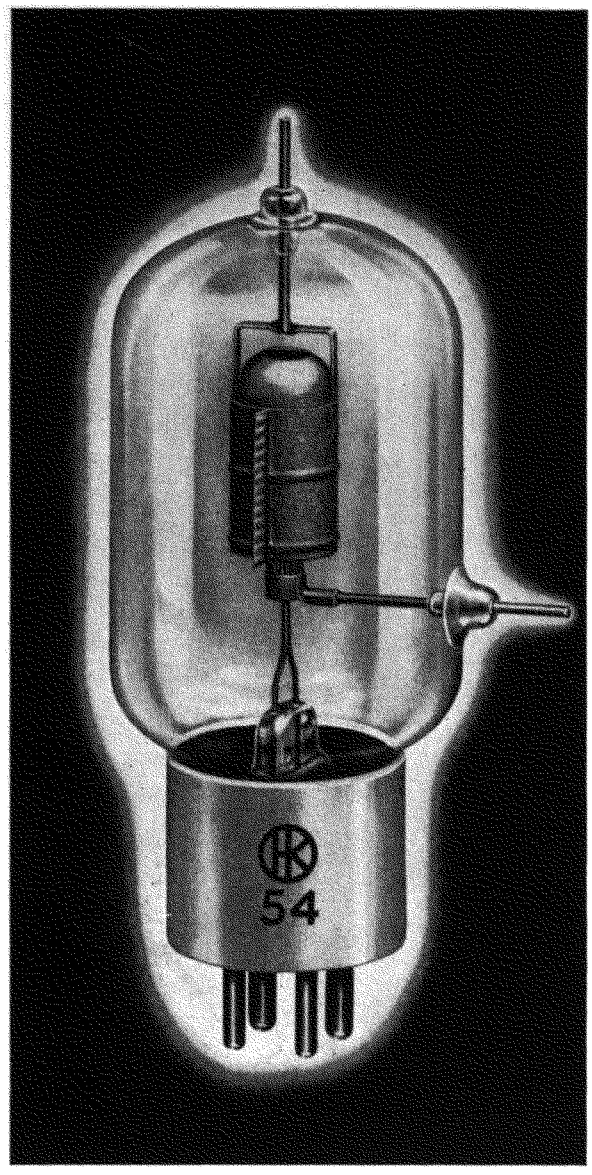
GAMMATRON TYPE 54



GENERAL PURPOSE TRIODE

50 watt radiation cooled universal triode, medium mu. Special design permits high voltage operation and unusual UHF efficiency.

PHYSICAL DATA

Plate	Cylindrical Tantalum
Grid	Braced Vertical Bar Tantalum
Filament	Thoriated Tungsten
Base	Medium 4 Pin Ceramic Base
Net Weight	2½ Ounces
Shipping Weight	8 Ounces
Maximum Height	5-7/16 Inches
Maximum Diameter	2-1/16 Inches

ELECTRICAL DATA

Filament Voltage	5.0 Volts
Filament Current	5.0 Amps.
Normal Plate Dissipation	50 Watts
Maximum Average Plate Current	150 MA.
Maximum Average Grid Current	30 MA.
Maximum Plate Voltage	3000 Volts
Average Amplification Constant	27

INTERELECTRODE CAPACITANCES

Grid-Plate	1.8 Mmfd.
Grid-Filament	2.0 Mmfd.
Plate-Filament	0.2 Mmfd.

The Type 54 GAMMATRON has amazing power capabilities even though it is small in size. It has very low interelectrode capacities, and it employs a domed plate construction confining the entire electron stream at very high frequencies. Thus, no power is wasted, and the UHF efficiency is unequaled by ordinary tubes. Tantalum elements are cleaned and degassed by Heintz and Kaufman's new and improved pumping process. The "getter" is eliminated, internal insulators are not used, and thus GAMMATRON tubes do not become gassy because every source of gas has been removed.

The 54 GAMMATRON has unusual stamina and is very versatile. Its excellent characteristics suit it as a Class C amplifier for low or ultra high frequencies, Class B audio amplifier, frequency multiplier and crystal oscillator.

