

The 5924 is a three-electrode tube designed for use as a radio-frequency power amplifier, modulator and oscillator. The anode is capable of dissipating 5 kilowatts and is forced-air cooled. The cathode is a thoriated-tungsten filament. Maximum ratings apply up to 75 mc. At reduced ratings it may be operated up to 220 mc.

TUBE TYPE 5924

P.1

<u>ELECTRICAL DATA</u>	Min.	Bogey	Max.	
Filament Voltage	12.0	12.6	13.2	volts
Filament Current at Bogey Voltage	30	33	36	amps
Amplification Factor ($I_b=1$ amp, $E_b=4000$ volts).	26	32	38	
<u>Direct Interelectrode Capacitances</u>				
Grid to Plate	9.5	11.0	1.25	uuf
Grid to Filament.	13	16	19	uuf
Plate to Filament	0.2	0.3	0.4	uuf
Transconductance (Grid to Plate) ($I_b=1.0$ amps).			17,000	micromhos
Peak Cathode Current ¹			10	amps

MECHANICAL DATA

Max. Overall Dimensions

Length. . . . .	.6-7/8 inches
Diameter. . . . .	.4-7/8 inches
Mounting Position-Vertical.	Radiator up or down
Type of Cooling	Forced-air
Plate Dissipation . . . . .	.5 KW
Air Flow to Radiator. . . . .	.325 CFM
Back Pressure . . . . .	.2.7 inches water
Max. Incoming Air Temperature . . . . .	.45° C
Max. Glass Temperature. . . . .	.180° C
Net Weight of Tube (approx.). . . . .	.10 Lbs.

Accessories

Filament Connector. . . . .	.Amperex # S-3707
Grid Connector. . . . .	.Amperex # S-3706
Air Flow Chamber. . . . .	.Amperex # S-3705

¹ Represents maximum useable cathode current for any condition of operation.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

A.F. Power Amplifier and Modulator—Class B
Maximum Ratings, Absolute Values

	CCS	
D.C. Plate Voltage ²	6000	volts max.
Max. Signal D.C. Plate Current ²	1.5	amps max.
Max. Signal Plate Input ²	9000	watts max.
Plate Dissipation ²	5000	watts max.
Grid Resistor	15,000	ohms max.

² Averaged over any audio-frequency cycle of sine-wave form.

Typical Operation

(Unless otherwise specified, values are for 2 tubes)

	CCS	CCS	CCS	CCS	CCS	CCS	
D.C. Plate Voltage	6000	5000	4500	4000	3500	3000	volts
D.C. Grid Voltage	-165	-138	-125	-112	-100	-90	volts
Peak A.F. Grid to Grid Voltage	910	661	655	632	618	570	volts
Zero Signal D.C. Plate Current	250	220	200	200	150	130	ma
Max. Signal D.C. Plate Current	3000	1820	1840	1880	1900	1600	ma
Effective Load Resistance,							
Plate to Plate	4900	6400	6100	4900	4200	4400	ohms
Max. Signal Driving Power (approx.)	230	84	54	108	100	104	watts
Max. Signal Power Output (approx.)	13.3	6.6	6.0	5.3	4.6	3.3	KW

A M P E R E X

PLATE-MODULATED R.F. POWER AMPLIFIER - CLASS C TELEPHONY

TUBE 5924 P.2

(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

Maximum Ratings, Absolute Values

	CCS
D.C. Plate Voltage ³	5000 volts max.
D.C. Grid Voltage ³	-1000 volts max.
D.C. Plate Current ³	1.3 amps max.
D.C. Grid Current	0.35 amp max.
Plate Input ³	6.5 KW max.
Plate Dissipation	4 KW max.

