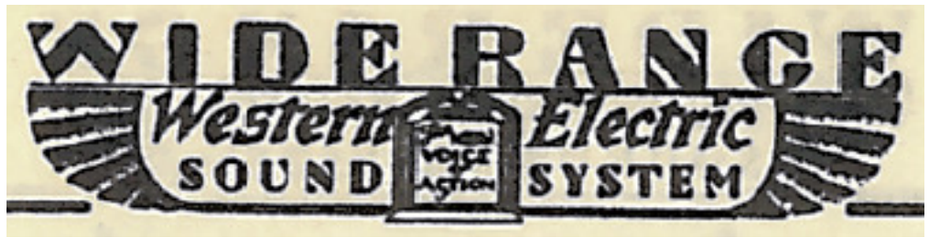
ALTEC SERVICE COMPANY



Many Ancient Transformers, A Few Amplifiers, Alignment Of Built-In Equalization, 1936.. 1945.. 1948.. And More

COLOR CODE: ALTEC WESTERN ELECTRIC RESTRICTED WESTERN ELECTRIC

In order of appearance…

	DOCUMENT DESIGNATION
ALTEC LANSING OUTPUT TRANSFORMER CHART 3753	50.48
ALTEC LANSING AND WESTERN ELECTRIC SPEECH TRANSFORMER CHART 3756	50.48
EQUALIZING NETWORKS AND CURVES	40.64
ALTEC LANSING MATCHING TRANSFORMER CHART 3754	50.48
ALTEC LANSING POWER TRANSFORMER CHART 3757	50.48
ALTEC LANSING CHOKE COIL CHART 3755	50.48
WESTERN ELECTRIC POWER TRANSFORMER CHART 1936 RESTRICTED	4.48
WESTERN ELECTRIC OUTPUT TRANSFORMERS AND REPEATING COILS CHART 1936 RESTRICTED	4.48
WESTERN ELECTRIC INPUT TRANSFORMERS CHART 1936 RESTRICTED	4.48
ALTEC LANSING POWER AMPLIFIER A-126	50.03
ALTEC LANSING POWER AMPLIFIER EQUALIZING A-126	50.03
ALTEC LANSING POWER AMPLIFIER SCHEMATIC AND EQUALIZER A-126/A/B DRAWING 3885	50.03
ALTEC LANSING POWER AMPLIFIER SCHEMATIC A-126 FOR LOWE’S EMERGENCY SYSTEM MODDED PER AS-1734 AX-1634	50.38
ALTEC LANSING POWER AMPLIFIER SCHEMATIC A-126 FOR LOWE’S EMERGENCY SYSTEM MODDED PER AS-1734 WITH A-442 PREAMP MODIFIED PER AQ-1686 AX-1635	50.38
EQUALIZER CHARACTERISTICS (PARTIAL) A-126 AMPLIFIER WITH SIMPLIFIED EQUALIZER DWG AQ-1936	50.03
WESTERN ELECTRIC 91 AMPLIFIER CHARACTERISTICS DWG AQ-8337-A	4.64
WESTERN ELECTRIC 91 AMPLIFIER CHARACTERISTICS DWG AQ-8337-B	4.64
AND FOLLOWS MORE EQUALIZATION CURVES ...	
TWO-TERMINAL R–C EQUALIZER DESIGN	4.64
THE DESIGN OF ATTENUATOR NETWORK	4.64

ALTEC SERVICE CORPORATION

OUTPUT TRANSFORMERS, GENERAL

ALTEC LANSING TRANSFORMERS - OUTPUT

TYPE	APPLICATION	IMPEDANCES INPUT OHMS	INPUT CONNECT TO	INPUT STRAP	OUTPUT OHMS	OUTPUT CONNECT TO	OUTPUT STRAP	FREQUENCY RANGE	RESPONSE	MAX. LEVEL REF. 6 mw.	SHIELDING	TOTAL MAX. D.C. PLATE CURRENT	MAX. D.C. UNBALANCE	OVERALL DIMENSIONS AS MOUNTED (INCHES)	MOUNTING DIMENSIONS (INCHES)
TBB-208	PP LOW LEVEL	12500 3125	1-4 1-4	2-3 1-3,2-4	500 250 125 62.5	5-10 6-9 5-10 6-9	7-8 7-8 5-8,7-10 6-8,7-9	100-5000	1 DB	+ 20 DB 0.6 WATTS	NONE	PARALLEL FEED		2 1/4 X 2 3/8 X 2 7/8 H	1 7/16 X 1 7/16
TM-222 (WE-A171A)	MEDIUM LEVEL	3000	BL WH-BRN		9 3.6	RD BL RD-RD WH		100-6000	1 DB	+ 31.2 DB 8 WATTS	NONE	60 MA	SINGLE ENDED	2 5/8 X 3 5/8 X 3 13/16 H	2 X 3 1/4
TJ-152A	OUTPUT OR INTERSTAGE PP HIGH LEVEL WITH TERTIARY	9500 2375	1-4 1-4	2-3 1-3,2-4	3000 2000 750 500 195	5-10 5-10 6-10 5-10 11-12	7-8 6-9 5-8,7-10 5-9,6-10 (TERTIARY)	20-20000	1 DB	+ 39 DB 47.7 WATTS	NONE	200 MA	10 MA	4 X 4 5/8 X 5 1/4 H	3 1/2 X 4
TJ-211B	PP HIGH LEVEL	9500	1-4	2-3	10 20	7-6 7-5		20-20000	1 DB	+ 39 DB 47.7 WATTS	NONE	130 MA	7 MA	4 X 4 5/8 X 5 1/4 H	3 1/2 X 4
TL-203 A	PP MEDIUM LEVEL	6600 1650	1-4 1-4	2-3 1-3,2-4	500 12 6	5-8 5-7 5-6		40-15 000	1 DB	+ 34 DB 15 WATTS	NONE	130 MA	7 MA	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-204 (TL-204A)	PP MEDIUM LEVEL	6600	1-3	C.T. 2	6 12	4-5 4-6		40-15000	1 DB	+ 35 DB 19 WATTS	NONE	100 MA	10 MA	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-216A	PP MEDIUM LEVEL WITH TERTIARY	6600 1650	1-4 1-4	2-3 1-3,2-4	500 220 125 56 14 20	5-10 6-9 5-10 6-9 5-10 11-12	7-8 7-8 5-8,7-10 6-8,7-9 5-9,6-10 (TERTIARY)	20-20000	1 DB	+ 35 DB 19 WATTS	NONE	130 MA	7 MA (6600 Ω) 14 MA (1650 Ω)	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-217 B *	PP MEDIUM LEVEL	6600	BR-BL	C.T. RD.	10 20	BLK-YEL BLK-GR		20-20000	1 DB	+ 35 DB 19 WATTS	NONE	130 MA	7 MA	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-218	PP MEDIUM LEVEL WITH TERTIARY	8000 2000	1-4 1-4	2-3 1-3,2-4	500 250 125 62.5 20	5-10 6-9 5-10 6-9 11-12	7-8 7-8 5-8,7-10 6-8,7-9 (TERTIARY)	20-20000	1 DB	+ 32 DB 9.5 WATTS	NONE	50 MA	5 MA (8000 Ω) 10 MA (2000 Ω)	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-219	OUTPUT OR INTERSTAGE PP MEDIUM LEVEL WITH TERTIARY	6600 1650	1-4 1-4	2-3 1-3,2-4	3000 2000 750 500 20	5-10 6-9 5-10 6-9 11-12	7-8 7-8 5-8,7-10 6-8,7-9 (TERTIARY)	20-20000	1 DB	+ 35 DB 19 WATTS	NONE	130 MA	7 MA (6600 Ω) 14 MA (1650 Ω)	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-220	PP LOW LEVEL	10 000 2500	1-4 1-4	2-3 1-3,2-4	7	5-6		7-1000	1 DB	+ 22 DB 1 WATT	30 DB	10 MA	5 MA	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TLB-208 (WE-159B)	PP MEDIUM LEVEL	4000	3-6	4-5	6 12	1-1T 1-2		40-8,000	1 DB	+ 30 DB 6 WATTS	NONE	120 MA	10 MA	3 7/16 X 2 11/16 X 4 3/4 H	2 1/4 X 1 3/4
TM-208 (WE-AR1053AL)	PP HIGH LEVEL (87E TO 87W CONVERSION)	6700 1675	1-4 1-4	2-3 1-3,2-4	500 250 125 62.5	5-11 7-9 5-11 7-9	8-10 8-10 5-10,8-11 7-10,8-9	40-8000 BELOW 40 DB 100-8000 40 DB-46 DB	0.5 DB	+ 46 DB 240 WATTS	NONE	400 MA	40 MA	5 3/8 X 6 X 6 1/8 H	5 3/4 X 3 1/4
TM-219B	PP HIGH LEVEL	8200 2050	1-4 1-2	2-3 1-3,2-4	20 9 5 2.25	5-10 6-9 5-10 6-9	7-8 7-8 5-8,7-10 6-8,7-9	60-10000	1 DB	+ 46.2 DB 250 WATTS	NONE	400 MA	40 MA	5 X 7 5/8 X 6 1/2 H	5 1/4 X 5 5/8
TM-220A (WE-AR1053 A)	PP HIGH LEVEL	4000	1-4	2-3	16 8 4 2	5-10 6-9 5-10 6-9	7-9 7-8 5-8,7-6 6-8,7-9	20-20000	1 DB	+ 42.2 DB 100 WATTS	NONE	300 MA	15 MA	5 9/32 X 6 X 6 H	5 5/8 X 3 1/4
TMB-210	PP LOW LEVEL	6600	1-3	C.T. 2	15	4-5		800 (ONLY)		+ 23 DB 1.2 WATTS	NONE				
TML-200	PP MEDIUM LEVEL	9000	1-3	C.T. 2	600 550 500	4-7 4-6 4-5		400 (ONLY)		+ 36.2 DB 25 WATTS	NONE				
TML-221	PP MEDIUM LEVEL	6600	PL-PL	C.T. B+	2700	G-G	C.T. C-	20-20000	1 DB	+ 35 DB 19 WATTS	NONE	140 MA	7 MA	4 7/8 X 3 3/4 X 4 1/2 H	3 5/8 X 3 1/8
TP-202	PP LOW LEVEL	20,000 3,125	1-4 1-4	2-3 1-3,2-4	500 250 125 62.5	5-10 6-9 5-10 6-9	7-8 7-8 5-8,7-10 6-8,7-9	20-20000	1 DB	+ 15 DB 0.19 WATTS	60 DB	PARALLEL FEED		2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
TP-204	PP LOW LEVEL	12,500 3,125	1-4 1-4	2-3 1-3,2-4	500 250 125 62.5	5-14 6-13 5-14 6-13	7-12 7-12 5-12,7-14 6-12,7-13	20-20000	1 DB	+ 15 DB 0.19 WATTS	60 DB	PARALLEL FEED		2 7/8 X 2 1/2 X 3 1/2	2 1/2 X 2
TP-211	PP MEDIUM LEVEL WITH TERTIARY	3500	BL-BRN	C.T. RD	10	RD.WH.-GRN.	——	20-10,000	2 DB	+ 30 DB 6 WATTS	NONE	50 MA	5 MA	2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
TL-217A *	PP MEDIUM LEVEL	6600	1-3	C.T. 2	10 20	6-5 6-4		20-20,000	1 DB	+ 35 DB 19 WATTS	NONE	130 MA	7 MA	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TP-212	SINGLE 6L6 WITH CATHODE TERTIARY	5200	1-4	2-3	8	5-8	——	50-8,000	1 DB	27 DB 3 WATTS	NONE	65 MA	65 MA	2 1/2 X 2 7/8 X 3 1/2 H	2 X 2 1/2

ISS	APPR'D	DATE	CHANGE
3E	[signature]	7-2-46	TP-211 ADDED
3F	[signature]	9-30-48	TM 222, TLB 208, TM 219, TM 220, TL 217 CORRECTIONS. ADDED TP212.

ISSUE	APPR'D	DATE	CHANGE
1	[signature]	7-45	
2	[signature]	8/22/45	"OVERALL" WAS "OUTSIDE"
3		10-9-45	CHANGED STRAPPING ON TP-204
3 A		10-15-45	NOTES - A, B, C, D, E, F, ADDED.
3 B	[signature]	4-2-46	REVISED TO INCLUDE CURRENT ITEMS.
3C	[signature]	5-29-46	TL-217A ADDED TM 219A WAS TM 219
3 D	[signature]	[illegible]	RATING OF TLB-208 CHANGED

DR. BY E.H.L. APPR'D [signature]