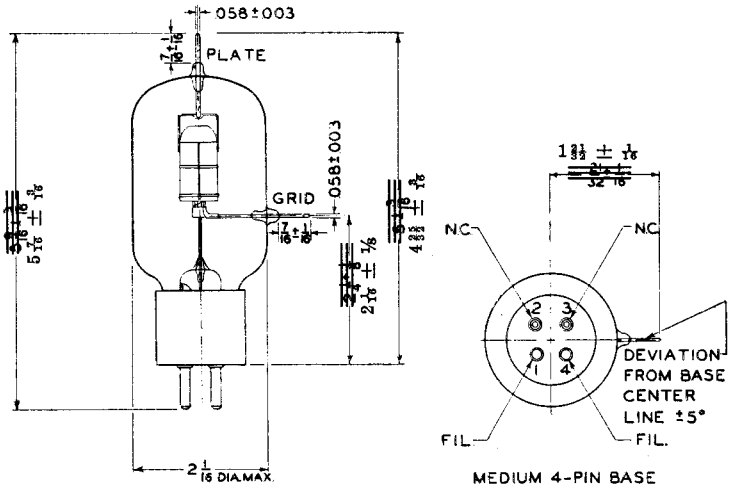
The tantalum plate is designed to run hot. Only a perceptible glow can be seen at 25 watts dissipation, and a dull cherry red color at 50 watts dissipation. This is normal, and no damage will result at this temperature. The convenience of the use of the plate color as an indication of proper circuit efficiency and tuning will be appreciated immediately after trying the 54 GAMMATRON.

5M 6-44

HEINTZ AND KAUFMAN LTD.
SOUTH SAN FRANCISCO, CALIFORNIA, U·S·A

TYPE HK 54

The information on this and the following page does not represent exact conditions of operation to be imposed for any particular situation. Because tubes are used under many widely different conditions Heintz and Kaufman will gladly furnish information for applications which differ appreciably from the illustrative examples given.



MEDIUM 4-PIN BASE

RADIO FREQUENCY POWER AMPLIFIER
Class C UNMODULATED*

	Maximum Rating Per Tube	Typical Operation, 1 Tube		
Power Output		250	210	100 Watts
Driving Power		10	9	6 Watts
DC Plate Voltage	3000	3000	2000	1000 Volts
DC Plate Current	150	100	130	135 ma
DC Grid Current	30	25	20	20 ma
DC Grid Voltage	−750	−290	−269	−130 Volts
Peak RF Grid Voltage		465	465	304 Volts
Plate Dissipation	50	50	50	35 Watts
Plate Input	300	300	260	135 Watts

*Carrier conditions for telegraphy.

RADIO FREQUENCY POWER AMPLIFIER
CLASS C PLATE MODULATED*

	Maximum Rating Per Tube	Typical Operation, 1 Tube		
Power Output		180	147	92 Watts
Driving Power		9	9	9 Watts
DC Plate Voltage	2500	2000	1500	1000 Volts
DC Plate Current	125	110	125	125 ma
DC Grid Current	30	25	30	30 ma
DC Grid Voltage	−750	−250	−140	−130 Volts
Peak RF Grid Voltage		422	310	295 Volts
Plate Dissipation	40	40	40	35 Watts
Plate Input	225	220	188	125 Watts

*Carrier conditions for 100% modulation and 60% average value.

AUDIO FREQUENCY POWER AMPLIFIER
CLASS B*

	Maximum Ratings Two Tubes	Typical Operation, 2 Tubes		
Power Output		260	200	140 Watts
Driving Power**		12	10	10 Watts
DC Plate Voltage	2500	2000	1500	1000 Volts
DC Plate Current, Zero Signal		24	40	40 ma
DC Plate Current, Maximum Signal	300	180	198	233 ma
DC Grid Voltage		−70	−45	−25 Volts
Peak AF Grid to Grid Voltage		360	300	295 Volts
Plate Dissipation	100	100	96	91 Watts
Plate Input, Maximum Signal	375	360	296	233 Watts
Load Resistance, Plate to Plate		36000	16800	8500 Ohms
Driver Transformer Ratio*** (Full secondary to full primary)		0.75	0.6	0.6