Typical Operation

	CCS	CCS	CCS	CCS	CCS	
D.C. Plate Voltage	5	4.5	4	3.5	3	KV
D.C. Grid Voltage ⁴	-400	-350	-300	-300	-250	volts
Peak R.F. Grid Voltage	690	650	600	600	510	volts
D.C. Plate Current	1.2	1.2	1.2	1.2	1.0	amps
D.C. Grid Current (approx.)	0.3	0.3	0.3	0.3	0.3	amp
Driving Power (approx.)	190	180	165	165	140	watts
Power Output (approx.)	4.7	4.1	3.5	3.0	2.2	KW

MAXIMUM RATINGS AS A FUNCTION OF FREQUENCY

Frequency (mc)	up to 75	up to 110 ⁵	up to 220 ⁵
D.C. Plate Voltage (volts)	5000	4000	3200
D.C. Plate Current (amps)	1.3	1.3	1.1
Plate Input (KW)	6.5	5.2	3.5

³ This data applies up to 75 megacycles.

⁴ Grid Bias partially obtained by the grid resistor.

⁵ When using the tube above 110 megacycles, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, guarantee for tubes operating above 110 mc. can only be given after approval of the prototype circuit.

(Key-down conditions per tube without amplitude modulation⁶)

Maximum ratings, Absolute Values

	CCS
D.C. Plate Voltage ⁷	6000 volts max.
D.C. Grid Voltage	-1000 volts max.
D.C. Plate Current ⁷	1.5 amps max.
D. C. Grid Current	0.35 amps max.
Plate Input ⁷	9000 watts max.
Plate Dissipation	5000 watts max.

Typical Operation, Grounded-Filament Circuit

	CCS	CCS	CCS	
Frequency	75	75	75	mc.
D.C. Plate Voltage	6	5	4	KV
D.C. Grid Voltage	-400	-300	-200	volts
Peak R.F. Grid Voltage	740	640	500	volts
D.C. Plate Current	1.5	1.5	1.37	amps
D.C. Grid Current (approx.)	0.31	0.33	0.35	amp
Driving Power	210	190	160	watts
Power Output (approx.)	6.9	5.6	4.0	KW

Typical Operation, Grounded-Grid Circuit, Two Tubes

	CCS	CCS	CCS	CCS	
Frequency	75	110	110	220	mc.
D.C. Plate Voltage	6	5	4	4	KV
D.C. Grid Voltage	400	300	200	200	volts
Peak R.F. Grid Voltage	740	640	500	450	volts
D.C. Plate Current	3	3	2.75	2.5	amps
D.C. Grid Current (approx.)	0.62	0.66	0.70	0.40	amp
Driving Power	2240	1840	1350	760	watts
Power Output (approx.) ⁸	15.6	12.1	8.6	5.6	KW

Maximum Ratings as a Function of Frequency

Frequency (mc)	up to 75	up to 110 ⁹	up to 220 ⁹
D.C. Plate Voltage (volts)	6000	5000	4000
D.C. Plate Current (amps)	1.5	1.5	1.25
Plate Input (KW)	9.0	7.5	5.0

⁶Modulation essentially negative may be used if the positive peak of the envelop does not exceed 115 per cent of the carrier conditions.

⁷This data applies up to 75 megacycles.

⁸Power transferred from driving stage included.

⁹When using the tube above 110 megacycles, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, guarantee for tubes operating above 110 mc. can only be given after approval of the prototype circuit.

R.F. POWER AMPLIFIER - CLASS B

(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

Maximum Ratings, Absolute Values

	CCS
D.C. Plate Voltage ¹⁰	6000 volts max.
D.C. Plate Current ¹⁰	1.1 amps max.
Plate Input ¹⁰	6600 watts max.
Plate Dissipation	5000 watts max.

