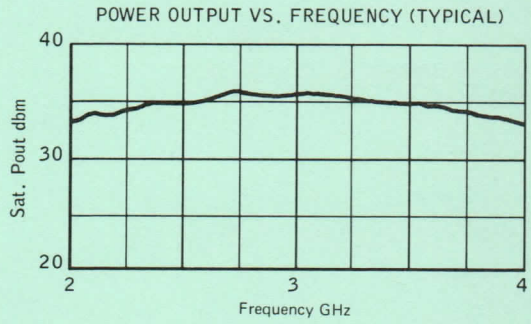
Cathode Voltage Range	−800 to −950 Vdc
Cathode Current (Maximum)	40.0 mA
Grid Voltage (Maximum) with respect to cathode	+70 V
Grid Current (Maximum)	5.0 mA

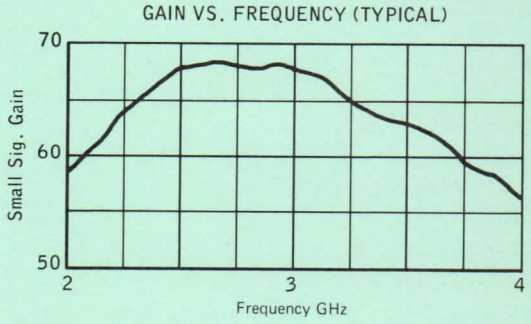
*Note: When tube is to be supplied with High Mu Grid specify Type L-3971-50.

TRAVELING WAVE TUBE

L-3971







APPLICATION NOTES:

1. This tube can be supplied with either the high mu grid or a non-intercepting grid of lower mu.
2. This tube is normally supplied with TNC RF connectors, however, any standard RF connectors can be supplied.
3. Helix isolated for modulation.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

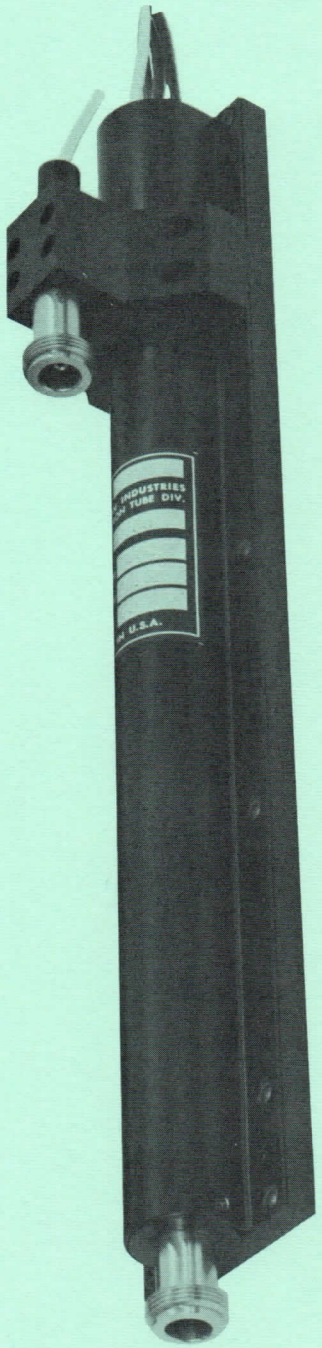
TRAVELING WAVE TUBE

L-3972*

2

5.4 to 10.7 GHz
1.0 watt min.
55 db gain
High mu grid

The L-3972 is a high gain, broadband, traveling wave amplifier with a high mu grid. One watt of RF power is available over the complete frequency range of 5,400 to 10,700 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2,000 Vdc (Neg.)
Cathode Current	33 mA
Helix Voltage	Ground potential (Can be modulated)
Grid Voltage (With respect to cathode)	50 V
Grid Current	2.0 mA
Collector Voltage	Ground potential
Filament Voltage	6.3 V
Filament Current	0.8 A

PERFORMANCE CHARACTERISTICS A

Frequency Range	5,400 to 10,700 MHz
Power Output	Min. 1.0 W
Small Signal Gain	Min. 55 db

PERFORMANCE CHARACTERISTICS B

Frequency Range	8,000 to 10,000 MHz
Power Output	Min. 2.0 W
Small Signal Gain	Min. 60 db

MAXIMUM RATINGS

Duty	CW
Collector Temperature	125° C
Helix Current	5.0 mA

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	Max. 1.5 lbs.
Cooling	Conduction
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	100 G
Vibration	20 G
Ambient Temperature	−54° C to +85° C
Altitude	Any

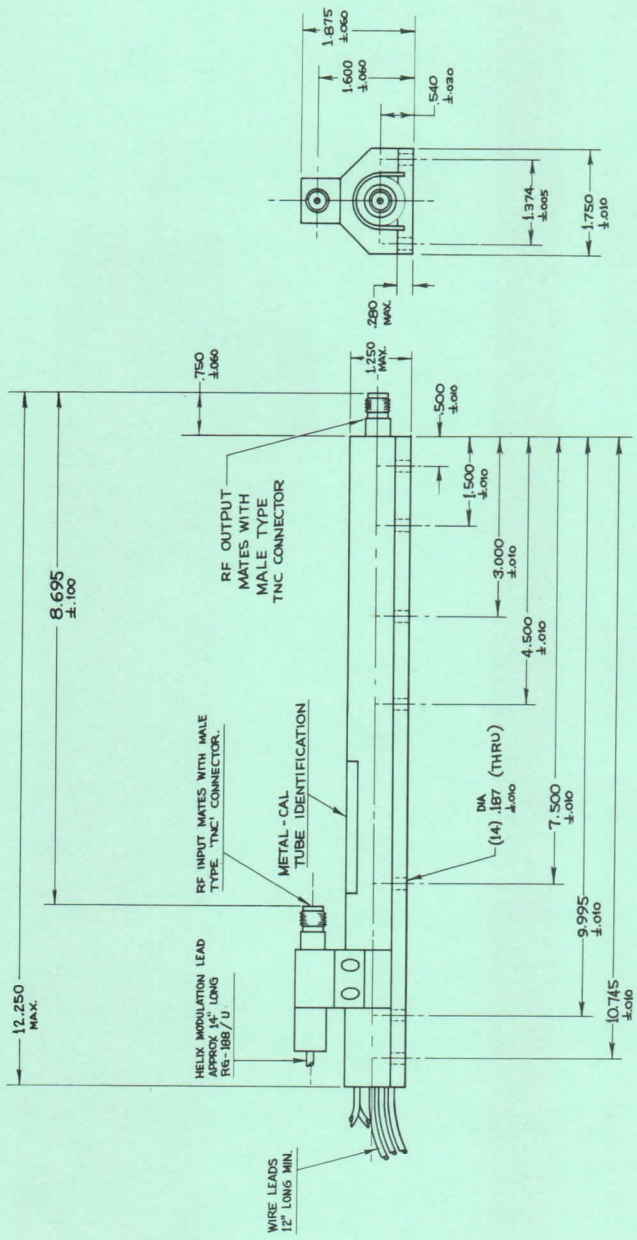
POWER SUPPLY REQUIREMENTS

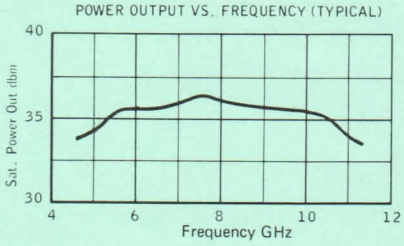
Cathode Voltage Range	−1,900 to −2,100 Vdc
Cathode Current (Maximum)	40.0 mA
Grid Voltage (with respect to cathode)	+70 V
Grid Current (Maximum)	5.0 mA

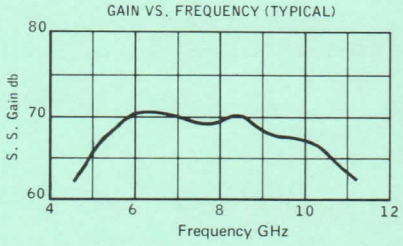
*Note: When tube is to be supplied with High Mu Grid specify Type L-3972-50.

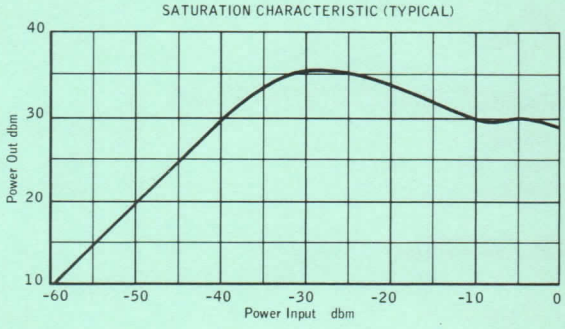
TRAVELING WAVE TUBE

L-3972









APPLICATION NOTES:

1. This tube can be supplied with either the high mu grid or a non-intercepting grid of lower mu.
2. This tube is normally supplied with TNC RF connectors, however, any standard RF connectors can be supplied.
3. Helix isolated for modulation.

The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-3998

1

7.0 to 11.0 Gc

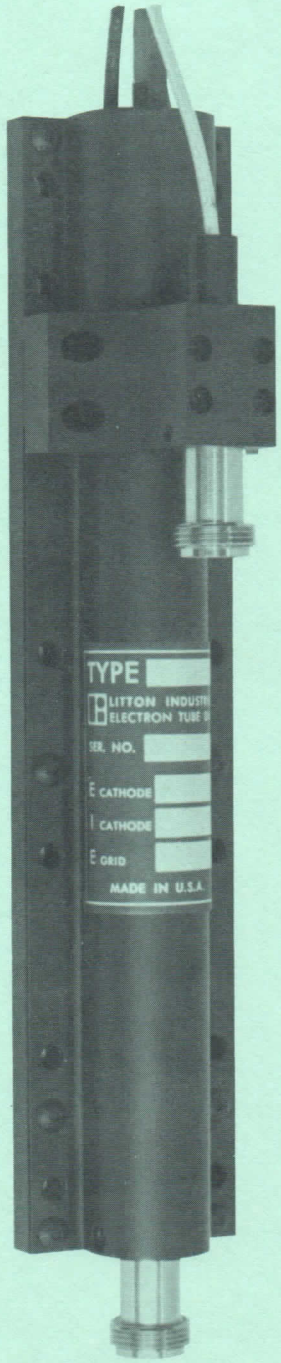
2.0 watts Min.

36 db gain

PPM Focused

High mu grid

The L-3998 is a broadband traveling wave amplifier having a minimum power output of two watts over the frequency range of 7,000 to 11,000 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2.1 kVdc (Neg.)
Cathode Current	35 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	60 V (Pos.)
Filament Voltage	6.3 V
Filament Current	0.9 A
Grid Current	4.0 mA

PERFORMANCE CHARACTERISTICS

Frequency Range	7,000 to 11,000 Mc
Power Output	Min. 2.0 W
Small Signal Gain	Min. 36 db

MAXIMUM RATINGS

Duty	CW
Cathode Voltage (Range)	2,050 to 2,300 Vdc
Cathode Current	42 mA
Grid Voltage (With respect to cathode)	85 V
Helix Current	5.0 mA
Collector Temperature	140° C
Grid Current	6.0 mA

MECHANICAL DESCRIPTION

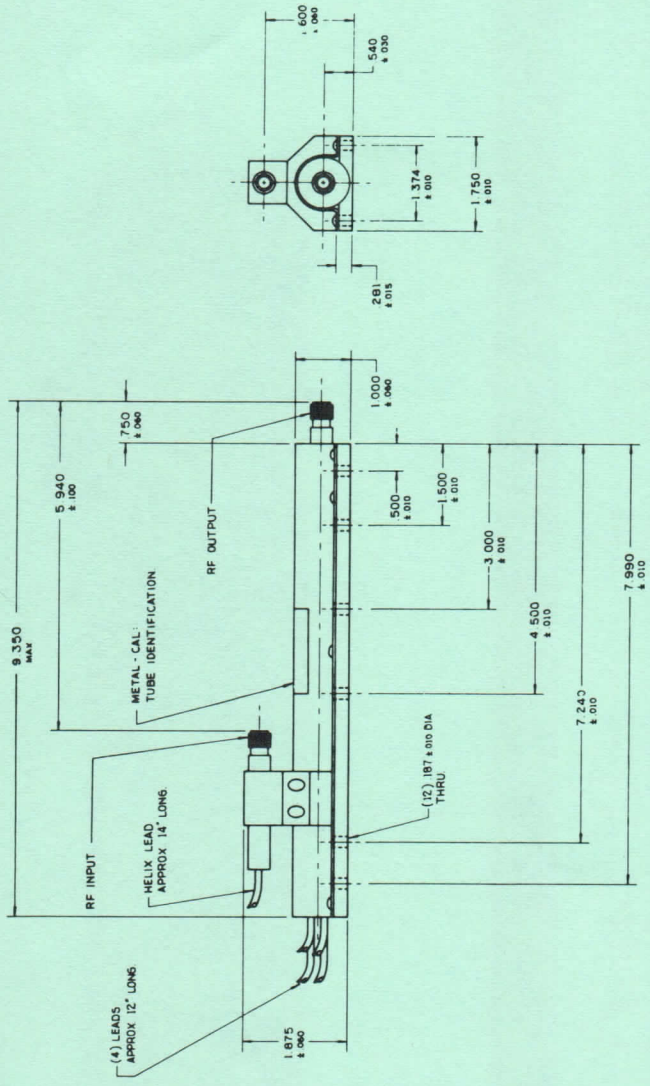
Dimensions	See Outline Drawing
Weight	1.2 lbs.
Cooling	Conduction
Mounting Position	Any

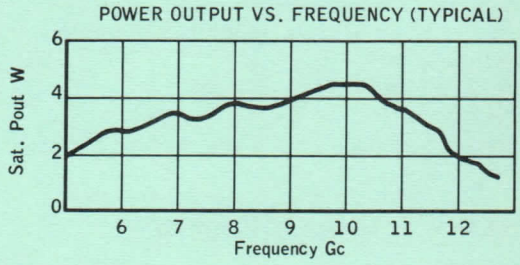
ENVIRONMENTAL CAPABILITY

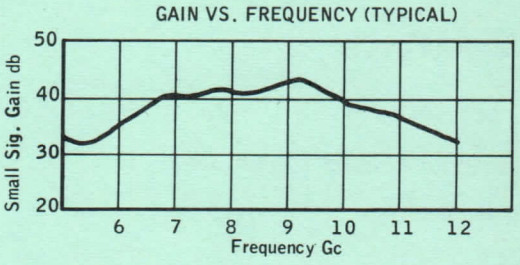
Shock	100 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

TRAVELING WAVE TUBE

L-3998







APPLICATION NOTES:

1. Available in different gain lengths for phase sensitive systems.
2. Helix isolated for modulation.
3. Available with high mu grid.
4. Gain control or narrow pulse operation.

TRAVELING WAVE TUBE

L-5007

1

2.0 to 4.0 Gc
2.0 watts Min.
36 db gain
PPM Focused

The L-5007 is a broadband traveling wave amplifier having a minimum power output of two watts over the frequency range of 2,000 to 4,000 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	900 Vdc (Neg.)
Cathode Current	30 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	45 Volts (Pos.)
Filament Voltage	6.3 V
Filament Current	1.0 A

PERFORMANCE CHARACTERISTICS

Frequency Range	2,000 to 4,000 Mc
Power Output	Min. 2.0 W
Small Signal Gain	Min. 36 db

MAXIMUM RATINGS

Duty	CW
Cathode Voltage (Range)	800 to 1,000 Vdc
Cathode Current	40 mA
Grid Voltage (With respect to cathode)	60 V
Helix Current	5.0 mA
Collector Temperature	140° C

MECHANICAL DESCRIPTION

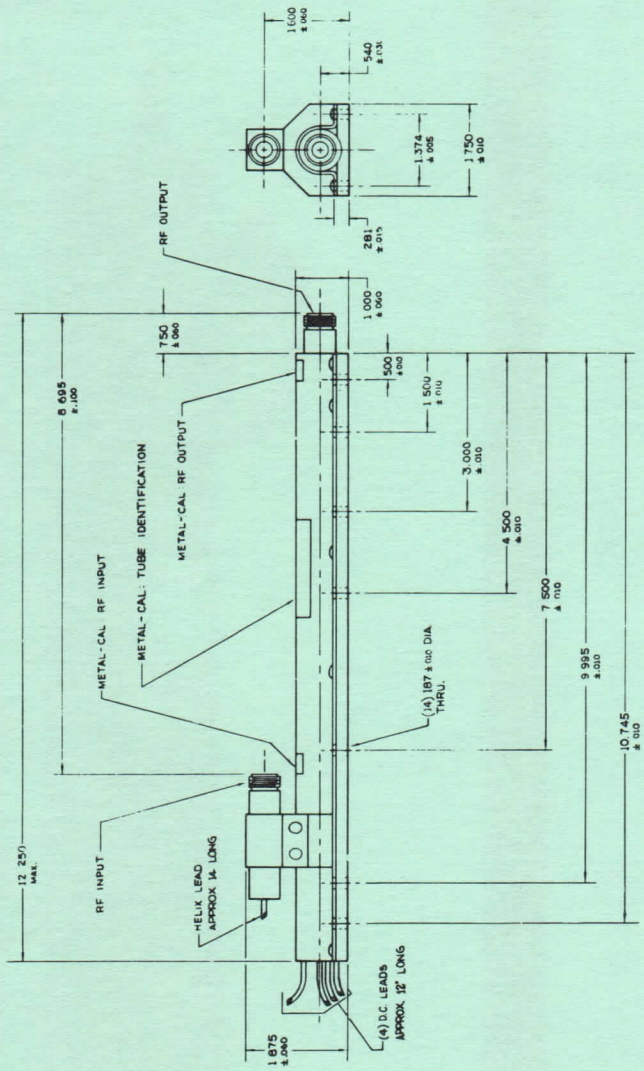
Dimensions	See Outline Drawing
Weight	1.5 lbs.
Cooling	Conduction
Mounting Position	Any

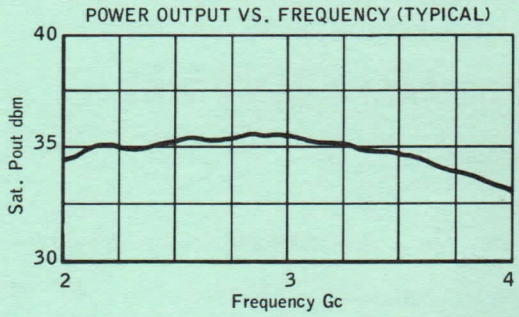
ENVIRONMENTAL CAPABILITY

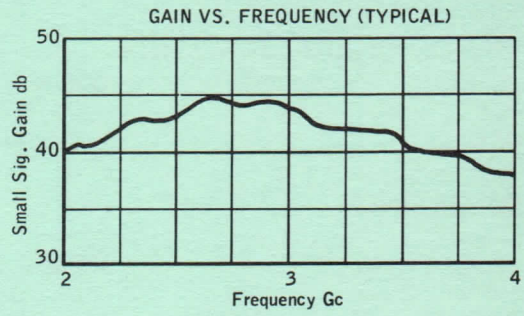
Shock	100 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

TRAVELING WAVE TUBE

L-5007







APPLICATION NOTES:

1. High mu grid optional.
2. Available with higher power for narrow band operation.
3. Helix isolated for modulation.

TRAVELING WAVE TUBE

L-5008*

2

8.0 to 12.0 GHz

2.0 watts Min.

36 db gain

PPM Focused

The L-5008 is a broadband traveling wave amplifier having a minimum power output of two watts over the frequency range of 8,000 to 12,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2.0 kVdc (Neg.)
Cathode Current	30 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	40 V (Pos.)
Filament Voltage	6.3 V
Filament Current	0.9 A

PERFORMANCE CHARACTERISTICS

Frequency Range	8,000 to 12,000 MHz
Power Output	Min. 2.0 W
Small Signal Gain	Min. 36 db

MAXIMUM RATINGS

Helix Current	5.0 mA
Grid Current	5.0 mA
Heat Sink Temperature	+100°C
Collector Temperature	+140°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	1.2 lbs.
Cooling	Conduction
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (upon request)

Shock	100 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

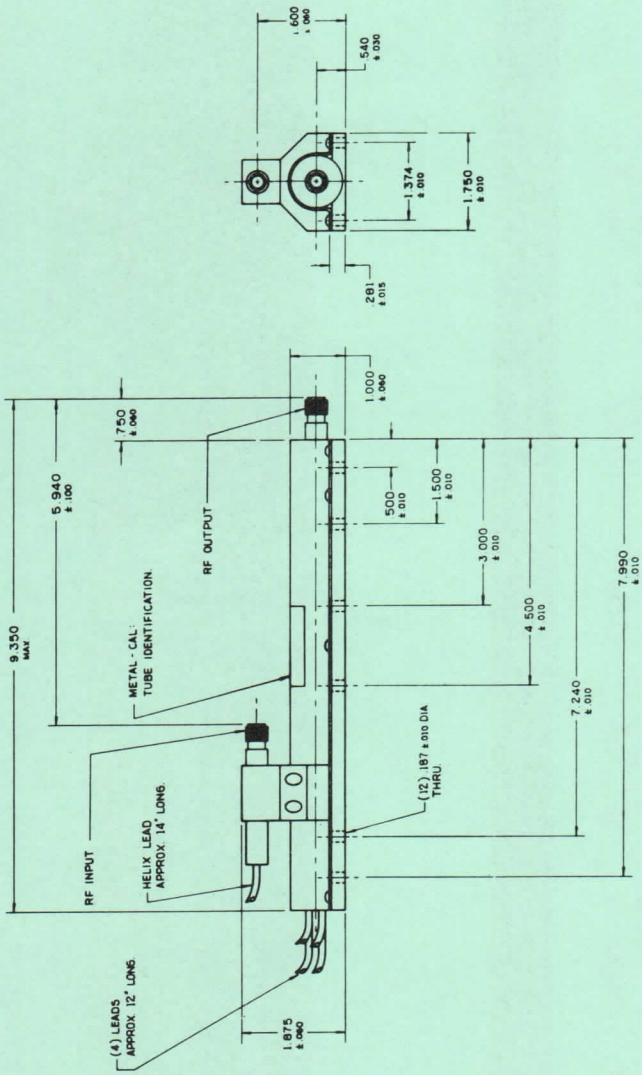
POWER SUPPLY REQUIREMENTS

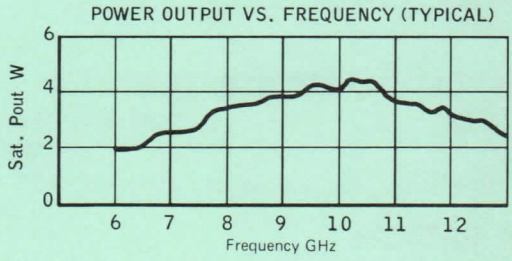
Cathode Voltage Range	−1,900 to −2,100 Vdc
Cathode Current (Maximum)	
Not including Grid Current	40.0 mA
Grid Voltage Range (with respect to cathode)	+20 to +85 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	5.0 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	0.5 to 1.2 A

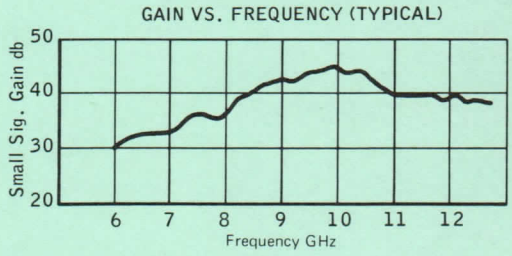
*Note: When tube is to be supplied with High Mu Grid specify Type L-5008-50.

TRAVELING WAVE TUBE

L-5008







APPLICATION NOTES:

1. Available in different gain lengths for phase sensitive systems.
2. Helix isolated for modulation.
3. This tube can be supplied with either the High Mu Grid or a Non-intercepting Grid of lower Mu.
4. Gain control or narrow pulse operation.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-5009

1

4.0 to 8.0 Gc
2.0 watts Min.
50 db gain
PPM Focused

The L-5009 is a broadband traveling wave amplifier having a minimum power output of two watts over the frequency range of 4,000 to 8,000 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1900 Vdc (Neg.)
Cathode Current	30 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	50 V (Pos.)
Filament Voltage	6.3 V
Filament Current	0.9 A

PERFORMANCE CHARACTERISTICS A

Frequency Range	4,000 to 8,000 Mc
Power Output	Min. 2.0 W
Small Signal Gain	Min. 50 db

PERFORMANCE CHARACTERISTICS B

Frequency Range	5,500 to 8,500 Mc
Power Output	Min. 3.0 W
Small Signal Gain	Min. 50 db

MAXIMUM RATINGS

Duty	CW
Cathode Voltage (Range)	1,750 to 2,000 Vdc
Cathode Current	40 mA
Grid Voltage (With respect to cathode)	85 V
Helix Current	5.0 mA
Collector Temperature	140° C

MECHANICAL DESCRIPTION

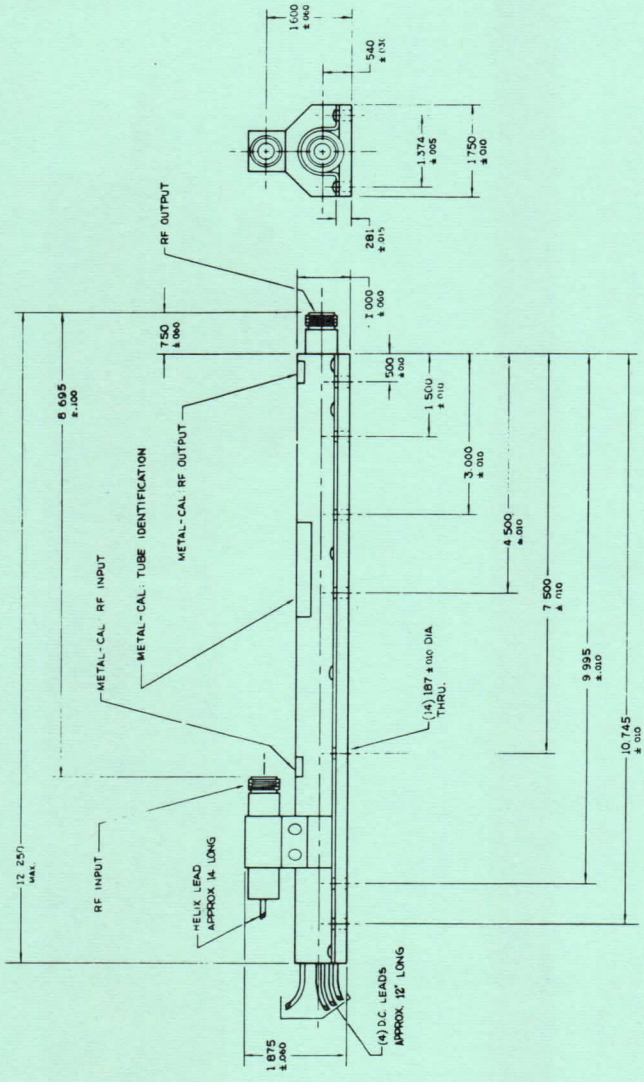
Dimensions	See Outline Drawing
Weight	1.5 lbs.
Cooling	Conduction
Mounting Position	Any

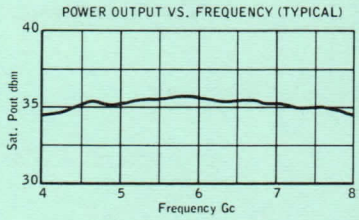
ENVIRONMENTAL CAPABILITY

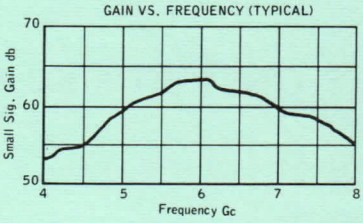
Shock	100 G
Vibration	20 G
Ambient Temperature	—54°C to +85°C
Altitude	Any

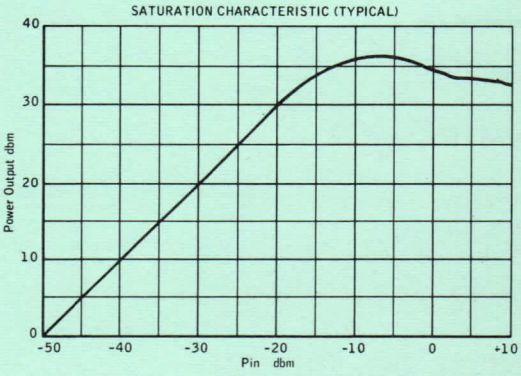
TRAVELING WAVE TUBE

L-5009









APPLICATION NOTES:

1. Available in different gain lengths for phase sensitive systems.
2. Helix isolated for modulation.
3. Available with high mu grid.
4. Gain control or narrow pulse operation.

TRAVELING WAVE TUBE

L-5010*

2

2.0 to 4.0 GHz
10 watts Min.
33 db gain
PPM Focused

The L-5010 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 2,000 to 4,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1600 Vdc (Neg.)
Cathode Current	80 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	75 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.3 A

PERFORMANCE CHARACTERISTICS

Frequency Range	2,000 to 4,000 MHz
Powed Output	Min. 10 W
Small Signal Gain	Min. 33 db

MAXIMUM RATINGS

Duty	CW
Helix Current	7.0 mA
Collector Temperature	125° C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.5 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	50 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

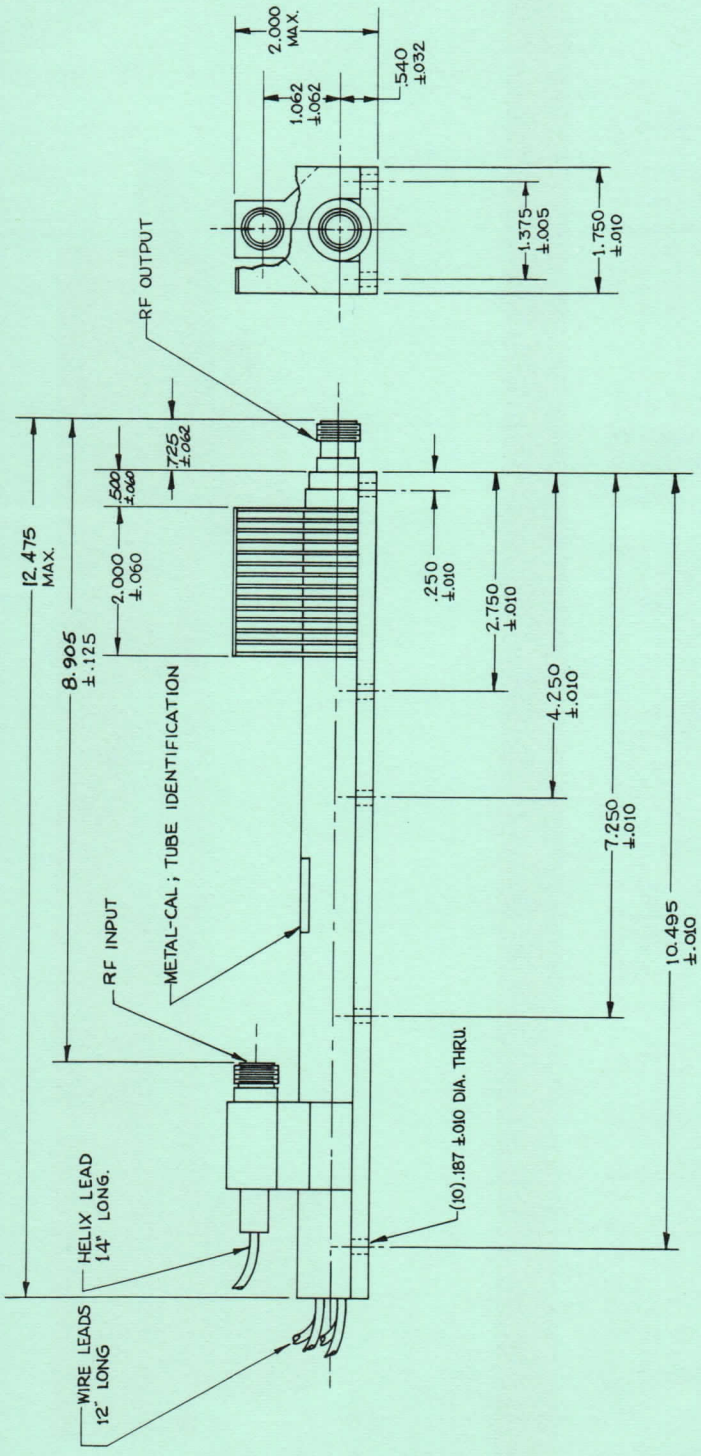
Cathode Voltage Range	−1500 to −1700 Vdc
Cathode Current (Maximum)	
Not including Grid Current	100 mA
Grid Voltage Range	
(with respect to cathode)	+40 to +100 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	12.0 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	0.9 to 1.5 A

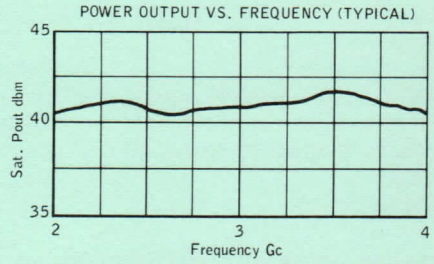
*NOTE: When tube is to be supplied with High Mu Grid specify type L-5010-50.

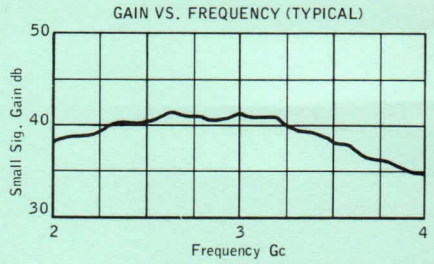
TRAVELING WAVE TUBE

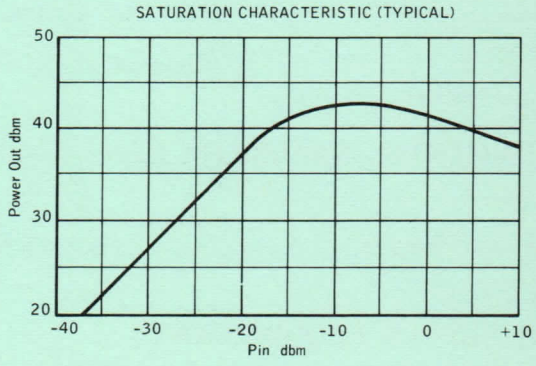
L-5010

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.









NOTES:

1. Available with high mu grid.
2. Helix isolated for modulation.
3. Can be supplied with 60 db or greater gain.
4. Available with higher power for narrow band applications.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-5011*

2

4.0 to 8.0 GHz
10 watts Min.
33 db gain
PPM Focused

The L-5011 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 4,000 to 8,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2650 Vdc (Neg.)
Cathode Current	80 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	65 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.3 A

PERFORMANCE CHARACTERISTICS

Frequency Range	4,000 to 8,000 MHz
Power Output	Min. 10 W
Small Signal Gain	Min. 33 db

MAXIMUM RATINGS

Duty	CW
Helix Current	7.0 mA
Collector Temperature	125° C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.5 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	50 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−2550 to −2750 Vdc
Cathode Current (Maximum)	
Not including Grid Current	85.0 mA
Grid Voltage Range	
(with respect to cathode)	+40 to +100 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	12.0 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	0.9 to 1.5 A

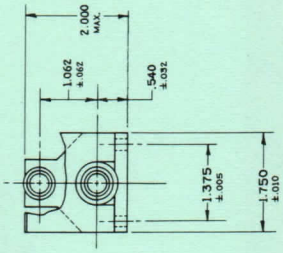
*NOTE: When tube is to be supplied with High Mu Grid specify type L-5011-50.

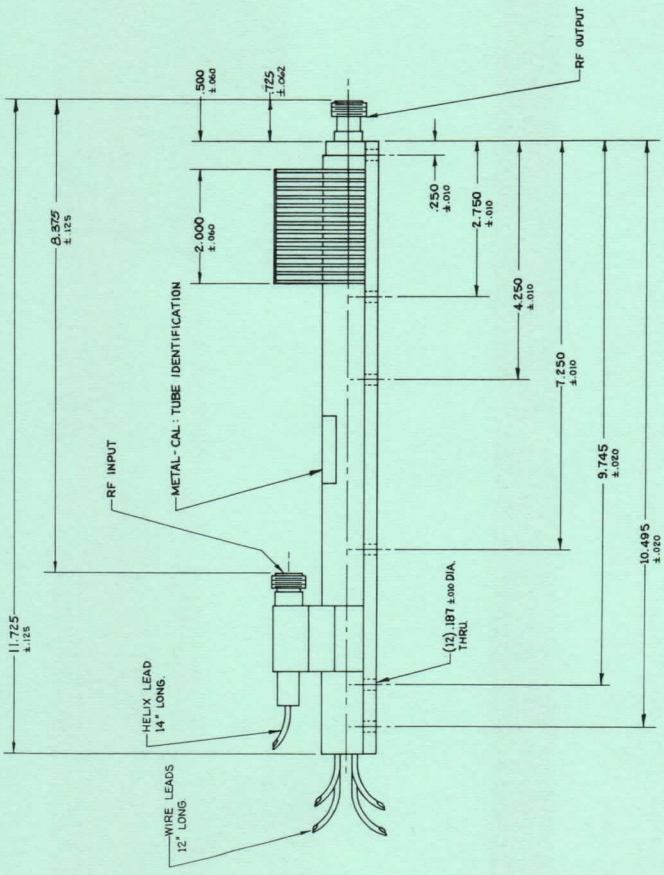
TRAVELING WAVE TUBE

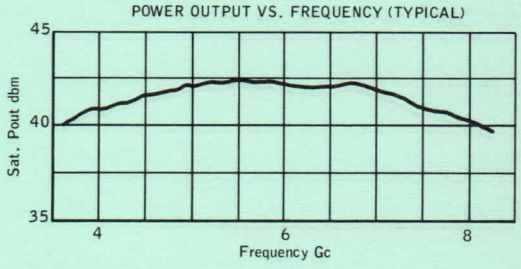
L-5011

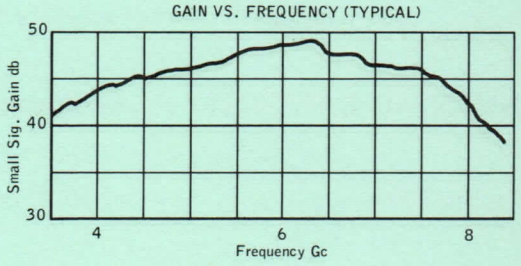
CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.









NOTES:

1. Available with high mu grid.
2. Helix isolated for modulation.
3. Can be supplied with 60 db or greater gain.
4. Available with higher power for narrow band applications.

The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-5014

- 2.0 to 4.0 Mc
- 10 Milliwatts Min.
- 13 db Gain
- PPM Focused

The L-5014 is a broadband traveling wave amplifier having a minimum power output of 10 milliwatts over the frequency range of 2,000 to 4,000 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	425 Vdc (Neg.)
Cathode Current	3.0 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Filament Voltage	6.3 V
Filament Current	0.25 A

PERFORMANCE CHARACTERISTICS

Frequency Range	2,000 to 4,000 Mc
Power Output	Min. 10 mW
Small Signal Gain	Min. 13 db

MAXIMUM RATINGS

Duty	CW
Cathode Voltage (Range)	400-500 Vdc
Cathode Current	5.0 mA
Anode Voltage (Range)	0 to +100 Vdc
Collector Temperature	140° C

MECHANICAL DESCRIPTION

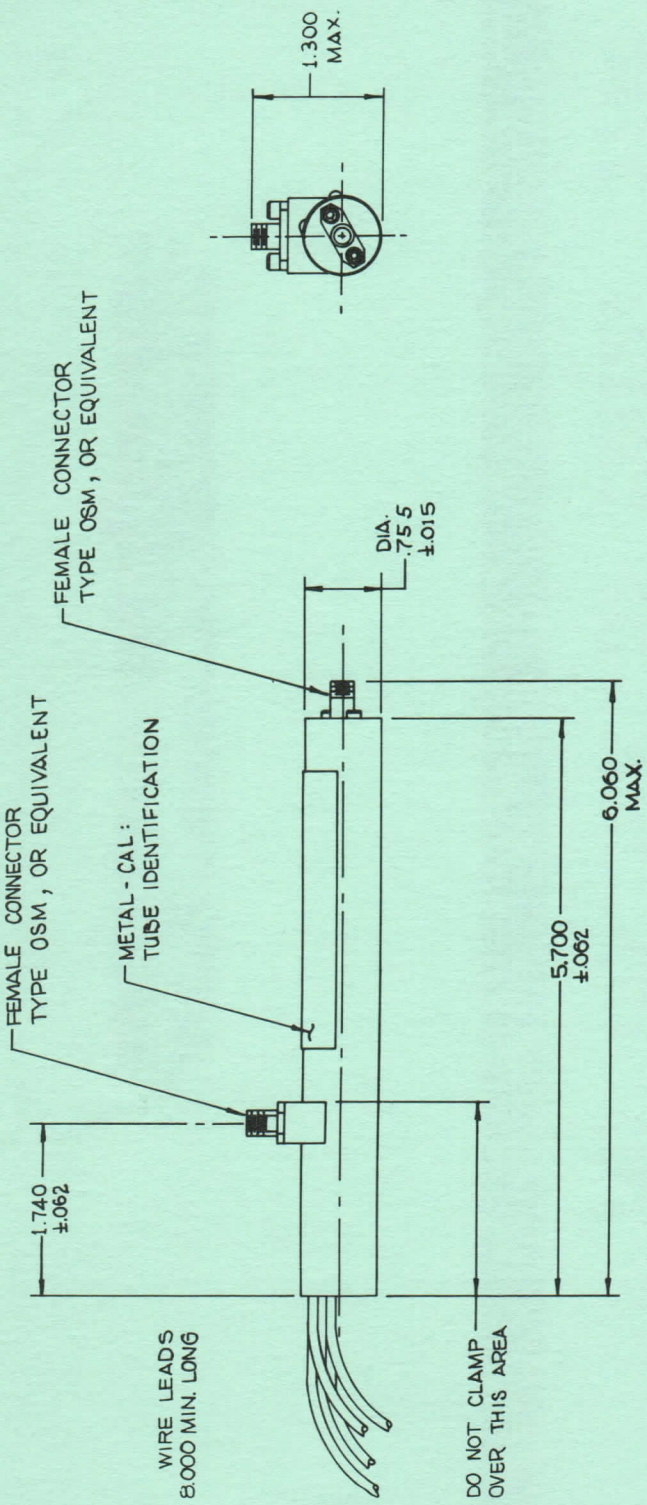
Dimensions	See Outline Drawing
Weight	7.0 oz.
Cooling	None
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

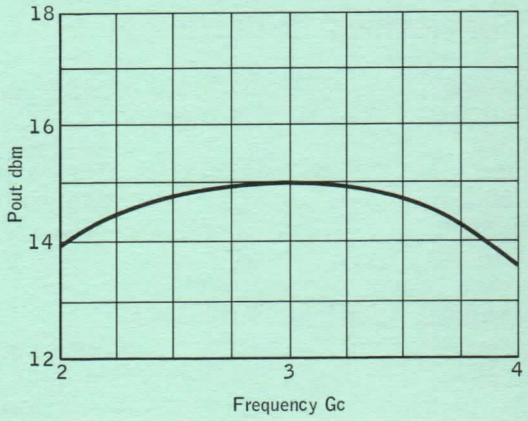
Shock	100 G
Vibration	20 G
Ambient Temperature	−54° C to +85° C
Altitude	Any

TRAVELING WAVE TUBE

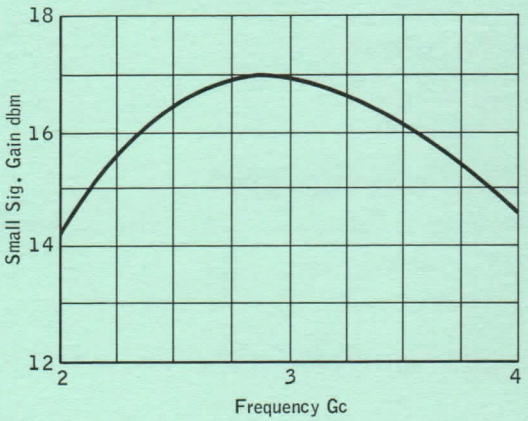
L-5014



POWER OUTPUT VS. FREQUENCY (TYPICAL)



GAIN VS. FREQUENCY (TYPICAL)



APPLICATION NOTES:

1. Can be used as limiter.
2. Can be gain matched.
3. Available in different gain lengths for phase sensitive systems.

TRAVELING WAVE TUBE

L-5015

4.0 to 8.0 Gc
10 Milliwatts Min.
13 db Gain
PPM Focused

The L-5015 is a broadband traveling wave amplifier having a minimum power output of 10 milliwatts over the frequency range of 4,000 to 8,000 Mc. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	680 Vdc (Neg.)
Cathode Current	3.5 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Filament Voltage	6.3 V
Filament Current	0.25 A

PERFORMANCE CHARACTERISTICS

Frequency Range	4,000 to 8,000 Mc
Power Output	Min. 10 mW
Small Signal Gain	Min. 13 db

MAXIMUM RATINGS

Duty	CW
Cathode Voltage (Range)	650-750 Vdc
Cathode Current	5.0 mA
Anode Voltage (Range)	0 to +100 Vdc
Collector Temperature	140° C

MECHANICAL DESCRIPTION

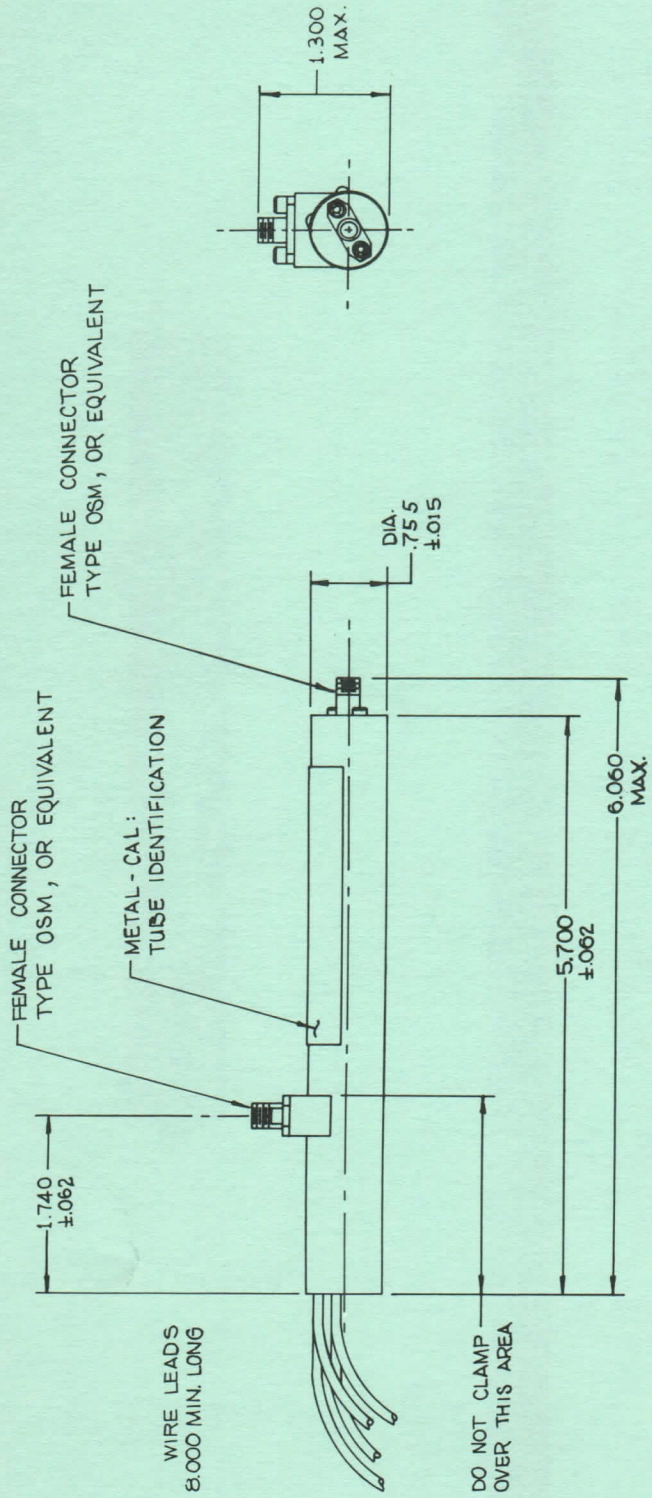
Dimensions	See Outline Drawing
Weight	7.0 oz.
Cooling	None
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

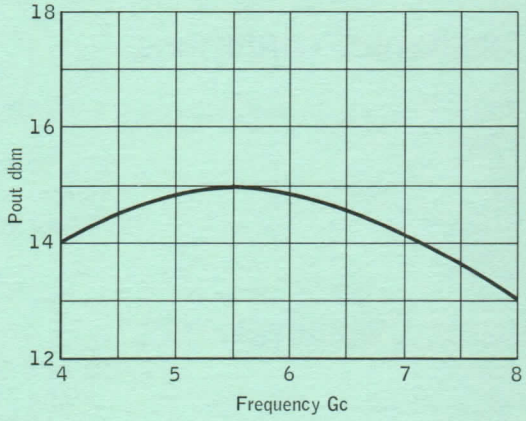
Shock	100 G
Vibration	20 G
Ambient Temperature	−54° C to +85° C
Altitude	Any

TRAVELING WAVE TUBE

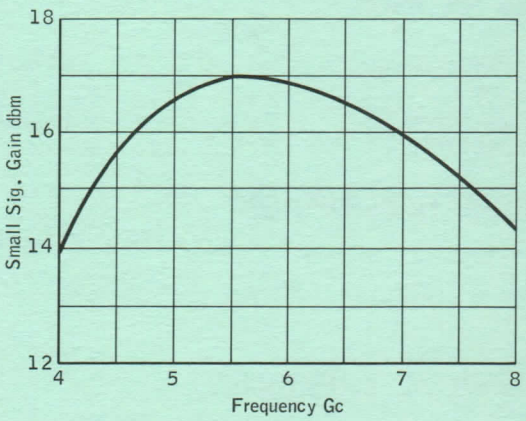
L-5015



POWER OUTPUT VS. FREQUENCY (TYPICAL)



GAIN VS. FREQUENCY (TYPICAL)



APPLICATION NOTES:

1. Can be used as limiter.
2. Can be gain matched.
3. Available in different gain lengths for phase sensitive systems.

TRAVELING WAVE TUBE

L-5036*

1

1.0 to 2.0 GHz

10 watts Min.

