

TECHNICAL DATA

CASS ALTSHULER
2737 RUSSELL ST. ASH. 9627
BERKELEY, CALIFORNIA

ARCTURUS



ARCTURUS RADIO TUBE COMPANY
NEWARK, NEW JERSEY

38	PENTODE	AMPLIFIER CLASS A	H	6.3	100.0 135.0	9.0 12.5	100.0 135.0	7.0 9.0	2.0 2.5	84,000 102,000	950 975	80.0 100.0	6,500 12,500	200 525	.3	4.1	8.6	
39-44	PENTODE	SUPER-CONTROL R.F. AMPLIFIER	H	6.3	90.0 180.0 250.0	3.0 2.0 3.0	90.0 90.0 90.0	5.6 5.8 5.8	1.6 1.4 1.4	275,000 750,000 1,000,000	960 ⁽⁷⁾ 1000 ⁽⁷⁾ 1050 ⁽⁷⁾	350.0 750.0 1050.0			.007	3.5	10.0	
		MODULATOR			180.0 250.0	7.0 ⁽⁸⁾ 7.0 ⁽⁸⁾	90.0 90.0											
42	PENTODE	AMPLIFIER CLASS A	H	6.3	250.0	16.5	250.0	34.0	6.5	100,000	2300	222.0	7,000	3000				
43	PENTODE	AMPLIFIER CLASS A	H	25.0 ⁽¹⁾	95.0 135.0	15.0 20.0	95.0 135.0	20.0 34.0	4.0 7.0	45,000 35,000	2000 2300	90.0 80.0	4,500 4,000	900 ⁽⁹⁾ 2000 ⁽⁹⁾				
44	USE TYPE 39-44																	
45	TRIODE	AMPLIFIER CLASS A	F	2.5	180.0 250.0 275.0	31.5 50.0 56.0		31.0 34.0 36.0		1,900 1,750 1,670	1850 2000 2100	3.5 3.5 3.5	3,500 3,900 4,600	780 1600 2000	7.2	4.5	5.0	
46	TETRODE	AMPLIFIER CLASS A	F	2.5	250.0 ⁽¹⁰⁾ 300.0	33.0 ± .0 ⁽¹⁰⁾	250.0 ⁽¹⁰⁾ ± .0 ⁽¹⁰⁾	22.0 4.0 ⁽¹⁰⁾ 6.0 ⁽¹⁰⁾		2,380	2350	5.6	6,400 1,300 1,450	1250 16000 ⁽¹⁰⁾ 20000 ⁽¹⁰⁾				
		AMPLIFIER CLASS B			400.0	± .0 ⁽¹⁰⁾												
47	USE TYPE PZ																	
50	TRIODE	AMPLIFIER CLASS A	F	7.5	250.0 400.0 450.0	63.0 70.0 84.0		45.0 55.0 55.0		1,900 1,800 1,800	2000 2100 2100	3.8 3.8 3.8	4,100 3,670 4,350	2400 3400 4600	9.0	5.0	3.0	
51	TETRODE	VARIABLE-MU AMPLIFIER MODULATOR	H	2.5	180.0 250.0 250.0	3.0 3.0 7.0	90.0 90.0 90.0 ⁽¹¹⁾	6.3 6.5	2.5 2.5	300,000 400,000	1150 ⁽¹¹⁾ 1110 ⁽¹¹⁾	350.0 445.0			.007	5.0	10.0	
55	DUPLEX DIODE TRIODE	AMPLIFIER CLASS A ⁽¹²⁾	H	2.5	135.0 180.0 250.0	10.5 13.5 20.0		3.7 6.0 8.0		11,000 8,500 7,500	750 975 1100	8.3 8.3 8.3	25,000 20,000 20,000	75 150 350	1.5	1.5	3.0	
		DETECTOR BIASED ⁽¹²⁾ AMPLIFIER	H	2.5	250.0 250.0	20.0 ⁽¹⁴⁾ 12.5		0.2 5.0		9,500	1450	13.8				3.2	3.2	2.2
57	PENTODE	DETECTOR BIASED ⁽¹²⁾ AMPLIFIER CLASS A	H	2.5	250.0 250.0	6.0 ⁽¹⁴⁾ 3.0	100.0 100.0	0.1 2.0	1.0	1,500,000	1235 ⁽¹⁴⁾	1500.0	250,000			.007	5.2	6.6