ALTEC LANSING CORPORATION
HOLLYWOOD, CALIFORNIA

OUTPUT TRANSFORMERS

3753

ALTEC SERVICE CORPORATION

SPEECH TRANSFORMERS, GENERAL

ALTEC LANSING TRANSFORMERS - SPEECH

TYPE	APPLICATION	BALANCED TO GROUND	IMPEDANCES INPUT OHMS	INPUT CONNECT TO	INPUT STRAP	OUTPUT OHMS	OUTPUT CONNECT TO	OUTPUT STRAP	FREQ. RANGE	RESPONSE ±	MAX. LEVEL REF. 6MW.	SHIELDING	OVERALL DIMENSIONS AS MOUNTED. (INCHES)	MOUNTING DIMENSIONS (INCHES)
TB-101	INPUT-LINE TO SINGLE OR PP GRIDS.	SECONDARY ONLY	500 125	1-4 1-4	2-3 1-3,2-4	70,000 17,500	5-8 5-8	6-7 5-7,6-8	20-20000	1 DB	-20 DB	25 DB MAGNETIC & ELECTROSTATIC	1 3/4 x 1 5/8 DIA	1 1/2
TB-102	INPUT - LINE TO SINGLE OR PP GRIDS.	SECONDARY ONLY	250 125 62.5 31	1-6 2-5 1-6 2-5	3-4 3-4 1-4,3-6 2-4,3-5	70,000 17,500	7-10 7-10	8-9 7-9,8-10	20-20000	1 DB	-20 DB	25 DB MAGNETIC & ELECTROSTATIC	1 3/4 x 1 5/8 DIA.	1 1/2
TB-103	INPUT - LINE TO SINGLE OR PP GRIDS	SECONDARY ONLY	500 250 30	1-3 1-2 2-3		70,000 17,500	5-8 5-8	6-7 5-7,6-8	20-20000	1 DB	-20 DB	25 DB MAGNETIC & ELECTROSTATIC	1 3/4 x 1 5/8 DIA.	1 1/2
TB-151	INTERSTAGE OR BRIDGING SINGLE OR PP PLATES TO SINGLE OR PP GRIDS	PRIMARY & SECONDARY	10000 2500	1-4 1-4	2-3 1-3,2-4	40,000 10,000	7-10 7-10	8-9 7-9,8-10	20-20000	1 DB	-20 DB	25 DB MAGNETIC & ELECTROSTATIC	1 3/4 x 1 5/8 DIA.	1 1/2
TBA-105 (WE A233E)	INPUT - LINE TO GRID	NO	200 50	1-6 1-6	2-5 2-6,1-5	25,000 6,250	3-8 3-8	4-7 3-7,4-8	60-8000	0.5 DB	+12 DB	30 DB	3 1/4 x 2 11/16 x 5 9/16 H	2 5/16 x 2 7/8
TBA-106 (WE-A247A)	INPUT - LINE TO GRID	NO	250	1-4	2-3	159,000	5-6		60-8000	0.5 DB	+4.8 DB	30 DB	2 7/8 x 2 7/8 x 3 7/8 H	2 3/8 x 2 3/8
TBA-201A (WE-A170A)	INPUT-PEC TO LINE	NO	357000	BL-BL WH		25	RD-RD,WH		100-6000	1 DB	0 DB	25 DB	1 13/16 x 1 9/16 DIA.	
TBB-101	INPUT-LINE TO SINGLE OR PP GRIDS	SECONDARY ONLY	500 125	1-4 1-4	2-3 1-3,2-4	70000 17,500	7-10 7-10	8-9 7-9,8-10	20-20000	1 DB	-20 DB	90 DB MAGNETIC & ELECTROSTATIC	2 1/4 x 2 3/8 x 2 7/8 H	1 7/16 x 1 7/16
TBB-102	INPUT - LINE TO SINGLE OR PP GRIDS	SECONDARY ONLY	250 125 62.5 31	1-6 2-5 1-6 2-5	3-4 3-4 1-4,3-6 2-4,3-5	70,000 17,500	7-10 7-10	8-9 7-9-10	20-20000	1 DB	-20 DB	90 DB MAGNETIC & ELECTROSTATIC	2 1/4 x 2 3/8 x 2 7/8 H	1 7/16 x 1 7/16
TBB-103	INPUT LINE TO SINGLE OR PP GRIDS	SECONDARY ONLY	500 250 30	1-3 1-2 2-3		70,000 17,500	7-10 7-10	8-9 7-9,8-10	20-20,000	1 DB	-20 DB	90 DB MAGNETIC & ELECTROSTATIC	2 1/4 x 2 3/8 x 2 7/8 H	1 7/16 x 1 7/16
TBB-115	INPUT LINE TO SINGLE OR PP GRIDS	SECONDARY ONLY	20 5	1-4 1-4	2-3 1-3,2-4	70000 17,500	7-10 7-10	8-9 7-9,8-10	20-20,000	1 DB	-20 DB	90 DB MAGNETIC & ELECTROSTATIC	2 1/4 x 2 3/8 x 2 7/8 H	1 7/16 x 1 7/16
TBB-151	INTERSTAGE OR BRIDGING SINGLE OR PP PLATES TO SINGLE OR PP GRIDS	PRIMARY & SECONDARY	10000 2500	1-4 1-4	2-3 1-3,2-4	40000 10000	7-10 7-10	8-9 7-9,8-10	20-20000	1 DB	-20 DB	90 DB MAGNETIC & ELECTROSTATIC	2 1/4 x 2 3/8 x 2 7/8 H	1 7/16 x 1 7/16
TBD-104 (WE-261B)	INPUT - LINE TO GRID	PRIMARY ONLY	200 50	1-4 1-4	2-3 1-3,2-4	110,000	5-6		20-20000	1.5 DB	-20 DB	90 DB MAGNETIC & ELECTROSTATIC	2 1/8 x 2 7/8 x 3 1/8 H	2 3/8 x 2 3/8
TJ-152-A	INTERSTAGE OR OUTPUT PP WITH TERTIARY	PRIMARY & SECONDARY	9500 2375	1-4 1-4	2-3 1-3,2-4	3000 2000 750 500	5-10 5-10 5-10 5-10	7-8 6-9 5-8 7-10 5-9, 6-10	20-20000	1 DB	+39 DB	NONE	4 x 4 5/8 x 5 1/4 H	3 1/2 x 4
TL-101 B	INPUT - A 287 F AMPL.	YES	500 220 125 56 14	1-6 2-5 1-6 2-5 1-6	3-4 3-4 1-4,3-6 2-4,3-5 1-5,2-6	30000	7-10	8-9	20-20000	1 DB	+34 DB	NONE	3 1/2 x 3 5/8 x 4 1/8 H	2 7/8 x 2 7/8
TM-151 A (WE-264C)	INTERSTAGE - SINGLE PLATE TO PP GRIDS	PRIMARY & SECONDARY	20000	1-2		100000	3-6	4-5	40-8000	1 DB	200 V PEAK ACROSS 3-6	30 DB HUM BUCKING.	2 13/16 x 2 13/16 x 3 1/2 H	2 3/8 x 2 3/8
TMB-156	SPECIAL SERVICE DUAL WINDINGS	NO	50000	1-2 OR 6-7		1,800,000	3-5 OR 8-10 C.T.'S 4 & 9		20-500	1 DB	2.5 V ACROSS PRIMARY	NONE		
TB-105	LOW LEVEL INPUT	NO	5000	RD,WH-RD		250,000	GRN-BLK		20-10,000	2 DB	0 DB	NONE	1 5/8 DIA x 1 3/4 H	1 1/2

ISSUE	APP'D	DATE	CHANGE
1	[illegible]	7/2/45	
2	[illegible]	8-21-45	"OVERALL" WAS "OUTSIDE"
3			CHANGED STRAPPING FOR TM-103
3 A	[illegible]	—	TBA-106, TBA-105, TBA-201A ADDED NOTES A, E, F ADDED
3 B	[illegible]	5-5-46	REVISED TO INCLUDE CURRENT ITEMS.
3C	[illegible]	5-12-46	RATING TJ-152A CORRECTED
3D	[illegible]	7-2-46	TB-105 ADDED

DR. BY E. Mc. APPR'D [illegible]

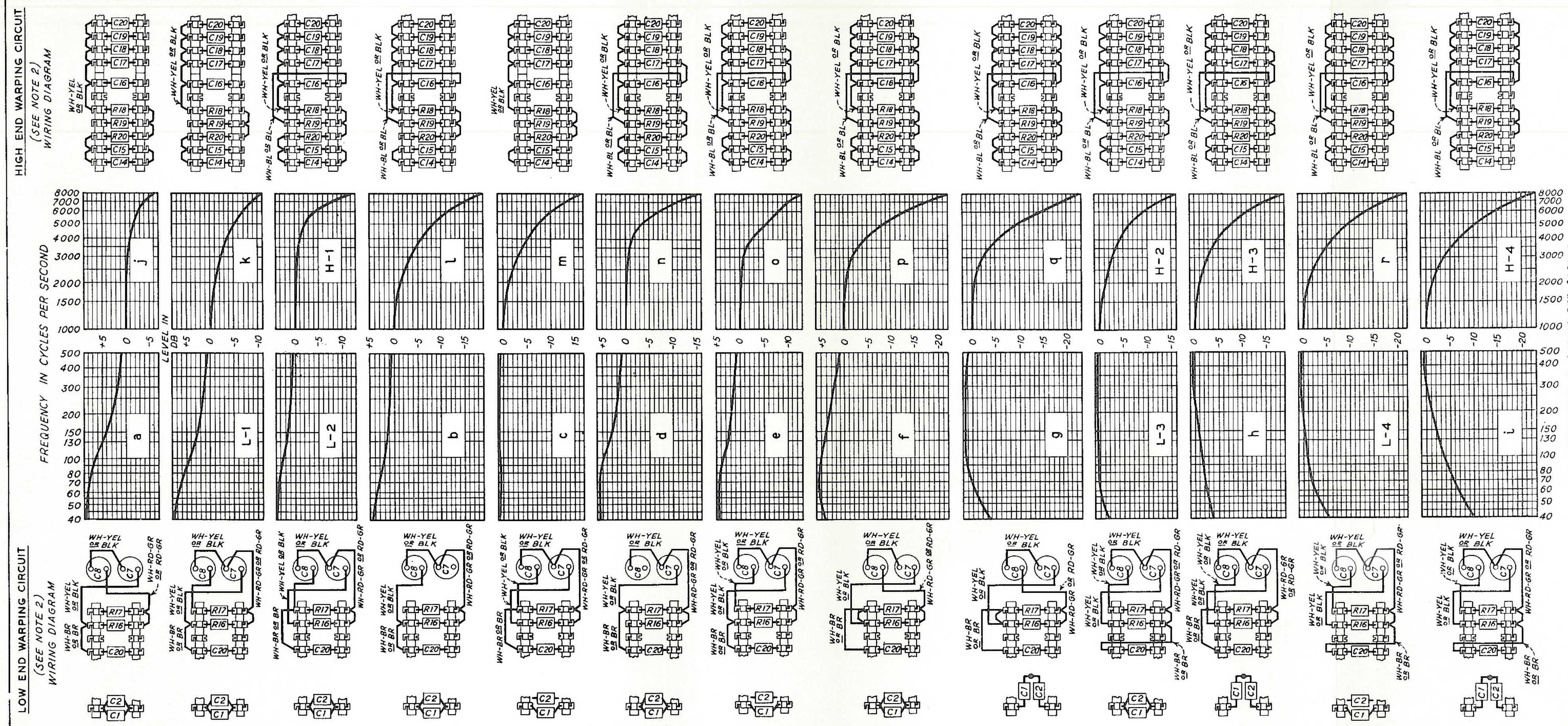
ALTEC LANSING CORPORATION
HOLLYWOOD, CALIFORNIA

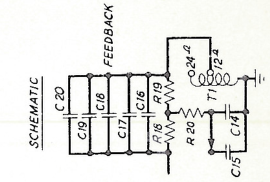
SPEECH TRANSFORMERS

3756

REDRAWN FROM ISSUE 2 WITH FOLLOWING CHANGES: NOTES: 2 AND 4 ADDED. NOTE 3 WAS NOTE 2. AM-1001 AMPLIFIER ADDED TO TITLE, SIMPLEX SOUND SYSTEMS REMOVED. LIMITS ± 1 DB ADDED IN NOTE 1. IN NOTE 3 WH-BL OR BL AND WH-YEL OR AND WH-RD-GR ADDED. WH-YEL OR, WH-BL OR, WH-BR OR, WH-RD-GR OR, ADDED TO ALL BL, BLK, BR AND RD-GR WIRES RESPECTIVELY. CURVE DATA REVISED. CURVES CHANGED TO AGREE.

ISSUE 3 7-22-48 CFA FG





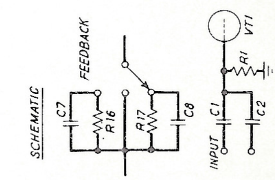
CURVE DATA - CYCLES & DEVIATIONS FROM REFERENCE IN DB

LOW END

CURVE DESIG.	40	70	130	300	500
a	8.6	7.9	4.9	1.9	0.8
L-1	7.7	6.0	3.1	1.2	0.7
L-2	3.9	3.2	1.8	0.8	0.5
b	4.6	3.0	1.3	0.8	0.5
c	0.7	0.5	0.9	0.8	0.5
d	5.4	5.5	3.4	1.4	0.8
e	4.5	4.3	2.5	1.2	0.7
f	4.2	5.5	4.3	2.3	1.0
g	-3.9	0.2	1.7	1.7	0.9
L-3	-1.8	0.1	0.2	0.7	0.5
h	-4.0	-2.1	-1.2	0.3	0.3
L-4	-5.3	-1.8	-0.5	0.5	0.4
i	-10.0	-5.5	-2.6	0	0.2

HIGH END

CURVE DESIG.	1000	2000	3000	5000	7000	8000
j	0	-0.4	-0.7	-1.9	-4.1	-6.1
k	0	-1.1	-2.3	-5.1	-8.8	-10.9
H-1	0	-0.3	-0.5	-2.2	-8.0	-12.1
l	0	-1.5	-3.4	-8.4	-14.9	-18.5
m	0	-1.4	-3.1	-7.6	-13.3	-16.5
n	0	-0.2	-0.5	-3.3	-10.8	-15.3
o	0	-0.3	-0.9	-5.6	-10.0	-13.0
p	0	-0.5	-1.8	-8.2	-17.4	-22.0
q	0	-0.7	-2.3	-9.2	-18.4	-22.9
H-2	0	-1.2	-2.5	-6.2	-12.1	-15.9
H-3	0	-1.2	-2.8	-7.5	-14.6	-18.7
r	0	-1.2	-3.4	-9.3	-17.2	-21.6
H-4	0	-1.2	-3.9	-10.3	-18.5	-22.9
FOR ADDITIONAL 10' EW-633 OR 8' BELDEN # 8401 ADD	0	-0.1	-0.2	-0.4	-0.6	-0.7



— NOTES —

1. THE FREQUENCY RESPONSE CHARACTERISTIC CURVES SHOWN (LIMITS ± 1DB) ARE OBTAINED BY ADJUSTMENT OF THE WARPING CIRCUIT IN THE AM-1001 AMPLIFIER (SEE DRAWING WD-113). CURVES L-1 TO L-4 AND H-1 TO H-4 ARE STANDARD. OTHER CURVES ARE FOR USE ONLY WHEN UNUSUAL ACOUSTIC CONDITIONS ARE ENCOUNTERED. ANY LOW END CURVE MAY BE ASSOCIATED WITH ANY HIGH END CURVE.

2. THE CURVES INCLUDE SCANNING LOSS, AND WERE OBTAINED USING ED-35 TEST FILM, 6 FEET OF SH-2100 COAXIAL CABLE (CAPACITY 8 MMF PER FOOT), AM-101 TYPE VOLUME CONTROL AMPLIFIER AND 15 FEET BELDEN # 8401 MICROPHONE CABLE, CAPACITY 26 MMF PER FOOT, (20 FEET EW-633 PLASTIC MICROPHONE CABLE OPTIONAL).