30 db gain

PPM Focused

The L-5036 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 1000-2000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1250 Vdc (Negative)
Cathode Current	90 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	65 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.4 A

PERFORMANCE CHARACTERISTICS

Frequency Range	1000 to 2000 MHz
Power Output	Min. 10 W
Small Signal Gain	Min. 30 db

MAXIMUM RATINGS

Duty	CW
Collector Temperature	140° C
Heat Sink Temperature	100° C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	3.0 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	50 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

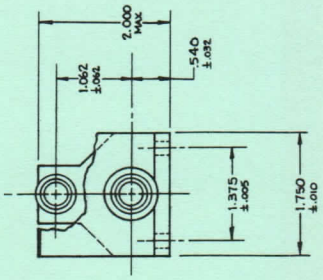
Cathode Voltage Range	−1125 to −1375 Vdc
Cathode Current (Maximum)	
Not including Grid Current	110 mA
Grid Voltage Range	
(with respect to cathode)	+40 to +100 V peak
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	15 mA
Non-intercepting Grid (CW Applications)	1.0 mA
Filament Voltage	6.3 V
Filament Current	1.0 to 1.6 A

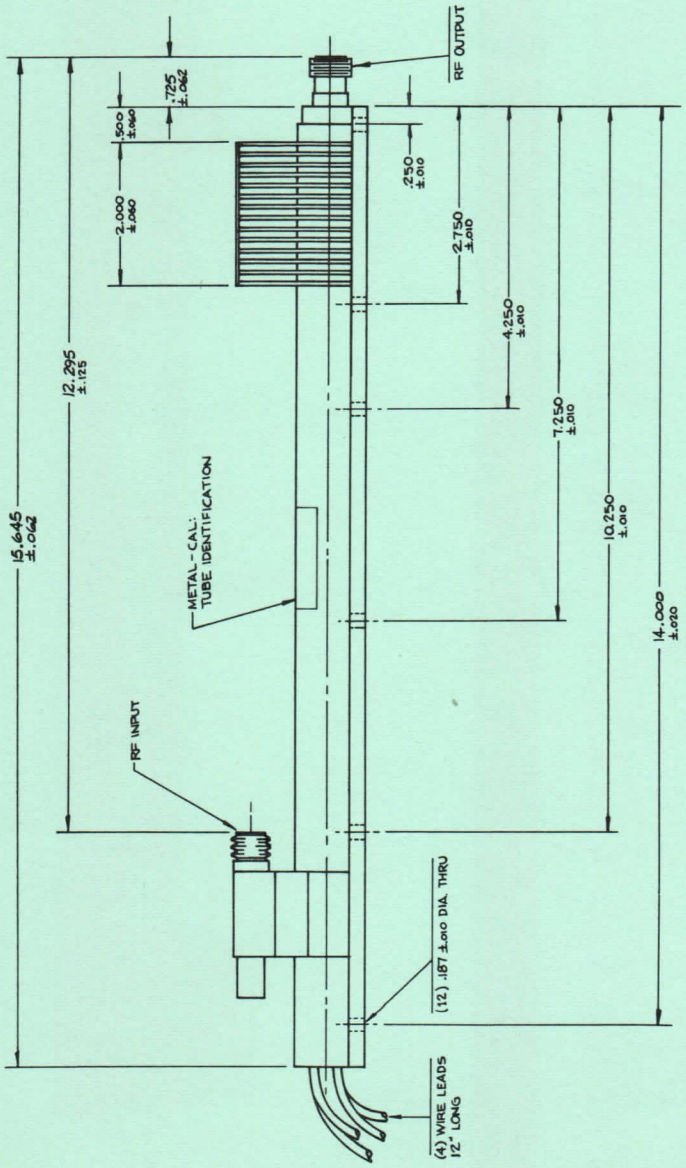
*NOTE: When tube is to be supplied with high mu grid specify type L-5036-50.

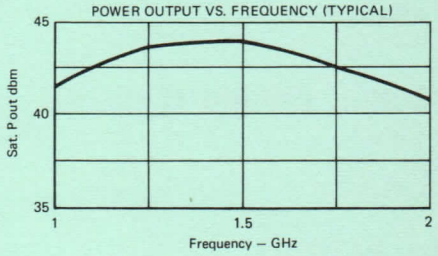
TRAVELING WAVE TUBE

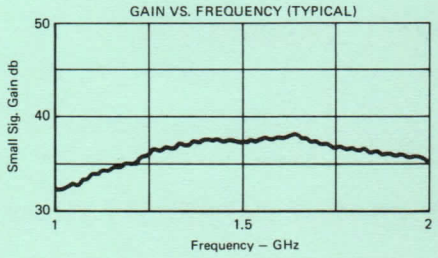
L-5036

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.









NOTE:

1. Available with high mu grid for pulse applications.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

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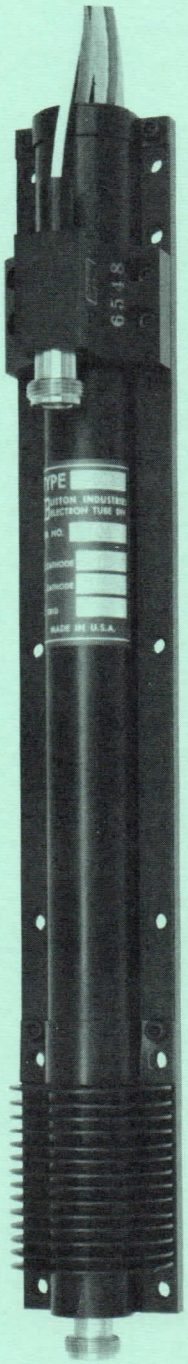
3.5MCA3/71

TRAVELING WAVE TUBE

L-5043*

1

7.0 to 11.0 GHz
10 watts min.
60 db gain
PPM Focused



The L-5043 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 7,000 to 11,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2950 Vdc (Neg.)
Cathode Current	60 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	60 V (Positive)
Grid Current (High Mu Grid — See Note 2)	8 mA
Filament Voltage	6.3 V
Filament Current	1.3 A

PERFORMANCE CHARACTERISTICS

Frequency Range	7,000 to 11,000 MHz
Power Output	Min. 10 Watts
Small Signal Gain	Min. 60 db

MAXIMUM RATINGS

Duty	CW
Helix Current	7.0 mA
Collector Temperature	140° C
Tube Heat Sink Temperature	100°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.5 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	50 G
Vibration	20 G
Ambient Temperature	—54° C to +85° C
Altitude	Any

POWER SUPPLY REQUIREMENTS

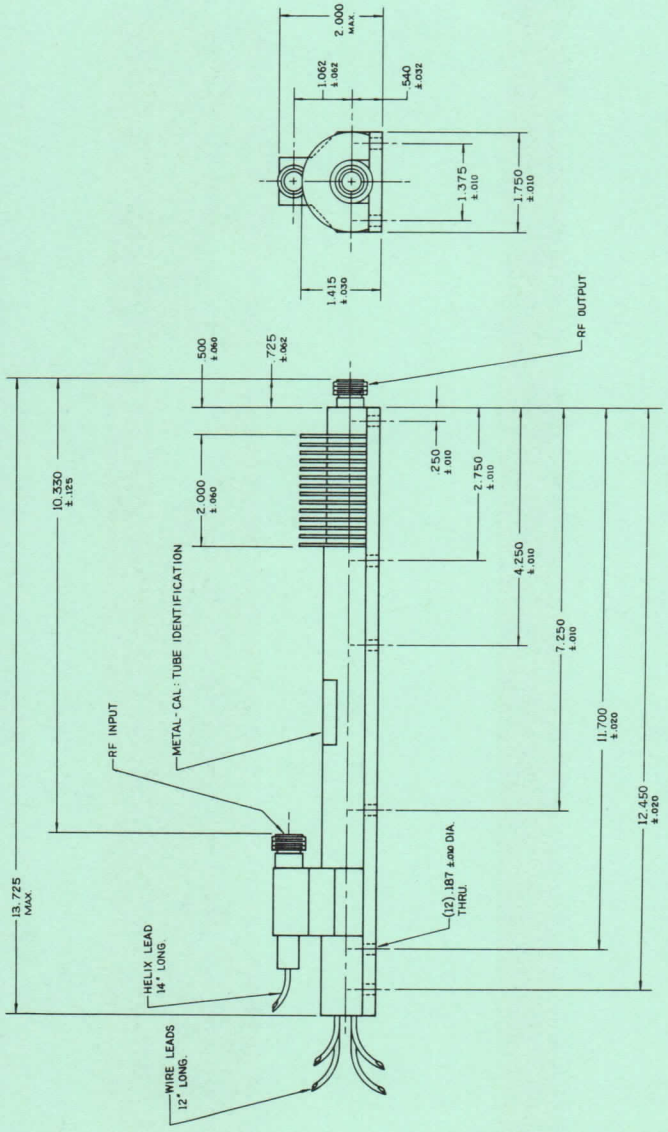
Cathode Voltage Range	—2850 to —3100 Vdc
Cathode Current (Maximum)	
Not including Grid Current	70.0 mA
Grid Voltage Range (with respect to cathode)	+30 to +100 V
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	12.0 mA
Non-intercept Grid (CW Applications)	1.0 mA

*NOTE: When Tube is to be supplied with High Mu Grid specify type L-5043-50.

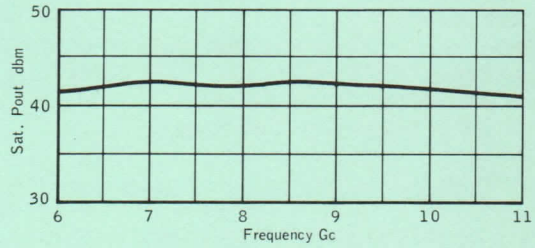
TRAVELING WAVE TUBE

L-5043

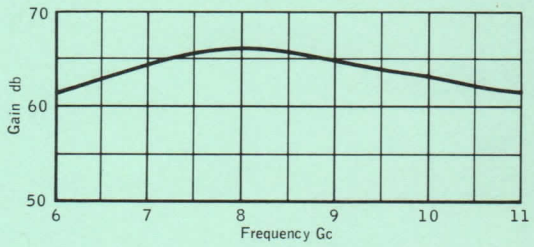
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output rf connections, waveguide flanges, and gaskets must be rf leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.



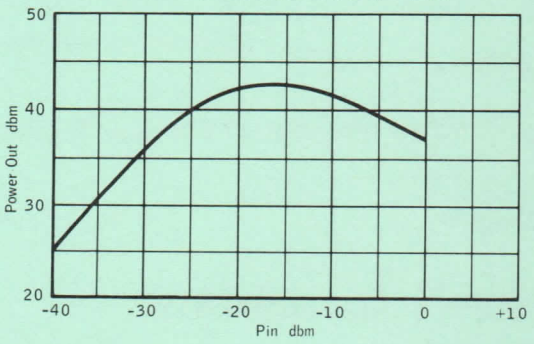
POWER OUTPUT VS. FREQUENCY (TYPICAL)



GAIN VS. FREQUENCY (TYPICAL)



SATURATION CHARACTERISTIC (TYPICAL)



APPLICATION NOTES:

1. Helix isolated for modulation.
2. This tube can be supplied with either the High Mu Grid or a non-intercepting Grid of Lower Mu.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

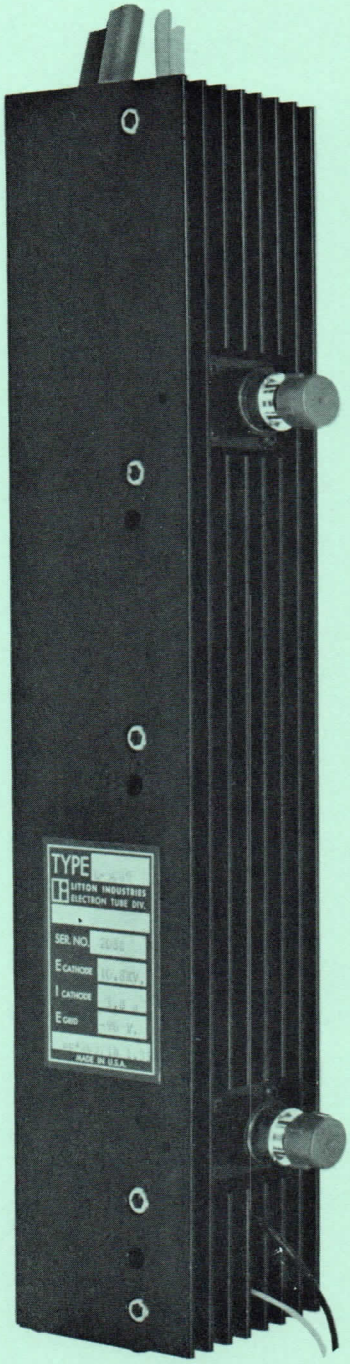
TRAVELING WAVE TUBE

L-5089

3

7.0 to 11.0 GHz
1 Kw (pk) Min.
30 db gain

The L-5089 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of one kilowatt over the frequency range of 7 to 11 GHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	0.01
Extended Duty	See Note #1
Cathode Voltage	10.5 kVdc (Negative)
Cathode Current	1.6 a (peak)
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Grid Voltage Cut-off (d. c. bias with respect to cathode)	—90 V
Grid Voltage (pulsed positive with respect to cathode)	+170 V (peak)
Grid Current	250 ma (peak)
Grid Capacity	25 pf
Filament Voltage	6.3 V
Filament Current	1.75 A

PERFORMANCE CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Power Output (peak)	Min. 1.0 kw
Small Signal Gain	Min. 35 db
Gain at 1.0 kw	Min. 30 db

MAXIMUM RATINGS

Duty	0.02
Special Duty	See Note #2
Body Current	500 ma (peak)
Collector Temperature	100° C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	5.5 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration	10 G
Ambient Temperature	—54° C to +85° C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−10.0 to −11.4 kVdc
Cathode Current, Max.	2.2 a (peak)
Grid Pulse Range (with respect to cathode)	+120 to +250 V
Grid Current	400 ma (peak)

NOTE 1
Extended Duty Operation 0.02
(Available upon request)

NOTE 2
Burst Mode Duty 0.04
Upon consultation bursts up to 5 seconds duration with minimum of 15 minutes between burst recurrence is available.

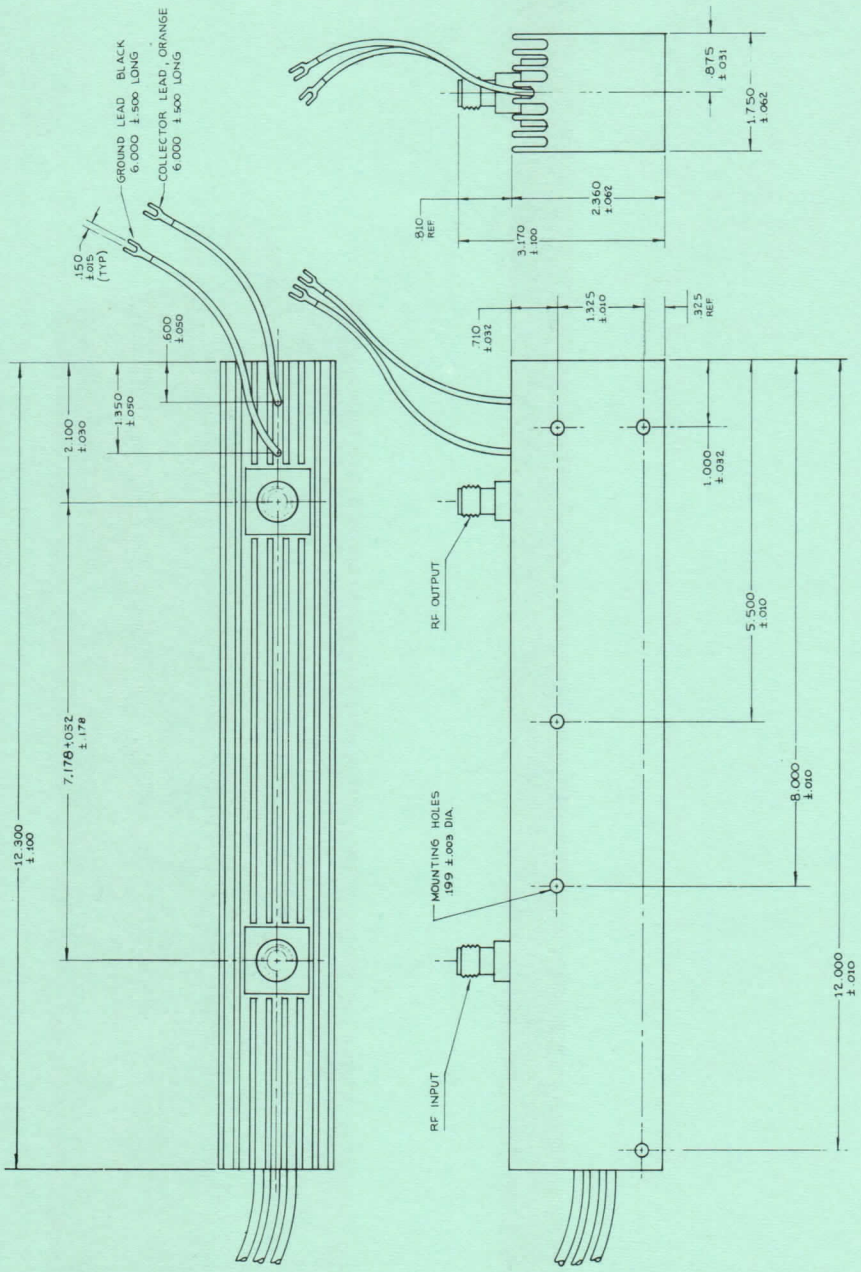
NOTE 3
Thermal interlock protection available upon request.

TRAVELING WAVE TUBE

L-5089

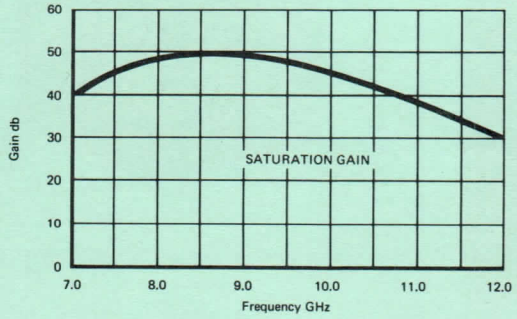
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output rf connections, waveguide flanges, and gaskets must be rf leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

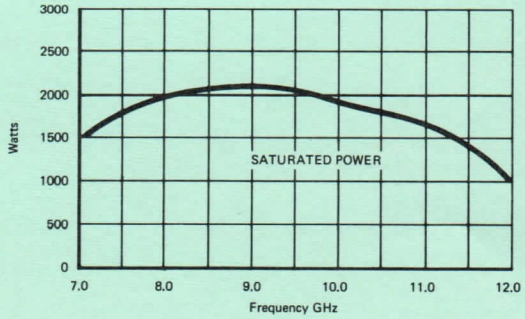
This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TYPICAL RF PERFORMANCE





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3.5M CA 7/69

TRAVELING WAVE TUBE

L-5095

1

2.0 to 4.0 GHz
50 W (pk) Min.
42 db gain

The L-5095 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of 50 watts over the frequency range of 2,000 to 4,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	0.1
Cathode Voltage	3.2 kVdc (Negative)
Cathode Current	300 ma (peak)
Anode Voltage	Ground potential
Helix Voltage	Ground potential (can be modulated)
Collector Voltage	Ground potential
Grid Voltage Cut-off (d. c. bias with respect to cathode)	—75 V
Grid Voltage (pulsed positive with respect to cathode)	+150 V (peak)
Grid Current	30 ma (peak)
Grid Capacity	20 pf
Filament Voltage	6.3 V
Filament Current	1.4 A

PERFORMANCE CHARACTERISTICS

Frequency Range	2,000 to 4,000 MHz
Power Output (peak)	Min. 50 W
Gain at Rated Power	Min. 42 db

MAXIMUM RATINGS

Duty	0.1
Helix Current	75 ma peak
Collector Temperature	125° C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.5 lbs.
Cooling	Conduction or Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY*

Shock	30 G
Vibration	10 G
Ambient Temperature	—54° C to +85° C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	—3.0 to —3.6 kVdc
Cathode Current (Maximum)	325 ma peak
Grid Voltage Range (with respect to cathode)	+100 to +200 V peak
Grid Current (Maximum)	30 ma peak
Filament Voltage	6.3 V
Filament Current	1.0 to 1.6 A

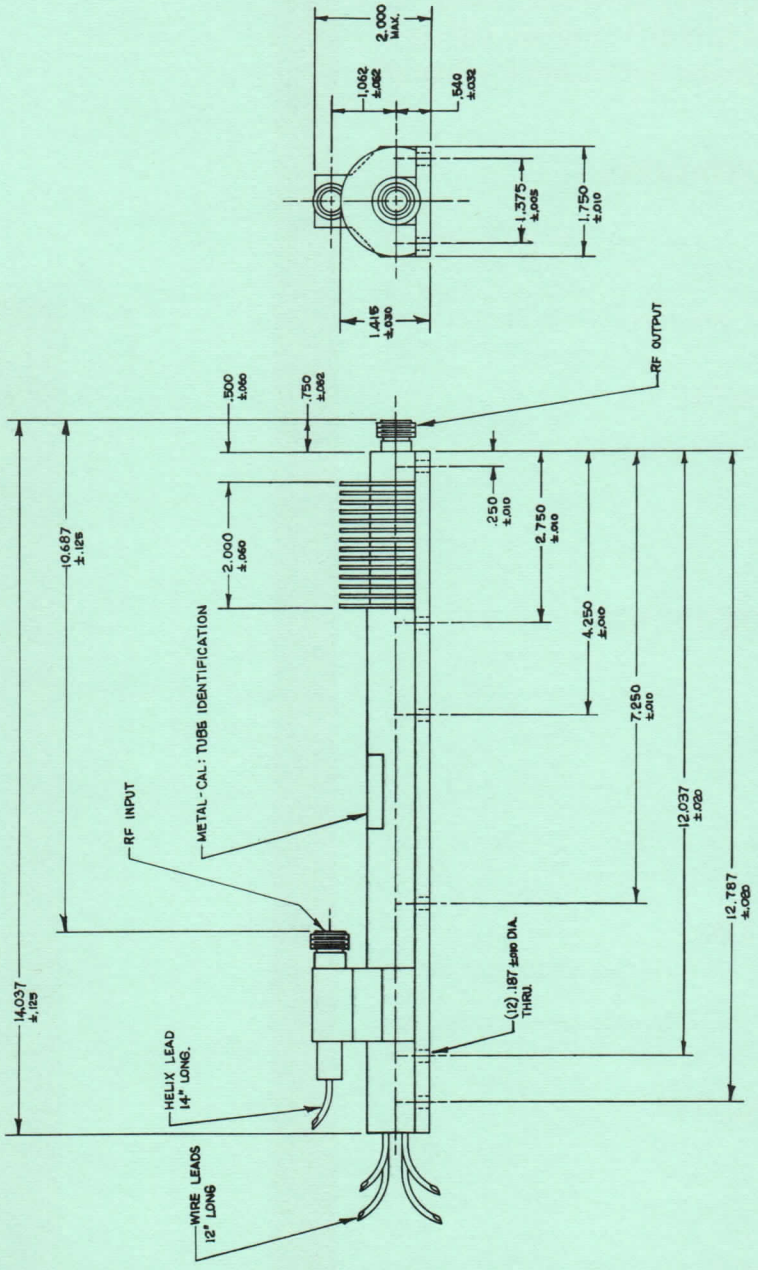
*Upon Request

TRAVELING WAVE TUBE

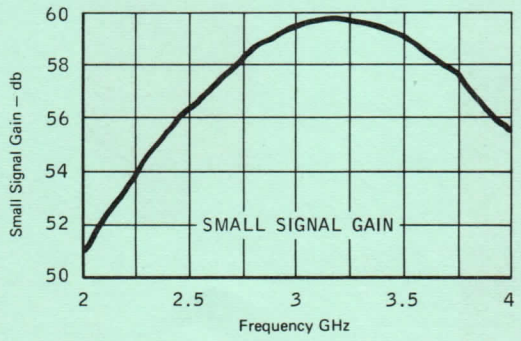
L-5095

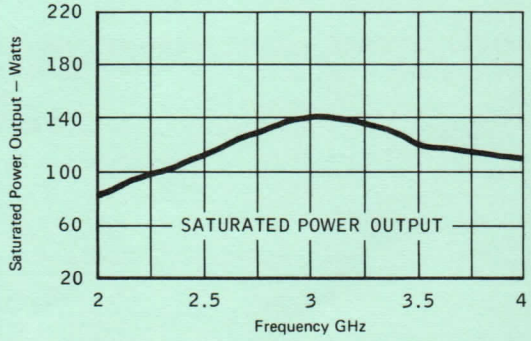
CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.





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3.5MCA3/71

TRAVELING WAVE TUBE

L-5117

2

15.5 to 16.5 GHz

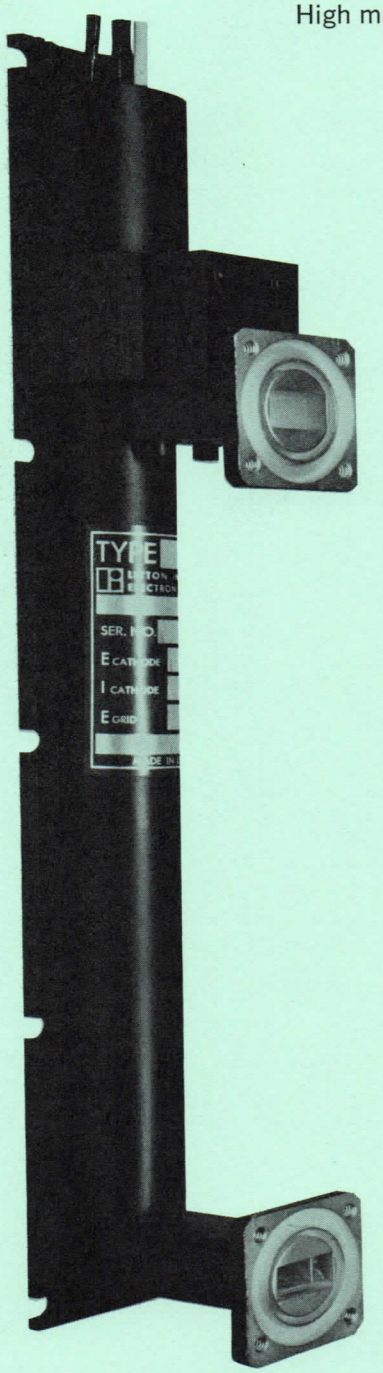
5 W (peak) Min.

60 db gain

PPM Focused

High mu grid

The L-5117 is a high gain broadband traveling wave amplifier having a minimum saturated (peak) power output of 5 watts over the frequency range of 15.5 to 16.5 GHz. A high mu grid can be used for continuous gain control from optimum performance to full cut-off. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	0.01
Cathode Voltage	3.4 kVdc (Negative)
Cathode Current	55 ma (peak)
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Grid Voltage Cut-off (d. c. bias with respect to cathode)	Min. −50 V
Grid Voltage (pulsed positive with respect to cathode)	+60 v (peak)
Grid Current	6 ma (peak)
Grid Capacity	20 pf
Filament Voltage	6.3 V
Filament Current	0.55 A

PERFORMANCE CHARACTERISTICS—A

Frequency Range	15.5 to 16. 5 GHz
Power Output (peak)	Min. 5 W
Gain at Rated Power	Min. 60 db

PERFORMANCE CHARACTERISTICS—B

Frequency Range	12.4-18.0 GHz
Power Output (peak)	3 W
Small Signal Gain	60 db

MAXIMUM RATINGS

Duty	0.1
Collector Temperature	125°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.0 lbs.
Cooling	Conduction
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	50 G
Vibration	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

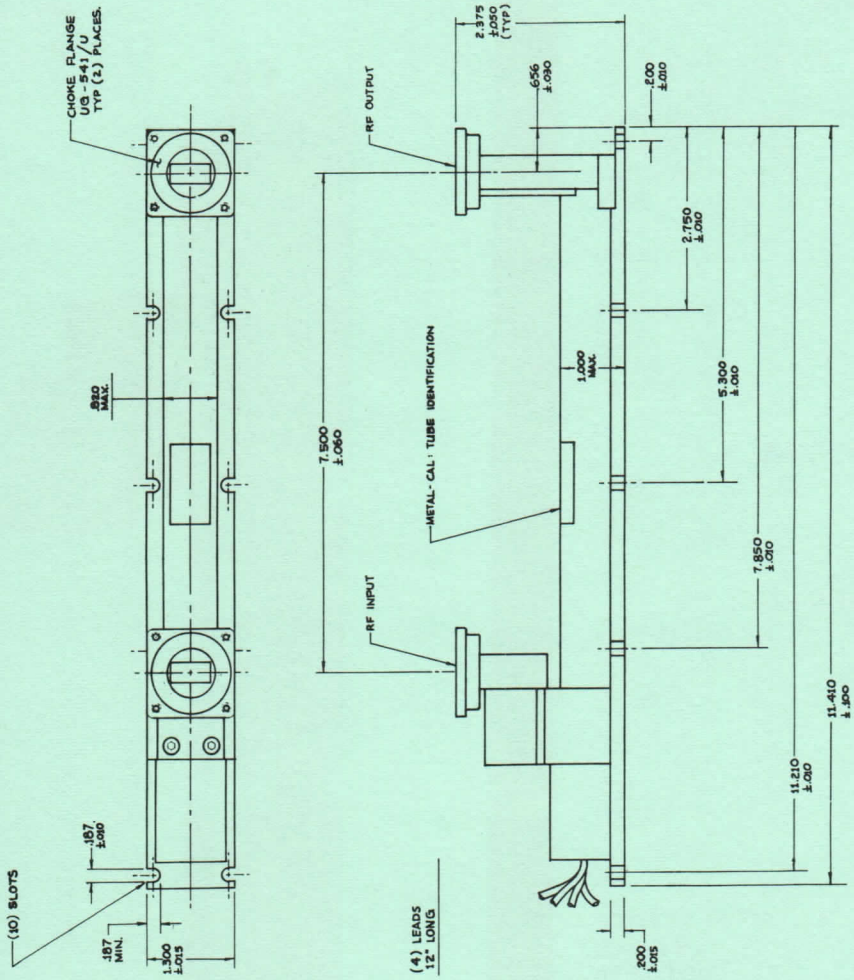
Cathode Voltage Range	−3.2 to −3.6 kVdc
Cathode Current (Maximum)	100 ma peak
Grid Voltage Range (with respect to cathode)	+40 to +100 V peak
Grid Current (Maximum)	10 ma peak
Filament Voltage	6.3 V
Filament Current	0.4 to 1.2 A

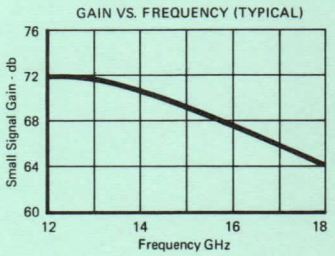
TRAVELING WAVE TUBE

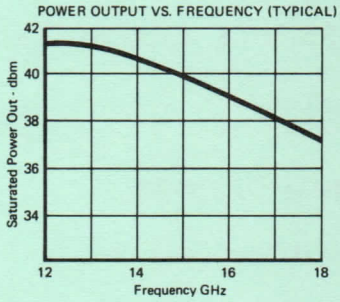
L-5117

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.







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3.5MCA3/71

TRAVELING WAVE TUBE

L-5126

2

7.0 to 11.0 GHz
1 Kw (pk) Min.
60 db gain

The L-5126 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of one kilowatt over the frequency range of 7 to 11 GHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	0.01
Extended Duty	See Note #1
Cathode Voltage	10.5 kVdc (Negative)
Cathode Current	1.6 a (peak)
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Grid Voltage Cut-off (d. c. bias with respect to cathode)	—90 V
Grid Voltage (pulsed positive with respect to cathode)	+170 V (peak)
Grid Current	250 ma (peak)
Grid Capacity	25 pf
Filament Voltage	6.3 V
Filament Current	1.75 A

PERFORMANCE CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Power Output (peak)	Min. 1.0 kw
Gain at 1.0 kw	Min. 60 db

MAXIMUM RATINGS

Duty	0.02
Special Duty	See Note #2
Body Current	500 ma (peak)
Collector Temperature	100° C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	6.5 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any
Thermal Protection	See Note #3

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration	10 G
Ambient Temperature	—54° C to +85° C
Altitude	Any

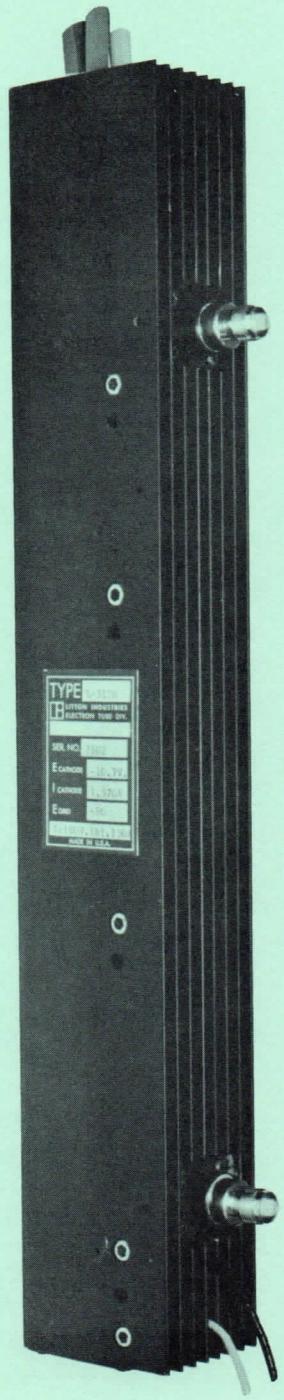
POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−10.0 to −11.4 kVdc
Cathode Current, Max.	2.2 a (peak)
Grid Pulse Range (with respect to cathode)	+120 to +250 V
Grid Current	400 ma (peak)

NOTE 1
Extended Duty Operation 0.02
(Available upon request)

NOTE 2
Burst Mode Duty 0.04
Upon consultation bursts up to 5 seconds duration with minimum of 15 minutes between burst recurrence is available.

NOTE 3
Thermal interlock protection available upon request.

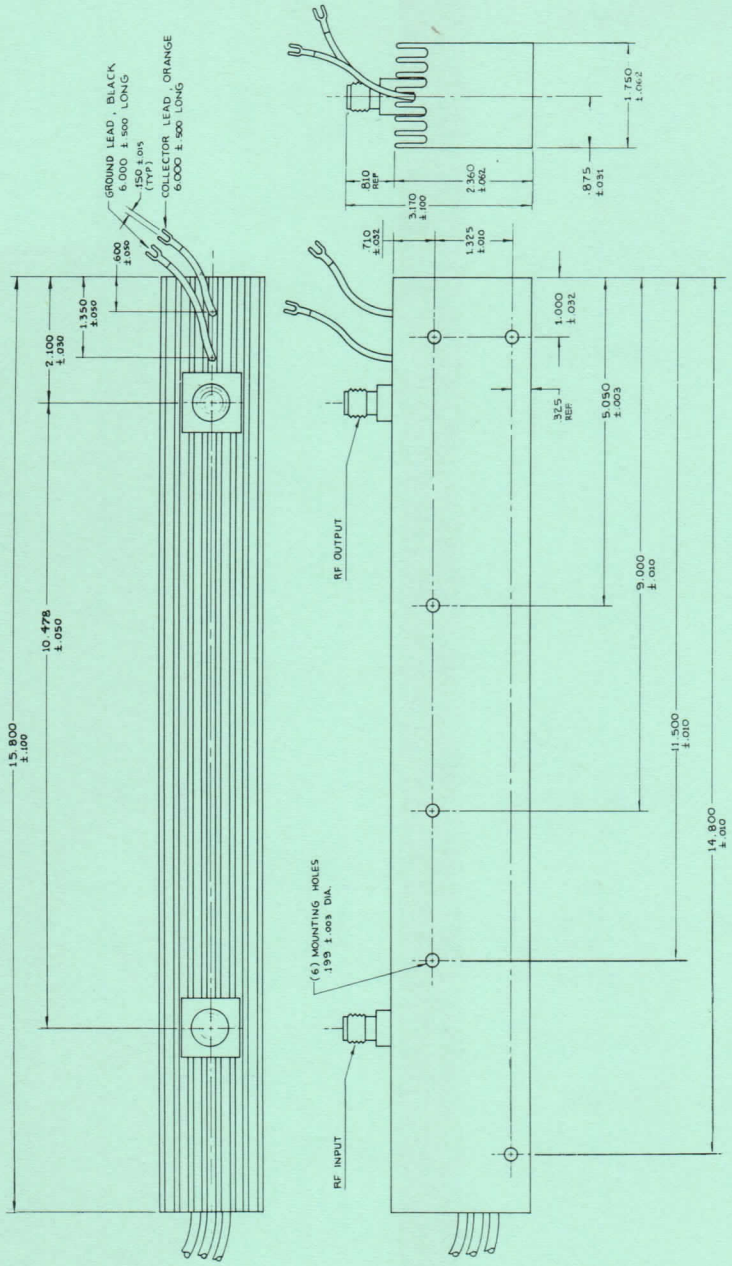


TRAVELING WAVE TUBE

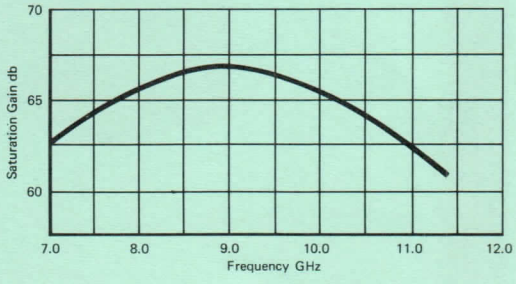
L-5126

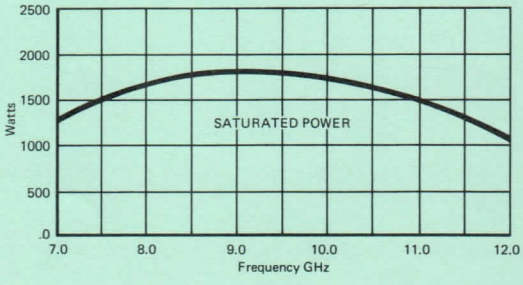
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output rf connections, waveguide flanges, and gaskets must be rf leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.





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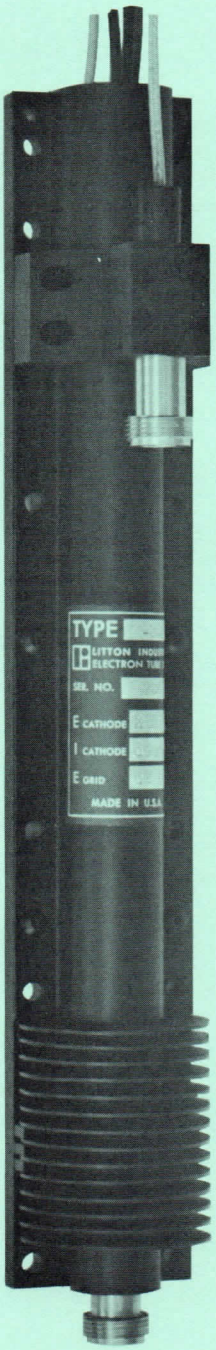
3.5M CA 7/69

TRAVELING WAVE TUBE

L-5134*

The L-5134 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 3700 to 6500 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

- 1
- 3.7 to 6.5 GHz
- 10 watts Min.
- 30 db gain
- PPM Focused



TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2750 Vdc (Negative)
Cathode Current	70 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode)	65 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.2 A

PERFORMANCE CHARACTERISTICS

Frequency Range	3700 to 6500 MHz
Power Output	Min. 10 W
Small Signal Gain	Min. 30 db

MAXIMUM RATINGS

Helix Current	7.0 mA
Grid Current	10.0 mA
Heat Sink Temperature	+100°C
Collector Temperature	+140°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	2.5 lbs.
Cooling	Conduction and Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	100 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

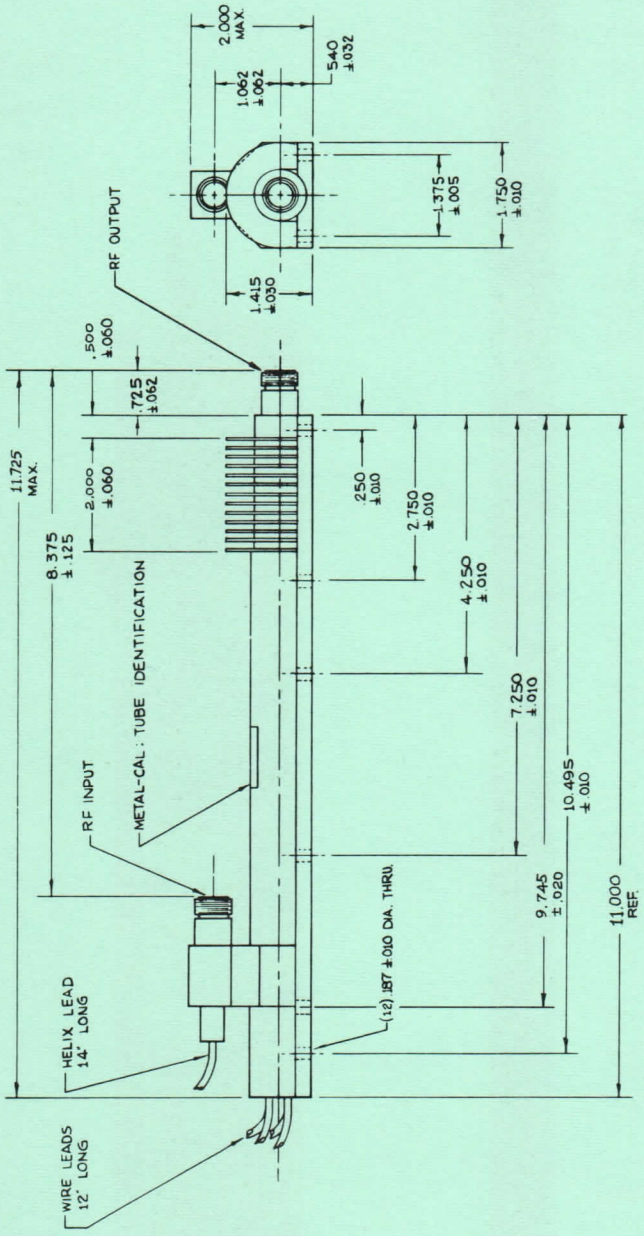
Cathode Voltage Range	−2,600 to −2,900 Vdc
Cathode Current (Maximum) Not including Grid Current	85.0 mA
Grid Voltage Range (with respect to cathode)	+50 to +100 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	10.0 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	0.9 to 1.5 A

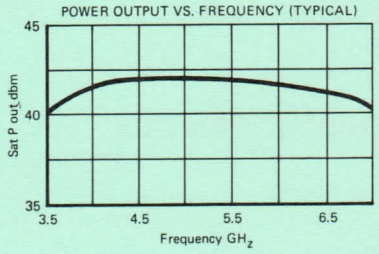
*Note: When tube is to be supplied with High Mu Grid specify Type L-5134-50.

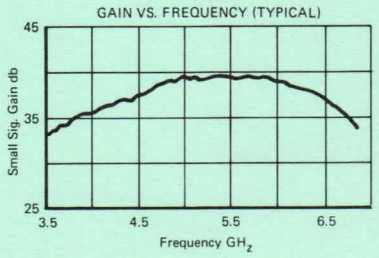
TRAVELING WAVE TUBE

L-5134

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output rf connections, waveguide flanges, and gaskets must be rf leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.







NOTES:

1. This tube can be supplied with either the High Mu Grid or a Non-intercepting Grid of lower Mu.
2. Helix isolated for modulation.
3. Available with higher power for narrow band applications.

The mechanical dimensions shown above are for reference only and are subject to change. Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-5137*

4.0 to 8.0 GHz
2 watts Min.
33 dB gain
PPM Focused

The L-5137 is a broadband traveling wave amplifier having a minimum power output of 2 watts over the frequency range of 4000 to 8000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1.9 kVdc (Neg.)
Cathode Current	38 mA
Anode Voltage	Ground Potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground Potential
Grid Voltage (With respect to cathode)	40 V (Pos.)
Filament Voltage	6.3 V
Filament Current	0.7 A
Grid Current (mesh; intercepting)	3.0 mA

PERFORMANCE CHARACTERISTICS

Frequency Range	4000 to 8000 MHz
Power Output	Min. 2 W
Small Signal Gain	Min. 33 dB

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	1.2 lbs.
Cooling	Conduction
Mounting Position	Any

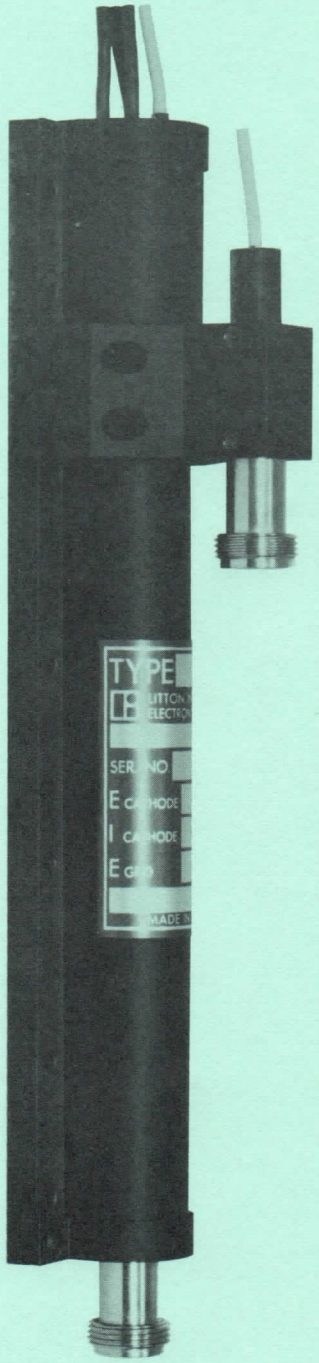
ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	1800 to 2000 Vdc
Cathode Current (Maximum)	
Not including Grid Current	45 mA
Grid Voltage Range (with respect to cathode)	+40 to +70 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	6 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	0.5 to 0.9 A

*NOTE: When tube is to be supplied with high mu grid specify type L-5137-50.



