

ELECTRON TUBE CONDENSED CATALOG / 1962

*Report ✓*

NEW YORK 10, N. Y.

INC.

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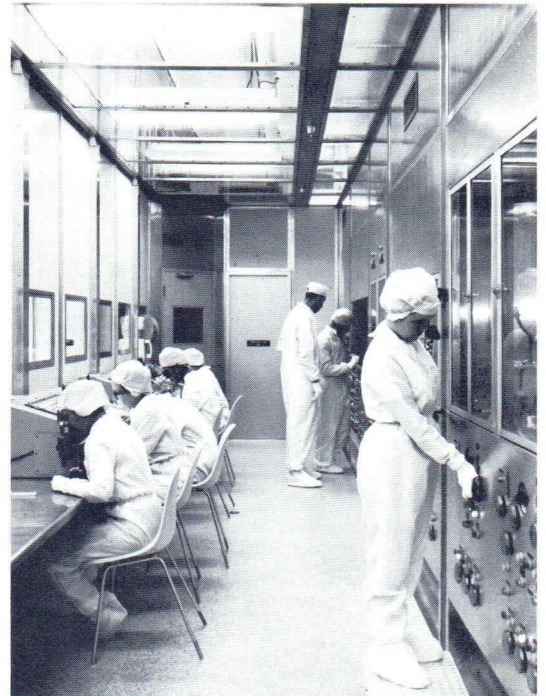
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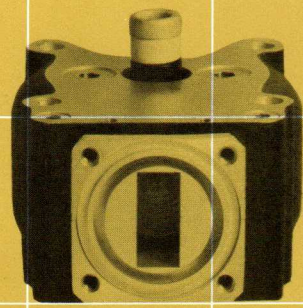
## INTRODUCTION

Within these pages, you will find a condensed listing featuring most of the basic unclassified types developed and manufactured by the Litton Industries Electron Tube Division. Other electron tubes with frequency and power variations are also available.

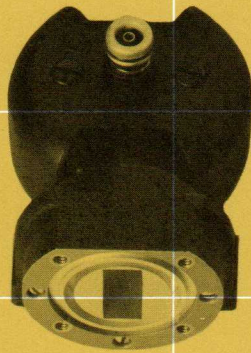
The 1962 edition of the Litton Condensed Tube Catalog provides an introduction to many new tube types. You will find devices *now being produced* in the super power magnetron field; klystrons of the broadband and super power class; new miniature magnetrons; a new group of switch tubes; new families of compact, lightweight traveling wave tubes; advances in the millimeter wave field; new precision, high resolution cathode ray tubes; the Litton Precision Resistance Network Analogue; and new accessories and equipment.

Litton Industries has continued its expansion during the past year, yet has not sacrificed its reputation for the highest quality in the microwave and display fields. High performance and reliability have always been foremost in the design and production of Litton tubes.

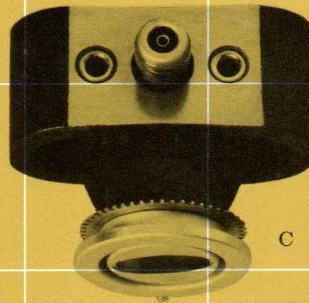




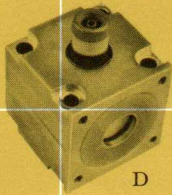
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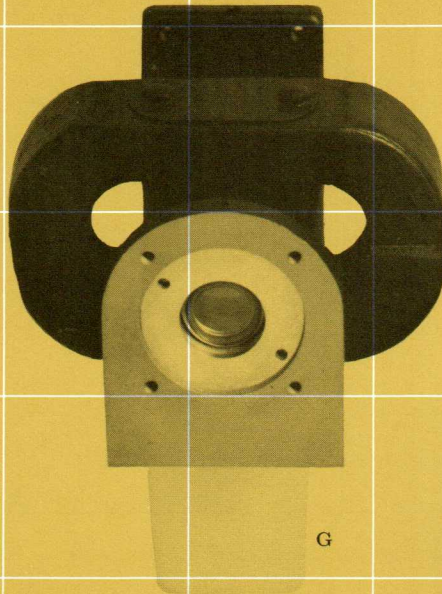
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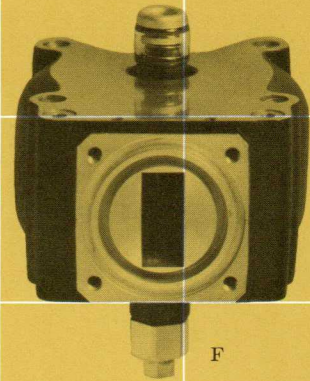


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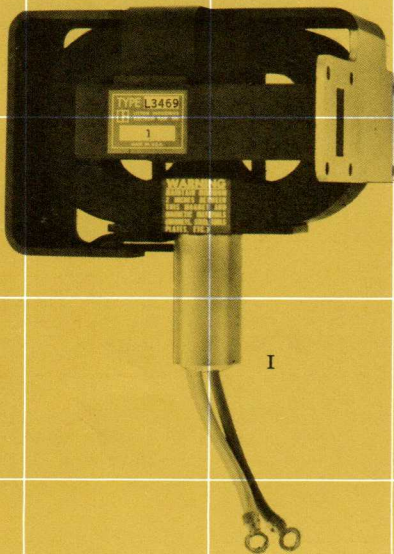
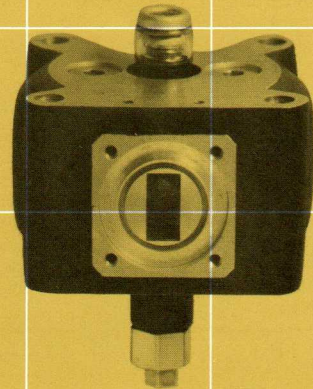


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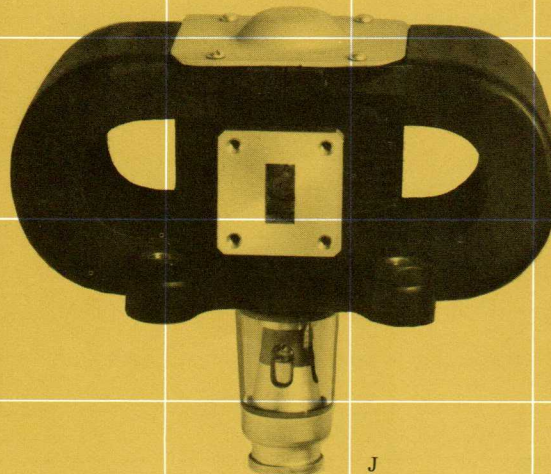
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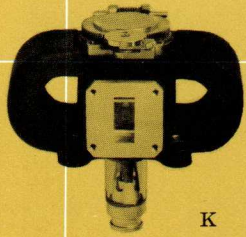
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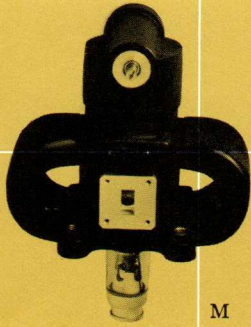
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# PULSE MAGNETRONS

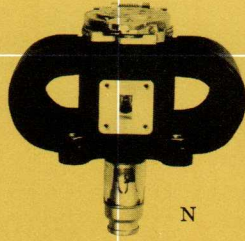
Tube Type	Minimum Peak Power kw	Frequency Mcs	Nominal Operating Characteristics				Max. Duty %	Max. Wt. oz.	
			Ef	Volts	If Amps	eb volts			
L-3602	0.03	8600 ± 40	6.3	0.50	550	0.30	2.7	22	Designed for high performance aircraft, missile and satellite applications, this series of highly ruggedized magnetrons provides a wide range of power levels. Low thermal factors (less than 75 Kc/°C), high frequency stability, and short pulse operation (.020 μs and less) make these tubes very versatile. Other frequency versions throughout high X-band are available upon request.
L-3105	0.10	9300 ± 40	6.3	0.50	800	0.55	2.7	22	
L-3434	0.10	9950 ± 30	6.3	0.50	800	0.55	2.7	22	
L-3603	0.50	9300 ± 30	6.3	0.50	1300	1.30	2.0	22	
L-3429	1.0	9300 ± 30	6.3	0.50	1400	2.20	0.5	22	
L-3604	1.0	9300 ± 30	6.3	0.50	2800	1.33	0.3	22	
L-3238	1.0	9340 ± 30	6.3	0.50	2800	1.33	0.3	22	
L-3239	2.0	9300 ± 30	6.3	0.50	3300	2.25	0.2	22	
L-3605	3.0	9300 ± 30	6.3	0.50	3600	3.15	0.1	22	
L-3268	4.0	9300 ± 30	6.3	0.90	3900	4.00	0.1	22	
L-3089	0.04	8800 ± 25	6.3	0.90	850	0.20	25.0	20	This long life, low power magnetron is designed for pulse doppler and beacon applications where extremely high duty is required. The L-3089 magnetron is available with warranted operation for 1000 or 2000 hours.
L-3212	0.12	9000 to 9020	6.3	0.50	800	0.55	2.7	16	This series of tunable magnetrons designed for beacon and transponder applications gives stable frequency operation with coded pulse groups with duties as high as 25%. High average duty ratings and capability for very short pulse operation (.020 μs and less) make possible many applications. Other frequency versions are available upon request.
L-3213	0.12	9050 to 9070	6.3	0.50	800	0.55	2.7	16	
L-3214	0.12	9100 to 9120	6.3	0.50	800	0.55	2.7	16	
L-3218	0.12	9150 to 9170	6.3	0.50	800	0.55	2.7	16	
L-3226	0.12	9180 to 9200	6.3	0.50	800	0.55	2.7	16	
L-3180	0.12	9200 to 9220	6.3	0.50	800	0.55	2.7	16	
L-3181	0.12	9250 to 9270	6.3	0.50	800	0.55	2.7	16	
L-3023D	0.12	9280 to 9330	6.3	0.50	800	0.55	2.7	16	
L-3601	0.12	9315 to 9340	6.3	0.50	800	0.55	2.7	16	
L-3327	0.12	9365 to 9385	6.3	0.50	800	0.55	2.7	16	
L-3187	0.12	9250 to 9270	5.0	0.60	800	0.55	2.7	16	
L-3087A	0.12	9280 to 9320	5.0	0.60	800	0.55	2.7	16	
L-3384	1.0	9280 to 9320	6.3	0.50	2800	1.33	0.3	16	
L-3058	1.0	9300 to 9320	6.3	0.50	2800	1.33	0.3	16	
L-3225	1.0	9310 to 9350	6.3	0.50	2800	1.33	0.3	16	
L-3606	0.5	9300 ± 30	6.3	0.90	1300	1.30	1.0	10	These newest, lightest and most rugged of the Litton miniature tubes are the first of a new series of all ceramic-metal construction. Having been assembled in a carefully controlled environment and processed at high temperatures, these tubes give highly reliable performance at high efficiency, negligible missing pulses, and nearly constant power with life. Tunable versions are planned.
L-3430	1.0	9300 ± 30	6.3	0.90	1400	2.20	0.5	10	
L-3358	1.0	16,000 to 16,500	6.3	0.95	3000	2.00	0.3	21	This group of highly ruggedized miniature Ku-band tubes is designed for use in high performance aircraft or missile applications. They may be pulsed with high duty coded pulse groups or with single short pulses. Special design features provide a low thermal factor less than 150 Kc/°C and stable frequency operation. Fixed frequency versions are available throughout the frequency ranges of the tunable tubes.
L-3383	1.0	16,250 to 16,300	6.3	0.95	3000	2.00	0.3	21	
L-3496	1.0	16,000 to 16,500	6.3	0.70	3000	1.60	0.3	19	
L-3359	2.0	16,000 to 16,500	6.3	0.95	3600	2.75	0.3	21	
L-3498	2.0	16,280 to 16,320	6.3	0.95	3600	2.75	0.3	21	
L-3452	2.2	16,200 ± 75	6.3	0.95	3600	2.75	0.3	20	
L-3379	1.0	8800 to 9500	6.3	0.90	3350	1.15	0.3	22	These tunable, highly ruggedized magnetrons make possible greater flexibility for beacons, transponders and small radars. Quick warmup, extremely short pulse operation, and stable frequency operation are characteristic of these long life, reliable tubes.
L-3380	2.0	8800 to 9500	6.3	0.90	3450	2.25	0.2	22	
L-3381	3.0	8800 to 9500	6.3	0.90	3600	3.25	0.1	22	
L-3382	4.0	8800 to 9500	6.3	0.90	4000	4.00	0.1	22	
L-3023/LT6233	7.0	9280 to 9345	6.3	1.0	5800	3.8	0.3	4 1/8 lbs.	These proven extremely reliable tubes are designed for beacon applications requiring constant frequency operation. Other frequency versions are available upon request.
L-3029A	7.0	9235 to 9300	6.3	1.0	5800	3.8	0.3	4 1/8 lbs.	
L-3029B	7.0	9250 to 9315	6.3	1.0	5800	3.8	0.3	4 1/8 lbs.	
L-3029C	7.0	9295 to 9360	6.3	1.0	5800	3.8	0.3	4 1/8 lbs.	
L-3029D	7.0	9265 to 9330	6.3	1.0	5800	3.8	0.3	4 1/8 lbs.	
L-3635	10.0	9375 ± 30	6.3	1.3	6000	6.0	0.2	3 3/4 lbs.	By conservative design and rigorous processing, these magnetrons provide many thousands of hours of stable performance. These tubes are available with warranted operation for 1000 or 2000 hours.
L-3431	18.0	9375 ± 30	6.3	1.3	7000	7.0	0.1	3 3/4 lbs.	
L-3654	24.0	9375 ± 30	6.3	1.3	8000	8.25	0.1	3 3/4 lbs.	
L-3469	20.0	9375 ± 30	12.6	0.5	7250	7.25	0.1	4 1/4 lbs.	
L-3306	30.0	16,500 ± 150	12.6	2.4	12,000	12.0	0.1	5 1/2 lbs.	Rigorous high temperature processing standard with all Litton products makes possible reliable, long life Ku-band fixed frequency tubes such as the L-3306 and L-3326.
L-3326	60.0	16,500 ± 150	12.6	2.4	17,000	16.0	0.1	5 1/2 lbs.	