- For use as a grid leak detector 250-volts plate; screen up to 70-volts; capacity .00025-mf; resistance 1-5 megohms; grid return to cathode.
- For use as a grid leak detector 90-volts plate; capacity .00025-mf; resistance 1-5 megohms; grid return to cathode.
- Screen G₂, -20 to -45-volts; adjust G₁ to give 0.1 ma. with no a.c. input signal.
- Adjust G₁ bias for plate current of 0.2 ma. with no a.c. input signal.
- For use as a grid leak detector 155-volts plate; .00025-mf; resistance 1-5 megohms; screen up to 45 volts; plate load 100,000 ohms; grid return to cathode.
- Mutual conductance at G₁ -22.5 volts is approximately 15 u-mhos.
- Mutual conductance at G₁ -42.5 volts is approximately 2 u-mhos.
- This grid bias is minimum for oscillator peak potential of 6.0 volts.
- Total harmonic distortion 11%.
- Total harmonic distortion 9%.
- Heater to cathode potential should not exceed 90 volts d.c. as measured between negative heater terminal and cathode.
- Grid G₂ adjacent to plate is connected to plate.
- G₁ and G₂ are connected together to serve as control grid.
- Peak plate current (per tube) 150 ma. and maximum plate dissipation (per tube) 10 watts.
- Peak plate current (per tube) 200 ma. and maximum plate dissipation (per tube) 10 watts.
- Maximum continuous power output for two tubes 20-watts.
- Maximum signal potential (rms per tube) 40 volts.
- Maximum signal potential (rms per tube) 41 volts.
- Mutual conductance at G₁ -40 volts is approximately 15.0 u-mhos, and at -50 is 0.
- Diode units used for half-wave and full-wave detection, and avc arrangement.
- Screen G₂, 20 to 60-volts, adjust G₁ to give 0.2 ma. with no input signal.
- Cut-off of cathode current occurs at -7 volts (g).
- Suppressor (K) connected to cathode at socket.