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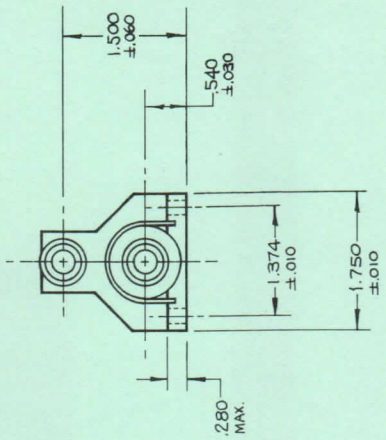
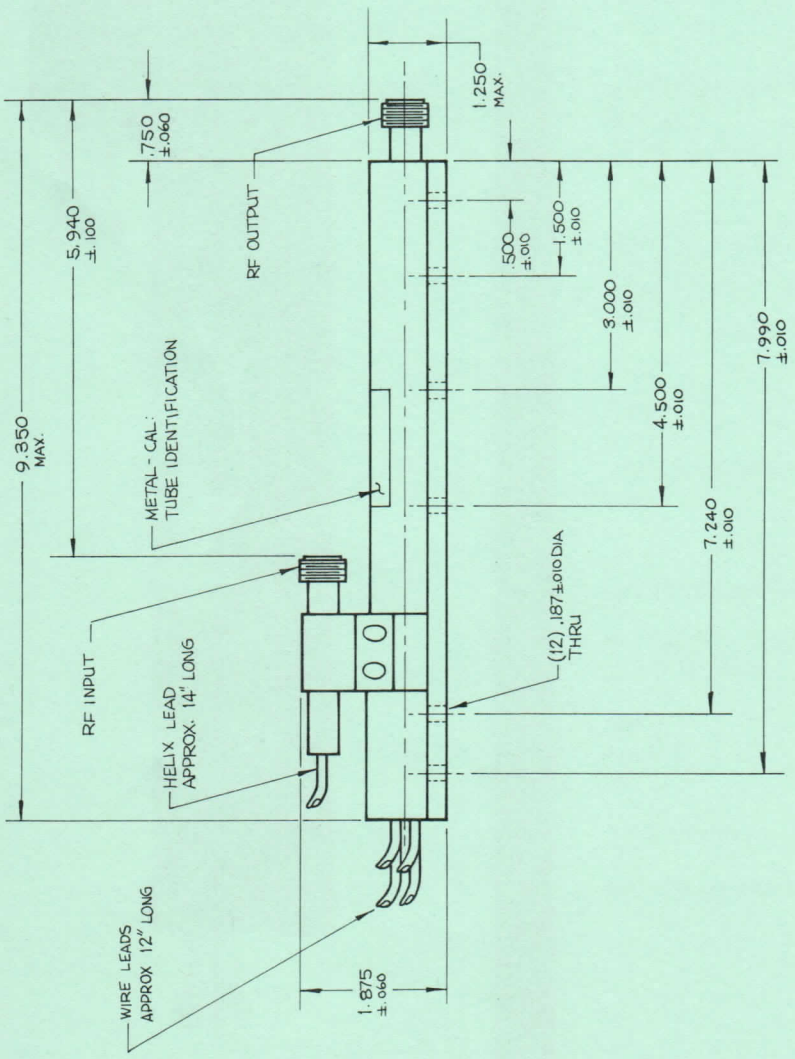
TRAVELING WAVE TUBE

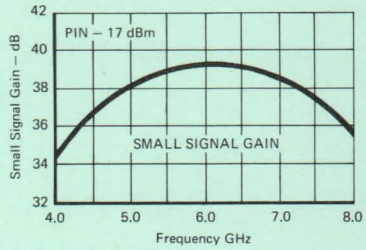
L-5137

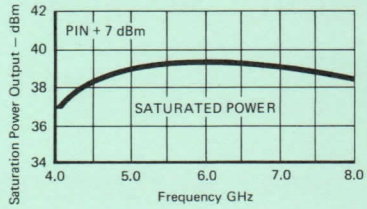
CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.









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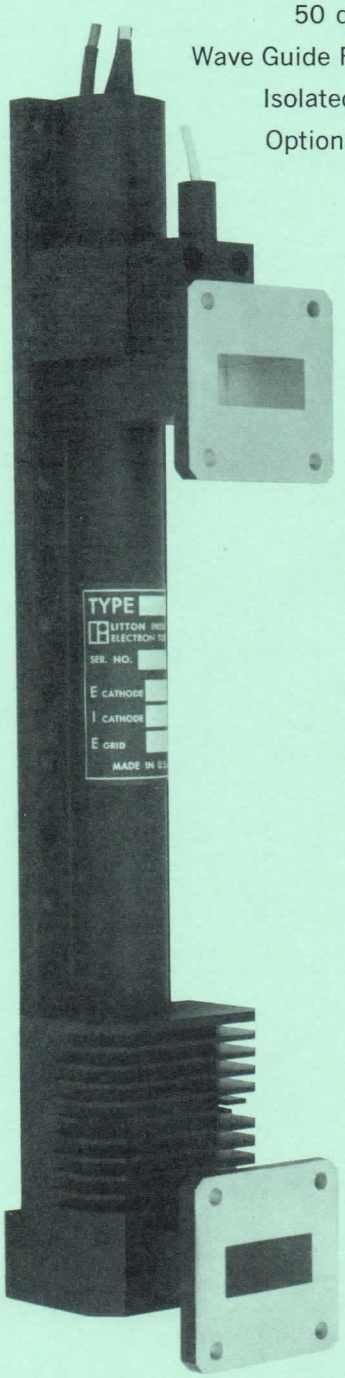
TRAVELING WAVE TUBE

L-5154

- 7.0 to 10.0 GHz
- 5 watts Min.
- 50 db gain
- Wave Guide Fittings
- Isolated Helix
- Optional Grid



The L-5154 is a broadband traveling wave amplifier having a minimum power output of 5 watts over the frequency range of 7,000 to 10,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2500 Vdc (Neg.)
Cathode Current (not including grid current)	45 mA
Anode Voltage	Ground potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground potential
Grid Voltage (With respect to cathode) See Note #1	50 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.0 A

PERFORMANCE A

Frequency Range	7.0 to 10.0 GHz
Power Output	Min. 5 W
Small Signal Gain (Note 1)	Min. 50 db

PERFORMANCE B

Frequency Range	7.9 to 8.4 GHz
Power Output	Min. 5 W, Max. 10 W
Gain (at rated power)	Min. 55 db

MAXIMUM RATINGS

Duty	CW
Helix Current	5.0 mA
Collector Temperature	125°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	3.2 lbs.
Cooling	Conduction or Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	40 G
Vibration	20 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−2400 to −2650 Vdc
Cathode Current, Max. (not including grid current)	55 mA
Grid Pulse Range (with respect to cathode)	+20 to + 60 V

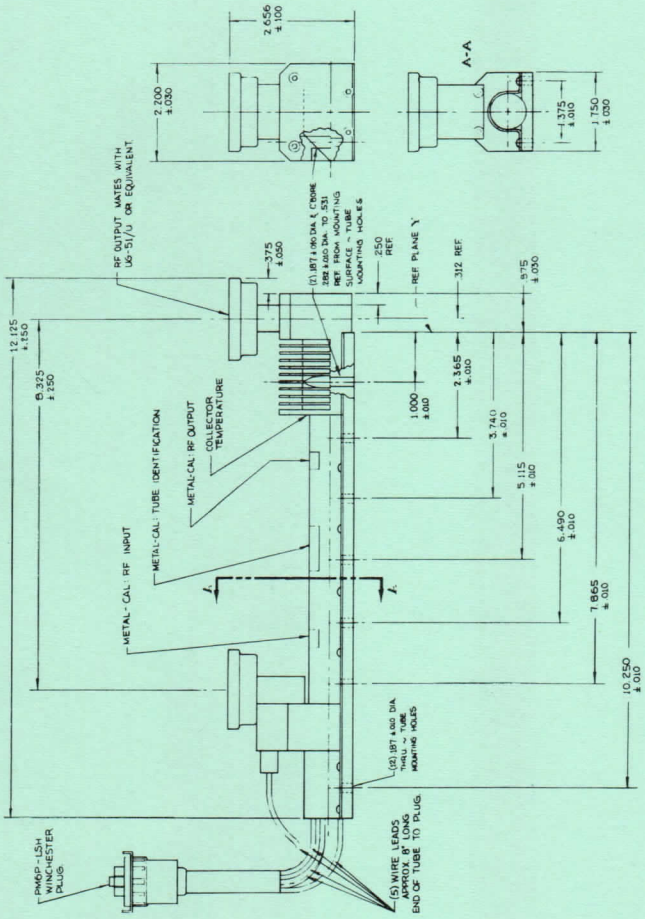
NOTES:

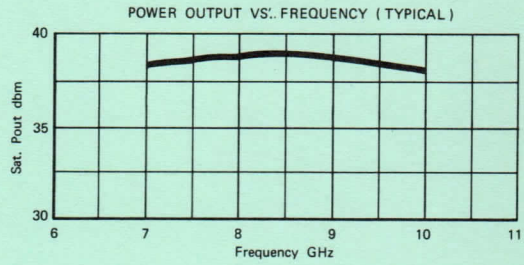
1. Available with high mu grid (sharp cut off)
2. Helix isolated for modulation.

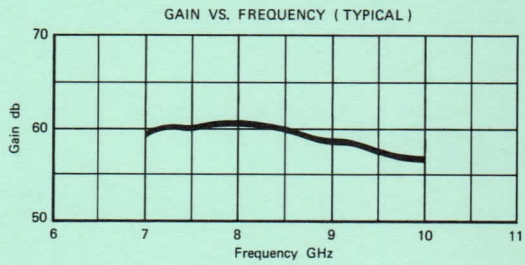
TRAVELING WAVE TUBE

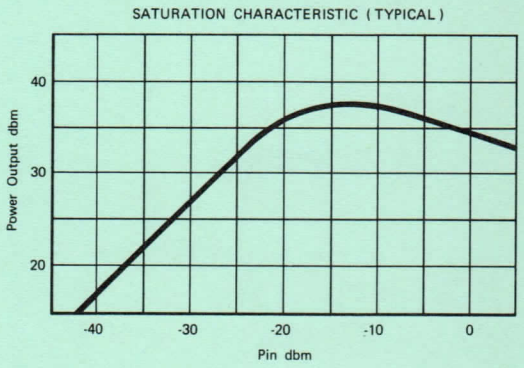
L-5154

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output rf connections, waveguide flanges, and gaskets must be rf leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.









The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

TRAVELING WAVE TUBE

L-5155

1.0 to 2.0 GHz
20 watts Min.
30 dB gain
PPM Focused

The L-5155 is a broadband traveling wave amplifier having a minimum power output of 20 watts over the frequency range of 1000 to 2000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1.2 kVdc (Neg.)
Cathode Current	140 mA
Anode Voltage	Ground Potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground Potential
Grid Voltage (With respect to cathode)	25 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.4 A
Grid Current (Aperture; Non-intercepting)	0.5 mA

PERFORMANCE CHARACTERISTICS

Frequency Range	1000 to 2000 MHz
Power Output	Min. 20 W
Small Signal Gain	Min. 30 dB

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	3.0 lbs.
Cooling	Conduction/Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	1150 to 1400 Vdc
Cathode Current (Maximum)	
Not including Grid Current	150 mA
Grid Voltage Range (with respect to cathode)	0 to +100 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	20 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	1.0 to 1.6 A

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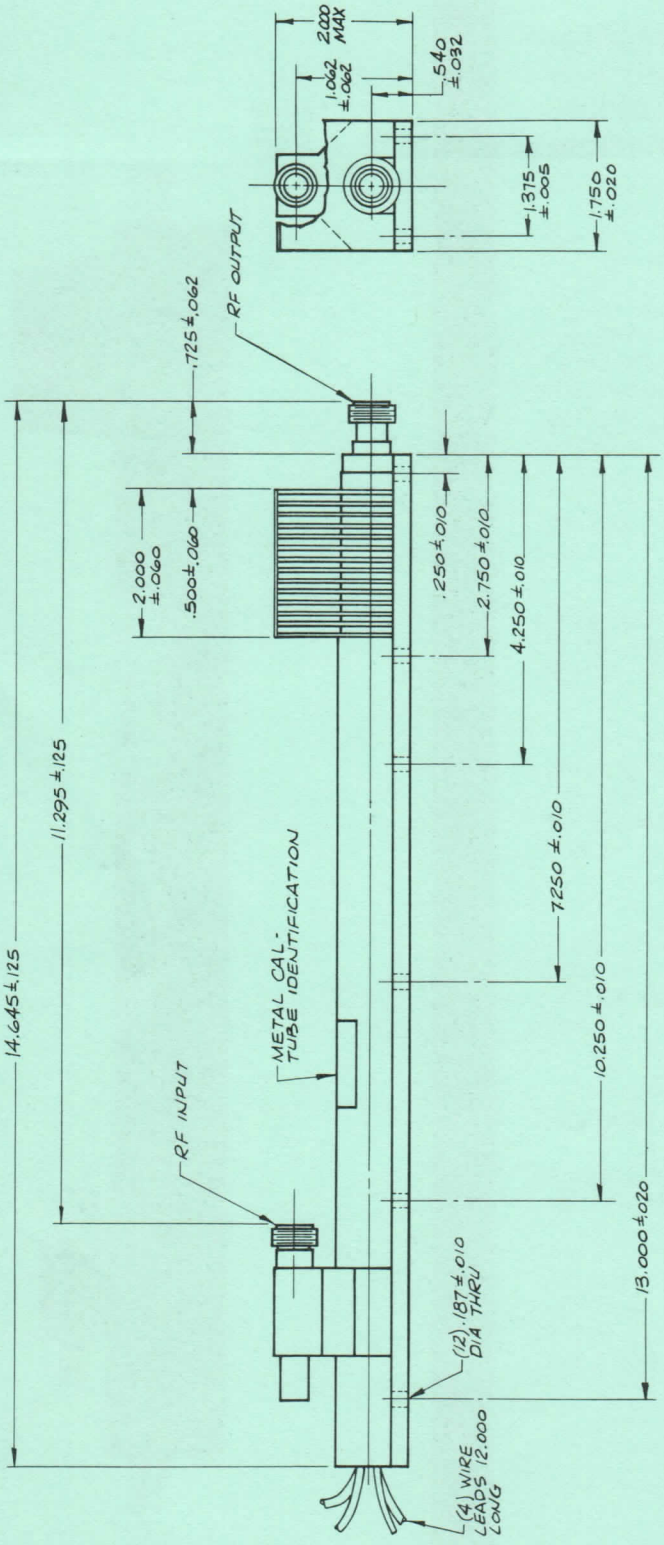
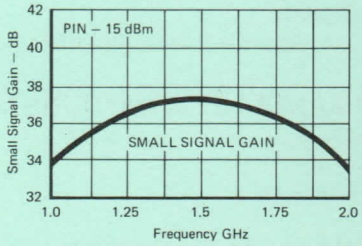
TRAVELING WAVE TUBE

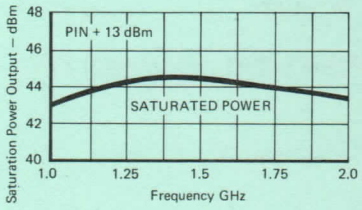
L-5155

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.







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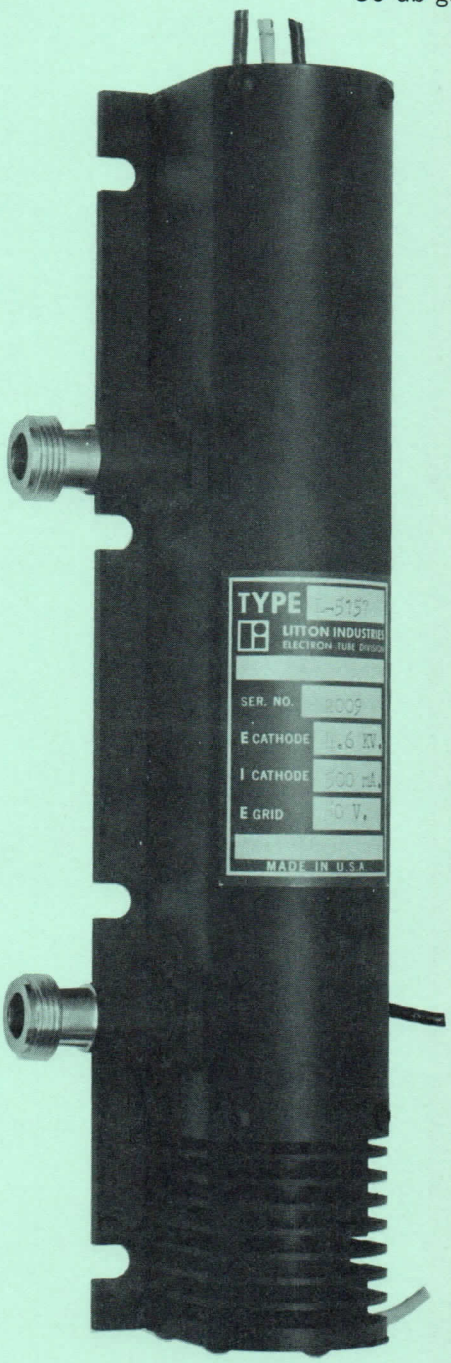
TRAVELING WAVE TUBE

L-5157

7.0 to 11.0 GHz ◀
100 W (pk) Min. ◀
30 db gain ◀

The L-5157 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of 100 watts over the frequency range of 7 to 11 GHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	0.10
Cathode Voltage	4.8 kVdc (Negative)
Cathode Current	525 ma (peak)
Anode Voltage	Ground potential
Helix Voltage	Ground potential
Collector Voltage	Ground potential
Grid Voltage Cut-off (d.c. bias with respect to cathode)	−50 V
Grid Voltage (pulsed positive with respect to cathode)	+50 V (peak)
Grid Current	60 ma (peak)
Grid Capacity	30 pf
Filament Voltage	6.3 V
Filament Current	1.8 A

PERFORMANCE CHARACTERISTICS

Frequency Range	7.0 to 11.0 GHz
Power Output (peak)	Min. 100 W
Small Signal Gain	Min. 35 db
Gain at 100 W	Min. 30 db

MAXIMUM RATINGS

Duty	0.15
Pulse Width	50 usec.
Collector Temperature	125°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Connectors	Type TNC or N
Weight	3.0 lbs.
Cooling	Conduction and Forced Air
Air Flow, Collector	2 Lb./Min.
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

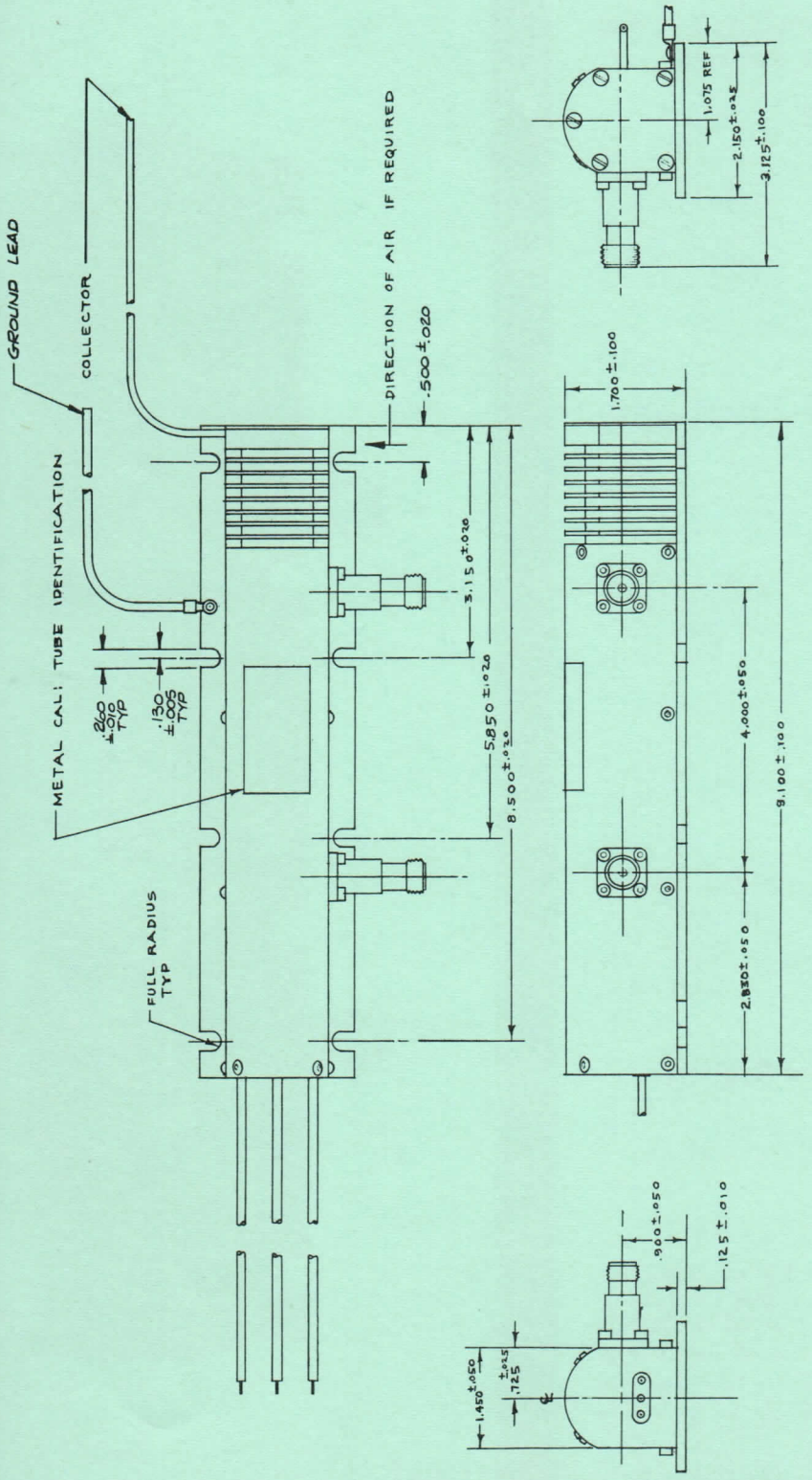
POWER SUPPLY REQUIREMENTS

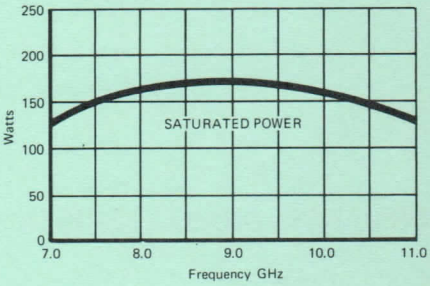
Cathode Voltage Range	−4.0 to −5.5 kVdc
Cathode Current, Max.	600 ma (peak)
Grid Pulse Range (with respect to cathode)	+20 to +100 V
Grid Current	75 ma (peak)

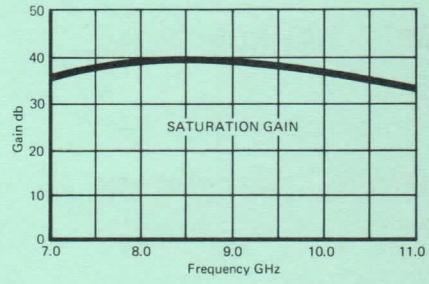
TRAVELING WAVE TUBE

L-5157

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output rf connections, waveguide flanges, and gaskets must be rf leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.







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TRAVELING WAVE TUBE

L-5160

2.0 to 4.0 GHz
20 watts Min.
33 dB gain
PPM Focused

The L-5160 is a broadband traveling wave amplifier having a minimum power output of 20 watts over the frequency range of 2000 to 4000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1.8 kVdc (Neg.)
Cathode Current	100 mA
Anode Voltage	Ground Potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground Potential
Grid Voltage (With respect to cathode)	80 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.4 A
Grid Current (Aperture; Non-intercepting)	0.5 mA

PERFORMANCE CHARACTERISTICS

Frequency Range	2.0 to 4.0 MHz
Power Output	Min. 20 W
Small Signal Gain	Min. 33 dB

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	3.0 lbs.
Cooling	Conduction/Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	1700 to 2000 Vdc
Cathode Current (Maximum)	
Not including Grid Current	120 mA
Grid Voltage Range (with respect to cathode)	0 to +100 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	15 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	1.0 to 1.6 A

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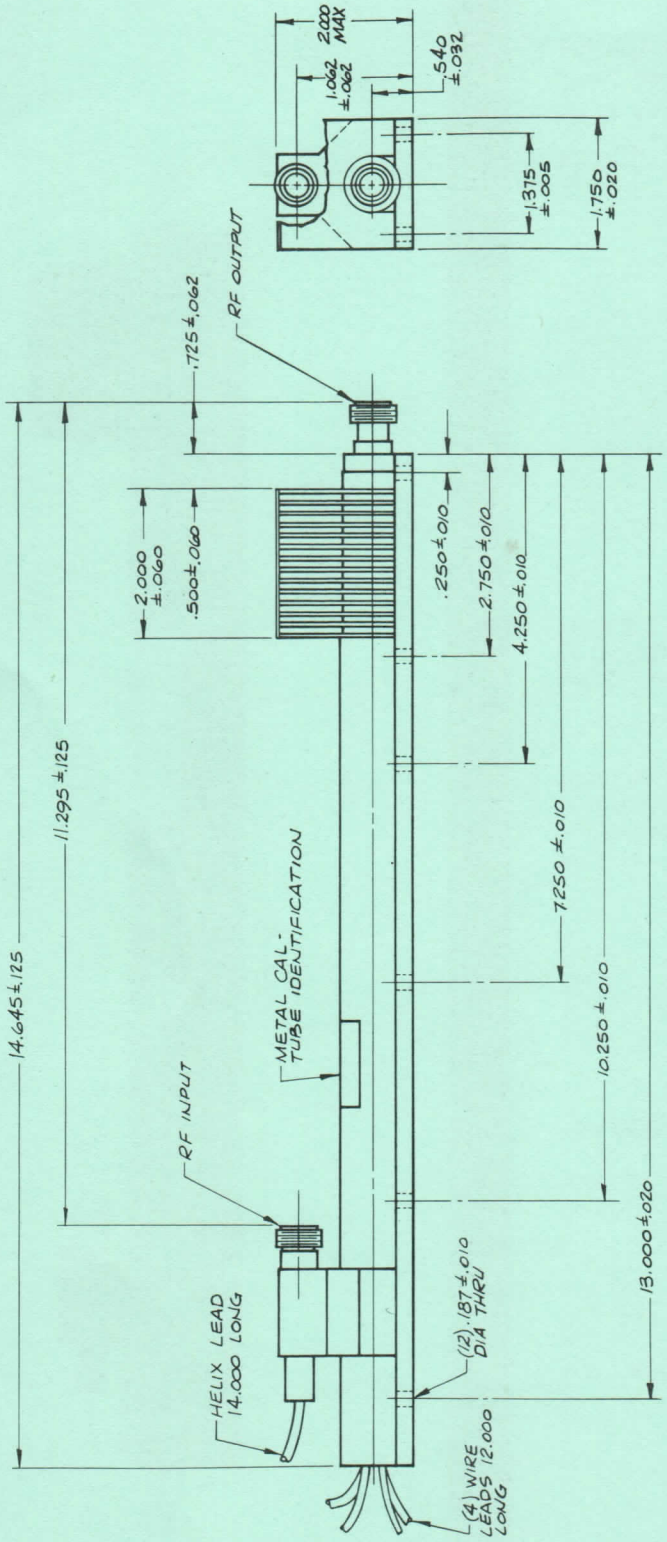
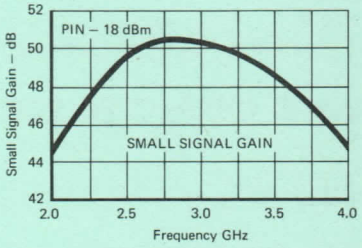
TRAVELING WAVE TUBE

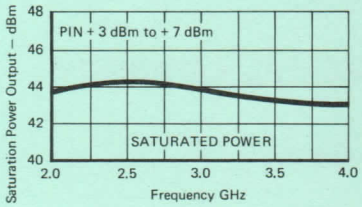
L-5160

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.







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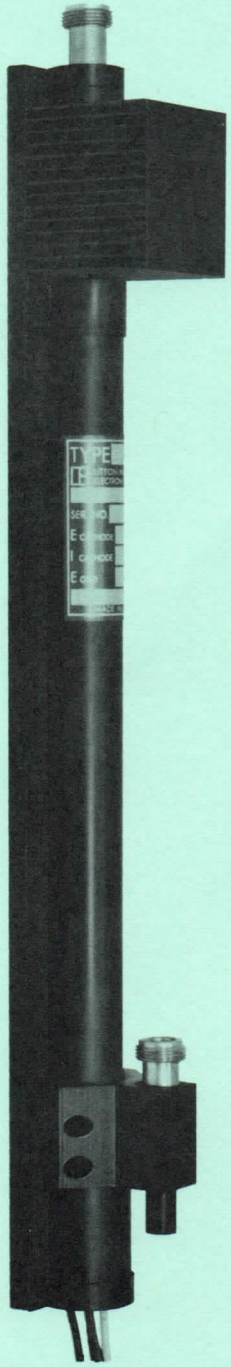
Litton **ELECTRON TUBE DIVISION**
San Carlos, California

3.5MCA1172

TRAVELING WAVE TUBE

L-5225

1.7 to 2.3 GHz
10 watts Min.
30 dB gain
PPM Focused



The L-5225 is a broadband traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 1700 to 2300 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	1.250 kVdc (Neg.)
Cathode Current	100 mA
Anode Voltage	Ground Potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	Ground Potential
Grid Voltage (With respect to cathode)	25 V (Pos.)
Filament Voltage	6.3 V
Filament Current	1.4 A
Grid Current (Aperture; Non-intercepting)	0.5 mA

PERFORMANCE CHARACTERISTICS

Frequency Range	1700 to 2300 MHz
Power Output	Min. 10 W
Small Signal Gain	Min. 30 dB

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	3.0 lbs.
Cooling	Conduction/Forced Air
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	1125 to 1375 Vdc
Cathode Current (Maximum)	
Not including Grid Current	110 mA
Grid Voltage Range (with respect to cathode)	0 to +80 Vdc
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	15 mA
Non-intercept Grid (CW Applications)	1.0 mA
Grid Cut-off Voltage (High Mu Grid)	−50 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	1.0 to 1.6 A

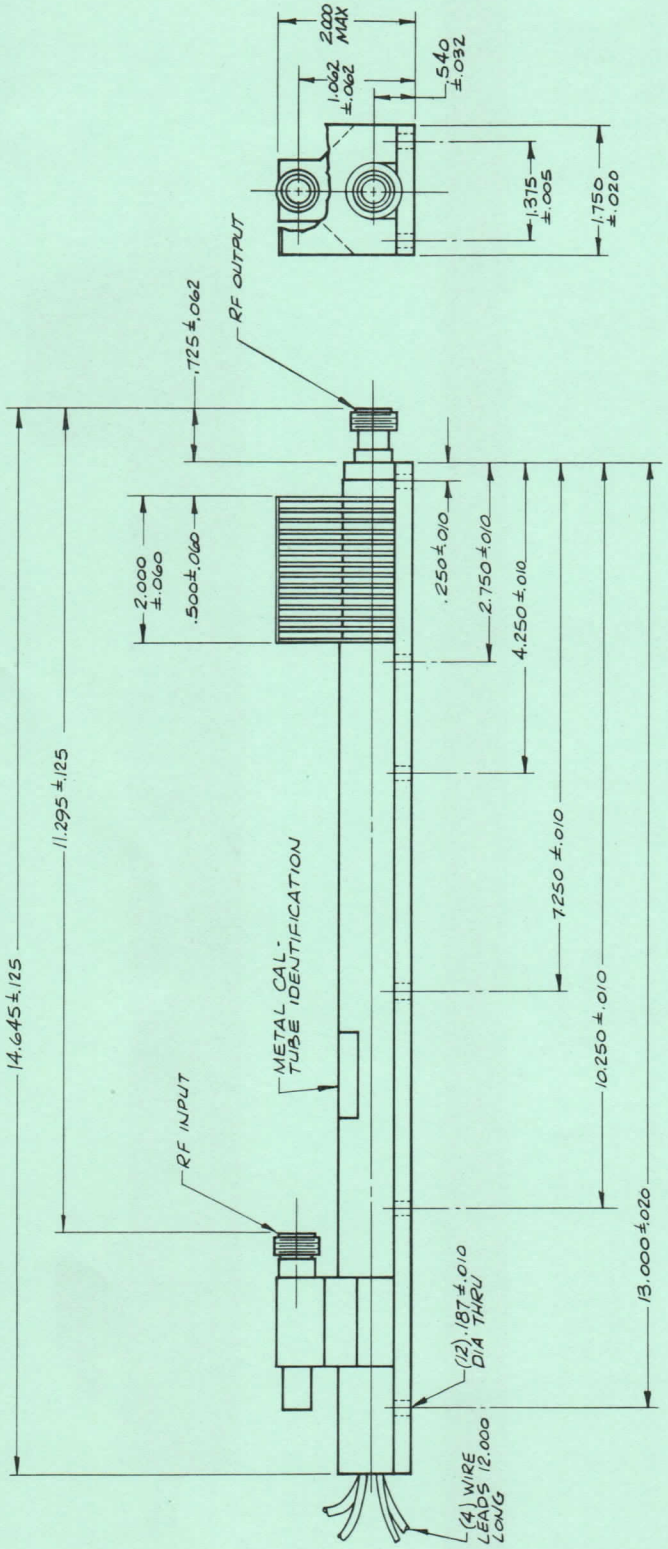
Litton
ELECTRON TUBE DIVISION
San Carlos, California

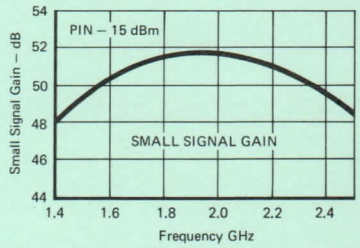
TRAVELING WAVE TUBE

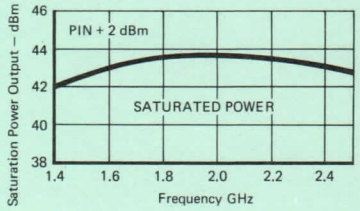
L-5225

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.







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Litton
ELECTRON TUBE DIVISION
San Carlos, California

3.5MCA1172

COUPLED CAVITY TRAVELING WAVE TUBE

L-5250

- 25 kw Peak
- X-band PPM
- Cathode Pulsed
- Optional Depression

The L-5250 provides 25 kw minimum pulse power output over the frequency range of 9.2 to 9.7 GHz. Other tubes in this series are available in 500 MHz bandwidths from 9.0 to 10.0 GHz.

Operated with the collector voltage depressed, the L-5250 is an ideal pulse power amplifier for use where optimum system efficiency must be attained with minimum size and weight.

PERFORMANCE (with collector depressed 11.0 kVdc)

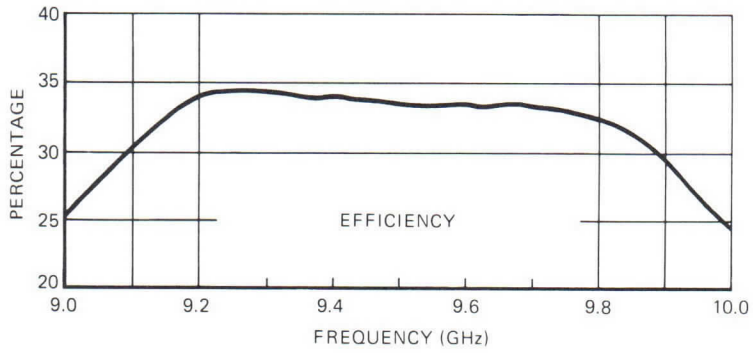
Pulse Power Output	Min. 25.0 kw
Duty	0.01
Power Input	Max. 250 mW
Frequency Range	9.2 - 9.7 GHz
Saturation Gain	Min. 50 db
Efficiency	30.0%
Insertion Loss	80.0 db

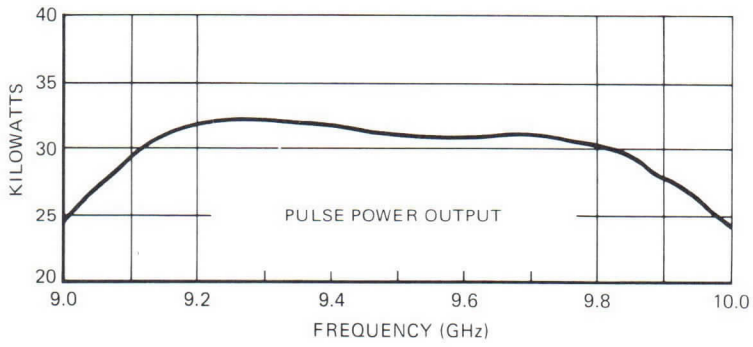
OPERATING CONDITIONS

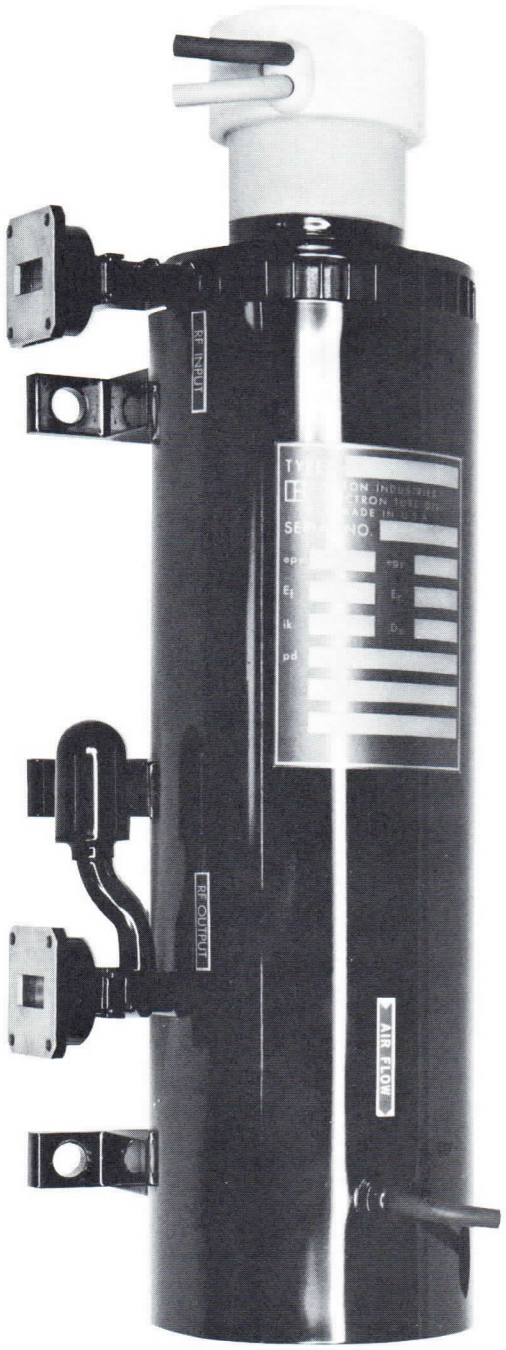
Beam Voltage	25.0 kv
Cathode Current	6.0 A
Collector Voltage	−11 kVdc
Heater	10.0 Vac, 3.0 A
Anode and Body	Ground
Cooling	120 CFM air at sea level

MECHANICAL

Mounting Position	Any
Weight	25.0 lbs.
Dimensions	See Outline Drawing







COUPLED CAVITY TRAVELING WAVE TUBE

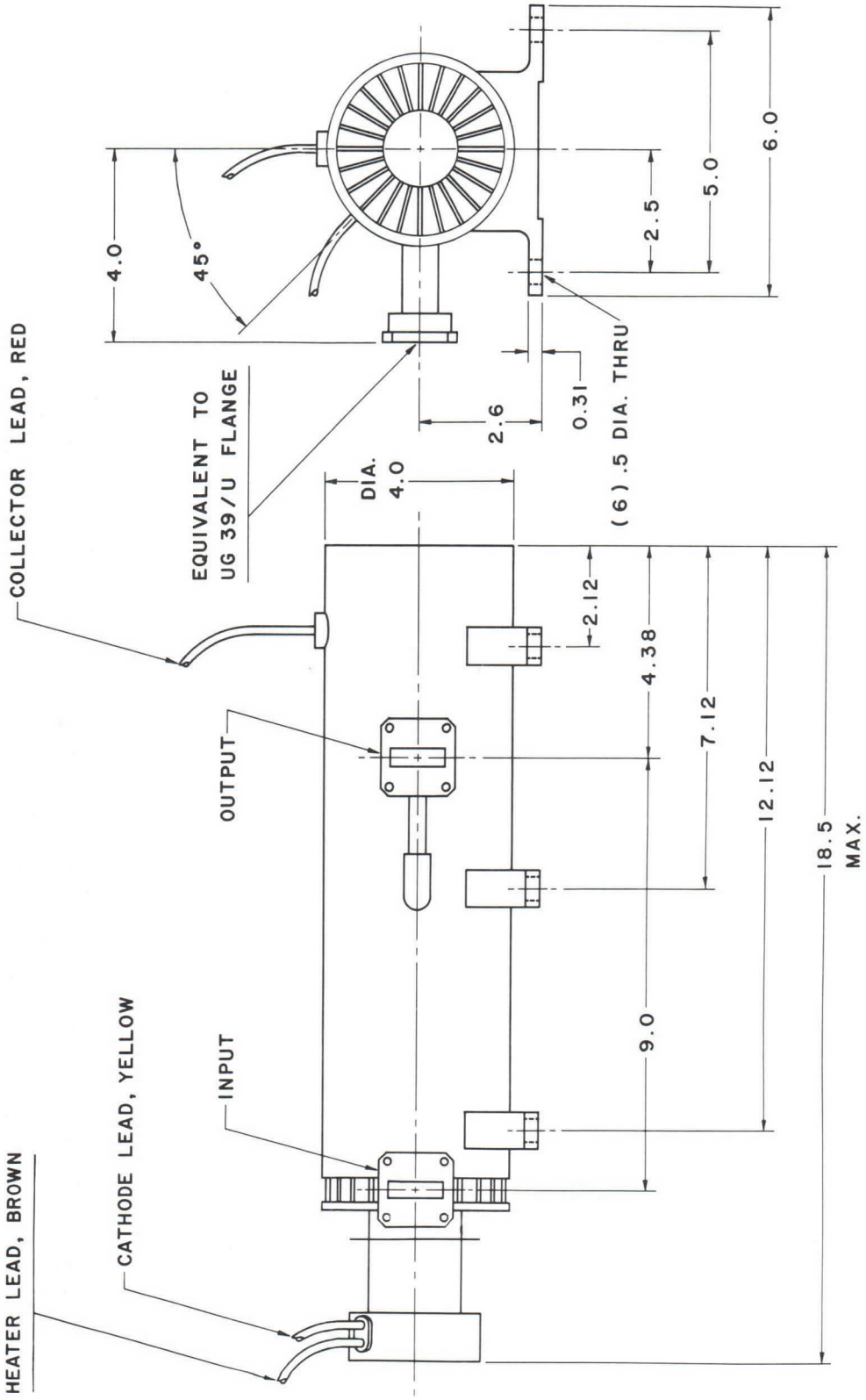
L-5250

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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3.5MCA470

COUPLED CAVITY TRAVELING WAVE TUBE

L-5252

12 kw Peak
X-band PPM
Grid Pulsed
Optional Depression

The L-5252 provides 12 kw minimum pulse power output over the frequency range of 8.9 to 9.5 GHz. Other tubes in this series are available in 500 MHz bandwidths from 8.7 to 9.7 GHz.

The tube is conduction cooled and features all metal-ceramic, PPM focused construction, a non-intercepting control grid structure, and optional use of collector depression. The L-5252 is designed for MIL-E-5400, Class 2 environments.

PERFORMANCE (with collector depressed 10.6 kVdc)

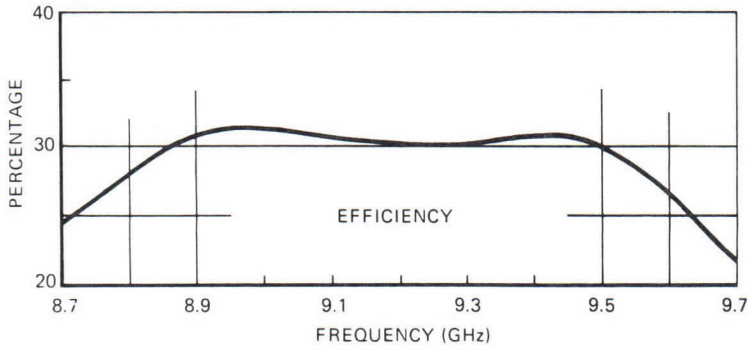
Pulse Power Output	Min. 12.0 kw
Duty	0.005
Power Input	Max. 1.2 W
Frequency	8.9 - 9.5 GHz
Saturation Gain	Min. 40 db
Efficiency	25.0%
Insertion Loss	80.0 db

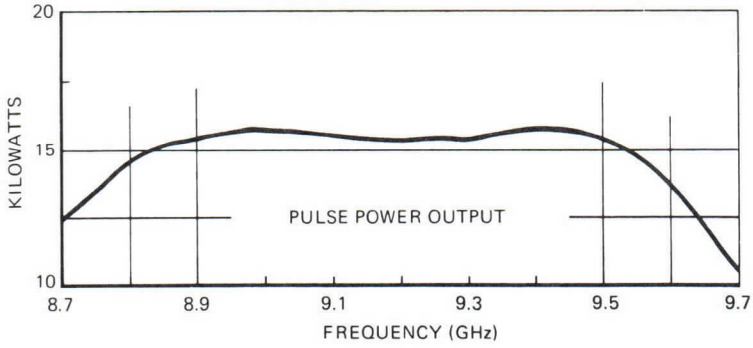
OPERATING CONDITIONS

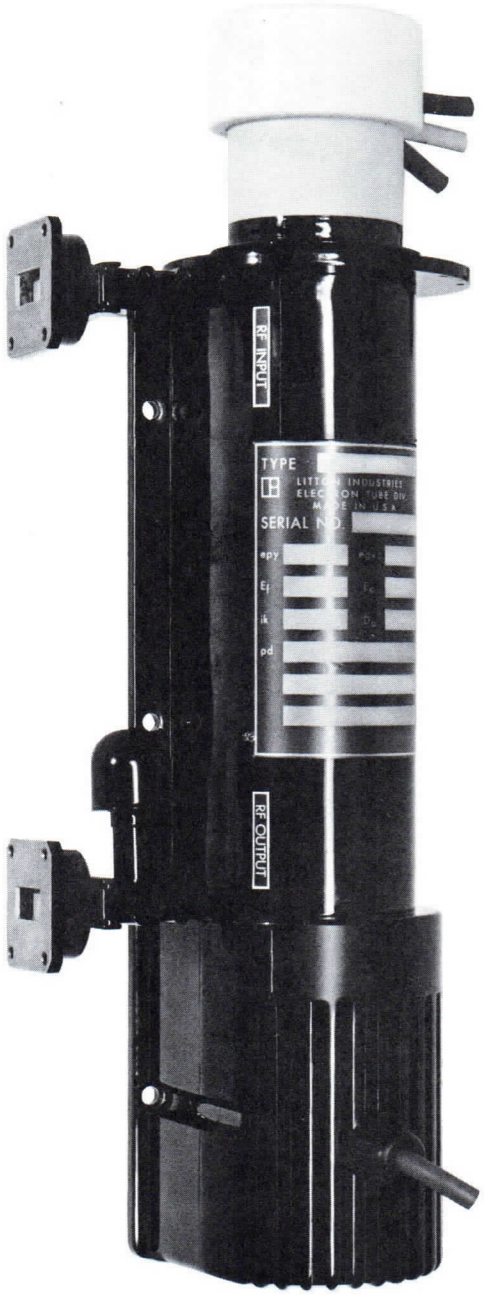
Beam Voltage	23.0 kv
Cathode Current	4.6 A
Collector Voltage	−10.6 kVdc
Heater	12.0 Vac, 3.0 A
Anode and Body	Ground
Control Grid Bias	−850 Vdc
Control Grid Pulse	500.0 v
Control Grid Current	Max. 50 ma
Cooling	Conduction

MECHANICAL

Mounting Position	Any
Weight	17.0 lbs.
Dimensions	See Outline Drawing





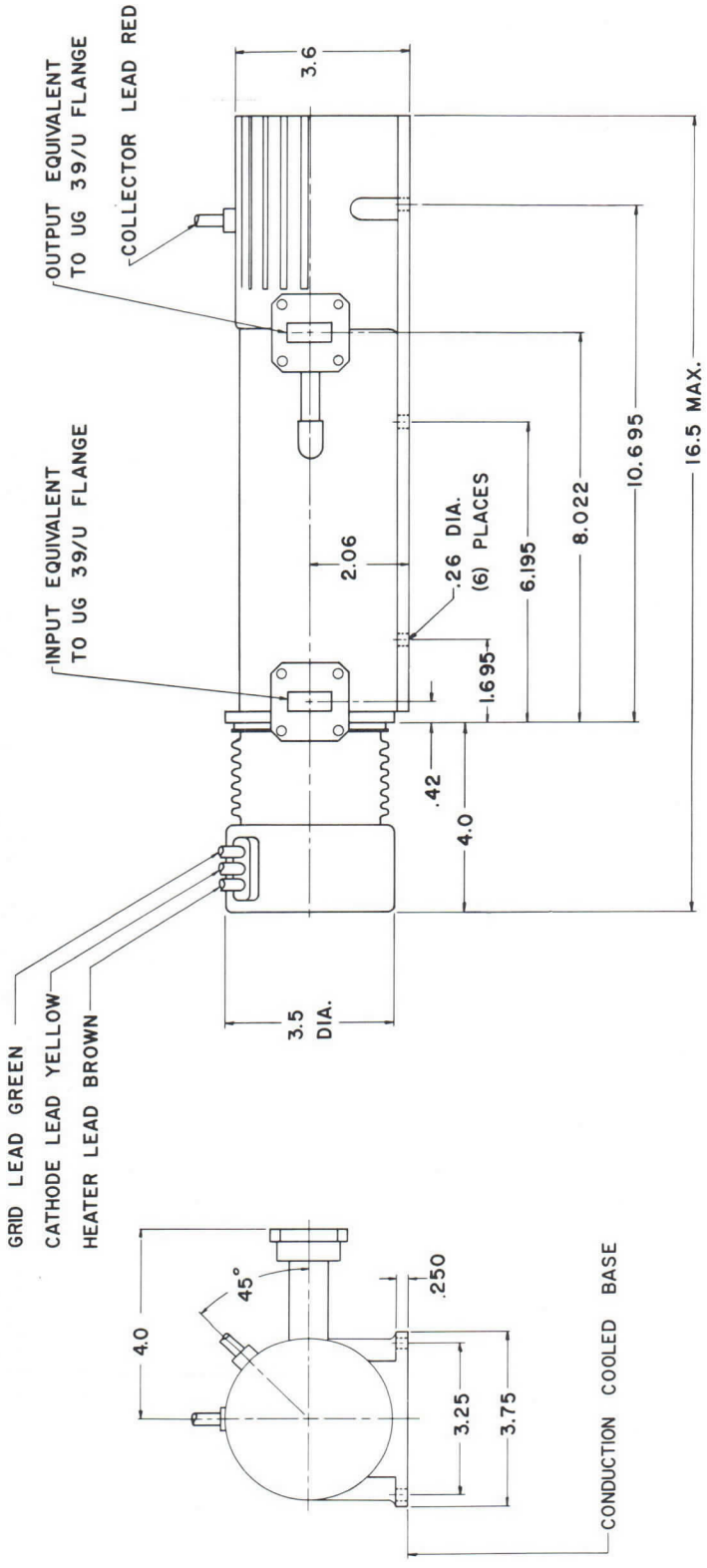


COUPLED CAVITY TRAVELING WAVE TUBE

L-5252

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

COUPLED CAVITY TRAVELING WAVE TUBE

L-5253

- 40 kw Peak
- X-band PPM
- Cathode Pulsed
- Conduction Cooled

The L-5253 provides 40 kw minimum pulse power output over the frequency range of 9.4 to 10.1 GHz. Other tubes in this series are available in 500 MHz bandwidths from 9.2 to 10.2 GHz.