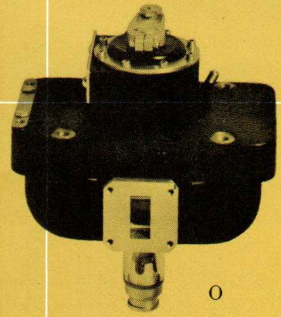
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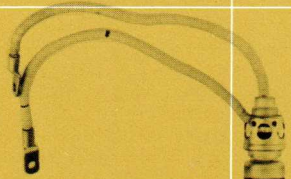
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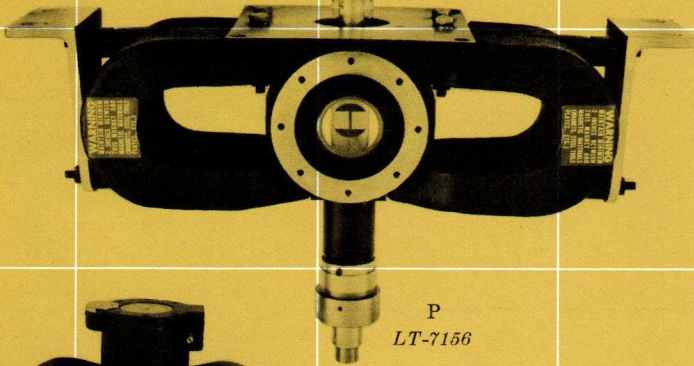
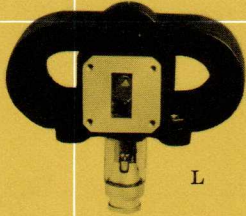
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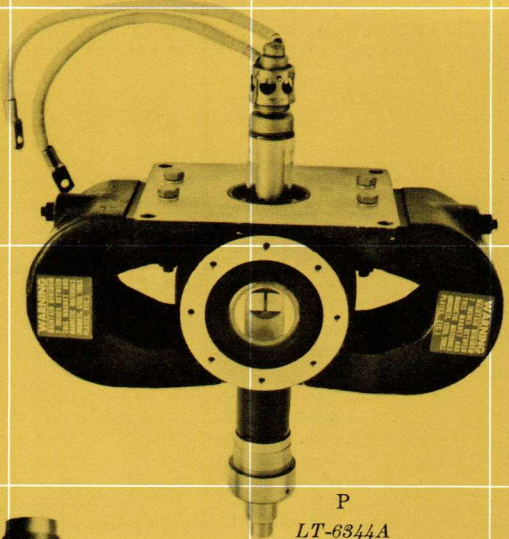
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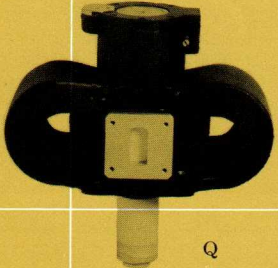
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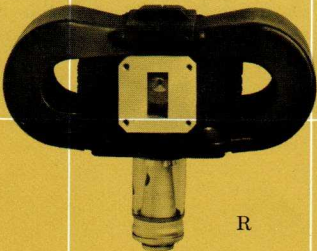
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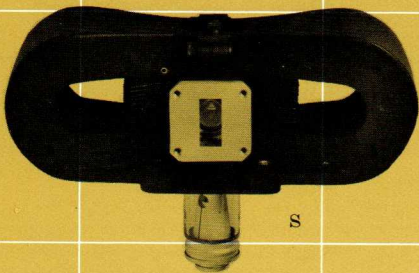
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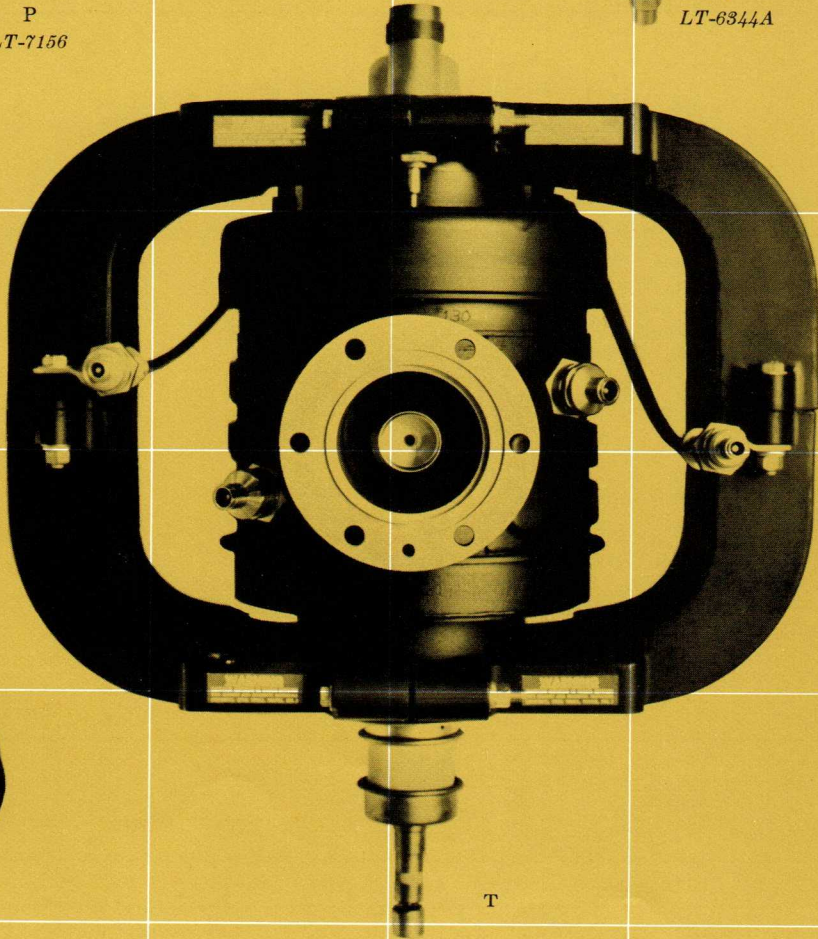
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## PULSE MAGNETRONS

Tube Type	Minimum Peak Power kw	Frequency Mcs	Nominal Operating Characteristics				Max. Duty %	Max. Wt. lbs.		
			Ef	Volts	If Amps	eb kilovolts				ib amps
<i>L-3103</i>	30.0	8500 to 9600	12.6	2.3	12.5	10.0	0.2	6 1/8	Extensive life testing of the LT-6543 X-band magnetron has demonstrated that it is one of the most reliable tunable magnetrons available today, capable of well over 1000 hours of stable performance under rugged cycle operation. The L-3103 is recommended for systems requiring higher duty operation, and the 6543A for MTI systems requiring low jitter performance.	
<i>LT-6543</i>	65.0	8500 to 9600	12.6	2.3	15.0	15.0	0.1	6 1/8		
<i>6543A</i>	65.0	8500 to 9600	12.6	2.3	15.0	15.0	0.1	6 1/8		
<i>L-3168</i>	30.0	9375 ± 30	12.6	2.3	12.5	10.0	0.2	6	Fixed frequency versions of the proven, long life, LT-4J52A magnetron other than those listed here are available upon request. The L-3168 is recommended for systems requiring higher duty operation and the LT-6510 for MTI systems requiring low jitter performance.	
<i>LT-4J52A</i>	70.0	9375 ± 30	12.6	2.3	15.0	15.0	0.1	6		
<i>LT-6510</i>	65.0	9375 ± 30	12.6	2.3	15.0	15.0	0.1	6		
<i>L-3036A</i>	65.0	9410 ± 5	12.6	2.3	15.0	15.0	0.1	6		
<i>L-3036B</i>	65.0	9275 ± 15	12.6	2.3	15.0	15.0	0.1	6		
<i>L-3036F</i>	65.0	9245 ± 30	12.6	2.3	15.0	15.0	0.1	6		
<i>L-3083A</i>	60.0	16,000 to 17,000	12.6	2.4	17.0	16.0	0.1	6 1/8	Long life and reliable performance are characteristic of these tunable Ku-band magnetrons which are rated for 1.0, 2.0 and 3.0 microsecond pulse operation respectively. The special tuner, which tunes the frequency range in approximately five turns, is designed for use with a multi-position Collins tuner drive.	
<i>L-3083B</i>	60.0	16,000 to 17,000	12.6	2.4	17.0	16.0	0.1	6 1/8		
<i>L-3083C</i>	60.0	16,000 to 17,000	12.6	2.4	17.0	16.0	0.1	6 1/8		
<i>L-3101A</i>	60.0	16,000 to 17,000	12.6	2.4	17.0	16.0	0.1	5 3/4	This series of tunable Ku-band magnetrons rated for 1.0, 2.0 and 3.0 microsecond pulse operation respectively is similar to the L-3083 series except that approximately 120 turns are required to traverse the frequency range. Tuning may be manual or by mechanical servo-drive.	
<i>L-3101B</i>	60.0	16,000 to 17,000	12.6	2.4	17.0	16.0	0.1	5 3/4		
<i>L-3101C</i>	60.0	16,000 to 17,000	12.6	2.4	17.0	16.0	0.1	5 3/4		
<i>L-3305</i>	65.0	8500 to 9600	12.6	2.3	15.0	15.0	0.1	9 1/2	Frequency diversity systems with increased performance and anti-jamming capability are possible with this hydraulically tunable magnetron capable of operating with programmed or random tuning rates up to 100,000 Mc/s/s. The L-3305 is interchangeable with the 6543 and 4J52 magnetrons.	
<i>LT-6344A</i>	175	5450 to 5825	13.5	2.5	21.5	22.0	0.1	25	Proven long life at C-band is available in the LT-6344A and LT-7156 magnetrons, where life in excess of 2500 hours has been recorded. Both the LT-6344A and the higher-powered version, the LT-7156, have been included in this catalog for the first time.	
<i>LT-7156</i>	250	5450 to 5825	5.0	5.0	25.0	24.0	0.1	35		
<i>L-3357</i>	190	9200 to 9550	13.75	3.35	21.5	27.5	0.1	12	The L-3312 is the first all ceramic-metal tunable version of the 4J50 magnetron. Reliable, linear tuning, low missing pulse performance, and long life at constant power are characteristic of this tube, which is interchangeable with the 7008 magnetron. The L-3357 is a limited tuning range version of the type L-3312.	
<i>L-3312</i>	200	8500 to 9600	13.75	3.35	21.5	27.5	0.1	11		
<i>LT-4J50A</i>	225	9375 ± 30	13.75	3.35	21.5	27.5	0.1	10	Fixed frequency versions of the widely used, reliable 4J50 magnetron are used in systems requiring multi-frequency operation. The L-3613 magnetron is a high pulling version of the 4J50 designed for frequency modulation and frequency diversity applications. A minimum of 30 Mc of frequency shift is obtained by varying the phase of a 2.0:1 VSWR.	
<i>L-3039D</i>	225	8800 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039E</i>	225	8860 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039F</i>	225	8920 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039G</i>	225	8980 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039H</i>	225	9040 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039I</i>	225	9100 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039J</i>	225	9160 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039K</i>	225	9220 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039L</i>	225	9280 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039M</i>	225	9340 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039N</i>	225	9400 ± 20	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039P</i>	225	9375 ± 30	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3039R</i>	225	8790 ± 90	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3613</i>	225	9375 ± 30	13.75	3.35	21.5	27.5	0.1	10		
<i>L-3030</i>	300	9375 ± 30	13.75	3.35	27.5	27.5	0.1	14		These high power versions of the standard 4J50 magnetron are designed for component testing and are not recommended for system applications.
<i>L-3030B</i>	300	9000 ± 30	13.75	3.35	27.5	27.5	0.1	14		
<i>L-3030C</i>	300	9200 ± 30	13.75	3.35	27.5	27.5	0.1	14		
<i>L-3455</i>	2.0MW	406 to 450	6.5	55	55	97.2	.002	220	This two-megawatt, all metal and ceramic, tunable, UHF pulse magnetron is one of the most recent additions to Litton capability in pulse magnetrons. Intended for high powered airborne search radar, the L-3455 provides long life, high reliability, negligible missing pulses, and high efficiency. This tube is capable of withstanding high shock and vibration. Liquid cooling is required on tuner and anode assemblies.	

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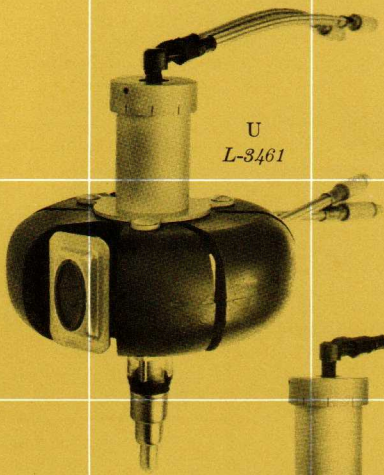
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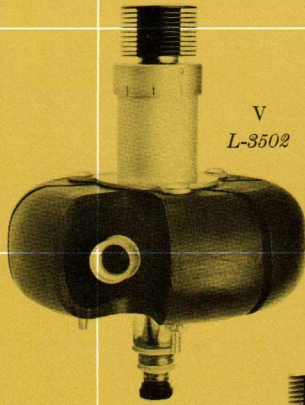
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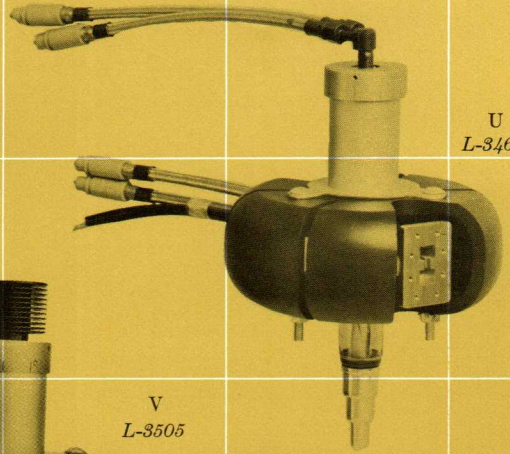
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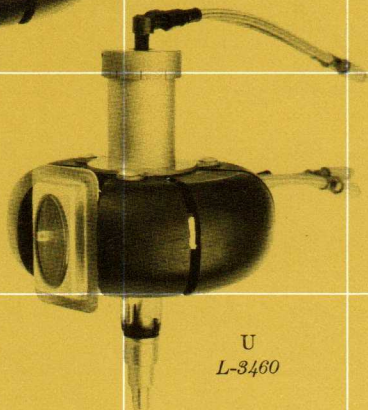
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L-3461



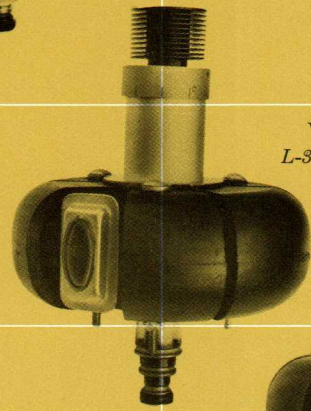
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L-3502