3. THE FIGURE, ASSOCIATED WITH EACH CURVE, SHOWS THE WARPING CIRCUIT STRAPPING REQUIRED TO OBTAIN THE CURVE. RECONNECT STRAPS, AS NECESSARY, AND REMOVE OTHER EXISTING STRAPS NOT SHOWN IN THE FIGURE. THE WH-BL OR BL AND WH-YEL OR BLK WIRES FROM T1 AND THE WH-RD-GR OR RD-GR WIRE FROM TS1 SHOULD REMAIN CONNECTED TO R19, C14 AND R16 RESPECTIVELY AS SHOWN ON DRAWING WD-113.

4. THE AMPLIFIER IS SHIPPED STRAPPED FOR THE L-2, H-2 CURVE.

AM-1001 AMPLIFIER
FREQUENCY RESPONSE
CHARACTERISTICS

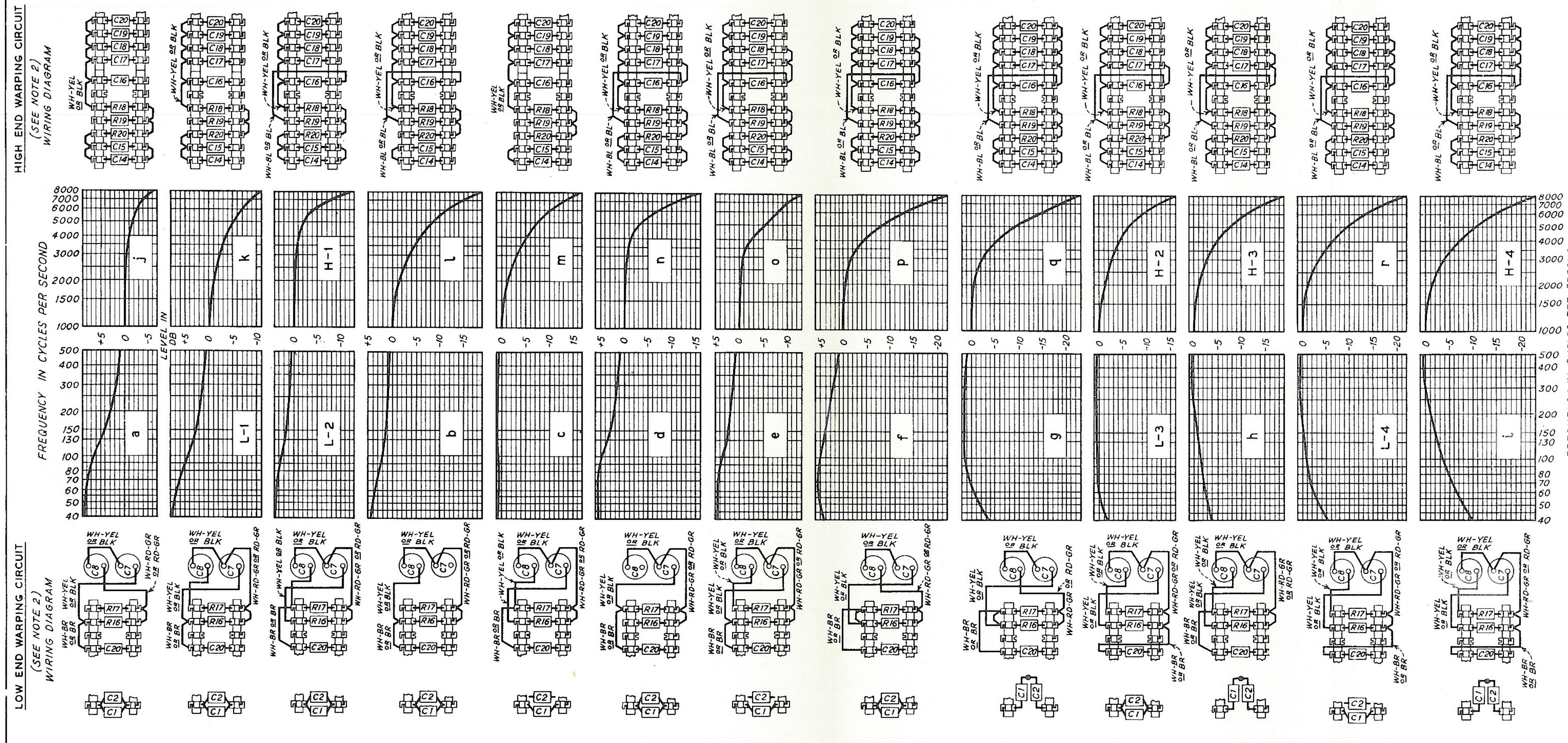
INTERNATIONAL PROJECTOR CORPORATION
55 LA FRANCE AVENUE
BLOOMFIELD NEW JERSEY

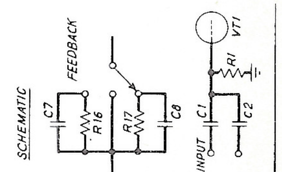
DR. CM'K CFA APP'D. F

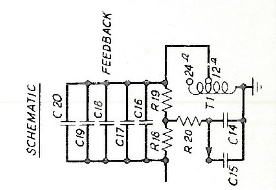
SC-21

REDRAWN FROM ISSUE 2 WITH FOLLOWING CHANGES: NOTES: 2 AND 4 ADDED. NOTE 3 WAS NOTE 2. AM-1001 AMPLIFIER ADDED TO TITLE, SIMPLEX SOUND SYSTEMS REMOVED. LIMITS ±1 DB ADDED IN NOTE 1. IN NOTE 3 WH-BL OR, WH-YEL OR AND WH-RD-GR ADDED. WH-YEL OR, WH-BL OR, WH-BR OR, WH-RD-GR OR, ADDED TO ALL BL, BLK, BR AND RD-GR WIRES RESPECTIVELY. CURVE DATA REVISED. CURVES CHANGED TO AGREE.

CFA	FG
ISSUE: 3	7-22-45







CURVE DATA – CYCLES & DEVIATIONS FROM REFERENCE IN DB

LOW END

CURVE DESIG.	40	70	130	300	500
a	8.6	7.9	4.9	1.9	0.8
L-1	7.7	6.0	3.1	1.2	0.7
L-2	3.9	3.2	1.8	0.8	0.5
b	4.6	3.0	1.3	0.8	0.5
c	0.7	0.5	0.9	0.8	0.5
d	5.4	5.5	3.4	1.4	0.8
e	4.5	4.3	2.5	1.2	0.7
f	4.2	5.5	4.3	2.3	1.0
g	-3.9	0.2	1.7	1.7	0.9
L-3	-1.8	0.1	0.2	0.7	0.5
h	-4.0	-2.1	-1.2	0.3	0.3
L-4	-5.3	-1.8	-0.5	0.5	0.4
i	-10.0	-5.5	-2.6	0	0.2

HIGH END

CURVE DESIG.	1000	2000	3000	5000	7000	8000
j	0	-0.4	-0.7	-1.9	-4.1	-6.1
k	0	-1.1	-2.3	-5.1	-8.8	-10.9
H-1	0	-0.3	-0.5	-2.2	-8.0	-12.1
l	0	-1.5	-3.4	-8.4	-14.9	-18.5
m	0	-1.4	-3.1	-7.6	-13.3	-16.5
n	0	-0.2	-0.5	-3.3	-10.8	-15.3
o	0	-0.3	-0.9	-5.6	-10.0	-13.0
p	0	-0.5	-1.8	-8.2	-17.4	-22.0
q	0	-0.7	-2.3	-9.2	-18.4	-22.9
H-2	0	-1.2	-2.5	-6.2	-12.1	-15.9
H-3	0	-1.2	-2.8	-7.5	-14.6	-18.7
r	0	-1.2	-3.4	-9.3	-17.2	-21.6
H-4	0	-1.2	-3.9	-10.3	-18.5	-22.9
FOR ADDITIONAL 10' EW-633 OR 8' BELDEN # 8401 ADD	0	-0.1	-0.2	-0.4	-0.6	-0.7

— NOTES —

1. THE FREQUENCY RESPONSE CHARACTERISTIC CURVES SHOWN (LIMITS ± 1DB) ARE OBTAINED BY ADJUSTMENT OF THE WARPING CIRCUIT IN THE AM-1001 AMPLIFIER (SEE DRAWING WD-113). CURVES L-1 TO L-4 AND H-1 TO H-4 ARE STANDARD. OTHER CURVES ARE FOR USE ONLY WHEN UNUSUAL ACOUSTIC CONDITIONS ARE ENCOUNTERED. ANY LOW END CURVE MAY BE ASSOCIATED WITH ANY HIGH END CURVE.

2. THE CURVES INCLUDE SCANNING LOSS, AND WERE OBTAINED USING ED-35 TEST FILM, 6 FEET OF SH-2100 COAXIAL CABLE (CAPACITY 8 MMF PER FOOT), AM-101 TYPE VOLUME CONTROL AMPLIFIER AND 15 FEET BELDEN # 8401 MICROPHONE CABLE, CAPACITY 26 MMF PER FOOT, (20 FEET EW-633 PLASTIC MICROPHONE CABLE OPTIONAL).

3. THE FIGURE, ASSOCIATED WITH EACH CURVE, SHOWS THE WARPING CIRCUIT STRAPPING REQUIRED TO OBTAIN THE CURVE. RECONNECT STRAPS, AS NECESSARY, AND REMOVE OTHER EXISTING STRAPS NOT SHOWN IN THE FIGURE. THE WH-BL OR BL AND WH-YEL OR BLK WIRES FROM T1 AND THE WH-RD-GR OR RD-GR WIRE FROM TS1 SHOULD REMAIN CONNECTED TO R19, C14 AND R16 RESPECTIVELY AS SHOWN ON DRAWING WD-113.

4. THE AMPLIFIER IS SHIPPED STRAPPED FOR THE L-2, H-2 CURVE.

AM-1001 AMPLIFIER
FREQUENCY RESPONSE
CHARACTERISTICS

INTERNATIONAL PROJECTOR CORPORATION
55 LA FRANCE AVENUE
BLOOMFIELD NEW JERSEY

DR. [illegible] CH'K CFA APP'D. F.

SC-21

ALTEC LANSING TRANSFORMERS – MATCHING

TYPE	APPLICATION	BALANCED TO GROUND	IMPEDANCES INPUT OHMS	INPUT CONNECT TO	INPUT STRAP	OUTPUT OHMS	OUTPUT CONNECT TO	OUTPUT STRAP	FREQUENCY RANGE	RESPONSE ±	MAX. LEVEL REF. 6 mw.	SHIELDING	OVERALL DIMENSIONS AS MOUNTED (INCHES)	MOUNTING DIMENSIONS (INCHES)
TJ-403A	HIGH LEVEL AUTO-TRANSFORMER	NO	3 12	WH-BR WH-RD					40–15000	1 DB	+42.2 DB 100 WATTS	NONE	4 X 4 5/8 X 5 1/4 H	3 1/2 X 4
TL-254C	MEDIUM LEVEL	NO	1000 500 250	1–4 1–3 1–2		12 6	5–7 5–6		20–20000	1 DB	+35 DB 19 WATTS	NONE	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-262	MEDIUM LEVEL	NO	250 500 1000	1–2 1–3 1–4		10 20	5–6 5–7		20–20000	1 DB	+35 DB 19 WATTS	NONE	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TP-253A	HYBRID 3 WINDING	YES ALL WINDINGS	500 500	1–2 3–4	2–3 2–3	500	5–14	7–12	20–10000 20–20000	1 DB 2 DB	+15 DB 0.2 WATTS	30 DB	2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
	MATCHING LOW LEVEL	"	1000 250	1–4 1–4	2–3 1-3,2–4	500 125	5–14 5–14	7–12 5–12,7–14	"	"	"	"	"	"
TP-256	LOW LEVEL	YES	500/600 250/300 125/150 62.5/75	1–6 2–5 1–6 2–5	3–4 3–4 1–4,3–6 2–4,3–5	500/600 250/300 125/150 62.5/75	7–12 8–11 7–12 8–11	9–10 9–10 7–10,9–12 8–10,9–11	20–20,000	1 DB	+15 DB 0.2 WATTS	40 DB	2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
TP-404	MEDIUM LEVEL AUTO-TRANSFORMER	NO	2.5 5 12	WH-YEL WH-RD WH-BR					50–8000	1 DB	+35.2 DB 20 WATTS	NONE	2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
TP-258	LOW LEVEL	YES	500/600 250/300 125/150 62.5/75	1–6 2–5 1–6 2–5	3–4 3–4 1–4,3–6 2–4,3–5	500/600 250/300 125/150 62.5/75	7–12 8–11 7–12 8–11	9–10 9–10 7–10,9–12 8–10,9–11	20–20,000	1 DB	+15 DB 0.19 WATTS	60 DB	2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
TP-261	MEDIUM LEVEL	NO	500	1–2	——	1.0 0.5 0.25	3–7 4–7 3–7	5–6 5–6 3–6,5–7	60–8,000	1 DB	32 DB 10 WATTS	NONE	2 1/2 X 2 7/8 X 3 1/2 H	2 X 2 1/2

NOTE: 1, TJ-403A AUTO-TRANSFORMERS
ARE RECOMMENDED FOR USE AS FOLLOWS –
VOICE OF THE THEATRE SPEAKER SYSTEMS WITH SIMPLEX C60
SOUND SYSTEMS OR EQUIVALENT.

ISSUE	APPR'D	DATE	CHANGE
1		7/21/47	
2	[illegible]	[illegible]	OVERALL WAS OUTSIDE
2A	[illegible]	8-47	REVISED TO INCLUDE CURRENT ITEMS
2B	[illegible]	12-6-48	TP-258 ADDED. NOTE CORRECTED.
2C	[illegible]	9-30-49	TP-261 ADDED.