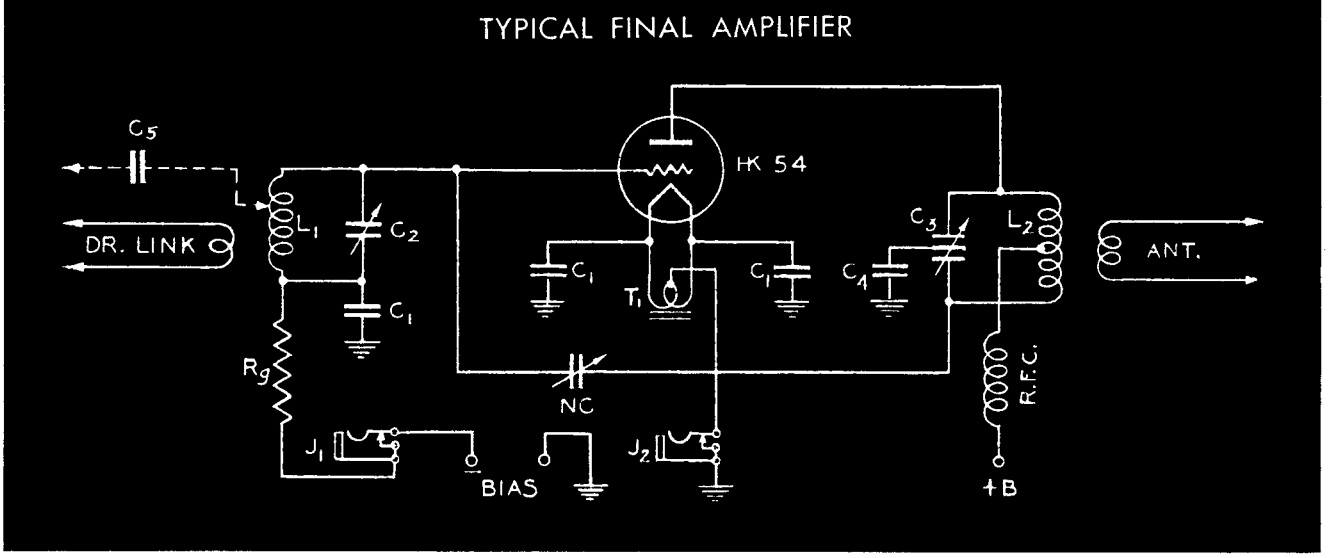
*All data for two tubes.

**Instantaneous power at crest of cycle; effective power is ½ of this value.

***Driver tubes 2 - 6V6 Class A_1. Plate volts 315. The use of inverse feed back is recommended to reduce distortion.

RADIO FREQUENCY DOUBLER AMPLIFIER
(Feedback neutralized by conventional methods)

	Maximum Rating Per Tube	Typical Operation, 1 Tube			
Power Output		115	105	80	57 Watts
Driving Power		12	12	12	10 Watts
DC Plate Voltage	3000	3000	2000	1500	1000 Volts
DC Plate Current	150	55	77	85	100 ma
DC Grid Current	30	14	15	20	20 ma
DC Grid Voltage	−750	−700	−500	−420	−339 Volts
Peak RF Grid Voltage		835	670	580	510 Volts
Plate Dissipation	50	48	48	48	43 Watts
Plate Input	165	165	155	127	100 Watts



This typical final amplifier is capable of a maximum output of 250 watts and requires a driving power of only 10 watts. A small receiving tube such as a 6V6-G is sufficient. It may be link-coupled to the grid circuit or directly coupled with C_5 to the point on L_1 which provides sufficient excitation. It is advisable to supply enough fixed bias to prevent plate current flow under static conditions (see plate curve), and the remaining bias is then developed by the grid current flow through R_g. Thus: DC grid voltage = Fixed Bias + ($R_g \times$ DC grid current).

COMPONENTS

C_1 — .01 mfd mica, 1000 volt working.
C_2 — 260 mmfd variable condenser, 1500 volt rating.
C_3 — 200 mmfd per section, 4500 volt rating variable condenser.
C_4 — .005 mfd mica, 5000 volt working.
C_5 — .001 mfd mica, 2500 volt working.
N.C. — Neutralizing condenser .7 to 4 mmfd.
J_1 and J_2 — Jacks to measure grid and cathode current.
R_g — As required.
T_1 — 5.0 volt, 5 ampere filament transformer.