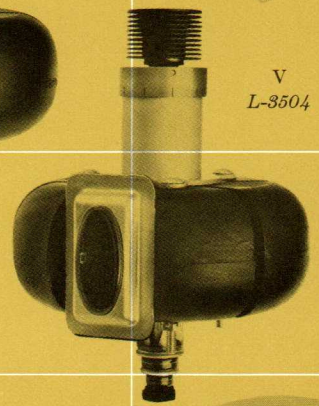
U  
L-3467



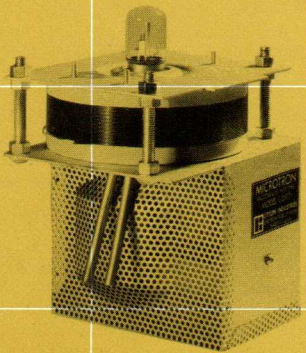
U  
L-3460



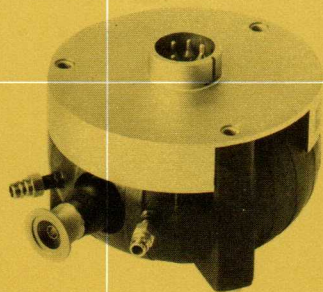
V  
L-3505



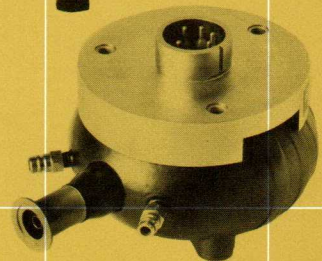
V  
L-3504



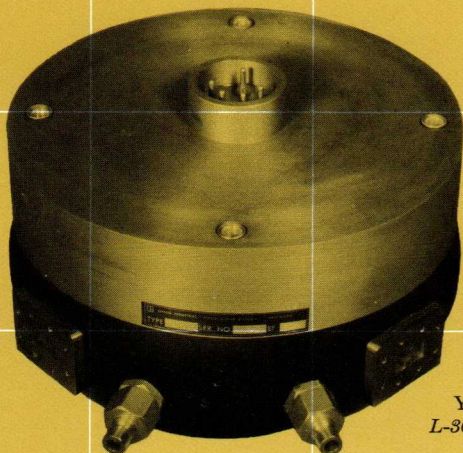
W  
L-3510



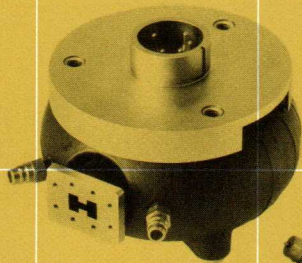
X  
L-3721



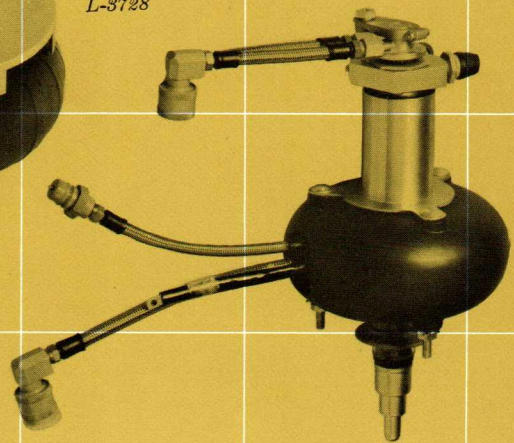
X  
L-3724



Y  
L-3650



X  
L-3728



Z

6 in.

12 in.

18 in.

24 in.

30 in.

36 in.



## CW/PULSE MAGNETRONS

Tube Type	Tunable Frequency Mcs	Minimum CW Power Watts	Nominal CW Characteristics			Minimum Pulse Power kw	Nominal Pulse Characteristics	
			Eb kilovolts	Ib ma			eb kilovolts	ib amps
L-3714	475 to 725	165	3.5	200	1.5	4.5	0.8	
L-3465	975 to 1500	400	4.0	300	2.0	4.6	0.8	
L-3464	1500 to 2350	400	4.0	325	2.0	4.8	0.8	
L-3460	2350 to 3575	500	4.0	300	2.0	4.5	0.8	
L-3461	3575 to 4975	350	4.0	250	1.5	4.5	0.8	
L-3467	4975 to 6175	400	4.2	250	2.0	4.6	0.8	
L-3468	6175 to 7275	300	4.2	200	1.8	4.6	0.8	
L-3462	7275 to 8775	300	4.4	200	1.5	5.0	0.8	
L-3463	8775 to 10,475	250	4.4	200	1.5	5.0	0.8	

All tubes in this series are packaged in 7½" diameter bowl magnets and are equipped with tuning knobs. Each tube weighs approximately 18 lbs. and is 11½" high. Liquid cooling is required on the body and tuner and forced air on the stem and output window. The tubes are intended for either CW, MCW or high duty pulse operation. CW power rating must not be exceeded when operating under high duty pulse conditions. All tubes in this series have 93 watt filaments. Standby filament voltage is nominally 5.5 volts. All tubes have a similar external appearance with the exception of the RF output fitting.

L-3502	975 to 1500	110	3.2	130	0.9	3.8	0.6
L-3503	1500 to 2350	110	3.2	130	0.9	3.8	0.6
L-3504	2350 to 3575	110	3.2	130	0.9	3.8	0.6
L-3505	3575 to 4975	110	3.2	130	0.9	3.8	0.6
L-3506	4975 to 6175	110	3.2	130	0.8	3.8	0.6
L-3507	6175 to 7275	110	3.2	130	0.8	3.8	0.6
L-3508	7275 to 8775	110	3.2	130	0.7	3.8	0.6
L-3509	8775 to 10,475	110	3.2	130	0.7	3.8	0.6

All tubes in this series are packaged in 7½" diameter bowl magnets and are equipped with tuning knobs. Each tube weighs approximately 18 lbs. and is 10½" high. Forced air cooling is required on the body, tuner and stem of this series. The tubes are intended for either CW, MCW or high duty pulse operation. CW power rating must not be exceeded when operating under high duty pulse conditions. All tubes in this series have 93 watt filaments. Standby filament voltage is nominally 5.5 volts. All tubes have a similar external appearance with the exception of the RF output fitting.

## MICROTRON

Package Type	Fixed Frequency Mcs	Minimum Power Watts	Minimum Liquid Cooling gpm	Nominal Input Ratings E <sub>line</sub> Volts	I <sub>line</sub> Amps
L-3510	2450 (ISM-band)	1000	0.55	220	25

The Microtron CW microwave heating package has been engineered for quick six-second warmup and long life warranted operation. The complete microwave package includes an electromagnet, RF filter assembly and plate, filament, and isolation transformers.

## M-TYPE BACKWARD WAVE OSCILLATORS

Tube Type	Tunable Frequency Mcs	Minimum Power Watts	INPUT RATINGS (with respect to cathode)								
			Delay Line		Accelerator		Sole		Grid		
			E <sub>b2</sub> Kv	I <sub>b2</sub> mA	E <sub>b1</sub> Kv	I <sub>b1</sub> mA	E <sub>so</sub> Kv	ΔE <sub>so</sub> Max. V p-p	I <sub>so</sub> mA	E <sub>c</sub> Volts	I <sub>c</sub> mA
L-3146	4800-6550	150	2.2 to 5.0	275	.80 to 1.6	-3 to +3	-1.2 to -2.0	225	-10 to +3	-100 to -700	-3 to +3
L-3147	6500-8550	125	2.2 to 5.0	275	.80 to 1.6	-3 to +3	-1.2 to -2.0	225	-10 to +3	-100 to -700	-3 to +3
L-3234	8500-9600	125	2.2 to 3.5	250	1.0 to 1.6	-3 to +3	-1.2 to -1.8	225	-10 to +3	-100 to -900	-3 to +3
L-3148	8500-11,000	125	2.2 to 5.0	250	.80 to 1.6	-3 to +3	-1.2 to -2.0	225	-10 to +3	-100 to -700	-3 to +3
L-3721	1000-1400	200	2.3 to 4.0	300	.90 to 1.9	0 to +3	-.90 to -3.4	1800	-20 to +5	-100 to -700	-3 to +3
L-3724	2500-3550	180	2.3 to 4.0	300	.90 to 1.9	0 to +3	-.90 to -3.4	1800	-20 to +5	-100 to -700	-3 to +3
L-3726	4800-6550	165	2.3 to 4.0	275	.90 to 1.9	0 to +3	-.90 to -3.4	1800	-20 to +5	-100 to -700	-3 to +3
L-3728	8500-11,000	150	2.3 to 4.0	275	.90 to 1.9	0 to +3	-.90 to -3.4	1800	-20 to +5	-100 to -700	-3 to +3

These voltage tunable CW oscillators are designed for long reliable performance into a mismatch of 1.5:1 without discontinuities. A large variety of uses include high power sweep oscillators, frequency modulated or amplitude modulated transmitters or as barrage countermeasures power sources. All are designed to operate at similar voltages and currents and have similar mounting dimensions. Tubes operating above 4.8 kMc are equipped with double ridge broadband waveguides and those below 4.8 kMc use ⅞" coaxial outputs. All have 6.3 volt filaments. Other types are in development.

## CROSSED FIELD FORWARD WAVE AMPLIFIER TUBES

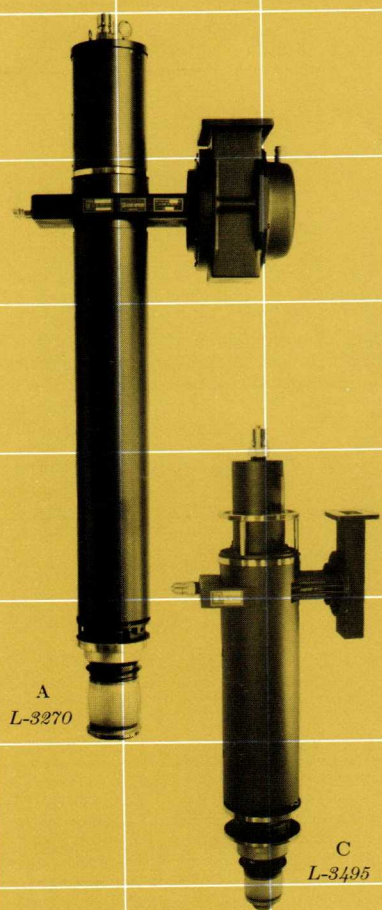
Tube Type	Tunable Frequency Mcs	Minimum Power Kilowatts	Gain db	Maximum Duty
L-3650	8500 to 9600	1	15	CW
L-3652	8500 to 11,000	1	20	CW
L-3685	8500 to 9600	500	13	.001

Litton Industries is engaged in R & D on crossed field forward wave amplifiers at microwave frequencies S through Ku-band. Work is for both CW and pulse applications. These are very efficient, high power, high gain linear amplifiers with many possible new applications. Details are classified for most tube types.

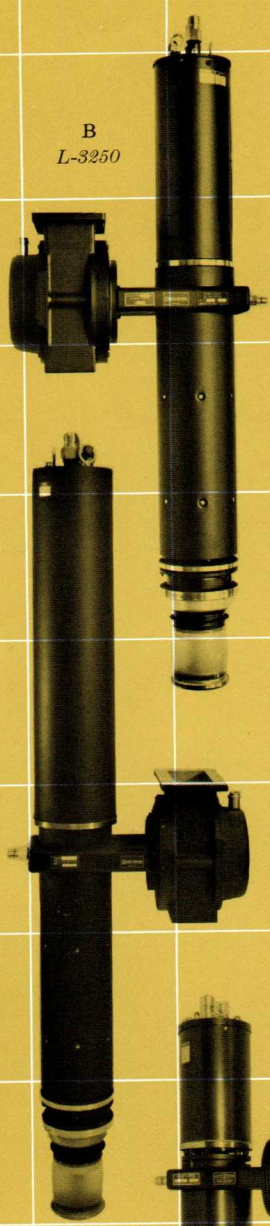
## BARRATRON® TRANSMITTING TUBES

Tube Type	Frequency Range	Tuning	Cooling	Power	RF Bandwidth	Video Bandwidth	Max. Wt. lbs.
L-3330 series	UHF through X-band	Hydraulic	Liquid	Classified	Classified	Classified	14
L-3360 series	UHF through X-band	Mechanical	Air	Classified	Classified	Classified	14
L-3475 series	X-band	Fixed	Liquid	Classified	Classified	Classified	12

The operating characteristics of these tubes are classified and available with a need-to-know in the field of countermeasures.