DR. BY EMC APPR'D [illegible]

ALTEC LANSING CORPORATION
HOLLYWOOD, CALIFORNIA

MATCHING TRANSFORMERS

3754

ALTEC LANSING POWER TRANSFORMERS

TYPE	FREQUENCY	PRIMARY TERMINALS	PRIMARY VOLTS	SECONDARY TERMINALS	SECONDARY VOLTS	SECONDARY AMPS.	ELECTROSTATIC SHIELD	OVERALL DIMENSIONS AS MOUNTED (INCHES)	MOUNTING DIMENSIONS (INCHES)
TJ-604 B	50-60	1-2 1-3 1-4	105 117 130	5-6-7 8-9-10 11-12	350-0-350 6.3 CT. 5.0	0.125 DC 5.0 3.0	YES	4 X 4 5/8 X 5 1/4 H	3 1/2 X 4
TJ-618 D	50-60	1-2 1-3 1-4	105 117 130	10-12-14 11-12-13 5-6-7 8-9	605-0-605 565-0-565 6.3 CT. 5.0	0.150 DC 0.150 DC 3.5 3.0	NO	4 X 4 5/8 X 5 1/4 H	3 1/2 X 4
TJ-619 C	50-60	1-2 1-3 1-4	105 117 130	5-6-7 8-9-10 11-12 13-14 15-16	545-0-545 6.3 CT. 5.0 6.3 6.3	0.200 DC 3.0 3.0 3.0 0.7	NO	4 X 4 5/8 X 5 1/4 H	3 1/2 X 4
TJB-702 (WE-A 359B)	50-60	1-2 1-3	110 120	4-5 7-8-9 6-8-9	5.0 70-0-70 78-0-78	5.0 1.4 1.4	NO	5 1/2 X 4 13/16 X 4 7/16 H	5 X 2 3/4
TL-608	50-60	BLK-BLK	117	RD-RD.TR-RD. GR.SLVG.-GR.- GR.SLVG. YEL.SLVG.-YEL.SLVG.	350-0-350 6.3 CT. 5.0	0.125 DC 2.4 3.0	YES	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TL-706	60	1-2	115	3-4 3-5 3-6	13.0 15.0 17.0	5.0 5.0 5.0	NO	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8
TM-602 (WE-A303B)	50-60	1-2	110	3-3T-4	430-0-430	0.063 DC	NO	3 15/16 X 3 3/8 X 3 1/2 H	2 13/16 X 2 7/8
TMJ-551 (WE-352Y)	50-60	1-2 1-3 1-3A	105 117 130	4-5-6 7-8-9 10-11	10.0 CT 10.0 CT 2.5	3.0 3.0 10.0	NO	5 1/2 X 3 7/8 X 5 H	5 X 2 3/4
TMJ-613	60	1-2	115	3-4-5 6-7-8 9-10-11 12-13-14	440-0-440 6.3 CT 5.0 CT 6.3 CT	0.125 DC 3.0 3.0 2.0	NO	5 1/2 X 3 5/8 X 5 H	5 X 2 3/4
TMJ-701 (UTC-18244)	50-60	1-2 1-3 1-4	107 115 122.5	5-6-7 8-9-10	4.0 CT 62.5-0-62.5	12.0 2.0 DC	NO		
TML-557	60	1-2	115	3-4 5-6	6.3 6.3	6.0 1.2	YES	4 7/8 X 3 3/4 X 4 1/2 H	3 5/8 X 3 1/8
TML-558	60	1-2	115	3-4-5 6-7-8	6.3 CT 6.3 CT	4.2 2.7	NO	4 7/8 X 3 3/4 X 4 1/2 H	3 5/8 X 3 1/8
TMP-550	60	1-2	115	3-4-5	6.3 CT	4.0	NO	2 3/8 X 2 7/8 X 3 1/2 H	2 X 2 1/2
TMP-551	60	1-2	115	3-4-5 6-7-8	6.3 CT 6.3 CT	3.3 0.6	NO	2 3/8 X 2 7/8 X 3 1/2 H	2 X 2 1/2
TMP-590	60	1-2	115	3-4-5 6-7-8	300 CT 300 CT	0.010 0.010	NO	2 3/8 X 2 7/8 X 3 1/2 H	2 X 2 1/2
TMP-612	60	1-2	115	3-4 5-6	700 2.5	0.002 3.0	NO	2 3/8 X 2 7/8 X 3 1/2 H	2 X 2 1/2
TMS-578 C (WE-D98835)	50-60	1-2 1-3 1-4	107 117 130	5-7-9 6-7-8	1725-0-1725 1470-0-1470	0.160 DC 0.160 DC	NO	7 5/8 X 5 1/2 X 7 1/2 H	6 7/8 X 4
TP-701	50-60	1-2 1-3	110 120	4-5	20.0	0.5	NO	2 7/8 X 2 1/2 X 3 1/2 H	2 1/2 X 2
TR-576 A (WE-AQ 1099) (WE-AR 1054A)	50-65	1-2 1-3 1-4	107.5 115 122.5	5-6-7	960-0-960	0.173	NO	8 1/2 X 4 3/4 X 6 H	7 3/4 X 3 1/8
TMS-579 B	50-60	1-2 1-3	110 120	4-5-6	1700-0-1700	0.3	YES	5 1/2 X 7 5/8 X 7 1/2 H	6 7/8 X 4
TM-608 (WE-A359A)	50-60	1-2 1-3	110 120	4-5-6 7-8 9-10-11 12-13-14	5-0-5 5.0 492.5-0-492.5 2.5-0-2.5	1.2 2.0 0.130 2.4	NO	4 5/16 X 5 1/2 X 4 1/2 H	5 X 2 3/4
TL-403 AUTO-TRANS. FOR USE WITH A-255 AMPL. ON 220V AC	50-60	0-220	220	0-110	110		NO	3 1/2 X 3 5/8 X 4 1/8 H	2 7/8 X 2 7/8

PRINTED IN U.S.A.

ISSUE	APPRD	DATE	CHANGE
1		7-14-42	
2		5-22-47	OVERALL DIMS.
2-A			NOTES E,F,G ADDED
2-B		3-27-48	REVISED TO INCLUDE CURRENT ITEMS
2-C		6-23-48	TMS-579B WAS TMS-579 A
2-D		7-27-48	TL-403 ADDED

DR. BY [illegible] APPROVED [illegible]

ALTEC LANSING CORPORATION
HOLLYWOOD, CALIFORNIA

POWER TRANSFORMERS
3757

50.48

ALTEC SERVICE CORPORATION

CHOKE COILS, GENERAL

ALTEC LANSING CHOKE COILS

TYPE	APPLICATION	INDUCTANCE HENRIES	D.C. M.A.	D.C. RESISTANCE OHMS	OVERALL DIMENSIONS AS MOUNTED (INCHES)	MOUNTING DIMENSIONS (INCHES)
TA-305 S	10 V 60 CYCLE AC	CONN. TO, STRAP 1 1-2 0 2 1-3 0 3 1-4 0 4 1-5 0 5 1-6 0		800 TOTAL	$1\frac{3}{4}$ X $1\frac{5}{8}$ DIA.	$1\frac{1}{2}$
TA-325	10 V 60 CYCLE AC	4	0	720	$1\frac{3}{4}$ X $1\frac{5}{8}$ DIA.	1
TBB-301	PLATE FEEDER WITH TP 202 & TP 204 TRANS.	100 1-4 2-3 25 1-4 1-3, 2-4	5 10	4600 1150	$2\frac{1}{4}$ X $2\frac{3}{8}$ X $2\frac{7}{8}$ H	$1\frac{7}{16}$ X $1\frac{7}{16}$
TBB-314	FILTER	35+	40	500	$2\frac{1}{4}$ X $2\frac{3}{8}$ X $2\frac{7}{8}$ H	$1\frac{7}{16}$ X $1\frac{7}{16}$
TL-502 A	FILTER	3.5	400	55	$3\frac{1}{2}$ X $3\frac{5}{8}$ X $4\frac{1}{8}$ H	$2\frac{7}{8}$ X $2\frac{7}{8}$
TL-517 A	FILTER	12	200	126	$3\frac{1}{2}$ X $3\frac{5}{8}$ X $4\frac{1}{8}$ H	$2\frac{7}{8}$ X $2\frac{7}{8}$
TL-518	FILTER	0.02	5000	0.32	$3\frac{1}{2}$ X $3\frac{5}{8}$ X $4\frac{1}{8}$ H	$2\frac{7}{8}$ X $2\frac{7}{8}$
TM-504 (WE-179 A)	FILTER	250 200 175	5 10 15	4317	3 X 3 X $3\frac{5}{8}$ H	$2\frac{3}{8}$ X $2\frac{3}{8}$
TM-507	FILTER	8 18	400 100	60	$4\frac{9}{16}$ X $7\frac{5}{8}$ X 6 H	3 X 7 $\frac{1}{4}$
TMJ-507 (WE-240 B)	FILTER	25	160	250	$4\frac{9}{32}$ X $5\frac{1}{2}$ X $4\frac{7}{8}$ H	5 X $2\frac{3}{4}$
TP-506 B	FILTER	9	150	170	$2\frac{7}{8}$ X $2\frac{1}{2}$ X $3\frac{1}{2}$ H	$2\frac{1}{2}$ X 2
TP-507	FILTER	3.0	120	60	$2\frac{7}{8}$ X $2\frac{1}{2}$ X $3\frac{1}{2}$ H	$2\frac{1}{2}$ X 2
TLB-506 A (WE-197A)	FILTER	15	150	208	$5\frac{9}{16}$ X $5\frac{3}{8}$ X $4\frac{3}{8}$ H	$3\frac{1}{16}$ X $2\frac{9}{16}$

ISSUE	APPR'D	DATE	CHANGE
1		2/14/45	
2	[illegible]	6-22-46	"[illegible]" [illegible]
2 A			TL 517 ADDED & TL 502-A
2 B	[illegible]	11-1-48	REVISED TO INCLUDE CURRENT ITEMS.
2 C	[illegible]	5-21-49	TP-507 ADDED
2 D	[illegible]	7-2-51	TLB-506 ADDED

DR. BY EM; APPR'D [illegible]

ALTEC LANSING CORPORATION
HOLLYWOOD, CALIFORNIA

CHOKES

3755

PRINTED IN U.S.A.

* Indicates Additions and Changes.

Replaces Transformers - Power, Section of E.B. "Transformers - General", File 4.4s

TRANSFORMER	WHERE USED	* FREQ.	* PRIMARY WINDINGS	PRIMARY VOLTS	* SECONDARY WINDINGS	SECONDARY VOLTS	SECONDARY AMPS.	* REMARKS
90-B Repeating Coil	Filament & Plate 25-C & 51-A Amplifiers	60	1-2	105-115	3-4, 5-6 7-8 9-10	5.0 5.0 390.0	1.6 1.6 0.030	4, 5 are Center Taps for Winding 3-6, 8 & 9 are Strapped
303-A Transformer	Filament & Plate 34-A & 34-B Amplifiers	60	1-2	110	3-4 5-6 7-8 8-9	1.0 4.5 4.5 385.0	0.25 1.6 1.6 0.030	"T" is Common Center Tap for Windings, 3-4 & 5-6
303-B Transformer	Plate, 42-A, 46-A, B,C,D,E & F Amplifiers	60	1-2	110	3-3T 3T-4	430 430	0.063 0.063	
303-C Transformer	Filament, 42-A, 46-A,B,C,D,E & F Amplifiers	60	1-2	110	3-3T-4 5-5T-6	4.5 4.5	3.2 3.2	3T & 5T are Center Taps
303-D Transformer	Plate, 706-A Control Cabinet	720	1-2A-2B	90	3-4 5-5T-6			Supplies Plate Potential for 2, 205-D Tubes in Full Wave Rect. 1, 205-D Tube in Half Wave Rect. "5T" is Center Tap for 5-6
303-F Transformer	Filament, TA-7114 Panel	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-7 8-10	4.5 4.5	3.2 3.2	6 & 9 are Center Taps for Windings, 5-7 & 8-10
307-A Transformer	Plate, 43-A Amplifier	60	1-2	110	3-3T 3T-4	760 760	0.13 0.13	
307-B Transformer	Filament, 43-A & B-43-A Amplifiers	60	1-2	110	3-3T-4 5-5T-6	10.0 10.0	6.0 6.0	3T & 5T are Center Taps
308-A Transformer	707-A Control Cabinet	60	1-2 3-4	110 110	5-6 5-6	5.0 10.0	16.0 16.0	Line Voltage Regulator
310-A Transformer	Filament & Plate, 708-A Control Cabinet	60	1-2 1-3 1-4	105.0 110.0 115.0	5-7 6-7 8-9 10-11 12-13	450 450 300 4.65 4.65	0.080 0.080 0.043 3.2 3.2	Half Wave Rectifier
311-A Transformer	Projection Lamp, 202-B & TA-4050 -53 Reproducer Sets	-	-	-	-	-	-	Replaced by 311-B Transformer
311-B Transformer	Projection Lamp, 202-B & TA-4050 -53 Reproducer Sets	60	1-2	100-125	3-4	30	30	8 Taps on Primary to Adjust for Line Voltage
316-A Transformer	Plate, 57-A, 59-A & 59-B Amplifiers	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-6 7-8	655 655	0.130 0.130	Full Wave Rectifier
*316-B Transformer	5-A Rectifier	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-6-7 8-9-10	5.0 720	2.0 0.125	6 & 9 are Center Taps. Full Wave Rectifier.
317-A Transformer	Filament, 57-A Amplifiers	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-6 7-9 10-12 13-15	2.52 2.2 5.0 5.0	6.0 3.0 2.0 2.0	8, 11 & 14 are Center Taps for Windings, 7-9, 10-12 & 13-15

Electrical Research Products Inc.
OPERATING DEPT. – EQUIPMENT DIV.
PRINTED IN U.S.A.

