

TRANSFORMER COMPONENTS

*for every
purpose*

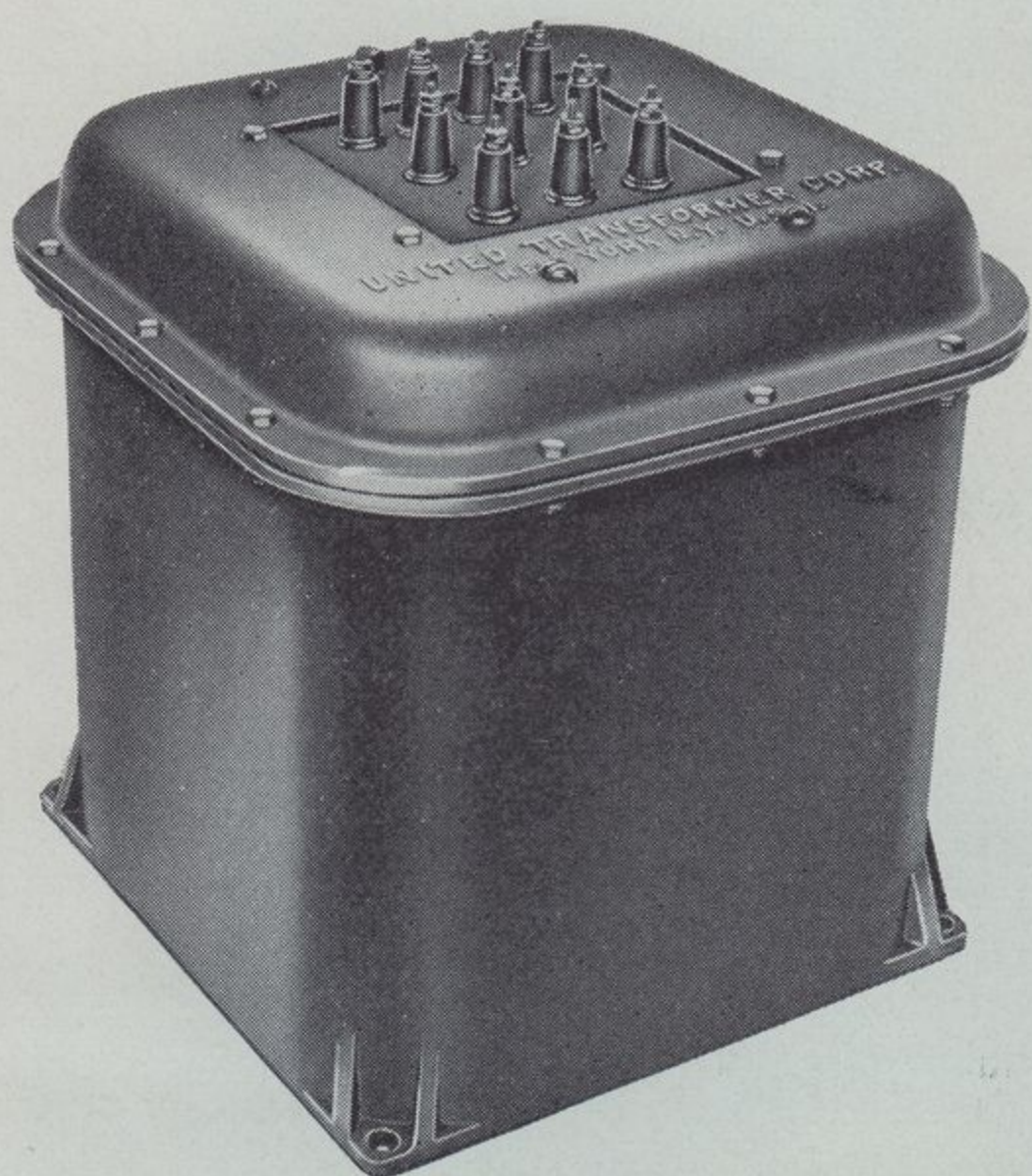


UNITED TRANSFORMER CORP.

264-266 Canal Street

::

New York, N. Y.



THE UTC organization consists of a group of specialists who have achieved an international reputation as designers and producers of quality transformer equipment.

The most modern equipment available is used in the production of UTC transformers. Both raw materials and finished units are kept under continuous engineering control to assure final perfection.

Transformer users are invited to bring their special problems to the UNITED TRANSFORMER CORP., where the services of a qualified technical staff, plus a fully equipped audio and research laboratory are available.

Bulletin U1100A

UNITED TRANSFORMER CORP.
264-266 Canal Street :: New York, N. Y.

UTC Linear Standard Components represent the closest approach to the ideal transformer from the standpoint of uniform response, low wave form distortion, high efficiency, thorough shielding and dependability.

Figure 1 illustrates the linear frequency response of a typical UTC audio output transformer. As shown, this series of audio units are linear over a frequency spectrum of 9 octaves, i.e., from 20 to 20,000 cycles.

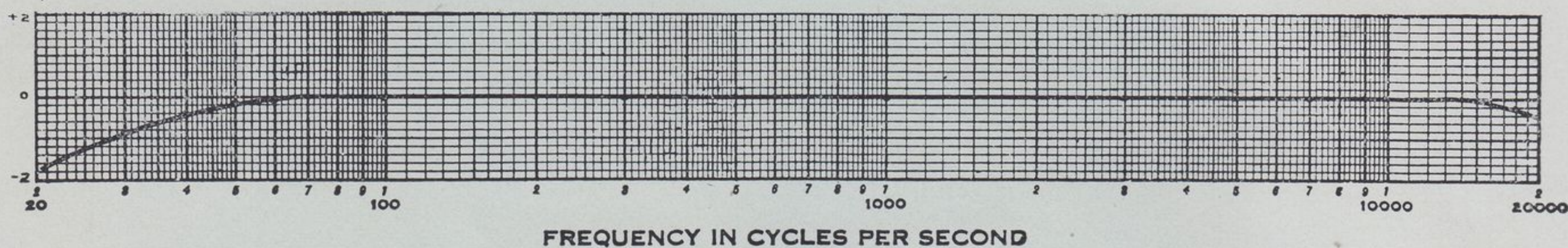
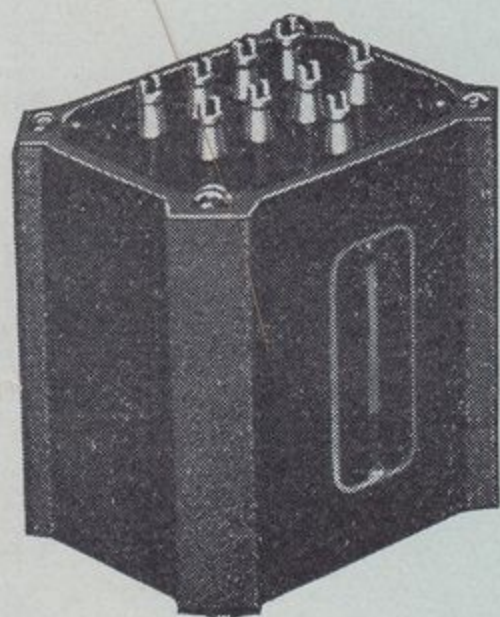


Figure 1

Every possible check is taken to assure uniform electrical characteristics on all audio components. Each transformer is individually tested for frequency range. Only the finest of insulating and impregnating materials are used. All coils are vacuum impregnated through special processes in vacuum equipment designed by UTC engineers. Each transformer is sealed with a moisture proof insulating compound in its shielded housing to eliminate deteriorating effects from high humidity conditions.

The multiple tap windings used on input to grid, plate to line, mixing and output audio transformers make possible a wide combination of impedance connections without impairing the audio range or efficiency of each unit. This is an exclusive UTC coil structure development.

UTC engineers have spent considerable time studying the many annoying hum pickup difficulties which are prevalent in high gain A.C. operated amplifying equipment. As a result, a special grade of high permeability cast iron has been developed to house all UTC Linear Standard units. This high permeability cast iron housing is an exclusive shielding feature found only in UTC Linear Standard units.



OVERALL DIMENSIONS

	Mtg. Dim.	L	W	H
LS-1	1-15/16 x 2-7/16	2 1/2	3	3-15/16
LS-2	2-11/16 x 3-11/16	3 1/4	4 1/4	4-6/8
LS-3	4-3/16 x 5-1/32	5 3/4	4 3/4	5-1/8
LS-4	5-3/4 x 5-3/4	6 1/4	6 1/4	5-5/16
LS-5	7-1/4 x 7-1/4	7 3/4	7 3/4	8-5/8

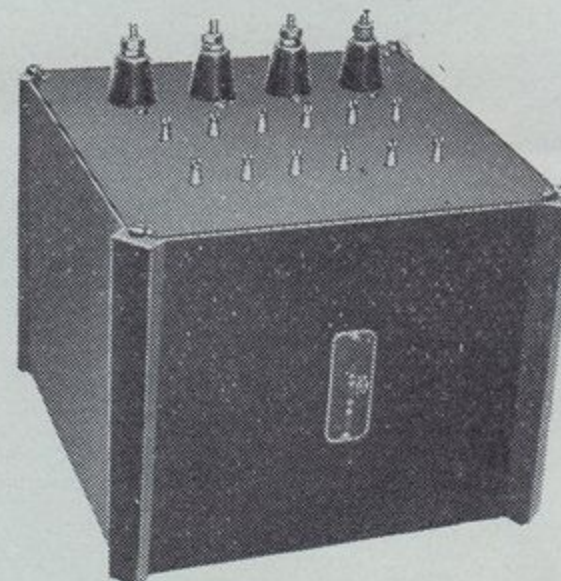
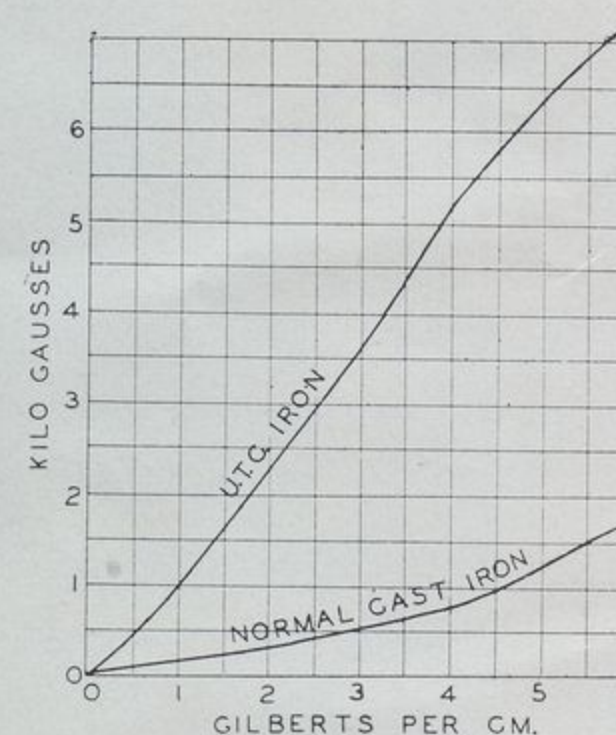


Figure 2

Figure 2 illustrates the relative shielding effect (permeability) of UTC high permeability cast iron and normal cast iron used for transformer housings. It is seen that the ratio of shielding afforded by UTC housings is 5:1.

Sound laboratories and broadcast engineers often find it necessary to adapt the same transformer for top or bottom lug connections. To avoid useless time spent for such makeshift adaptations, UTC castings are designed so they may be fastened to chassis or rack panel with lugs at top or bottom.

LINEAR STANDARD INPUT TRANSFORMERS (TO ONE OR TWO GRIDS)

LS-10	Primary will match 500, 333, 250, 200, 125 or 50 ohm line as required for carbon, voice coil microphones, low impedance electro-magnetic, or oil damped pickups. Secondary in two sections for series or parallel connection. Overall impedance of windings in series 100,000 ohms, impedance of each winding 25,000 ohms. LS-1	\$15.00
LS-11	Primary will match a high impedance photo electric cell to one or two grids. LS-1	15.00
LS-12	Primary will match 500, 333, 250, 200, 125 or 50 ohm line as required for carbon, voice coil microphones, low impedance electro-magnetic or oil damped pickups. Secondary in two sections for series or parallel connection. Overall impedance of windings in series 200,000 ohms, impedance of each winding 50,000 ohms. LS-1	20.00
LS-14	Primary will match one or more voice coil microphones or extremely low impedance electro-magnetic or oil damped pickups. Primary impedance 60, 38, 30, 22, 15, 10, 5.5, or 2.5 ohms. Secondary in two sections for series or parallel connection. Overall impedance of windings in series 130,000 ohms, impedance of each winding 32,500 ohms. LS-1	20.00
LS-16	Primary will match a velocity ribbon microphone. Secondary in two sections for series or parallel connection. Overall impedance of winding in series 130,000 ohms, impedance of each winding 32,500 ohms. LS-1	20.00
LS-18	Primary designed for 500, 333, 250, 200, 125, or 50 ohm line to 2-50 watt grids at a plus 25 level. LS-2	22.00

COUPLING TRANSFORMERS

LS-20	Cascade, single plate to single grid. Turn ratio 2:1 overall. LS-1	\$10.00
LS-21	Input, one plate to two grids. Turn ratio 1 1/2:1 each side of center. Primary and secondary each in two sections. LS-1	13.00
LS-22	Input, two plates to two grids. Turn ratio 1.6:1 each side of center. Primary and secondary each in two sections. Maximum operating level + 25 DB. LS-2	22.00
LS-23	Input, two screen grid plates to two grids. Effective ratio 1:1. LS-2	20.00
LS-24	Single plate or line to one or two grids. One primary winding will match single plate of tubes like 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, or W.E. 262A. Another primary winding designed for a carbon or voice coil microphone or a low impedance pickup. Secondary in two sections. Total secondary impedance 100,000 ohms. LS-1	20.00

MIXING AND MATCHING TRANSFORMERS

LS-30	Mixing, carbon or moving coil microphone or low impedance pickup to a variable impedance line. Primary and secondary windings will match 500, 333, 250, 200, 125 or 50 ohm lines. LS-1	\$15.00
LS-31	Mixing, velocity ribbon microphone to a 500, 333, 250, 200, 125, or 50 ohm line. LS-1	15.00
LS-32	Mixing, one or more moving coil microphones or extremely low impedance pickups to a variable impedance line. Primary impedances 60, 38, 30, 22, 15, 10, 5.5, 2.5 ohms. Secondary impedances 500, 333, 250, 200, 125, 50 ohms. LS-1	20.00
LS-33	15 watt audio line matching transformer. Input designed for 500, 333, 250, 200, 125, 50 ohms. Output designed for 15, 10, 7.5, 5, 3.75, 2.5, 1.25, .68 ohms. LS-2	15.00
LS-34	30 watt audio line matching transformer. Input designed for 3500, 2700, 2000, 1350, 875, 500, 200, 50 ohms. Output tapped for 30, 20, 15, 10, 7.5, 5, 1.2 ohms. LS-3	20.00
LS-35	60 watt audio line matching transformer. Input designed for 500, 333, 250, 200, 125, 50 ohms. Output designed for 500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2 ohms. LS-4	30.00
LS-36	200 watt audio line matching transformer. Input designed for 500, 333, 250, 200, 125, 50 ohms. Output designed for 500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2 ohms. LS-5	50.00
LS-37	Crystal microphone to 500, 333, 250, 200, 125 or 50 ohm line. LS-1	15.00

A PRIME AND CLASS B INPUT TRANSFORMERS

LS-4	Primary designed for 500, 333, 250, 200, 125 or 50 ohm lines to two class B 46, 59 or 210 grids operating at a maximum level of +32 DB. LS-2	\$ 25.00
LS-5	Primary designed for 500, 333, 250, 125, or 50 ohm lines to two 203A class B grids. LS-2	30.00
LS-6	Push pull 45 or 59 triode plates to push pull 845A prime grids. LS-2	22.00
LS-7	Push pull 56 plates to push pull 45A prime grids. LS-2	22.00
LS-41	Single 46 or 59 plate to 2-46 or 2-59 grids in class B. LS-1	15.00
LS-42	Single 49 plate to 2 class B grids. LS-1	15.00
LS-43	Single 89 plate to 2-79 grids in class B. LS-1	15.00
LS-44	Single 53 plate to 2-53 grids in class B. LS-1	15.00
LS-45	Push pull 45 or 59 plates to 2-46 or 2-59 grids in class B. LS-2	15.00
LS-46	Push pull 45 or 59 plates to 2-210, 2-830, 2-800, 2-KR 18 grids in class B. LS-2	15.00
LS-47	Push pull 2A3 plates to 2-203A grids in class B. LS-2	20.00
LS-48	Push pull 845 plates to 2-204 or 849 grids in class B. LS-4	35.00

CLASS A OUTPUT TRANSFORMERS

LS-50	From a single plate like the 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, W.E. 262A to 500, 333, 250, 200, 125 or 50 ohm line. LS-1	\$15.00
LS-51	From push pull plates like the 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, W.E. 262A to 500, 333, 250, 200, 125, or 50 ohm line. LS-1	15.00

SPECIAL A PRIME AND CLASS B OUTPUT TRANSFORMERS

LS-65	From two class B 210 plates to high and low impedance loads. High impedance load 5000, 3500, 2500, 2100, 1250, or 600 ohms. Low impedance load 30, 20, 15, 10, 7.5, 5.5, 2.5, 1.2 ohms. Secondary windings will handle 60 watts audio power. LS-4	\$35.00
LS-66	Two class B 203A or 211 plates to 5000, 3500, 2500, 2100, 1250, or 600 ohms. Secondary windings will handle 200 watts audio power. LS-5	70.00
LS-67	Two class B 203A or two Class B 830B plates to 10,000 ohms or 2500 ohms (split secondary). Secondary will handle 200 watts audio power. LS-5	70.00
LS-68	Two class B 203 A plates to 500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5.5, 2.5, 1.2 ohms. LS-5	70.00
LS-69	Two 849 or 204A plates to 6000, 5000, 4000, 1800, 1500, or 1000 ohms. Secondary will handle up to 1000 watts audio power. Special casting	200.00
LS-845M	From two A prime 845 plates to high impedance loads. Secondary impedances 5000, 3500, 2500, 2100, 1250 or 600 ohms. Will handle 125 watts audio power. LS-5	50.00
LS-845	From two A prime 845 plates to 500, 333, 250, 200, 125, 50, 30, 20, 15, 7.5, 5.5, 2.5, 1.2 ohms. Will handle 125 watts audio power. LS-5	50.00



LINEAR STANDARD CLASS A AND CLASS B OUTPUT TRANSFORMERS

Type	Primary Impedance	Will Match	Secondary Impedance	Case & Price
LS-52	8000 ohms plate to plate.	Class A , push pull 250, push pull 245, single 211, 843, 842, 205D, 48.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-53	8000 ohms plate to plate.	Same tubes as LS-52.	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-54	8000 ohms plate to plate.	Same tubes as LS-52.	30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 14.00
LS-55	5000 ohms plate to plate and 3000 ohms plate to plate.	For 5000 ohms Self bias push pull 2A3's, push pull W.E. 275A's, single 71A, 2B6, or single 59 triode. For 3000 ohms Fixed bias push pull 2A3's, single W.E. 52A.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-56	5000 ohms plate to plate and 3000 ohms plate to plate.	Same tubes as LS-55.	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-57	5000 ohms plate to plate and 3000 ohms plate to plate.	Same tubes as LS-55.	30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 14.00
LS-58	2500 ohms plate to plate or 1500 ohms plate to plate.	For 2500 ohms Four 2A3's in push pull parallel self bias circuit. For 1500 ohms Four 2A3's in push pull parallel fixed bias circuit.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-3 30.00
LS-59	2500 ohms plate to plate or 1500 ohms plate to plate.	Same tubes as LS-58.	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-3 30.00
LS-60	2500 ohms plate to plate or 1500 ohms plate to plate.	Same tubes as LS-58.	30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-3 20.00
LS-61	10,000 ohms plate to plate or 6000 ohms plate to plate.	For 10,000 ohms Push pull 59 triodes, push pull 2B6's, push pull 71A's, single 210, 41, 268A, 2A3, Class B 49's, 53's, 79's, 89's. For 6000 ohms In Class A push pull W.E. 52A's, single 31, 46, 59 pentode. In class B push pull 46's, push pull 59's.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-62	10,000 ohms plate to plate or 6000 ohms plate to plate.	Same tubes as LS-61.	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-63	10,000 ohms plate to plate or 6000 ohms plate to plate.	Same tubes as LS-61.	30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 14.00
LS-64	18,000 ohms plate to plate.	Class A push pull 845's.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-4 35.00
LS-800A	12,500 ohms plate to plate. or 8000 ohms plate to plate.	Class B push pull 800's, RK 18's or 211's.	20,000, 16,500, 13,000, 6000, 5000, 3500.	LS-4 50.00