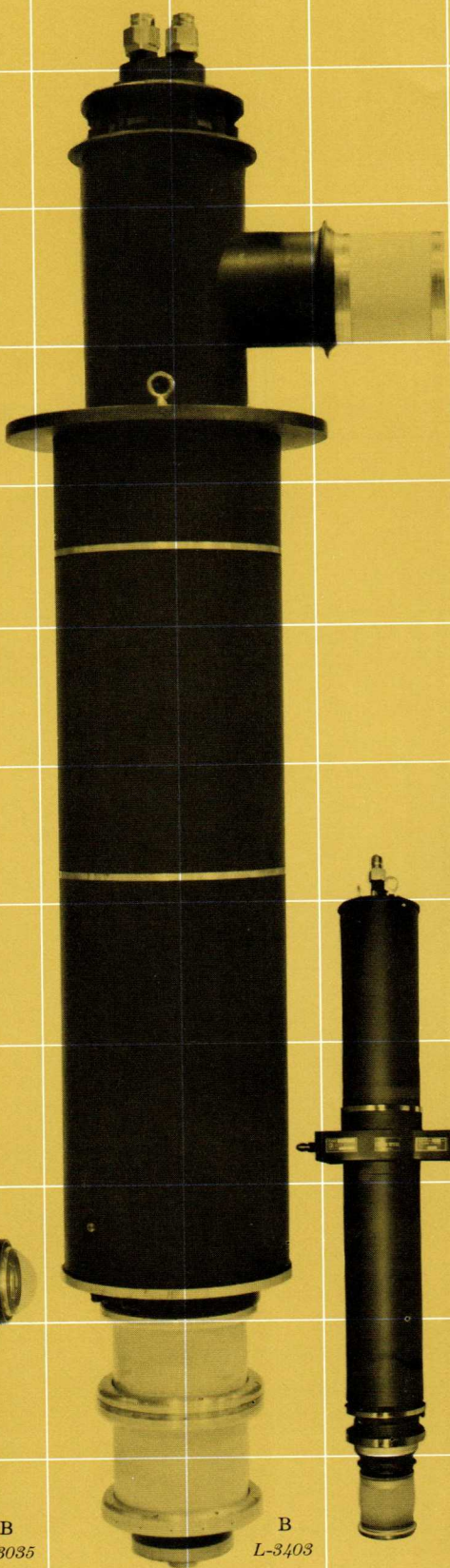
A  
L-3270



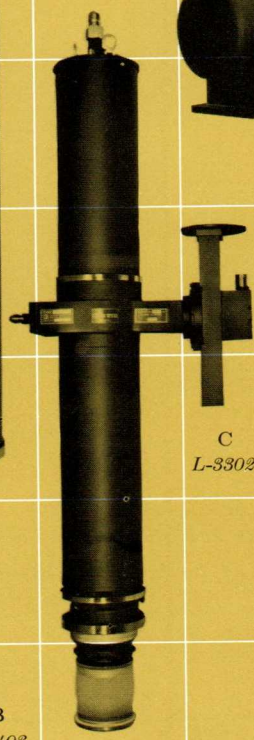
B  
L-3387



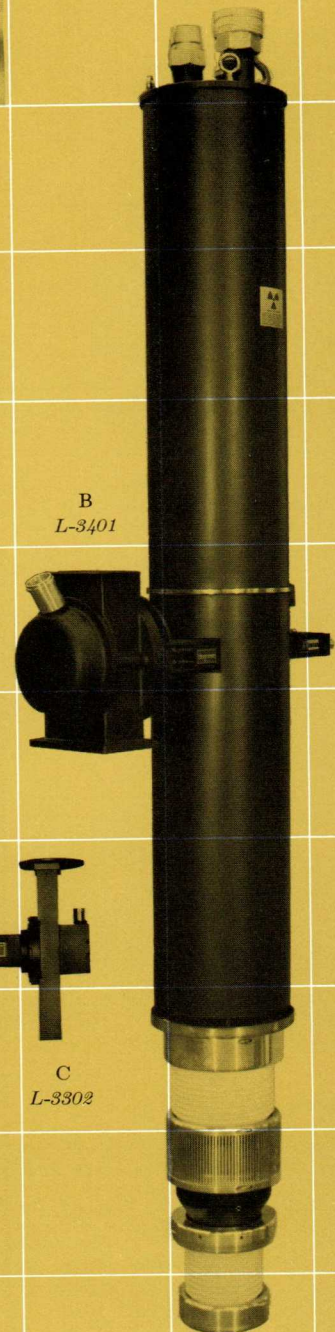
B  
L-3035



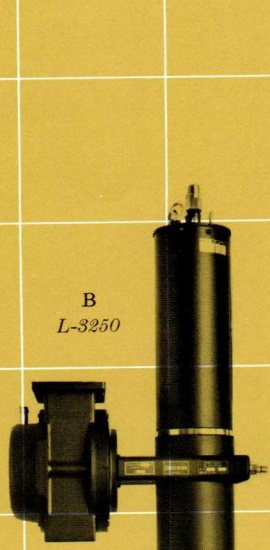
B  
L-3403



C  
L-3302



B  
L-3401



B  
L-3250

1 ft.

2 ft.

3 ft.

4 ft.

5 ft.

6 ft.

7 ft.

8 ft.

9 ft.

10 ft.

A

B

C

D

## KLYSTRONS

### KLYSTRON AMPLIFIERS, PULSED—BROADBAND

Type No.	Frequency Range (Mcs)	Minimum Bandwidth at Rated Power Points (Mcs)	Peak Power Output Minimum Over Indicated Bandwidth (Mw)	Cathode Pulse Length (Microseconds)	Duty Cycle (RF)	Minimum Gain (db)	Minimum Efficiency (%)	Typical Operating Values		Focus Coil Model Number
								eb (kv)	ib (Amperes)	
<i>L-3694</i> (Mod Anode)	400-450	3% to 3db Points	1.25	2100	.06	35	33	108	35	190
<i>L-3270</i>	1250-1350	100	2	8	.002	30	19	115	93	156
<i>L-3303</i>	1250-1350	100	5	23	.004	32	25	145	139	166
<i>L-3323</i>	1250-1350	100	10	10	.002	36	33.3	170	174	56
<i>L-3702</i>	1250-1350	100	30	30	.005	33	33	280	324	203
<i>L-3647</i>	2750-2850	100	5	10	.01	33	30	140	119	200
<i>L-3428</i>	S-Band	4%	Classified	4	.004	30	20	Classified		120

### KLYSTRON AMPLIFIERS, PULSED—TUNABLE

Type No.	Frequency Range (Mcs)	Peak Power Output Minimum Over Indicated Bandwidth (Mw)	Cathode Pulse Length (Microseconds)	Duty Cycle (RF)	Minimum Gain (db)	Minimum Efficiency (%)	Typical Operating Values		Focus Coil Model Number
							eb (kv)	ib (Amperes)	
<i>L-3403</i> (Mod Anode)	400-450	1.25	2100	.06	35	35	105	32.5	190
<i>L-3486</i>	1250-1380	.250	40	.068	30	30	45	18.5	201377
<i>L-3035/LT-7504</i>	1240-1360	2.2	8	.003	36	25	115	78	201377
<i>L-3257</i>	1250-1350	4	34	.00033	29	25	130	95	46 or 204
<i>L-3227</i>	1250-1350	5	7	.002	30	30	136	100	46 or 204
<i>L-3250</i>	1250-1350	10	7	.0015	36	33.3	185	160	46
<i>L-3355</i>	1250-1350	20	7	.0015	36	40	230	220	46
<i>L-3531</i>	1250-1350	25	8	.0033	36	36	240	290	46
<i>L-3387</i>	1250-1350	30	6	.003	36	36	270	280	46 (Modified)
<i>L-3401</i> (Mod Anode)	1254-1386	5	550	.06	35	35	124	115	187

### KLYSTRON AMPLIFIERS, PULSED—FIXED TUNED

Type No.	Frequency Range (Mcs)	Peak Power Output Minimum Over Indicated Bandwidth (Mw)	Cathode Pulse Length (Microseconds)	Duty Cycle (RF)	Minimum Gain (db)	Minimum Efficiency (%)	Typical Operating Values		Focus Coil Model Number
							eb (kv)	ib (Amperes)	
<i>L-3661</i>	1250-1350*	20	8	.0015	36	35	240	234	200
<i>L-3530</i>	1250-1350*	25	8	.0033	40	36	240	290	200
<i>L-3660</i>	1295-1305*	10	32	.002	33	33.3	175	171	200
<i>L-3495</i>	2855	2	8	.002	50	33.3	95	63	120
<i>L-3617</i>	2855	5	23	.003	40	35	148	112	46
<i>L-3302</i>	2855	10	7	.0015	40	33.3	185	160	46
<i>L-3733</i>	2855	10	7	.002	40	35	185	160	46
<i>L-3618</i>	2855	25	32	.0011	50	35	250	250	PM

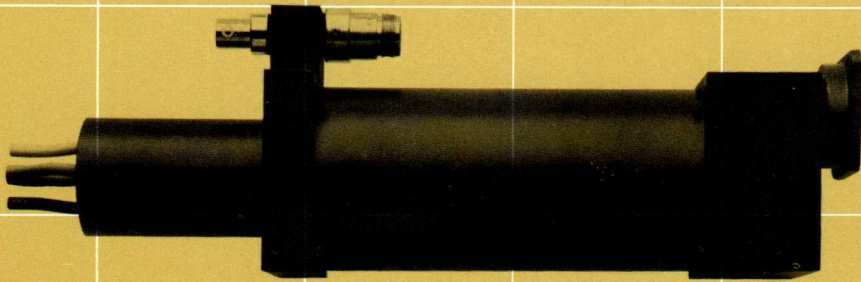
\*Fixed Tuned to a point within this range.

### KLYSTRON AMPLIFIERS, CW—FIXED TUNED

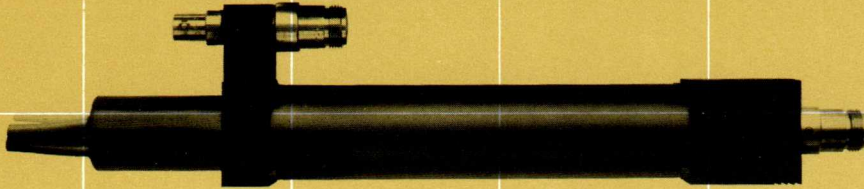
Type No.	Frequency Range (Mcs)	Average Power Output (kW)	Minimum Gain (db)	Minimum Efficiency (%)	Typical Operating Values		Focus Coil Model Number
					Ebb (kVdc)	Ik (Amperes)	
<i>L-3709</i>	2100-2200	100 CW	50	35	40	7	200

Direct inquiries are invited concerning other tube types in the field of continuous wave klystrons.

Litton Industries, Electron Tube Division, San Carlos, California



L-3614



L-3472



L-3612

3 in.

6 in.

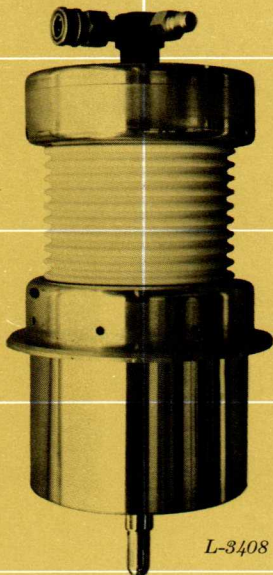
9 in.

12 in.

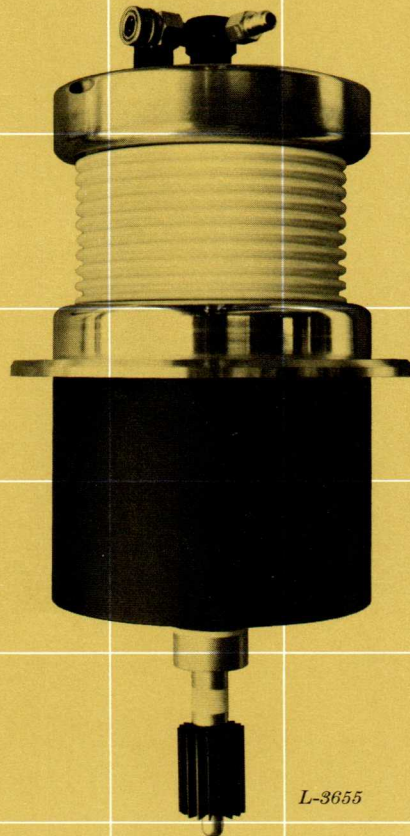
15 in.

18 in.

21 in.



L-3408



L-3655

6 in.

12 in.

18 in.

24 in.

30 in.

36 in.

42 in.

48 in.

## TRAVELING WAVE TUBES

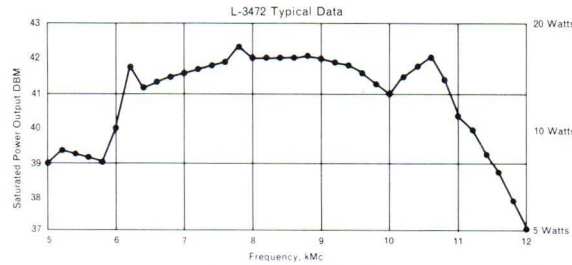
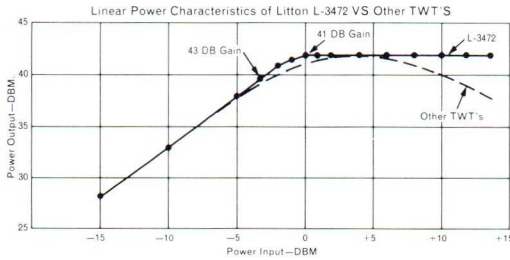
Litton Industries traveling wave tubes have been engineered for high CW power, wide bandwidth, yet are lightweight and compact. Most of the TWTs listed below are PPM focused. Special helix design and fabrication techniques have raised the saturation gain to within 3 db of small signal gain. These tubes can be supplied with small signal gains up to 60 db and with linear power

characteristics similar to the L-3472 shown on these pages. Input and output circuits are coaxial, providing minimum frequency sensitivity. Therefore, useable bandwidth is limited only by the electronic bandwidth of the beam and circuit combination. These all metal-ceramic, ruggedized TWTs, weighing between 1.5 and 6.0 pounds, meet military environmental specifications, Class II.

Tube Type Number	Frequency Range Megacycles	Power Output Minimum	Small Signal Gain Minimum	Duty Factor	Cooling
L-3499	2000-4000	2 Watts	36 db	CW	Conduction
L-3663	2000-4000	10 Watts	33 db	CW	Conduction and Forced Air
L-3619	2000-4000	20 Watts	33 db	CW	Conduction and Forced Air
L-3470	4000-8000	20 Milliwatts	36 db	CW	None
L-3711	4000-8000	1 Watt	36 db	CW	Conduction
L-3471	4000-8000	2 Watts	36 db	CW	Conduction
L-3657	4000-8000	10 Watts	33 db	CW	Conduction and Forced Air
L-3658	4000-8000	20 Watts	33 db	CW	Conduction and Forced Air
L-3611	7000-11,000	20 Milliwatts	36 db	CW	None
L-3612	7000-11,000	2 Watts	36 db	CW	Conduction
L-3528	5000-11,000	5 Watts	33 db	CW	Conduction and Forced Air
L-3472	7000-11,000	10 Watts	36 db	CW	Conduction and Forced Air
L-3529	7000-11,000	20 Watts	36 db	CW	Conduction and Forced Air
L-3614	8000-11,000	1 Kilowatt	36 db	.02	Conduction up to .01
L-3497*	1240-1400	5.5 Kilowatts	40 db	.06	Conduction plus liquid up to .02
L-3674*	400- 450	5 Kilowatts	37 db	.06	Liquid
L-3337*	5900-8400	200 Milliwatts	30 db	CW	Liquid

(15 db max. noise fig.)

\*In Development



## HIGH VOLTAGE SWITCH TUBES

Tube Number	Collector Voltage kVdc	Collector Current Amps	Application	Weight Lbs.
L-3408	150	20	Floating Deck	45
L-3534	200	2	Shunt Regulator	120
L-3655	200	150	Series Switch	100
L-3621	300	30	Series Switch	150
L-3620	350	30	Floating Deck	70

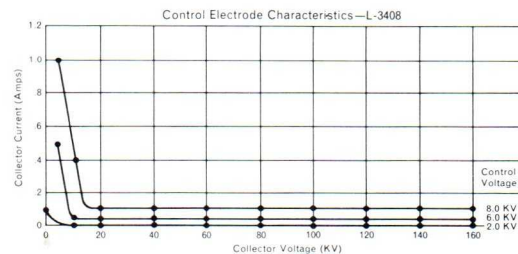
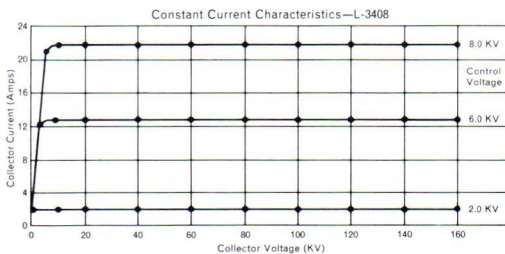
### TYPICAL OPERATING CHARACTERISTICS L-3408 SWITCH TUBE

The L-3408 Switch Tube is intended for use in high voltage, high switch rate, floating deck modulator applications.