ISSUE 1
July 2, 1936

* Indicates Additions & Changes *

TRANSFORMER	WHERE USED	FREQ.	PRIMARY WINDINGS	PRIMARY VOLTS	SECONDARY WINDINGS	SECONDARY VOLTS	SECONDARY AMPS.	REMARKS
317-C Transformer	Filament, 59-A & 59-B Amplifiers	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-6 7-8-9 10-11-12 13-14-15	2.52 10.0 5.0 5.0	6.0 0.70 2.0 2.0	8, 11 & 14 are Center Taps for Windings, 7-9, 10-12 & 13-15
319-A Transformer	Filament, 10-A Radio Receiver	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-6-7	2.13	8.0	6 is Center Tap, for Winding 5-7
321-A Transformer	Filament, 63-A Amplifier	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-6-7	10.0	0.70	6 is Center Tap, for Winding 5-7
322-A Transformer	10 Volt Supply, D-94852 & D-94852-B & D Control Unit	50-60	1-2	100	3-4	11.5	0.70	
325-A Transformer	Filament, 5-A Current Supply Set	50-60	1-2 1-3 1-4	107.5 115.0 122.5	5-7 8-10	2.5 2.5	16.0 16.0	6 & 9 are Center Taps
326-A Transformer	Plate, 5-A Current Supply Set	50-60	10)-3 9)-2 8)-1 7) 6) 5) 4)	107.5 115.0 122.5	11-12-13 14-15-16	40-64 40-64	3.0 3.0	12 & 15 are Center Taps. Taps 10,9,8,7,6,5 & 4 are used to adjust the secondary voltage.
327-A Transformer	Filament & Plate, D-94531 & D-95036 type Amplifiers except D-95036-E	50-65	1-2 1-3 1-4	107.5 115.0 122.5	5-7 8-10 11-13 14-16	5.0 10.0 5.0 834.0	2.5 0.7 2.0 0.108	6, 9, 12 & 15 are Center Taps for Windings, 5-7, 8-10, 11-13 & 14-16
328-A Transformer	Projector Lamp, D-94644 Type, Reproducer Set	60	4-7 3-7 2-7 1-7	100.0 107.5 115.0 122.5	5-6	20.0	12.5	5-6 is part of Winding, 1-7
*332-B Transformer	Filament & Plate, 86-A type Amplifiers	60	1-2 1-3	110 120	4-6 7-9 10-12 13-14	5.0 10.0 1120.0 5.0	2.4 1.92 0.106 2.0	Terminals 5, 8 & 11 are Center Taps for Windings, 4-6, 7-9 & 10-12
*352-A Transformer	Filament & Plate, 91-A Amplifier	60-63	1-2 1-3	110 120	4-6 7-8 9-11 12-14	10.0 5.0 1000.0 5.0	0.64 2.0 0.130 1.2	5, 10 & 13 are Center Taps for Windings 4-6, 9-11 & 12-14
*352-B Transformer	12-A Rectifier	60-63	1-2 1-3	110 120	4-5 6-8	5.0 130.0	6.0 1.4	7 is Center Tap for Winding 6-8
*357-A Transformer	Filament & Plate, 86-B & 86-C Amplifiers	50-60	1-2 or 1-3	110-120 110-120	4-6 7-9 10-12 13-14	5.0 10.0 1120.0 5.0	2.4 1.92 0.106 2.0	Terminals 5, 8 & 11 are Center Taps for Windings 4-6, 7-9 & 10-12
*359-A Transformer	Filament & Plate, 91-B Amplifier	50-60	1-2 or 1-3	110-120 110-120	4-6 7-8 9-11 12-14	10.0 5.0 985.0 5.0	1.2 2.0 0.130 2.4	Terminals 5, 10 & 13 are Center Taps for Windings 4-6, 9-11 & 12-14
*359-B Transformer	12-B Rectifier	50-60	1-2 or 1-3	110-120 110-120	4-6 7-9 10-12	5.0 10.0 1120.0	2.4 1.92 0.106	Terminals 5, 8 & 11 are Center Taps for Windings 4-6, 7-9 & 10-12
*ASL-2852 Transformer	Filament & Plate, TA-7321 Power Unit		1-2	115	C-17 C-18 C-19 C-20	17.0 18.0 19.0 20.0		

Electrical Research Products Inc.
OPERATING DEPT. — EQUIPMENT DIV.
PRINTED IN U.S.A.

ISSUE 1
July 2, 1936

* Indicates Additions & Changes *

TRANSFORMER	WHERE USED	FREQ.	PRIMARY WINDINGS	PRIMARY VOLTS	SECONDARY WINDINGS	SECONDARY VOLTS	SECONDARY AMPS.	REMARKS
D-87299 Transformer (Now Coded, 310-A)	Filament & Plate, 708-A Control Cabinet	60	1-2 1-3 1-4	105 110 115	5-6 6-7 8-9 10-11 11-12	450 450 300 4.65 4.65	0.08 0.08 0.043 3.2 3.2	
D-88444 Transformer	Plate, D-88446 Amplifier	25-60	1-2	110	3-3T 3T-4	430 430	0.063 0.063	This rating is for 25 Cycles
D-88445 Transformer	Filament, D-88446 Amplifier	25-60	1-2 1-3 1-4	107.5 115.0 122.5	3-4 5-6	4.5 4.5	3.2 3.2	
D-95557 Transformer	Plate, B-43-A, Amplifier	50-65	1-2 1-3 1-4	107.5 115.0 122.5	5-7	1920	1.73	6 is Center Tap of Winding 5-7
D-95660 Transformer	Filament, TA-7249 Rectifier	50-65	1-2 1-3 1-4	107.5 115.0 122.5	5-7 8-10 11-13 13-16	2.64 10.0 5.0 920.0	14.0 0.7 2.0 0.078	6 is Center Tap for Winding 5-7
D-95661 Transformer	Plate, TA-7249 Rectifier	50-65	1-2 1-3 1-4	107.5 115.0 122.5	5-7	3180	0.198	
D-95998 Transformer	Filament & Plate, D-95036-E Amplifier	50-65	1-2 1-3 1-4	107.5 115.0 122.5	5-7	5.0	2.5	6, 9, 12 & 15 are Center Taps for Windings 5-7, 8-10, 11-13 and 14-16
D-96835 Transformer	Plate, 87-A, B-87-A & 87-C Amplifiers	47-63	1-2 1-3	110 120	4-6	2940	0.121	5 is Center Tap for Winding 4-6
D-96836 Transformer	Filament, 87-A, B-87-A & 87-C Amplifiers	47-63	1-2 1-3	110 120	4-6 7-9 10-12	10.0 10.0 2.59	3.2 3.2 30.0	5, 8 & 11 are Center Taps for Windings 4-6, 7-9 and 10-12
*D-96970 Transformer	Filament & Plate, 86-C & B, & C-86-A Amplifiers	50-60	1-2 1-3	110 120	4-6 7-9 10-12 13-14	5.0 10.0 1120.0 5.0	2.4 1.92 0.106 2.0	5, 8 & 11 are Center Taps for Windings 4-6, 7-9 and 10-12
KS-2261 Transformer	Filament, 520-A, 521-A and D-94836 Panels	60	1-2 3-4	110	5-9 6-8	14.0	12.0 10.0	7 is Center Tap
KS-2264 Transformer	Plate, 520-A & D-94836 Panels	60	1-2 3-4	110 220	5-7	2200	0.7	6 is Center Tap of Winding 5-7
KS-6154 Transformer	Filament & Plate, 700-A Control Cabinet	20	4(start) 1 2 3	90 65 75 85	5-6 7-8 9-11	5.0 5.0 800.0	3.2 3.2 0.10	10 is Center Tap for Winding 9-11
KS-6155 Transformer	Filament & Plate, 701-A Control Cabinet	50-60	1-2 1-3 1-4 1-5 1-6 1-7 1-8	100 105 110 115 120 125 130	9-10 11-12 13-14 15-16 15-17 18-20	5.0 5.0 5.0 350 400 900	3.2 3.2 3.2 0.06 0.06 0.06	19 is Center Tap for Winding 18-20
*T-5797 Transformer	TA-4151 Loud-speaking Telephone	50-60	BL-BL	105-125	-	-	-	See E.B. "Loudspeaking Telephones, TA-4151 & TA-4153 Types", File 4.22.
*T-7186 Transformer	TA-4165 Loud-speaking Telephone	50-60	BL-BL	105-125	-	-	-	See E.B. "Loudspeaking Telephones, TA-4165 & TA-4166 Types", File 4.22.

Electrical Research Products Inc.
OPERATING DEPT. — EQUIPMENT DIV.
PRINTED IN U.S.A.

ISSUE 1
July 2, 1936

* Indicates Additions & Changes *

TRANSFORMER	WHERE USED	FREQ.	PRIMARY WINDINGS	PRIMARY VOLTS	SECONDARY WINDINGS	SECONDARY VOLTS	SECONDARY AMPS.	REMARKS
TA-7278 Transformer	Filament & Plate, TA-7276 Power Unit	50 to 62.5	1-2 1-3 1-4 1-5 1-6 1-7	100 105 110 115 120 125	Coil #1 (Fil.) Coil #2 (Fil.) Coil #1 (Anode) Coil #2 (Anode)	2.25 2.25 33.0 33.0	17.0 17.0 6.0 6.0	
#51157 Transformer (Heyer Products Co.)	Filament & Plate, TA-4144 Power Unit	50 to 62.5	1-2 1-3 1-4 1-5 1-6 1-7	100 105 110 115 120 125				Secondary Supplies Anode and Filament of Two #189048 Tungar Bulbs
#79884 Auto-Transf. (G.E.Co.)	In 220 Volt Output of KS-5321 Motor Generator Set	5-140	1-2	220	3-4	110	13.6	Has Flexible Leads Approx. 6" Long
#102311 Transformer (Heyer Products Co.)	Filament & Plate, TA-4038 Power Unit	50 to 62.5	1-2 1-3 1-4 1-5 1-6 1-7	100 105 110 115 120 125				Secondary Supplies Anode and Filament of Two #189048 Tungar Bulbs
#211312 Transformer (Heyer Products Co.)	Filament & Plate, TA-4035 Power Unit	50 to 62.5	1-2 1-3 1-4 1-5 1-6 1-7	100 105 110 115 120 125				Secondary Supplies Anode and Filament of Four #189048 Tungar Bulbs
#325311 Transformer (Heyer Products Co.)	Filament & Plate, TA-4036 Power Unit	50 to 62.5	1-2 1-3 1-4 1-5 1-6 1-7	100 105 110 115 120 125				Secondary Supplies Anode and Filament of Two #189048 Tungar Bulbs
#330304 Transformer (Heyer Products Co.)	Filament & Plate, TA-4033 Power Unit	50 to 62.5	1-2 1-3 1-4 1-5 1-6 1-7	100 105 110 115 120 125				Secondary Supplies Anode and Filament of Two #189048 Tungar Bulbs
#799827 Transformer (W.E. & Mfg. Co.)	KS-7146 type Current Supply Sets	50 to 62.5	1-2 1-3 1-4	105-110 111-119 120-125	5) Aging 6) Steps 7) 2.0 8) Volts 9) Per 10) Step			Secondary Feeds a Rectox Unit which has an output of 2.0 Amps. at 20.0 Volts.

REPLACING OUTPUT TRANSFORMER & REPEATING COIL
SECTION OF E.B. TRANSFORMERS - GENERAL, FILE 4.48

*INDICATES ADDITIONS OR CHANGES.

TRANSFORMER	USE	IMPED. RATIO (OHMS)	* SHIELD	*AVERAGE DC RESISTANCE (See Note) L.WINDING	*RES.	H.WINDING	*RES.
Output Transformer							
113-A	Output, 9-A Ampl.	8000:500	E	1-2 & 5-6	20	3-4 & 7-8	317
113-C	Output, 10-A Ampl.	3000:500	E	1-2 & 5-6	25.2	3-4 & 7-8	228
120-A	Output, 8-B & 17-B Amps.	6000:500	No	1-2 & 3-4	104	5-6 . . .	695
120-F	Output, 34-A & 34-B Amps.	4000:4000	No	1-2 & 3-4	450	5-6 . . .	450
120-G	Output, 32-A Ampl.	4000:2000	No	1-2 & 3-4	210	5-6 . . .	450
120-H	Output, 25-C & 51-A Amps.	4000:35	No	1-2 & 3-4	4.13	5-6 . . .	565
127-A	Output, 42-A & 46-E Amps.	8000:500:250	No	1-2-3-4 .	58.5	5-6 & 7-8	925
127-C	Output, 49-A, 49-B, 49-C, 50-A, D-85943, D-86729, & TA-7310 type Amps. and 207-A Panel	23000:500	No	1-2 & 5-6	67	3-4 & 7-8	3220
127-D	Output, 46-A,B,C,D,F type & D-88446 Amps.	7200:8	No	1-2 . . .	0.675	3-4 & 5-6	860
128-A	Output, 43-A Ampl.	6500:500	No	1-2 & 5-6	18.2	3-4 & 7-8	200
130-A	Output, 47-A, 47-B, 53-A & 53-B Amps.	25000:200	No	1-2 & 3-4	37.2	5-6 . . .	2440
131-A	Output, 8-C Ampl.	6000:500	No	1-2 & 3-4	105	5-6 . . .	695
132-A	Output, 48-A & 54-A Amps.	25000:200	No	1-2 & 3-4	37	5-6 . . .	2440
132-C	Output, 62-A, TA-7246 & TA-7261 Amps.	23000:500	No	1-2 & 5-6	56	3-4 & 7-8	2740
134-C	Output, 57-A Ampl.	6800:500	No	1-2 & 5-6	23	3-4 & 7-8	122
134-D	Output, 59-A & 59-B Amps.	6800:500:8	No	1-2-3 . .	21	4-5 & 6-7	177
139-A	Output, 10-A Radio Receiver	30000:140	No	1-2 . . .	12	3-4 . . .	3950
144-A	Output, D-94531 & D-95036 type Amps., except D-95036-E Amps.	6800:8	No	1-2 . . .	0.37	3-5 . . .	140
147-A	Output, 63-A Ampl.	25000:200	No	1-2 & 3-4	38	5-6 . . .	2430
150-A	Output, 80-A & 80-B type Amps.	25000:200	No	1-2 & 3-4	38	5-6 . . .	2500
*159-B	Output, 86-C & B-86-A Amps.	(4130:12 (4130:6		1-2 . . . 1-1T . .	.515 .349	3-4 & 5-6	167
166-A	Output, 86-A type Ampl.	4130:12:6	No	1-1T-2 .	0.49	3-4 & 5-6	120
170-A	Output, PEC 209-A & B Repro. Sets and TA-7391 Coupling Unit	357000:25	No	1-2 . . .	3.4	3-4 . . .	4400
171-A	Output, 91-A Ampl.	(3000:9 (1900:3.5 (1190		1-3 . . .	.825	4-5-6-7 .	143
D-95659	Output, B-10-A, C-10-A, D-10-A, B-43-A, C-43-A, 87-A & TA-7248 & TA-7248-A Amps.	8000:16	No	(5-6 & 7-8 (& 9-10 & (11-12	0.44	1-2 & 3-4	77.5
D-95995	Output, D-95036-E Ampl.	6800:16		1-2 & 3-4	0.85	5-7 . . .	178
D-96736	Output, D-46-A, D-46-B, H-46-C & F-46-F Ampls.	18000:5	No	1-1T-2 .	0.23	3-4 & 5-6	590
Repeating Coil							
80-A	Radio Broadcasting Systems	200:500	No	1-2 & 5-6	13.8	3-4 & 7-8	42.5
80-B	D-88449 type Panels & Radio Broadcasting Systems	200:200	No	1-2 & 5-6	18.3	3-4 & 7-8	22.6
105-A	201 type Panels	200:50	No	1-2 & 5-6	10	3-4 & 7-8	24
111-C	Output, TA-7294 Control Cabinet	600:600	E	1-2-5-6 .	35	3-4-7-8-	35
118-A	Output, 711-A Control Cabinet	200:200	No	1-2 & 5-6	12.6	3-4 & 7-8	12.6
D-87744 (now coded 118-A)	Output, 711-A type Control Cabinet	200:200	No	1-2 & 5-6	12.6	3-4 & 7-8	12.6
D-93957 (now coded 137-A)	Ant. Coupling, 10-A Radio Receiver (245-B & 246-A Panels)	100:1000	E	1-2 & 5-6	0.4	3-4 & 7-8	4
D-94288	"Vertical" Input, D-94255 type Control Cabinet & TA-7253 type Equalizer	5:500	No	1-2 . . .	0.44	3-4 . . .	41
D-96245	TA-7284 Control Cabinet	16:500	No	1-2 . . .	0.33	3-4 . . .	12.5
*D-97823 (now coded 141-A)	Music Reproducing Systems	5:500	M	1-2 . . .	0.30	3-10 . .	2800

E - Electrostatic Shield; M - Magnetic Shield.