— PHYSICAL CHARACTERISTICS —

TYPE	TYPE BULB	TYPE BASE	TERMINAL ARRANGEMENT								PIN NO.	TOP CAP	OVERALL HEIGHT (MAX.) INCHES	DIAMETER (MAX.) INCHES
			1	2	3	4	5	6	7					
01-A	S-14	M-4	F	F	G ₁	F							4.688	1.813
10	S-17	M-4	F	F	G ₁	F							5.625	2.188
12 A	S-14	M-4	F	F	G ₁	F							4.688	1.813
22	S-140	M-4	F	F	G ₂	F					0 ₁		5.051	1.813
24	S-140	M-5	H	F	G ₂	K	H				0 ₁		5.051	1.813
26	S-14	M-4	F	F	G ₁	F							4.688	1.813
27	S-14	M-5	H	F	G ₁	K	H						4.688	1.813
30	S-12	S-4	F	F	G ₁	F							4.250	1.563
31	S-12	S-4	F	F	G ₁	F							4.250	1.563
32	S-140	M-4	F	F	G ₂	F					0 ₁		5.051	1.813
35	S-14	M-5	F	F	G ₁	G ₂	F						4.688	1.813
34	S-140	M-4	F	F	G ₂						0 ₁		5.051	1.813
36	S-120	S-5	H	F	G ₂	K	H				0 ₁		4.551	1.563
37	S-12	S-5	H	F	G ₁	K	H						4.250	1.563
38	S-120	S-5	H	F	G ₂	K	H				0 ₁		4.551	1.563
39-44	ST-120	S-5	H	F	G ₂	K	H				0 ₁		4.551	1.563
42	ST-14	M-6	H	F	G ₂	G ₁	K	H					4.688	1.813
43	ST-14	M-6	H	F	G ₂	G ₁	K	H					4.688	1.813
45	ST-14	M-4	F	F	G ₁	F							4.688	1.813
46	S-17	M-5	F	F	G ₁	G ₂	F						5.625	2.188
50	S-21	M-4	F	F	G ₁	F							6.250	2.863
51	S-140	M-5	H	F	G ₂	K	H				0 ₁		5.051	1.831
55	ST-120	S-6	H	F	P ₁	P ₂	K	H			0 ₁		4.551	1.563
56	S-12	S-5	H	F	G ₁	K	H						4.250	1.563
57	ST-120	S-6	H	F	G ₂	G ₃	K	H			0 ₁		4.957	1.563
58	ST-120	S-6	H	F	G ₂	G ₃	K	H			0 ₁		4.957	1.563
59	ST-16	M-7	H	F	G ₂	G ₁	G ₃	K	H				5.375	2.063
71-A	S-14	M-4	F	F	G ₁	F							4.688	1.813
75	ST-120	S-6	H	F	P ₁	P ₂	K	H			0 ₁		4.551	1.563
77	ST-120	S-6	H	F	G ₂ ⁽⁶⁾	G ₃	K	H			0 ₁		4.551	1.563
78	ST-120	S-6	H	F	G ₂	G ₃	K ⁽⁶⁾	H			0 ₁		4.551	1.563
79	ST-120	S-6	H	F _a	G _{1a}	K	F _b	H			G _{1b}		4.551	1.563
80	S-17	M-4	F	F ₁	F ₂	F							5.625	2.188
81	S-19	M-4	F	F	-	F							6.250	2.438
82	S-14	M-4	F	F ₁	F ₂	F							4.688	1.813
83	ST-16	M-4	F	F ₁	F ₂	F							5.375	2.063
84	S-12	S-5	H	F ₁	F ₂	K	H						4.250	1.563
85	ST-120	S-6	H	F	P ₁	P ₂	K	H			0 ₁		4.551	1.563
89	ST-120	S-6	H	F	G ₂	G ₃	K	H			0 ₁		4.551	1.563
99 UV	T-8	S-4M	F	F	F	G ₁							3.500	1.063
99 UX	T-8	S-4	F	F	G ₁	F							4.125	1.188
QA	S-14	M-5	F	F	G ₁	G ₂	F						4.688	1.813
PZ	S-17	M-5	F	F	G ₁	G ₂	F						5.625	2.188
PZH	S-17	M-7	H	F	G ₂	G ₁	G ₃	K	H				5.625	2.188
WUNDERLICH "A" WUNDERLICH "A"-AUTO.	S-120	M-5	H	G	P	G	H	H			K		4.438	1.563
	S-12	M-6	H	P	G	G	K	H					4.125	1.563
2A5	ST-14	M-6	H	F	G ₂	G ₁	K	H					4.688	1.813
2A7	ST-120	S-7	H	F	G ₃ ⁽⁶⁾	G ₂	G ₁	K	H		G ₄		4.551	1.563
2B7	ST-120	S-7	H	F	G ₂	P ₁	P ₂	K	H		0 ₁		4.551	1.563
5Z5	ST-16	M-4	F	F ₁	P ₂	F							5.375	2.063
6A7	IDENTICAL TO 2A7 EXCEPT HEATER													
6B7	IDENTICAL TO 2B7 EXCEPT HEATER													
12Z5	ST-12	S-4	H	F	K	H							4.250	1.563
12Z5	ST-12	S-7	H	F ₁	K ₁	H ⁽⁶⁾	K ₂	P ₂	H				4.250	1.563
25Z5	ST-12	S-6	H	F ₁	K ₁	K ₂	P ₂	H					4.250	1.563

EXPLANATION OF SYMBOLS

CLASS OF TUBE

Tubes are assigned names according to the number of active elements, progressing outward from the cathode; a tube with a cathode, a control grid and a plate is classified as a triode.