The tube is conduction cooled and features all metal-ceramic, PPM focused construction. It is designed for operation in MIL-E-5400, Class 2 environments.

PERFORMANCE

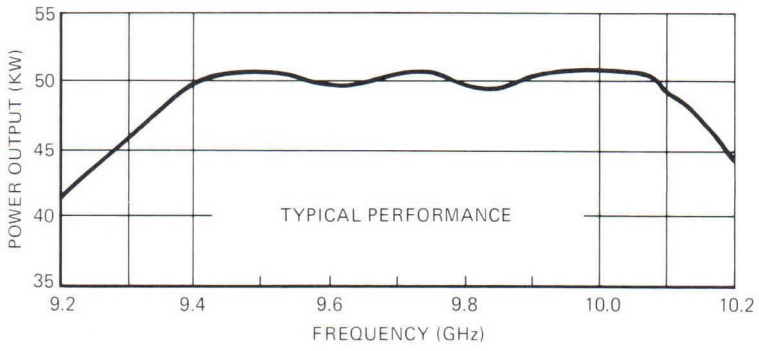
Pulse Power Output	Min. 40.0 kw
Duty	.002
Power Input	Max. 1.0 W
Frequency	9.4 - 10.1 GHz
Saturation Gain	Min. 46 db
Insertion Loss	80.0 db

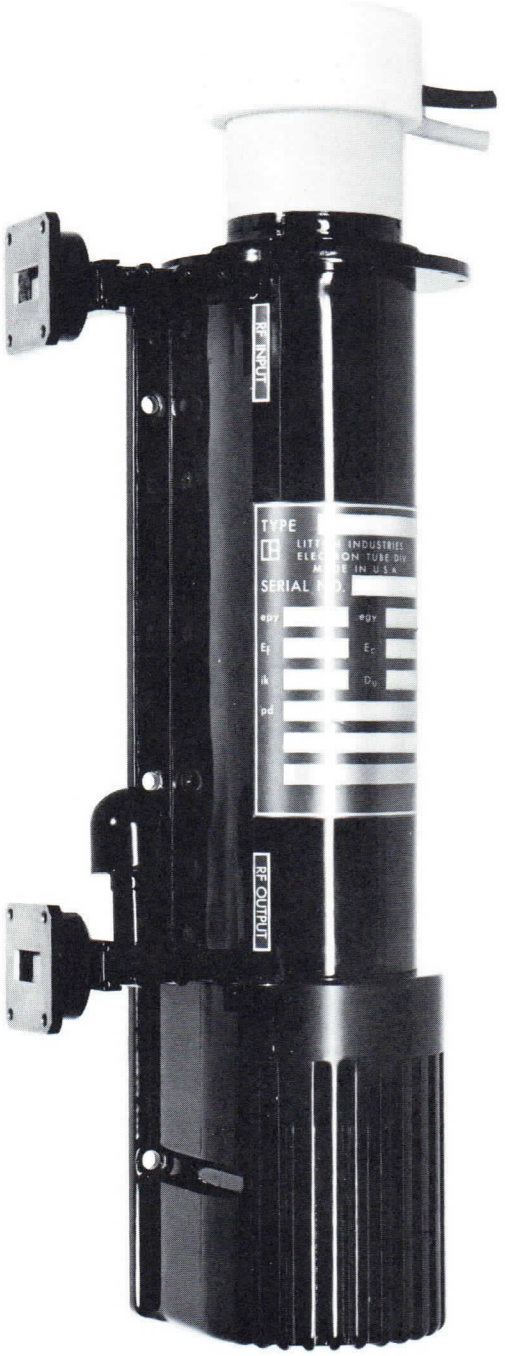
OPERATING CONDITIONS

Beam Voltage	31.5 kv
Cathode Current	8.5 A
Heater	10.0 Vac, 3.0 A
Anode and Body	Ground
Cooling	Conduction

MECHANICAL

Mounting Position	Any
Weight	20.0 lbs.
Dimensions	See Outline Drawing





COUPLED CAVITY TRAVELING WAVE TUBE

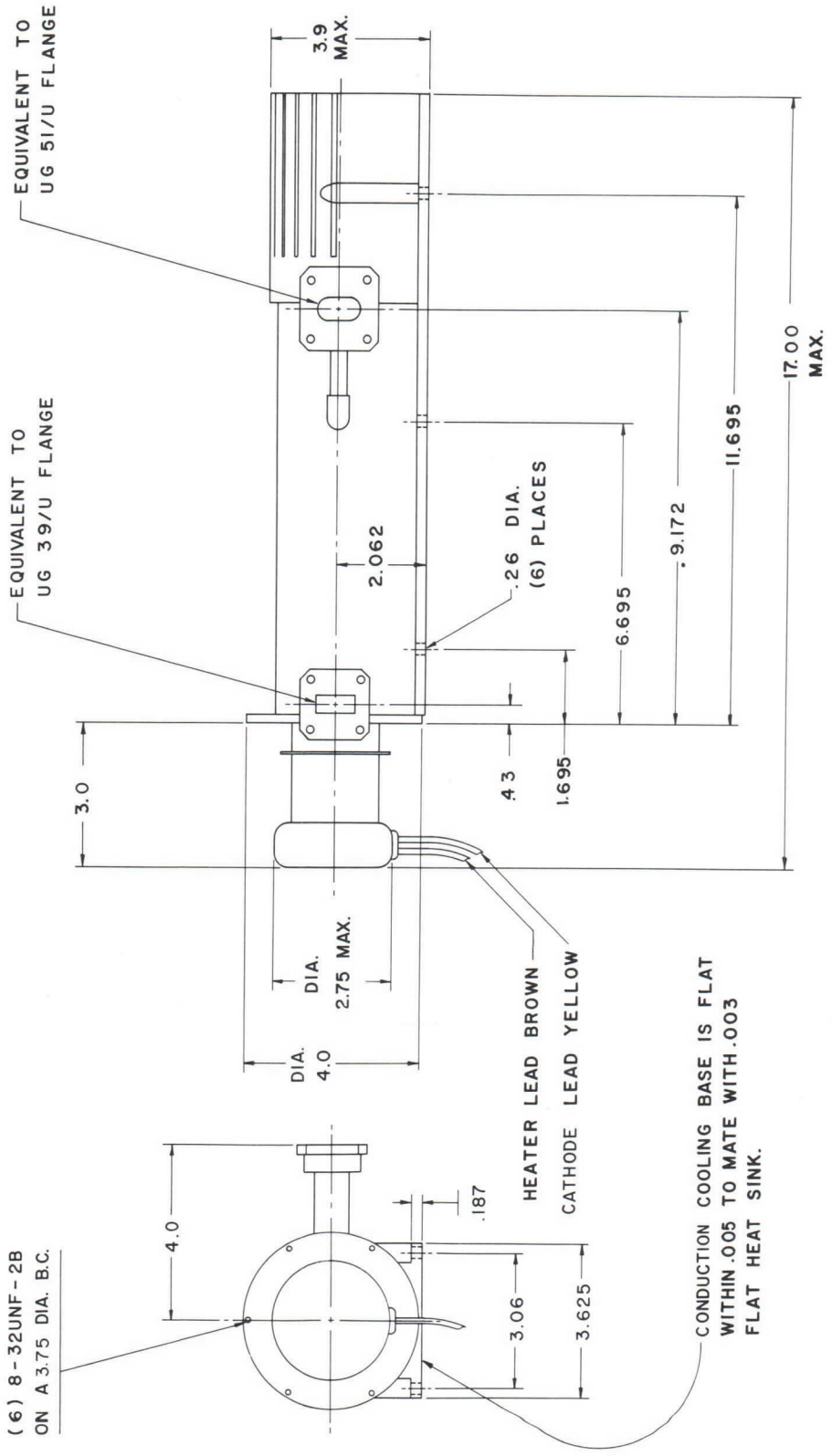
L-5253

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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3.5MCA470

COUPLED CAVITY TRAVELING WAVE TUBE

L-5253-01

- 50 kw Peak
- X-band PPM
- Cathode Pulsed
- Conduction Cooled

The L-5253-01 provides 50 kw minimum pulse power output over the frequency range of 9.4 to 9.9 GHz. Other tubes in this series are available in 500 MHz bandwidths from 9.2 to 10.2 GHz.

The tube is conduction cooled and features all metal-ceramic, PPM focused construction. It is designed for operation in MIL-E-5400, Class 2 environments.

PERFORMANCE

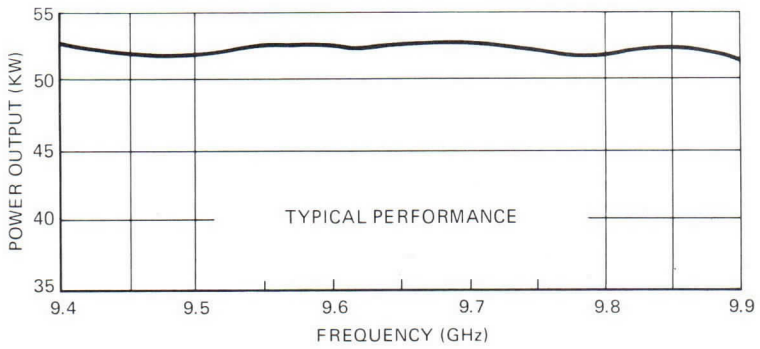
Pulse Power Output	Min 50 kw
Duty	.002
Power Input	Max. 0.5 W
Frequency	9.4 - 9.9 GHz
Saturation Gain	Min. 50 db
Insertion Loss	80.0 db

OPERATING CONDITIONS

Beam Voltage	31.5 kv
Cathode Current	8.5 A
Heater	10.0 Vac, 3.0 A
Anode and Body	Ground
Cooling	Conduction

MECHANICAL

Mounting Position	Any
Weight	12.5 lbs.
Dimensions	See Outline Drawing



COUPLED CAVITY TRAVELING WAVE TUBE

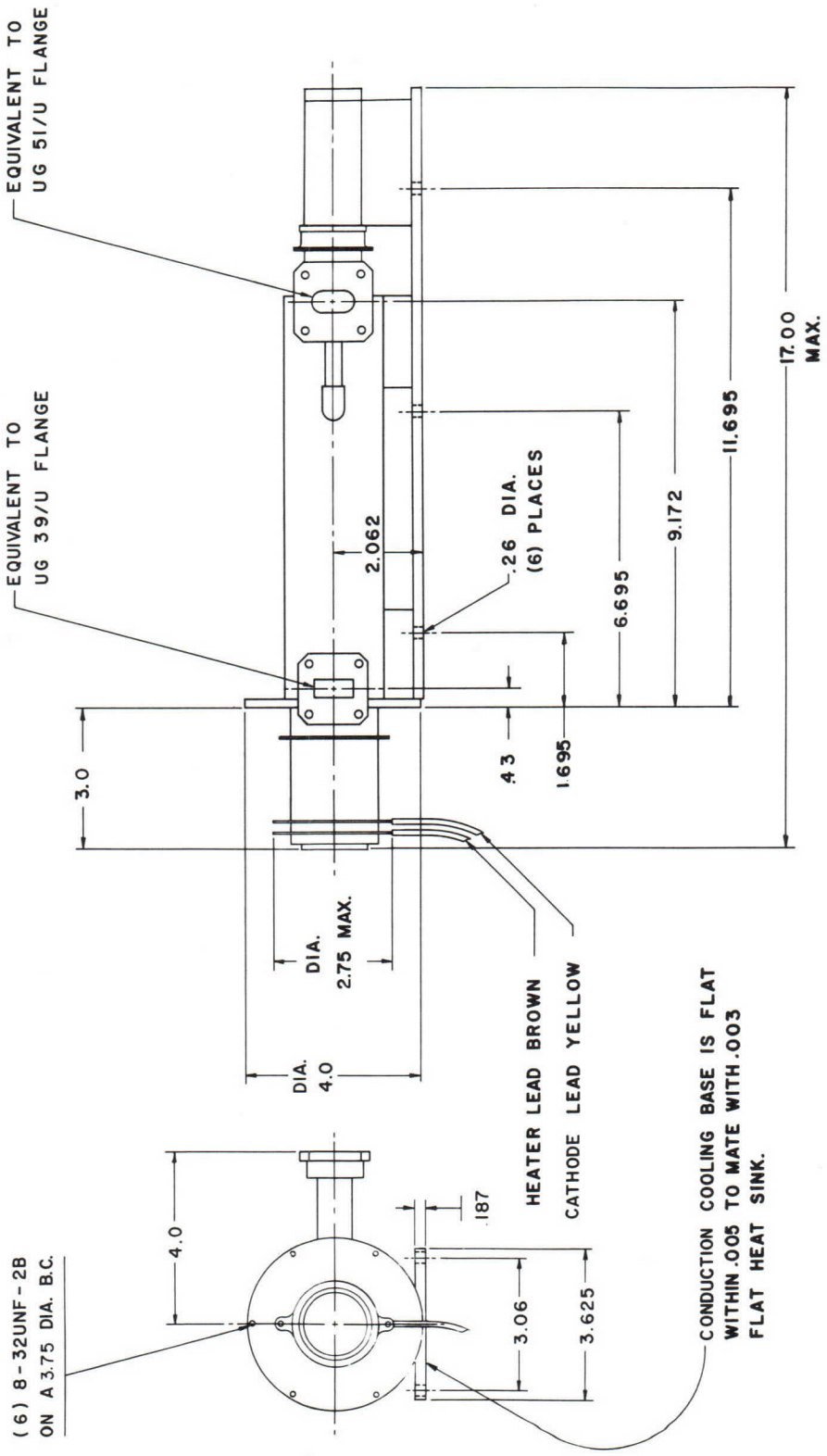
L-5253-01

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION

X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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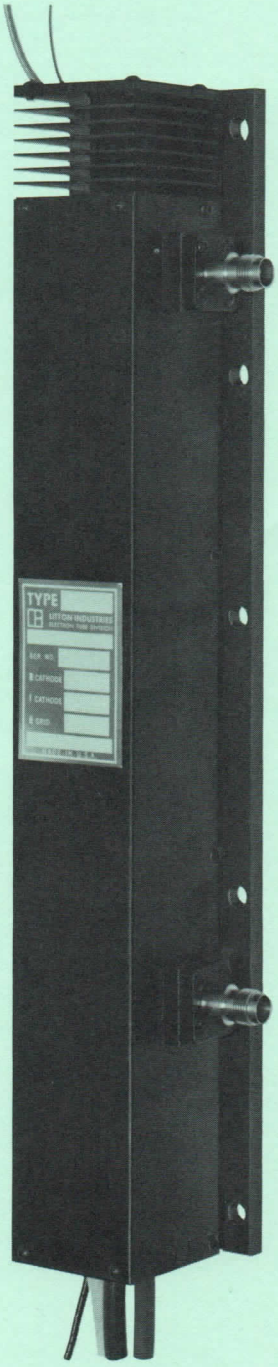
TRAVELING WAVE TUBE

L-5263

4.0-8.0 GHz
1 Kw (pk) Min.
35 dB gain

The L-5263 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of one kilowatt over the frequency range of 4.0 to 8.0 GHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing. It has long pulse capability to 150 microsecond pulse widths.



TYPICAL OPERATING CONDITIONS

Duty	0.01
Cathode Voltage	10.2 kVdc (Negative)
Cathode Current	1.9 a (peak)
Anode Voltage	Ground Potential
Helix Voltage	Ground Potential
Collector Voltage	Ground Potential
Grid Voltage Cut-off (d.c. bias with respect to cathode)	−90 V
Grid Voltage (pulsed positive with respect to cathode)	+125 V (peak)
Grid Current	250 ma (peak)
Grid Capacity	30 pf
Filament Voltage	6.3 V
Filament Current	2.2 A

PERFORMANCE CHARACTERISTICS

Frequency Range	4.0 to 8.0 GHz
Power Output (peak)	Min. 1.0 kw
Small Signal Gain	Min. 35 dB
Gain at 1.0 kw	Min. 30 dB

MAXIMUM RATINGS

Duty	0.02
Pulse Width	250 μsec.
Body Current	700 ma (peak) with rf drive
Collector Temperature (Thermal overload operating temperature)	180°C
Body Temperature (Measured @ tube mounting surface)	125°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	6.0 lbs. nominal
Cooling	Conduction (body) & Forced Air (collector)
Air Flow, Collector	2.0 lbs./min. @ 1.0 in. H_2O @ 2% duty
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration (to 2,000 cps)	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−9.5 to −11.0 kVdc
Cathode Current, Max.	2.5 a (peak)
Grid Pulse Range (with respect to cathode)	+100 to +230 V
Grid Current	500 ma (peak)

Litton

ELECTRON TUBE DIVISION
San Carlos, California

TRAVELING WAVE TUBE

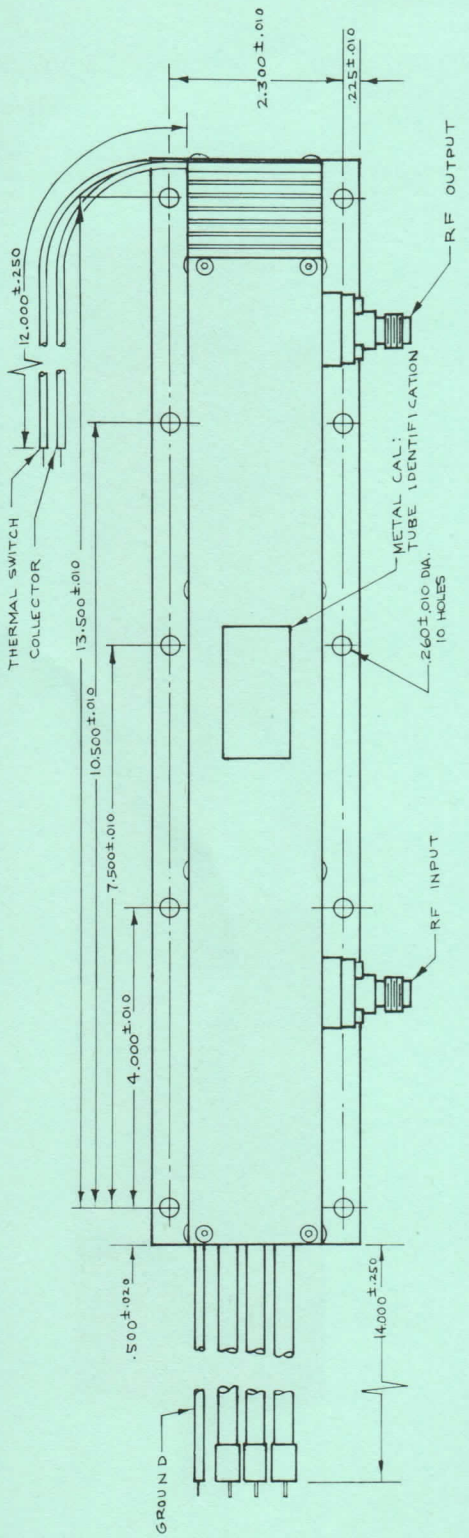
L-5263

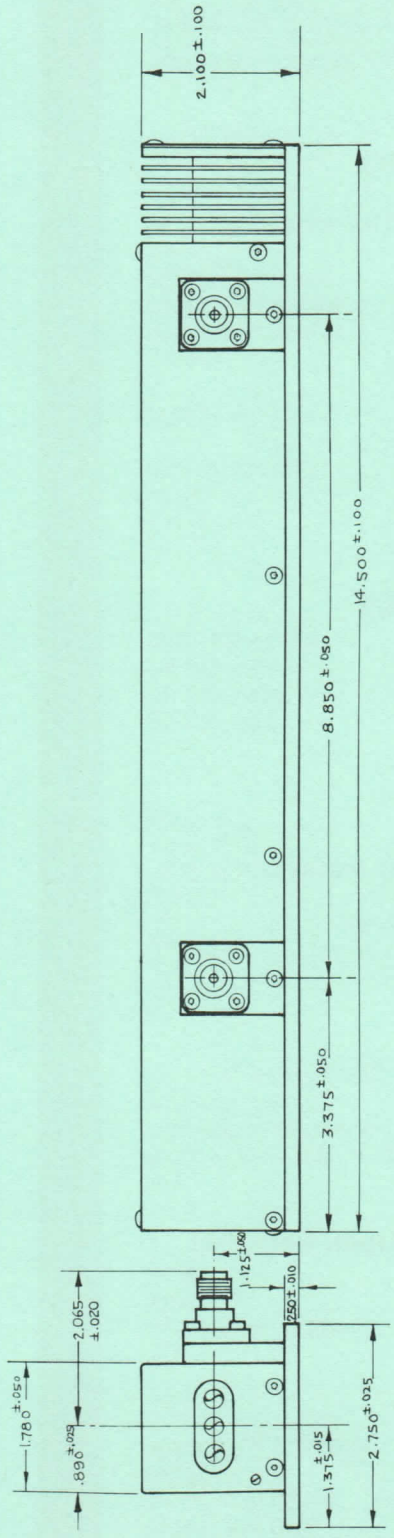
CAUTION
MICROWAVE RADIATION

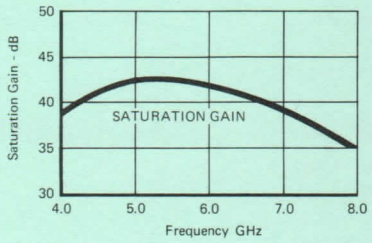
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

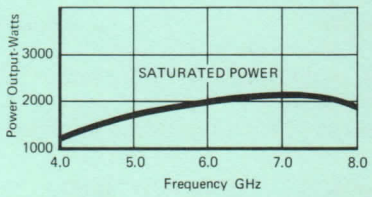
CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.









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Litton
ELECTRON TUBE DIVISION
San Carlos, California

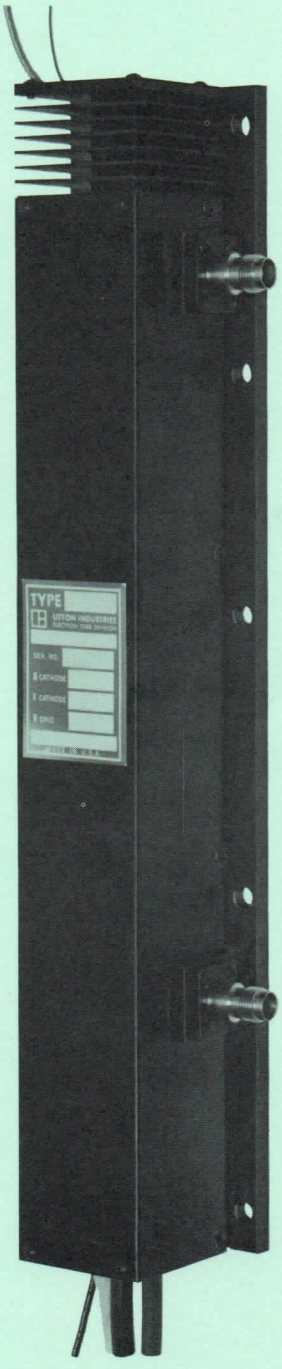
3.5MCA1172

TRAVELING WAVE TUBE

L-5283

2.0 to 4.0 GHz
1 Kw (pk) Min.
55 dB gain

The L-5283 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of one kilowatt over the frequency range of 2.0 to 4.0 GHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing. It has long pulse capability to 100 microsecond pulse widths.



TYPICAL OPERATING CONDITIONS

Duty	0.02
Cathode Voltage	7.2 kVdc (Negative)
Cathode Current	1.7 a (peak)
Anode Voltage	Ground Potential
Helix Voltage	Ground Potential
Collector Voltage	Ground Potential
Grid Voltage Cut-off (d.c. bias with respect to cathode)	−120 V
Grid Voltage (pulsed positive with respect to cathode)	+75 V (peak)
Grid Current	200 ma (peak)
Grid Capacity	30 pf
Filament Voltage	6.3 V
Filament Current	2.2 A

PERFORMANCE CHARACTERISTICS

Frequency Range	2.0 to 4.0 GHz
Power Output (peak)	Min. 1.0 kw
Small Signal Gain	Min. 55 dB
Gain at 1.0 kw	Min. 50 dB

MAXIMUM RATINGS

Duty	0.03
Pulse Width	150 μsec.
Body Current	800 ma (peak) with rf drive
Collector Temperature	125°C
Body Temperature (Measured @ tube mounting surface)	100°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	8 lbs. nominal
Cooling	Conduction (body) & Forced Air (collector)
Air Flow, Collector	2.0 lbs./min. @ 1.0 in. H_2O @ 3% duty
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration (to 2,000 cps)	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−6.5 to −8.0 kVdc
Cathode Current, Max.	2.5 a (peak)
Grid Pulse Range (with respect to cathode)	+30 to +150 V
Grid Current	300 ma (peak)

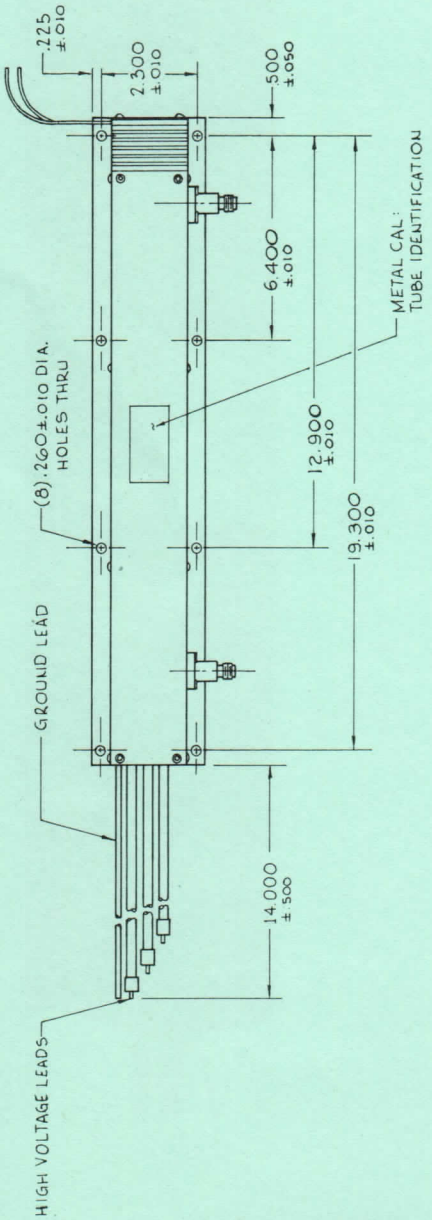
Litton
ELECTRON TUBE DIVISION
San Carlos, California

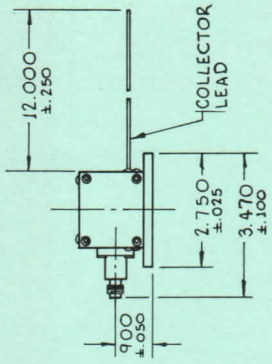
TRAVELING WAVE TUBE

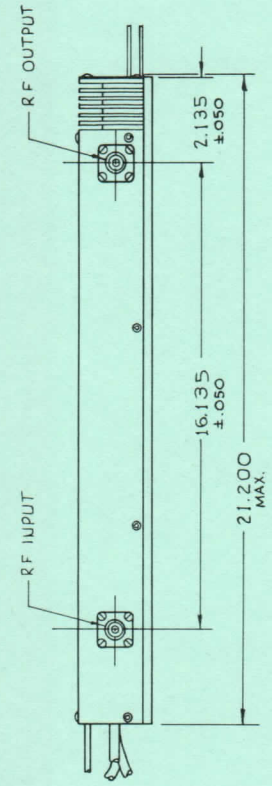
L-5283

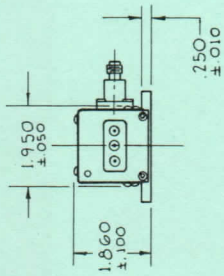
CAUTION
MICROWAVE RADIATION

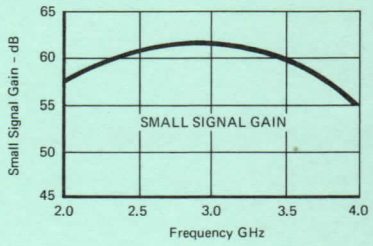
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

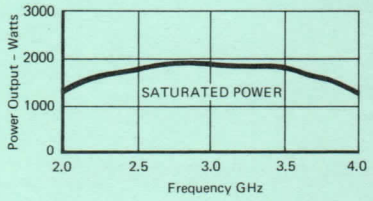












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Current detailed outline drawings are available on request.

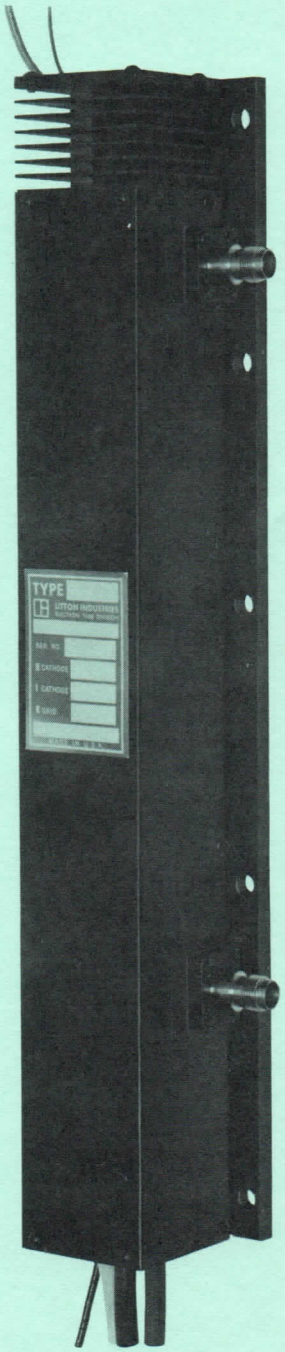
Litton
ELECTRON TUBE DIVISION
San Carlos, California

TRAVELING WAVE TUBE

L-5336

2.0 to 4.0 GHz
1 Kw (pk) Min.
35 dB gain

The L-5336 is a broadband traveling wave amplifier having a minimum saturated (peak) power output of one kilowatt over the frequency range of 2.0 to 4.0 GHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing. It has long pulse capability to 100 microsecond pulse widths.



TYPICAL OPERATING CONDITIONS

Duty	0.02
Cathode Voltage	7.2 kVdc (Negative)
Cathode Current	1.7 a (peak)
Anode Voltage	Ground Potential
Helix Voltage	Ground Potential
Collector Voltage	Ground Potential
Grid Voltage Cut-off (d.c. bias with respect to cathode)	−120 V
Grid Voltage (pulsed positive with respect to cathode)	+75 V (peak)
Grid Current	200 ma (peak)
Grid Capacity	30 pf
Filament Voltage	6.3 V
Filament Current	2.2 A

PERFORMANCE CHARACTERISTICS

Frequency Range	2.0 to 4.0 GHz
Power Output (peak)	Min. 1.0 kw
Small Signal Gain	Min. 35 dB
Gain at 1.0 kw	Min. 30 dB

MAXIMUM RATINGS

Duty	0.03
Pulse Width	150 μsec.
Body Current	800 ma (peak) with rf drive
Collector Temperature	125°C
Body Temperature (Measured @ tube mounting surface)	100°C

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	6 lbs. nominal
Cooling	Conduction (body) & Forced Air (collector)
Air Flow, Collector	2.0 lbs./min. @ 1.0 in. H_2O @ 3% duty
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration (to 2,000 cps)	10 G
Ambient Temperature	−54°C to +85°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	−6.5 to −8.0 kVdc
Cathode Current, Max.	2.5 a (peak)
Grid Pulse Range (with respect to cathode)	+30 to +150 V
Grid Current	300 ma (peak)

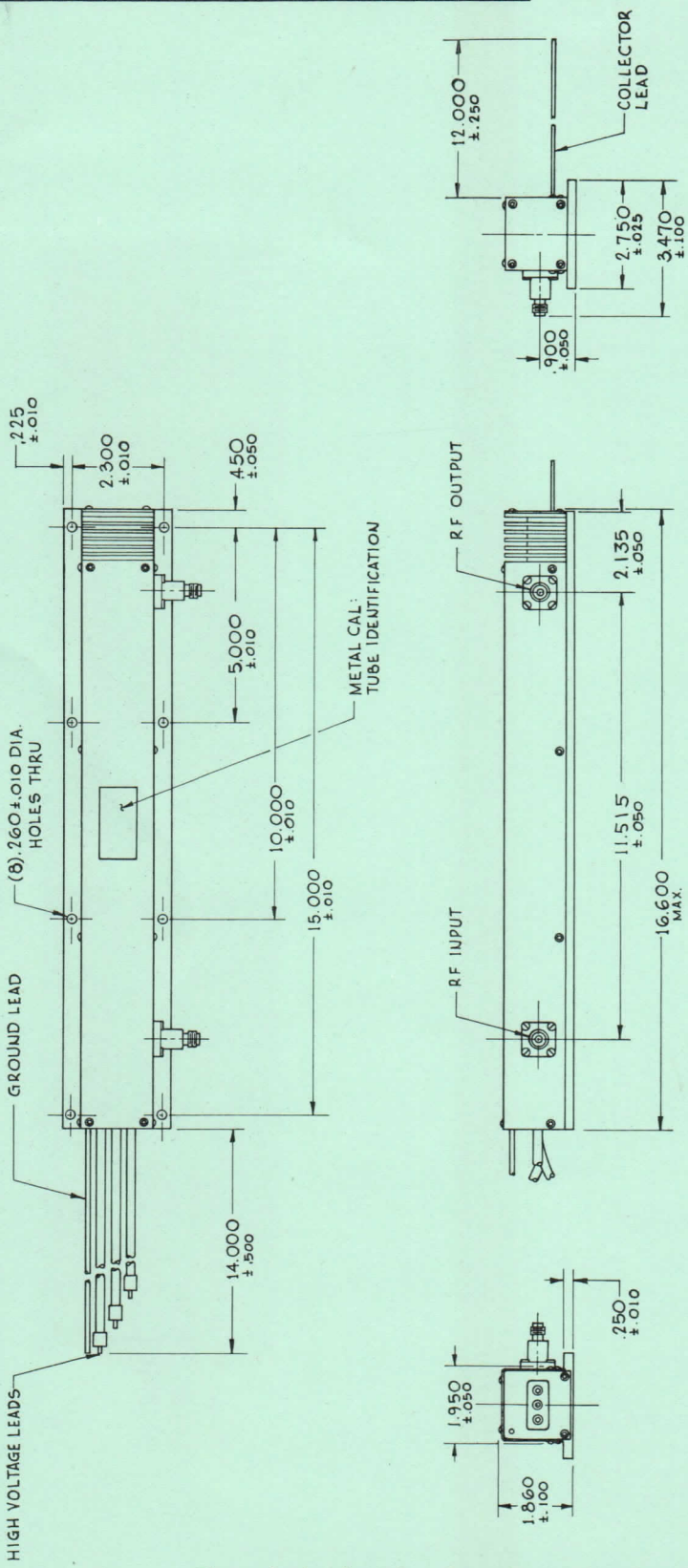
Litton
ELECTRON TUBE DIVISION
San Carlos, California

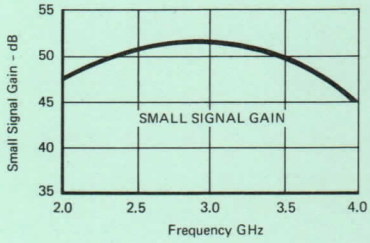
TRAVELING WAVE TUBE

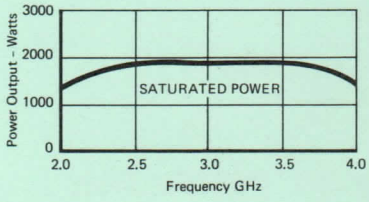
L-5336

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.







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Litton
ELECTRON TUBE DIVISION
San Carlos, California

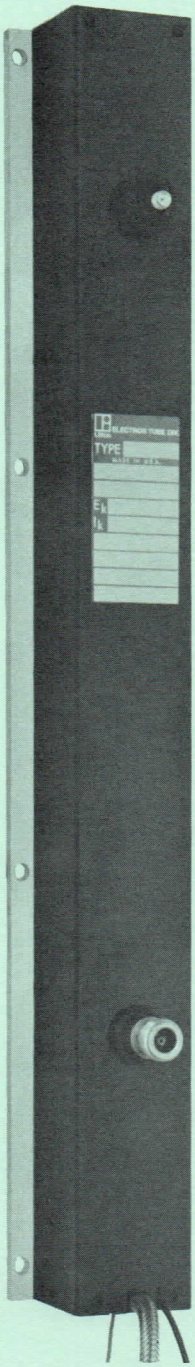
3.5MCA1172

TRAVELING WAVE TUBE

L-5366-50

- 12% Bandwidth
- 2.7 to 3.5 GHz
- 3 kilowatts Min.
- 60 dB gain
- PPM focused
- High mu grid

The L-5366-50 is a broadband, pulsed, ring-loop traveling wave amplifier having a minimum peak power output of 3 kilowatts over any specified 12% band in the frequency range of 2700 to 3500 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.



TYPICAL OPERATING CONDITIONS

Duty	.03
Cathode Voltage	8.5 kVdc (Neg.)
Cathode Current	1.5 a peak
Anode Voltage	Ground Potential
Helix Voltage	Ground potential (Can be modulated)
Collector Voltage	5500 V
Grid Pulse Voltage (With respect to cathode)	120 V (Pos.)
Grid Bias Voltage (Cut-off)	—100 V
Grid Current	250 ma peak
Heater Voltage	6.3 V
Heater Current	2.2 A

PERFORMANCE CHARACTERISTICS

Instantaneous Bandwidth	12%
Frequency Range	2700 to 3500 MHz
Power Output	Min. 3000 W
Small Signal Gain	Min. 63 dB
Gain at Rated Power	Min. 60 dB

MAXIMUM RATINGS

Duty	.04
Helix Current	1.0 a peak
Grid Current	500 ma peak
Collector Temperature	140°C
Load VSWR	3.0:1

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	8 lbs.
Cooling	Conduction
Mounting Position	Any

ENVIRONMENTAL CAPABILITY (Upon Request)

Shock	30 G
Vibration	15 G
Ambient Temperature	—54°C to +71°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	7500 to 9000 Vdc
Cathode Current (Maximum) Not including Grid Current	3.0 a peak
Grid Voltage Range (with respect to cathode)	+70 to +200 Vdc
Grid Current (Maximum) High Mu Grid	400 ma peak
Grid Cut-off Voltage (High Mu Grid)	—300 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	1.8 to 2.5 A

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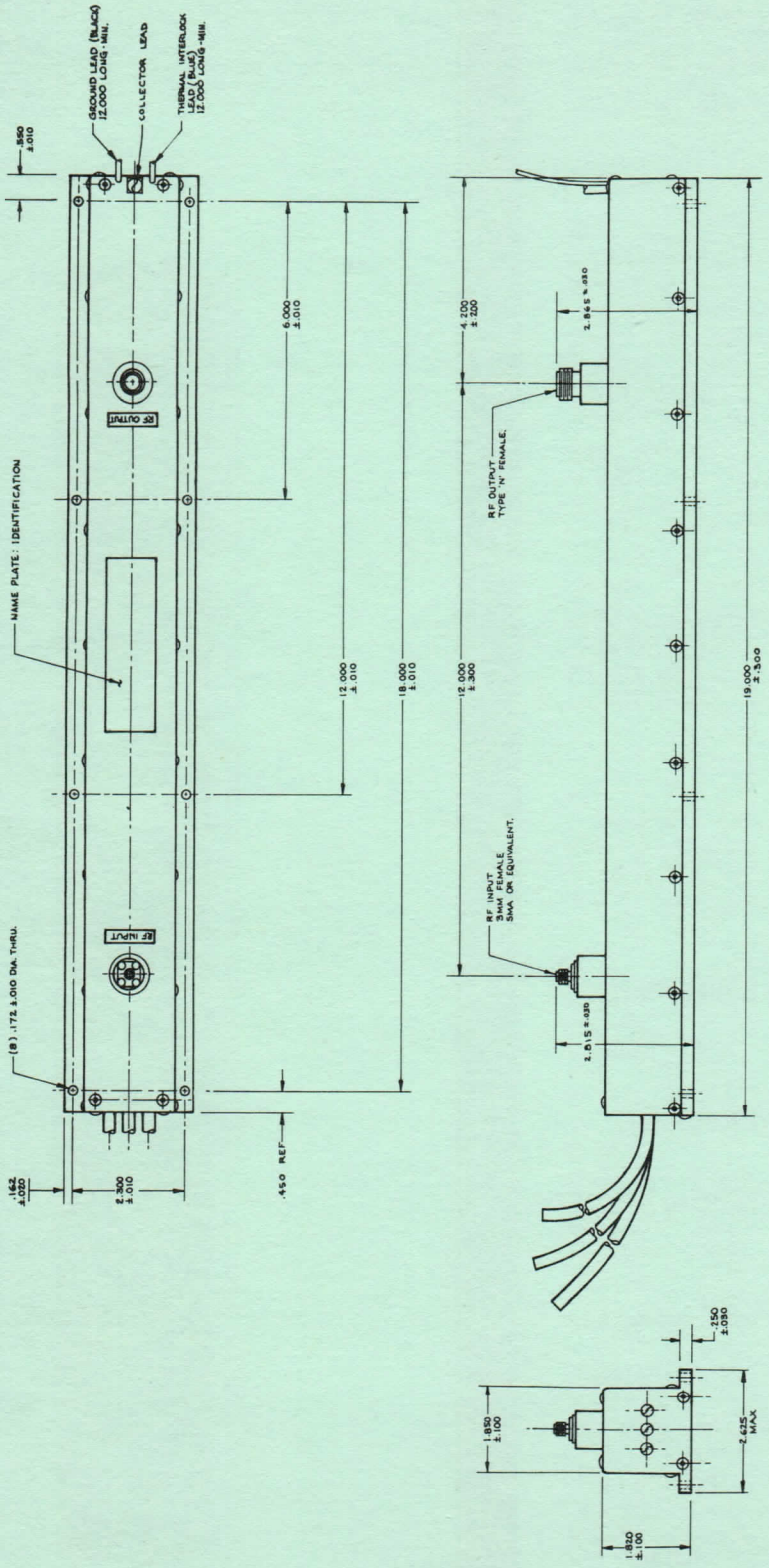
ELECTRON TUBE DIVISION
San Carlos, California

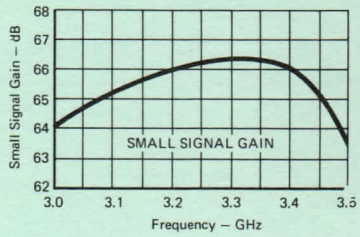
TRAVELING WAVE TUBE

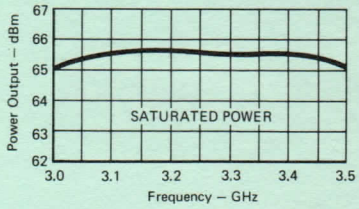
L-5366-50

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.







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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

3MJA474

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-01

- 100 kW Peak
- X-Band PPM
- Cathode Pulsed
- Conduction & Air Cooled
- .002 Duty
- 62 dB Gain

The L-5391-01 coupled cavity traveling wave tube provides a minimum pulsed power output of 100 kW over the frequency range of 9.0 to 9.2 GHz. It is conduction and forced air cooled and operates at a duty cycle of .002. The tube is cathode pulsed and is PPM focused with Samarium Cobalt magnets. The L-5391-01 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 100 kW
Duty	0.002
Power Input	Max .07 W
Frequency	9.0 to 9.2 GHz
Saturation Gain	Min 62 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	35°/1%
— RF Input Power	6°/1 dB

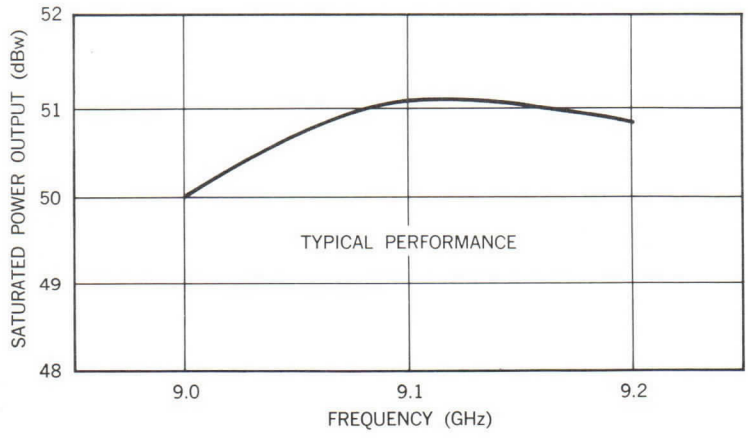
The tube is fully stable without RF drive power and operating into a worst phase mismatch of 2:1.