Note: The "Average" D.C. Resistances are for, (a) the Low windings in series, (b) the High windings in series. These values are for checking purposes only, because of manufacturing limits, to permit the adjustment of turns for inductance unbalance, etc. The "Maximum" or "Minimum" D.C. Resistance may vary 12% from the "Average".

Electrical Research Products Inc.
OPERATING DEPT. - EQUIPMENT DIV.
PRINTED IN U.S.A.

ISSUE #1
May 20, 1936

REPLACING INPUT-TRANSFORMER SECTION OF
E.B. TRANSFORMERS - GENERAL, FILE 4.48

INPUT TRANSFORMERS

* INDICATES ADDITIONS OR CHANGES.

TRANSFORMERS	USE	IMPED. RATIO (OHMS)	* SHIELD	*AVERAGE DC RESISTANCE (See Note) L. WINDING	*RES.	H. WINDING	*RES.
Auto-Transformers							
7-A	TA-7257 Network, 200-A, 209-A, ASL-2828 & D-85125 Panels	500:16	No	2-13 . .	-	1-13 . . .	10.4
*TA-4183	Music Reproducing & P.A. Systems	50:8.0:Var.	No	L-C or H-C	-	1-C or 10-C	-
Induction Coil							
#13	521-A Subscriber Set	. . . . .	No	P-P . . .	1.3	S-S	16.9
#66	D-85125 Panel	. . . . .	No	1-2 . . .	5.6	3-4	79.5
Input Transformers							
208-AD	Input, 518-B Panel	500:14000	No	1-2 . . .	54	(3-4-5-6-7-(8-9-10-11-(12-)13-)14 .	3400
208-K	700-A Control Cabinet	600:80000	E	1-2 & 5-6	5.8	3-4 & 7-8 .	335
208-R	Input, 9-A Ampl.	4000:30000	No	1-2 & 5-6	895	3-4 & 7-8 .	5050
208-W	Input, 10-A Ampl.	4000:8000	No	1-2 & 5-6	305	3-4 & 7-8 .	310
226-B	Interstage, 8-B & A-8-B Ampls.	6000:165000	No	1-2 . . .	19800	1-4	10500
226-G	Input, 32-A Ampl.	20000:133000	No	1-2 . . .	2190	3-4	6950
226-H	Input, 34-A & 34-B Ampls.	200:100000	No	1-2-3 . .	58	4-5-6-7-8 .	6300
227-A	Interstage, 34-A & 34-B Ampls.	20000:133000	No	1-2 & 3-4	2190	5-6	5650
227-C	Input, 25-C & 51-A Ampls.	35:140000	No	1-2 . . .	3.8	3-4	6180
233-B	Input, 8-B & A-8-B Ampls.	200:25000	No	1-2 & 3-4	37.4	6-7-8 . . .	2440
233-D	Interstage, 32-A, D-85943, D-85943-A & E, D-86729, D-86729-A & E, and TA-7310 Ampls.	20000:50000	No	1-2 & 5-6	3020	3-4 & 7-8 .	4740
233-E	Input, 32-A, 41-A, A-41-A, 41-B, E-41-C Ampls. (See D-88822 Input Transf.)	200:25000	No	1-2 & 5-6	52.2	3-4 & 7-8 .	3920
233-F	Input, 203-B Panel	500:14000	No	1-2 . . .	143	3-14 . . .	3890
233-G	Input, 42-A Ampl.	16000:64000	No	1-2 & 5-6	2600	3-4 & 7-8 .	5200
233-H	Interstage, 46-A, 46-B type & D-88446 Ampls.	20000:180000	No	1-2 . . .	1740	3-4 & 5-6 .	5210
233-J	Input, 46-A, 46-B type & D-88446 Ampls. * (Replace with 247-A and Det. 1-A, ASP-930 Mounting Plate)	250:250000	No	1-2 & 3-4	70.5	5-6	7600
241-A	Input, A-10-A, C-10-A & 43-A type Ampls.	275:3370	No	1-2 & 5-6	62	3-4 & 7-8 .	895
242-F	706-A & 708-A Control Cabinets	600:80000	No	1-2 & 5-6	16.5	3-4 & 7-8 .	1680
246-A	Interstage, 49-A, 49-B & 49-C type, D-85943-B,C,&D D-86729-B,C & D, D-94531-A & D-95036-A & B Ampls.	13000:117000	No	1-2 & 5-6	1690	3-4 & 7-8 .	6000
247-A	Input, 46-C,D,E & F type, D-46-B, A-80-B, D-90500, D-94013, TA-7261 & TA-7246 Ampls.	250:159000	No	1-2 & 3-4	75	5-6	5740
247-B	Interstage, 46-C,D,E & F type & D-46-B Ampls.	16000:100000	No	1-2 & 5-6	2050	3-4 & 7-8 .	5200
247-H	Input, 59-A Ampl.	200:135000	No	1-2 & 3-4	15.4	5-6	4850
247-J	Input, 57-A Ampl.	250:75000	No	1-2 & 5-6	26.8	3-4 & 7-8 .	3900
247-E	Interstage, 59-A & 59-B Ampls.	16000:75000	No	1-T-2 .	1150	3-4 & 5-6 .	3400
247-L	Interstage, 59-A & 59-B Ampls.	17000:113000	No	1-2 . . .	1350	3-4	4300
257-A	Detector Input, 10-A Radio Receiver	1:1	No	1-2 . . .	-	3-4	-
258-A	Input, D-94531 & D-95036 type Ampls., except D-95036-E Ampl.	200:80000	M	Rd-Bl . .	43.5	Gr-Bl.Wh. .	5750
260-A	Interstage, D-94531 & D-95036 type Ampls., except D-95036-E Ampl.	18000:84000	No	1-2 . . .	2260	3-5	5200
261-A	Input, 59-A, 59-B & 63-A Ampls. (Mid tap for 387 Transmitter)	200:135000	M	1-2-3-4 .	15.2	5-6	4850
261-B	Input, 86-A type Ampls.	200:110000	E&M	1-2 & 3-4	15.7	5-6	4440
264-A	Input, 80-A Ampl.	25:150000	M	1-2 & 3-4	0.96	5-6	3990
264-B	Input, 80-B & D-95036-E & F Ampls.	200:135000	M	1-2 & 3-4	15.4	5-6	4760
264-C	Interstage, 86-A type Ampls.	18000:100000	No	1-2 . . .	2010	3-4 & 5-6 .	4950
*285-A	Input, 91-A Ampl.	30:200000	E&M	1-2 . . .	5	3-4	4400
D-88822	Spec. Input, 41-A Ampl. for 6 db Increased Gain	200:100000	No	1-2 & 5-6	8.6	3-4 & 7-8 .	3900
D-95072	Input, 41 & 53 type Ampls. using 618 Transmitter	30:150000	No	1-2 & 3-4	2.26	5-6	3900
D-95658	Input, B-10-A, 87-A & TA-7248 & TA-7248-A Ampls.	250:30900	No	1-2 & 5-6	66	3-4 & 7-8 .	4700
D-95997	Interstage, D-95036-E Ampl.	17000:113000	No	1-2 . . .	1370	3-4	3990

E - Electrostatic Shield; M - Magnetic Shield.

Note: The "Average" D.C. Resistances are for, (a) the Low windings in series, (b) the High windings in series. These values are for checking purposes only, because of manufacturing limits, to permit the adjustment of turns for inductance unbalance, etc. The "Maximum" or "Minimum" D.C. Resistance may vary 12% from the "Average".

Electrical Research Products Inc.
OPERATING DEPT. - EQUIPMENT DIV.
PRINTED IN U.S.A.

ISSUE #1
May 20, 1936

1. DESCRIPTION

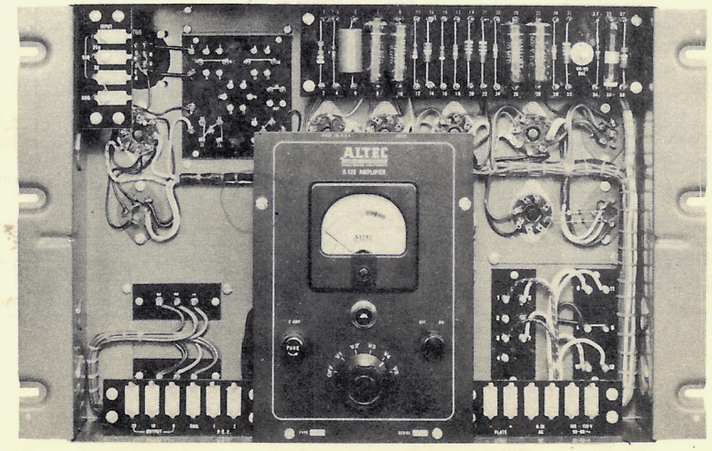
1.1 The A-126 Amplifier is an all AC operated voltage gain and power amplifier, of recessed panel type construction with a removable front panel. The amplifier consists of 2 voltage stages, a phase inverter and a pushpull stage and has provision for tapped attenuation in steps of 4, 8 and 12 db. It is equipped with an equalizer section for HF and LF equalization which is so designed that there is no insertion loss for any setting of equalization. It supplies plate and filament voltage for 2 Altec Lansing A-421 Cathode Follower Amplifiers as well as for pre-amplifiers. A potentiometer is included in the cathode circuit of the output stage to balance tubes for maximum power and minimum hum.

2. CHARACTERISTICS

GAIN	90 db Max.
ATTENUATION	Taps for 4, 8 and 12 db attenuation from full gain
POWER OUTPUT at 8% Intermodulation or 2% Total Harmonics	15 watts / 41.8 dbm *
FREQUENCY RESPONSE	Flat within 1 db 20-20,000 cps with Equalizer strapped out
NOISE LEVEL	-27.2 dbm *
IMPEDANCE Input (Source) Output (Load)	 30 - 250 - 500 ohms 10 or 20 ohms
VACUUM TUBES	2-6J7; 1-6J5; 2-6L6G; 1-5U4G; 1-0C3 VR
POWER REQUIRED	105/130 volts 50/60 cycles 110 watts
POWER SUPPLIED	85V regulated DC for 2 Altec Lansing A-421 Cathode Follower Amplifiers and PEC'S with 1 milliamp drain. Also 300 V DC at 30 MA - and 6.3 V AC at 2 amp
FUSING	2 Amp. Buss 3 A G
EQUALIZATION	See Correction Data - Page 2
DIMENSIONS	12-1/4" high x 19" long x 9-1/4" deep
WEIGHT	39 lbs.

* dbm uses a reference level of 1.0 milliwatt (0.001 watt). To correct to reference of 6.0 milliwatts (0.006 watt) subtract algebraically 7.8 db.

ASSOCIATED DRAWING - 3885



Issued by
Engineering Department
Printed in U. S. A.

January 13, 1946
Issue #1

ALTEC SERVICE CORPORATION

ALTEC LANSING

AMPLIFIER, A-126 — SOUND EQUIPMENT BULLETIN

3. EQUALIZATION

3.1 An equalizer, a simplified circuit of which is shown in the lower left hand corner of Drawing 3885, is incorporated as an integral part of this amplifier which provides a large number of combinations of equalization. Basically, it permits of individual settings of Low End droop, Low End rise, High End cut-off and High End rise.

The low droop section involves equalizer terminals 1,2,3,4,5,6 normal flat 1-4
" " rise " " " " " 7,8,9,10,11,12 " " 7-10
" high " " " " " 13,14,15,16 " " open 13 and 16
" " cut-off " " " " " In,Out,19,20,21,22 " " Out,(no strap on "In")

A combination of the various strappings listed in the correction chart will provide practically any equalization curve desired for a given condition.