Type	Primary Impedance	Will Match	Secondary Impedance	Case & Price
LS-2451	6000 ohms plate to plate and 3500 ohms plate to plate.	For 6000 ohms Class A prime 45's self bias and Class B 46's, 59's; Class A WE 252A's. For 3500 ohms Class A prime 45's fixed bias.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5 1.2.	LS-2 20.00
LS-2452	6000 ohms plate to plate and 3500 ohms plate to plate.	Same tubes as LS-2451.	6000, 5,000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2.	LS-2 20.00
LS-2453	6000 ohms plate to plate and 3500 ohms plate to plate.	Same tubes as LS-2451.	30, 20, 15, 10, 7.5, 5.5, 2.5 1.2.	LS-2 14.00
LS-4451	3000 ohms plate to plate and 1750 ohms plate to plate.	For 3000 ohms Four 45's in push pull parallel A prime self bias. Four WE 252A's Class A. Four 46's or 59's in Class B. For 1750 ohms Four 45's in push pull parallel A prime fixed bias.	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5.5, 2.5, 1.2.	LS-3 30.00
LS-4452	3000 ohms plate to plate and 1750 ohms plate to plate.	Same tubes as LS-4451.	6000, 5000, 4000, 1800, 1500, 1000, 30, 20, 15, 10, 7.5, 5.5, 2.5, 1.2.	LS-3 30.00
LS-4453	3000 ohms plate to plate and 1750 ohms plate to plate.	Same tubes as LS-4451.	30, 20, 15, 10, 7.5, 5.5, 2.5, 1.2.	LS-3 20.00

PLATE TRANSFORMERS

LS-70	For use with P.P. class A 2A3, 59, 45, 47 tubes or class B 53 tubes. Primary tapped for 100, 105, 110, 115, 120, 125 volts 60 cycles A.C. Secondaries: 425 volts each side of center at 200 MA, also tapped at 375 volts each side of center. 2 1/2 V.C.T. 3 A. 2 1/2 V.C.T. 5 A. 2 1/2 V.C.T. 12 A. 5 V.C.T. 3 amps. LS-4.....	\$25.00
LS-71A	For use with single or push pull 45, 47, 59, 2B6 or class B 79 tubes. Primary 100, 105, 110, 115, 120, 125 volts 60 cycles A.C. Secondaries: 375 V. each side of center at 140 MA. 6.3 V.C.T. 2.5 A. 5 V.C.T. 3A. 2 1/2 V.C.T. 12 A. LS-3.....	20.00
LS-72	For use with P.P. class B 46 or 59 tubes. Primary tapped for 100, 105, 110, 115, 120, 125 volts 60 cycles A.C. Secondaries: 570-0-570 at 200 MA, 2 1/2 V.C.T. 5 A. 2 1/2 V.C.T. 14 A. 5 V.C.T. 3 A. LS-4.....	25.00
LS-74	For use with push pull class A 250 power tubes. Primary tapped for 100, 105, 110, 115, 120, 125 volts. Secondaries 600 volts each side of center at 200 MA. 7 1/2 V.C.T. 3 A. 7 1/2 volts tapped at 5 volts at 3 A. 2 1/2 V.C.T. 14 amps. 5 V.C.T. at 3 amps. LS-4.....	25.00
LS-75	For use with push pull class B 210 tubes. Primary tapped for 100, 105, 110, 115, 120, 125 volts 60 cycles A.C. Secondaries: 720 volts each side of center at 250 MA. 7 1/2 V.C.T. at 3 A. 7 1/2 V. tapped at 5 volts 3 A. 2 1/2 volts C.T. 10 amps. Low voltage plate winding for fixed C bias, 2-2 1/2 V.C.T. 3 amp. windings for 82 C bias rectifiers. LS-5.....	30.00
LS-76	For use with push pull 50 watt tubes. Primary tapped for 100, 105, 110, 115, 120, 125 volts, 60 cycles A.C. Secondaries: 1450 V. each side of center at 200 MA; also tapped at 1200 volts each side of center. Secondary winding may be joined in parallel. LS-5.....	45.00
LS-77	For use with 50 watt Class B and A Prime tubes. Primary tapped for 100, 110, 120, 220, 230 and 240 volts, 50-60 cycles A.C. Secondary winding 1450 volts each side of center at 350 MA; also tapped at 1200 volts each side of center. Special casting.....	60.00
LS-78A	For use with 200 watt tubes, AF and RF. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary winding 1450 volts each side of center at 500 MA; also tapped at 1200 volts each side of center. Special casting.....	75.00
LS-79AX	Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary tapped to supply fixed C bias for class B 203's, 830B's and class A 845's with 82 rectifiers. LS-3.....	20.00
LS-106	For use with 1000 watt tubes, AF and RF. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary winding 3500 volts each side of center at 1 Ampere; also tapped at 2800 volts each side of center. Special casting.....	180.00
LS-107	For use as fixed bias plate transformer. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary designed to supply fixed C bias both for Class B 849's or A Prime 845's. LS-4.....	25.00
LS-180	Plate and filament transformer for a pre-amplifier. Primary 110 volts. Secondaries: 225 volts each side of center at 15 MA. 6.3 V.C.T. at 2 Amps. 6.3 volts .4 Amps for 84 rectifier. LS-1.....	10.00

FILAMENT TRANSFORMERS

LS-80	Filament transformer for two 866 mercury vapor rectifier tubes. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary: 2½ V.C.T. 10 A. 12,000 volts insulation. LS-3.....	\$15.00
LS-81	Filament transformer for four 866 mercury vapor rectifier tubes. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary: 2½ V.C.T. 20 Amps. 12,000 volts insulation. LS-3.....	20.00
LS-82	Filament transformer for two 872 mercury vapor rectifier tubes. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary: 5 V.C.T. 20 amps. 12,000 volts insulation. LS-3.....	20.00
LS-83	Filament transformer for three 872 mercury vapor rectifier tubes. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary: 5 volts C.T. 30 amps. 12,000 volts insulation. LS-3....	24.00
LS-84	Filament transformer for two 203A, 211, 17C, 845, 852, or 860 tubes. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondary: 10 V.C.T. 7 A. 10,000 volts insulation. LS-3.....	15.00
LS-85	Filament transformer for 866 and 50 watt power tubes. Primary tapped for 100, 110, 120, 220, 230, 240 volts, 50-60 cycles A.C. Secondaries: 2½ V.C.T. 10 A. 2-10 V.C.T. 3 A. windings. 10,000 volts insulation. LS-3	25.00
LS-86	Filament transformer for 2½ volt heater tubes. Primary tapped for 105, 115, 125 volts, 50-60 cycles A.C. Secondary 2½ V.C.T. 6 amps. 2500 volts insulation. LS-1	7.50
LS-87	Filament transformer for 2-WE 252 A's or 1-5Z3, 83 rectifier. Primary tapped for 105, 115, 125 volts, 50-60 cycles A.C. Secondary 5 V.C.T. 3 amps. 2500 volts insulation. LS-1.....	7.50
LS-88	Filament transformer for 6.3 volt heater tubes. Primary tapped for 105, 115, 125 volts, 50-60 cycles. Secondary 6.3 V.C.T. 2 amps. 2500 volts insulation. LS-1	7.50
LS-89	Filament transformer for WE 262 A or 271 A tubes. Primary tapped for 105, 115, 125 volts, 50-60 cycles. Secondary 10 V.C.T. 1.5 amps. 2500 volts insulation. LS-1	7.50

FILTER AND AUDIO REACTORS

LS-90	Hum-bucking split tapped filter choke. 50 henrys 50 MA; 510 ohms D.C. in series. 12.5 henrys 100 MA; 127.5 ohms D.C. in parallel. LS-2.....	\$8.50
LS-91	Hum-bucking split tapped filter choke. 14 henrys 125 MA; 200 ohms D.C. in series. 3.5 henrys 250 MA; 50 ohms D.C. in parallel. LS-2	8.50
LS-92	Hum-bucking split tapped filter choke. 16 henrys 175 MA; 96 ohms D.C. in series. 4 henrys 350 MA; 24 ohms D.C. in parallel. LS-3	15.00
LS-93	Hum-bucking split tapped filter choke. 26 henrys 200 MA; 112 ohms D.C. in series. 6.25 henrys 400 MA; 28 ohms D.C. in parallel. LS-4	25.00
LS-96	Hum-bucking split tapped filter choke. 20 henrys 500 MA; 90 ohms D.C. in series. 5 henrys 1000 MA; 22.5 ohms D.C. in parallel. LS-5	40.00
LS-94	Split winding parallel feed audio choke. 320 henrys 3 MA; 6400 ohms in series. 80 henrys 6 MA; 1600 ohms D.C. in parallel. LS-1	10.00
LS-95	Split winding parallel feed audio choke. 720 henrys 5 MA; 3600 ohms D.C. in series. 180 henrys 10 MA; 900 ohms D.C. in parallel. LS-2	20.00
LS-97	Swinging class B choke. 8-40 henrys 200 MA; 100 ohms D.C. LS-3	15.00
LS-98	Swinging class B choke. 8-40 henrys 400 MA; 90 ohms D.C. LS-4	25.00
LS-99	Hum-bucking split tapped filter choke. 20 henrys 1 Ampere; 50 ohms D.C. in series. 5 henrys 2 Amperes; 12.5 ohms D.C. in parallel. Special casting.....	60.00
LS-199	Swinging class B choke 8-40 henrys 1 Ampere; 50 ohms D.C. Special casting.....	60.00

MODULATION REACTORS 10,000 VOLTS INSULATION

LS-100	50 henrys 100 MA; 500 ohms D.C. LS-3	\$17.50
LS-101	50 henrys 175 MA; 350 ohms D.C. LS-4	25.00
LS-102	50 henrys 350 MA; 250 ohms D.C. LS-5.....	40.00
LS-103	50 henrys 500 MA; 175 ohms D.C. Special casting.....	60.00

The UTC Engineering Laboratories Have Developed NEW

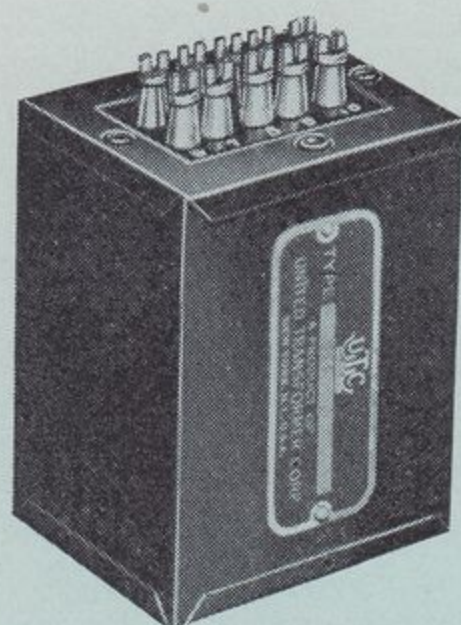
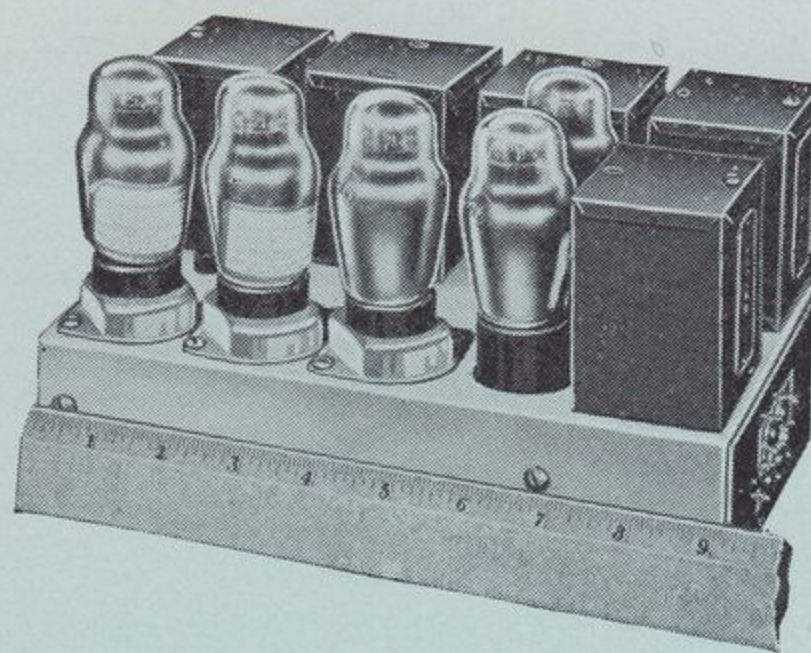
- Television transformers, linear from 30 to 200,000 cycles.
- Hi Q audio reactors.
- Audio equalizers and filters.
- Automatic voltage regulators.
- Saturable control reactors.
- High potential and high current test sets.
- Oscillation transformers.

Users of these devices are invited to write us concerning their particular application either in research or production fields.

High Fidelity HIPERM ALLOY Audio Components

OVERALL DIMENSIONS

H1	Case	1 7/8 x 2 1/8 x 2 3/4
H2	Case	1 7/8 x 3-3/16 x 2 3/4
H3	Case	2 1/4 x 2 7/8 x 3 1/2



4 stage pre-amplifier, gain over 100 DB,—output 10 DB.

This new group of transformers, specifically designed for portable use, are extremely compact and light in weight. The fidelity of these units measures up to high quality broadcast standards, being uniform in response from 40 to 12,000 cycles. These high fidelity transformers are the smallest quality transformers of their class, and have only been made possible through the development of **Hiperm Alloy**, a nickel iron alloy having extremely high initial permeability. This alloy is not only used for the core material, but also for the shielding case, affording a maximum of shielding with a minimum of size and weight. Another unique feature developed to make possible the small size of these units is the elimination of all extended mounting flanges or feet. These are replaced by simple threaded metal inserts in the case allowing mounting with terminals either up or down, so that the units can be mounted either on rack panel or metal chassis with no waste space.

COUPLING TRANSFORMERS

HA-105	Cascade, single plate like 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, WE262A, 864, 57 triode, 77 triode to a single grid. Turn ratio 2:1 overall. H-1	9.00
HA-106	Input, single plate like 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, WE26A, 864, 57 triode, 77 triode to push pull grids. Turn ratio 1 1/2:1 each side of center. H-1	11.00
HA-107	Input, two push pull plates like 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, WE 262A, 864, 57 triodes, to push pull grids. Turn ratio 1 1/2:1 overall. Primary and secondary in two sections. H-2	15.00

INPUT TRANSFORMERS (TO ONE OR TWO GRIDS)

HA-100	Variable impedance line to single grid. Primary will match 500, 333, 250, 200, 125, or 50 ohm line, as required, for carbon or voice coil microphones, electro-magnetic or oil damped pickups. Secondary impedance 90,000 ohms. H-1	\$12.50
HA-101	Variable impedance line to single or push pull grids. Primary will match 500, 333, 250, 200, 125, or 50 ohm line, as required, for carbon or voice coil microphones, electro-magnetic or oil damped pickups. Secondary in two sections for series or parallel connection. Overall impedance of windings in series 180,000 ohms, impedance of each winding 45,000 ohms. H-1	15.00
HA-102	Velocity ribbon microphone to single grid. Secondary impedance 90,000 ohms H-1	12.50
HA-103	Dynamic voice coil microphone to single grid, secondary impedance 90,000 ohms. H-1	12.50
HA-104	High impedance photo-electric cell to single or push pull grids. Secondary in two sections for series or parallel connection. Overall impedance of windings in series 180,000 ohms, impedance of each winding 45,000 ohms. H-1	15.00

MIXING, MATCHING AND OUTPUT TRANSFORMERS

HA-108	Variable impedance line for mixing carbon or voice coil microphones, electro-magnetic or oil damped pickups to a variable impedance line. Primary and secondary windings will match 500, 333, 250, 200, 125, or 50 ohm line. H-1	12.50
HA-109	Matching, velocity ribbon microphone to a 500, 333, 250, 200, 125 or 50 ohm line. H-1	12.50
HA-110	Matching, dynamic voice coil microphone to a 500, 333, 250, 200, 125, or 50 ohm line. H-1	12.50
HA-111	Matching, crystal microphone or pickup to a 500, 333, 250, 200, 125, or 50 ohm line. H-1	12.50
HA-112	Matching, high impedance photo electric cell to a 500, 333, 250, 200, 125 or 50 ohm line. H-1	12.50
HA-113	Output, from a single plate like the 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, WE 262A, 864, 57 triode, 77 triode, to a 500, 333, 250, 200, 125, or 50 ohm line. H-1	12.50
HA-114	Output, from push pull plates, like 01A, 12A, 30, 31, 26, 27, 37, 55, 56, 85, WE 262A, 864, 57 triodes, 77 triodes to a 500, 333, 250, 200, 125 or 50 ohm line. H-1	12.50

FILTER AND AUDIO CHOKES

HC-115	Split winding parallel feed audio choke. May also be used as a push pull audio choke. 400 henrys 2.5 MA; 7000 ohms in series. 100 henrys 5 MA; 1750 ohms in parallel. Capacity of windings for push pull connection 20 MA each side. Inductance with no unbalanced D.C. 500 henrys. H-1	8.50
HC-116	Split winding parallel feed audio choke. May also be used as a push pull audio choke. 600 henrys 8 MA; 4000 ohms D.C. in series. 150 henrys 16 MA; 1000 ohms in parallel. Capacity of windings for push pull connection 40 MA each side. Inductance with no unbalanced D.C. 1000 henrys. H-2	15.00
HC-117	Hum-bucking tapped filter and audio choke 60 henrys 15 MA; DC resistance 3000 ohms, alloy core. H-1	8.50
HC-127	Hum bucking tapped filter and audio choke, 60 henrys 40 MA. D.C. resistance 1000 ohms, alloy core. H-2	15.00

HIGH AND LOW FREQUENCY AUDIO EQUALIZERS

HC-118	Low frequency equalizer tapped for resonance at either 25, 50, or 100 cycles. Will bring up low frequencies to compensate for losses in disc and film recording, etc. H-2.....	20.00
HC-119	High frequency equalizer tapped for resonance at either 4000, 6000, 8000, or 10,000 cycles. Will bring up high frequencies to compensate for losses in disc and film recording, etc. H-2.....	20.00
HC-120	Surface noise (scratch) filter for disc recording; tapped for sharp resonance and maximum loss at 2500, 3500, or 4200 cycles. H-2.....	20.00
HC-121	Speaker voice coil equalizing network provides gradual cutoff for low frequency speaker beyond 1300 cycles and gradual cutoff for high frequency voice coil or crystal speaker (tweeter) below 4000 cycles. Specify speaker type number and its impedance when ordering. H-2.....	25.00

PRE-AMPLIFIER POWER AND FILAMENT TRANSFORMERS

HP-122	Plate and filament supply for a portable pre-amplifier using 6 volt heater tubes. Primary 115—60 cycles AC. Secondaries 220 each side of center at 15 MA. 6.3 V.C.T. at 1.2 amps. 6.3 Volt. .4 amps for 84 rectifier. H-2.....	10.00
HP-123	Plate and filament supply for a portable pre-amplifier or tuner using 6 volt heater tubes. Primary 115—60 cycles. Secondaries 275 each side of center at 35 MA. 6.3 V.C.T. at 2 amps. 6.3 volt .4 amps for 84 rectifier. H-3	15.00
HF-124	Filament transformer. Primary 115—60 cycles. Secondary 6.3 V.C.T. 1.2 amps. H-1.....	7.50
HF-125	Filament transformer—primary 115—60 cycles. Secondary 2½ V.C.T. 5 amps. H-1.....	7.50
HF-126	Filament transformer. Primary 115—60 cycles. Secondary 10 V.C.T. 1.2 amps. For use with WE 262A tubes. H-1	7.50

Where the highest fidelity is an absolute requirement UTC Linear Standard components, which are at present housed in high permeability cast iron cases, can be furnished in **Hiperm Alloy** cases—thereby reducing both size and weight—at no additional cost.