Typical Operation

	CCS	CCS
D.C. Plate Voltage	6	5 KV
D.C. Grid Voltage	-180	-145 volts
Peak R.F. Grid Voltage	250	225 volts
D.C. Plate Current	0.99	0.9 amp
Driving Power (approx.) ¹¹	140	130 watts
Power Output (approx.)	1.9	1.45 KW

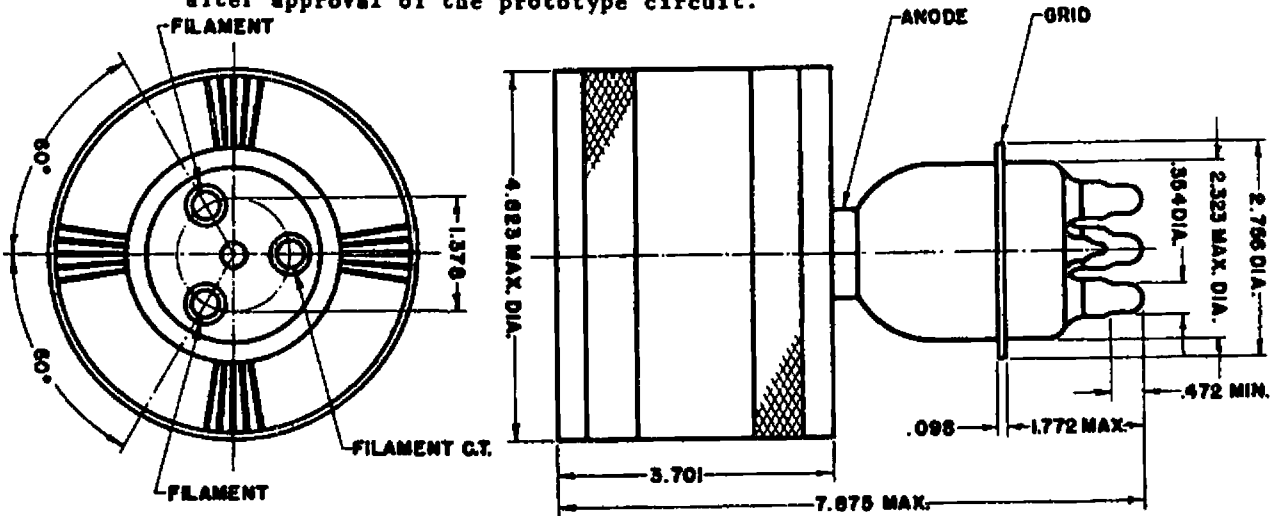
Maximum Ratings as A Function of Frequency

Frequency (mc)	up to 75	up to 110 ¹²	up to 220 ¹²
D.C. Plate Voltage (volts)	6000	5000	4000
D.C. Plate Current (amps)	1.1	1.1	0.9
Plate Input (KW)	6.0	5.5	3.6

¹⁰This data applies up to 75 megacycles.

¹¹At crest of audio-frequency cycle with modulation factor of 1.0.

¹²When using the tube above 110 megacycles, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, guarantees for tubes operating above 110 mc. can only be given after approval of the prototype circuit.



GRID-MODULATED R.F. POWER AMPLIFIER CLASS C
TELEVISION SERVICE

TUBE TYPE 5924 P.5

Negative Modulation, Positive Synchronization

Maximum Ratings, Absolute Values

	CCS
D.C. Plate Voltage ¹³	6000 volts max.
D.C. Grid No. 1 Voltage-White Level	-1000 volts max.
Plate Current (sync.) ¹³	1.9 amps max.
Plate Input (sync.) ¹³	11.4 KW max.
Plate Dissipation (sync.)	5 KW max.
Grid No. 1 Dissipation (sync.)	120 watts max.

Typical Operation in Television Service at 75 mc. and Bandwidth of 5.25 mc. at 85% Antenna Current and 8 mc. at 70% Antenna Current (Values for 2 tubes, Push-Pull)

D.C. Plate Voltage	5000 volts
D.C. Grid No. 1 Voltage	
Synchronizing Level	-200 volts
Pedestal Level	-300 volts
White Level	-550 volts
R.F. Grid No. 1 Voltage, Peak to Peak	
Synchronization Level	1000 volts
D.C. Plate Current	
Synchronization Level	3.8 amps
Pedestal Level	2.6 amps
D.C. Grid Current (approx.)	
Synchronization Level	0.5 amp.
Pedestal Level	0.35 amp.
Driving Power at	
Synchronization Level (approx.)	250 watts
Power Output (approx.)	
Synchronization Level	9 KW
Pedestal Level	5.35 KW

Maximum Ratings as a Function of Frequency

Frequency (mc)	up to 75	up to 110 ¹⁴	up to 220 ¹⁴
D.C. Plate Voltage (volts)	6000	5000	4500
Plate Current (sync.) (amps)	1.9	1.9	1.9
Plate Input (sync.) (KW)	11.4	9.5	8.5

¹³This data applies up to 75 megacycles.