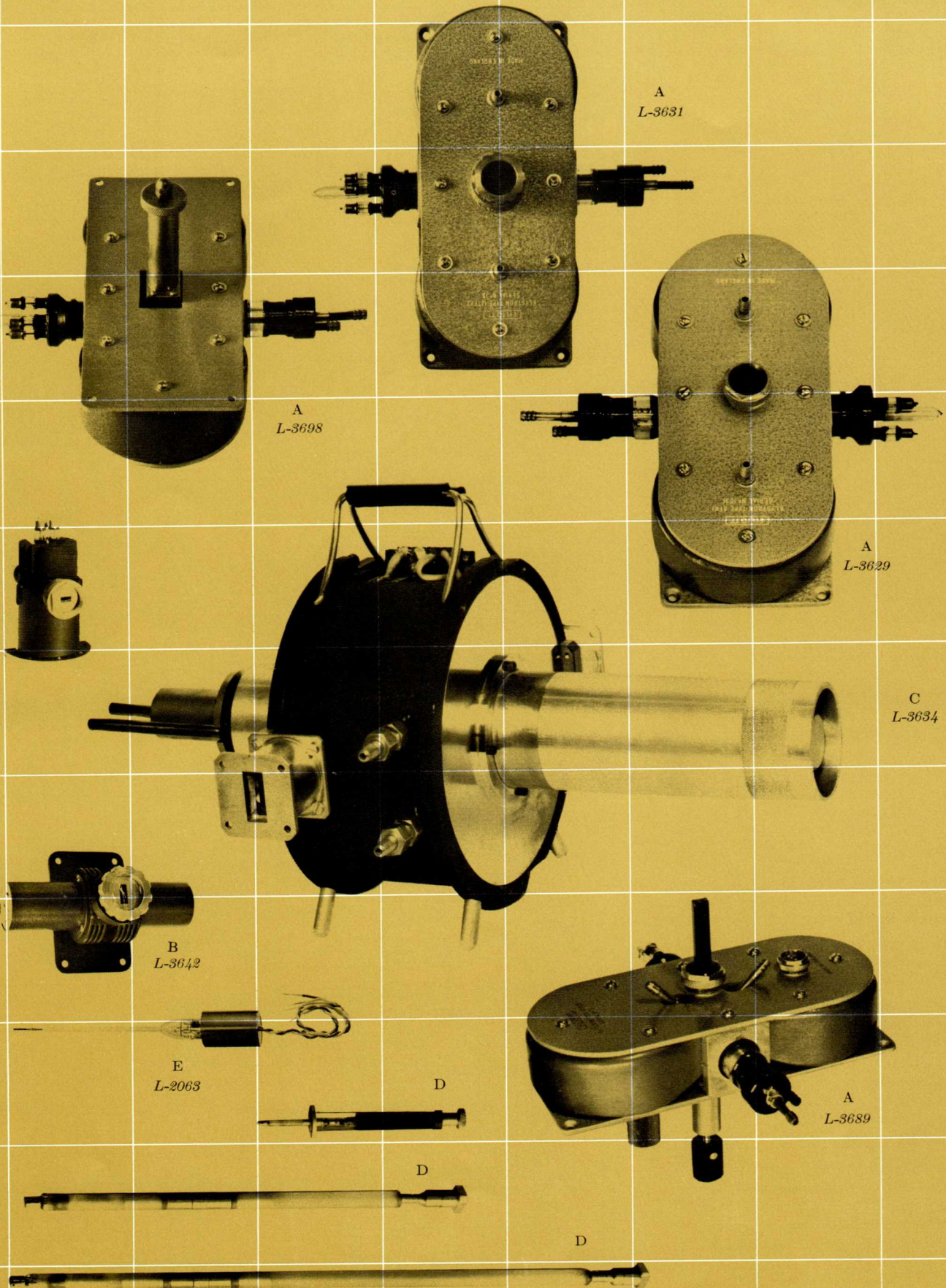
#### Tentative Specifications

Collector Voltage, maximum	150 kVdc
Collector Current, peak	20 Amps
Collector Dissipation, maximum	10 kW
Pulse Length,	
$I_c = 1$ Amp	CW
$I_c = 20$ Amps	$\leq 100 \mu s.$
Mod. Anode Voltage at	
$I_c = 20$ Amps (max.)	10 kv
$I_c = 1$ Amp (max.)	2.5 kv

Mod. Anode Current, maximum*	100 mA
Mod. Anode Perveance, approximate at $I_c = 20$ Amps	$25 \times 10^{-6}$
Mod. Anode Bias	$< 1000 v$
Capacity (Mod.—Anode to all electrodes)	$35 \mu f$
Size, approximate	
Length	20"
Diameter, including Magnets	8"
Weight, including Magnets, approximate	45 lbs.
Heater Voltage	12 volts
Heater Current	$6 \pm 0.5$ Amp
Tube voltage drop, approximate	50% of Mod. Anode voltage
Cooling	Liquid
*at $I_c = 20$ Amps / $E_c = > 20$ kv	



An advanced concept for high power beam switching, the new Litton INJECTRON® high voltage, high current switch tubes feature 95 per cent efficiency and fast rise time at low control voltage levels. The collector current is independent of collector voltage over a broad range, resulting in pentode-like current characteristics. Also features high voltage gain under conditions of low impedance loads.



A  
B  
C  
D  
E

3 in.      6 in.      9 in.      12 in.      15 in.      18 in.      21 in.      24 in.

## MILLIMETER WAVE TUBES

These Elliott-Litton, Ltd. products are available through the Litton Industries Electron Tube Division.

### FLOATING DRIFT TUBE KLYSTRON OSCILLATORS

Tube Type	Frequency kMc	Minimum Tuning Range Mc	Power Output Watts (minimum except where stated otherwise.)	Maximum Cavity Potential With Respect to Cathode kVdc	Maximum Cathode Current mA	Cooling
L-3638	68-80	Fixed	0.100	4.0	150	Liquid
L-3639	68-80	Fixed	0.500	4.0	150	Liquid
L-3689	68-80	1500	0.500 nominal	4.0	150	Liquid
L-3690	68-80	1500	0.100	4.0	150	Liquid
L-3691	68-80	1500	0.100 nominal	4.0	150	Liquid
L-3640	48-52	Fixed	1.0	4.0	150	Liquid
L-3693	48-52	1500	1.0	4.0	150	Liquid
L-3629	33-37	Fixed	15.0	4.0	150	Liquid
L-3628	33-37	1600	10.0	4.0	150	Liquid
L-3659	32-37	700	5.0	4.0	150	Liquid
L-3697	30-37	1600	1.5	2.5	75	Liquid
L-3698	30-37	1600	1.0	2.0	50	Air
L-3713	34-36	Fixed	30.0	6.0	150	Liquid
L-3736	34-36	Fixed	50.0	6.0	150	Liquid
L-3630	21-25	Fixed	10.0	4.0	150	Liquid
L-3631	21-25	1000	8.0	4.0	150	Liquid
L-3699	21-25	1000	1.5	2.5	75	Liquid
L-3700	21-25	1000	1.0	2.0	50	Air

### REFLEX KLYSTRONS

Tube Type	Frequency kMc	Minimum Tuning Range Mc	Power Output Watts (minimum)	Maximum Cavity Potential With Respect to Cathode kVdc	Maximum Cathode Current mA	Cooling
L-3632	30-37	1000	0.030	2.2	15	Air
L-3633	30-37	1000	0.200	2.5	20	Air
L-3710	30-37	2000	0.030	2.0	15	Air
L-3642	18-25	500	0.100	3.0	20	Air
L-3692	18-25	500	0.350	3.0	25	Air

### CW TRAVELING WAVE TUBE AMPLIFIER

Tube Type	Frequency	Power Output	Gain	Cooling
L-3634	9.1-9.5 kMc	1000 W (nominal)	10 db (1000 W)	Liquid and Air

### MONITOR DIODES

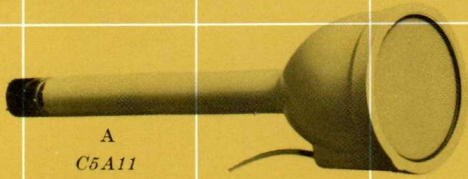
Tube Type	Frequency	Peak Power Input	Average Power Input	Heater Voltage
L-2060	8.5-10 kMc	20 kw	18 W	6.3 volts
L-2061	2.7-3.5 kMc	20 kw	18 W	6.3 volts
L-2062	34.5-36 kMc	12 kw	15 W	3 volts

### NOISE TUBE

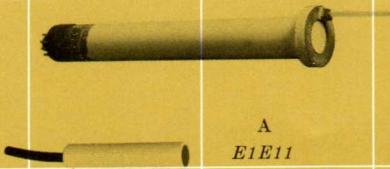
Tube Type	Frequency	Noise Factor	Noise Temperature
L-2063	Q-Band	15 db above kTB	11,000°K (Approx.)

Millimeter wave tube power supplies, as well as monitor diode tube mounts and waveguide mounts, are also available.

Litton Industries, Electron Tube Division, San Carlos, California

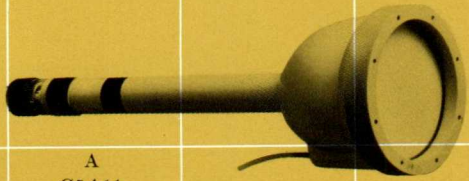


A  
C5A11

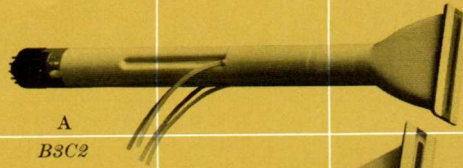


A  
E1E11

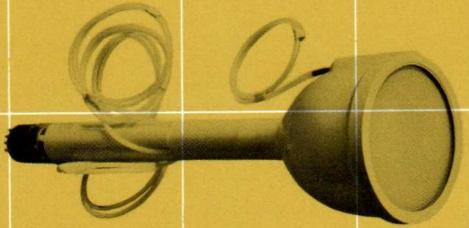
A  
C2A11



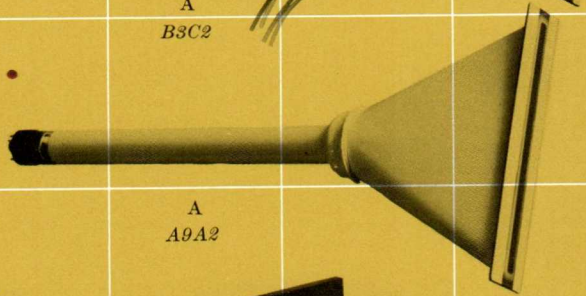
A  
G5A11



A  
B3C2



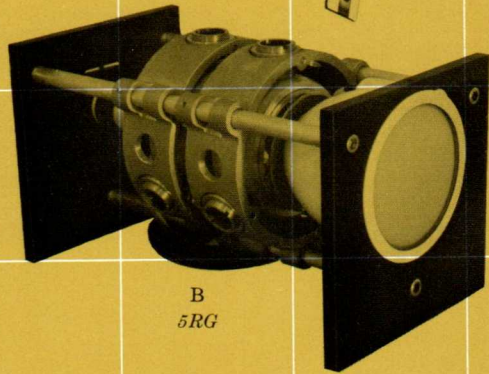
A  
L-4010



A  
A9A2

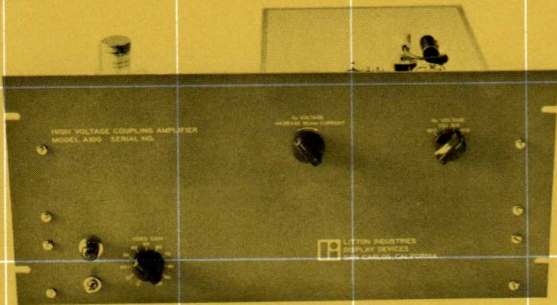


A  
C10T7

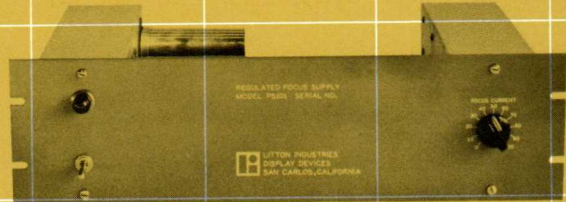


B  
5RG

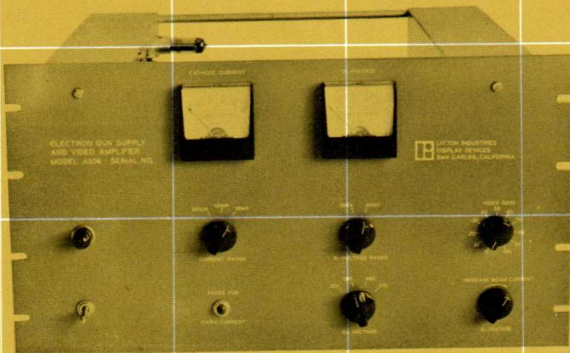
A



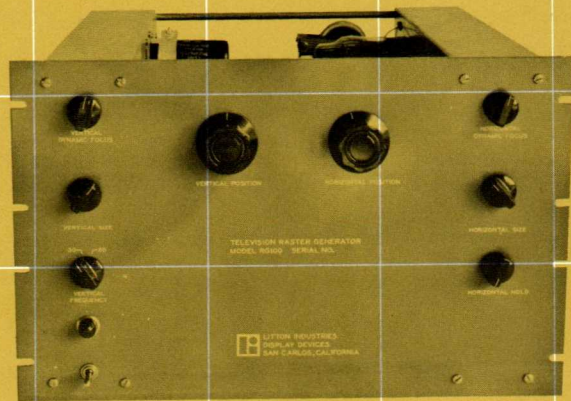
B  
A100



B  
PS101



B  
A106



B  
RG100

B

6 in.

12 in.

18 in.

24 in.

30 in.

36 in.

42 in.

48 in.