UNIVERSAL CLASS A, CLASS B OUTPUT CHOKES

These chokes are tapped so that they can be used as autotransformer couplers from the audio modulation stage to Class C stages. A variety of impedance matching taps are brought out on each unit effecting an arrangement so that the coupler will readily accommodate push pull RF, single end RF with the DC adding, or single end RF with the DC bucking. The units are huskily constructed and air gaps are arranged to take care of the maximum DC currents.

HUC-20	Will handle 20 watts audio power. It can be used with Class B 46's, 59's, 53, 6A6, 79 etc.; or class A 2A3's, 250's, 210's, Class A prime 42's, 45's etc. PA-2	\$ 7.00
HUC-50	Will handle 50 watts audio power. Suitable for use with class B 210's, 801's, 830's, 841's, push pull parallel 46's, 59's, 6A6's, push pull parallel 45's A prime, push pull parallel 250's, 2A3's etc. PA-3	12.50
HUC-100	Will handle 100 watts audio power. Suitable for use with class B 800's, 211E's, A prime 845's, 284A's, etc. PA-4.....	20.00
HUC-200	Will handle 200 watts audio power. Suitable for use with class B 203's, 830B's HK354's, single Eimac 150T, push pull parallel A prime 845's, 284A's, push pull parallel 800's etc. PA-5.....	32.50
HUC-500	Will handle 500 watts audio power. Suitable for class B 204's, A prime 849's, Eimac 150T's, push pull 212D's in A prime, etc. UTS Case.....	80.00

UTC VOLTAGE REGULATORS

UTC Voltage regulators are of the electro-magnetic type and instantaneous in action, having no moving parts. Operated from an input voltage of 90-130 volts, the output voltage remains constant plus or minus 1%. Unusually high efficiency and good power factor is inherent in these units. The output voltage variation from no load to full load is negligible.

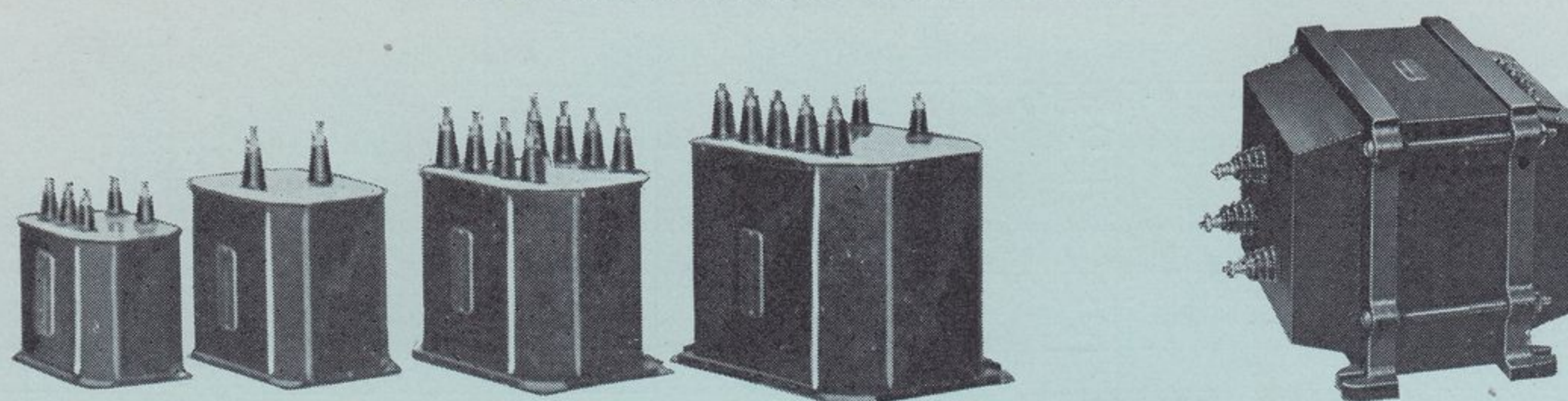
Voltage regulators of this type are built to order only. Stock designs are available in a large number of sizes from 15 watts to 6 KVA.

Some applications of these units are noted.

Input voltage control for—exciter lamps audio amplifiers, radio receivers, filament supply of high power vacuum tubes and mercury vapor rectifiers, photo cell color matching, photo cell testing of razor blades, all industrial photo cell applications.

Inquiries on these units are earnestly solicited. Quotations and application advice will be furnished promptly upon request.

UTC TRANSMITTING COMPONENTS



Mounting Dimensions

PA-1	1-15/16 x 2-7/16
PA-2	2-7/16 x 3-7/8
PA-3	3-1/16 x 4-5/16
PA-4	3-3/4 x 5-7/32
PA-5	4-3/4 x 6-3/8

OVERALL DIMENSIONS

	L	W	H
PA-1	2 1/2	3	3
PA-2	3-1/16	4 1/2	3
PA-3	3 5/8	4 7/8	4 1/4
PA-4	6	4 1/2	4 3/4
PA-5	7	5 3/8	5 1/2

The transmitting type of UTC Class B audio, filter and power components have been developed for and are now widely used by Commercial Telephone, Telegraph, Communication and Broadcast systems. They are particularly well adapted for use in AMATEUR TRANSMITTER applications.

All audio, filter and power units are fully shielded in symmetrically housed cases and present a thoroughly professional appearance when grouped in finished equipment. PA type cases may be mounted with terminals on top or below the chassis. All units are fully impregnated and then sealed in their cases with a special heat dissipating compound.

All units are designed to operate at maximum efficiency, and designs have actually been developed and proven in operating circuits. Intelligent sectionalizing of coil windings and proper impedance relationships maintain high efficiency and uniform response.

Selected core materials are operated at proper flux densities to keep out harmonic distortion other than that incident with class B tubes. Class B output transformers are accurately adjusted to carry plate current of class C stage. However, for minimum harmonic content at low frequencies it is suggested that the output be coupled through a condenser and modulation reactor.

INPUT TRANSFORMERS CLASS B, A PRIME

PA-49	Push pull 45 or 59 plates to push pull 845 A prime grids. PA-2.....	\$ 7.50
PA-50	Driver plate to 19, 49, 53, 6A6, 79 or 89 grids. PA-1.....	5.50
PA-51	Driver 46 or 59 plate to 46 or 59 grids. PA-1.....	5.50
PA-52	Push pull 45 or 59 plates to 2-46 or 2-59 grids, or push pull 2A3 plates to 2-841 grids. PA-2.....	6.50
PA-53	Push pull 42, 45, 50, or 59 plates to 2-242A's, 2-800's, 2-830's, 2-RK 18's or 2-210 grids. PA-2.....	7.50
PA-54	Push pull 2A3 plates to 2-203A grids. PA-2.....	8.50
PA-55	500, 200 or 50 ohm line to 2-46 or 2-59 grids. PA-2	7.50
PA-56	500, 200 or 50 ohm line to 2-203A grids. PA-2	10.00
PA-57	Push pull 2A3 plates to 2-830B, 2-800, 2-RK18 or 2-210 grids. PA-2	7.50
PA-58	Driver 2A5, 42 or 45 triode plate to two 2A5, 42 or 45 A prime grids. PA-1.....	5.50
PA-59	500, 200 or 50 ohm line to 2-830B, 2-800, 2-RK18 or 2-210 grids. PA-2	7.50

FILAMENT TRANSFORMERS

Types PA-34 to PA-127 tapped at 105-115, 220, 230 Volts A.C., 50/60 cycles

PA-34	2 1/2 V.C.T. 10 amps for 2-866's—5000 V. insulation—PA-2	\$7.50
PA-120	2 1/2 V.C.T. 10 amps for 2-866's—10,000 V. insulation—PA-3	9.00
PA-121	5 V.C.T. 20 amps for 2-872's—10,000 V. insulation—PA-3	14.00
PA-122	7 1/2 V.C.T. at 6.5 amps for 2-800's, RK-18's, 825's, 210's. 5000 Volt insulation—PA-3	11.00
PA-123	2-7 1/2 V.C.T. 6.5 amp windings for 800's, RK-18's, 825's, 210's—5000 V. insulation—PA-3	14.50
PA-124	10 V.C.T. 7amps for 2-203 A's, 242 A's, 211's, 845's, 852's, 860's, 217 C's. 10,000 V. insulation—PA-3	12.00
PA-126	2-14 V.C.T. 12.5 amp windings tapped at 11 or 10 volts. 5000 V. insulation—for 04 A's, 49's, F100 A's—PA-4	20.00
PA-127	2 1/2 V.C.T. at 10 amps. 10,000 volt insulation, 2-10 V.C.T. 3.5 amp windings. 5000 V. insulation—PA-3	15.00
PA-29	Secondaries. 2 1/2 V.C.T. 5 A., 2 1/2 V.C.T. 5 A., 5 V.C.T. 3 A. PA-2	6.25
PA-30	Secondaries. 2 1/2 V.C.T. 5 A., 7 1/2 V.C.T. 2.5 A., 7 1/2 V.C.T. 2.5 A. PA-2	6.75
PA-31	Secondaries. 2 1/2 V.C.T. 5 A., 5 V.C.T. 3 A., 7 1/2 V.C.T. 2 1/2 A. PA-2	6.75
PA-32	Secondaries. 5 V.C.T. 3 A., 5 V.C.T. 3 A., 5 V.C.T. 3 A. PA-2	6.75
PA-33	Secondaries. 5 V.C.T. 3 A., 7 1/2 V.C.T. 2 1/2 A., 7 1/2 V.C.T. 2 1/2 A. PA-2	6.75

NOTE: Types PA-29, 30, 31, 32, 33 are insulated for 2000 volts. Primaries designed only for 115 volts A.C., 50/60 cycles.



CLASS B OUTPUT TRANSFORMERS

Type	Primary Impedance	Will Match	Sec. Impedance	Price	Case
PA-20	10,000 ohms plate to plate. 6000 ohms plate to plate.	10,000 ohms Class B 49's, 53's, 79's, 89's. 6000 ohms Class B 46's, 59's.	5000, 3500 ohms.	\$7.00	PA-2
PA-60	6000 ohms plate to plate.	Class B 203's.	3000, 2500 ohms.	30.00	PA-5
PA-62	10,000 ohms plate to plate 6000 ohms plate to plate.	Class B 830B's. Class B 203's.	10,000, 2500 ohms.	32.50	PA-5
PA-70	8000 ohms plate to plate.	A prime 2A5's, 42's.	5000, 3500 ohms.	7.00	PA-2
PA-71	6000 ohms plate to plate.	Class B 46's, 59's.	14,000, 3500 ohms.	7.00	PA-2
PA-80	12,500 ohms plate to plate.	Class B 800's, RK18's, 825's.	5000, 3000 ohms.	20.00	PA-4
PA-82	12,500 ohms plate to plate 8000 ohms plate to plate.	12,500 ohms Class B 800's, RK 18's, 825's. 8000 ohms Class B 242A's, 211E's.	20,000, 5000 ohms.	25.00	PA-5
PA-83	8000 ohms plate to plate.	Class B 210's, 830's, 841's.	18,000, 4500 ohms.	12.50	PA-3
PA-201	6000 ohms plate to plate and 3500 ohms plate to plate.	6000 ohms Class B 46's, 59's. A prime 45's self bias. 3500 ohms A prime 45's fixed bias.	5000, 3500 ohms.	7.00	PA-2
PA-401	3000 ohms plate to plate and 1750 ohms plate to plate.	3000 ohms Four 46's or 59's in class B. Four 45's A prime self bias. 1750 ohms Four 45's A prime fixed bias.	5000, 3500 ohms.	12.50	PA-3
PA-84	6000 ohms plate to plate and 3500 ohms plate to plate.	6000 ohms Class B 203's. 3500 ohms A prime 845's.	6500, 5000, 3500 ohms.	32.50	PA-5

CLASS B INPUT SWINGING CHOKES*

Type	Swinging Action	Current Range	Maximum DC Oper. Voltage	Ohmic Resistance	List Price	Case
PA-101	5 to 25 henrys.	15 to 150 MA	450	115	\$5.00	PA-2
PA-103	5 to 25 henrys.	20 to 200 MA	600	110	8.00	PA-3
PA-105	6 to 30 henrys	25 to 250 MA	1300	90	12.00	PA-4
PA-107	20 to 100 henrys	25 MA to 250 MA	2600	240	20.00	PA-5
PA-109	5 to 25 henrys	75 to 500 MA	1300	60	20.00	PA-5
PA-1C	5 to 25 henrys	100 to 1000 MA	4000	50	35.00	UTS

TRAP RESONANT SMOOTHING CHOKES*

Smoothing Chokes have an off center tap for hum bucking arrangements.

Type	Inductance	DC Output	Ohmic Resistance	List Price	Case
PA-100	8 henrys	150 MA	115	\$5.00	PA-2
PA-102	10 henrys	200 MA	110	8.00	PA-3
PA-104	12 henrys	250 MA	90	12.00	PA-4
PA-106	35 henrys	250 MA	240	20.00	PA-5
PA-108	10 henrys	500 MA	60	20.00	PA-5
PA-1S	10 henrys	1000 MA	50	35.00	UTS

*Test voltage is twice maximum peak voltage plus 1000 volts.

MODULATION CHOKES

Type	Inductance	D.C. Output	Ohmic Resistance	List Price	Case
150	30 Henrys	125 MA	550	12.50	PA-3
151	30 Henrys	200 MA	425	20.00	PA-5
152	30 Henrys	400 MA	300	32.50	PA-5

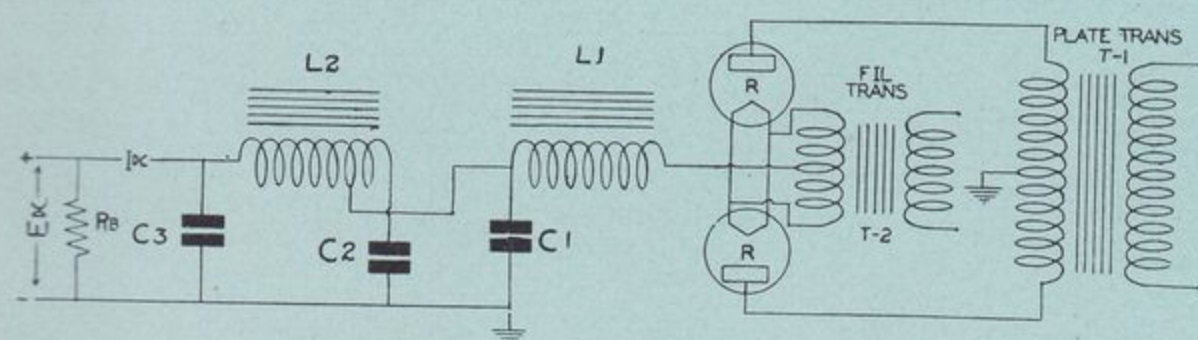
PLATE TRANSFORMERS

Primary 105, 115, 220, 230 volts A.C. 50/60 cycles

Test voltage is twice maximum peak voltage plus 1000 volts

PA-110	515 or 625 each side of center at 200 MA.	PA-3	\$10.00
PA-111	750 or 900 each side of center at 250 MA.	PA-4	18.00
PA-112	1250 or 1400 each side of center at 400 MA.	PA-5	35.00
PA-113	1600 or 2000 each side of center at 400 MA.	PA-6	57.50
PA-114	2500 or 3000 each side of center at 500 MA.	UTS case	76.00
PA-115	C bias plate transformer for class B 203A's, 830B's, 800's or 210's using one or two 82 rectifiers.	PA-3	10.00
PA-116	1250 or 1400 each side of center at 200 MA.	PA-5	25.00
PA-117	3500 or 3000 each side of center at 1 ampere.	UTS case	115.00

RF				CLASS B							DRIVER			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RF Tubes	Plate Volts	Plate Current	RF Load Impedance W=Ohms	Coupling Transformer Type No.	Audio Output Watts	Audio Output DB	Class B Output Tubes	Plate Volts	Bias Volts	Class B Load Plate to Plate W=Ohms	Input Transformer Type No.	Turns Ratio Input Trans. Total Primary to 1/2 secondary	Driver Tube	Level into Driver DB
203A, 211E, 242A	1,000	400MA	2,500W	PA-60 or PA-62	225	46	203A's	1,000	38	6,000W	PA-54	3.2:1	2A3's	+8
852's, 860's	2,000	200MA	10,000W	PA-62	225	46	203's	1,000	38	6,000W	PA-54	3.2:	2A3's	+8
203A	1,000	400MA	2,500W	PA-62	180	45	830B's	1,000	33	10,000W	PA-57	2:1	2A3's	+7
852	2,000	100MA	20,000W	PA-82	100	42	800's	1,000	55	12,500W	PA-57	2:1	2A3's	+7
800's, RK-18's														
Single	1,000	200MA	5,000W	PA-82	140	43	242A's	1,000	60	8,000W	PA-53	2.5:1	42's A Prime	-6
203A, 211, 242A	1,000	200MA	5,000W	PA-82	100	42	211E's	1,000	100	8,000W	PA-53	2.5:1	42's A Prime	-6
Single 203A, 211, 242A	1,000	200MA	5,000W	PA-80 or PA-82	100	42	800's	1,000	55	12,500W	PA-53	2.5:1	42's A Prime	-7
210's, 830's single														
203A, 211	630	140MA	4,500W	PA-83	50	39	210's	600	66	8,000W	PA-53	2.5:1	42's A Prime	-7
210's, 830's	500	110MA	4,500W	PA-83	30	37	210's	500	52	8,000W	PA-53	2.5:1	45's	0
46's	400	115MA	3,500W	PA-20	23	36	46's 59's	400	0	6,000W	PA-51	3:1	Single 59	-3
210's	450	130MA	3,500W	PA-20	23	36	46's 59's	400	0	6,000W	PA-51	3:1	Single 59	-3
Single 800, 825	800	57MA	14,000W	PA-71	23	36	46's 59's	400	0	6,000W	PA-51	3:1	Single 59	-3
46's	350	100	3,500W	PA-70	18	35	42's A Prime	350	35	8,000W	PA-58	1.6:1	Single 42	-7

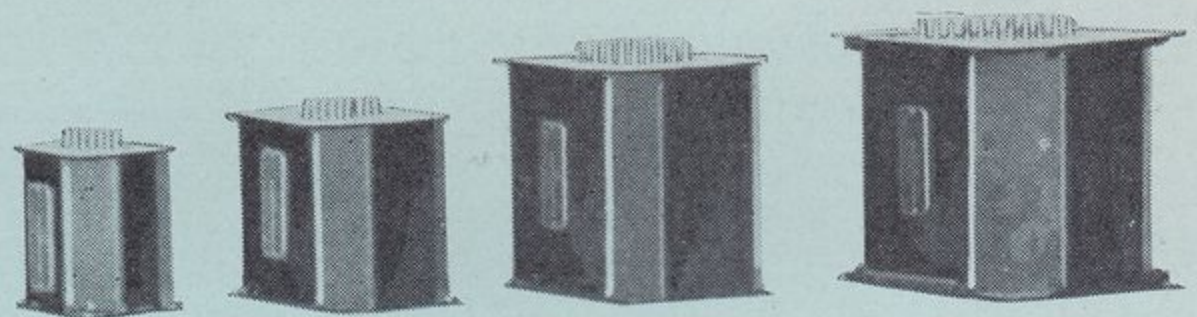


The rectifier schematic illustrated is typical of the single phase full wave circuit most popular for transmitting plate supplies.

The first choke is of the saturated type and the second has a tap for trap resonant filtering. The overall regulation of the grouped components shown is excellent for class B applications. The ripple voltage ranges from 1/10% to 2/10% depending upon load. The bleeder resistor R_b should throw away 10% of the total plate current. In other words R_b equals $E_{DC}/I_{DC} \times 10$.