<u>NUMBER ELEMENTS</u>	<u>CLASSIFI- CATION</u>	<u>NUMBER ELEMENTS</u>	<u>CLASSIFI- CATION</u>
2	Diode	6	Hexode
3	Triode	7	Heptode
4	Tetrode	8	Octode
5	Pentode		

Where two separate units are contained in a single bulb, a compound name is assigned -- i.e., double diode, diode triode, etc.

TUBE TYPE NUMBERS (New Tubes)

The first digit or digits indicates the filament voltage in steps of one volt. The figure 1 is used for voltages below 2.0; the figure 2, for voltages between 2.0 and 2.9; 3, voltages between 3.0 and 3.9; etc.

Next is a letter for serial designation. Rectifiers start at "Z" and work backwards; all other types start at "A".

The next number indicates the number of useful elements brought out to terminals.

ELECTRODE SYMBOLS

In a tube embodying a single set of elements, the electrodes are designated:

H - Heater	G - Grid
K - Cathode	P - Plate

PLATE NOMENCLATURE

In tubes with one plate the letter "P" is employed; tubes possessing two sets of elements, as the type 75 (duplex diode triode), the plate of the triode unit is identified by the letter "P"; the two diode plates as P₁ and P₂.

NOTE: P₁ and P₂ always designate the plates of a diode or rectifier.

Where duplex elements are contained in a bulb each set are uniformly correlated and designated by small letters, a, b, etc. For instance, the type 79 class "B" twin amplifier; the plate and grid of one unit should be designated as P_a and G_{1a}; the other unit P_b and G_{2b}.

GRID NOMENCLATURE

In tubes possessing more than one grid the notations G₁, G₂, etc. are used. G₁ is the grid nearest the cathode and the numbering runs consecutively toward the plate.

Where grids are not coaxially arranged but interlaced as in the co-planar or twin-grid construction, the grids are designated as No. A-1 grid and No. A-2 grid, etc.

PIN IDENTIFICATION

To identify the contact pins of a vacuum tube base, point the pins toward the observer so that the two heater pins (the heater terminals or pins are larger than the others) are at the top. Separate these two pins by a vertical line and the heater pin to the right is No. 1.

The numbers assigned to the remaining pins progress consecutively in a clock-wise direction.

TUBE DIMENSIONS

When capital letters designate the various dimensions of a radio tube, generally the letter "A" represents the over-all height of the tube as measured from the extreme bottom of the pins to the extreme top of the tube. When a top cap is employed "A" represents the over-all height of the tube including the top cap.

- B, the largest diameter of the tube,
- C, the diameter of the dome,
- D, the height of the top-cap,
- E, the height from the bottom of the base to the top of the dome,
- F, the height of the base,
- G, the length of the pins,
- H, the diameter of the base.

When a single dimension is listed it represents the average dimension; when two are entered they are maximum and minimum.

BULB SHAPE AND DIMENSIONS

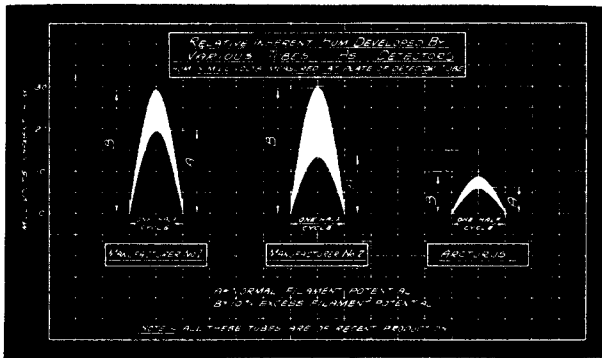
A letter indicates the shape of the bulb and a figure represents the number of eighths of inches as the maximum diameter of the bulb.