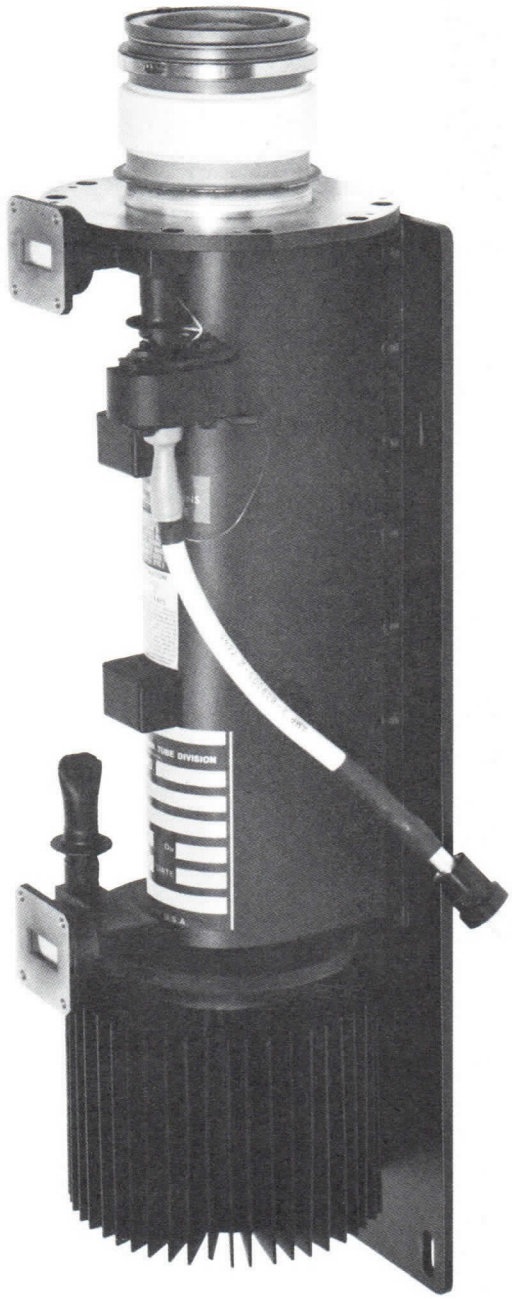
TYPICAL OPERATING CONDITIONS

Peak Cathode Voltage	—44.0 kV
Peak Cathode Current	15.3 A
Collector Voltage	Ground
Heater Voltage	11.5 V
Heater Current	4.8 A
Cooling	
Conduction and Forced Air	150 CFM

MECHANICAL

Mounting Position	Any
Weight	31 lbs.
Dimensions	See Outline Drawing

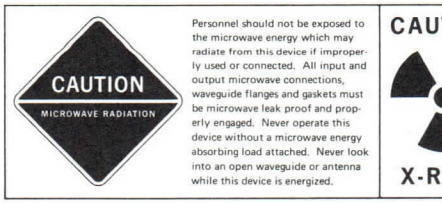




Litton **ELECTRON TUBE DIVISION**
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-01



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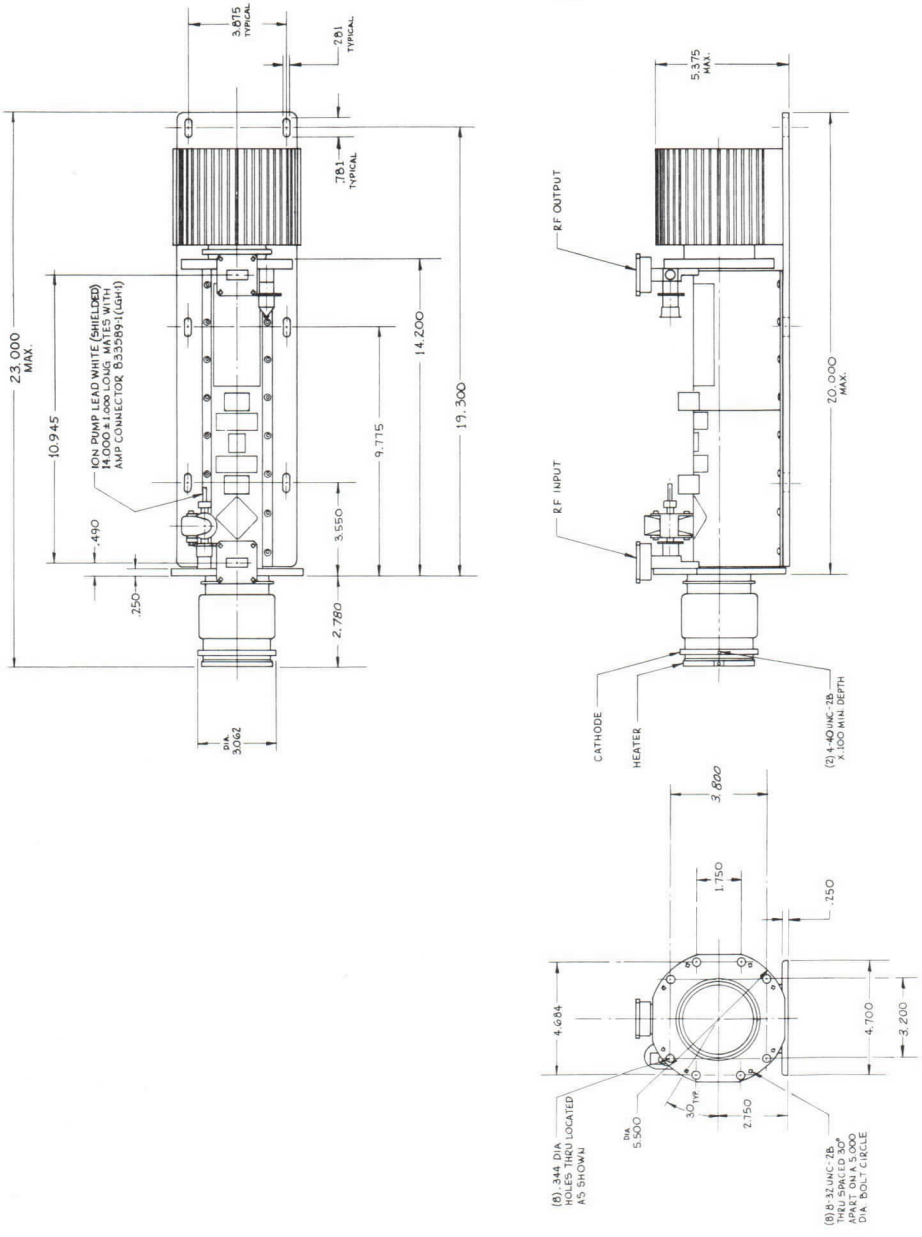
This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070. (415) 591-8411

2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-51

- 100 kW Peak
- X-Band PPM
- Grid Pulsed
- Conduction & Air Cooled
- .001 Duty
- 53 dB Gain

The L-5391-51 coupled cavity traveling wave tube provides a minimum pulsed power output of 100 kW over the frequency range of 9.0 to 10.0 GHz. It is conduction and forced air cooled and operates at a duty cycle of .001. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-51 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 100 kW
Duty	0.001
Power Input	Max .5 W
Frequency	9.0 to 10.0 GHz
Saturation Gain	Min 53 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	22°/1 %
— Grid Voltage	6°/1 %
— RF Input Power	5°/1 dB

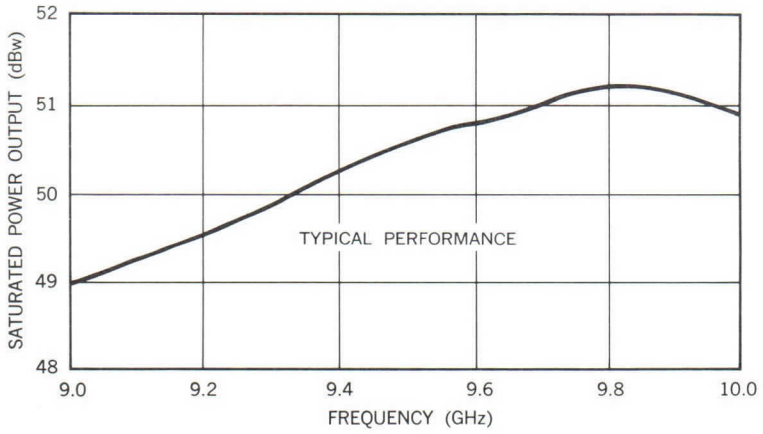
The tube is fully stable without RF drive power and operating into a worst phase mismatch of 2:1.

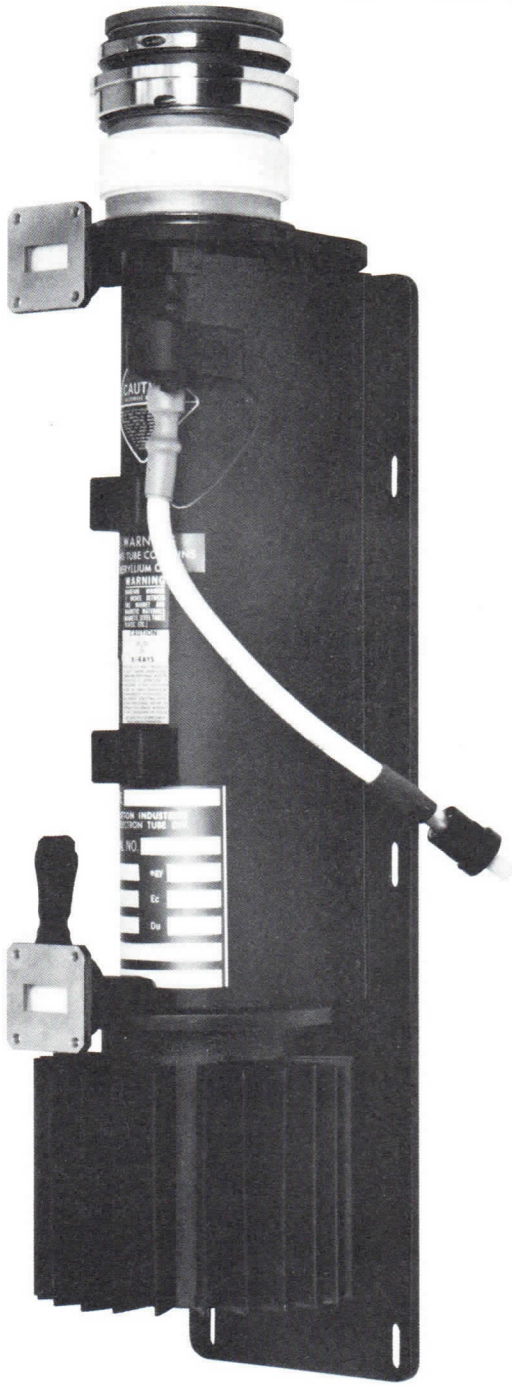
TYPICAL OPERATING CONDITIONS

Cathode Voltage	—44.5 kV
Peak Cathode Current	13.5 A
Collector Voltage	Ground
Grid Bias	—500 V
Peak Grid Drive (Above cathode)	+683 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Conduction & Forced Air	100 CFM

MECHANICAL

Mounting Position	Any
Weight	30 lbs.
Dimensions	See Outline Drawing





Litton

ELECTRON TUBE DIVISION
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-51

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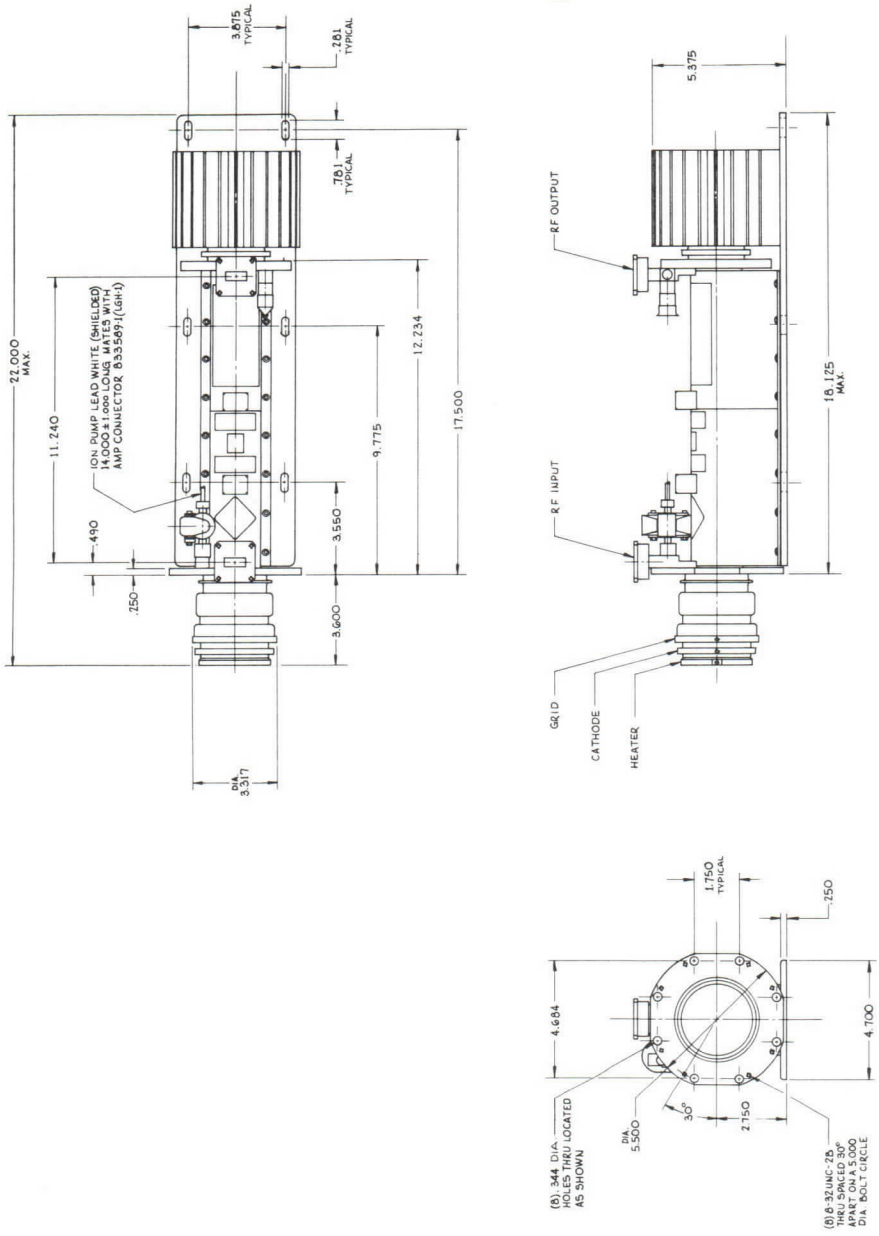
This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-52

- 80 kW Peak
- X-Band PPM
- Grid Pulsed
- Liquid Cooled
- .01 Duty
- 59 dB Gain

The L-5391-52 coupled cavity traveling wave tube provides a minimum pulsed power output of 80 kW over the frequency range of 9.6 to 9.9 GHz. It is liquid cooled and operates at a duty cycle of .01. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-52 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 80 kW
Duty	0.01
Power Input	Max .1 W
Frequency	9.6 to 9.9 GHz
Saturation Gain	Min 59 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	24°/1 %
— Grid Voltage	6°/1 %
— RF Input Power	6°/1 dB

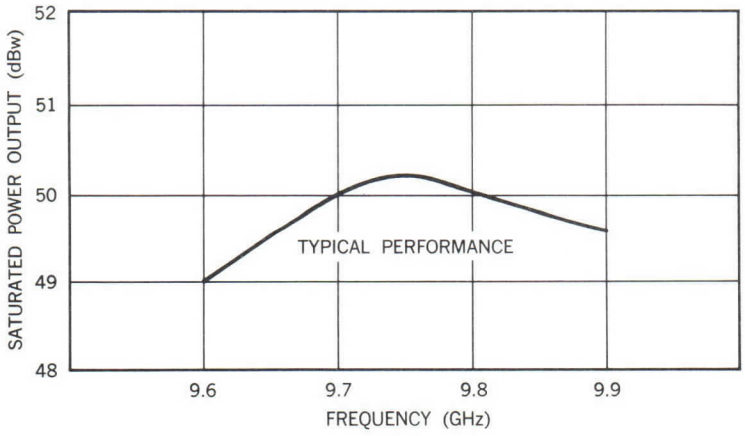
The tube is fully stable without RF drive power operating into a worst phase mismatch of 2:1.

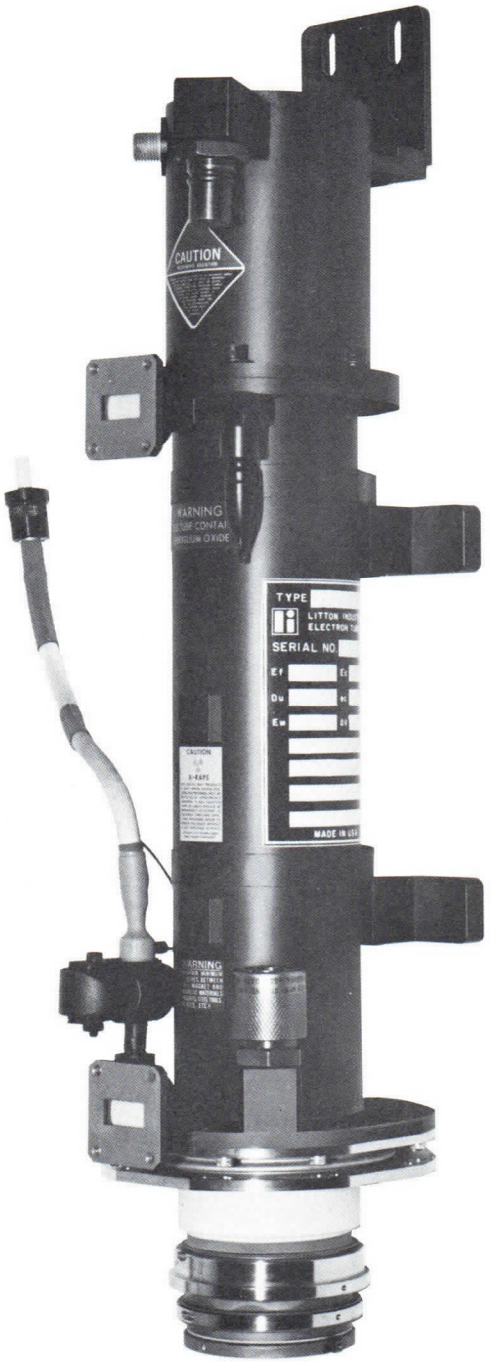
TYPICAL OPERATING CONDITIONS

Cathode Voltage	−42.1 kV
Peak Cathode Current	13.0 A
Collector Voltage	−17.0 kV
Peak Body Current	2 A
Grid Bias	−500 V
Peak Grid Drive (Above cathode)	+775 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Coolanol 20/25 or FC75/77	2.5 GPM

MECHANICAL

Mounting Position	Any
Weight	32 lbs.
Dimensions	See Outline Drawing





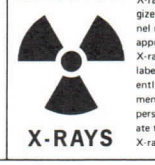
Litton

ELECTRON TUBE DIVISION
San Carlos, California

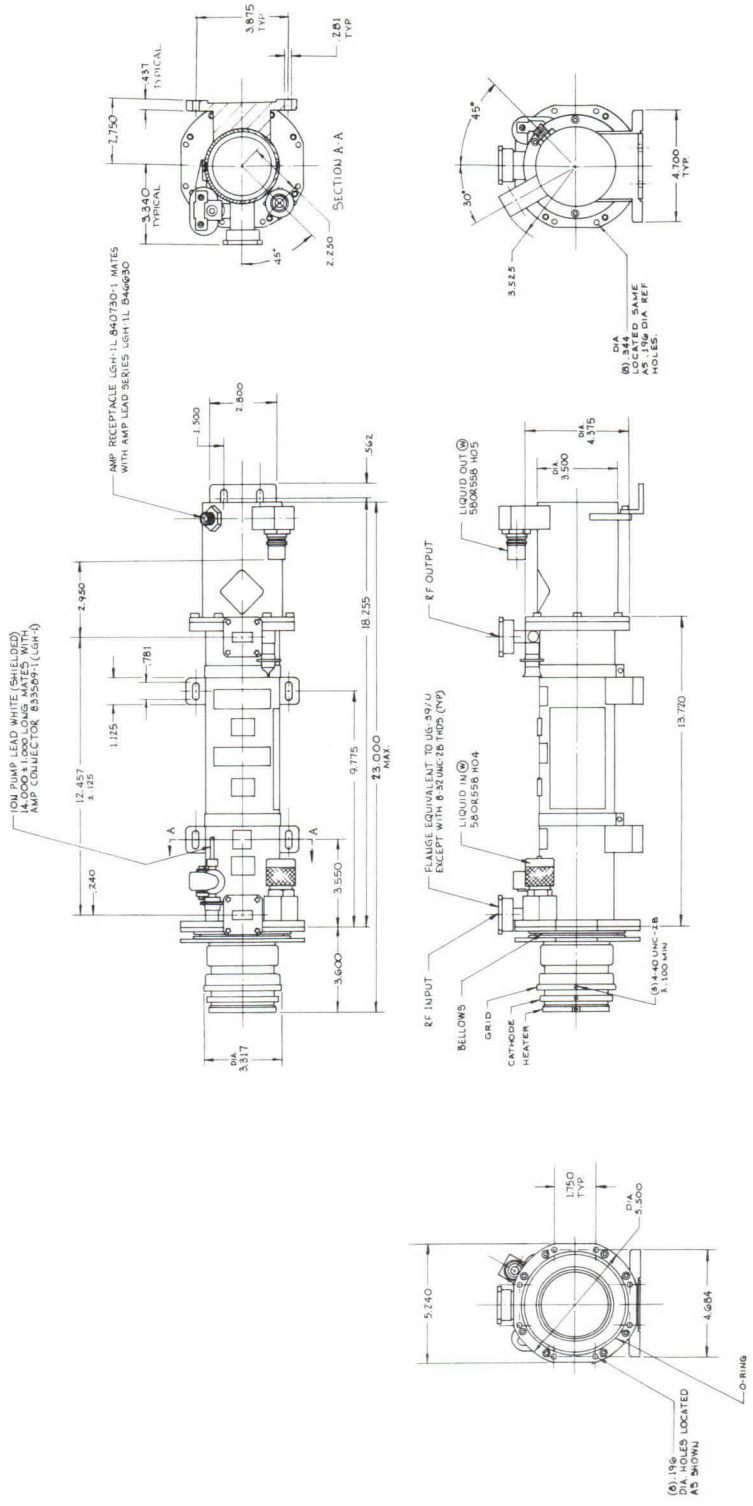
COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-52

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-53

100 kW Peak
X-Band PPM
Grid Pulsed
Liquid Cooled
.01 Duty
51 dB Gain

The L-5391-53 coupled cavity traveling wave tube provides a minimum pulsed power output of 100 kW over the frequency range of 8.9 to 9.7 GHz. It is liquid cooled and operates at a duty cycle of .01. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-53 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 100 kW
Duty	0.01
Power Input	Max .8 W
Frequency	8.9 to 9.7 GHz
Saturation Gain	Min 51 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	25°/1 %
— Grid Voltage	8°/1 %
— RF Input Power	6°/1 dB

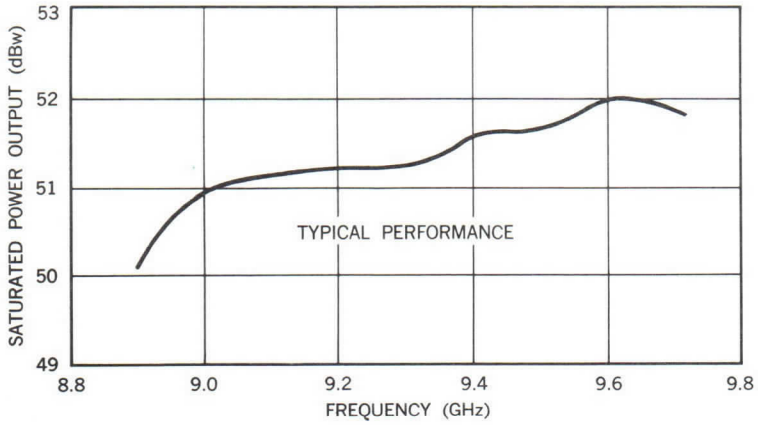
The tube is fully stable without RF drive power operating into a worst phase mismatch of 2:1.

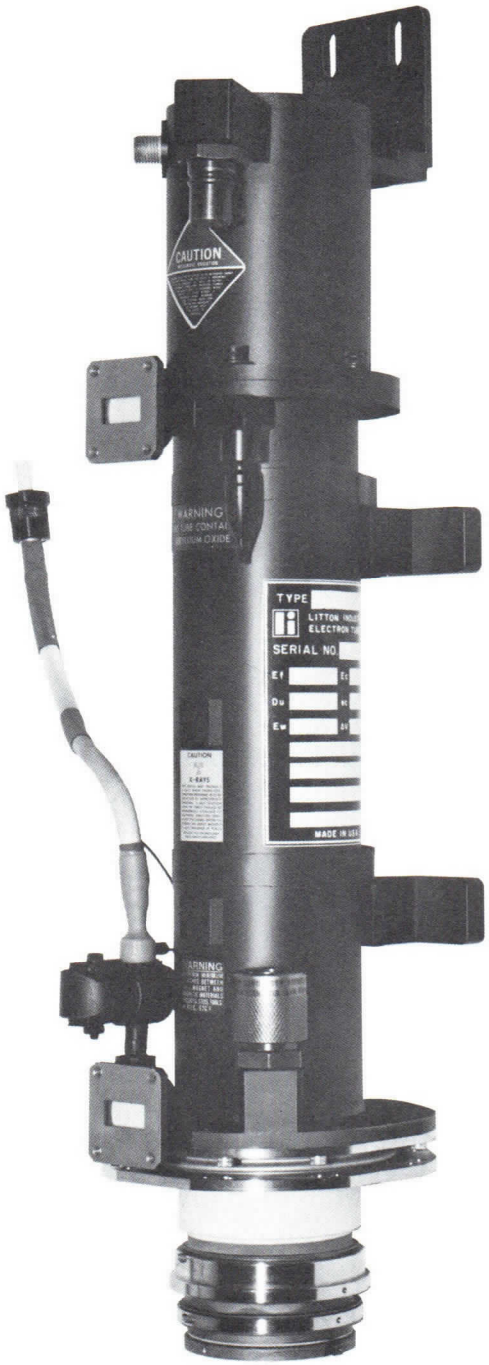
TYPICAL OPERATING CONDITIONS

Cathode Voltage	−42.6 kV
Peak Cathode Current	13.5 A
Collector Voltage	−17.0 kV
Peak Body Current	2 A
Grid Bias	−500 V
Peak Grid Drive (Above cathode)	+681 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Coolanol 20/25 or FC75/77	3.0 GPM

MECHANICAL

Mounting Position	Any
Weight	27 lbs.
Dimensions	See Outline Drawing





Litton
ELECTRON TUBE DIVISION
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

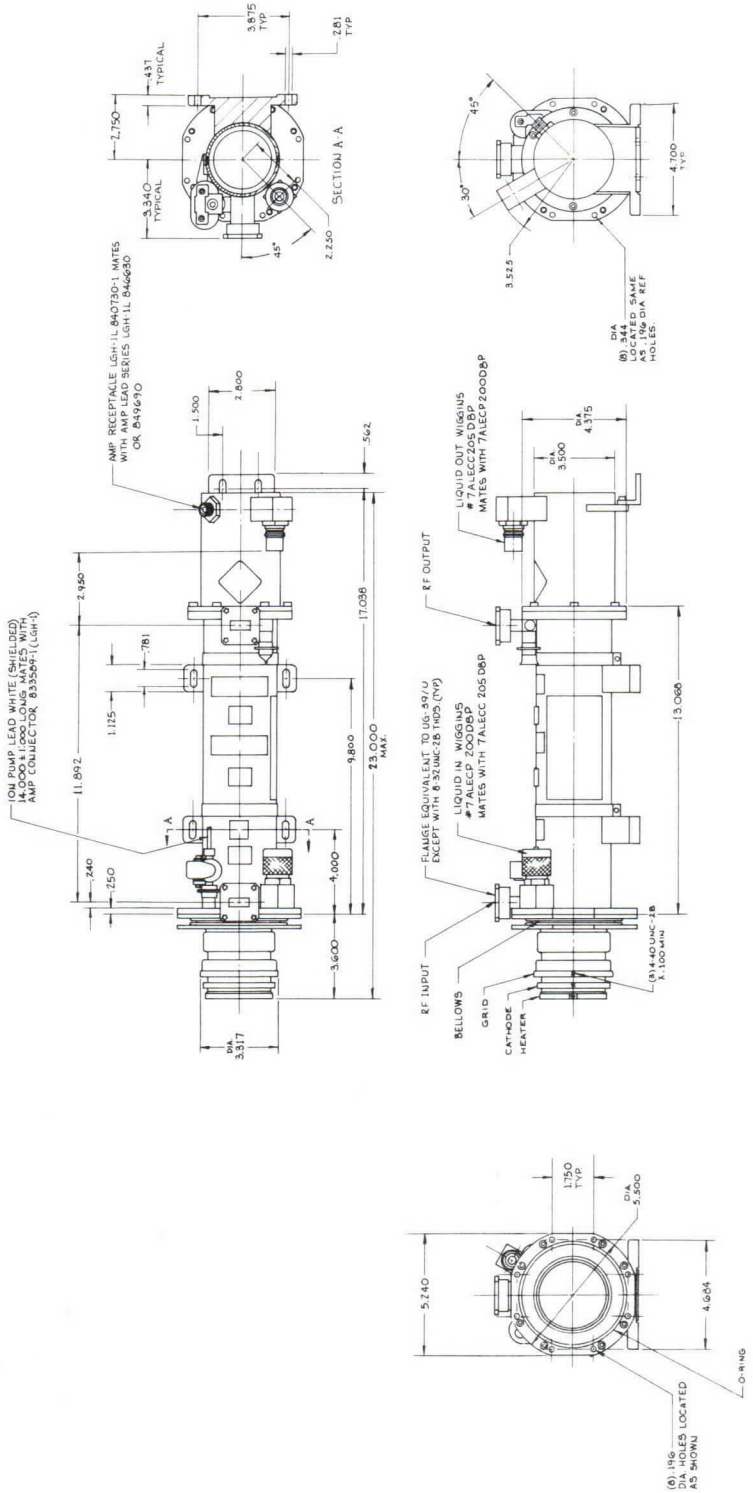
L-5391-53

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-54

80 kW Peak
X-Band PPM
Grid Pulsed
Conduction & Air Cooled
.001 Duty
46 dB Gain

The L-5391-54 coupled cavity traveling wave tube provides a minimum pulsed power output of 80 kW over the frequency range of 10.0 to 11.0 GHz. It is conduction and forced air cooled and operates at a duty cycle of .001. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-54 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 80 kW
Duty	0.001
Power Input	Max 2.0 W
Frequency	10.0 to 11.0 GHz
Saturation Gain	Min 46 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	25°/1 %
— Grid Voltage	12°/1 %
— RF Input Power	4°/1 dB

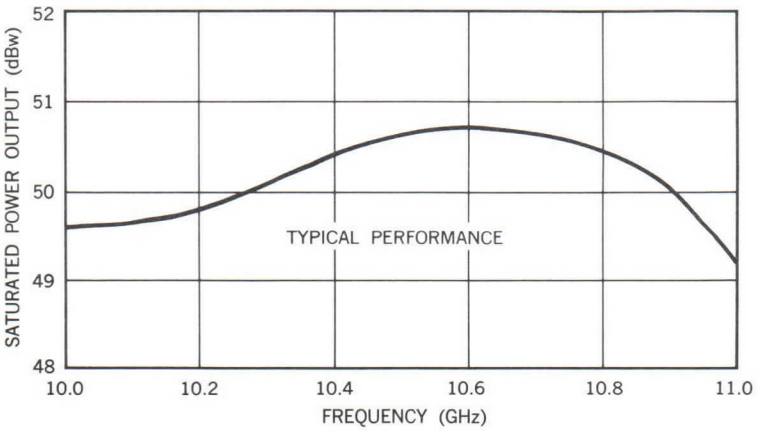
The tube is fully stable without RF drive power and operating into a worst phase mismatch of 2:1.

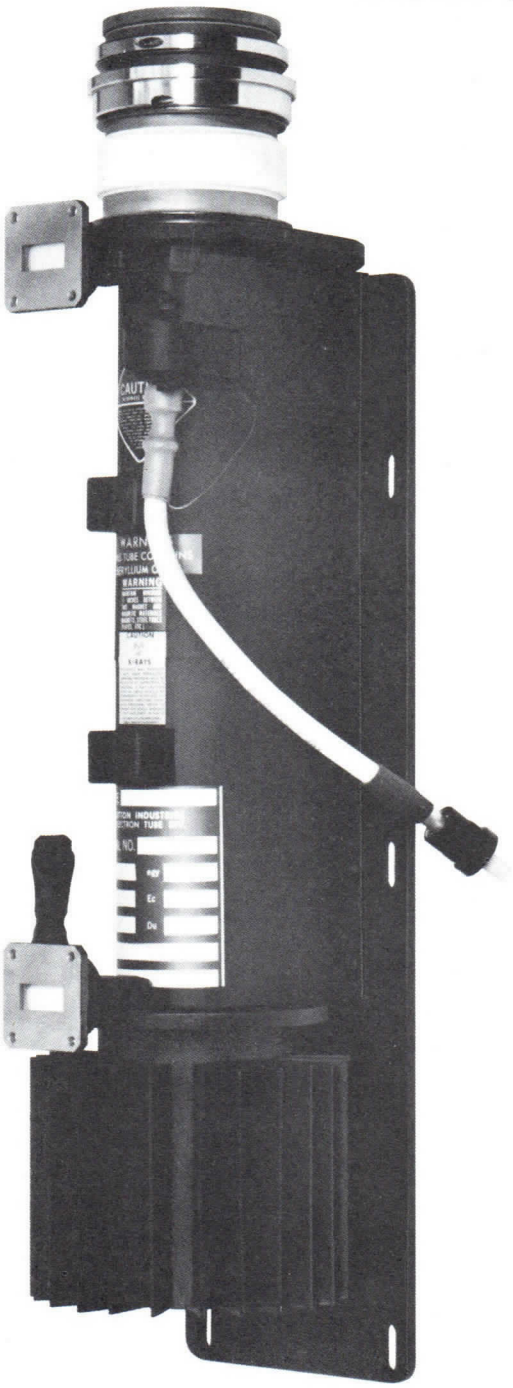
TYPICAL OPERATING CONDITIONS

Cathode Voltage	—41.7 kV
Peak Cathode Current	13.2 A
Collector Voltage	Ground
Grid Bias	—500 V
Peak Grid Drive (Above cathode)	+570 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Conduction and Forced Air	100 CFM

MECHANICAL

Mounting Position	Any
Weight	32 lbs.
Dimensions	See Outline Drawing





Litton
ELECTRON TUBE DIVISION
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-54

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

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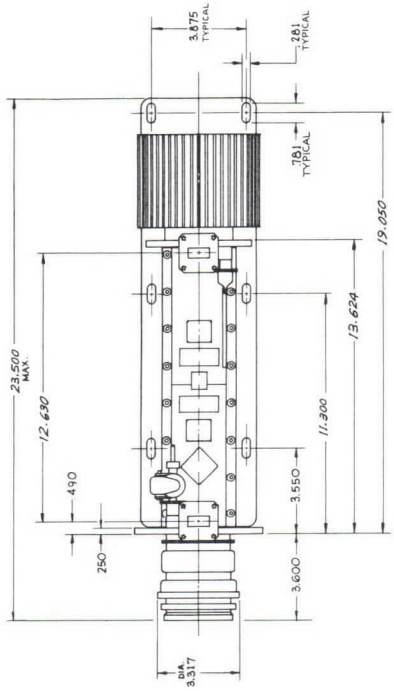

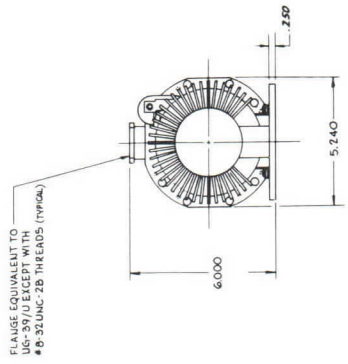

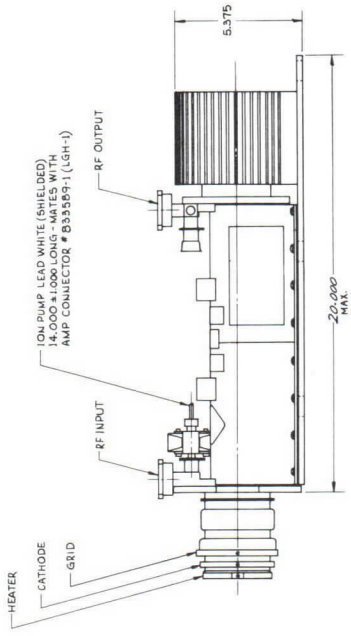

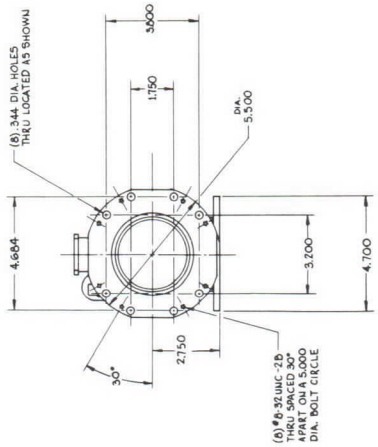

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Litton **ELECTRON TUBE DIVISION**
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-01

- 100 kW Peak
- X-Band PPM
- Cathode Pulsed
- Conduction & Air Cooled
- .002 Duty
- 62 dB Gain

The L-5391-01 coupled cavity traveling wave tube provides a minimum pulsed power output of 100 kW over the frequency range of 9.0 to 9.2 GHz. It is conduction and forced air cooled and operates at a duty cycle of .002. The tube is cathode pulsed and is PPM focused with Samarium Cobalt magnets. The L-5391-01 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 100 kW
Duty	0.002
Power Input	Max .07 W
Frequency	9.0 to 9.2 GHz
Saturation Gain	Min 62 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	35°/1%
— RF Input Power	6°/1 dB

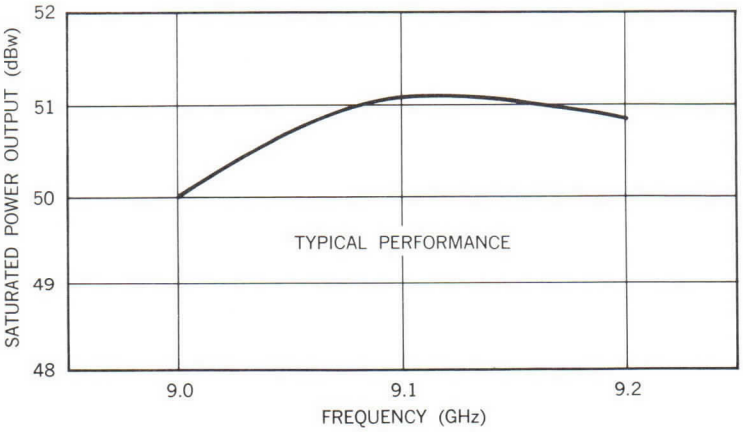
The tube is fully stable without RF drive power and operating into a worst phase mismatch of 2:1.

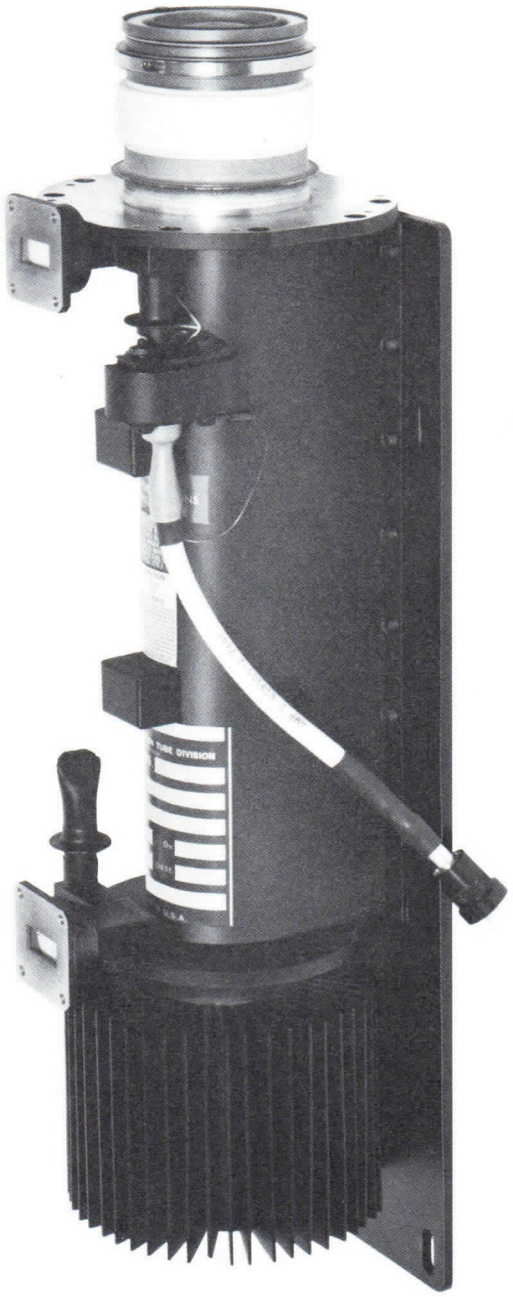
TYPICAL OPERATING CONDITIONS

Peak Cathode Voltage	—44.0 kV
Peak Cathode Current	15.3 A
Collector Voltage	Ground
Heater Voltage	11.5 V
Heater Current	4.8 A
Cooling	
Conduction and Forced Air	150 CFM

MECHANICAL

Mounting Position	Any
Weight	31 lbs.
Dimensions	See Outline Drawing





Litton **ELECTRON TUBE DIVISION**
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

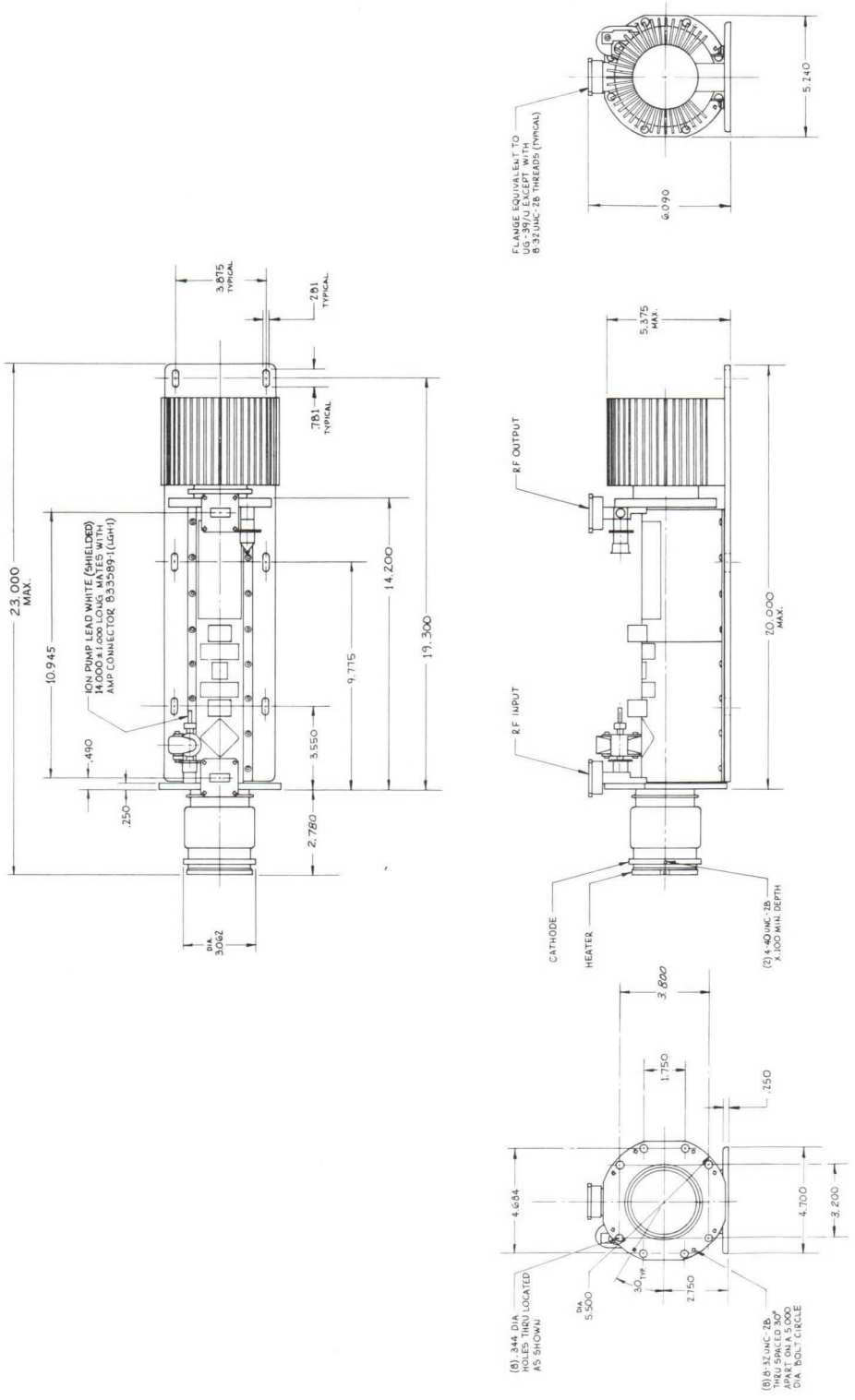
L-5391-01

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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ELECTRON TUBE DIVISION
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2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-51

- 100 kW Peak
- X-Band PPM
- Grid Pulsed
- Conduction & Air Cooled
- .001 Duty
- 53 dB Gain

The L-5391-51 coupled cavity traveling wave tube provides a minimum pulsed power output of 100 kW over the frequency range of 9.0 to 10.0 GHz. It is conduction and forced air cooled and operates at a duty cycle of .001. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-51 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 100 kW
Duty	0.001
Power Input	Max .5 W
Frequency	9.0 to 10.0 GHz
Saturation Gain	Min 53 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	22°/1 %
— Grid Voltage	6°/1 %
— RF Input Power	5°/1 dB

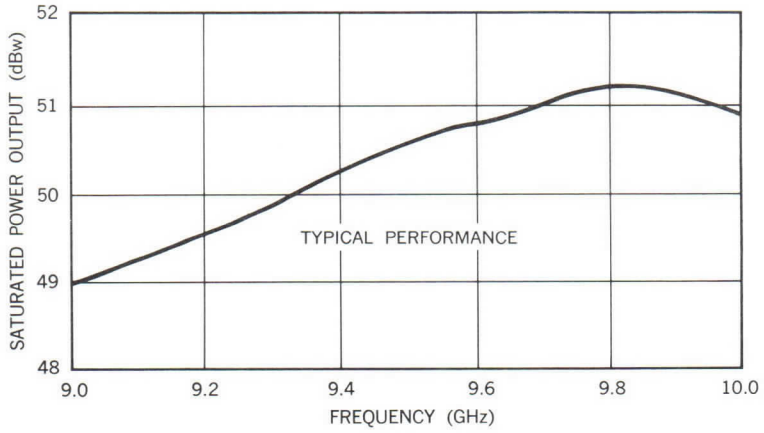
The tube is fully stable without RF drive power and operating into a worst phase mismatch of 2:1.