PLATE TRANSFORMER						FILAMENT TRANSFORMER				L1		L2		C1	C2	C3
D.C. Voltage	D.C. MA	Rectifier Tube	Volts Each Side	Amps	Type No.	Volts	Amps	Type No.		Henrys	Type No.	Henrys	Type No.			
400	200	83	515 or	.2	PA-110	5	3	PA-26		5-25	PA-103	10	PA-102	4	1	4
500	200	83	625		PA-110	5	3	PA-26		5-25	PA-103	10	PA-102	4	1	4
600	250	66	750	.25	PA-111	2 1/2	10	PA-34		6-30	PA-105	12	PA-104	2	1	2
730	250	66	900	.25	PA-111	2 1/2	10	PA-34		6-30	PA-105	12	PA-104	2	1	2
1050	200	66	1250	.2	PA-116	2 1/2	10	PA-34		6-30	PA-105	12	PA-104	2	1	2
1190	200	66	1400	.2	PA-116	2 1/2	10	PA-34		6-30	PA-105	12	PA-104	2	1	2
1050	400	66	1250	.4	PA-112	2 1/2	10	PA-34		5-25	PA-109	10	PA-108	2	1	2
1190	400	66	1400	.4	PA-112	2 1/2	10	PA-34		5-25	PA-109	10	PA-108	2	1	2
1370	400	66	1600	.4	PA-113	2 1/2	10	PA-34		5-25	PA-109	10	PA-108	2	1	2
1720	400	66	2000	.4	PA-113	2 1/2	10	PA-34		5-25	PA-109	10	PA-108	2	1	2
2160	500	66	2500	.5	PA-114	2 1/2	10	PA-120		5-25	PA-109	10	PA-108	2	1	2
2620	500	66	3000	.5	PA-114	2 1/2	10	PA-120		5-25	PA-109	10	PA-108	2	1	2

The Public Address series of audio, filter and power units described below are designed to satisfy the demand for a popular priced quality line having the many exclusive and Universal features associated with UTC products. All cases are finished in a black eggshell enamel to suit exacting commercial requirements as to appearance. Each transformer may be fastened to chassis or rack panel with lugs either at top or bottom. The housings are physically symmetrical and similar in construction and when grouped in finished equipment present a thoroughly professional appearance.



Mounting Dimensions	
PA-1	1-15/16 x 2-7/16
PA-2	2-7/16 x 3-7/8
PA-3	3-1/16 x 4-5/16

OVERALL DIMENSIONS			
	L	W	H
PA-1	2 1/2	3	3
PA-2	3-1/16	4 1/2	3
PA-3	3 5/8	4 7/8	4 1/4

INPUT TRANSFORMERS, CLASS A

PA-131	Transformer from 1 plate to 1 grid. 3:1 ratio. PA-1	\$4.50
PA-132	From 1 plate to 2 grids. 2:1 ratio each side. Split sec. PA-1	5.00
PA-133	From 2 plates to 2 grids. 1.75 ratio each side. Primary and secondary each in two sections. PA-1	6.00
PA-233	From 2-56 plates to 45 A prime grids PA-1	6.00
PA-134	500, 200, or 50 ohm line to single grid. PA-1	6.50
PA-135	500, 200, or 50 ohm line to push pull grids. PA-1	7.50
PA-136	Single plate or pickup and carbon mike or low impedance pickup to one or two grids. PA-1	7.50
PA-142	Ribbon velocity mike to one or two grids. PA-1	6.50
PA-143	Ribbon velocity mike to 500, 200 or 50 ohm line. PA-1	6.50

MIXING, MATCHING TRANSFORMERS

PA-137	Mixing 500, 200, or 50 ohm line to 500, 200 or 50 ohm line. PA-1	\$5.50
PA-138	Audio line matching. Will handle 20 watts audio power. Input 500 or 200 ohm line, Output 16, 8, 5, 3 and 1.5 ohms. PA-2	7.50
PA-139	Audio line matching. Will handle 30 watts audio power. Input 500 or 200 ohm line. Output 16, 8, 5, 3, 1.5 ohms. PA-3	12.50

CLASS A OUTPUT TRANSFORMERS

PA-140	From a triode plate like 864, 27, 112A, 55, 30 to 500, 200 or 50 ohms.	\$6.50
PA-141	From push pull triode plates like 864's, 27's, 112A's 30's to 500, 200 or 50 ohms.	7.50

REACTORS

PA-40	Filter choke. 12 henrys. Max. D.C. 200 MA. Resistance 110 ohms. PA-2	\$4.50
PA-41	Class B input filter choke for 46, 53, and 59 tubes. Max. D.C. 200 MA. Resistance 100 ohms. PA-2	4.50
PA-43	Filter choke. 15 henrys. Max. D.C. 165 MA. Resistance 375 ohms. PA-2	4.50
PA-44	Filter choke. 30 henrys. Max. D.C. 100 MA. Resistance 375 ohms. PA-2	4.00
PA-45	Parallel feed audio choke, 250 henrys. Max. D.C. 15MA. Resistance 4500 ohms. PA-1	4.50
PA-46	Center tapped audio choke for P.P. 245, 59, 2A3 and 250 tubes. Over all inductance 50 henrys. Max. D.C. 125 MA. Resistance 725 ohms. PA-2	5.50
PA-47	Center tapped audio choke for P.P. connection. Overall inductance 300 henrys. Max. D.C. 10 MA. Resistance 4750 ohms. PA-1	5.50

POWER and FILAMENT TRANSFORMERS

PA-21	Plate transformer for single 45, 47, 59 or class B 79 tubes. Primary 115 V. A.C. 60 cycles. Secondaries: 300-0-300 at 75 MA; 2 1/2 V.C.T. 3 A., 6.3 V.C.T. 2.5 A., 2 1/2 V.C.T. 6 A. PA-3	\$8.00
PA-22	Plate transformer for push pull 45, 59, 47, 2A3 tubes, or class B 53's. Pri. 115 V. A.C. 60 cycles. Secondaries: 400-0-400 at 125 MA; 2 1/2 V.C.T. 5 A., 2 1/2 V.C.T. 10 A., 5 V.C.T. 3 A. PA-3	10.00
PA-23	Plate transformer for class B 46 or 59 tubes. Primary 115 V. A.C. 60 cycles. Secondaries: 570-0-570 at 150 MA; 2 1/2 V.C.T. 5 A., 2 1/2 V.C.T. 10 A., 5 V. 3 A. PA-3	12.00
PA-24	Plate transformer for push pull 250 tubes and tuner. Primary 115 V. A.C. 60 cycles. Secondaries: 600-0-600 150 MA; 2 1/2 V.C.T. 10 A., 7 1/2 V.C.T. 2.5 A., 7 1/2 tapped at 5 V. 3 A., 5 V.C.T. 3 A. Pa-3	13.50
PA-426	Plate transformer for class B 6A6 and A prime 42 tubes. Pri. 115 V.A.C. 60 cycles. Secondaries 400-0-400 at 125MA; 2 1/2 V.C.T. 6 A. 6.3 V.C.T. 4 A. 5 V.C.T. 3 A. PA-3	10.00
PA-445	Plate transformer for parallel push pull 45 A prime tubes. Pri. 115 V.A.C. 60 cycles. Secondaries 400-0-400 at 200 MA; 2 1/2 V.C.T. 6 A.; 2 1/2 V.C.T. 10 A., 5 V.C.T. 3 A. PA-3	12.50
PA-25	Secondary. 2 1/2 V.C.T. 10 amps. PA-1	4.50
PA-26	Secondary. 5 V.C.T. 3 amps. PA-1	4.50
PA-27	Secondary. 6.3 V.C.T. 2.5 amps. PA-1	4.50
PA-28	Secondary. 7 1/2 V.C.T. 3 amps. PA-1	4.50

PA SERIES OF CLASS A AND CLASS B OUTPUT TRANSFORMERS

Type	Primary Impedance	Will Match	Secondary Impedance	Case & Price
PA-15	8000 ohms plate to plate.	Class A, in push pull: 250's, 245's, 43's. Single: 211, 843, 842, 205D, 48.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-2 7.00
PA-16	5000 ohms plate to plate or 3000 ohms plate to plate.	For 5000 ohms In push pull: self bias 2A3's, W.E. 275A's. Single: 59 triode or 71A. For 3000 ohms In push pull: Fixed bias 2A3's, single W.E. 52A.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-2 7.00
PA-17	2500 ohms plate to plate or 1500 ohms plate to plate.	For 2500 ohms Four 2A3's in push pull parallel self bias. For 1500 ohms Four 2A3's in push pull parallel fixed bias.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-3 10.00
PA-18	4000 ohms plate to plate.	Four 250's in push pull parallel.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-3 10.00
PA-19	10,000 ohms plate to plate or 6000 ohms plate to plate.	For 10000 ohms Class A push pull 59 triodes, 71A's, 2B6's, single 210, 41, 268A, 2A3. Class B push pull 49's, 53's, 79's, 89's. For 6000 ohms Class A push pull 52A's, single 31, 46, 59 pentode. Class B push pull 46's, 59's.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-2 7.00
PA-48	4000 ohms plate to plate.	Class A push pull 48 triodes or pentodes.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-2 7.00
PA-710	20,000 ohms plate to plate or 14,000 ohms plate to plate.	For 20,000 ohms Push pull 210's. For 14,000 ohms Push pull 47's, 2A5's, 42's used as pentodes.	500, 200, 16, 8, 5, 3, 1.5 ohms.	PA-2 7.00
PA-245	6000 ohms plate to plate and 3500 ohms plate to plate.	For 6000 ohms Class A prime 45's self bias. Class B 46's and 59's. Class A WE 252 A's. For 3500 ohms Class A prime 45's fixed bias.	500, 200, 15, 8, 5, 3, 1.5 ohms.	PA-2 7.00
PA-445	3000 ohms plate to plate and 1750 ohms plate to plate.	For 3000 ohms Four 45's in push pull parallel A prime self bias. Four WE 252A's in push pull parallel class A. Four 46's or 59's in push pull parallel class B. For 1750 ohms Four 45's in push pull parallel A prime fixed bias.	500, 200, 15, 8, 5, 3, 1.5 ohms.	PA-3 12.50
PA-448	2000 ohms plate to plate.	Class A push pull parallel 48's.	500, 200, 15, 8, 5, 3, 1.5 ohms.	PA-3 10.00
PA-720	6000 ohms plate to plate and 3500 ohms plate to plate.	For 6000 ohms Class B 203's. For 3500 ohms A prime 845's.	500, 200, 15, 8, 5, 3, 1.5 ohms.	PA-5 32.50

See pages 19 and 20 for schematic layouts using Public Address audio, filter and power components.

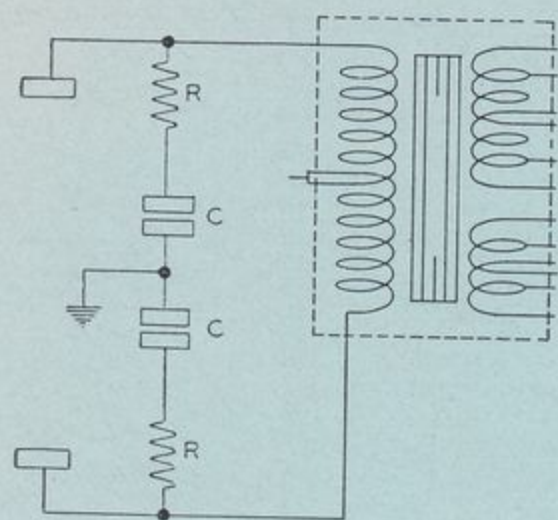


Figure 3

Upon examination of the schematic layouts which follow, it will be found that a number of important and exclusive UTC circuit improvements have been incorporated.

In a large number of circuits a fixed C bias supply has been provided for the output tubes. As is well known, the normal output of an amplifier reproducing speech or music is not a continuous uniform value but a succession of valleys and peaks. These peak conditions will in many cases drive the grids of the output tubes positive. Naturally when this occurs, there is a tendency both for grid current and plate current variation. These effects tend to introduce strong harmonics into the output. In a self biased amplifier, the plate current flows through the bias resistor and any variation of plate current causes a variation in the bias voltage of the tube, which is further amplified by the tube itself. Fixed bias eliminates this effect entirely, and consequently allows higher power outputs to be obtained from a given pair of tubes. The distortion due to the flow of grid current in the input circuits is kept to a low value in UTC transformers inasmuch as a low DC resistance is incorporated in the windings of the input transformers.

The use of fixed C bias also makes possible the operation of the power tubes in an overbiased condition. If the bias is increased about 20 percent above the normal rated tube value, it will be found that the plate current variation will be large even before positive values of grid voltage are reached. With fixed bias, no grid distortion is effected because of this plate current variation. Also a large increase in power output is made available. This feature is particularly valuable with 2A3 tubes, but is applicable as well to the tubes used in the other circuits shown with fixed C bias.

Another circuit feature that will be noted is the wide use of push pull stages. The additional quality improvements resulting from push pull readily explain this. Push pull allows the cancellation of even order harmonics, and also of plate supply and filament supply hum.

However, it is often difficult to perfectly match tubes for full cancellation. To offset this, a number of the fixed C bias circuits show a 2 arm potentiometer as the bias voltage resistor. These arms allow individual adjustment of the tube bias so that through the use of a plate current milliammeter the tubes may be perfectly balanced.

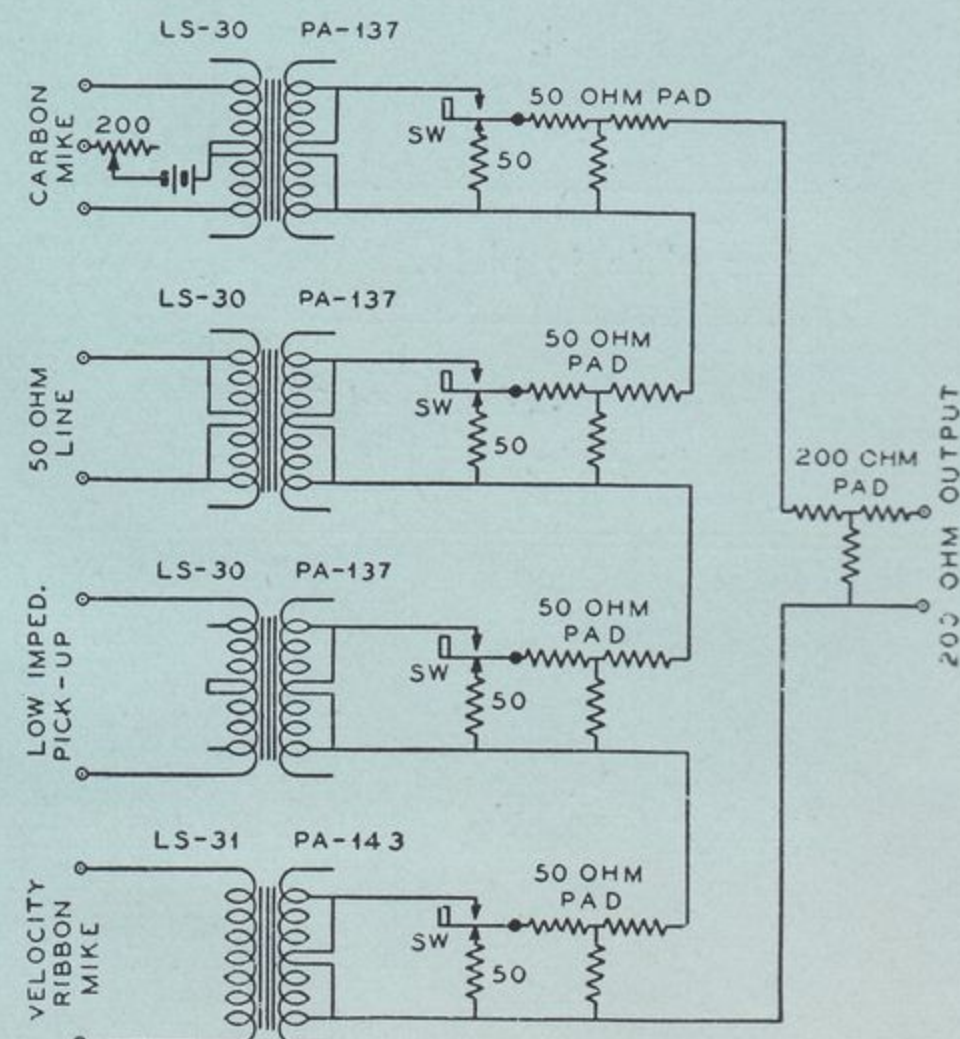
It is essential for high quality that all circuits in an audio amplifier be properly matched. This is difficult to do in the output stage of class B tubes working to a speaker load. The plate load of class B tubes is quite critical in value and is readily matched if working into an RF stage which is practically non-inductive and constant in value. However, a speaker load is inductive and consequently varies in impedance with the frequency of the signal, as for example, a speaker system which is 500 ohms at 1000 cycles might show an impedance of 5000 ohms at 10,000 cycles. To compensate for this, an equalizing network should be used, as illustrated in Fig. 3. For 46 or 59 tubes, $R = 3000$ ohms and $C = .08$ mfd. For 19, 53, or 79 tubes $R = 5000$ ohms and $C = .05$ mfd. For 49, 89, or 203A tubes, $R = 6000$ ohms and $C = .04$ mfd.

ATTENUATION NETWORK DATA

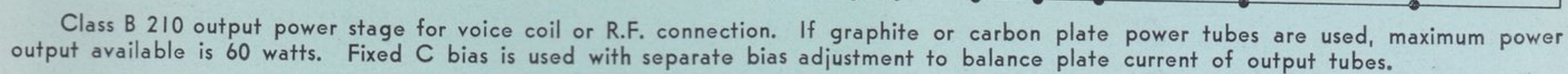
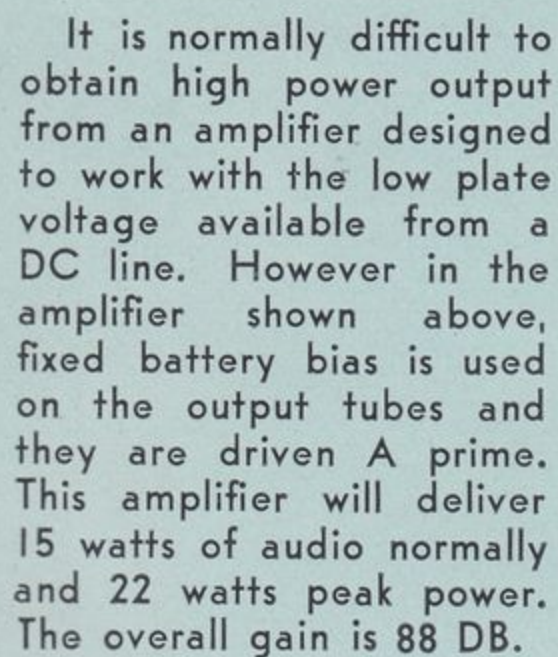
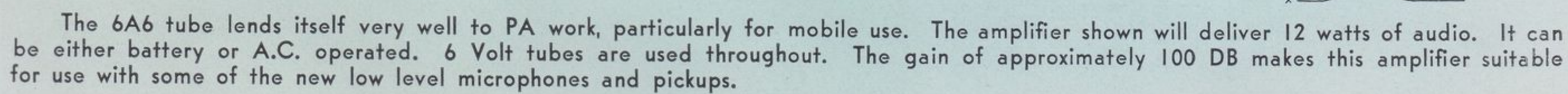
NOTE Z_L (LINE IMPEDANCE) = 500 OHMS; $f = 11513$				
ATTENUATION	$A = \frac{Z_L}{2} \times \tanh\left(\frac{Nf}{2}\right)$	$B = \frac{Z_L}{\sinh(Nf)}$	$C = \frac{Z_L}{2} \times \sinh(Nf)$	$D = \frac{Z_L}{\tanh\left(\frac{Nf}{2}\right)}$
NO. DB	A	B	C	D
.1	1.440	43420	2.879	86850
.2	2.878	21720	5.755	43440
.3	4.318	14480	8.635	28950
.4	5.758	10850	11.52	21710
.5	7.193	8685	14.40	17380
.6	8.635	7232	17.29	14480
.7	10.07	6198	20.17	12420
.8	11.51	5421	23.06	10870
.9	12.95	4818	25.95	9656
1.0	14.38	4333	28.85	8690
2.0	28.65	2152	58.08	4364
3.0	42.75	1420	88.08	2925
4.0	56.58	1049	119.3	2209
5.0	70.03	822.4	152.0	1785
6.0	83.08	669.4	186.8	1505
7.0	95.65	558.0	224.0	1308
8.0	107.7	473.1	264.3	1162
9.0	119.1	405.9	308.0	1050
10.0	129.9	351.3	355.8	962.5
15	174.5	183.6	680.8	756.3
20	204.5	101.0	1238	611.2
25	223.5	56.40	2216	559.5
30	234.7	31.65	3949	532.7
35	241.3	17.79	7027	518.0
40	245.1	10.00	12500	510.1
45	247.2	5.624	22230	505.7
50	248.5	3.163	39530	503.2
55	249.2	1.775	70300	501.8
60	249.5	1.0	125000	501.0
65	249.8	.5623	222300	500.5
70	249.8	.3163	395400	500.4
75	249.9	.1779	703000	500.2
80	249.9	.10	1250000	500.1
85	250.0	.05620	2223000	500.1
90	250.0	.03161	3954000	500.0
95	250.0	.01879	7027000	500.0
100	250.0	.010	12500000	500.0