When the bulb is referred to as a S-16, it describes a "straight-sloped sided" bulb similar to that of the 01-A, the maximum diameter being 16/8" or 2".

An ST-12 bulb has a tee section at the top, commonly called a dome bulb, similar to the glass of the 25-Z-5 rectifier. "C" appended to the bulb designation indicates a top cap.

SALIENT FEATURES OF ARCTURUS TUBES

LABORATORY TESTS SHOW ARCTURUS TUBES HAVE LESS HUM



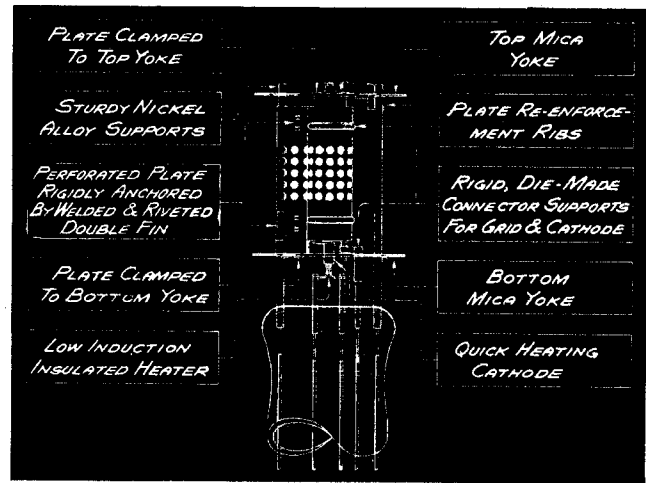
This diagram shows comparative hum output of three makes of tubes. Considerable increase in hum was shown with tubes of two manufacturers when the filament potential was increased, while the curve for Arcturus Tubes remained constant. While different manufacturers' tubes were used in this test, No. 1 and 2 are among the largest in the industry and the curves are representative of the tubes in present use. The tubes of manufacturer No. 2 were found to have lower average hum than other makes investigated with the exception of Arcturus.

UNITARY STRUCTURE PRINCIPLE FOR IMPROVED PERFORMANCE

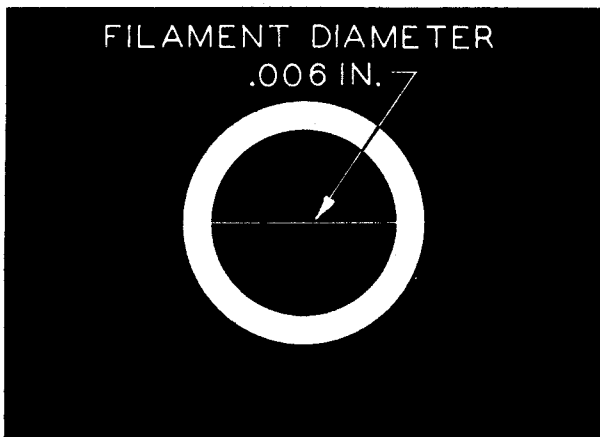
This exclusive Arcturus Unitary Structure is a decided advance and is the last word in tube ruggedness assuring uniform characteristics.

This sturdy construction insures precise spacing and grips every element firmly in position making all elements inter-dependent. This entire assembly, exceptionally rigid, is safe against distortion of elements and minimizes microphonism.

Rated as the most rugged tube construction on the market, this is another reason why Arcturus Tubes insure efficient and dependable performance, improved reception and satisfied customers.



PRECISION IN MANUFACTURE GUARDED BY 137 TESTS AND CHECKS



The average diameter of the filament used in Arcturus Tubes is like that shown by the hair-like line. Yet the precise construction of the elements in Arcturus Tubes is held to less than one-tenth of this dimension.

This precision in manufacture plus the rugged construction of Arcturus Tubes also insures uniformity of characteristics and performance in even the most critical circuits.

Guarding Arcturus quality are 137 tests and checks which each tube receives before it is shipped. Such fine workmanship and care have gained for Arcturus Tubes a world-wide acceptance for quality.