## DISPLAY DEVICES

### CATHODE RAY TUBES

These tubes represent only a cross-section of the types and varieties of precision, high performance cathode ray tubes available from the Display Devices Department. Variations of these tubes and other special purpose tubes are available upon request.

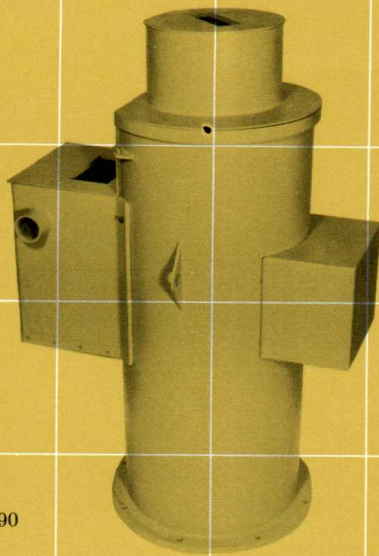
A9A2	8½" PRINTAPIX® CRT for high speed facsimile reproduction of documentary and half tone copy. One of PRINTAPIX family. Others available include 2¾", 5" and 11".
B3C2	2¾" PRINTAPIX® CRT with supplementary electrostatic deflection plates for the high speed direct printing of high quality alpha-numeric symbols.
C2A11	Special Purpose MICROPIX® CRT 1¼" screen diameter, minimum 2000 lines resolution. For minimum volume high resolution recording equipment.
C5A11	5" Multi-Purpose MICROPIX® CRT. For use in all high performance applications requiring high resolution. Line widths of 0.0006 inches available. Other phosphors available for special purposes.
C10T7	10" Low drive (12 volt video) version of the 10KP7A for transistor operation. Directly mechanically and electrically interchangeable with the 10KP7A.
G5A11	5" Special Purpose MICROPIX® CRT. Especially adapted for precision camera recording of high resolution information.
E1E11	1" Fiber Optic CRT—has precision array of 32 x 32 light conducting fibers for the direct film recording of digital information. Electrically interchangeable with the 1DP11.
E2A16	1½" Fiber Optic high resolution CRT for direct film recording. One of a family of Fiber Optic Tubes.
L-4003	5000 Line 21" rectangular glass tube. Full gamut of phosphors. Metallized screens.
L-4010	5" Dual deflection COMPOSIPIX® high definition character writing CRT. 4000 line resolution. Electrostatic deflection for character writing; magnetic deflection for character positioning.

### CRT OPERATIONAL ACCESSORIES

These items result from years of experience by the Equipment Group of the Display Devices Department with operation and testing of high performance CRT's. They are provided as accessories to enable the user to achieve maximum performance from CRT's. Special designs for unusual applications can be provided upon request.

A100	High Voltage Coupling Amplifier—provides CRT metering, all electron gun static voltages and signal amplification and isolation with bandpass of 10 cps to 4.5 Mc for CRT's operating with depressed cathode and grounded anode.
A101	Same as A100, except bandpass is from DC to 300 Kc.
A105	Low frequency deflection amplifier. For sawtooth waveforms from dc to 100 cycles, sine waves to 1000 cycles or more.
A106	Video Amplifier and electron gun supply. Has all the features of the PS 105, plus a high level video amplifier, 10 cps to 5 Mc band width.
A107	Same as A100, except bandpass from 10 cycles to 12 Mc.
A111	Same as A106, with extended range to 12 Mc.
PS101	Universal Current Regulated Focus Supply—with appropriate focus coil will focus all magnetically focused CRT's. Has provision for introduction of low frequency dynamic focus correction.
PS102	Universal High Voltage Power Supply for CRT operation. RF type supply with 0 to 30 KV at 1 ma output, ½% regulation and low ripple. For use with CRT's requiring grounded anode operation.
PS103	Same as PS102 except the output voltage is positive for conventional operation of CRT's.
PS104	Positive regulated, high voltage power supply, 15 to 30 kv or 20 to 40 kv. Similar to PS103, except does not go to zero.
PS105	Universal Electron Gun Power Supply. Supplies static voltages to the electron gun of magnetically focused and deflected CRT's.
RG100	Universal Raster Generator for TV standards. Will provide high quality raster for all magnetically deflected CRT's up to 90° and 27.5 KV.
S100	Universal mounting socket for all 2¾" PRINTAPIX® CRT's.
SG200	Sawtooth Magnetic Sweep Generator, 2.5 to 6 Kc.
5RG	Tube Mount for all MICROPIX® tubes, includes adjustable mounts for deflection and focus components, permitting precision positioning.

E  
Radiation  
Shield



D  
Model 202



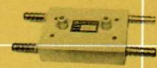
A  
Model 46



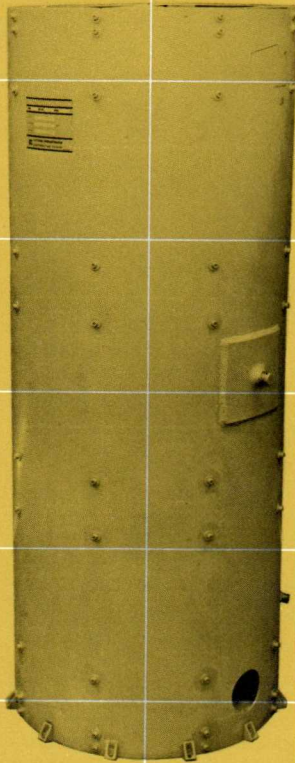
A  
Socket



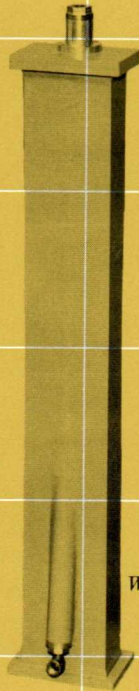
E  
Thermopile



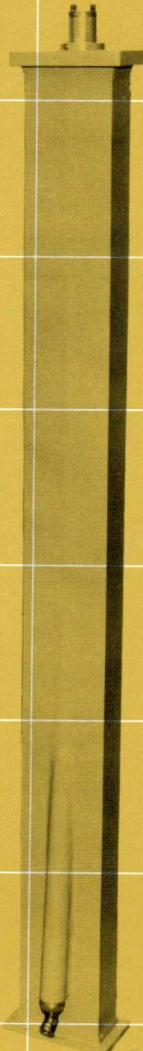
A  
Model 190



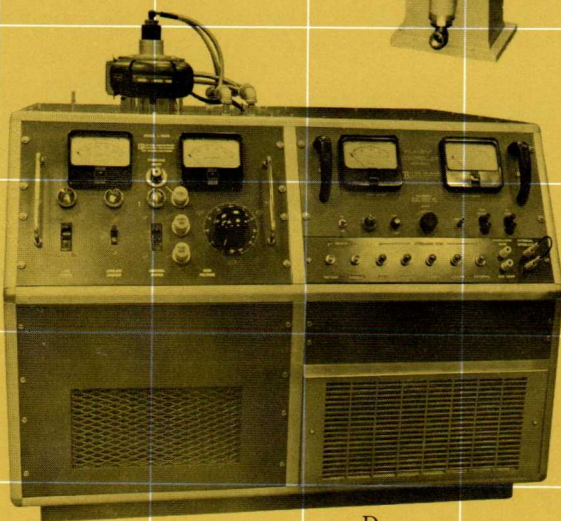
B  
WL-54



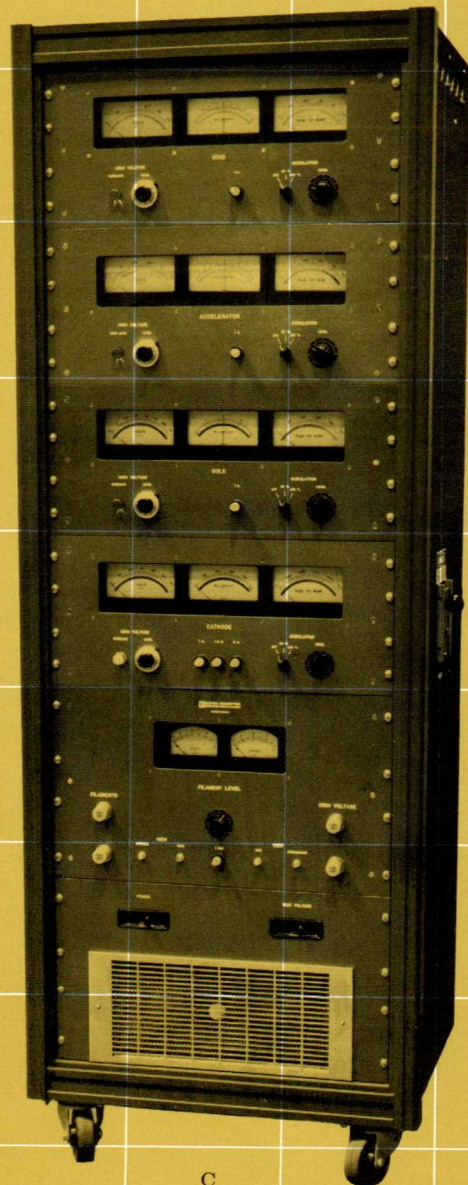
B  
WL-82



D  
3653



C  
Power Supply



A

B

C

D

E

F

1 ft.

2 ft.

3 ft.

4 ft.

5 ft.

6 ft.

7 ft.

8 ft.

9 ft.

## EQUIPMENT—ACCESSORIES

To assist Litton Industries' customers in the application of tubes to their equipments, a new department has been formed within the Electron Tube Division. The primary function of this group is to design, in parallel with the tube design phases, accessory items such as focus coils, water loads, radiation

shields and operating power equipment, where applicable. Illustrations of some of these accessory items are shown on the facing page, and the listings below indicate examples of equipment available. In addition, custom requirements will be supplied upon request.

### FOCUS COILS—SOCKETS

Klystron Type	Focus Coil Model	Socket	Klystron Type	Focus Coil Model	Socket	Klystron Type	Focus Coil Model	Socket	
L-3035	201377	10.400	L-3385	166	10.404	L-3617	46	10.401	Designed and produced for Litton klystrons and TWT's as well as other manufacturers' products, focus coils and sockets are foil or wire wound in any size, from low-noise TWT's to super-power klystrons. Epoxy impregnated by vacuum or pressure. One terminal board. One coolant input/output manifold. Leak-resistant cooling systems. Integral lead shielding.
L-3227	204 or 46	10.401	L-3386	166	10.404	L-3618	PM	10.404	
L-3250	46	10.401	L-3387	46	10.401	L-3647	200	10.404	
L-3257	204 or 46	10.401	L-3401	187	207	L-3660	200	10.404	
L-3270	156	10.401	L-3403	190	206	L-3661	200	10.404	
L-3302	46	10.401	L-3428	120	10.403	L-3694	190	206	
L-3303	166	10.404	L-3486	201377	10.400	L-3702	203	TBS	
L-3323	56	10.404	L-3495	120	10.403	L-3709	200	10.404	

### WATER LOADS

Model Number	Frequency Mcs	Power		VSWR	Waveguide Gas Pressure	Input Water Pressure	R.F. Connection	Water Connection	Length	Weight Lbs.	Versatile P, L and S-band water loads combine low VSWR with high peak and average power ratings. Model WL-82 L-band load has been tested at Litton Industries to 20 Megawatts peak power, 50 Kilowatts average power. Fabricated in pressure tight aluminum or copper waveguide, the loads may be pressurized to 50 psia where the application requires. Other designs upon request.
		Peak MW	Average KW								
WL-54	1300±5%	10	20	1.15:1	50 psia	100 psi	CPR-650F	½" NPT	4'2"	35	
WL-82	1120-1700	30	100	1.15:1	50 psia	100 psi	CPR-650F	½" NPT	6'6"	50	
WL-88	1120-1700	10	300	1.05:1	50 psia	100 psi	CPR-650F	1" NPT	7'6"	60	
WL-209	2700-2900	10	20	1.15:1	30 psia	100 psi	UG 553/u	½" NPT	5'1"	100	
WL-210	400-450	2.3	150	*1.2:1	0 psig	150 psi	WR 2100	1½" NPT	28'	250	

\*VSWR measured with circulating fluid composed of 9 parts of ethylene glycol to 1 part of water.

### POWER SUPPLIES

Power supplies are offered to tube customers on a custom design basis. The close correlation between tube design and operating power requirements gives Litton a unique capability to match the requirements of the tube at the earliest possible time. The parallel development of the tube and the equipment permits

customers to achieve operational testing without inherent delays. Technical capability includes DC power supplies for microwave tubes, pulsed power supplies and focusing solenoid current supplies. Power supplies for the Elliott-Litton millimeter wave tubes are also available.