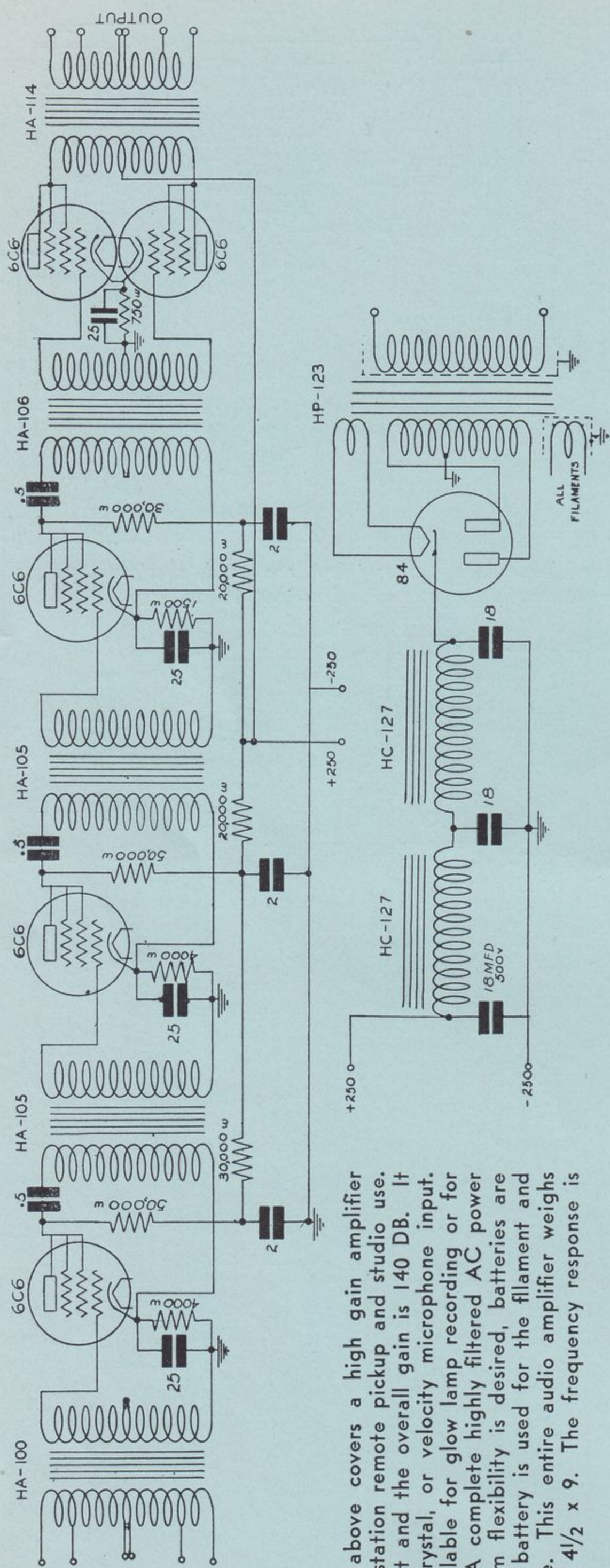
It is often necessary to couple two sources of input, such as a tuner and microphone, to an amplifier. To properly do this and still obtain full efficiency from the amplifier gain control, some attenuation should be available at one of the sources. This is readily done with an attenuator based on the illustrated chart. The data shown has been computed to great accuracy, and is suitable for use in making attenuators for laboratory or professional applications. Obviously, a group of fixed attenuator units can be made into a variable pad. For example, a 10 DB T type network would use 2 series resistors of 260 ohms each and one shunt resistor of approximately 350 ohms.

For a line impedance other than 500 ohms multiply all resistor value by $Z/500$ where Z_x is the impedance desired.

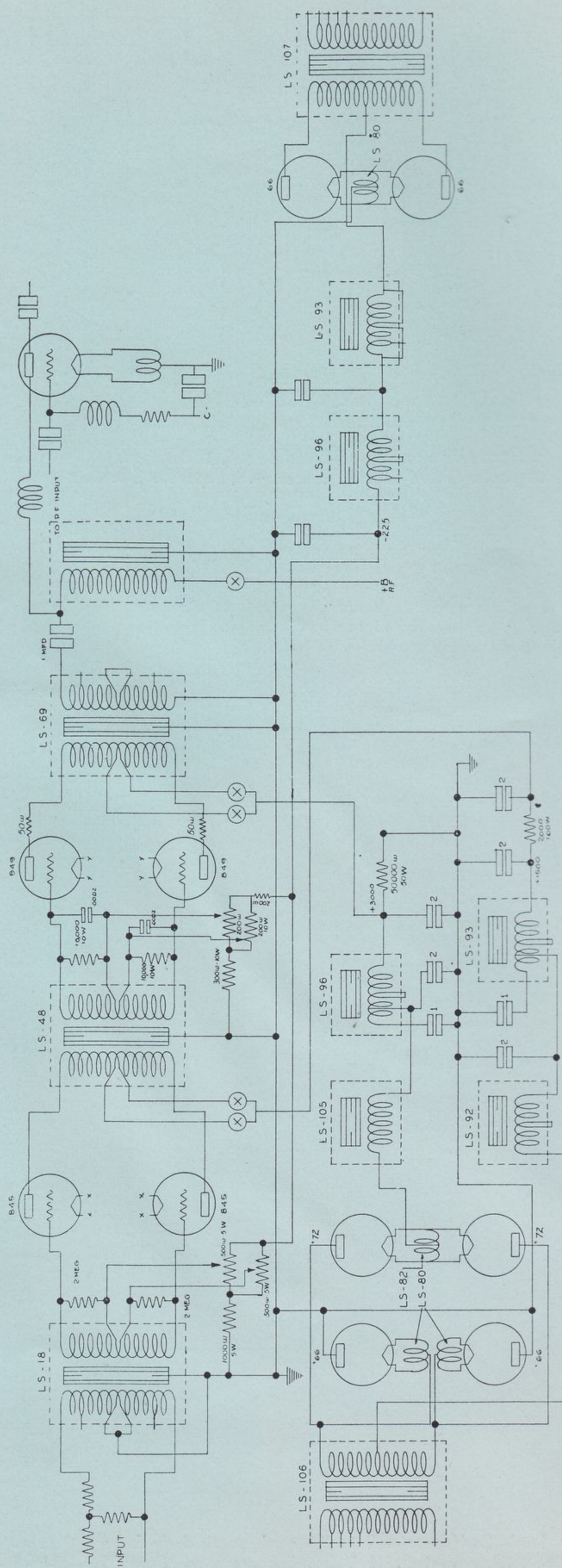


Four position series mixer

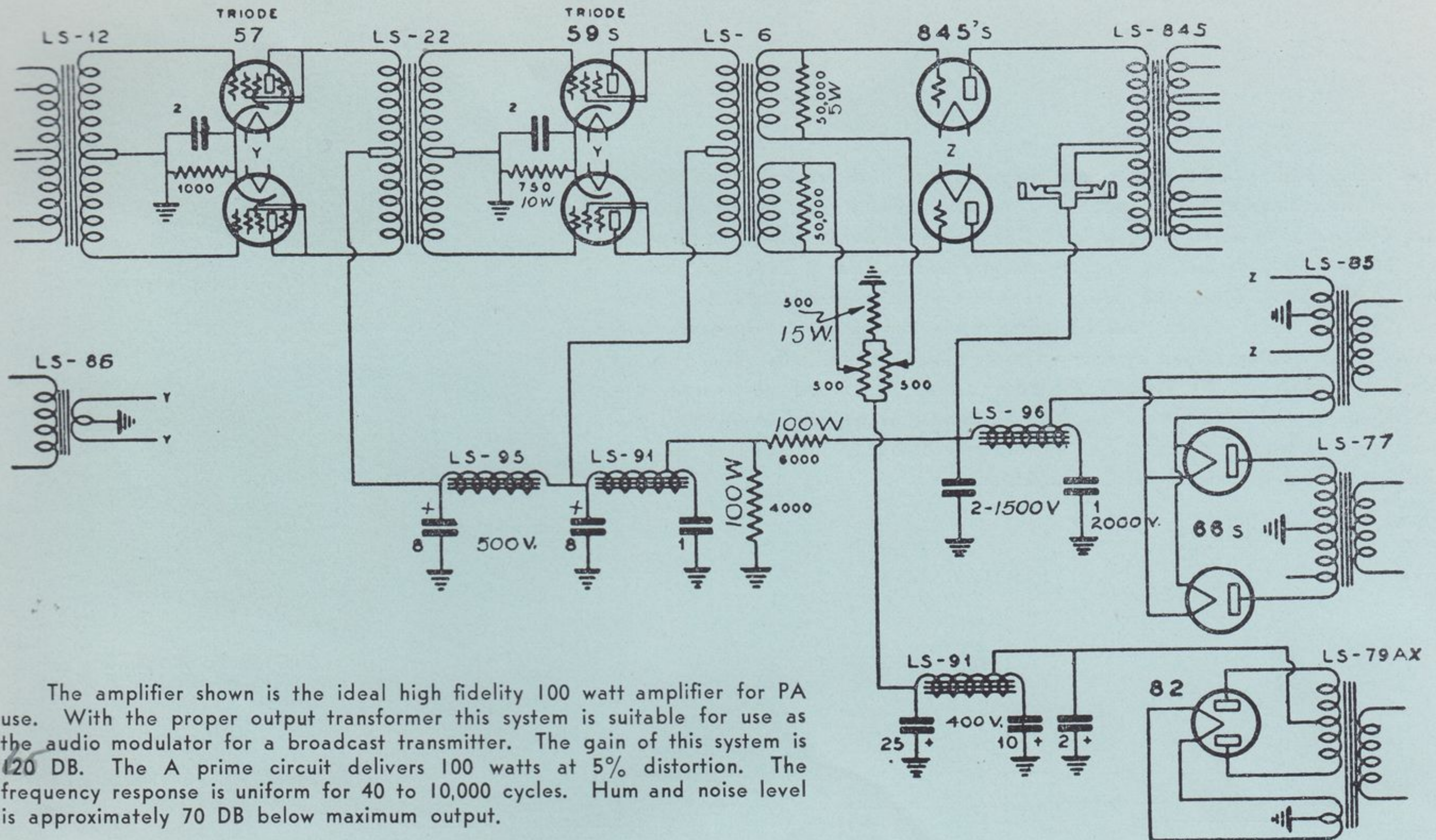




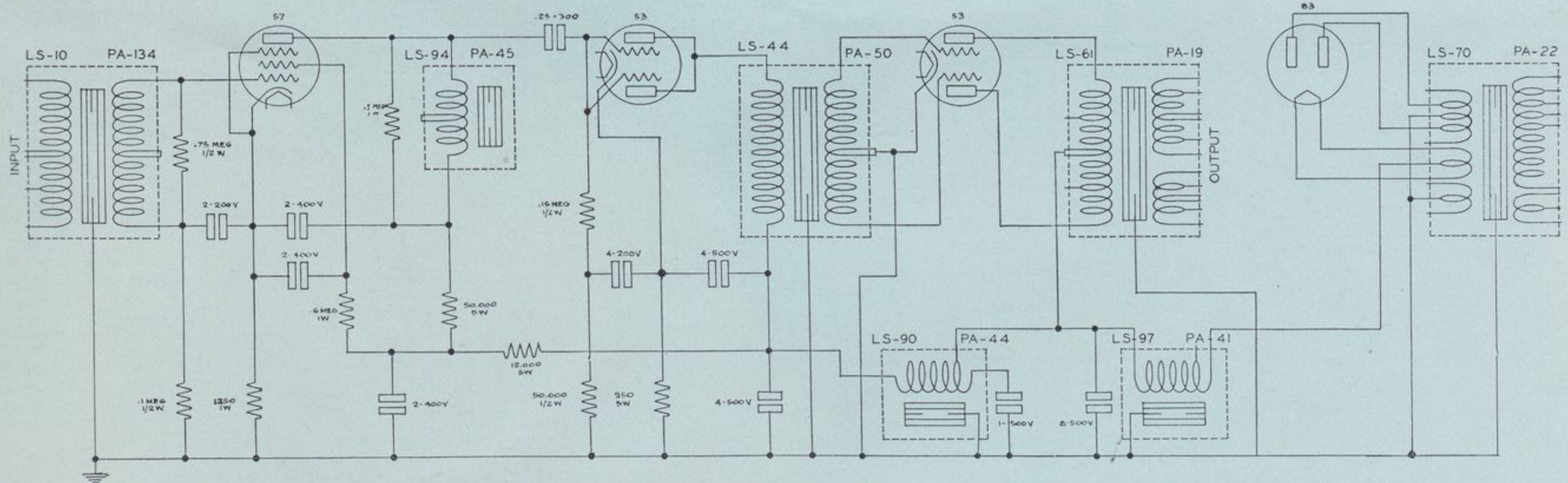
The schematic circuit shown above covers a high gain amplifier suitable for recording or broadcast station remote pickup and studio use. The maximum power output is 1 watt and the overall gain is 140 DB. It is suitable for use with dynamic, crystal, or velocity microphone input. Special output transformers are available for glow lamp recording or for coupling to a monitoring speaker. A complete highly filtered AC power supply is shown, but where maximum flexibility is desired, batteries are customarily used. A 6 volt storage battery is used for the filament and 250 volts of B battery for the plate. This entire audio amplifier weighs only 9 lbs. and fits in a space $5 \times 4\frac{1}{2} \times 9$. The frequency response is uniform from 60 to 10,000 cycles.



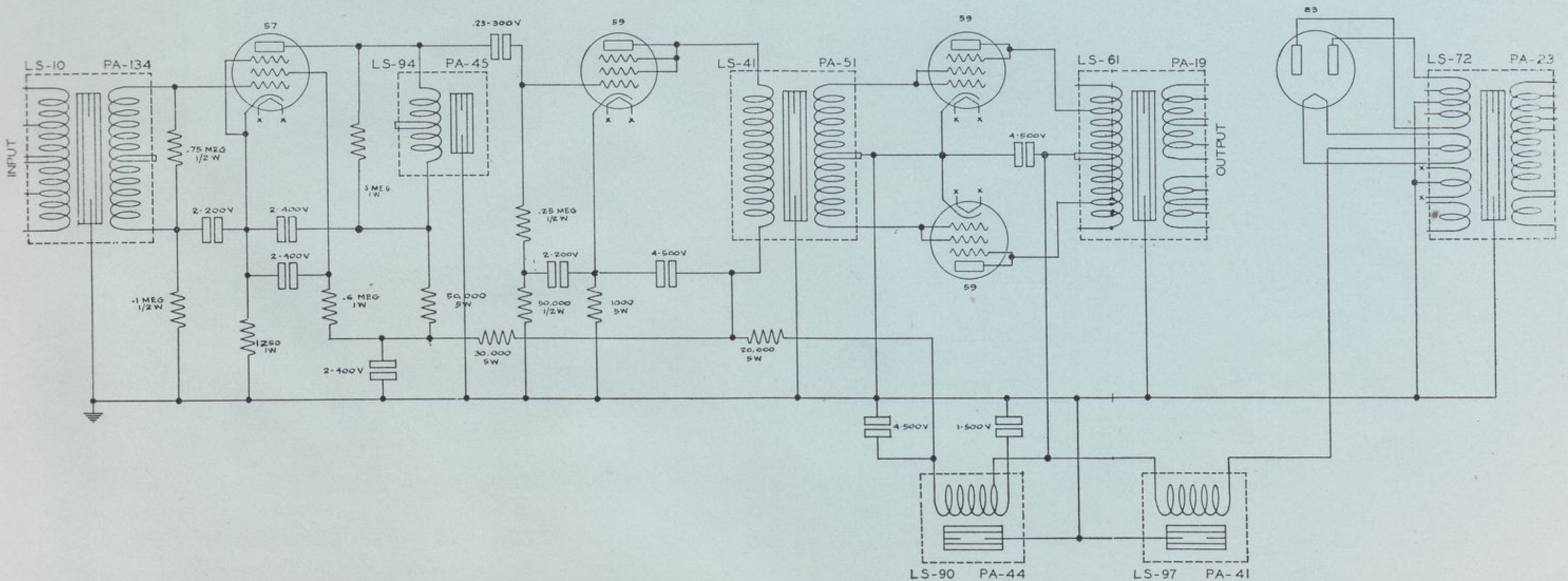
The above schematic covers the complete circuit of a 1000 watt class B modulator power stage including plate and bias voltage supplies. A duplex bridge rectifier for the 849 plate supply and a full wave rectifier for the 845 plate supply effects maximum economy in cost and operation. It also permits practically complete isolation of the driver and output plate supplies; which is of considerable advantage, as the plate current swing of the 849 tubes is quite high. Potentiometers are incorporated in the bias supply circuit to balance the plate currents of both driver and output tubes. The filter condensers used in the bias supply are 25 mfd. Though not shown, it is also advisable to have a 25 mfd. condenser from each 849 grid return to ground. While the balancing of plate current—the 849 plate and grid resistors—and the 849 grid condensers complicate the circuit somewhat, the final results are well worth the trouble. The power output of 1000 watts is based on 5% harmonic distortion and the frequency discrimination is negligible from 40 to 12,000 cycles. The overall gain of this power stage is 27 DB.



The amplifier shown is the ideal high fidelity 100 watt amplifier for PA use. With the proper output transformer this system is suitable for use as the audio modulator for a broadcast transmitter. The gain of this system is 120 DB. The A prime circuit delivers 100 watts at 5% distortion. The frequency response is uniform for 40 to 10,000 cycles. Hum and noise level is approximately 70 DB below maximum output.

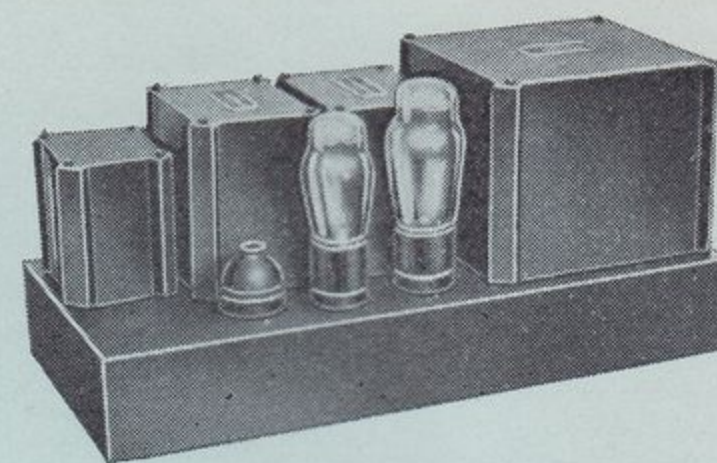


3 stage 53 Class B power amplifier. Output stage may be connected to voice coils or R.F. stage.