The equalizer consists of 4 individual equalizer sections any one of which may be employed separately or combinations of any 2 or more sections can be used collectively. For example, a combination of low droop classification 11, low rise class 23, high rise class 32, and high cut-off class 41 may be made to result in an overall correction of the algebraic total of the classes as follows:

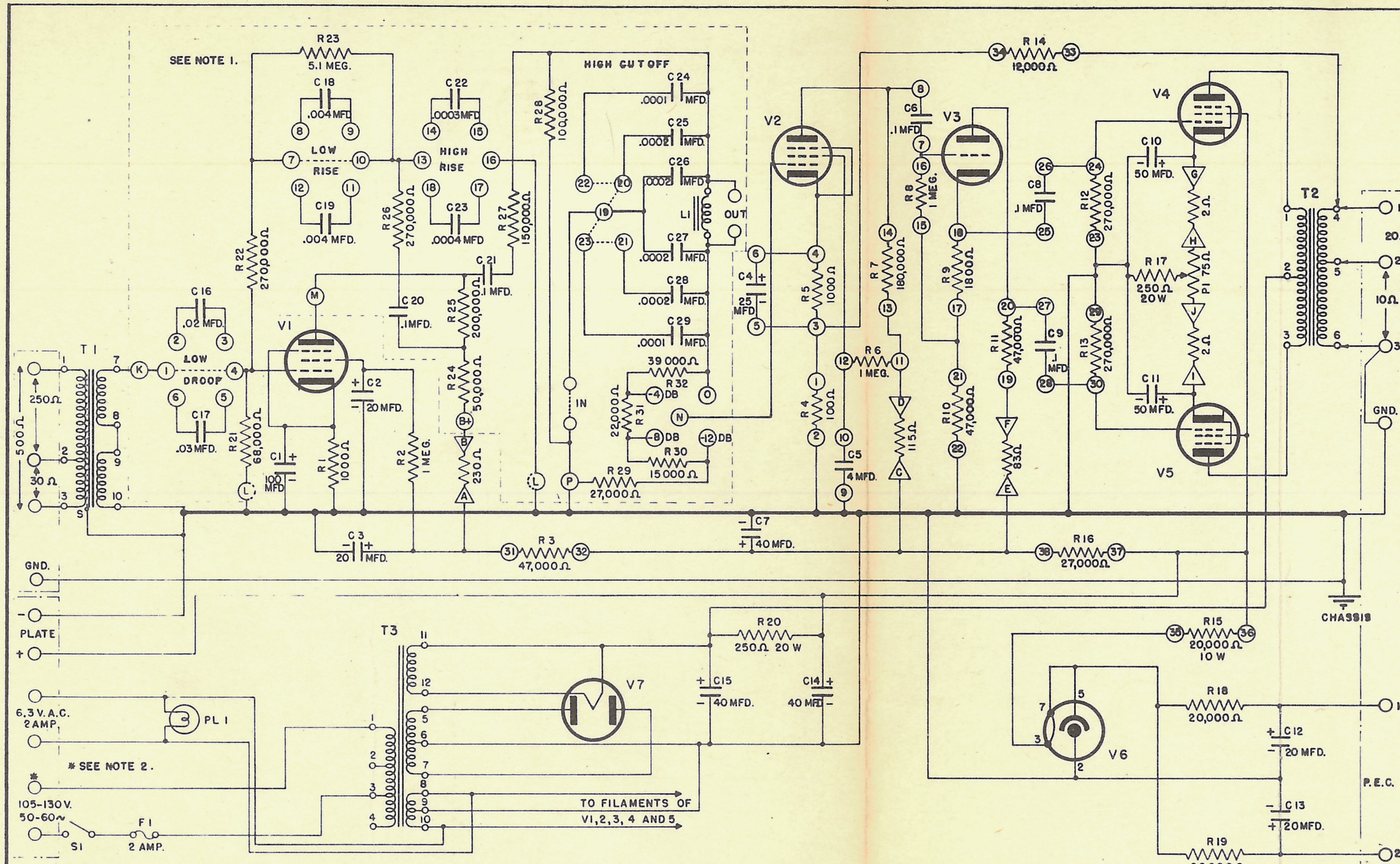
	40	55	70	130	300	500	1000	2000	3000	5000	7000	8000
Class 11	1.6	0.8	0.6	0	0	0	0					
" 23	-4.2	-4.0	-3.8	-2.0	-0.4	0	0					
" 32								-0.8	-1.6	-3.2	-4.4	-4.8
" 41								0	0	1.0	3.6	5.6
Total	-2.6	-3.2	-3.2	-2.0	-0.4	0	0	-0.8	-1.6	-2.2	-0.8	+0.8

As shipped the strappings are: 10-20-30-44

When equalization is required of less than all 4 sections, the remaining and unused sections must be strapped for flat response.

CORRECTION FACTORS FOR EQUALIZER STRAPPING FREQUENCY

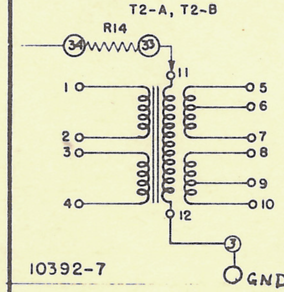
Section	Class	Strapping	40	55	70	130	300	500	1000	2000	3000	5000	7000	8000
Low Droop	10	1-4	0	0	0	0	0	0	0					
	11	1-2-6,3-4-5	+1.6	+0.8	+0.6	0	0	0	0					
	12	1-6,4-5	+3.2	+2.0	+1.2	0	0	0	0					
	13	1-2,3-4	+5.6	+4.0	+2.8	+1.0	0	0	0					
	14	1-2,3-6,4-5	+9.8	+7.2	+4.2	+2.4	+0.2	0	0					
Low Rise	20	7-10	0	0	0	0	0	0	0					
	21	7-8-12,9-10-11	-2.0	-1.2	-0.4	0	0	0	0					
	22	7-8,9-10	-4.0	-2.8	-2.2	-0.8	0	0	0					
	23	1-2,6,3-4-5,7-8, 12-9,11-10	-4.2	-4.0	-3.8	-2.0	-0.4	0	0					
	24	7-8,9-12,10-11	-5.6	-5.2	-4.4	-2.4	-0.6	0	0					
High Rise	30	No straps on 13 and 16							0	0	0	0	0	0
	31	13-14,15-18, 16-17							0	-0.2	-0.8	-2.0	-2.8	-3.2
	32	13-14,15-16							0	-0.8	-1.6	-3.2	-4.4	-4.8
	33	13-18,16-17							0	-1.2	-2.4	-4.0	-5.6	-6.2
	34	13-14-18, 15-16-17							0	-2.4	-3.8	-5.4	-5.6	-5.8
High Cut Off	40	Out							0	0	0	0	0	0
	41	1-4,7-10 In							0	0	0	+1.0	+3.6	+5.6
	42	19-22-23 In							0	0	0	+1.4	+5.2	+8.0
	43	19-20-21 In							0	0	+0.4	+1.6	+7.6	+11.2
	44	19-20-21-22-23 In							0	0	+0.2	+2.4	+9.6	+13.2



PARTS LIST	
C1	100 MFD. 25 V.D.C.
C2,3,7,12,13	20X20 MFD. 450 V.D.C.
C4	25 MFD. 25 V.D.C.
C5	4 MFD. 350 V.D.C.
C6,8,9	.1 MFD. 600 V.D.C.
C10,11	50X50 MFD. 150V.D.C.
C14,15	40 X 40 MFD. 450 V.D.C.
C16	.02 MFD. 600 V.D.C.
C17	.03 MFD. 600 V.D.C.
C18,19	.004 MFD. 300 V.D.C.
C20,21	.1 MFD. 600 V.D.C.
C22	.0003 MFD. 500 V.D.C.
C23	.0004 MFD. 500 V.D.C.
C24,29	.0001 MFD. 500 V.D.C.
C25,26,27,28	.0002 MFD. 500 V.D.C.
R1,5	1000 OHMS 1/2 WATT
R2,6,8	1 MEGOHM " "
R3,24	47,000 OHMS " "
R4	100 " " "
R7	180,000 " 1 "
R9	1800 " 1/2 "
R10,11	47,000 " 1 "
R12,13	270,000 " 1/2 "
R14	12,000 " " "
R15	20,000 " 10 "
R16	27,000 " 1 "
R17,20	250 " 20 "
R18,19	20,000 " 1/2 "
R21	68,000 " " "
R22,26	270,000 " " "
R23	5.1 MEGOHMS " "
R25*	200,000 OHMS 3/4 "
R27	150,000 " 1/2 "
R28	100,000 " " "
R29	27,000 " " "
R30	15,000 " " "
R31	22,000 " " "
R32	39,000 " " "
A – B	ALTEC LANSING PRECISION RESISTORS PER DWG. 3884: 230 OHMS
C – D	140 "
E – F	83 "
G – H	2.6 "
I – J	2.6 "
L1	ALTEC LANSING TYPE TA 325
T1	" " " TBB 103
T2	" " " TL 217
T2-A	" " " TL 216
T3	" " " TJ 604
V1,V2	1620 (6J7 MAY BE SUB'D FOR V2)
V3	6J5
V4,V5	6L6G
V6	OC3
V7	5U4G
F1	2 AMP. TYPE 3AG
S1	CENTRALAB 1411 6 POS. 2 CIR.
M1	ALTEC LANSING % METER PER DRAWING 3679
P1	75 OHMS IRC W-75
PL1	GE MAZDA NO. 44
S2	H & H NO. 81715 S.P.S.T.
T2-B	ALTEC LANSING TYPE TL 219
R24*	50,000 OHMS 3/4 WATT

* USE S.S. WHITE NOISE TESTED RES.

T2-A, T2-B



(A126A) T2-A SECONDARY CONNECTIONS

LINE	CONNECT	STRAP
14 OHMS	① 5, 10 ②	5-9, 6-10
56 "	① 6, 9 ②	6-8, 7-9
125 "	① 5, 10 ②	5-8, 7-10
220 "	① 6, 9 ②	7-8
† 500 "	① 5, 10 ②	7-8

† SHIPPED STRAPPED FOR 500 OHMS

(A126B) T2-B SECONDARY CONNECTIONS

LINE	CONNECT	STRAP
500 OHMS	① 6, 9 ②	6-8, 7-9
750 "	① 5, 10 ②	5-8, 7-10
2000 "	① 6, 9 ②	7-8 ③
†† 3000	① 5, 10 ②	7-8 ③

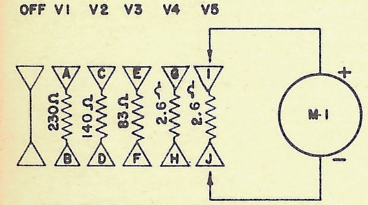
†† SHIPPED STRAPPED FOR 3000 OHMS
CONNECT TERTIARY AS SHOWN

CIRCLED NUMBERS ARE TERM. STRIP NUMBERS

NOTES:

1. AMPLIFIER IS SHIPPED WITH EQUALIZER SECTION STRAPPED AS SHOWN BY DOTTED LINES. EQUALIZER SECTION SHOWN INSIDE DOTTED BORDER.
2. CONNECT THIS TERMINAL TO GROUND SIDE OF COMMERCIAL AC LINE.

ALTEC LANSING
TYPE A126 AMPLIFIER



METER & SWITCH ASSEMBLY– S1

OPERATING DATA	
GAIN:	90 DB AT 1000 C.P.S.
POWER OUTPUT: 15 WATTS AT 8% IM. OR 2% TOTAL HARMONICS	+34 DB (.006 W. REF. LEVEL) +41.8 DBM (.001 W. REF. LEVEL)
FREQUENCY RESPONSE:	± 1 DB. 20 TO 20,000 C.P.S.
HUM LEVEL:	– 35 DB. (.006 W. REF. LEVEL) – 27.2 DBM. (.001 W. REF. LEVEL)
NOTE: SEE DRAWING NO. 3809 FOR POWER CURVE.	

10392-7

REDUCE TO 9" LONG AND TRIM TO THIS LINE

PRINTED IN U. S. A.

11-A	DLD	12-6-46	T2-A&B CONNECTIONS CLARIFIED

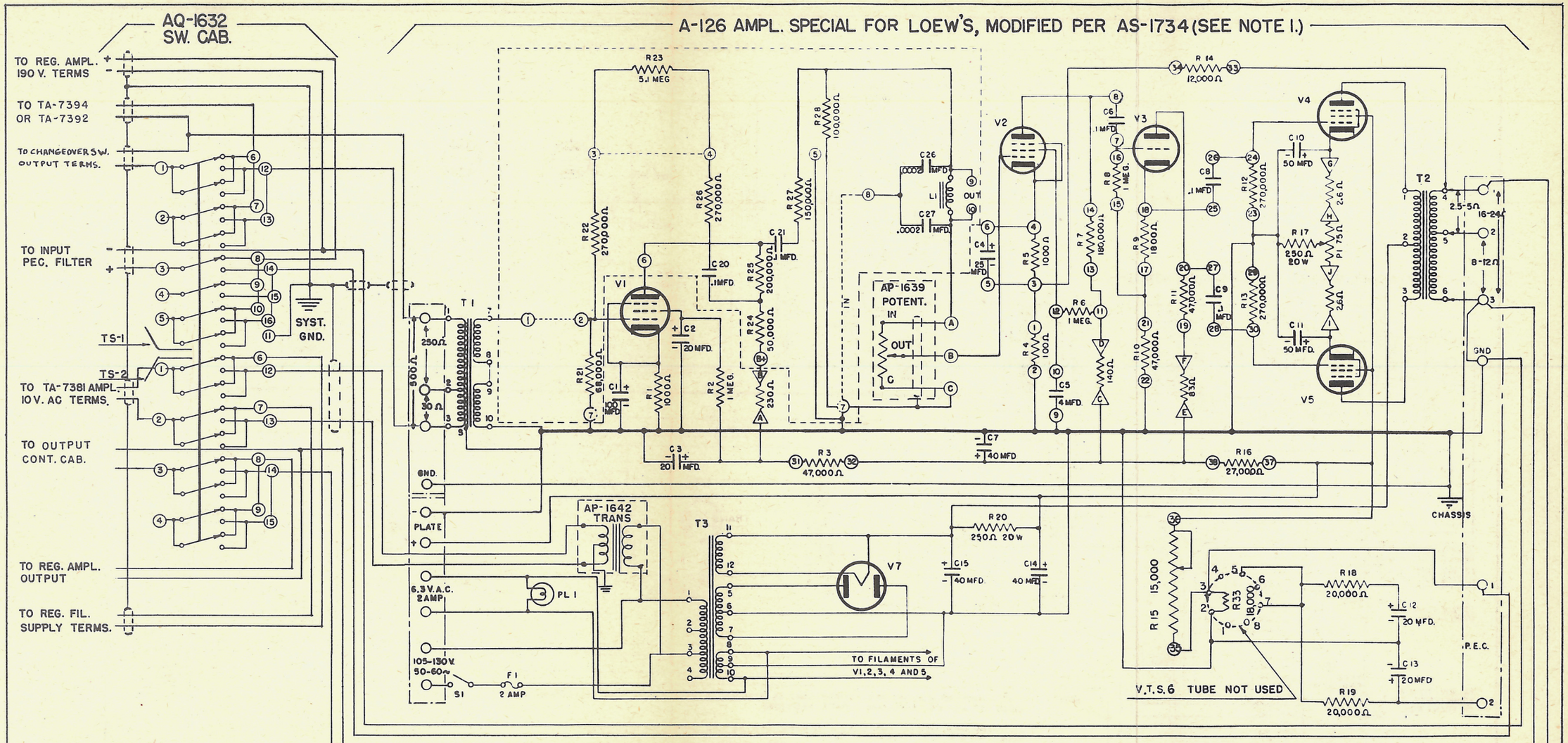
ISSUE	APPR'D	DATE	CHANGE
7	CMM	7-5-46	REDRAWN, T-2A & T-2B CONNECTIONS SHOWN
8	CMM	8-6-46	#35 Term. CHANGED TO #33
9	CMM	8-20-46	T-2-A connections changed
10	CMM	9-8-46	connections shown to ⑲ Equalizer Terminal.
11	CMM	9-30-46	SHUNT C-D WAS 115Ω, G-H, I-J WERE 2Ω S.S. WHITE SPECIFIED FOR R-24, 25

DR. BY [signature] APPR'D

ALTEC LANSING CORPORATION
HOLLYWOOD, CALIF.