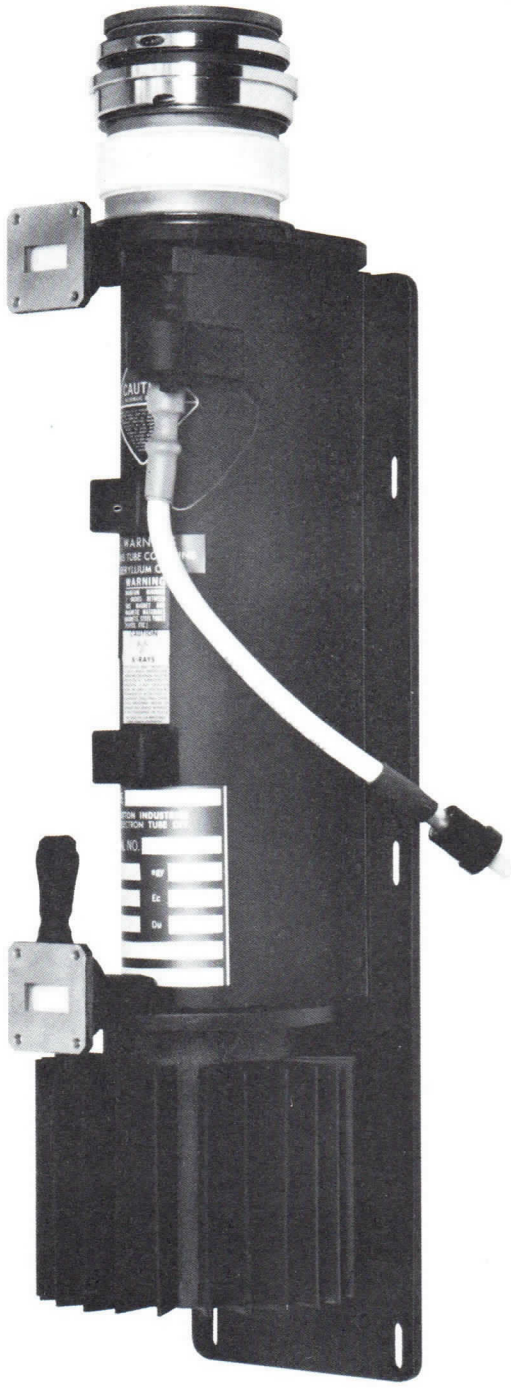
TYPICAL OPERATING CONDITIONS

Cathode Voltage	—44.5 kV
Peak Cathode Current	13.5 A
Collector Voltage	Ground
Grid Bias	—500 V
Peak Grid Drive (Above cathode)	+683 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Conduction & Forced Air	100 CFM

MECHANICAL

Mounting Position	Any
Weight	30 lbs.
Dimensions	See Outline Drawing





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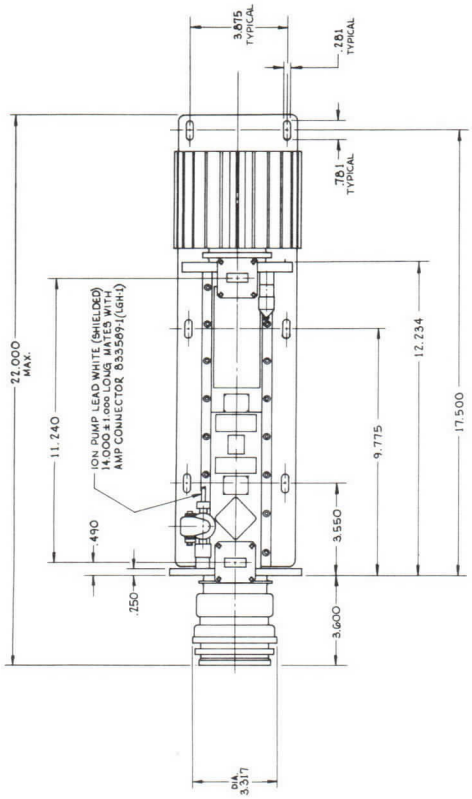
San Carlos, California

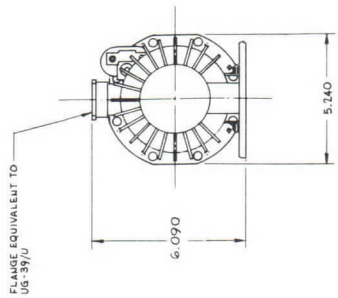
COUPLED CAVITY TRAVELING WAVE TUBE

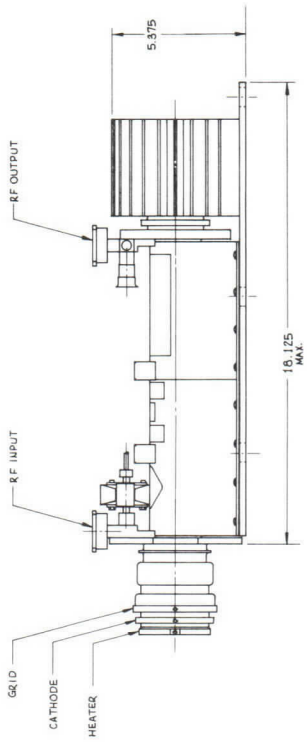
L-5391-51

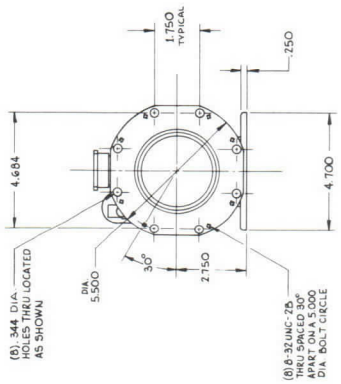
Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.









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960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-52

- 80 kW Peak
- X-Band PPM
- Grid Pulsed
- Liquid Cooled
- .01 Duty
- 59 dB Gain

The L-5391-52 coupled cavity traveling wave tube provides a minimum pulsed power output of 80 kW over the frequency range of 9.6 to 9.9 GHz. It is liquid cooled and operates at a duty cycle of .01. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-52 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 80 kW
Duty	0.01
Power Input	Max .1 W
Frequency	9.6 to 9.9 GHz
Saturation Gain	Min 59 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	24°/1 %
— Grid Voltage	6°/1 %
— RF Input Power	6°/1 dB

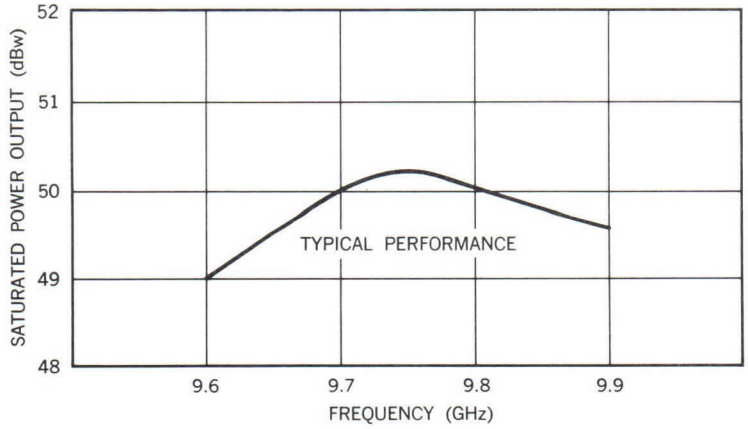
The tube is fully stable without RF drive power operating into a worst phase mismatch of 2:1.

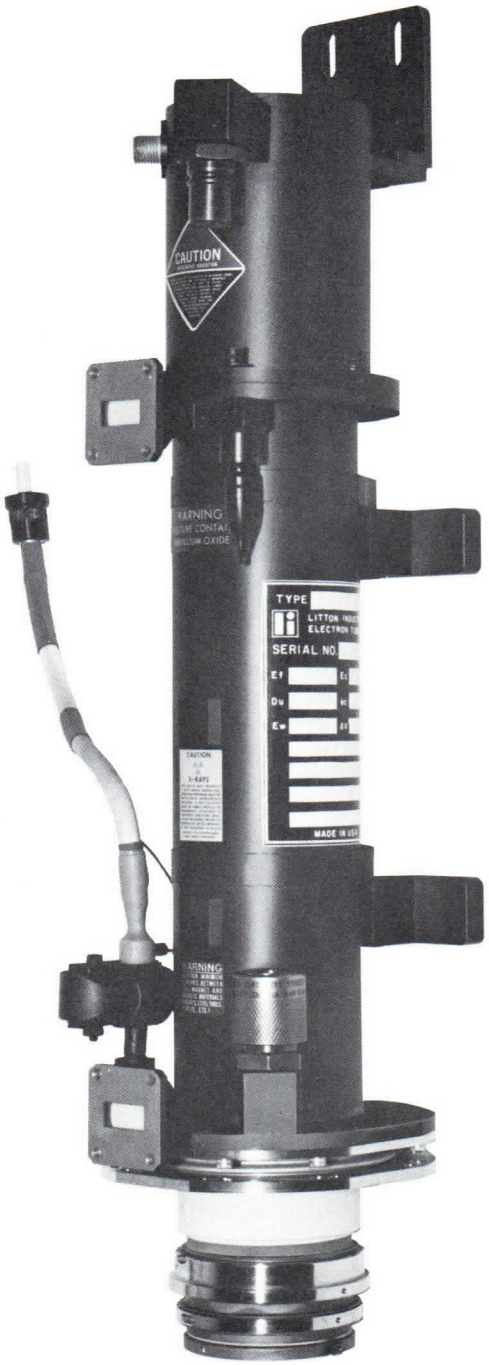
TYPICAL OPERATING CONDITIONS

Cathode Voltage	—42.1 kV
Peak Cathode Current	13.0 A
Collector Voltage	—17.0 kV
Peak Body Current	2 A
Grid Bias	—500 V
Peak Grid Drive (Above cathode)	+775 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Coolanol 20/25 or FC75/77	2.5 GPM

MECHANICAL

Mounting Position	Any
Weight	32 lbs.
Dimensions	See Outline Drawing





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ELECTRON TUBE DIVISION
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-52

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

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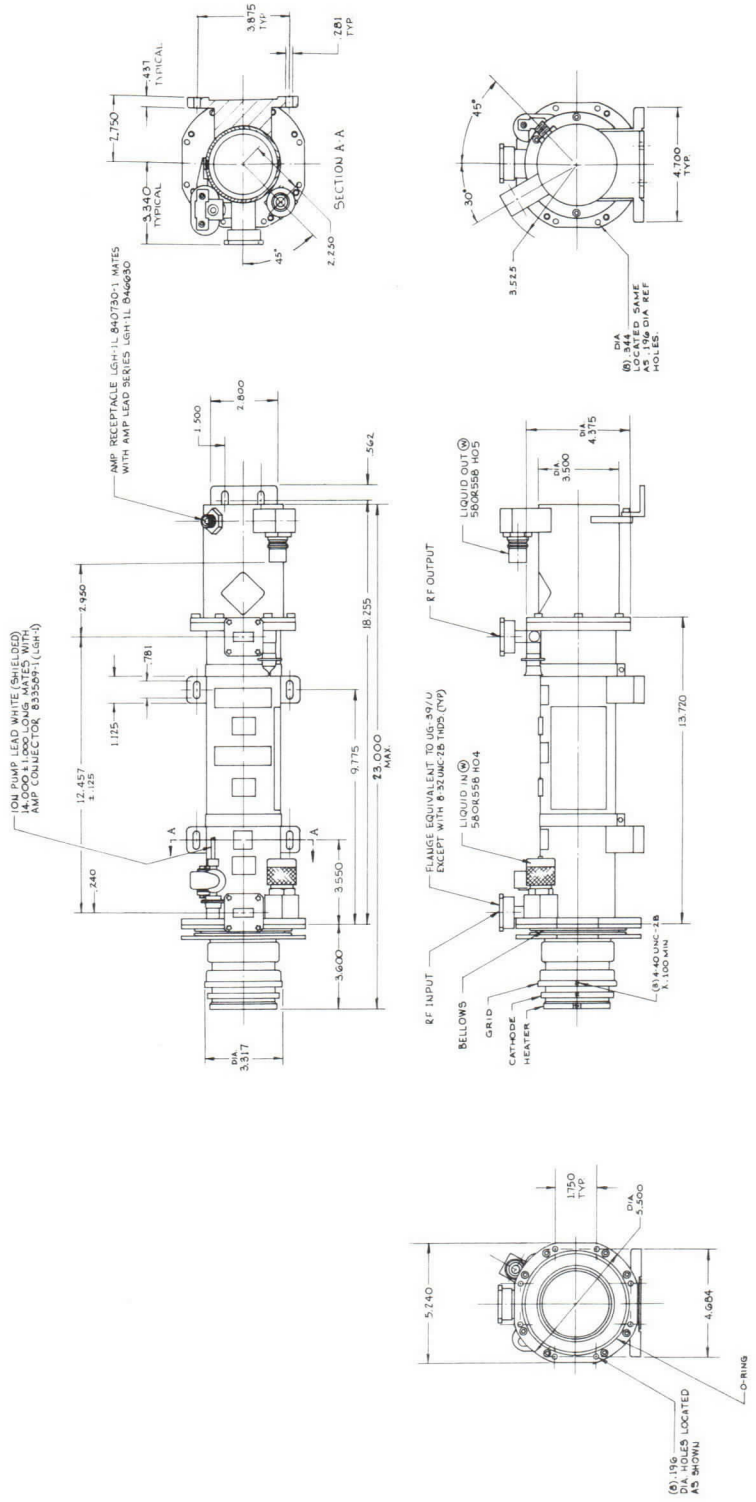

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2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-53

- 100 kW Peak
- X-Band PPM
- Grid Pulsed
- Liquid Cooled
- .01 Duty
- 51 dB Gain

The L-5391-53 coupled cavity traveling wave tube provides a minimum pulsed power output of 100 kW over the frequency range of 8.9 to 9.7 GHz. It is liquid cooled and operates at a duty cycle of .01. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-53 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 100 kW
Duty	0.01
Power Input	Max .8 W
Frequency	8.9 to 9.7 GHz
Saturation Gain	Min 51 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	25°/1 %
— Grid Voltage	8°/1 %
— RF Input Power	6°/1 dB

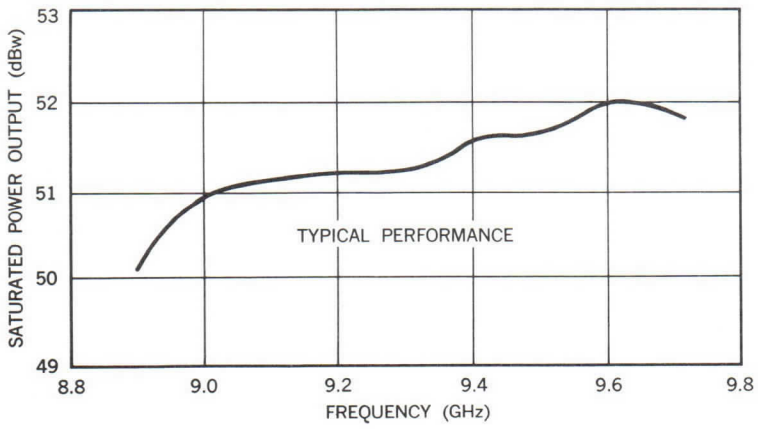
The tube is fully stable without RF drive power operating into a worst phase mismatch of 2:1.

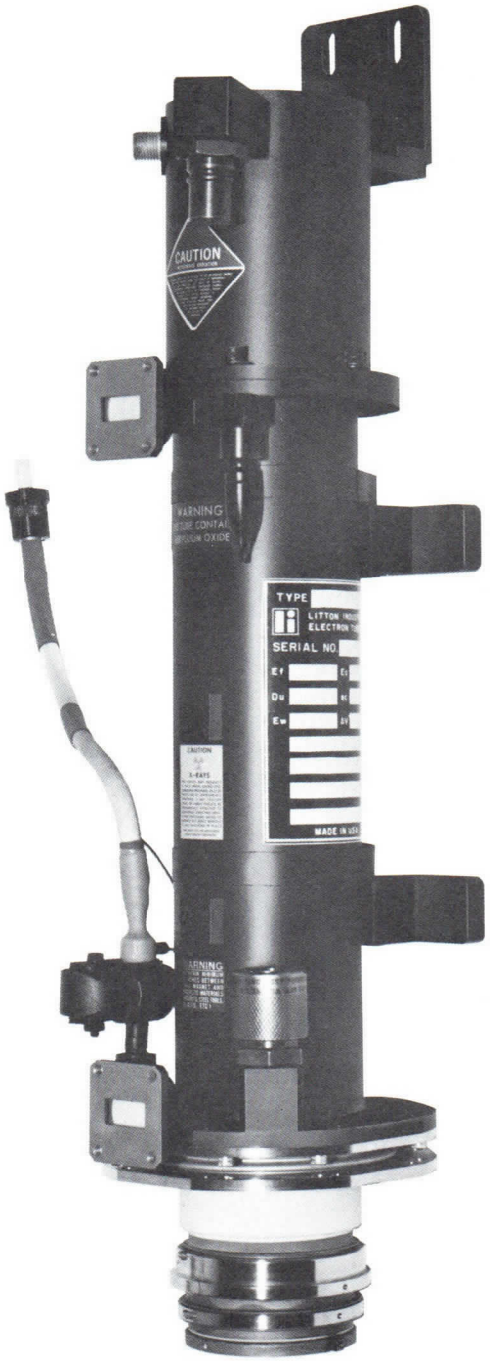
TYPICAL OPERATING CONDITIONS

Cathode Voltage	−42.6 kV
Peak Cathode Current	13.5 A
Collector Voltage	−17.0 kV
Peak Body Current	2 A
Grid Bias	−500 V
Peak Grid Drive (Above cathode)	+681 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Coolanol 20/25 or FC75/77	3.0 GPM

MECHANICAL

Mounting Position	Any
Weight	27 lbs.
Dimensions	See Outline Drawing





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COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-53

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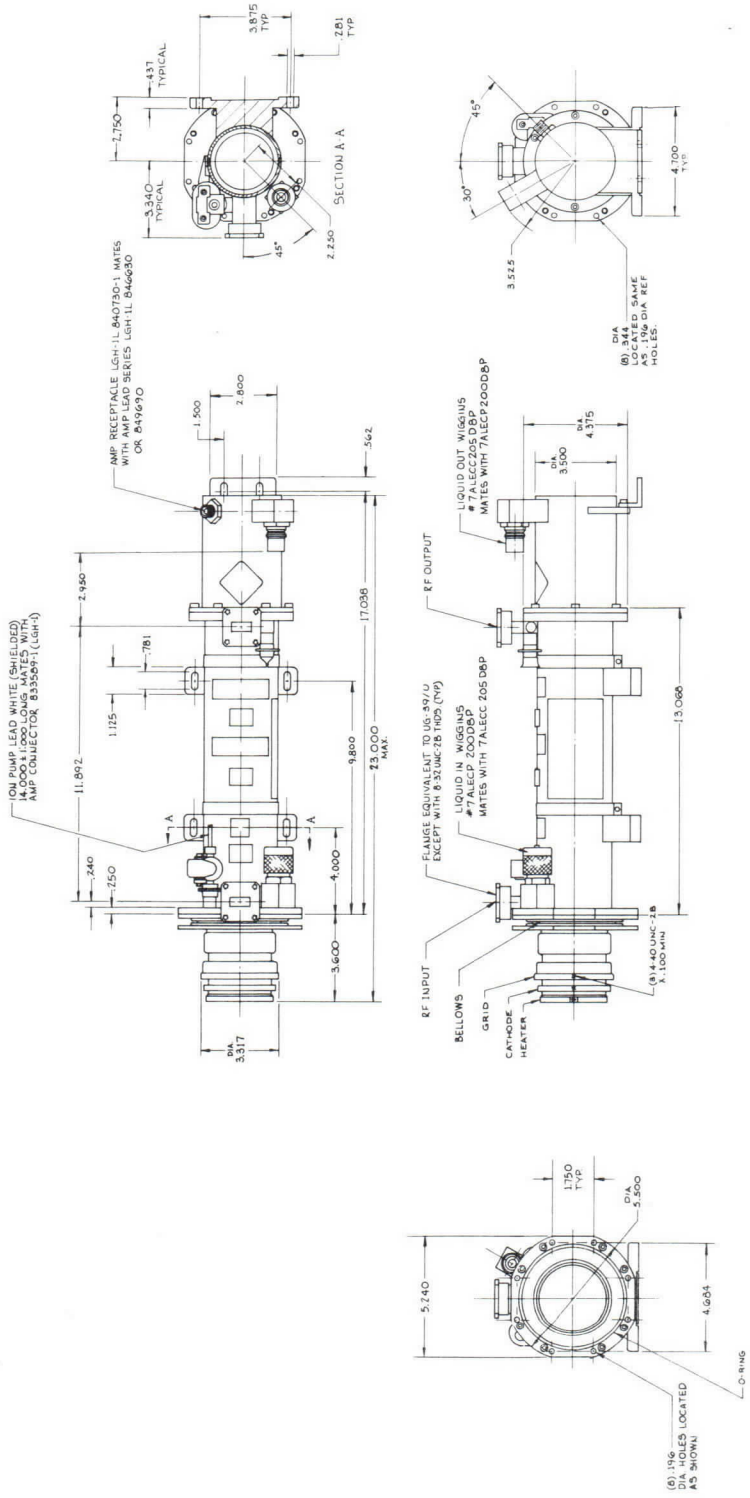

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2.5MJA475

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-54

80 kW Peak
X-Band PPM
Grid Pulsed
Conduction & Air Cooled
.001 Duty
46 dB Gain

The L-5391-54 coupled cavity traveling wave tube provides a minimum pulsed power output of 80 kW over the frequency range of 10.0 to 11.0 GHz. It is conduction and forced air cooled and operates at a duty cycle of .001. The tube has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets. The L-5391-54 is designed for operation in MIL-E-5400, Class 2 environment.

The L-5391 series of coupled cavity TWT's is designed to provide up to 100 kW pulsed power output in discrete frequency ranges within the 7 to 11 GHz band, with instantaneous bandwidths of 2 to 11% and up to .01 duty cycle.

PERFORMANCE

Pulsed Power Output	Min 80 kW
Duty	0.001
Power Input	Max 2.0 W
Frequency	10.0 to 11.0 GHz
Saturation Gain	Min 46 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	25°/1 %
— Grid Voltage	12°/1 %
— RF Input Power	4°/1 dB

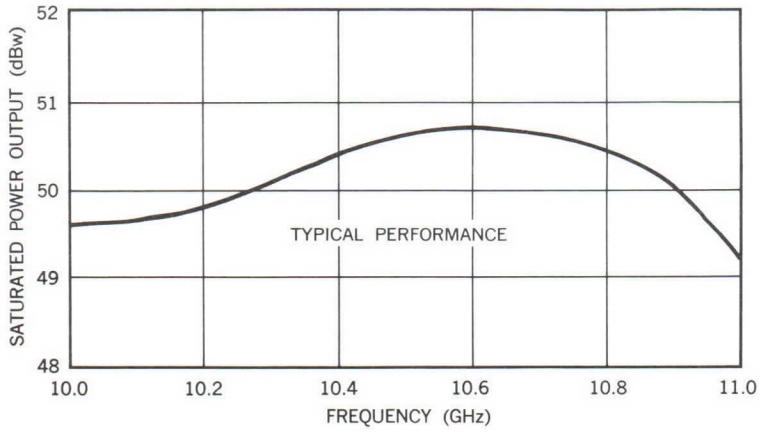
The tube is fully stable without RF drive power and operating into a worst phase mismatch of 2:1.

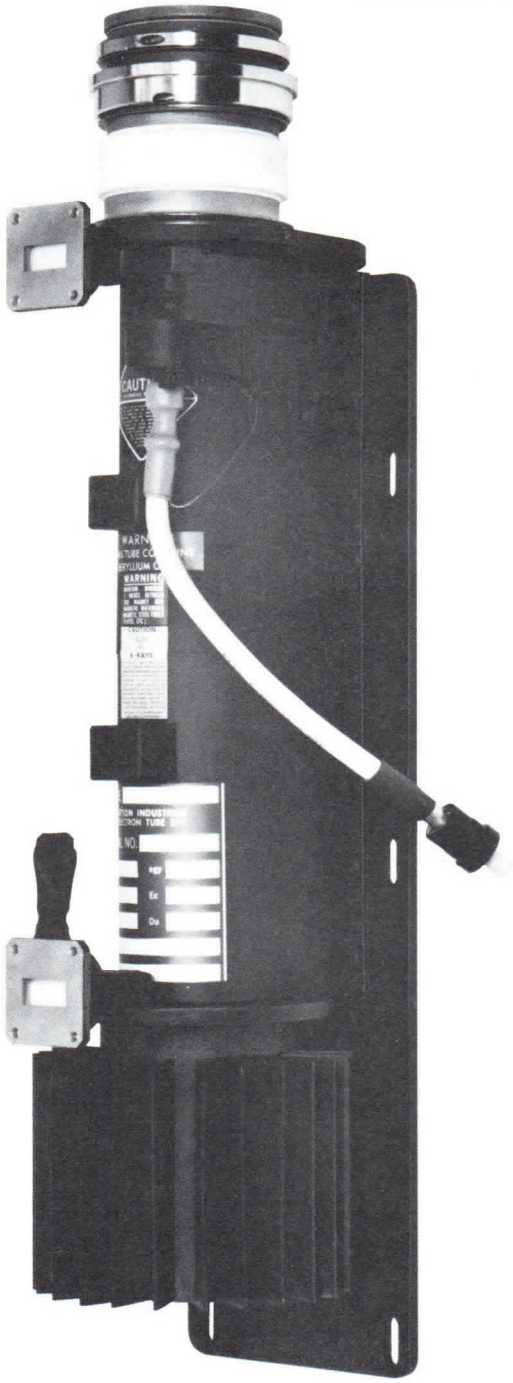
TYPICAL OPERATING CONDITIONS

Cathode Voltage	−41.7 kV
Peak Cathode Current	13.2 A
Collector Voltage	Ground
Grid Bias	−500 V
Peak Grid Drive (Above cathode)	+570 V
Peak Grid Current	Max 50 mA
Heater Voltage	11 V
Heater Current	5 A
Cooling	
Conduction and Forced Air	100 CFM

MECHANICAL

Mounting Position	Any
Weight	32 lbs.
Dimensions	See Outline Drawing





Litton
ELECTRON TUBE DIVISION
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

L-5391-54

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CAUTION

X-RAYS

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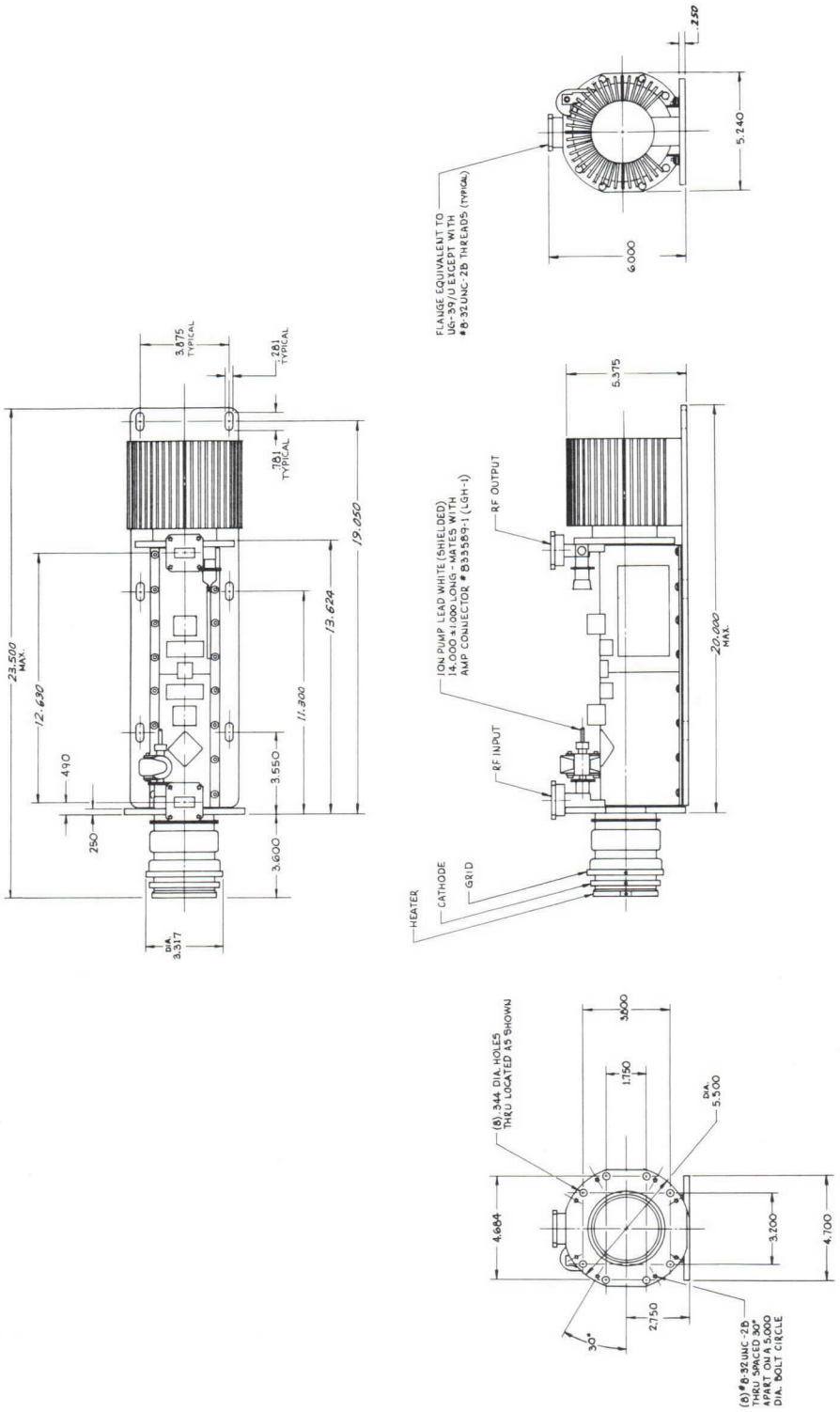

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Litton **ELECTRON TUBE DIVISION**
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA475

TRAVELING WAVE TUBE

L-5437-01

5.0 to 10.0 GHz
10 watts Min.
30 dB gain
PPM Focused

The L-5437-01 is a broadband miniature traveling wave amplifier having a minimum power output of 10 watts over the frequency range of 5000 to 10,000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	CW
Cathode Voltage	2.4 kVdc (Neg.)
Cathode Current	50 mA
Anode Voltage	Ground Potential
Helix Voltage	Ground Potential
Collector Voltage	1500 V
Heater Voltage	6.3 V
Heater Current	0.4 A

PERFORMANCE CHARACTERISTICS

Frequency Range	5000 to 10,000 MHz
Power Output	Min. 10 W
Small Signal Gain	Min. 35 dB
Gain at Rated Power	Min. 30 dB

MAXIMUM RATINGS

Cathode Voltage	2650 V
Cathode Current	60 mA
Collector Temperature	125°C
Load VSWR	3.1:0

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	0.5 lbs.
Cooling	Conduction
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	15 G
Ambient Temperature	−55°C to +75°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	2300 to 2500 Vdc
Cathode Current (Maximum)	55 mA
Heater Voltage (RMS AC or DC)	6.0 to 6.6 V
Heater Current	0.35 to 0.5 A

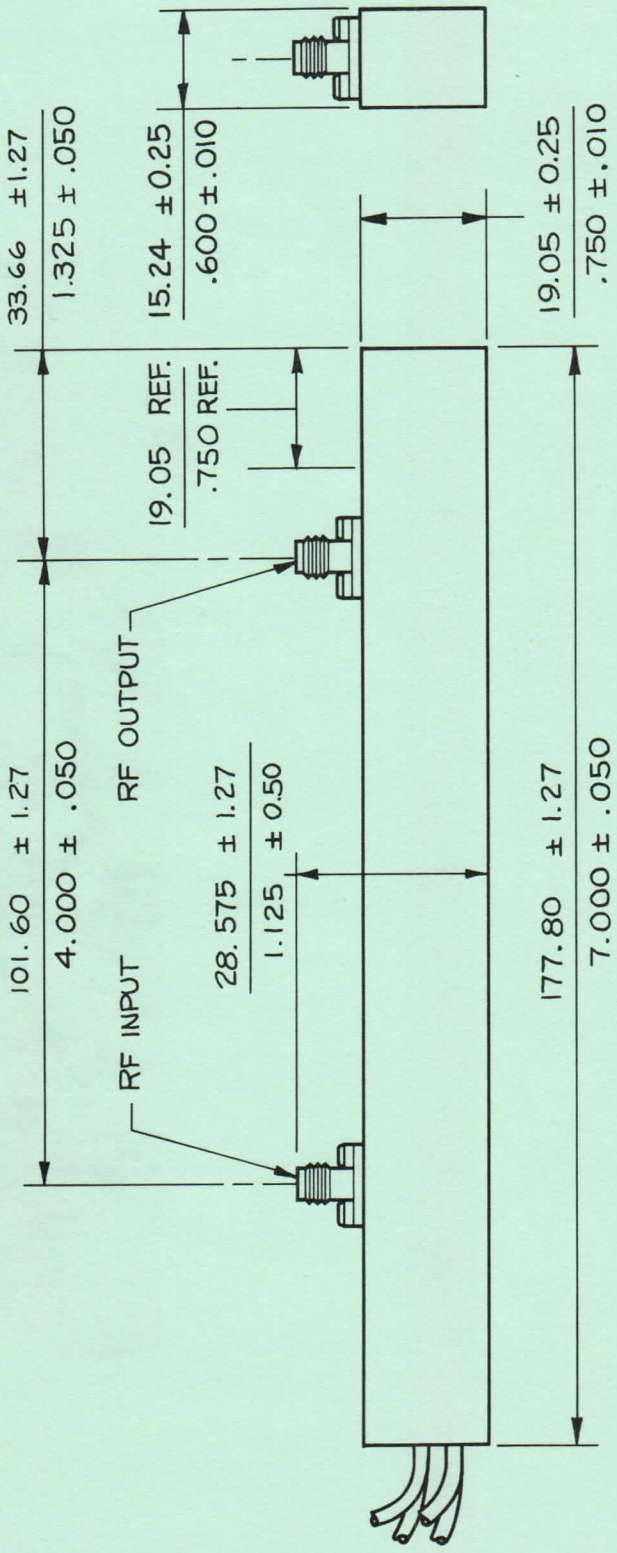
Litton **ELECTRON TUBE DIVISION**
San Carlos, California

TRAVELING WAVE TUBE

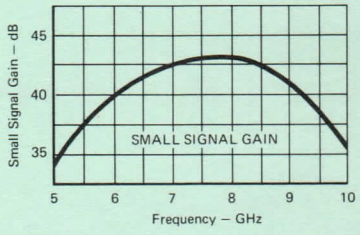
L-5437-01

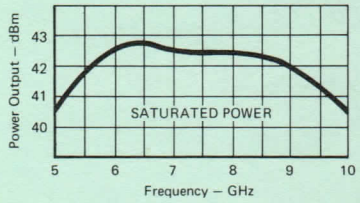
CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.



NOTE: MILLIMETERS / INCHES





The mechanical dimensions shown above are for reference only and are subject to change.
Current detailed outline drawings are available on request.

Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

3MJA474

COUPLED CAVITY TRAVELING WAVE TUBE

L-5519-51

- 15 kW Peak
- X-Band PPM
- Grid Pulsed
- Liquid Cooled
- .0125 Duty
- 57 dB Gain

The L-5519-51 coupled cavity traveling wave tube provides a minimum pulsed power output of 15 kW over the frequency range of 9.5 to 10.0 GHz. It has a saturated gain of 57 dB minimum over a 5% bandwidth, and is suitable for use in airborne radar systems.

The tube is liquid cooled and operates at a duty cycle of .0125. It has a shadow gridded gun and is PPM focused with Samarium Cobalt magnets.

The L-5519-51 is designed for operation in MIL-E-5400, Class 2 environment.

PERFORMANCE

Pulsed Power Output	Min 15 kW
Duty	0.0125
Power Input	Max 30 mW
Frequency	9.5 to 10.0 GHz
Saturation Gain	Min 57 dB
Insertion Loss	80 dB
Phase Pushing — Cathode Voltage	22°/1 %
— Grid Voltage	7°/1 %
— RF Input Power	2°/1 dB

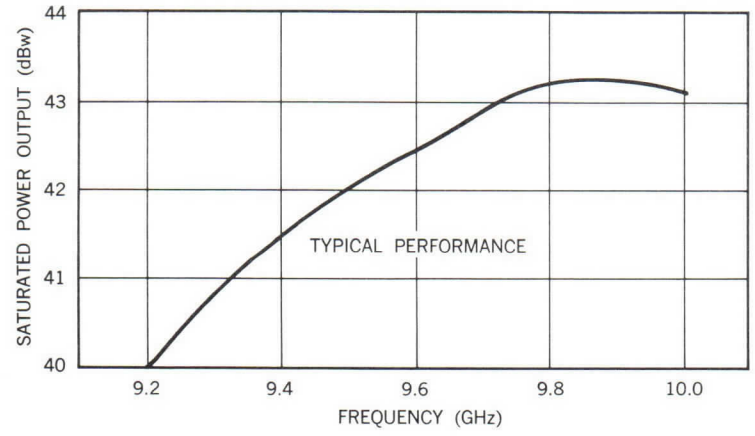
The tube is fully stable without RF drive power operating into a worst phase mismatch of 2.5:1.

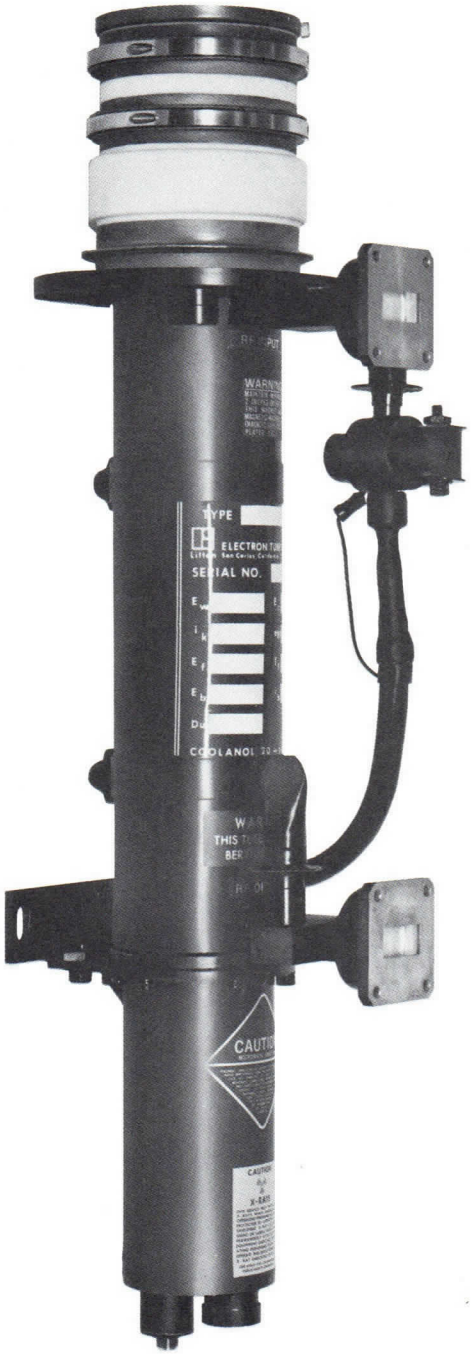
TYPICAL OPERATING CONDITIONS

Cathode Voltage	−23.9 kV
Peak Cathode Current	4.5 A
Collector Voltage	−11.0 kV
Peak Body Current	0.6 A
Grid Bias	−400 V
Peak Grid Drive (Above cathode)	+250 V
Peak Grid Current	Max 50 mA
Heater Voltage	12.5 V
Heater Current	3.5 A
Cooling	
Coolanol 20/25 or FC75/77	1 GPM

MECHANICAL

Mounting Position	Any
Weight	12.5 lbs.
Dimensions	See Outline Drawing





Litton

ELECTRON TUBE DIVISION
San Carlos, California

COUPLED CAVITY TRAVELING WAVE TUBE

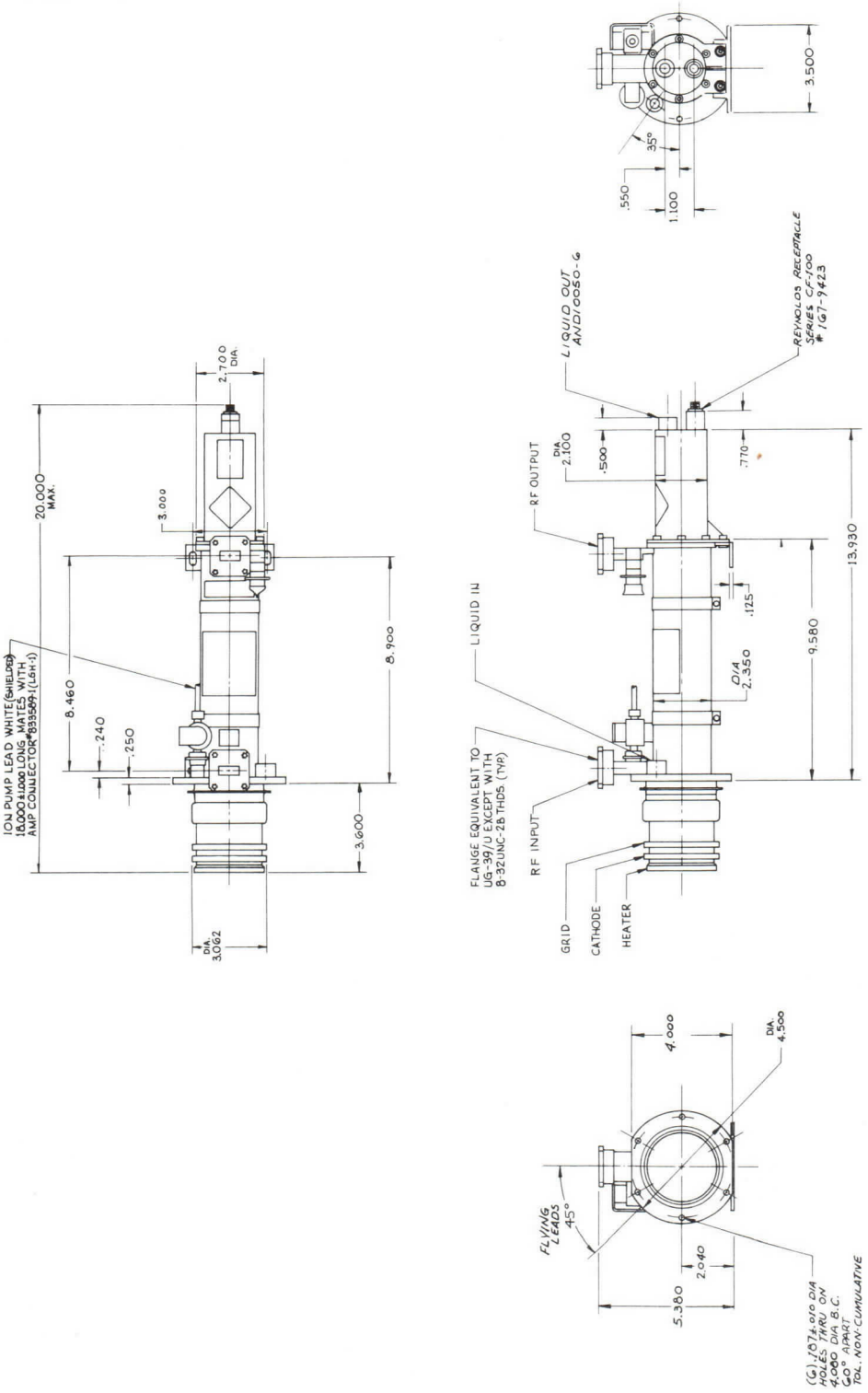
L-5519-51

CAUTION
MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

CAUTION
X-RAYS

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

RING-LOOP TRAVELING WAVE TUBE

L-5540-50

1.8 to 2.0 GHz
2000 watts Min.
35 dB saturation gain
PPM Focused
High Mu grid

The L-5540-50 is a ring-loop traveling wave amplifier having a minimum power output of 2000 watts over the frequency range of 1800 to 2000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	0.10
Cathode Voltage	6.9 kVdc (Neg.)
Cathode Current	1.15 a
Anode Voltage	Ground Potential
Helix Voltage	Ground Potential
Collector Voltage	2.0 kVdc (Neg.)
Grid Voltage (With respect to cathode)	70 V (Pos.)
Filament Voltage	6.3 V
Filament Current	3.6 A
Grid Current	50 ma

PERFORMANCE CHARACTERISTICS

Frequency Range	1800 to 2000 MHz
Power Output	Min. 2000 W
Small Signal Gain	Min. 37 dB

MAXIMUM RATINGS

Cathode Voltage	10.0 kVdc (Neg.)
Cathode Current	2.0 a
Collector Temperature	140°C
Load VSWR	3.0:1

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	6.5 lbs.
Cooling	Forced Air*
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +71°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	6.8 to 7.0 Vdc
Cathode Current (Maximum)	
Not including Grid Current	1.2 a
Grid Voltage Range (With respect to cathode)	+50 to +100 v
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	100 ma
Grid Cut-off Voltage (High Mu Grid)	−125 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	3.5 to 3.75 A

*This tube is also available in a conduction cooled version which weighs 6.0 pounds, and is 17.5 inches long.

Litton

ELECTRON TUBE DIVISION
San Carlos, California

RING-LOOP TRAVELING WAVE TUBE

L-5540-50

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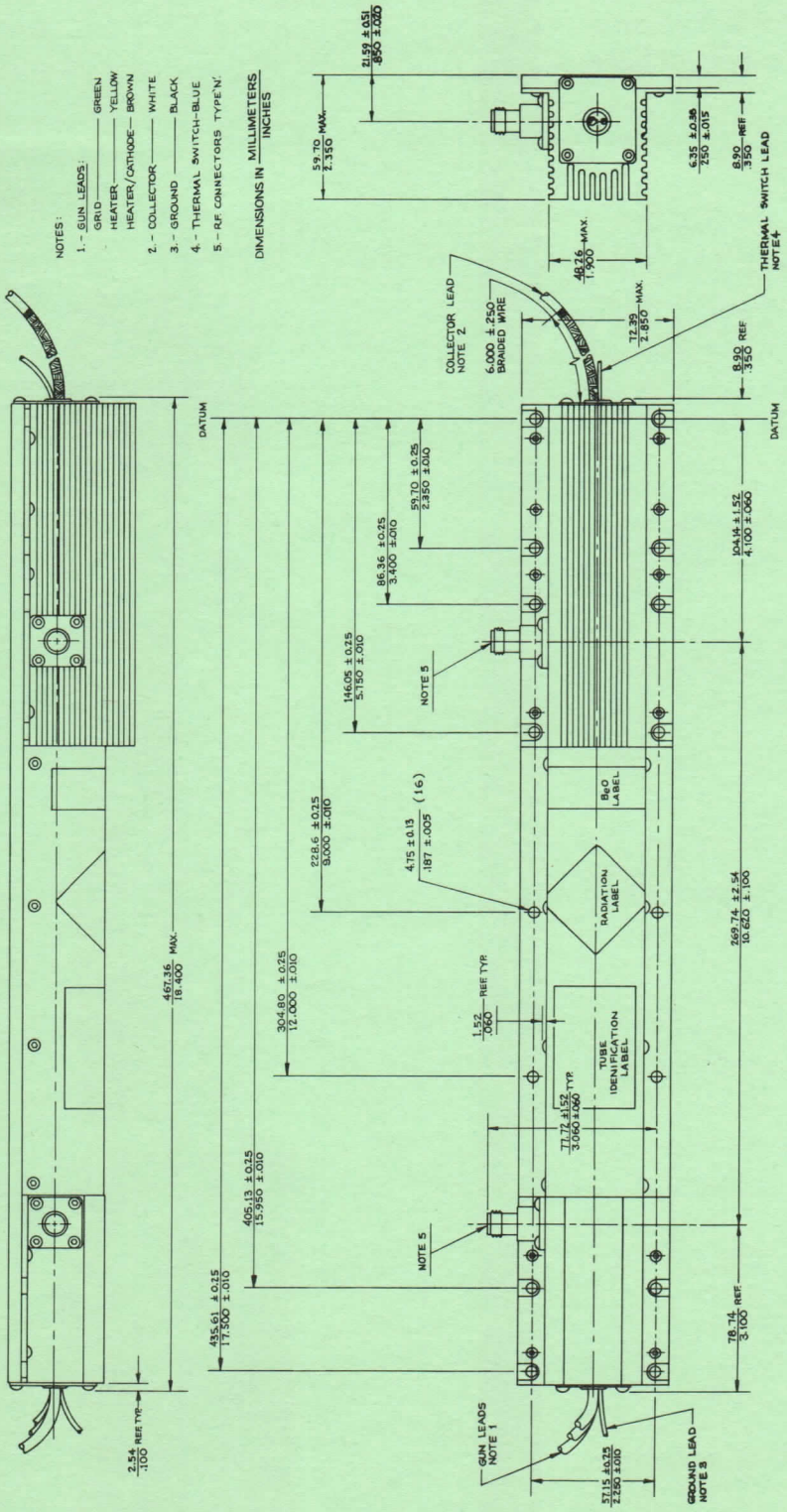

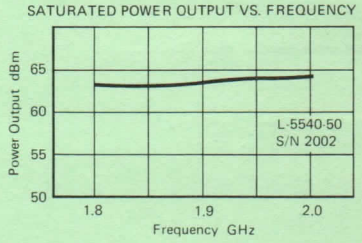

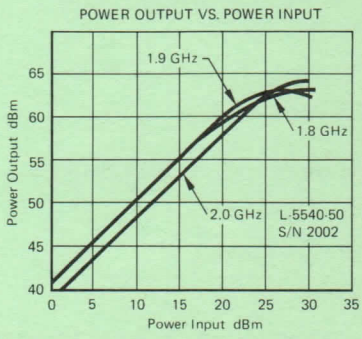

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Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA375

RING-LOOP TRAVELING WAVE TUBE

L-5540-50

- 1.8 to 2.0 GHz
- 2000 watts Min.
- 35 dB saturation gain
- PPM Focused
- High Mu grid

The L-5540-50 is a ring-loop traveling wave amplifier having a minimum power output of 2000 watts over the frequency range of 1800 to 2000 MHz. The tube has a metal-ceramic vacuum envelope and utilizes periodic permanent magnet focusing.