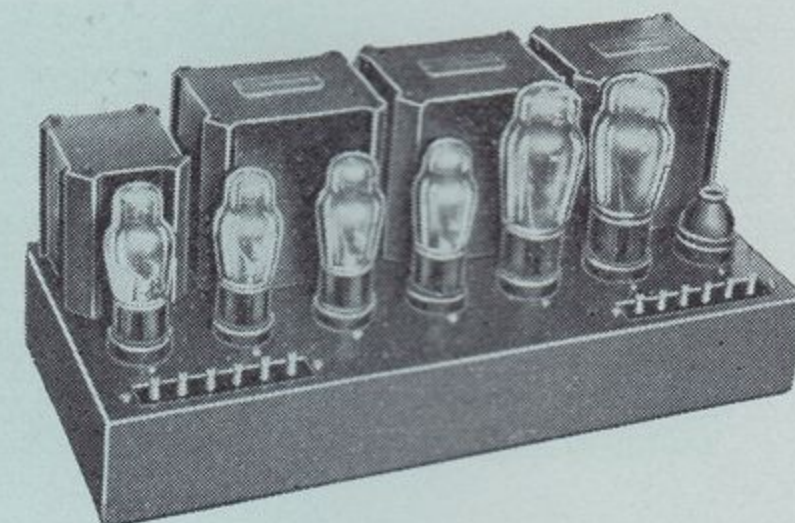


3 stage 59 Class B power amplifier. Output stage may be connected to voice coils or R.F. stage.

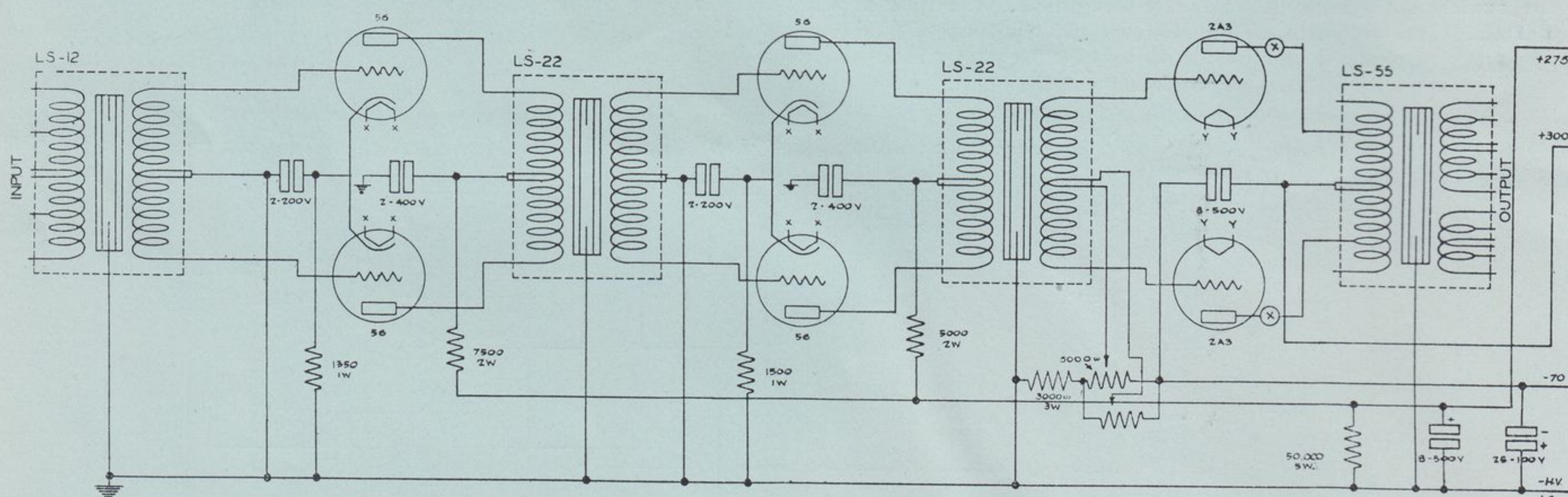
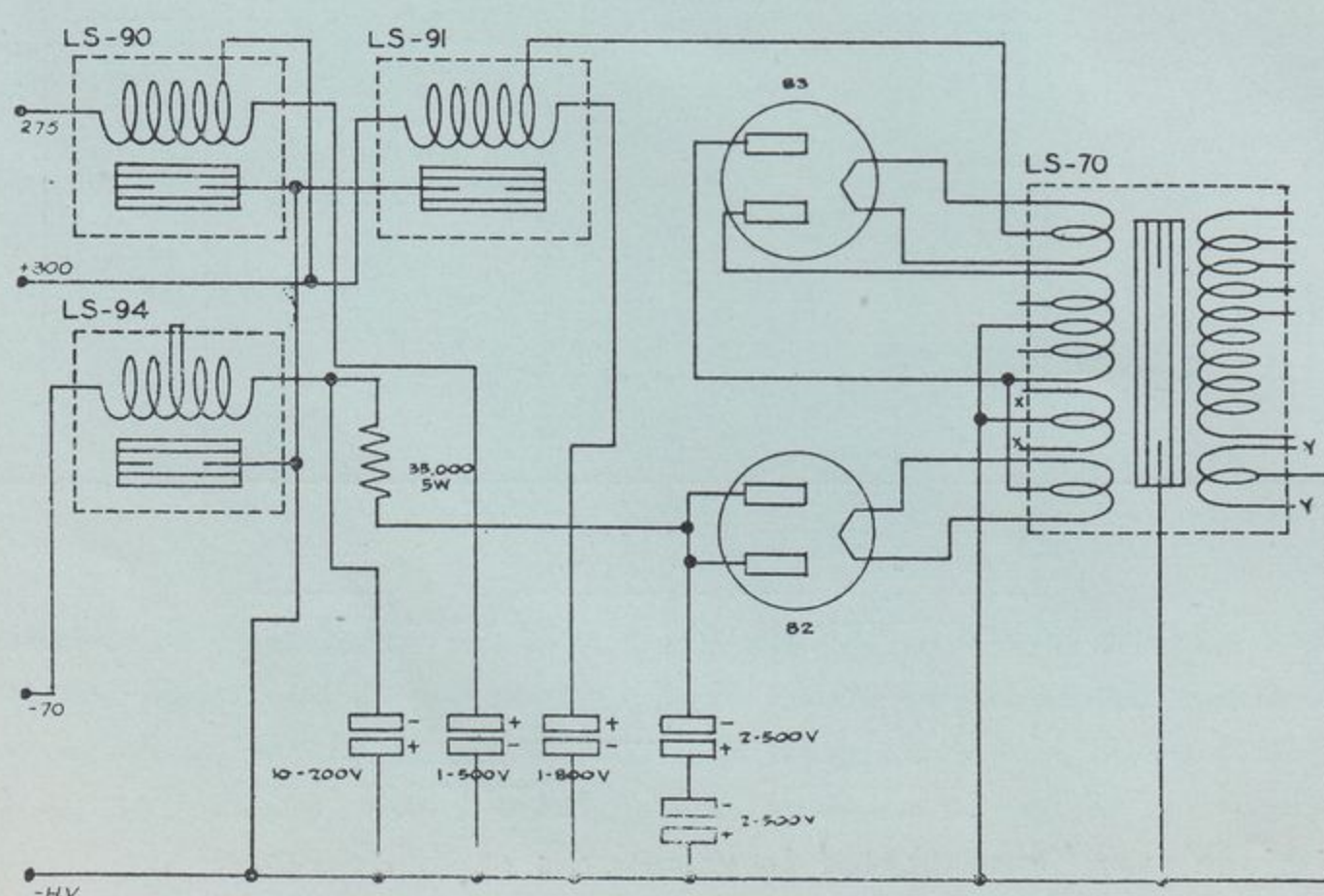
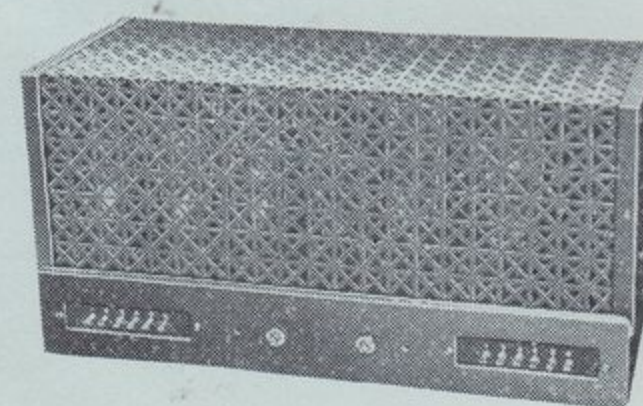
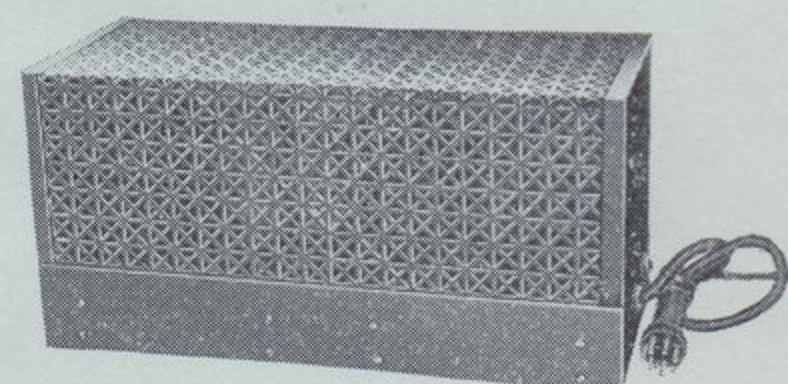
The triple push pull fixed bias 2A3 amplifier circuit shown below will satisfy the most discriminating Broadcast stations and audio laboratories. The undistorted class A output is 15 watts, the gain is 80 DB. The amplifier is uniform in response from 30 to 12,000 cycles. A trap resonant rectifier filter is used for highest filtering efficiency, audio and power sections are mounted on separate drilled, heavy gauge metal decks. All LS audio filter and power components fully shielded and doubly sealed against adverse climatic conditions. List price of complete transformer kit \$152.50 [includes drilled decks and perforated protective covers—all transformers mounted at factory at no extra cost] 40% discount or net price of \$91.50 to Universities, Broadcast Stations or dealers. Purchase through your local U.T.C. distributor.



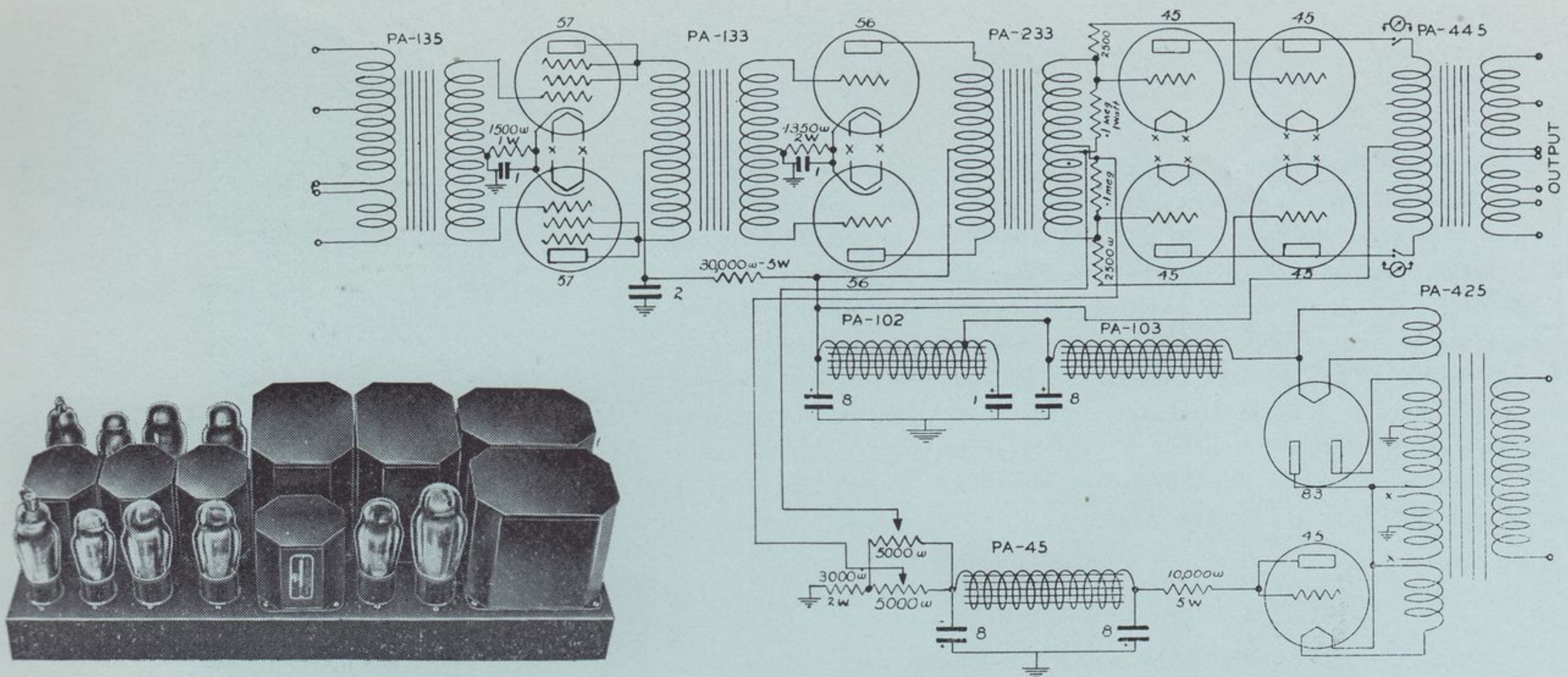
2A3 Power Supply



2A3 Audio Amplifier

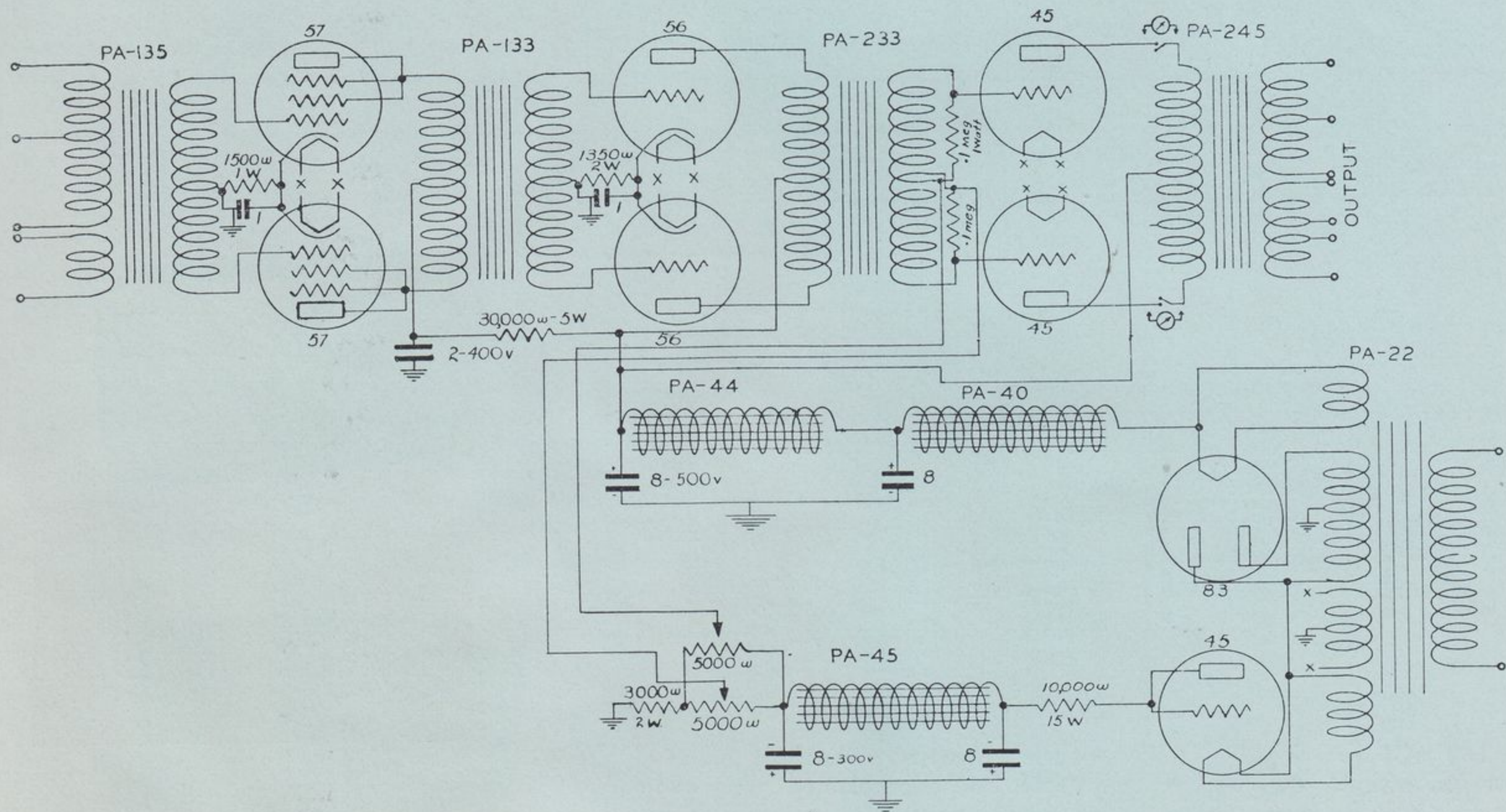


2A3 amplifier and power supply
with perforated protective covers
fully mounted.

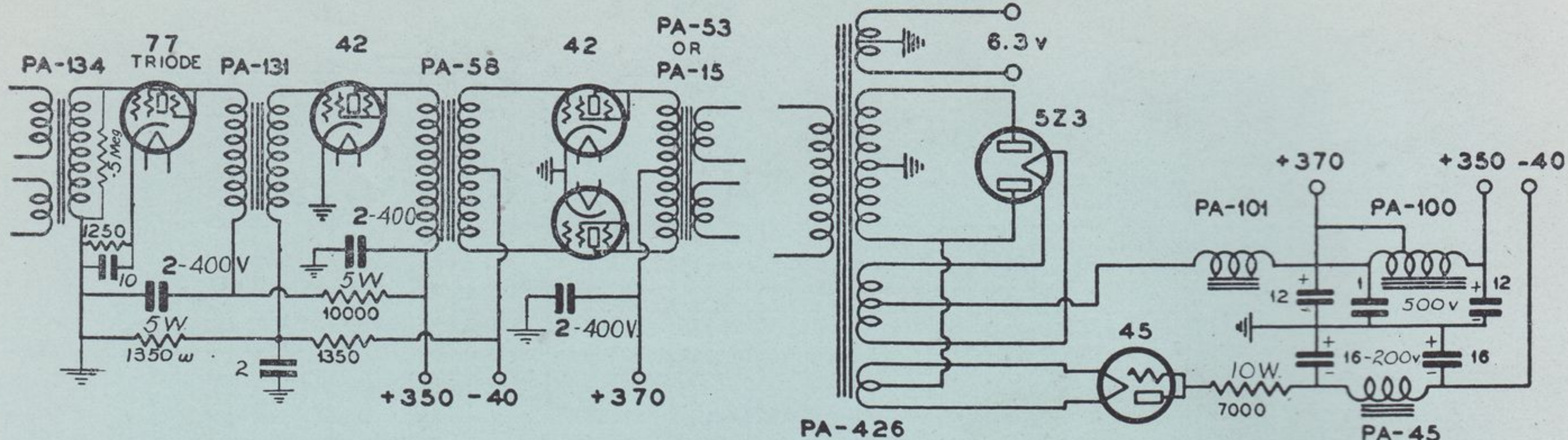
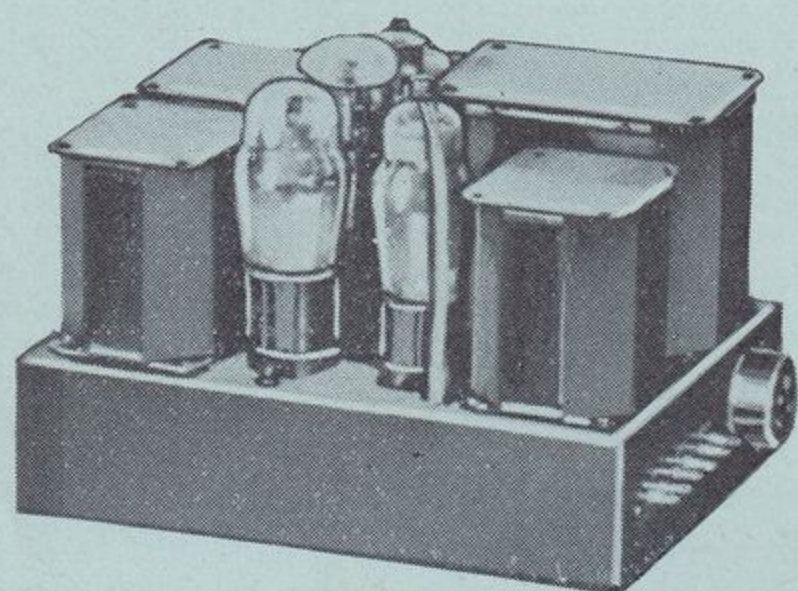
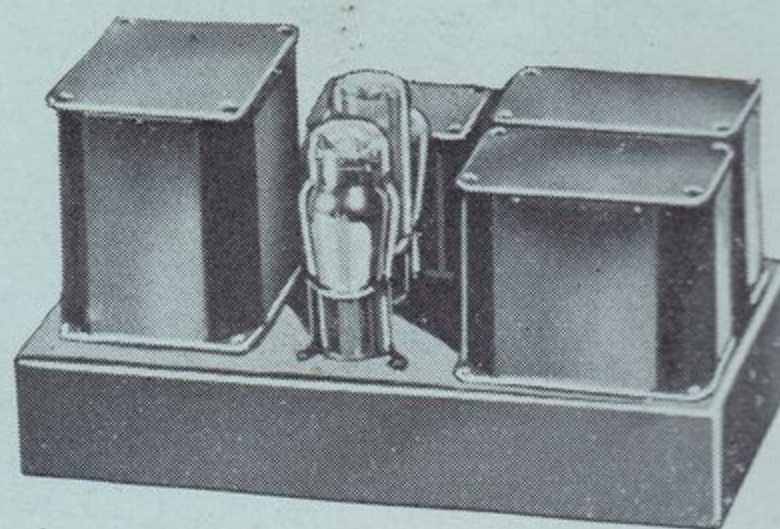


The above amplifier is the ideal unit for Public Address work. Through the use of four inexpensive type 45 tubes operated A prime in the output, maximum economy is obtained in both initial cost, tube replacement, and operation. By employing fixed bias and perfectly matched transformers a power output of 38 watts is made available. The adjustable bias potentiometers allow perfect matching of the output tube plate currents. This has a considerable bearing on the magnitude of harmonic distortion. The overall gain of this amplifier is 90 DB.