¹⁴When using the tube above 110 megacycles, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, guarantee for tubes operating above 110 mc. can only be given after approval of the prototype circuit.

Negative Modulation and Positive Synchronization

Maximum Ratings, Absolute Values

	CCS
D.C. Plate Voltage ¹⁵	6000 volts max.
D.C. Grid Voltage	1000 volts max.
D.C. Plate Current (sync.) ¹⁵	1.9 amps max.
Plate Input ¹⁵	11,400 watts max.
Plate Dissipation	5000 watts max.
Grid Dissipation	120 watts max.

Typical Operation in Television Service at 75 mc. and Bandwidth of 5.25 mc.:
at 85% Antenna Current and 8 mc. at 70% Antenna Current (Values for 2 Tubes,
Push-Pull)

D.C. Plate Voltage	5000 volts
D.C. Grid Voltage	-200 volts
R.F. Grid Voltage, Peak to Peak	
Synchronization Level	1000 volts
Pedestal Level	800 volts
White Level	0 volts
D.C. Plate Current	
Synchronization Level	3.8 amps
Pedestal Level	3 amps
White Level	0.2 amp
D.C. Grid Current	
Synchronization Level	0.5 amp
Pedestal Level	0.22 amp
White Level	0 amp
Driving Power at Synchronization Level (approx.)	250 watts
Power Output (approx.)	
Synchronization Level	9 KW
Pedestal Level	5.35 KW

Maximum Ratings As A Function Of Frequency

Frequency	up to 75	up to 110 ¹⁶	up to 220 ¹⁶
D.C. Plate Voltage (volts)	6000	5000	4500
Plate Current (sync.) (amps)	1.9	1.9	1.9
Plate Input (KW)	11.4	9.5	8.5

¹⁵This data applies up to 75 megacycles.

¹⁶When using the tube above 110 mc. particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, guarantee for tubes operating above 110 mc. can only be given after approval of the prototype circuit.

OSCILLATOR - CLASS C - RECTIFIED, UNFILTERED, SINGLE-PHASE, FULL-WAVE PLATE SUPPLY

Maximum Ratings, Absolute Values

TUBE TYPE 5924 P. 7

	CCS	
D.C. Plate Voltage ¹⁷	5400	volts max.
D.C. Grid Voltage	-900	volts max.
D.C. Plate Current ¹⁷	1.35	amps max.
D.C. Grid Current	0.31	amp max.
Plate Input ^{17, 18}	9000	watts max.
Plate Dissipation	5000	watts max.
Grid Dissipation	120	watts max.

Typical Operation

	CCS	CCS	
Transformer Voltage	6000 ¹⁹	5100 ²¹	volts, rms
D.C. Plate Voltage	5.4	4.6	KV
D.C. Plate Current	1.35	1.15	amps
D.C. Grid Current	0.31	0.27	amp
Grid Resistor	1300	1100	ohms
Plate Input	9	6.5	KW
Plate Dissipation	2.3	1.84	KW
Driving Power at Tube ²⁰ (approx.)	210	160	watts
Power Output (approx.)	6.5	4.5	KW

Maximum Ratings As a Function Of Frequency

Frequency (mc)	up to 75	up to 110 ²²	up to 220 ²²
D.C. Plate Voltage	5400	4500	3600
D.C. Plate Current (amps)	1.35	1.35	1.1
Plate Input (KW)	9.0	7.5	5.0

¹⁷This data applies up to 75 megacycles

¹⁸Plate input is 1.23 times the product of D.C. Plate Voltage and D.C. Plate Current.