TYPICAL OPERATING CONDITIONS

Duty	0.10
Cathode Voltage	6.9 kVdc (Neg.)
Cathode Current	1.15 a
Anode Voltage	Ground Potential
Helix Voltage	Ground Potential
Collector Voltage	2.0 kVdc (Neg.)
Grid Voltage (With respect to cathode)	70 V (Pos.)
Filament Voltage	6.3 V
Filament Current	3.6 A
Grid Current	50 ma

PERFORMANCE CHARACTERISTICS

Frequency Range	1800 to 2000 MHz
Power Output	Min. 2000 W
Small Signal Gain	Min. 37 dB

MAXIMUM RATINGS

Cathode Voltage	10.0 kVdc (Neg.)
Cathode Current	2.0 a
Collector Temperature	140°C
Load VSWR	3.0:1

MECHANICAL DESCRIPTION

Dimensions	See Outline Drawing
Weight	6.5 lbs.
Cooling	Forced Air*
Mounting Position	Any

ENVIRONMENTAL CAPABILITY

Shock	30 G
Vibration	10 G
Ambient Temperature	−54°C to +71°C
Altitude	Any

POWER SUPPLY REQUIREMENTS

Cathode Voltage Range	6.8 to 7.0 Vdc
Cathode Current (Maximum)	
Not including Grid Current	1.2 a
Grid Voltage Range (With respect to cathode)	+50 to +100 v
Grid Current (Maximum)	
High Mu Grid (Pulse Applications)	100 ma
Grid Cut-off Voltage (High Mu Grid)	−125 Vdc
Filament Voltage (RMS AC or DC)	6.3 V
Filament Current	3.5 to 3.75 A

*This tube is also available in a conduction cooled version which weighs 6.0 pounds, and is 17.5 inches long.

Litton

ELECTRON TUBE DIVISION
San Carlos, California

RING-LOOP TRAVELING WAVE TUBE

L-5540-50

CAUTION
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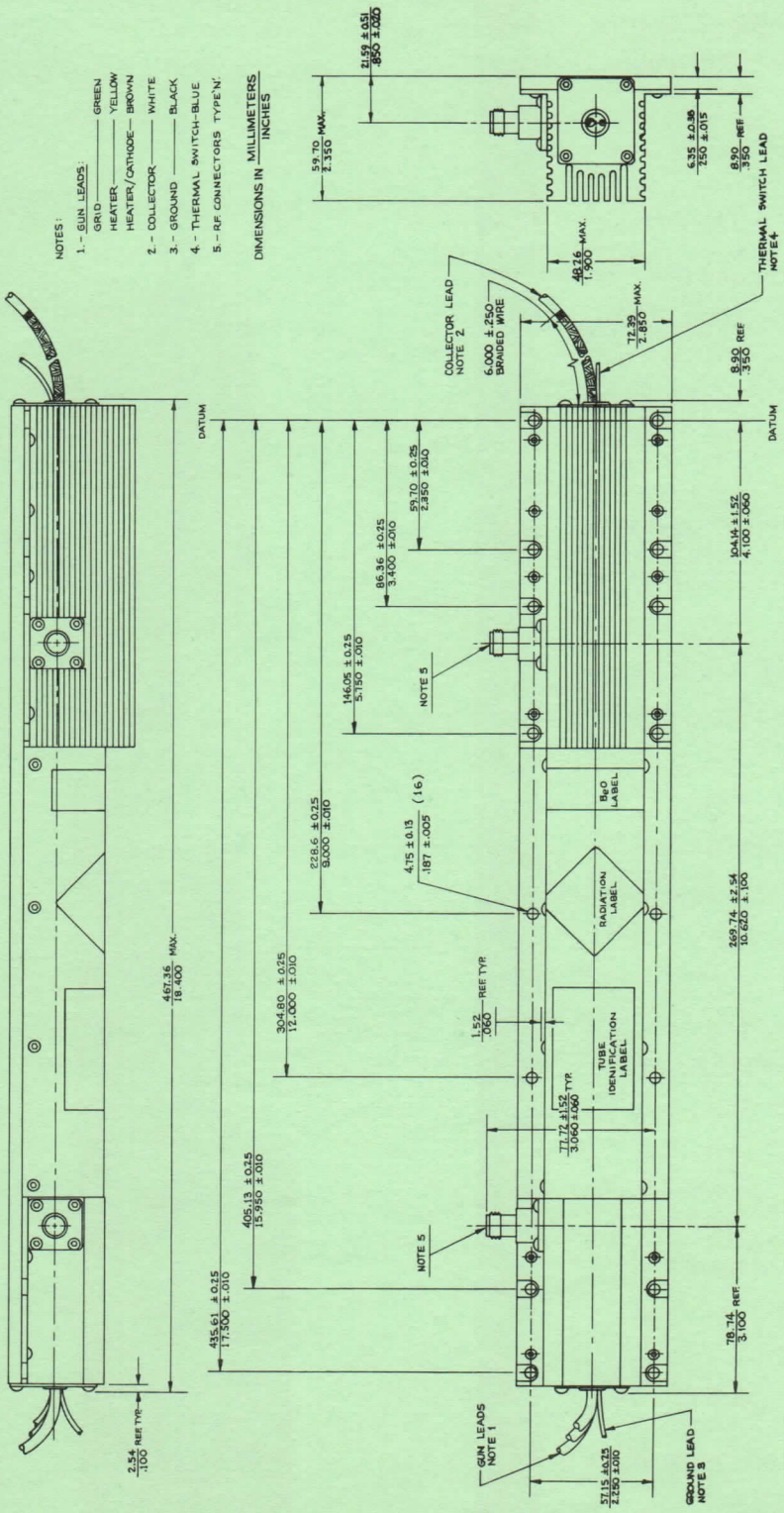
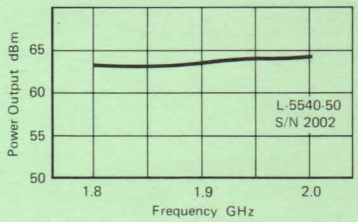
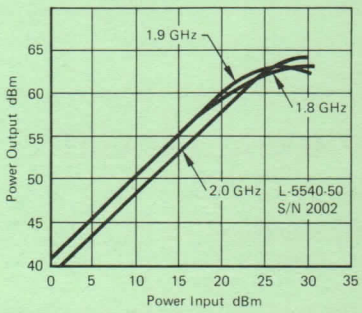


SATURATED POWER OUTPUT VS. FREQUENCY



POWER OUTPUT VS. POWER INPUT



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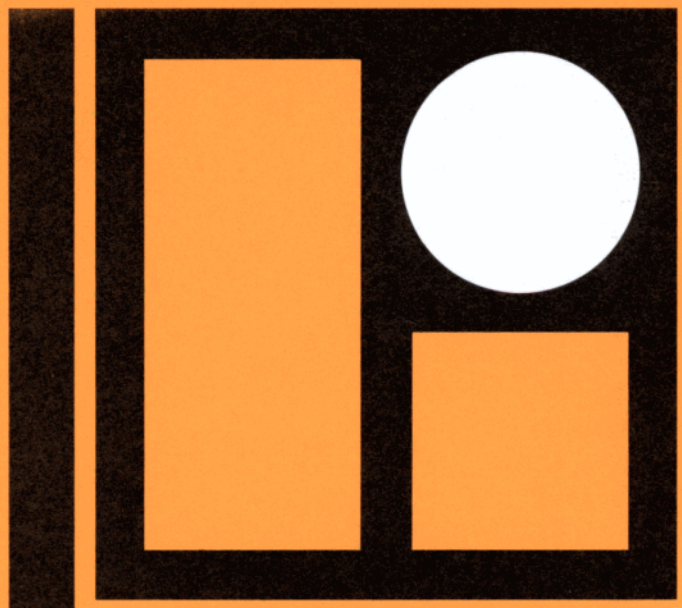
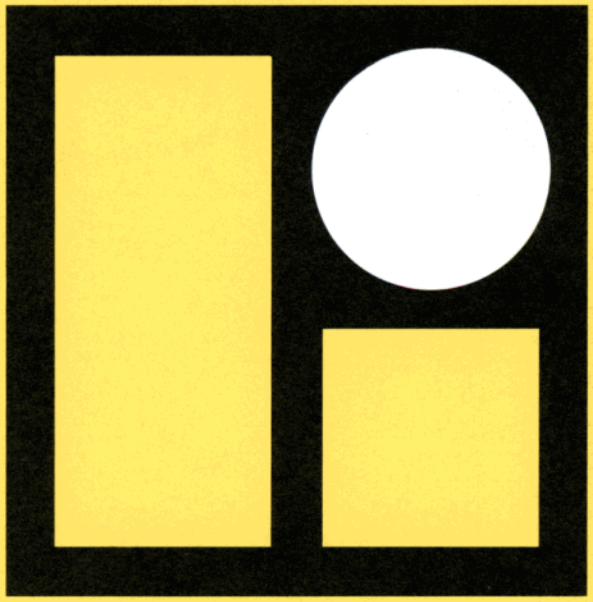
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

2.5MJA375

MILLIMETER WAVE TUBES



SWITCH TUBES



EQUIPMENTS—ACCESSORIES

9

MODEL 46

FOCUS COIL

Litton Industries designs and produces auxiliary tube hardware and tube related equipment whether it be for Litton tube customers or an accessory for other manufacturers' products.

Solenoids engineered by Litton incorporate the following design features:

1. Single electrical terminal board for top and bottom sections.
2. One coolant input/output manifold.
3. Ease of access to the microwave tube.
4. Moderate power requirement.
5. Integral lead shielding where required.
6. Vacuum potting to insure complete insulation, with a resultant improvement in reliability.
7. Leak resistant cooling system.
8. Reworkable design.
9. Wound in either foil or wire.

MECHANICAL SPECIFICATIONS

Number of coils..... 6
Four (4) coil windings in bottom section
Two (2) coil windings in top section
Height entire assembly including eyebolts..... 32.06 in.
Height bottom and top coil assembly..... 29.81 in.
Height bottom coil assembly..... 23.06 in.
Height top coil assembly..... 6.75 in.
Width, O.D. of entire coil assembly..... 11.62 in.
Width, I.D. of entire coil assembly..... 6.260 in.
Maximum diameter.....14.625 in.
Weight entire coil assembly.....467 lbs.
Cooling (water).....1.5 gpm

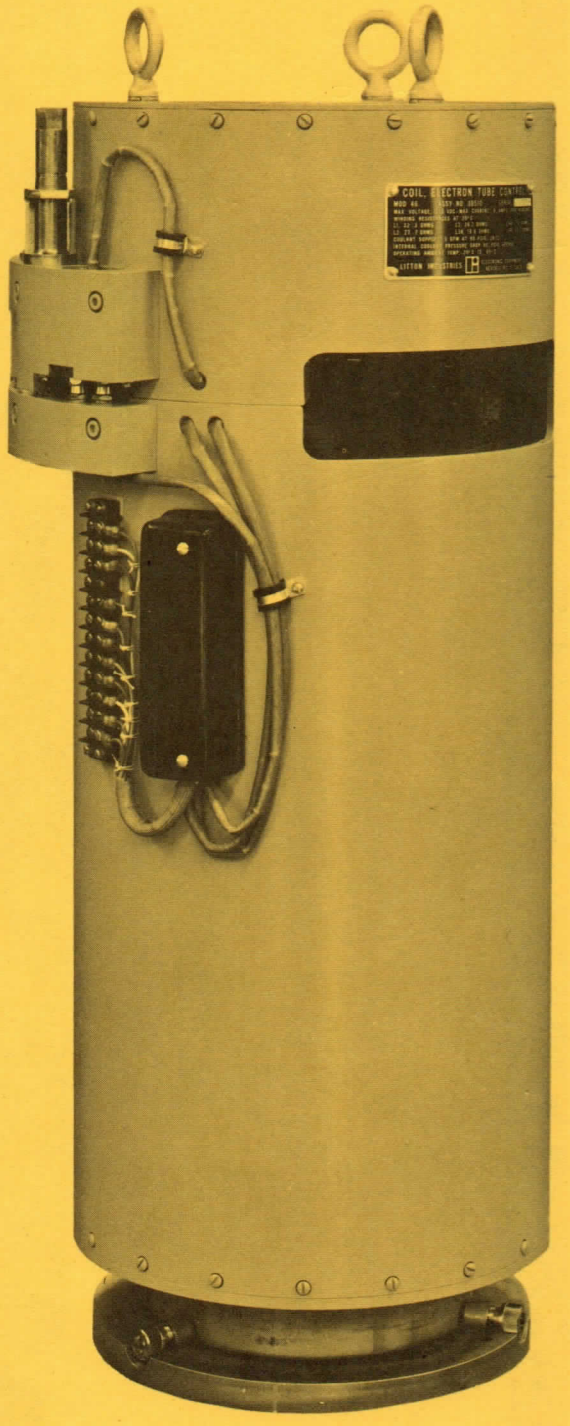
ENVIRONMENTAL LIMITATIONS

Temperature, Operating.....–29° C to + 52° C
Temperature, Non-operating.....–62° C to + 54° C
Altitude, Operating.....up to 10,000 feet
Altitude, Non-operating.....up to 40,000 feet

ELECTRICAL SPECIFICATIONS

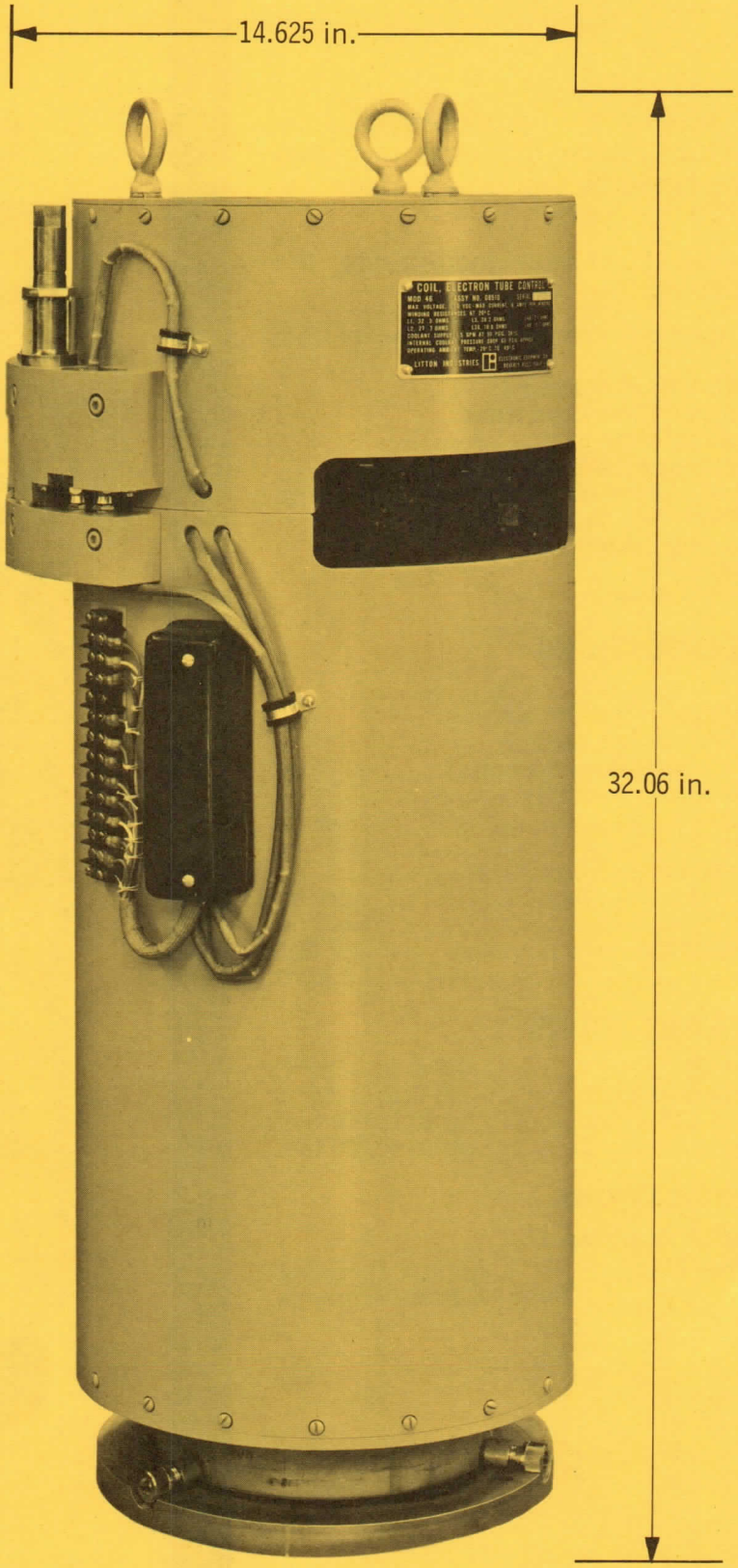
Typical Resistance at 20° C ambient

Coil Designation	Terminal Nos. —	+	R Ohms	Approx. Focusing Current Amperes
L1	1	2	32.9	4
L2	3	4	27.3	2
L3	5	6	29.05	2
L3A	7	8	16.4	2
L4A	10	11	7.28	–
L4B	11	12	16.0	–
L4A & L4B	10	12	23.28	3

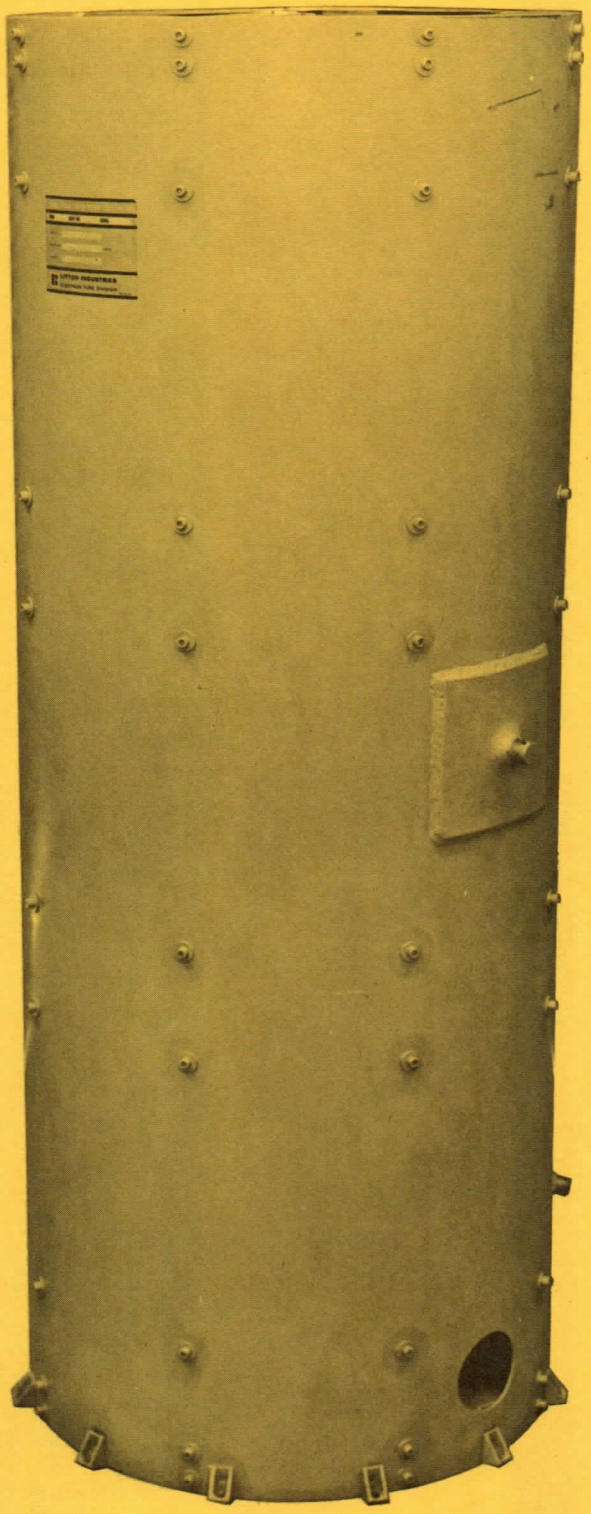


EQUIPMENT – ACCESSORIES

MODEL 46



MODEL 190



FOCUS COIL

Litton Industries designs and produces auxiliary tube hardware and tube related equipment whether it be for Litton tube customers or an accessory for other manufacturers' products.

Solenoids engineered by Litton incorporate the following design features:

1. Single electrical terminal board for top and bottom sections.
2. One coolant input/output manifold.
3. Ease of access to the microwave tube.
4. Moderate power requirement.
5. Integral lead shielding where required.
6. Vacuum potting to insure complete insulation, with a resultant improvement in reliability.
7. Leak resistant cooling system.
8. Reworkable design.
9. Wound in either foil or wire.

MECHANICAL SPECIFICATIONS

Number of coils.....8
Three (3) coil windings in bottom section
Five (5) coil windings in top section
Height bottom coil assembly.....20.3125 in.
Height top coil assembly.....63.0375 in.
Maximum diameter.....20.7500 in.
Weight (entire coil assembly).....1450 lbs.
Cooling (water).....4.5 gpm.

ENVIRONMENTAL LIMITATIONS

Temperature, Operating.....−29° C to +52° C
Temperature, Non-operating.....−62° C to +54° C
Altitude, Operating.....up to 10,000 feet
Altitude, Non-operating.....up to 40,000 feet

ELECTRICAL SPECIFICATIONS

Typical Resistance at 23° C ambient

Coil Designation	Connector Pin Connection −	+	R ± 5% Ohms	Approx. Focusing Current Amperes
L1	A	B	5.66	5.0
L2	C	D	2.42	5.2
L3	E	F	9.20	5.2
L4	G	H	3.00	5.2
L5	J	K	20.40	4.0
L6	L	M	20.40	4.0
L7	N	P	20.40	5.0
L8	R	S	3.30	5.0

Insulation Resistance (to Ground) Min-100 meg.
Power Connector Type AN3102A-32-1S

EQUIPMENT – ACCESSORIES

MODEL 190

MODEL 200

FOCUS COIL

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Solenoids engineered by Litton incorporate the following design features:

1. Single electrical terminal board for top and bottom sections.
2. One coolant input/output manifold.
3. Ease of access to the microwave tube.
4. Moderate power requirement.
5. Intergral lead shielding where required.
6. Vacuum potting to insure complete insulation, with a resultant improvement in reliability.
7. Leak resistant cooling system.
8. Reworkable design.
9. Wound in either foil or wire.

MECHANICAL SPECIFICATIONS

Number of coils.....7
Five (5) coil windings in bottom section
Two (2) coil windings in top section
Height, entire assembly.....35.560″
Height, bottom and top coil assembly.....32.835″
Height, bottom coil assembly.....23.060″
Height, top coil assembly..... 9.775″
Width, O.D. of entire coil assembly.....12.712″
Width, I.D. of entire coil assembly..... 7.140″
Width, maximum diameter.....15.875″
Weight, entire coil assembly.....578 lbs.
Cooling (water)
Pressure drop at rated flow.....@ 1.5 GPM—16 PSI

ENVIRONMENTAL LIMITATIONS

Temperature, Operating.....65° C
Temperature, Non-Operating.....120° C
Altitude, Operating..... up to 10,000 feet
Altitude, Non-Operating.....up to 40,000 feet

ELECTRICAL SPECIFICATIONS

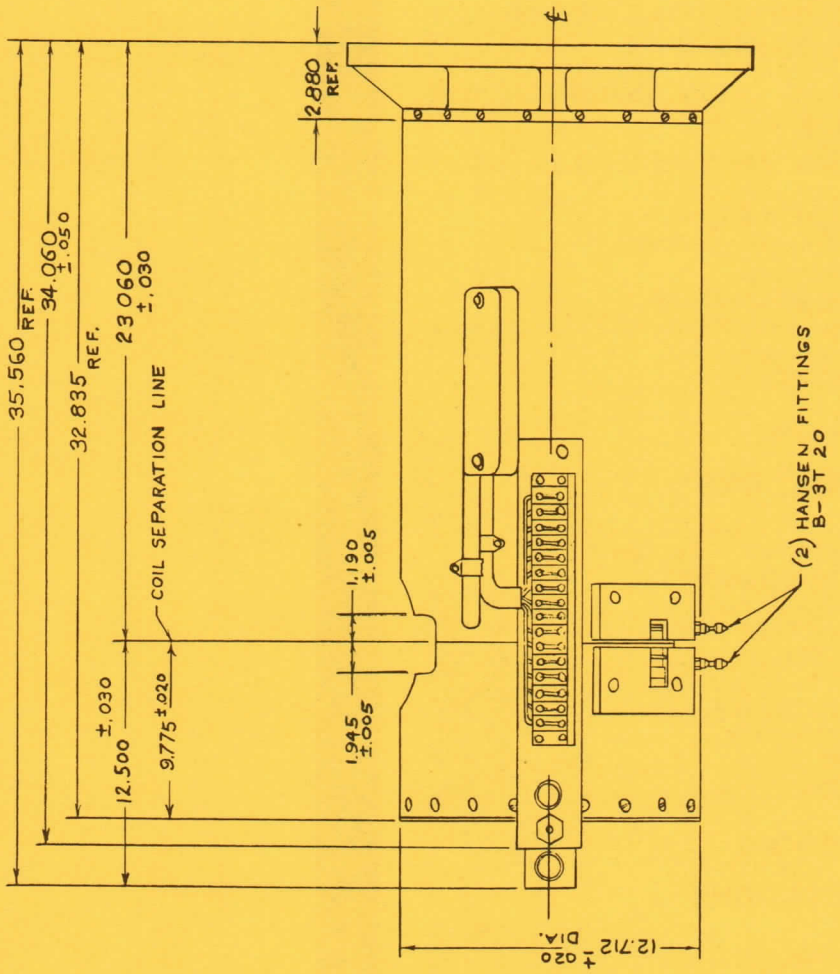
Typical Resistance at 20° C Ambient

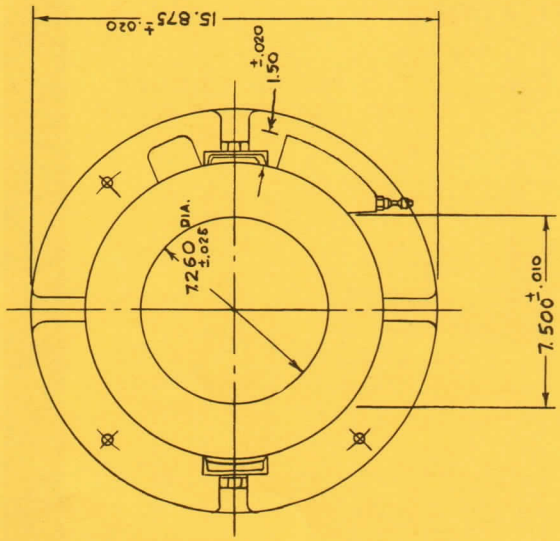
Coil Designation	Terminal Nos. —	Terminal Nos. +	R Ohms	Approx. Focusing Current Amperes
L1	1	2	8.4	7.2
L2	3	4	7.9	0
L3	5	6	7.9	3.5
L4	7	8	4.8	13.0
L5	9	10	4.8	13.0
L6	12	13	10.3	4.7
L7	13	14	10.5	4.7

Maximum D.C. Power Requirements
Total.....11.0 Kilowatts
Bottom Section..... 8.8 Kilowatts
Top Section..... 2.2 Kilowatts
Flux Density
Maximum.....1650 Gauss

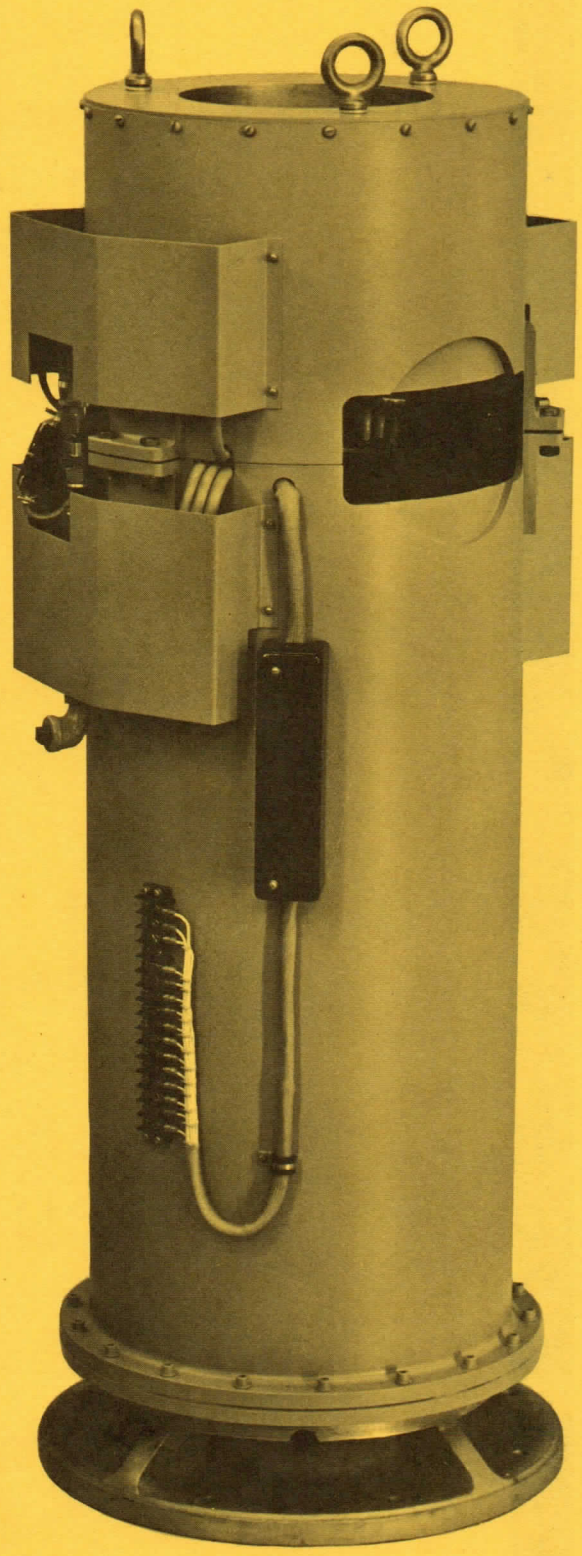
EQUIPMENT – ACCESSORIES

MODEL 200





MODEL 215



FOCUS COIL

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Solenoids engineered by Litton incorporate the following design features:

1. Single electrical terminal board for top and bottom sections.
2. One coolant input/output manifold.
3. Ease of access to the microwave tube.
4. Moderate power requirement.
5. Intergral lead shielding where required.
6. Vacuum potting to insure complete insulation, with a resultant improvement in reliability.
7. Leak resistant cooling system.
8. Reworkable design.
9. Wound in either foil or wire.

MECHANICAL SPECIFICATIONS

Number of coils..... 8
Six (6) coil windings in bottom section
Two (2) coil windings in top section
Height entire assembly.....43.978″
Height bottom and top coil assembly.....41.603″
Height bottom coil assembly.....31.848″
Height top coil assembly..... 9.755″
Width, O.D. of entire coil assembly.....12.712″
Width, I.D. of entire coil assembly..... 7.140″
Width, maximum diameter.....15.875″
Weight entire coil assembly.....750 lbs.
Cooling (water)
Pressure drop at rated flow.....9.6 PSI at 3.3 GPM

ENVIRONMENTAL LIMITATIONS

Temperature, Operating.....45° C
Temperature, Non-Operating.....120° C
Altitude, Operating.....up to 10,000 feet
Altitude, Non-Operating.....up to 40,000 feet

ELECTRICAL SPECIFICATIONS

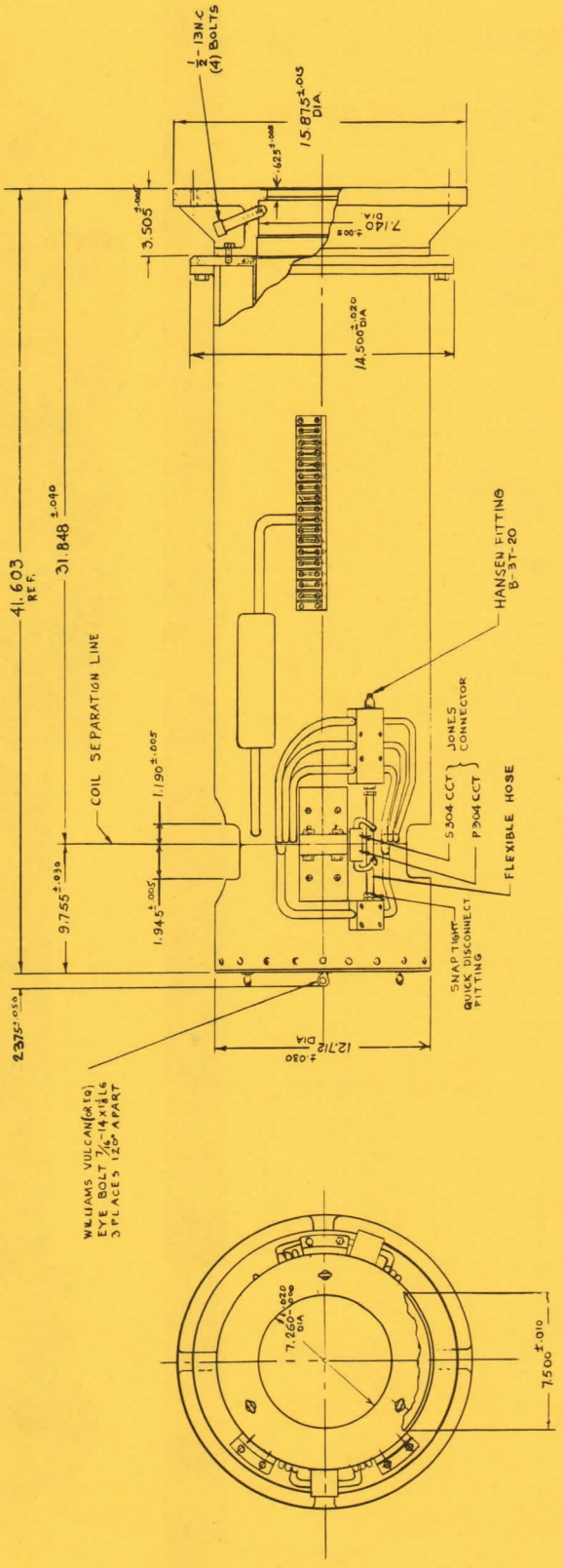
Typical Resistance at 20° C Ambient

Coil Designation	Terminal Nos. —	Terminal Nos. +	R Ohms	Approx. Focusing Current Amperes
L1	1	2	11.7	7.0
L2	3	4	16.7	0
L3	5	6	7.0	4.6
L4	7	8	7.0	4.6
L5	9	10	3.9	13.5
L6	11	12	3.9	13.5
L7	14	15	10.4	7.8
L8	15	16	10.4	7.8

Maximum D.C. Power Requirements
Total.....11.1 Kilowatts
Bottom Section..... 9.9 Kilowatts
Top Section..... 2.2 Kilowatts
Flux Density
Maximum.....1700 Gauss

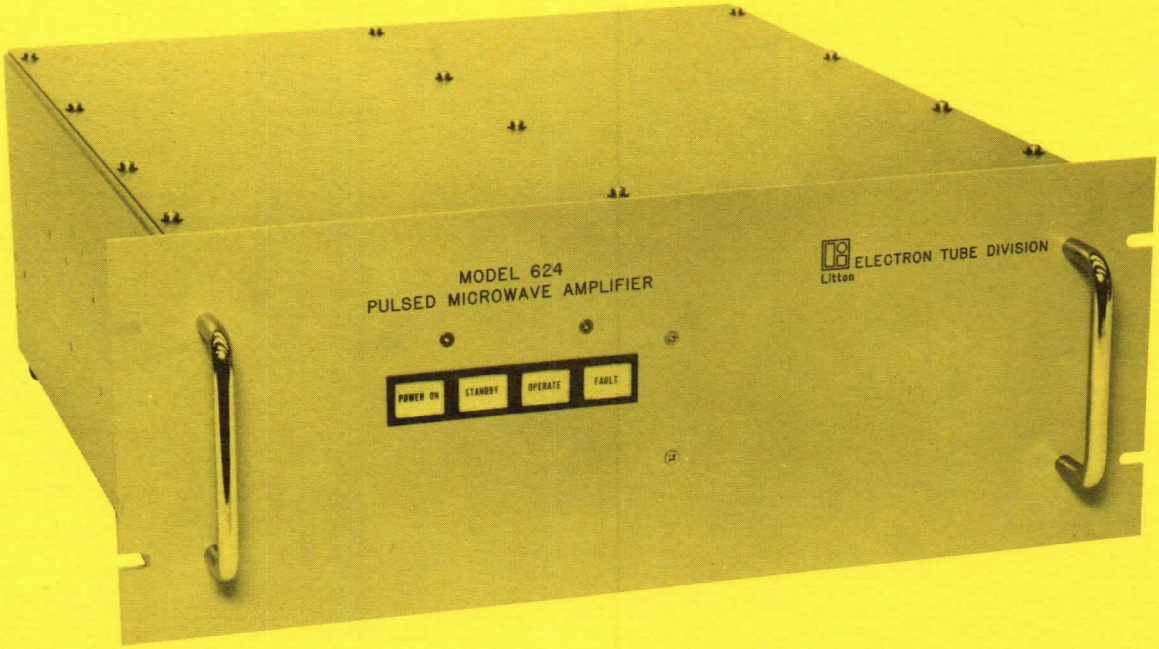
EQUIPMENT – ACCESSORIES

MODEL 215



Model 624

Pulsed Microwave Amplifier



The M-624 Power Supply has been custom designed for use with Litton's family of kilowatt pulsed traveling wave tubes operating in the 2 to 18 GHz range of frequencies.

The standard unit operates from a 115 volt, 60 Hz source. As an option, the M-624 can be supplied for 50 Hz or 400 Hz operation at most standard values of line voltage.

Pulse width control may be derived either from (1) external pulse triggering (standard), (2) optional built-in circuits which accept external start-stop trigger inputs, or (3) by a front-panel-adjustable internal trigger pulse generator.

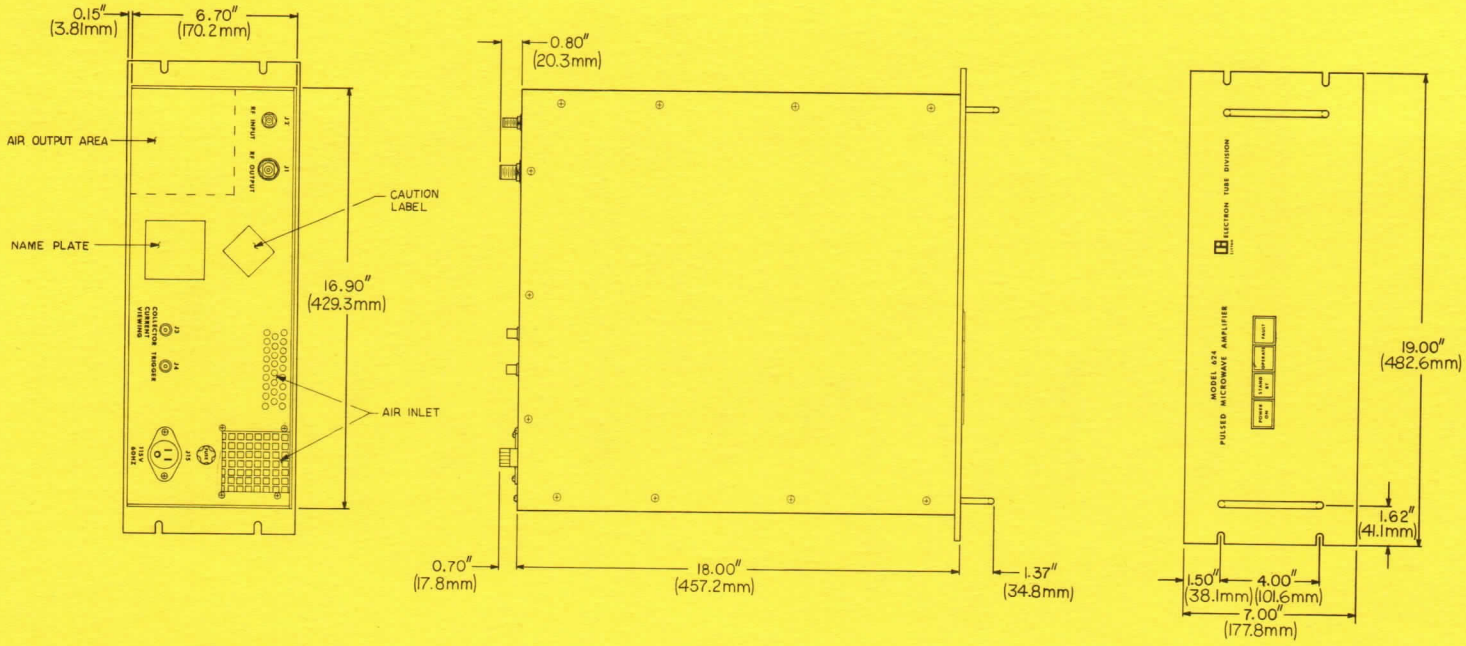
GENERAL SPECIFICATIONS

Input Voltage	115 Volts ac ±10%, 60 Hz
Power Supply Efficiency	80%
High Voltage Regulation	0.01%
High Voltage Ripple	5 Volts, peak to peak
High Voltage Droop during 2 Amp. Pulse	6.6 Volts per Microsecond
Filament Voltage Regulation	0.5%
Pulse Width Range	0.1 to 15.0 Microseconds
Delay, Trigger to RF	150 Nanoseconds
Duty Cycle	2% maximum
Dimensions	7" x 19" (panel) x 18" deep (178 mm x 483 mm (panel) x 457 mm deep)
Weight	Nominally, 60 lbs. (27.3 kg)

Litton **ELECTRON TUBE DIVISION**
San Carlos, California

Model 624

Pulsed Microwave Amplifier



The following is a partial listing of traveling wave tubes which can be furnished with the M-624 power supply. TWT's at other frequency ranges and/or peak output power levels are also available.

Frequency Range (GHz)	Litton Tube Type	Minimum Gain at Rated Output Power (dB)	Minimum Rated Peak Power Output (Kilowatts)
1.2- 1.4	L-5476-50	30	5.0
2.0- 4.0	L-5336-50	35	1.0
2.0- 4.0	L-5283-50	50	1.0
2.6- 5.3	L-5321-50	35	1.0
2.6- 5.3	L-5320-50	50	1.0
2.8- 3.2	L-5366-50	60	3.0
4.0- 8.0	L-5263-50	35	1.0
4.0- 8.0	L-5284-50	55	1.0
7.0-11.0	L-5089-50	35	1.0
7.0-11.0	L-5126-50	60	1.0
8.0-16.0	L-5435-50	60	1.0
16.0-17.0	L-5412-50	33	1.0
16.0-17.0	L-5411-50	60	1.0

Litton **ELECTRON TUBE DIVISION**
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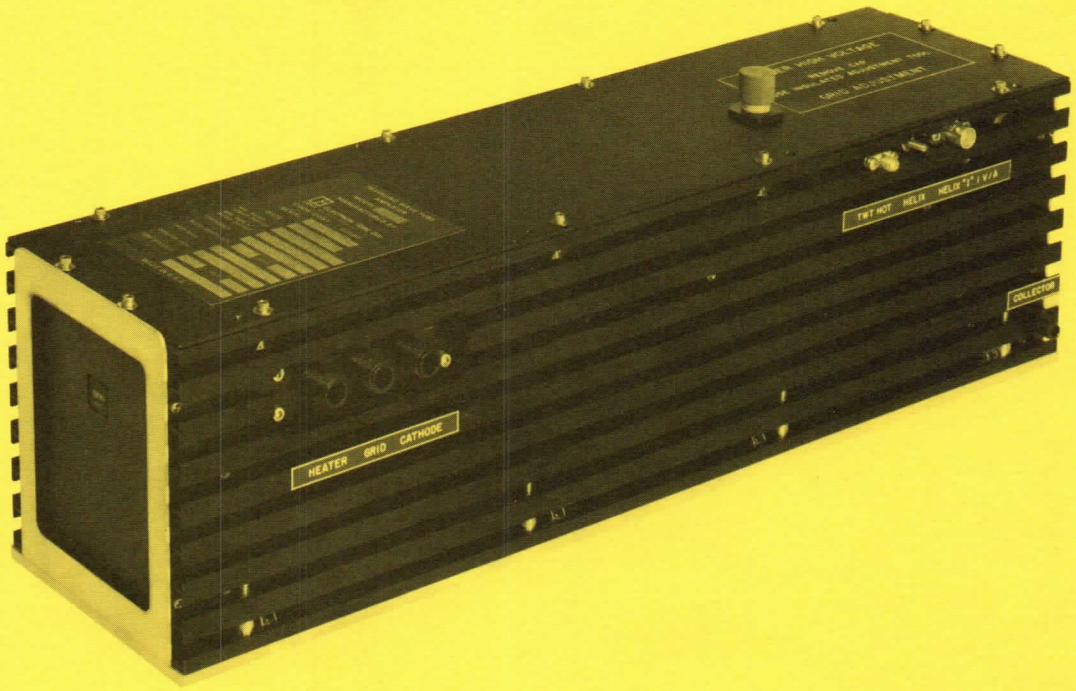
3MJA1073

Model 636

Pulsed Microwave Amplifier



The M-636 Power Supply is designed to drive Litton's family of depressed collector, kilowatt pulsed traveling wave tubes operating in the 1 to 18 GHz frequency range. The M-636 is compact, lightweight, highly efficient, and is suitable for operation at high altitude and at extreme temperatures. It is designed for airborne use and meets the environmental requirements of MIL-E-5400. The unit features a fast, fully protected grid modulator, making it suitable for short delay ECM applications.

The standard unit operates from a 115 volt, 400 Hz, 3-phase, 4 wire source, and incorporates a built-in grid modulator which follows an external pulse trigger. The M-636 is fully protected against damage due to tube arcs, phase loss, or excess duty cycle. Full viewing and monitoring of tube voltages is provided.

Options available* include:

- Higher duty cycle for lower frequency tubes
- Triggering from start-stop pulse inputs
- Extended pulse width range, or reduced ripple and droop

*These options involve an increase in size.