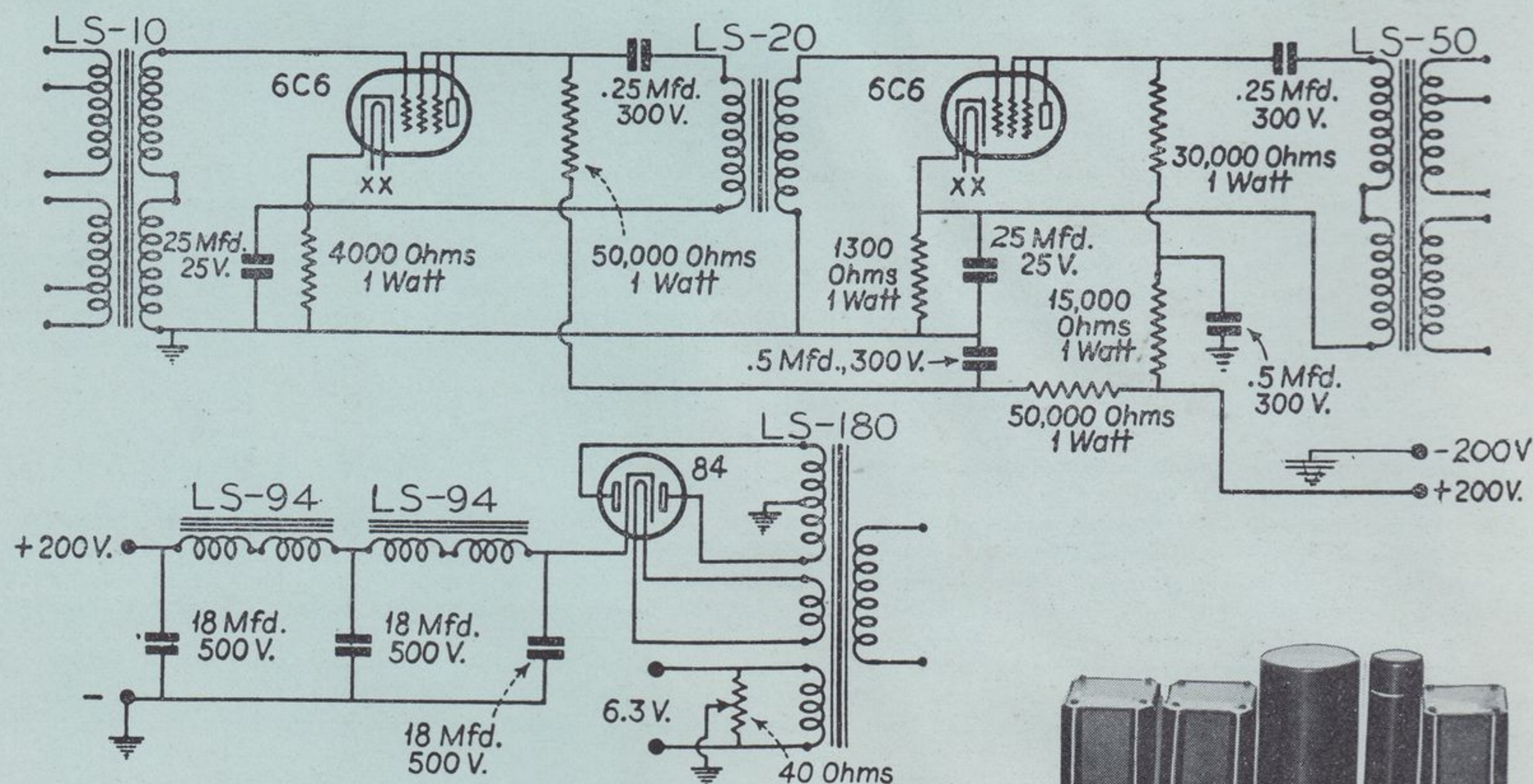
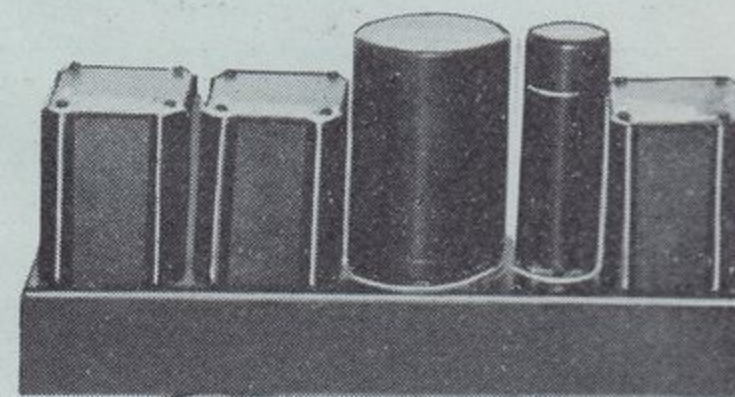
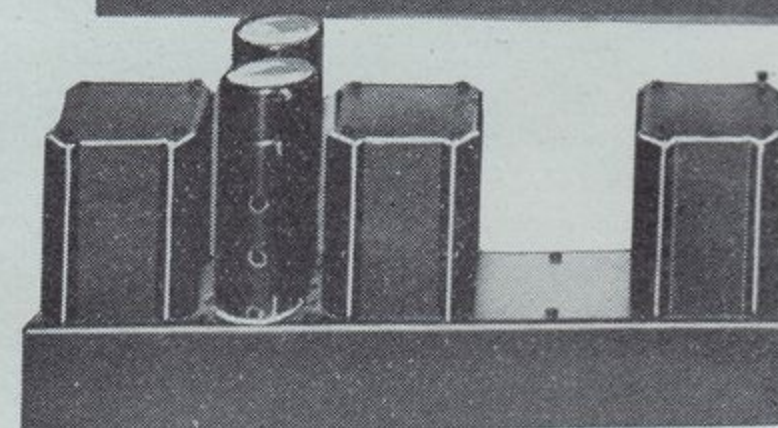
List price of complete transformer kit \$77.25 (includes stamped chassis and perforated cover—all transformers mounted on chassis at factory at no extra cost). Regular 40% discount or net price of \$46.35 to Universities, Broadcast stations or dealers. Purchase through your local U.T.C. distributor.



The 45 A prime circuit shown above will appeal to the public address specialist. All the latest amplifier refinements are incorporated: push pull operation throughout, adjustable bias control for the output power stage, stable fixed C bias for output stage. A maximum output of 19 watts is available and the overall gain is 80 DB. List price of complete transformer kit \$62.25 (includes stamped chassis and protective perforated cover—all transformers mounted on chassis at factory at no extra cost). Regular 40% discount or net price of \$37.35 to Universities, Broadcast stations or dealers. Purchase through your local U.T.C. distributor.

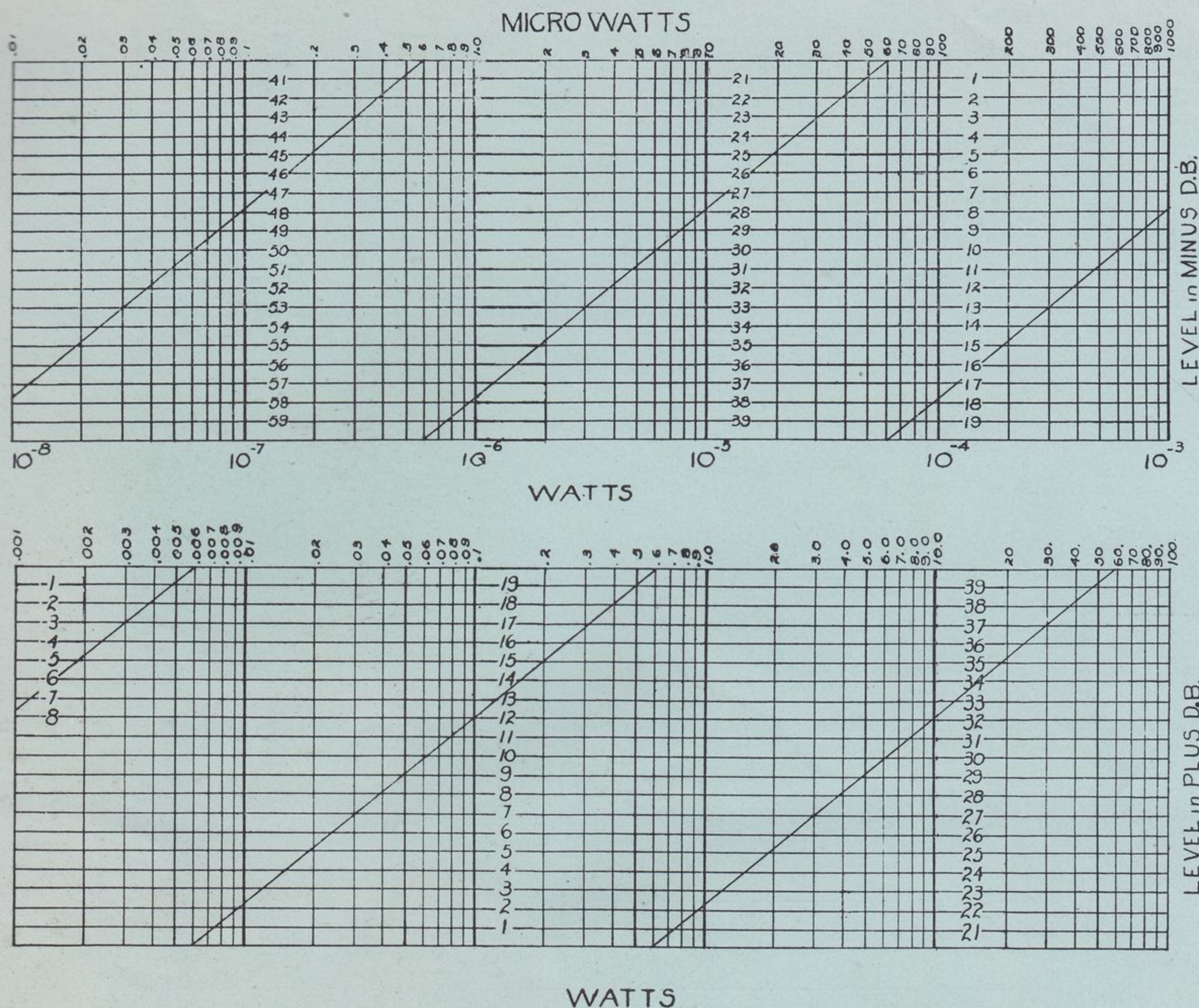


The above amplifier circuit employs the 42's in A prime to deliver an output of 18 watts for PA or RF applications. Six volt beater tubes are used in the audio section. Fixed C bias is used for the driver and output stages. The audio and power sections mounted on separate heavy gauge drilled decks. List price of complete transformer kit \$62.50 [includes drilled decks and perforated protective covers—all transformers mounted at factory at no extra cost] 40% discount or net price of \$37.50 to Universities, Broadcast stations, dealers. Purchase through your local UTC distributor.



The 6C6 pre-amplifier circuit shown above is particularly adapted for use with Crystal, Ribbon and Voice Coil microphones. The audio section may be used separately for battery operation or with its highly filtered power supply from an AC source. The response is linear from 30 to 12,000 cycles. The gain is 58 DB and power output plus 7B. List price of complete transformer kit, audio and power \$81.00 [includes drilled audio and power decks—all transformers mounted at factory at no extra cost] 40% discount, or net price of \$48.60 to Universities, Broadcast stations, dealers. Purchase through your local UTC distributor.

DECIBEL DATA



To set up a standard of electrical energy comparison, the use of the decibel has been based on a reference level of 0DB at a power level of .006 watts. In other words, energy levels greater than .006 watts are + DB compared to reference level and energy levels less than .006 watts are - DB compared to reference level.

The chart above indicates power level in watts against DB as compared to .006 watts reference level. The DB equivalent of any specific value of audio power can be immediately determined. This chart can also be used for determining DB gain or loss if the two powers are known. The DB equivalent of these powers can immediately be located on the chart. Subtracting these DB equivalents (algebraically) we obtain the gain or loss in DB. For example, let us consider an amplifier which requires 1 volt at 500 ohms input to drive the

output to 12 watts. The power input equals $\frac{E^2}{R}$ or $\frac{1}{500} = .002$ watts.

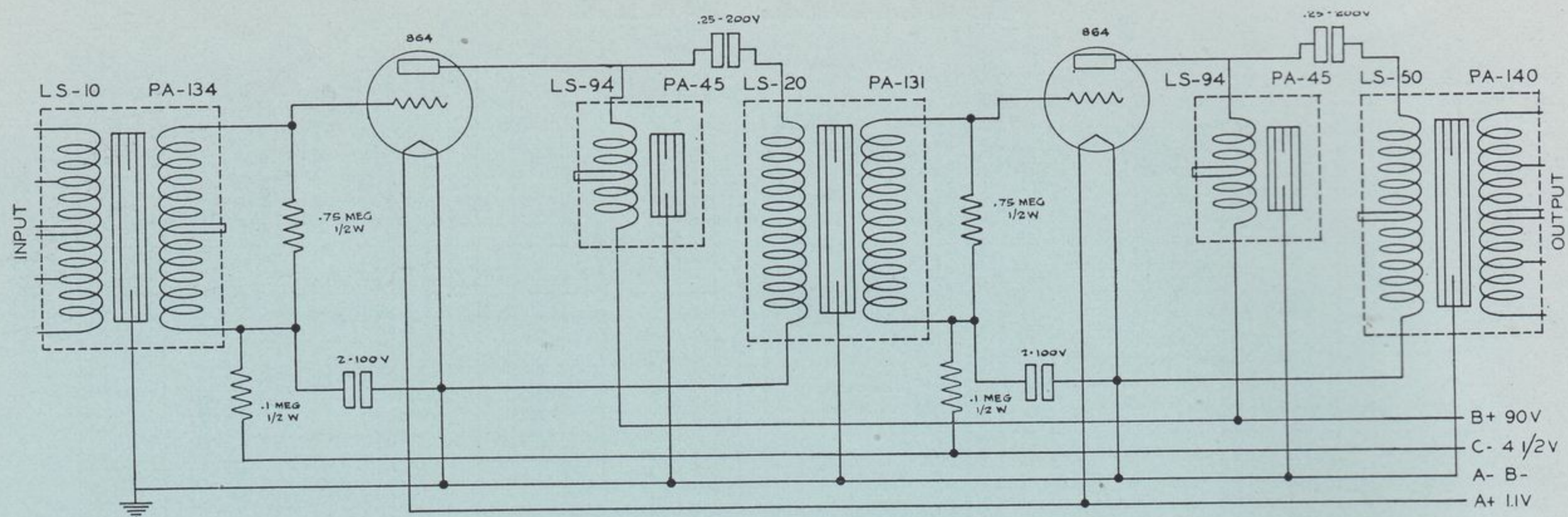
The DB equivalents for input and output powers are then seen to be approximately - 5 DB and + 33 DB respectively. The overall gain is then 33 - (5) or a total of 38 DB.

The table below is intended for the conversion of power or voltage ratios to DB. If voltage ratios are used, it is necessary that the same impedance apply to both voltage measurements. The lesser value of power or voltage should be taken as the numerator of the ratio so that the ratio itself will be less than unity. Whether the DB value obtained is a gain or loss is naturally governed by whether the output power or voltage is greater than the input or less. Current ratios are naturally the same as voltage ratios. If the loss or gain is greater than 20 DB, the following additional step must be taken:

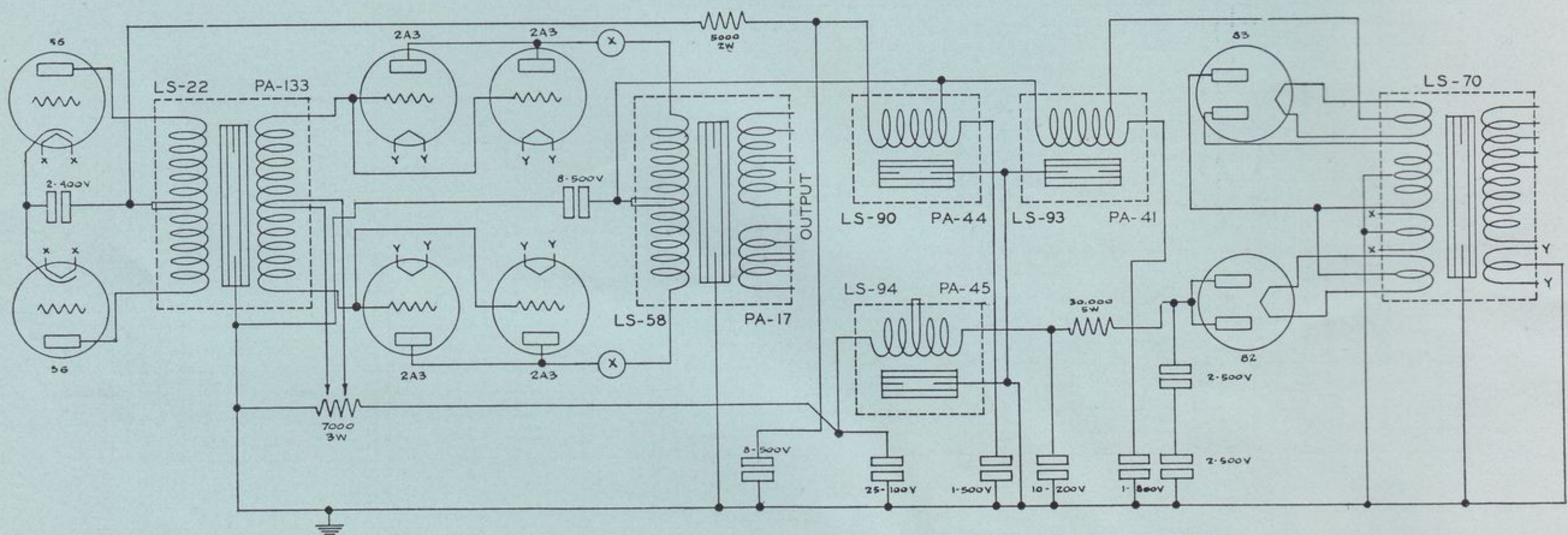
For voltage ratios, move the decimal point one point right for each 20 DB; in other words, if we have a ratio of .00041, move point 3 figures to the right, making .41 and add 60 DB to the DB equivalent of .41 (7.74 DB). This gives us a total of 67.74 DB.