¹⁹Care must be taken that, under these operating conditions, the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances, in the circuit elements.

²⁰From a driver with a rectified, unfiltered, single-phase, full-wave plate supply.

²¹Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the tube must, however, not be exceeded.

²²When using the tube above 110 mc., particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, guarantee for tubes operating above 110 mc. can only be given after approval of the prototype circuit.

ELECTRICAL DATA & LIMITS

CHARACTERISTIC

CONDITIONS

LIMITS

MIN. BOGEY MAX.

Grid Voltage²⁹ $E_b = 1000$ volts $E_c: -$ $-$ 420 volts

$I_b = 6$ amps

Grid Current²⁹ $E_b = 1000$ volts $i_c: -$ $-$ 2.5 amps

$I_b = 6$ amps

Plate Current $E_b = 6000$ volts $I_b: -$ $-$ 130 ma

$E_c = -188$ volts

Grid Current $E_b = 6000$ volts $i_c: -$ $-$ 40 microamps

$E_c = 0.85$ amp

Grid Voltage $E_c = 6000$ volts $E_c: 67$ 94 121 volts

$I_b = 0.85$ amp

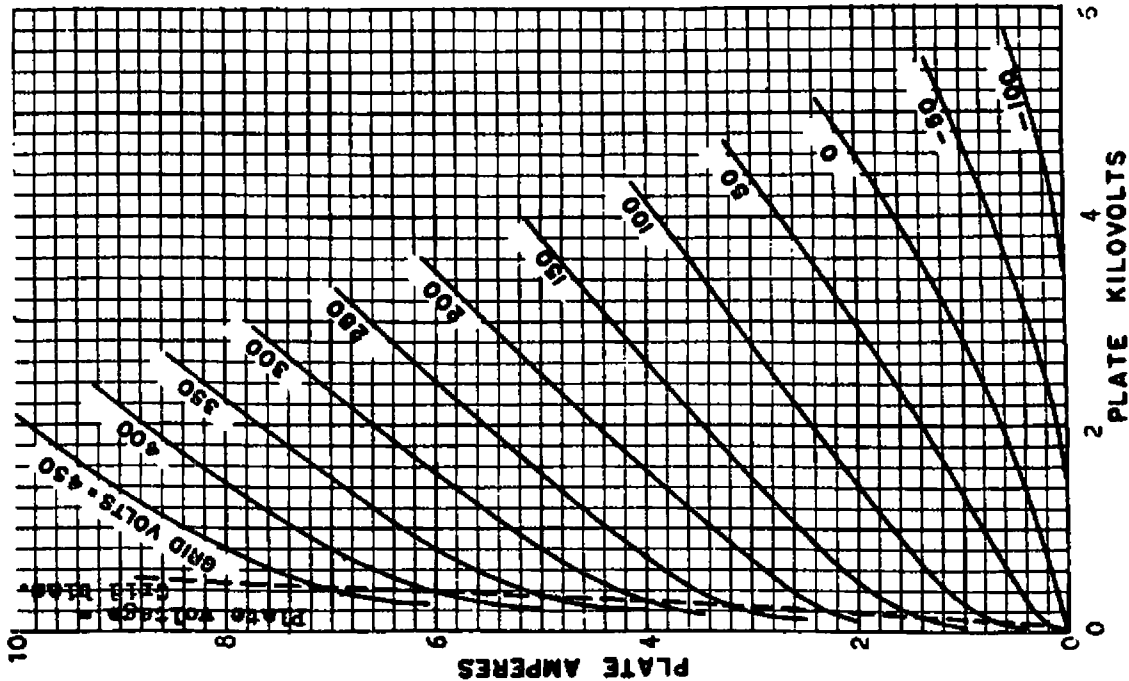
Power Output $E_b = 6000$ volts $P_o: 6$ $-$ KW

$I_b = 1.5$ amps

$E_c = -400$ volts

$I_c = 0.31$ amp

$f = 75$ megacycles



²⁹This data is given only for design purposes, not for measurements.