### AMPLIFIERS AND SIGNAL SOURCES

Model Number	Description	Frequency Range	Power Output
3653	CW Magnetron RF Signal Source	350 to 10,500 Mc	300 to 600 Watts
202	TWT Amplifier	2 kMc to 11 kMc	2 Watt
211	TWT Amplifier	4 kMc to 11 kMc	10 Watt

### OTHER ACCESSORY EQUIPMENTS

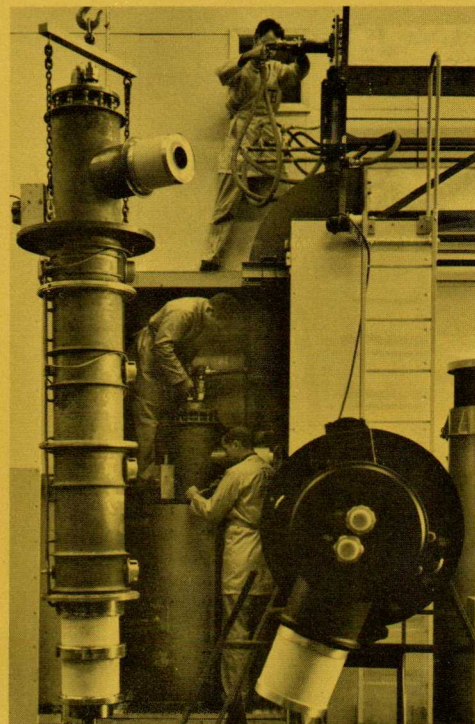
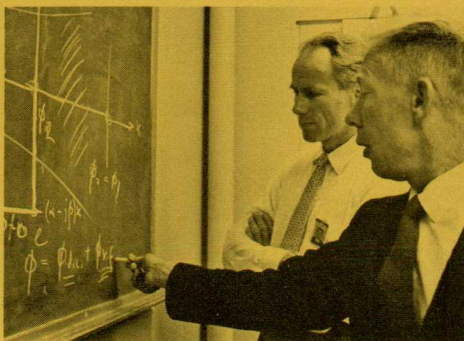
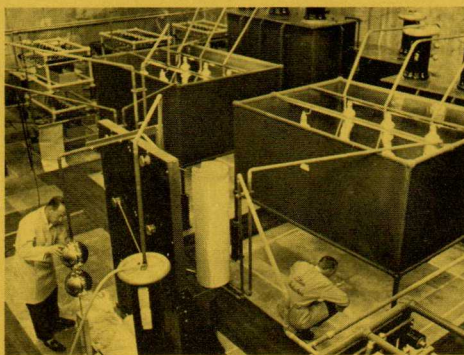
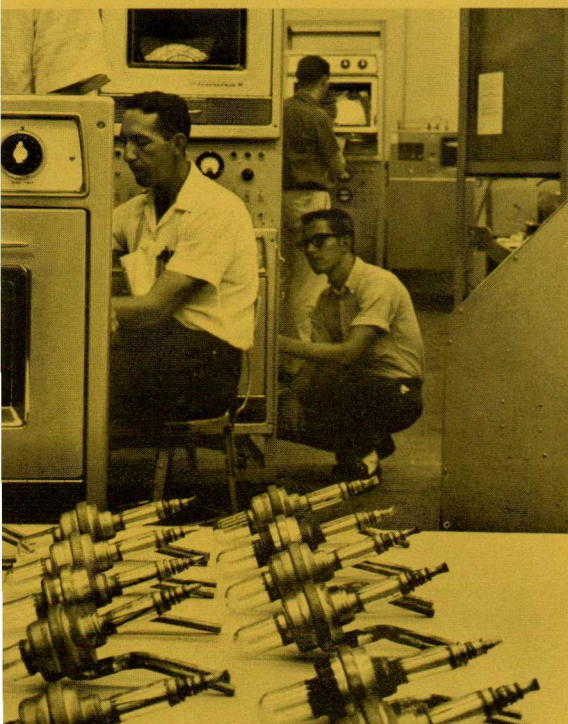
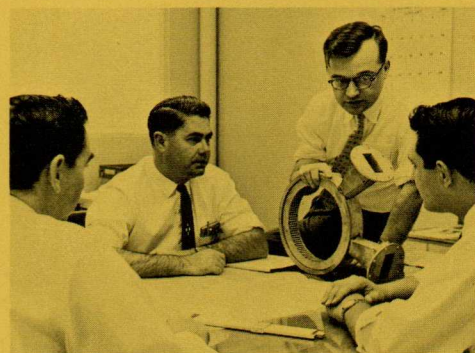
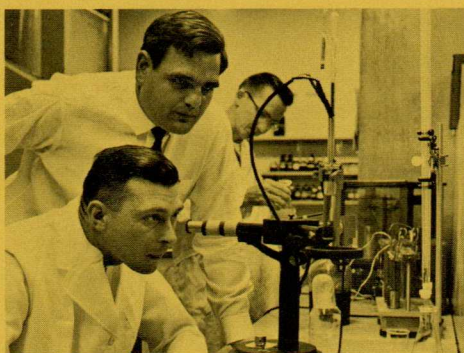
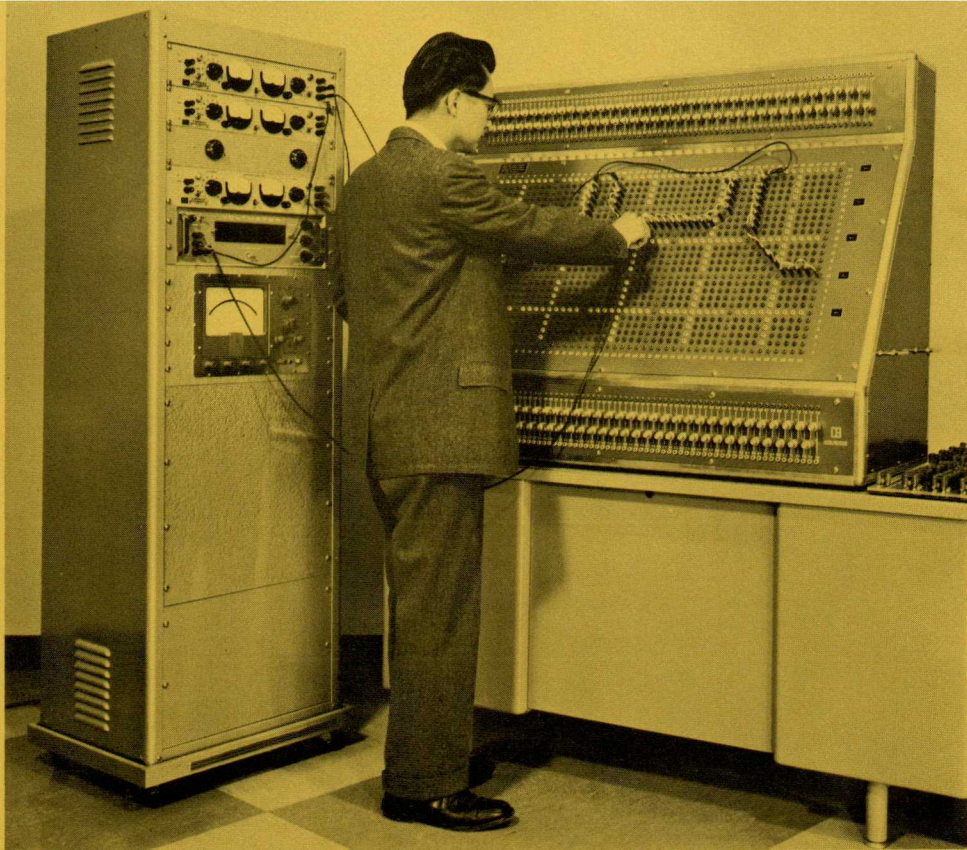
Litton Industries also manufactures Magnetron Sockets, Magnetron Filament Controllers, Radiation Shields, and Thermopiles. Information on our standard

models is available upon request. Litton welcomes inquiries concerning particular needs.

### RESISTANCE NETWORK ANALOGUE

The Litton Industries Precision Resistance Network Analogue has been designed to meet requirements for a versatile tool to solve boundary value problems under static conditions. The use of the Resistance Network Analogue enables the engineer to quickly obtain solutions to problems involving Poisson's,

Laplace's and special cases of Maxwell's equations with a higher degree of accuracy than any other means presently available. The accuracy of the Network Analogue is inherently high (1 part in 10,000).



## RESEARCH LABORATORY

*New Ideas—New Areas of Interest—New Concepts* The Litton Industries Electron Tube Division Research Laboratory was established three years ago in modern San Carlos facilities to explore and solve problems relative to electron devices.

Key scientists, backed by a highly qualified staff, now include such widely-known engineers as Research Director Dr. Joseph F. Hull and Senior Scientists Dr. J. Richard Hechtel, Dr. Philip Hess, Dr. Gerold E. Pokorny, and Dr. Alfred J. Prommer.

Aggressive research and development have led to many new product areas such as:

- *high power switch tubes*
- *new miniature magnetrons*
- *super-power klystrons*
- *the CW magnetron for commercial applications*
- *solid state and gaseous lasers*
- *electrostatically-focused klystrons*
- *Resistance Network Analogue*
- *crossed-field forward-wave amplifier*

The tube divisions' areas of interest continuously grow as evidenced by current Research Laboratory projects such as:

- *electron optics studies*
- *slow-wave structure studies*
- *millimeter wave generation*
- *plasma physics*
- *quantum electronics*
- *low noise research*
- *the injected-beam crossed-field amplifier (BIMATRON)*
- *solid state devices research*
- *the study of new uses for microwaves*
- *light amplifiers*
- *ion-propulsion*
- *plasma devices*
- *super-power microwave sources*
- *the distributed-emission crossed-field amplifier (DEMATRON)*



*Litton Industries, Electron Tube Division, San Carlos, California*

## MARKETING

**APPLICATION ENGINEERING SERVICES AND REGIONAL OFFICES:**—Main marketing offices are located in San Carlos, California, where application engineering specialists are available for consultation. Call LYtell 1-8411. Our regional offices are located at:

1. 341 North Foothill Road  
Beverly Hills, California  
TRemont 8-1570  
James C. Munger, Manager
2. 333 West First Street  
Dayton, Ohio  
BALdwin 3-3285  
Michael F. Olah, Jr., Manager
3. P.O. Box 548  
Manasquan, New Jersey  
CASTle 3-4160  
Frank M. Oakes, Manager
4. 221 Crescent Street  
Waltham, Massachusetts  
TWInbrook 9-2238  
Robert H. Kelly, Manager
5. 1625 "I" Street, N.W.  
Washington 6, D.C.  
EXecutive 3-4991  
W. Dewey Clower, Millimeter  
Wave Tube representative

Foreign sales are handled through:

1. Elliott-Litton, Ltd.  
Manor Way  
Borehamwood, Hertfordshire  
London, England  
(serving British Commonwealth,  
excluding Canada)
2. Lake Engineering Co., Limited  
123 Manville Road  
Scarborough, Ontario, Canada  
(serving Canada)
3. Litton World Trade Corporation  
P.O. Box 2754  
Zurich 23, Switzerland  
(serving Free Europe,  
Africa and Middle East)
4. Kobe Kogyo Corp.  
No. 5, Wadayama Dori 1-Chome  
Hyogo-Ku, Kobe, Japan  
(serving Free Asia)

Affiliated Companies:

1. Elliott-Litton, Ltd.  
Manor Way  
Borehamwood, Hertfordshire  
London, England
2. Kobe Kogyo Corp.  
No. 5, Wadayama Dori 1-Chome  
Hyogo-Ku, Kobe, Japan