GENERAL SPECIFICATIONS

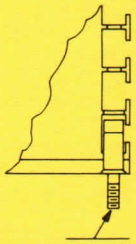
Input Voltage	115/200 Vac ±10%, 400 Hz, 3-phase, 4 wire
Efficiency	85% typical
High Voltage Regulation	0.5% maximum change for any combination of line voltage and dynamic load
Temperature Coefficient of High Voltage	±0.01% per °C maximum
High Voltage Droop During 2 Amp Pulse	5 volts per microsecond, typical
Filament Voltage Regulation	2% maximum change for any combination of line voltage and ambient temperature
Pulse Width Range	0.25 to 40 microseconds
Total Time Delay from Trigger Input to RF Output from the TWT	35 nanoseconds typical
Duty Cycle	4% maximum
Cooling	Conduction
Altitude	70,000 feet maximum
Temperature Range	−55°C to +85°C
Dimensions	5" x 5.5" x 19.5" (127 mm x 140 mm x 495.3 mm) without TWT
Weight	36 pounds (16.4 kilograms) without TWT

Litton **ELECTRON TUBE DIVISION**
San Carlos, California

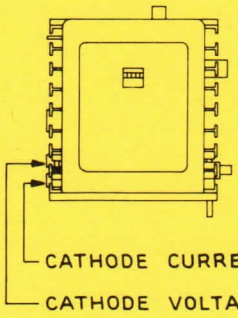
Model 636

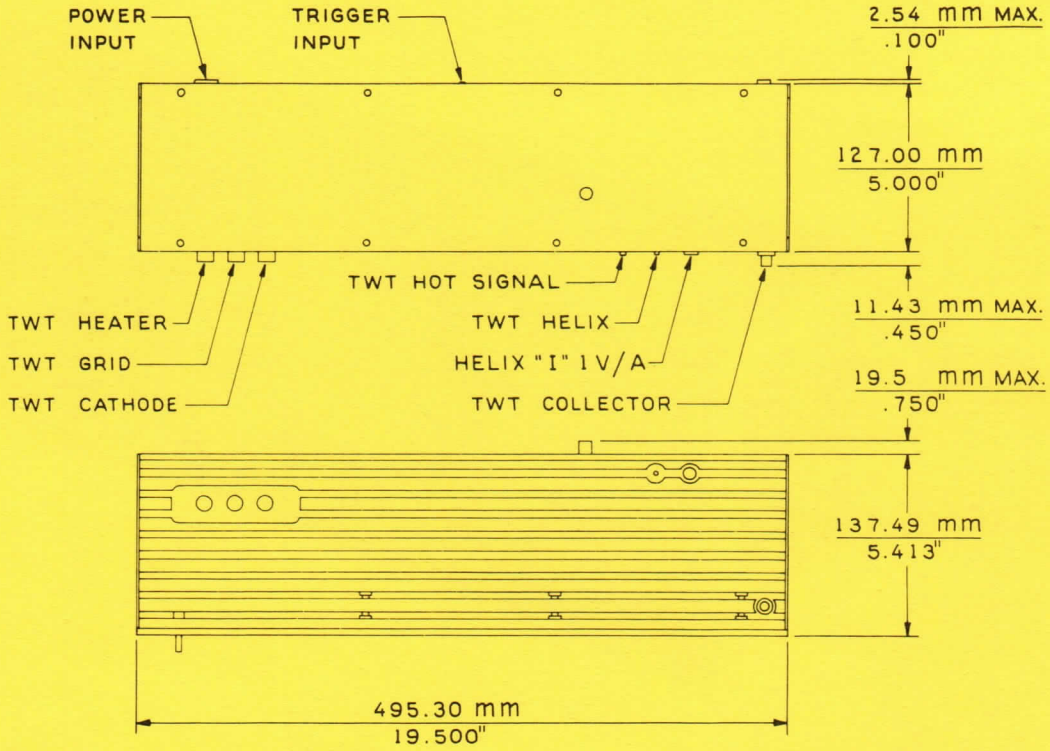
Pulsed Microwave Amplifier

ENLARGED VIEW
MOUNTING DETAIL



TRIDAIR CAPTIVE SCREW
10-32 CA2820-HS
(8) PLACES

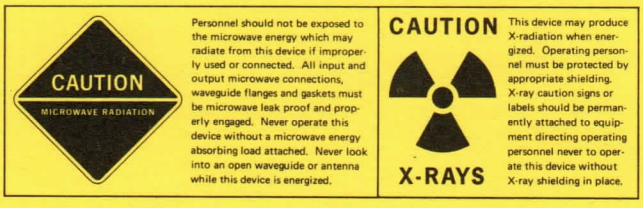




The following is a list of depressed collector traveling wave tubes which can be furnished with the M-636 power supply. The M-636 can also be used with many non-depressed collector, kilowatt pulsed TWT's. Please contact a Litton representative or applications engineer for assistance in selecting a TWT to match your specific requirement.

When ordering, specify the TWT type or performance requirements to assure that the M-636 will be furnishd with the correct voltages.

Frequency Range (GHz)	Tube Type	Power Output (kw)	Gain at Rated Power Output (—dB)
1.2- 1.4	L-5476-50	5.0	30
1.7- 2.1	L-5540-50	2.0	40
3.1- 3.5	L-5551-50	3.0	35
3.1- 3.5	L-5366-50	3.0	60
4.0- 8.0	L-5123-50	1.0	30
5.0-10.0	L-5489-50	1.0	50
7.0-11.0	L-5546-50	1.0	40
8.5- 9.5	L-5554-50	1.0	60
8.0-16.0	L-5444-50	1.0	55
8.0-18.0	L-5495-50	1.0	45



Litton
ELECTRON TUBE DIVISION
960 Industrial Road, San Carlos, California 94070, (415) 591-8411

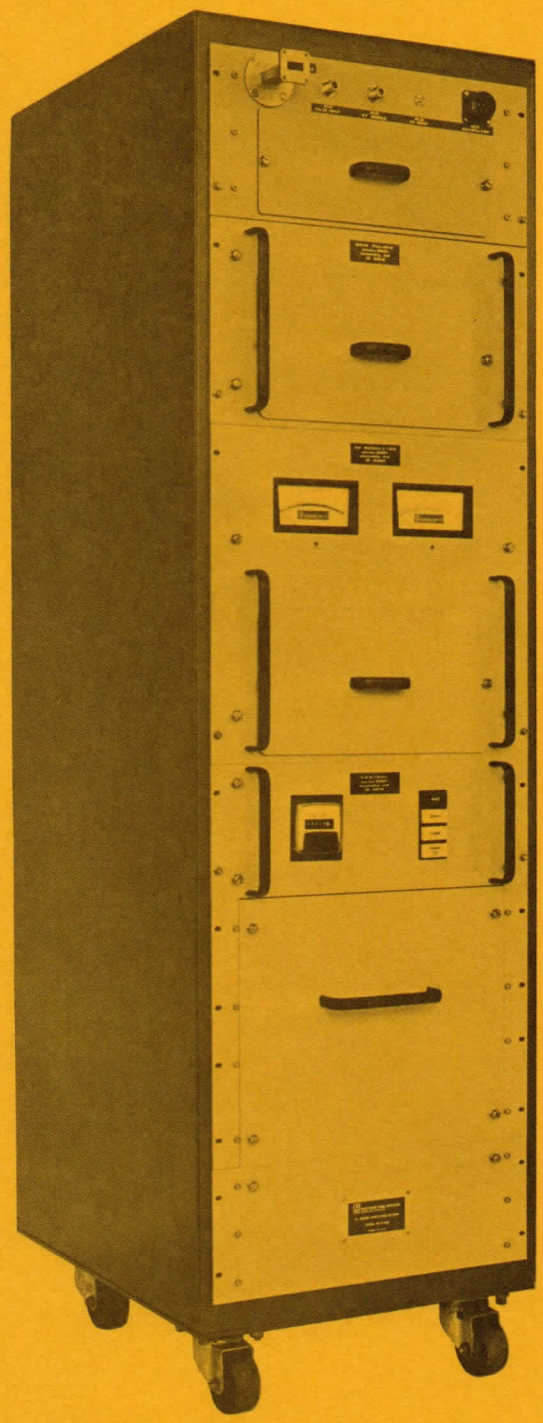
3MJA374

Model 642

Pulsed Microwave Amplifier

The Model 642 Pulsed Microwave Amplifier has been designed for use in pulse doppler radar applications. The unit provides 40 kW minimum pulse power output over the frequency range of 9.5 to 10.0 GHz. Pulse follower triggering is utilized.

The Model 642 uses a Litton L-5507-51, 40 kW coupled cavity traveling wave tube as the output amplifier, which is driven by a Litton L-2795 TWTA.



PERFORMANCE CHARACTERISTICS

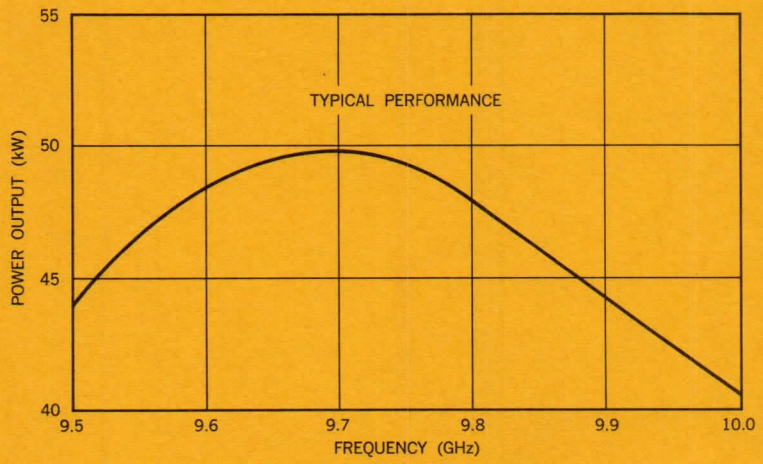
Pulse Power Output	40 kW, Min.
Duty	0.003
Power Input	0.01 mW, Max.
Gain	96 dB, Min.
Frequency	9.5 to 10.0 GHz
Pulse Width	50 to 750 ns
Pulse Rate Frequency	100 to 12,500 Hz
Pulse Rise/Fall Time	20 ns, Max.
Throughput Delay	150 ns, Typ.

OPERATING CONDITIONS

Primary Power	208/415 Vac ±10%, 3 ϕ, 4 wire "wye", 50/60/400 Hz
Trigger	+5 to +10 V Pulse Follower

MECHANICAL DESCRIPTION

Height	72 in.
Width	23 in.
Depth	30 in.
Weight	800 lbs.



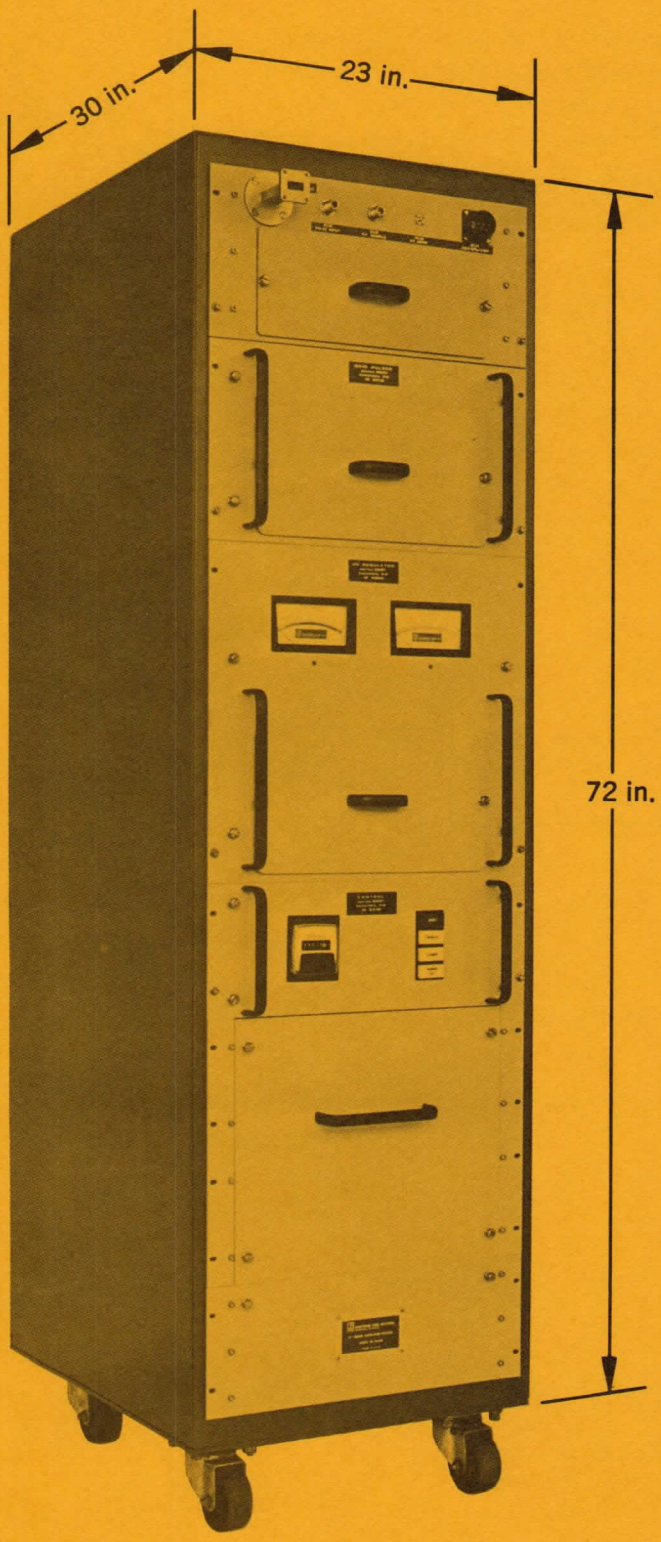
Litton **ELECTRON TUBE DIVISION**
San Carlos, California

Model 642

Pulsed Microwave Amplifier

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.



Litton
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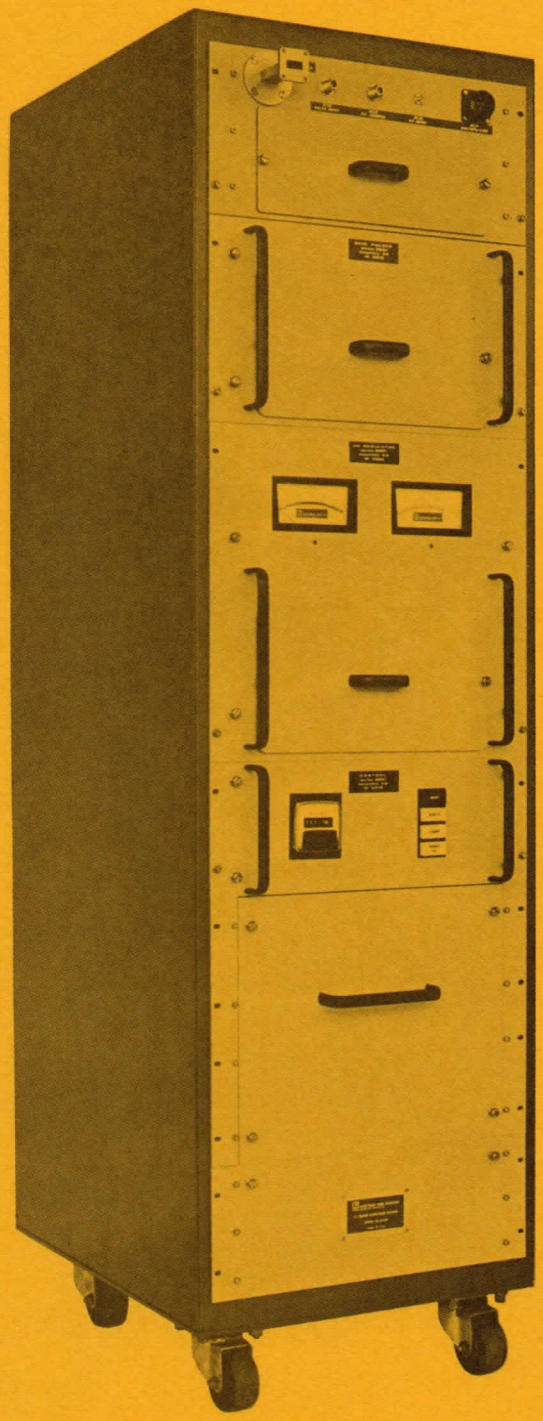
2.5MJA575

Model 642

Pulsed Microwave Amplifier

The Model 642 Pulsed Microwave Amplifier has been designed for use in pulse doppler radar applications. The unit provides 40 kW minimum pulse power output over the frequency range of 9.5 to 10.0 GHz. Pulse follower triggering is utilized.

The Model 642 uses a Litton L-5507-51, 40 kW coupled cavity traveling wave tube as the output amplifier, which is driven by a Litton L-2795 TWTA.



PERFORMANCE CHARACTERISTICS

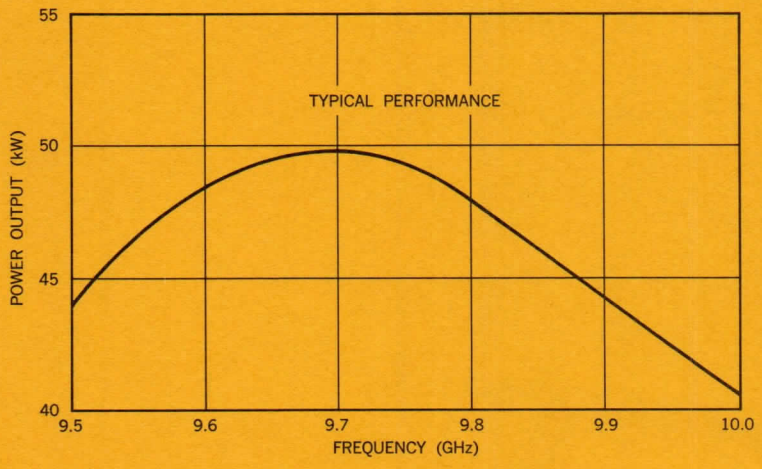
Pulse Power Output	40 kW, Min.
Duty	0.003
Power Input	0.01 mW, Max.
Gain	96 dB, Min.
Frequency	9.5 to 10.0 GHz
Pulse Width	50 to 750 ns
Pulse Rate Frequency	100 to 12,500 Hz
Pulse Rise/Fall Time	20 ns, Max.
Throughput Delay	150 ns, Typ.

OPERATING CONDITIONS

Primary Power	208/415 Vac ±10%, 3 ϕ, 4 wire "wye", 50/60/400 Hz
Trigger	+5 to +10 V Pulse Follower

MECHANICAL DESCRIPTION

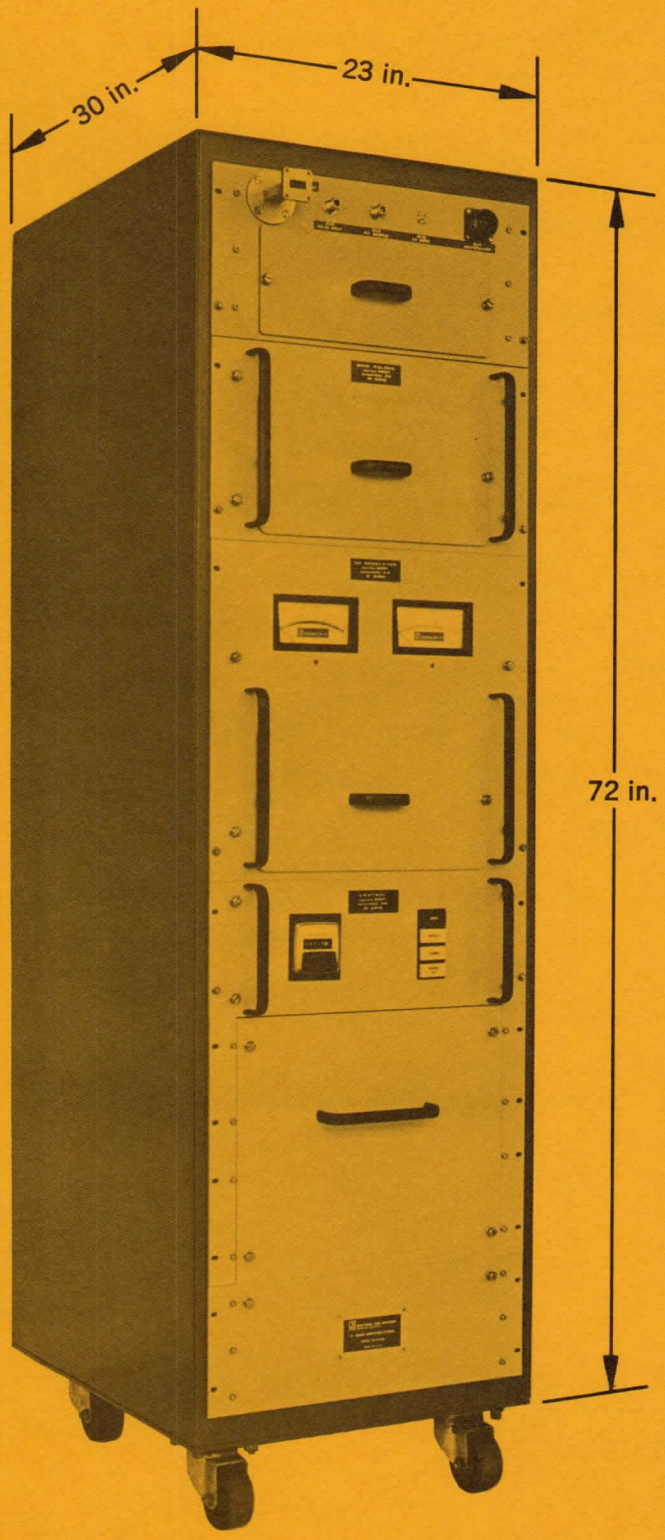
Height	72 in.
Width	23 in.
Depth	30 in.
Weight	800 lbs.



Litton **ELECTRON TUBE DIVISION**
San Carlos, California

Model 642

Pulsed Microwave Amplifier



Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output microwave connections, waveguide flanges and gaskets must be microwave leak proof and properly engaged. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while this device is energized.

This device may produce X-radiation when energized. Operating personnel must be protected by appropriate shielding. X-ray caution signs or labels should be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.

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2.5MJA575

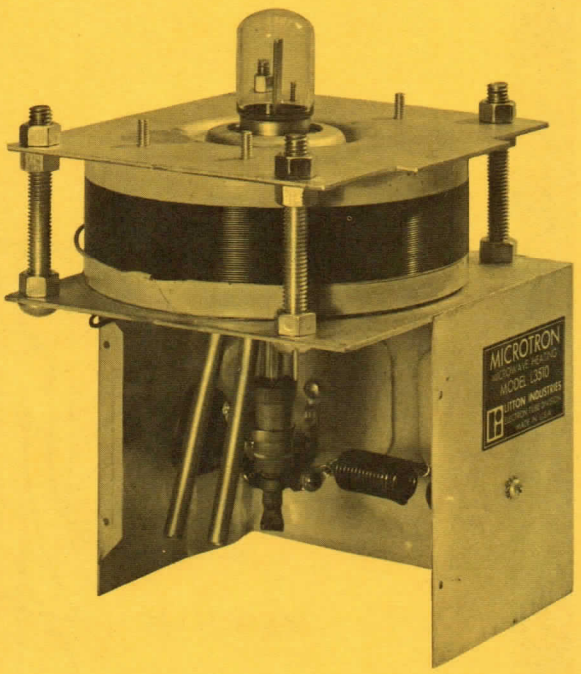
MODEL 3510

MICROTRON MICROWAVE POWER PACK

The 3510 MICROTRON microwave heating unit has been especially designed for use in ovens for modern food preparation. The Unit includes a one-kilowatt CW Magnetron, a high voltage transformer, a filament and isolation transformer, and an electro-magnet and filter assembly.

Exceptional features of the heating and cooking package include quick warm-up, high power and long-life warranty.

The MICROTRON power source may be tailored to specific equipments.



PERFORMANCE CHARACTERISTICS

Frequency	2450 ISM band
Power Output	(nominal) 1000 W
Power Supply	220 V, 60 cycles AC
Heater Voltage	4.8 to 5.2 V
Heater Current	15.5 to 16.5 A
Load VSWR (average)	Max. 6:1
Cathode Heating Time	Min. 8 sec.
Cathode Seal Temperature	Max. 172° C

OPERATING CHARACTERISTICS

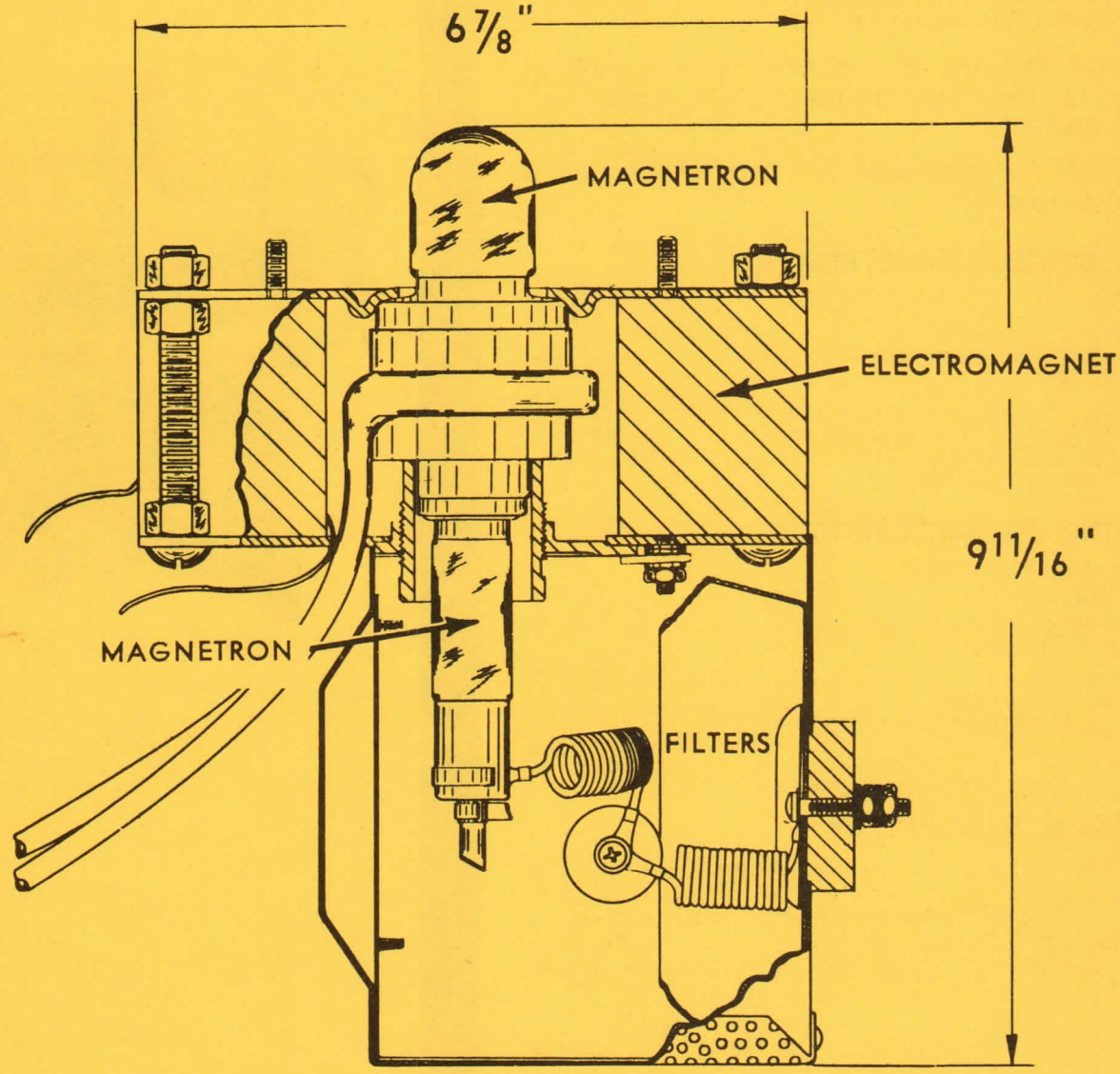
CW Magnetron (L-3189)	
Heater Voltage	5 V
Heater Current at 5 V	16 A
High Voltage Transformer	
Primary	208:224:240 V
Secondary	5.6 KV
Filament and Isolation Transformer	
Primary	106:112:120 V
Secondary	5 V; 220 C. T.

MECHANICAL DESCRIPTION

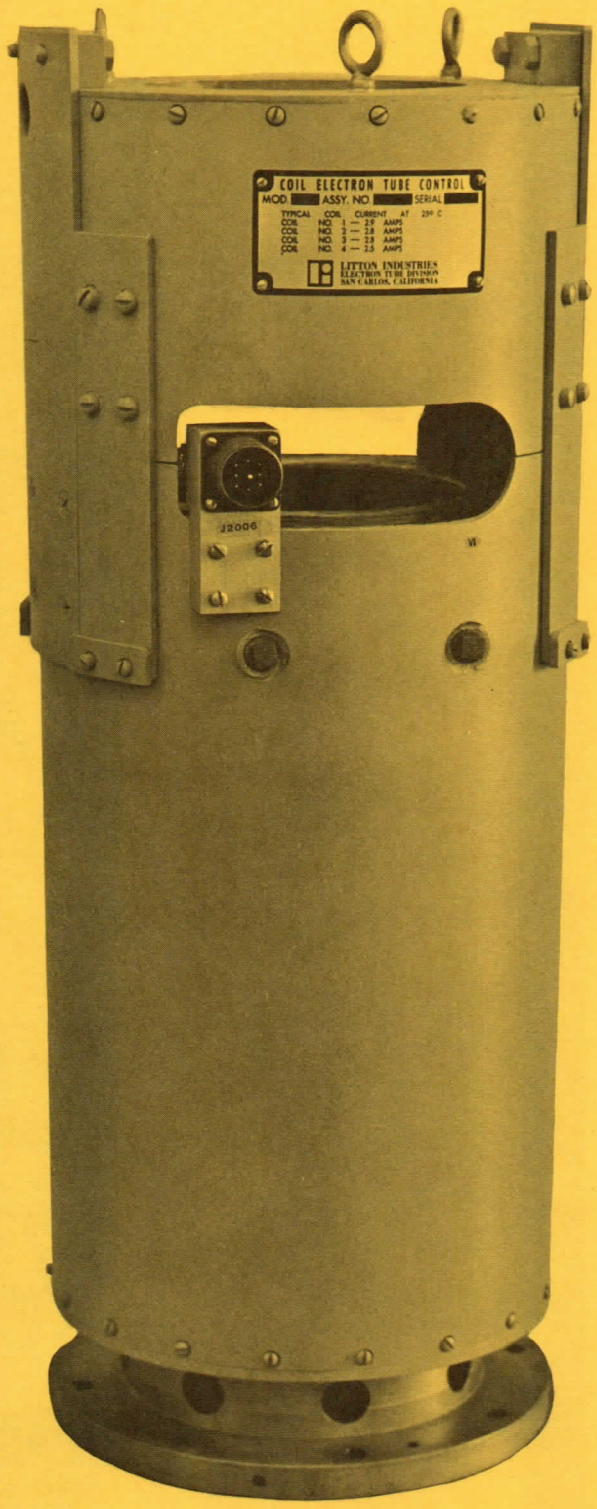
Dimensions	See Outline Drawing
Cooling	Water
	(Self-contained water supply is sufficient)
Cooling System Temperature	Max. 85° C
Package Weight	Approx. 85 lbs.

EQUIPMENT – ACCESSORIES

MODEL 3510



MODEL 201377



FOCUS COIL

Litton Industries designs and produces auxiliary tube hardware and tube related equipment whether it be for Litton tube customers or an accessory for other manufacturers' products.

Solenoids engineered by Litton incorporate the following design features:

1. Single electrical terminal board for top and bottom sections.
2. One coolant input/output manifold.
3. Ease of access to the microwave tube.
4. Moderate power requirement.
5. Integral lead shielding where required.
6. Vacuum potting to insure complete insulation, with a resultant improvement in reliability.
7. Leak resistant cooling system.
8. Reworkable design.
9. Wound in either foil or wire.

MECHANICAL SPECIFICATIONS

Number of coils..... 4
Three (3) coil windings in bottom assembly
One (1) coil winding in top assembly
Height entire assembly including eyebolts.....29.25 in.
Height bottom and top coil assembly.....27.81 in.
Height bottom coil assembly.....16.81 in.
Width, O.D. of entire coil assembly.....10.62 in.
Width, I.D. of entire coil assembly..... 6.25 in.
Weight entire coil assembly..... 325 lbs.
Cooling (water)..... 2 gpm
(air).....250-300 CFM

ENVIRONMENTAL LIMITATIONS

Temperature, Operating.....—30° C to + 70° C
Temperature, Non-operating.....—54° C to + 71° C
Altitude, Operating.....up to 10,000 feet
Altitude, Non-operating.....up to 40,000 feet

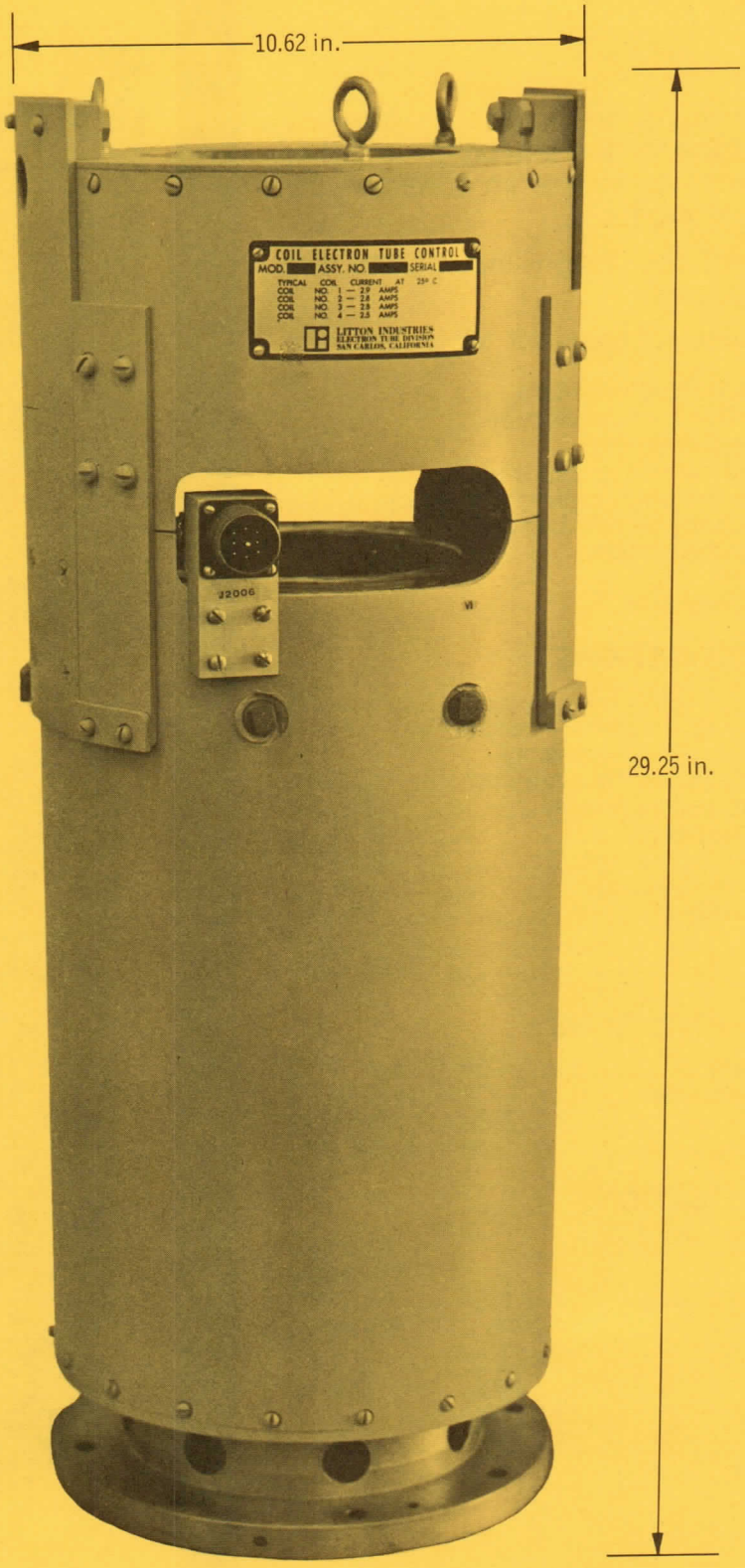
ELECTRICAL SPECIFICATIONS

Typical Resistance at 25° C ambient

Coil Designation	Terminal Nos. —	+	R ± 5% Ohms	Approx. Focusing Current Amperes
L1	1	2	21.4 ±5%	2.9
L2	3	4	14.6 ±5%	2.8
L3	5	6	18.5 ±5%	2.8
L4	7	8	14.7 ±5%	2.5

EQUIPMENT – ACCESSORIES

MODEL 201377



MODEL 215000

FOCUS COIL

Litton Industries designs and produces auxiliary tube hardware and tube related equipment whether it be for Litton tube customers or an accessory for other manufacturers' products.

Solenoids engineered by Litton incorporate the following design features:

1. Single electrical terminal board for top and bottom
1. sections.
2. One coolant input/output manifold.
3. Ease of access to the microwave tube.
4. Moderate power requirement.
5. Integral lead shielding where required.
6. Vacuum potting to insure complete insulation, with a resultant improvement in reliability.
7. Leak resistant cooling system.
8. Reworkable design.
9. Wound in either foil or wire.

MECHANICAL SPECIFICATIONS

Number of coils..... 4
Height entire assembly with lifts and fittings....21.375 in.
Height coil assembly.....17.750 in.
Width, O.D. of entire coil assembly.....12.625 in.
Width, I.D. of coil assembly..... 5.476 in.
Maximum diameter.....12.625 in.
Weight entire coil assembly..... 230 lbs.
Cooling (water).....1 gpm

ENVIRONMENTAL LIMITATIONS

Temperature, Operating.....—29° C to +52° C
Temperature, Non-operating.....—62° C to +54° C
Altitude, Operating.....up to 10,000 feet
Altitude, Non-operating.....up to 40,000 feet

ELECTRICAL SPECIFICATIONS

Typical Resistance at 23° C ambient

Coil Designation	Terminal Nos. —	Terminal Nos. +	R ± 5% Ohms	Approx. Focusing Current Amperes
L1	2	1	12.87	5.5
L2	4	3	1.43	5.5
L3	6	5	2.54	5.5
L4	8	7	24.76	5.5

EQUIPMENT – ACCESSORIES

MODEL 215000

LITTON INDUSTRIES • ELECTRON TUBE DIVISION • SAN CARLOS, CALIFORNIA

SOCKETS

MICROWAVE TUBE SOCKETS

Litton Industries designs and manufactures cathode and anode connectors for the entire line of high power microwave tubes. These sockets are produced using highest quality materials and workmanship to insure optimum compatability between the tube and the systems in which it is installed.

Features of Litton Industries sockets include:

1. Materials used are selected for conductivity and durability.
2. Sockets are gold plated to insure electrical contact reliability.
3. Insulating materials (Teflon, ceramic, epoxy laminates, etc.) are selected to match each application.
4. Component parts are repairable or replaceable.

Tube/Socket Reference	Litton Tube Types
10,400	L-3035
10,401	L-3227, L-3250, L-3257 L-3270, L-3302, L-3617
10,403	L-3428
10,404	L-3303, L-3323, L-3385 L-3386, L-3618, L-3647 L-3660, L-3661, L-3709
205	L-3702
206	L-3403, L-3694
207	L-3401
212	L-3618, L-3735
223	L-3739
245	L-3408

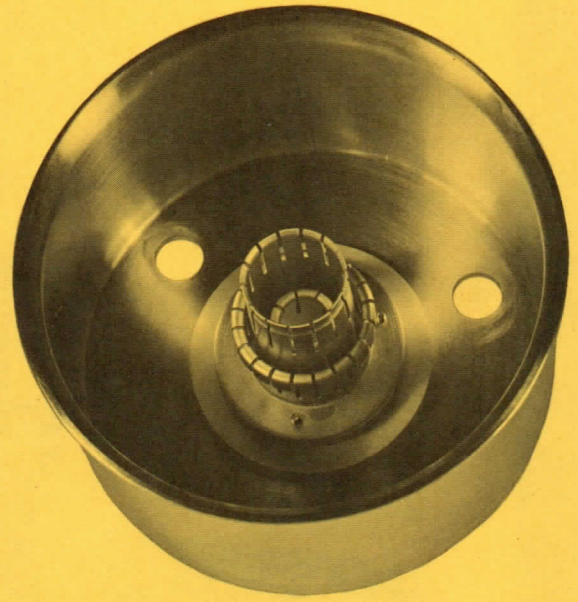
252....Liquid cooled CW/Pulse Magnetrons and BARRATRONS.

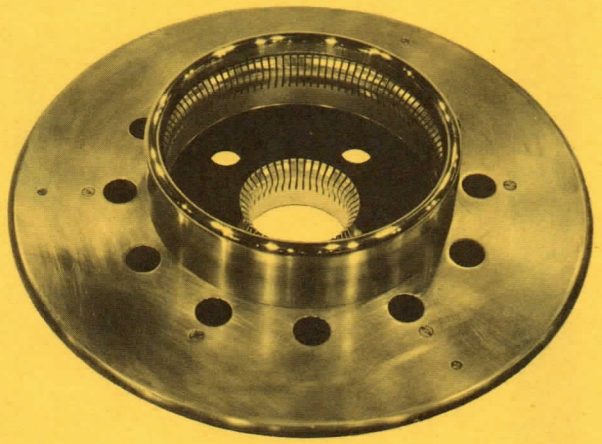
253....Air Cooled CW/Pulse Magnetrons.

254....High Power Pulse Magnetrons, LT-4J50 and LT-4J52 Types.

254A..Same as 254 except with built-in 3000 PF capacitor.

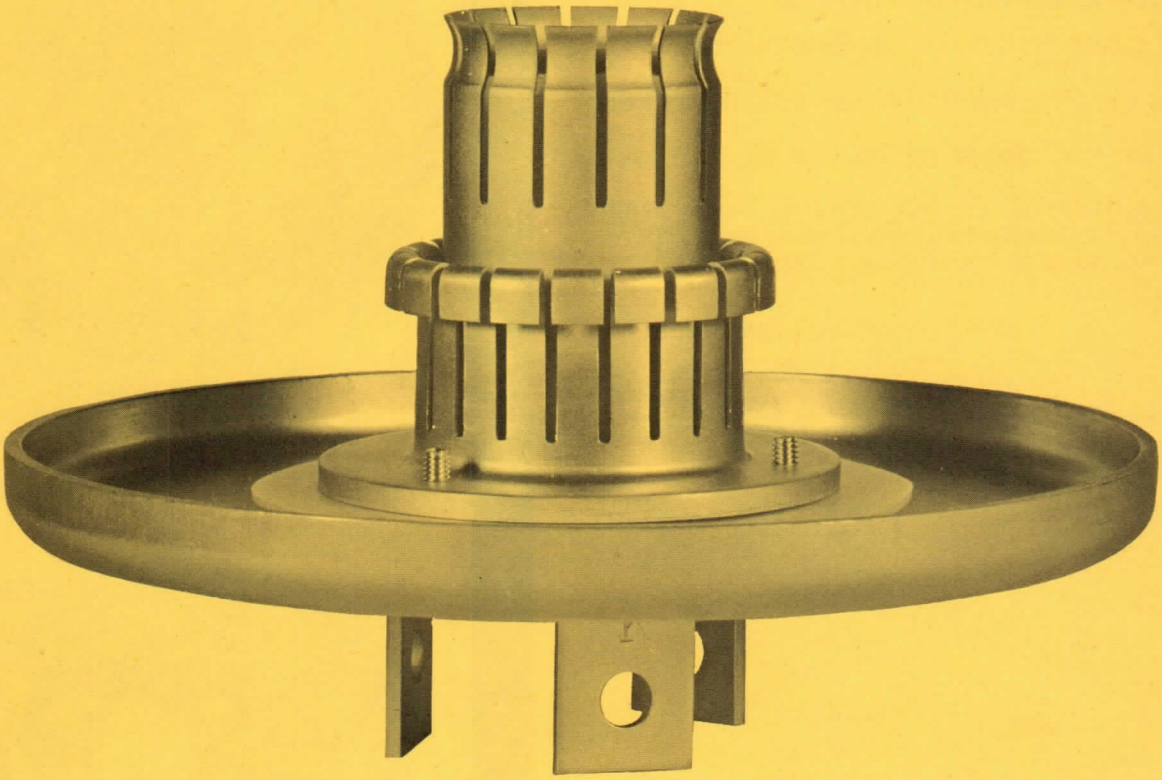
255....All miniature pulse magnetrons.





EQUIPMENT – ACCESSORIES

SOCKETS



4 in.

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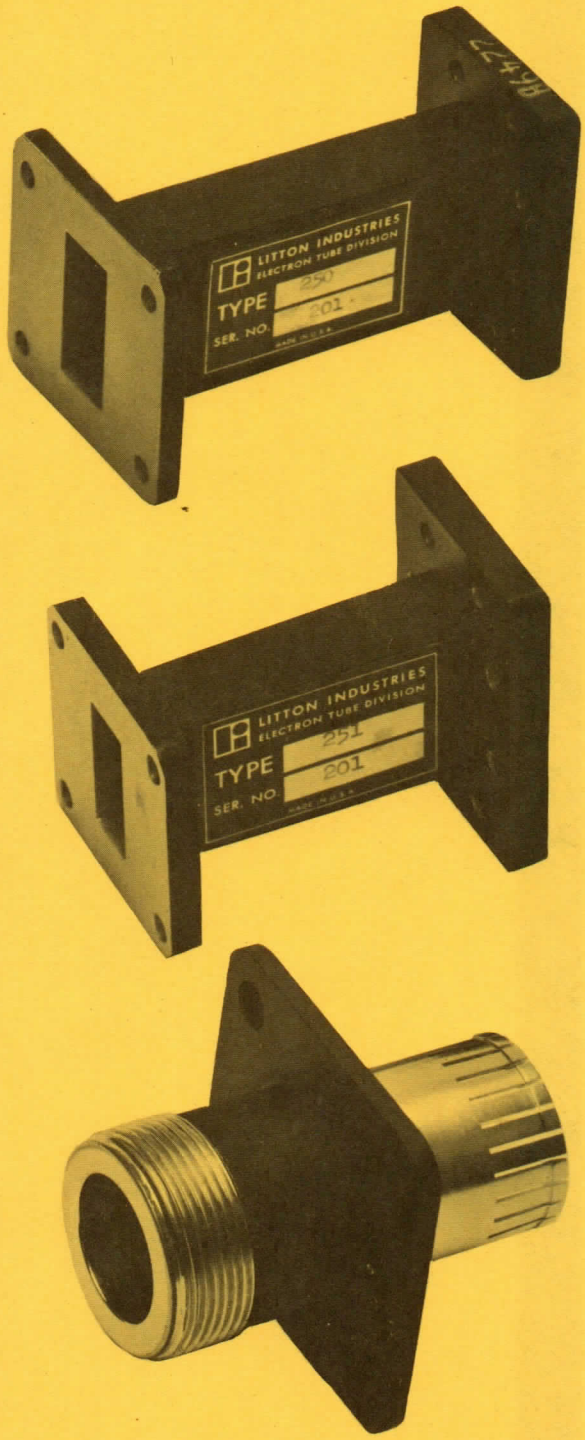
TRANSITIONS

RF OUTPUT TRANSITIONS

Litton Industries makes available a standard group of rf output adaptors for use with microwave tubes. These transitions are available for crossed field and linear beam tubes. As an example, rf output transitions for the Litton Industries line of CW magnetrons are listed below.

Model Number	Output Description	Applicable Magnetrons
247	Coaxial output to 7/8" coaxial line	L-3464, L-3465, L-3502, L-3503, L-3714
228	Output window to RG-49/u waveguide	L-3461, L-3505
229	Output window to RG-48/u waveguide	L-3460, L-3504
248	Double ridge output to RG-49/u	L-3467, L-3506 (low end of band)
249	Double ridge output to RG-50/u	L-3467, L-3506 (high end of band) L-3468, L-3507 (full band) L-3462, L-3508 (low end of band)
250	Double ridge output to RG-51/u	L-3468, L-3507 (high end of band) L-3462, L-3508 (full band) L-3463, L-3509 (low end of band)
251	Double ridge output to RG-52/u	L-3462, L-3508 (high end of band) L-3463, L-3509 (full band)



EQUIPMENT – ACCESSORIES

TRANSITIONS

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