For power ratios, the same method applies, except that the decimal point is moved one figure to the right for each 10 DB.

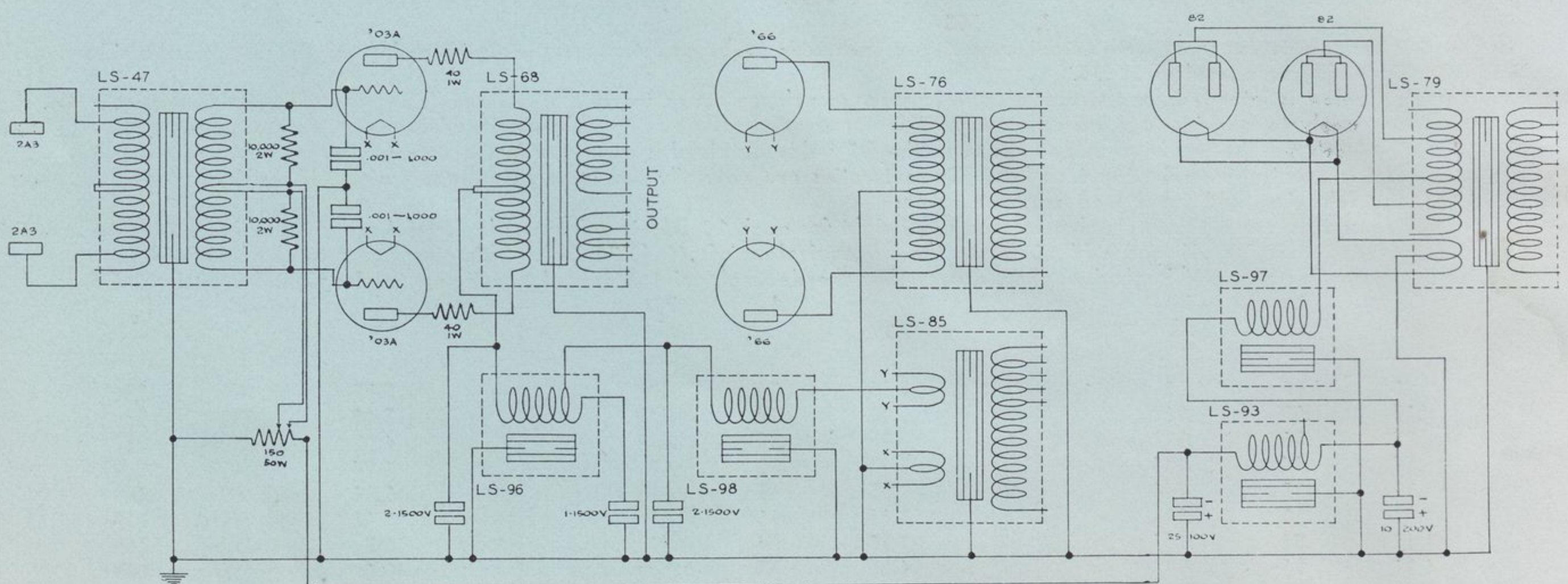
DB	$\frac{I_2}{I_1}$	$\frac{P_2}{P_1}$	DB	$\frac{I_2}{I_1}$	$\frac{P_2}{P_1}$	DB	$\frac{I_2}{I_1}$	$\frac{P_2}{P_1}$
0	1.00	1.00	2.36	.76	.578	5.35	.54	.292
.18	.98	.96	2.62	.74	.548	5.68	.52	.27
.35	.96	.922	2.85	.72	.518	6.02	.50	.25
.54	.94	.884	3.10	.70	.49	6.94	.45	.203
.72	.92	.846	3.35	.68	.462	7.96	.40	.16
.92	.90	.81	3.61	.66	.435	9.12	.35	.123
1.11	.88	.774	3.88	.64	.41	10.5	.30	.09
1.31	.86	.74	4.15	.62	.384	12.0	.25	.063
1.51	.84	.706	4.44	.60	.36	14.0	.20	.04
1.72	.82	.672	4.73	.58	.336	16.5	.15	.023
1.94	.80	.64	5.04	.56	.314	20.0	.10	.01
2.16	.78	.608						



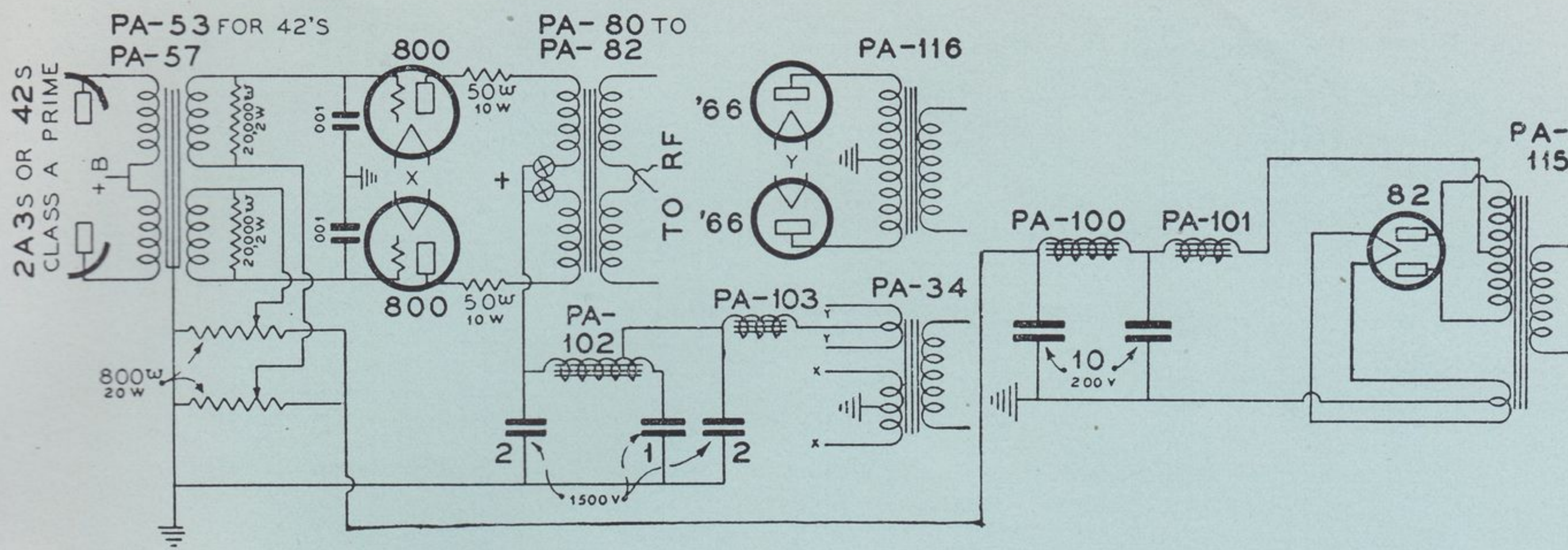
Two stage battery microphone or photo electric cell pre-amplifier using 864 tubes.



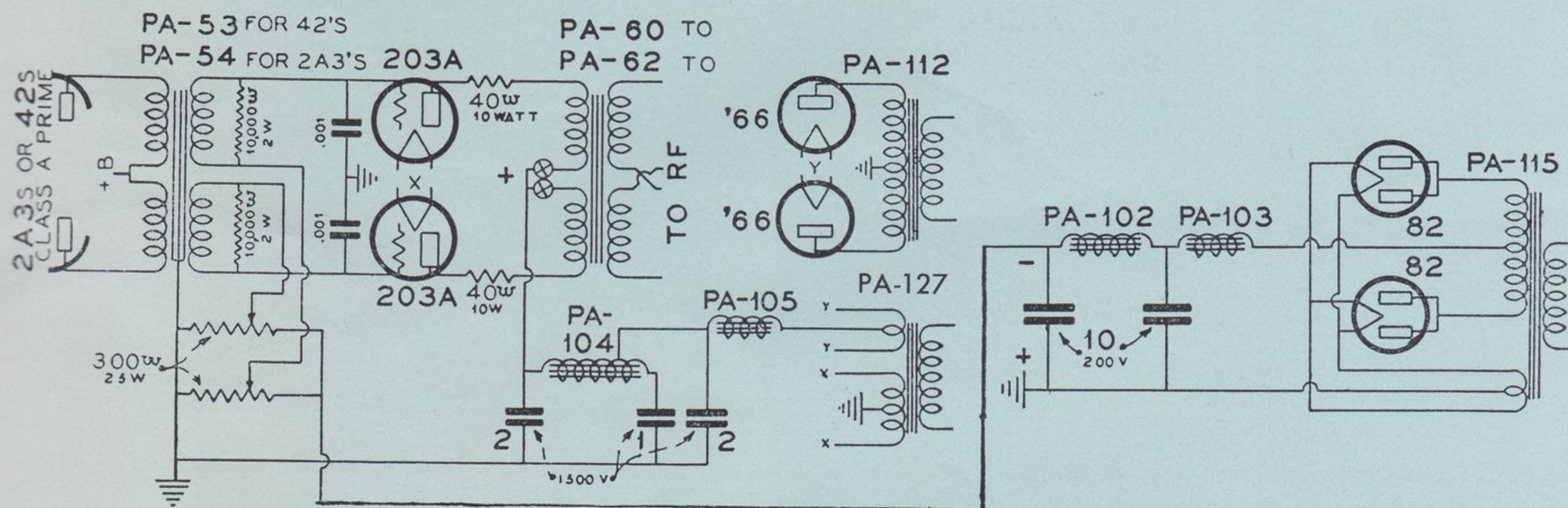
Push pull parallel 2A3 output power stage with fixed C bias and separate bias adjustment to balance plate current of output tubes. Shunt resonant rectifier filter used for highest filtering efficiency.



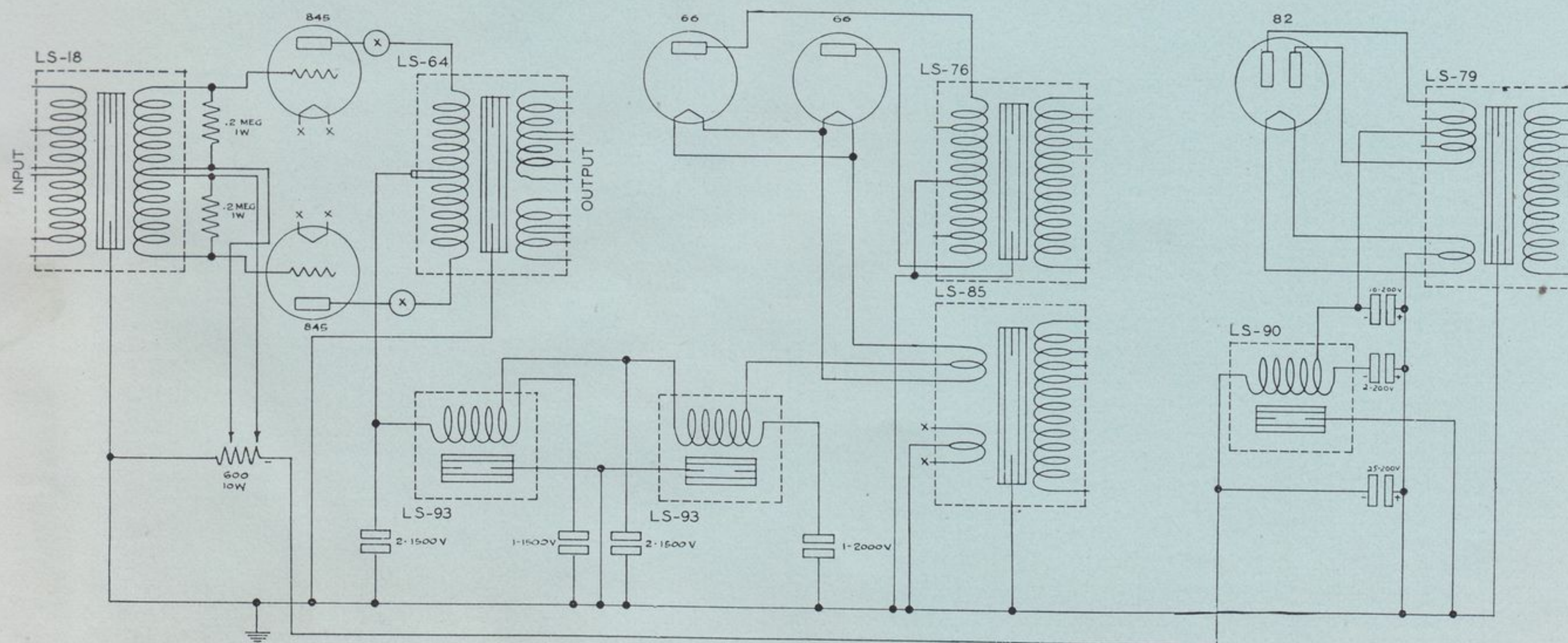
Class B 203 output stage. If graphite or carbon plate power tubes are used the maximum power output available is 200 watts. Fixed C bias is used with separate bias adjustment to balance plate current of output tubes.



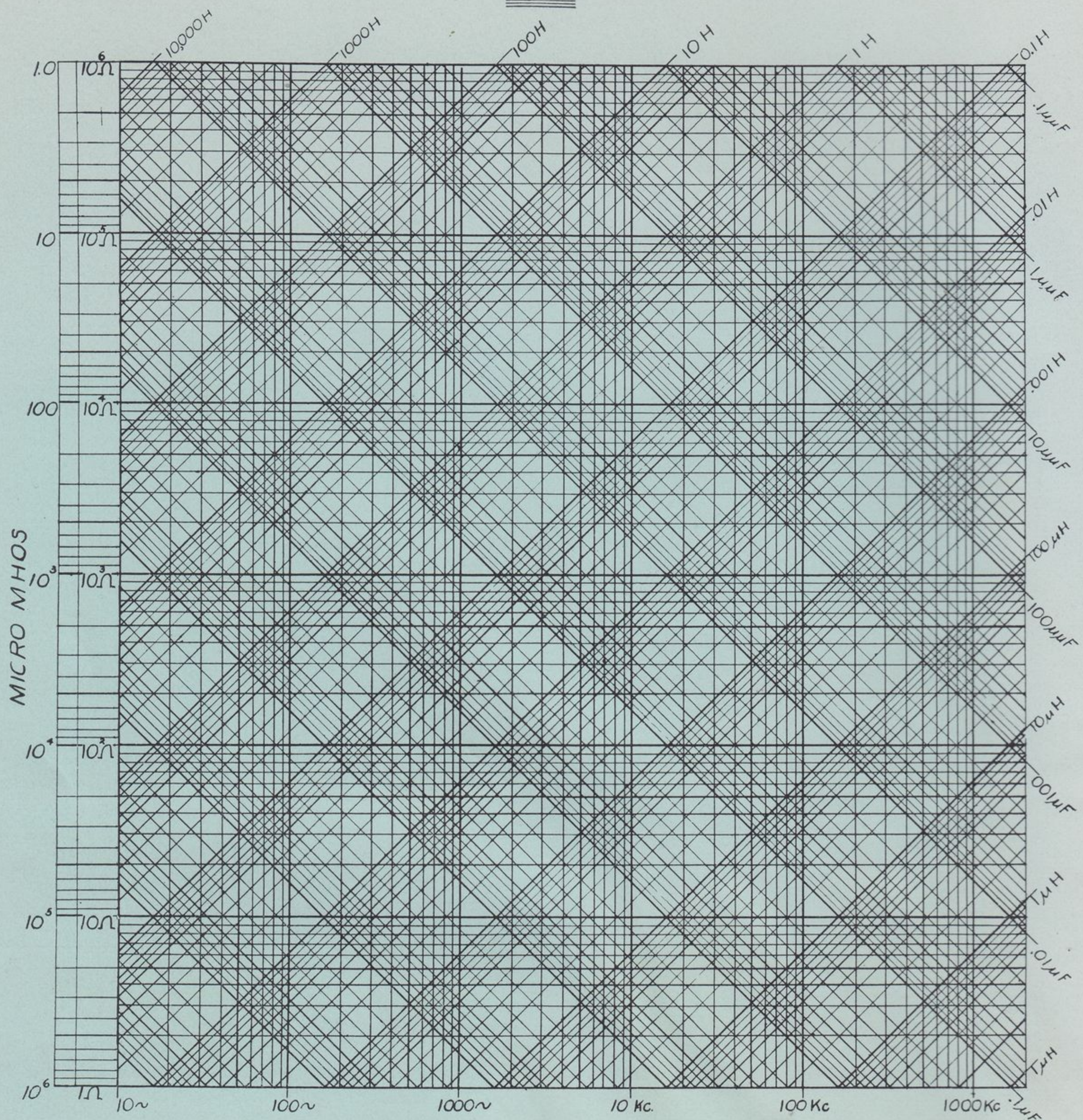
Class B 800, 100 watt output stage for transmitter applications. Fixed C bias is used for Class B 800's. Note the individual bias adjustment controls for each 800 tube.



Class B 203A, 225 watt output stage for transmitter applications. Fixed C bias is used for Class B 203A's. Note the individual bias adjustment controls for each 203A tube.



Class A 845 output power stage. Fixed C bias is used with separate bias adjustment, to balance plate current of output tubes. Shunt resonant rectifier used for highest filtering efficiency. If utilized to drive Class B 204 power stage, substitute LS-48 for LS-64 output unit.



KC=KILOCYCLES

 μ F=MICROFARADS

H=HENRYS

 Ω =OHMS $\mu\mu$ F=MICROMICROFARADS μ H=MICROHENRYS

The construction and use of this chart is as follows:

The sloping lines from lower left to upper right represent inductances and those from lower right to upper left, capacitances. The main divisions are subdivided on a logarithmic scale, each line being an even multiple of the first. For example, the light line immediately following the dark 1 Henry line represents two times 1 Henry; the next line represents 3 Henrys; etc. It should be noted that when interpolating between minor divisions, the same logarithmic gradation should be used as in the major divisions. To obtain the reactance or admittance of a capacitance or inductance, the sloping line should be followed to the point where it intersects with the vertical line corresponding to the frequency at which the value is desired. The horizontal line which corresponds with this intersection when carried to the left gives the value of reactance or admittance. In a similar manner, if reactance and frequency are known, the inductance or capacitance can be determined by a reverse process.

EXAMPLE TO DETERMINE REACTANCES.

To find the reactance of a coil having an inductance of 1 Henry at a frequency of 1000 cycles, we follow the slanting 1 Henry line until it meets the vertical 1000 cycle line. At the point of intersection, a horizontal line to the left edge of the chart indicates a reactance of 6200 ohms. Similarly, the sloping .1 mfd. line can be followed to the point where it intersects with the vertical 1000 cycle line and a horizontal line from the point of intersection to the left side of the chart indicates a reactance of 1600 ohms.

EXAMPLE TO DETERMINE RESONANCE.

To determine the point of resonance, let us consider the values of inductance and capacitance chosen in the previous example. We follow the sloping 1 Henry line to the point where it intersects with the .1 mfd. line. The vertical line through the point of intersection indicates a resonance frequency of 500 cycles.

EXAMPLE OF PARALLEL CIRCUIT CALCULATIONS.

The mho scale is primarily useful in the solution of parallel circuits. Consider an inductance of 1 Henry in parallel with .1 mfd. at 1000 cycles. The admittance of 1 Henry is found by the chart to be 161 micromhos at 1000 cycles, and the admittance of a .1 mfd. condenser 625 micromhos at the same frequency. In adding admittances of inductances in parallel or condensers in parallel, the admittances are simply added without regard to sign. However, the sign of capacitance and inductance are opposite when used in parallel. Therefore, in this example, the total admittance is 161 minus 625, or minus 464 micromhos. Glancing at the left side of the chart, this is found to correspond to 2160 ohms, which is the total reactance of the combination.