**MICROWAVE TUBE CROSS REFERENCE BY CENTER FREQUENCY**

Tube Number	Tube Type	Center Frequency	Power Output	Frequency Range	Page No.	Tube Number	Tube Type	Center Frequency	Power Output	Frequency Range	Page No.
L-3674	TWT	425	5.0 KW	400-450	11	L-3226	Mag.	9190	0.12 KW	9180-9200	3
L-3403	Kly.	425	1.25 MW	400-450	9	L-3030C	Mag.	9200	300 KW	9200±30	5
L-3694	Kly.	425	1.25 MW	400-450	9	L-3180	Mag.	9210	0.12 KW	9200-9220	3
L-3455	Mag.	428	2.0 MW	406-450	5	L-3039K	Mag.	9220	225 KW	9220±20	5
L-3714	Mag.	600	165 W	475-725	7	L-3036F	Mag.	9245	65 KW	9245±30	5
L-3721	MBWO	1200	200 W	1000-1400	7	L-2060	M.D.	9250	20 KW	8500-10000	13
L-3502	Mag.	1237	110 W	975-1500	7	L-3181	Mag.	9260	0.12 KW	9250-9270	3
L-3465	Mag.	1237	400 W	975-1500	7	L-3187	Mag.	9260	0.12 KW	9250-9270	3
L-3270	Kly.	1300	2.0 MW	1250-1350	9	L-3029A	Mag.	9267	7.0 KW	9235-9300	3
L-3035	Kly.	1300	2.2 MW	1240-1360	9	L-3036B	Mag.	9275	65 KW	9275±15	5
L-3257	Kly.	1300	4.0 MW	1250-1350	9	L-3039L	Mag.	9280	225 KW	9280±20	5
L-3303	Kly.	1300	5.0 MW	1250-1350	9	L-3029B	Mag.	9288	7.0 KW	9250-9315	3
L-3227	Kly.	1300	5.0 MW	1250-1350	9	L-3029D	Mag.	9298	7.0 KW	9265-9330	3
L-3250	Kly.	1300	10 MW	1250-1350	9	L-3105	Mag.	9300	0.10 KW	9300±40	3
L-3323	Kly.	1300	10 MW	1250-1350	9	L-3087A	Mag.	9300	0.12 KW	9280-9320	3
L-3660	Kly.	1300	10 MW	1295-1305	9	L-3603	Mag.	9300	0.5 KW	9300±30	3
L-3355	Kly.	1300	20 MW	1250-1350	9	L-3606	Mag.	9300	0.5 KW	9300±30	3
L-3661	Kly.	1300	20 MW	1250-1350	9	L-3384	Mag.	9300	1.0 KW	9280-9320	3
L-3530	Kly.	1300	25 MW	1250-1350	9	L-3429	Mag.	9300	1.0 KW	9300±30	3
L-3531	Kly.	1300	25 MW	1250-1350	9	L-3430	Mag.	9300	1.0 KW	9300±30	3
L-3387	Kly.	1300	30 MW	1250-1350	9	L-3604	Mag.	9300	1.0 KW	9300±30	3
L-3702	Kly.	1300	30 MW	1250-1350	9	L-3634	TWT	9300	1.0 KW	9100-9500	13
L-3486	Kly.	1315	250 MW	1250-1380	9	L-3239	Mag.	9300	2.0 KW	9300±30	3
L-3497	TWT	1320	5.5 KW	1240-1400	11	L-3605	Mag.	9300	3.0 KW	9300±30	3
L-3401	Kly.	1320	5.0 MW	1254-1386	9	L-3268	Mag.	9300	4.0 KW	9300±30	3
L-3503	Mag.	1925	110 W	1500-2350	7	L-3028D	Mag.	9305	0.12 KW	9280-9330	3
L-3464	Mag.	1925	400 W	1500-2350	7	L-3058	Mag.	9310	1.0 KW	9300-9320	3
L-3709	Kly.	2150	100 KW	2100-2200	9	L-3023/LT-6233	Mag.	9313	7.0 KW	9280-9345	3
L-3510	Mag.	2450	1000 W	ISM-band	7	L-3601	Mag.	9327	0.12 KW	9315-9340	3
L-3647	Kly.	2800	5.0 MW	2750-2850	9	L-3029C	Mag.	9328	7.0 KW	9295-9360	3
L-3495	Kly.	2855	2.0 MW	2855	9	L-3225	Mag.	9330	1.0 KW	9310-9350	3
L-3617	Kly.	2855	5.0 MW	2855	9	L-3238	Mag.	9340	1.0 KW	9340±30	3
L-3302	Kly.	2855	10 MW	2855	9	L-3039M	Mag.	9340	225 KW	9340±20	5
L-3733	Kly.	2855	10 MW	2855	9	L-3327	Mag.	9375	0.12 KW	9365-9385	3
L-3618	Kly.	2855	25 MW	2855	9	L-3635	Mag.	9375	10 KW	9375±30	3
L-3504	Mag.	2962	110 W	2350-3575	7	L-3431	Mag.	9375	18 KW	9375±30	3
L-3460	Mag.	2962	500 W	2350-3575	7	L-3469	Mag.	9375	20 KW	9375±30	3
L-3499	TWT	3000	2.0 W	2000-4000	11	L-3654	Mag.	9375	24 KW	9375±30	3
L-3663	TWT	3000	10 W	2000-4000	11	L-3168	Mag.	9375	30 KW	9375±30	5
L-3619	TWT	3000	20 W	2000-4000	11	LT-6510	Mag.	9375	65 KW	9375±30	5
L-3724	MBWO	3025	180 W	2500-3550	7	LT-4J52A	Mag.	9375	70 KW	9375±30	5
L-2061	M.D.	3150	20 KW	2700-3500	13	L-3357	Mag.	9375	190 KW	9375±30	5
L-3505	Mag.	4275	110 W	3575-4975	7	LT-4J50A	Mag.	9375	225 KW	9375±30	5
L-3461	Mag.	4275	350 W	3575-4975	7	L-3039P	Mag.	9375	225 KW	9375±30	5
L-3506	Mag.	5575	110 W	4975-6175	7	L-3613	Mag.	9375	225 KW	9375±30	5
L-3467	Mag.	5575	400 W	4975-6175	7	L-3030	Mag.	9375	300 KW	9375±30	5
LT-6344A	Mag.	5637	175 KW	5450-5825	5	L-3039N	Mag.	9400	225 KW	9400±20	5
LT-7156	Mag.	5637	250 KW	5450-5825	5	L-3036A	Mag.	9410	65 KW	9410±5	5
L-3146	MBWO	5675	150 W	4800-6550	7	L-3614	TWT	9500	1.0 KW	8000-11000	11
L-3726	MBWO	5675	165 W	4800-6550	7	L-3509	Mag.	9625	110 W	8775-10475	7
L-3470	TWT	6000	20 mW	4000-8000	11	L-3463	Mag.	9625	250 W	8775-10475	7
L-3711	TWT	6000	1.0 W	4000-8000	11	L-3652	CFA	9750	1.0 KW	8500-11000	7
L-3471	TWT	6000	2.0 W	4000-8000	11	L-3148	MBWO	9750	125 W	8500-11000	7
L-3657	TWT	6000	10 W	4000-8000	11	L-3728	MBWO	9750	150 W	8500-11000	7
L-3658	TWT	6000	20 W	4000-8000	11	L-3434	Mag.	9950	0.10 KW	9950±30	3
L-3507	Mag.	6725	110 W	6175-7275	7	L-3452	Mag.	16200	2.2 KW	16200±75	3
L-3468	Mag.	6725	300 W	6175-7275	7	L-3358	Mag.	16250	1.0 KW	16000-16500	3
L-3637	TWT	7150	200 mW	5900-8400	11	L-3496	Mag.	16250	1.0 KW	16000-16500	3
L-3147	MBWO	7525	125 W	6500-8550	7	L-3359	Mag.	16250	2.0 KW	16000-16500	3
L-3528	TWT	8000	5.0 W	5000-11000	11	L-3383	Mag.	16275	1.0 KW	16250-16300	3
L-3508	Mag.	8025	110 W	7275-8775	7	L-3498	Mag.	16300	2.0 KW	16280-16320	3
L-3462	Mag.	8025	300 W	7275-8775	7	L-3306	Mag.	16500	30 KW	16500±150	3
L-3602	Mag.	8600	0.03 KW	8600±40	3	L-3326	Mag.	16500	60 KW	16500±150	3
L-3039R	Mag.	8790	225 KW	8790±90	5	L-3083A	Mag.	16500	60 KW	16000-17000	5
L-3089	Mag.	8800	0.04 KW	8800±25	3	L-3083B	Mag.	16500	60 KW	16000-17000	5
L-3039D	Mag.	8800	225 KW	8800±20	5	L-3083C	Mag.	16500	60 KW	16000-17000	5
L-3039E	Mag.	8860	225 KW	8860±20	5	L-3101A	Mag.	16500	60 KW	16000-17000	5
L-3039F	Mag.	8920	225 KW	8920±20	5	L-3101B	Mag.	16500	60 KW	16000-17000	5
L-3039G	Mag.	8980	225 KW	8980±20	5	L-3101C	Mag.	16500	60 KW	16000-17000	5
L-3611	TWT	9000	20 mW	7000-11000	11	L-3642	R Kly.	21500	0.1 W	18000-25000	13
L-3612	TWT	9000	2.0 W	7000-11000	11	L-3692	R Kly.	21500	0.35 W	18000-25000	13
L-3472	TWT	9000	10 W	7000-11000	11	L-3630	F Kly.	23000	10 W	21000-25000	13
L-3529	TWT	9000	20 W	7000-11000	11	L-3631	F Kly.	23000	8.0 W	21000-25000	13
L-3030B	Mag.	9000	300 KW	9000±30	5	L-3699	F Kly.	23000	1.5 W	21000-25000	13
L-3212	Mag.	9010	0.12 KW	9000-9020	3	L-3700	F Kly.	23000	1.0 W	21000-25000	13
L-3039H	Mag.	9040	225 KW	9040±20	5	L-3697	F Kly.	33500	1.5 W	30000-37000	13
L-3650	CFA	9050	1.0 KW	8500-9600	7	L-3698	F Kly.	33500	1.0 W	30000-37000	13
L-3234	MBWO	9050	125 W	8500-9600	7	L-3632	R Kly.	33500	0.03 W	30000-37000	13
L-3103	Mag.	9050	30 KW	8500-9600	5	L-3633	R Kly.	33500	0.2 W	30000-37000	13
L-3305	Mag.	9050	65 KW	8500-9600	5	L-3710	R Kly.	33500	0.03 W	30000-37000	13
LT-6543	Mag.	9050	65 KW	8500-9600	5	L-3659	F Kly.	34500	5.0 W	32000-37000	13
6543A	Mag.	9050	65 KW	8500-9600	5	L-3628	F Kly.	35000	10 W	33000-37000	13
L-3312	Mag.	9050	200 KW	8500-9600	5	L-3713	F Kly.	35000	30 W	34000-36000	13
L-3685	CFA	9050	500 KW	8500-9600	7	L-3736	F Kly.	35000	50 W	34000-36000	13
L-3213	Mag.	9060	0.12 KW	9050-9070	3	L-3629	F Kly.	35000	15 W	33000-37000	13
L-3039I	Mag.	9100	225 KW	9100±20	5	L-2062	M.D.	35250	12 KW	34500-36000	13
L-3214	Mag.	9110	0.12 KW	9100-9120	3	L-3693	F Kly.	50000	1.0 W	48000-52000	13
L-3379	Mag.	9150	1.0 KW	8800-9500	3	L-3640	F Kly.	50000	1.0 W	48000-52000	13
L-3380	Mag.	9150	2.0 KW	8800-9500	3	L-3691	F Kly.	74000	0.1 W	68000-80000	13
L-3381	Mag.	9150	3.0 KW	8800-9500	3	L-3690	F Kly.	74000	0.1 W	68000-80000	13
L-3382	Mag.	9150	4.0 KW	8800-9500	3	L-3638	F Kly.	74000	0.1 W	68000-80000	13
L-3218	Mag.	9160	0.12 KW	9150-9170	3	L-3639	F Kly.	74000	0.5 W	68000-80000	13
L-3039J	Mag.	9160	225 KW	9160±20	5	L-3689	F Kly.	74000	0.5 W	68000-80000	13

• Indicates new since 1961 condensed catalog.

**TUBE & EQUIPMENT LISTING BY TYPE NUMBER**

Tube No.	Type	Page No.	Tube No.	Type	Page No.	Tube No.	Type	Page No.	Tube No.	Type	Page No.
LT-4J50A	Mag.	5	L-3268	Mag.	3	L-3528	TWT	11	L-3724	MBWO	7
LT-4J52A	Mag.	5	L-3270	Kly.	9	L-3529	TWT	11	L-3726	MBWO	7
L-2060	M.D.	13	L-3302	Kly.	9	L-3530	Kly.	9	L-3728	MBWO	7
L-2061	M.D.	13	L-3303	Kly.	9	L-3531	Kly.	9	L-3733	Kly.	9
L-2062	Mag.	13	L-3305	Mag.	5	L-3534	Switch	11	L-3736	F Kly.	13
L-2063	Mag.	13	L-3306	Mag.	3	L-3601	Mag.	3	LT-6344A	Mag.	5
L-3023	Mag.	3	L-3312	Mag.	5	L-3602	Mag.	3	LT-6510	Mag.	5
L-3028D	Mag.	3	L-3323	Kly.	9	L-3603	Mag.	3	LT-6543	Mag.	5
L-3029A	Mag.	3	L-3326	Mag.	3	L-3604	Mag.	3	6543A	Mag.	5
L-3029B	Mag.	3	L-3327	Mag.	3	L-3605	Mag.	3	LT-7156	Mag.	5
L-3029C	Mag.	3	L-3330	BAR	7	L-3606	Mag.	3	A9A4	CRT	15
L-3029D	Mag.	3	L-3337	TWT	11	L-3611	TWT	11	B3C2	CRT	15
L-3030	Mag.	5	L-3355	Kly.	9	L-3612	TWT	11	C2A11	CRT	15
L-3030B	Mag.	5	L-3357	Mag.	5	L-3613	Mag.	5	C5A11	CRT	15
L-3030C	Mag.	5	L-3358	Mag.	3	L-3614	TWT	11	C10T7	CRT	15
L-3035	Kly.	9	L-3359	Mag.	3	L-3617	Kly.	9	G5A11	CRT	15
L-3036A	Mag.	5	L-3360	BAR	7	L-3618	Kly.	9	E1E11	CRT	15
L-3036B	Mag.	5	L-3379	Mag.	3	L-3619	TWT	11	E2A16	CRT	15
L-3036F	Mag.	5	L-3380	Mag.	3	L-3620	Switch	11	L-4003	CRT	15
L-3039D	Mag.	5	L-3381	Mag.	3	L-3621	Switch	11	L-4010	CRT	15
L-3039E	Mag.	5	L-3382	Mag.	3	L-3628	F Kly.	13			
L-3039F	Mag.	5	L-3383	Mag.	3	L-3629	F Kly.	13	Equip. No.	Type	Page No.
L-3039G	Mag.	5	L-3384	Mag.	3	L-3630	F Kly.	13	A100	Amp.	15
L-3039H	Mag.	5	L-3387	Kly.	9	L-3631	F Kly.	13	A101	Amp.	15
L-3039I	Mag.	5	L-3401	Kly.	9	L-3632	R Kly.	13	A105	Amp.	15
L-3039J	Mag.	5	L-3403	Kly.	9	L-3633	R Kly.	13	A106	Amp.	15
L-3039K	Mag.	5	L-3408	Switch	11	L-3634	TWT	13	A107	Amp.	15
L-3039L	Mag.	5	L-3428	Kly.	9	L-3635	Mag.	3	A111	Amp.	15
L-3039M	Mag.	5	L-3429	Mag.	3	L-3638	F Kly.	13	PS101	Pow. S	15
L-3039N	Mag.	5	L-3430	Mag.	3	L-3639	F Kly.	13	PS102	Pow. S	15
L-3039P	Mag.	5	L-3431	Mag.	3	L-3640	F Kly.	13	PS103	Pow. S	15
L-3039R	Mag.	5	L-3434	Mag.	3	L-3642	R Kly.	13	PS104	Pow. S	15
L-3058	Mag.	3	L-3452	Mag.	3	L-3647	Kly.	9	PS105	Pow. S	15
L-3083A	Mag.	5	L-3455	Mag.	5	L-3650	CFA	7	RG100	Gen.	15
L-3083B	Mag.	5	L-3460	CW Mag.	7	L-3652	CFA	7	S100	Socket	15
L-3083C	Mag.	5	L-3461	CW Mag.	7	L-3654	Mag.	3	SC200	Gen.	15
L-3087A	Mag.	3	L-3462	CW Mag.	7	L-3655	Switch	11	5 RG	Mount	15
L-3089	Mag.	3	L-3463	CW Mag.	7	L-3657	TWT	11	WL-54	Load	17
L-3101A	Mag.	5	L-3464	CW Mag.	7	L-3658	TWT	11	WL-82	Load	17
L-3101B	Mag.	5	L-3465	CW Mag.	7	L-3659	F Kly.	13	WL-88	Load	17
L-3101C	Mag.	5	L-3467	CW Mag.	7	L-3660	Kly.	9	WL-209	Load	17
L-3103	Mag.	5	L-3468	CW Mag.	7	L-3661	Kly.	9	WL-210	Load	17
L-3105	Mag.	3	L-3469	Mag.	3	L-3663	TWT	11	46	Coil	17
L-3146	MBWO	7	L-3470	TWT	11	L-3674	TWT	11	56	Coil	17
L-3147	MBWO	7	L-3471	TWT	11	L-3685	CFA	7	120	Coil	17
L-3148	MBWO	7	L-3472	TWT	11	L-3689	F Kly.	13	156	Coil	17
L-3168	Mag.	5	L-3475	BAR	7	L-3690	F Kly.	13	166	Coil	17
L-3180	Mag.	3	L-3486	Kly.	9	L-3691	F Kly.	13	187	Coil	17
L-3181	Mag.	3	L-3495	Kly.	9	L-3692	R Kly.	13	190	Coil	17
L-3187	Mag.	3	L-3496	Mag.	3	L-3693	F Kly.	13	200	Coil	17
L-3212	Mag.	3	L-3497	TWT	11	L-3694	Kly.	9	202	Amp.	17
L-3213	Mag.	3	L-3498	Mag.	3	L-3697	F Kly.	13	203	Coil	17
L-3214	Mag.	3	L-3499	TWT	11	L-3698	F Kly.	13	204	Coil	17
L-3218	Mag.	3	L-3502	CW Mag.	7	L-3699	F Kly.	13	206	Socket	17
L-3225	Mag.	3	L-3503	CW Mag.	7	L-3700	F Kly.	13	207	Socket	17
L-3226	Mag.	3	L-3504	CW Mag.	7	L-3702	Kly.	9	211	Amp.	17
L-3227	Kly.	9	L-3505	CW Mag.	7	L-3709	Kly.	9	3653	Sig. S	17
L-3234	MBWO	7	L-3506	CW Mag.	7	L-3710	F Kly.	13	10.400	Socket	17
L-3238	Mag.	3	L-3507	CW Mag.	7	L-3711	TWT	11	10.401	Socket	17
L-3239	Mag.	3	L-3508	CW Mag.	7	L-3713	F Kly.	13	10.404	Socket	17
L-3250	Kly.	9	L-3509	CW Mag.	7	L-3714	CW Mag.	7	201377	Coil	17
L-3257	Kly.	9	L-3510	CW Mag.	7	L-3721	MBWO	7			

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