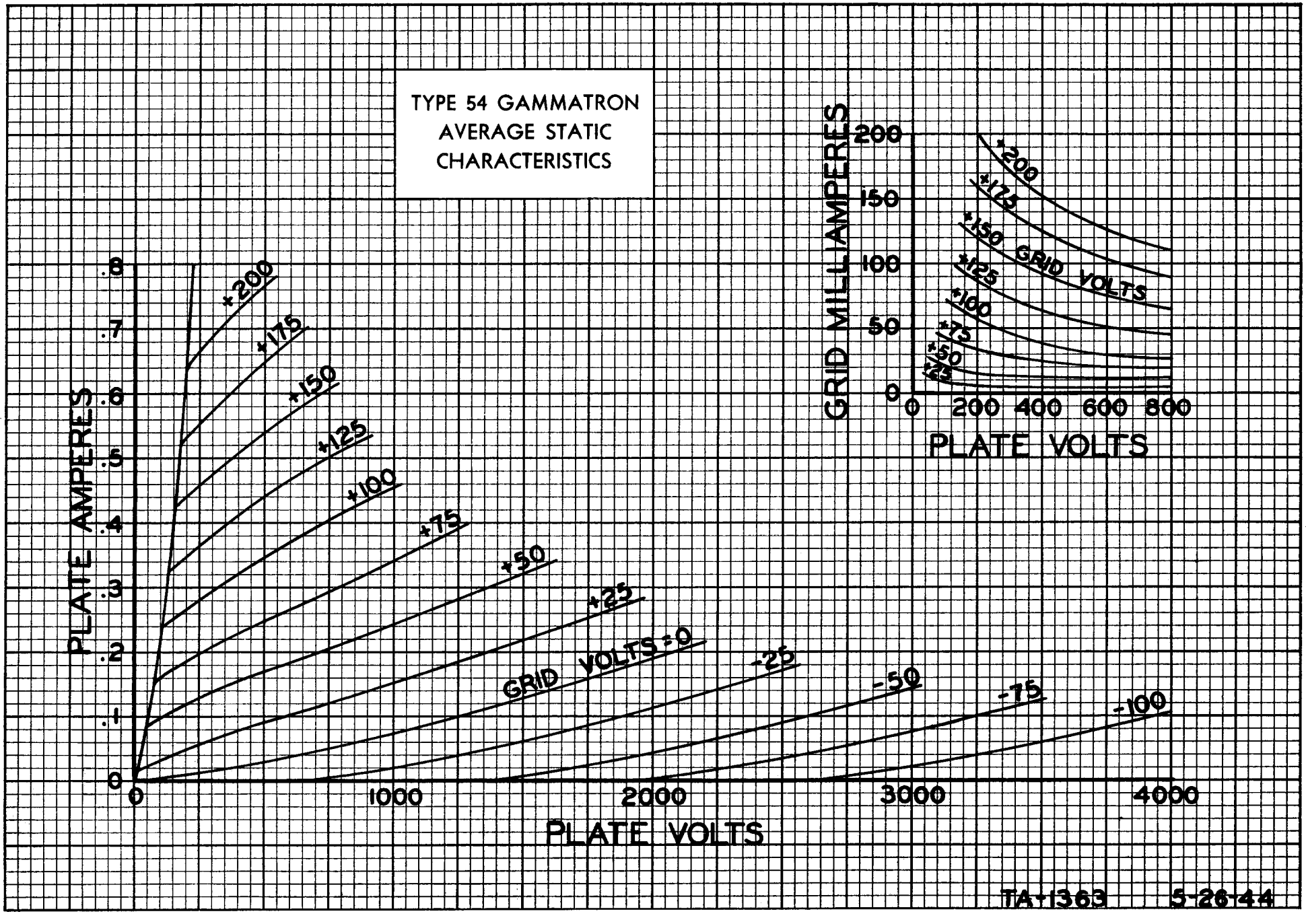
COIL DATA

Band	L_1	L_2*
160 Meters	34 Turns #22 Enamel Close Wound Diameter 1½ Inches Length 1 Inch	54 Turns #18 DCC Diameter 2½ Inches Length 4 Inches
80 Meters	20 Turns #22 Enamel Diameter 1½ Inches Length 1 Inch	34 Turns # 16 Diameter 2½ Inches Length 4 Inches
40 Meters	13 Turns #22 Enamel Diameter 1½ Inches Length 1 Inch	20 Turns #12 Diameter 2½ Inches Length 4 Inches
20 Meters	8 Turns #22 Enamel Diameter 1½ Inches Length 1 Inch	10 Turns #12 Diameter 2½ Inches Length 3 Inches
10 Meters	5 Turns #16 Enamel Diameter 1½ Inches Length 1 Inch	6 Turns #12 Diameter 2½ Inches Length 3½ Inches

*Length includes ½ inch space at center for antenna or transmission line link windings.

ULTRA HIGH FREQUENCY PERFORMANCE

FREQUENCY	30	60	120	200 mc
Class C Unmodulated				
Max. Input	250	215	180	140 Watts
Max. Plate Volts	3000	2700	2500	2000 Volts
Typical Plate Efficiency	80	77	72	64 Percent
Class C Plate Modulated				
Max. Input	210	180	150	115 Watts
Max. Plate Volts	2500	2200	2000	1700 Volts


TYPE 54 GAMMATRON
AVERAGE STATIC
CHARACTERISTICS
PLATE AMPERES
.8
.7
.6
.5
.4
.3
.2
.1
0
+200
+175
+150
+125
+100
+75
+50
+25
GRID VOLTS = 0
-25
-50
-75
-100
0
1000
2000
3000
4000
PLATE VOLTS
GRID MILLIAMPERES
200
150
100
50
0
+200
+175
+150
+125
+100
+75
+50
+25
GRID VOLTS
0
200
400
600
800
PLATE VOLTS
TA-1363
5-26-44