A 126 AMPLIFIER SCHEMATIC

3885



NOTE 1: THE A-126 AMPLIFIER, SPECIAL FOR LOEW'S MODIFIED PER AS-1734 SAME AS STANDARD A-126 EXCEPT FOR THE FOLLOWING:

ADDED		REMOVED	
R-15	15,000 OHM, 25 WATT, ADJUSTABLE	R-15	20,000 OHM, 10 WATT
R-33	18,000 " , 10 "	R-29	27,000 " , 1/2 "
AP-1639	POTENTIOMETER	R-30	15,000 " , 1/2 "
AP-1642	TRANSFORMER	R-31	22,000 " , 1/2 "
		R-32	39,000 " , 1/2 "
		V-6	OC-3 TUBE

ISSUE 1 6-30-47 APP'D

DRAWN BY DJ DATE 6-30-47

APP'D DATE

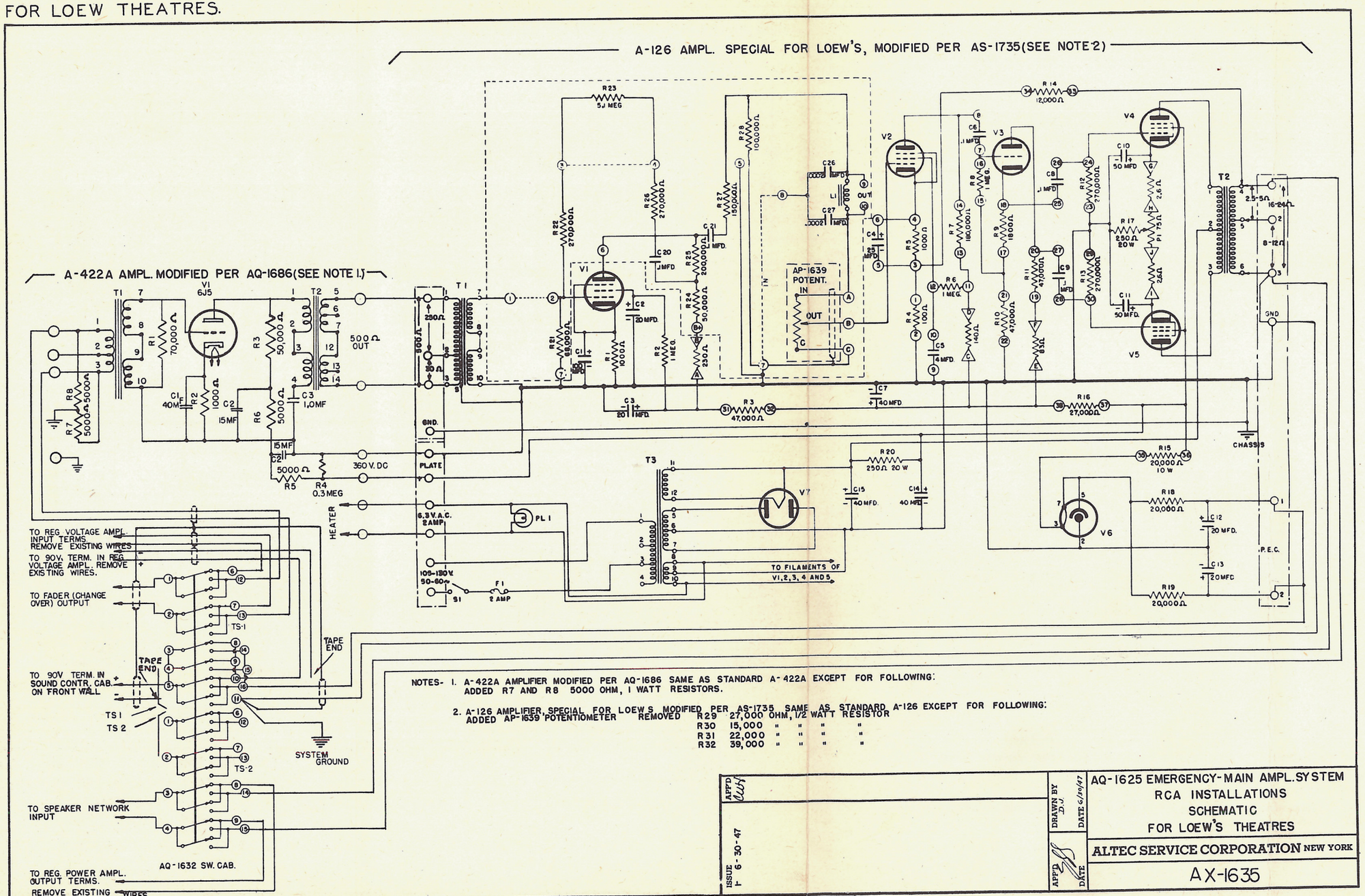
AQ-1624 EMERGENCY MAIN AMPL. SYSTEM
W.E. INSTALLATIONS (USING TA-7381 AMPLS.)
SCHEMATIC
FOR LOEW'S THEATRES

ALTEC SERVICE CORPORATION NEW YORK

AX-1634

PRINTED IN U.S.A.

A.L. EMERGENCY SYSTEM, FOR LOEW THEATRES.



NOTES- 1. A-422A AMPLIFIER MODIFIED PER AQ-1686 SAME AS STANDARD A-422A EXCEPT FOR FOLLOWING:
ADDED R7 AND R8 5000 OHM, 1 WATT RESISTORS.

2. A-126 AMPLIFIER, SPECIAL FOR LOEW'S MODIFIED PER AS-1735 SAME AS STANDARD A-126 EXCEPT FOR FOLLOWING:
ADDED AP-1639 POTENTIOMETER REMOVED R29 27,000 OHM, 1/2 WATT RESISTOR
R30 15,000 " " " "
R31 22,000 " " " "
R32 39,000 " " " "

APP'D		AQ-1625 EMERGENCY-MAIN AMPL. SYSTEM RCA INSTALLATIONS SCHEMATIC FOR LOEW'S THEATRES
ISSUE 1 - 6 - 30 - 47	DRAWN BY D.J. DATE 6/19/47	ALTEC SERVICE CORPORATION NEW YORK
	APP'D DATE	AX-1635

PRINTED IN U.S.A.

1. PURPOSE - Hum reduction in Altec Lansing Amplifier Systems.

2. A-421 Cathode Follower, 721 Control Cabinet & A-126 Amplifier. Both the ground and hot side of the A-421 should be carried to the respective change-over cabinets in two conductor shielded wires which has an outer cloth or rubber covering so that its shield is insulated from the other shields. The common terminal of each 721 Cabinet should go to the ground position on the A-126 Amplifier in such a way that the only circuit ground for all three of these items is at the A-126 Amplifier.

3. A-420, A-422 and A-422-A Amplifiers. - The strap between " -Plate" terminal and the chassis ground lug should be removed. All pre-amplifiers now shipped from the factory have this modification. The " -Plate" of the pre-amplifiers will go to ground through the power supply.

3.1 Additional hum reduction may be obtained in the A-422 and A-422-A Amplifiers by replacing Resistor R-8, 10,000 ohms with 2 - 5000 ohm resistors connected in series. Disconnect 1 - 15 mf section of C-2 and connect to the junction of the 2 - 5000 ohm resistors.

4. A-126 Amplifier - The ground lug on the lower left hand terminal strip is the main ground. This lug may also be used as " -Plate" as it is strapped internally to the " -Plate" terminal on the lower right hand terminal strip. On early amplifiers the ground lug on the upper left hand terminal strip should be used only to ground the shield of input cable or one side of input line, if that is required. New A-126 Amplifiers have the ground lugs on the upper left hand and lower left hand terminal strips tied together so that they may be used indiscriminately.

Issued by
Engineering Dept.
Printed in U. S. A.

Nov. 4, 1946
Issue #2

	13	3-4	0.02	1 & 2	-5.6	-4.0	-2.6	-1.0	0	0	0					
	14	3-4	0.02 -0.03	1 & 2	-9.8	-7.0	-5.4	-2.4	-0.2	0	0					
Low Rise	10	1-2, 3-4			0	0	0	0	0	0	0					
	21	1-2	0.004 + 0.0004	3 & 4	+2.0	+1.2	+0.4	0	0	0	0					
	22	1-2	0.004	3 & 4	+3.8	+3.0	+2.2	+0.8	0	0	0					
	23	1-2	0.004 - 0.004	3 & 4	+5.8	+5.2	+4.4	+2.4	+0.6	+0.2	0					
Comb. Low Rise & Low Droop	30		0.02 +0.03 0.004 -0.004	1 & 2 3 & 4	+3.8	+3.6	+3.4	+2.2	+0.5	+0.1	0					
	31		0.03 0.004 -0.004	1 & 2 3 & 4	+2.3	+2.5	+2.7	+1.9	+0.6	+0.2	0					
	32		0.02 +0.03 0.004	1 & 2 3 & 4	+2.3	+1.8	+1.6	+0.4	+0.2	+0.1	0					
	33		0.03 0.004	1 & 2 3 & 4	+0.6	+0.7	+0.8	+0.5	+0.2	+0.1	0					
	34		0.02 +0.03 0.004 +0.004	1 & 2 3 & 4	+0.4	+0.3	+0.2	+0.1	0	0	0					
	35		0.02 0.004 -0.004	1 & 2 3 & 4	+0.1	+0.5	+1.3	+1.3	+0.3	+0.1	0					
	36		0.03 0.004 +0.004	1 & 2 3 & 4	-1.4	-1.0	-0.7	-0.3	-0.1	0	0					
	37		0.02 0.004	1 & 2 3 & 4	-1.5	-1.0	-0.5	-0	0	0	0					
	38		0.02 -0.03 0.004 -0.004	1 & 2 3 & 4	-3.1	-1.8	-1.1	-0.1	0	0	0					
	39		0.02 0.004 +0.004	1 & 2 3 & 4	-3.7	-2.6	-1.9	-0.7	0	0	0					
	40		0.02 -0.03 0.004	1 & 2 3 & 4	-4.9	-3.7	-3.1	-1.6	-0.5	-0.2	0					
	41		0.02 -0.03 0.004 +0.004	1 & 2 3 & 4	-7.5	-5.8	-4.6	-2.2	-0.5	-0.1	0					
High Cut-Off	50	9-10									0	0	0	0	0	0
	51	7-8									0	0	0	-1.0	-3.6	-5.6
	52	7-8	0.0001 0.0001	8 & 9 8 & 10							0	0	0	-1.4	-5.0	-8.0
	53	7-8	0.0002 0.0002	8 & 9 8 & 10							0	0	-0.2	-1.8	-7.6	-11.0
	54	7-8	0.0001 +0.0002 0.0001 +0.0002	8 & 9 8 & 10							0	0	-0.2	-2.4	-9.6	-13.2
High Rise	50	9-10									0	0	0	0	0	0
	61	9-10	0.0003 -0.0004	4 & 5							0	+0.2	+0.8	+2.0	+2.8	+3.2
	62	9-10	0.0003	4 & 5							0	+0.8	+1.6	+3.2	+4.4	+5.0
	63	9-10	0.0004	4 & 5							0	+1.2	+2.4	+4.0	+5.6	+6.2
	64	9-10	0.0003 +0.0004	4 & 5	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	0	+1.6	+3.8	+5.4	+5.7	+5.8
Comb. High Cut-off & High Rise	70	7-8	0.0003 +0.0004	4 & 5	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	0	+1.6	+3.8	+4.4	+2.1	+0.2
	71	7-8	0.0003 +0.0004 0.0001 0.0001	4 & 5 8 & 9 8 & 10	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	0	+1.6	+3.8	+4.0	+0.7	-2.2
	72	7-8	0.0003 +0.0004 0.0002 0.0002	4 & 5 8 & 9 8 & 10	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	0	+1.6	+3.6	+3.6	-1.9	-5.2
	73	7-8	0.0003 +0.0004 0.0001 +0.0002 0.0001 +0.0002	4 & 5 8 & 9 8 & 10	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	0	+1.6	+3.6	+3.0	-3.9	-7.4
	74	7-8	0.0004	4 & 5							0	+1.2	+2.4	+3.0	+2.0	+0.6
	75	7-8	0.0004 0.0001 0.0001	4 & 5 8 & 9 8 & 10							0	+1.2	+2.4	+2.6	+0.6	-1.8
	76	7-8	0.0004 0.0002 0.0002	4 & 5 8 & 9 8 & 10							0	+1.2	+2.2	+2.2	-2.0	-4.8
	77	7-8	0.0004 0.0001 +0.0002 0.0001 +0.0002	4 & 5 8 & 9 8 & 10							0	+1.2	+2.2	+1.6	-4.0	-7.0
	78	7-8	0.0003	4 & 5							0	+0.8	+1.6	+2.2	+0.8	-0.6
	79	7-8	0.0003 0.0001 0.0001	4 & 5 8 & 9 8 & 10							0	+0.8	+1.6	+1.8	-0.6	-3.0
	80	7-8	0.0003 0.0002 0.0002	4 & 5 8 & 9 8 & 10							0	+0.8	+1.4	+1.4	-3.2	-6.0
	81	7-8	0.0003 0.0001 +0.0002 0.0001 +0.0002	4 & 5 8 & 9 8 & 10							0	+0.8	+1.4	+0.8	-5.2	-8.2
	82	7-8	0.0003 -0.0004	4 & 5							0	+0.2	+0.8	+1.0	-0.8	-2.4
	83	7-8	0.0003 -0.0004 0.0001 0.0001	4 & 5 8 & 9 8 & 10							0	+0.2	+0.8	+0.6	-2.2	-4.8
	84	7-8	0.0003 -0.0004 0.0002 0.0002	4 & 5 8 & 9 8 & 10							0	+0.2	+0.6	+0.2	-4.8	-7.8
	85	7-8	0.0003 -0.0004 0.0001 +0.0002 0.0001 +0.0002	4 & 5 8 & 9 8 & 10							0	+0.2	+0.6	-0.4	-6.8	-10.0

NOTES - 1. For correction factors, reverse signs
2. This drawing is to be used with A-126 Type Amplifiers, with Simplified Equalizer
3. Where two condensers are shown separated by a plus (+) sign, connect in parallel; by a minus (-) sign, connect in series.

APP'D

ISSUE / 7-8-47

DRAWN BY DATE 7-8-47

APP'D DATE 7-8-47

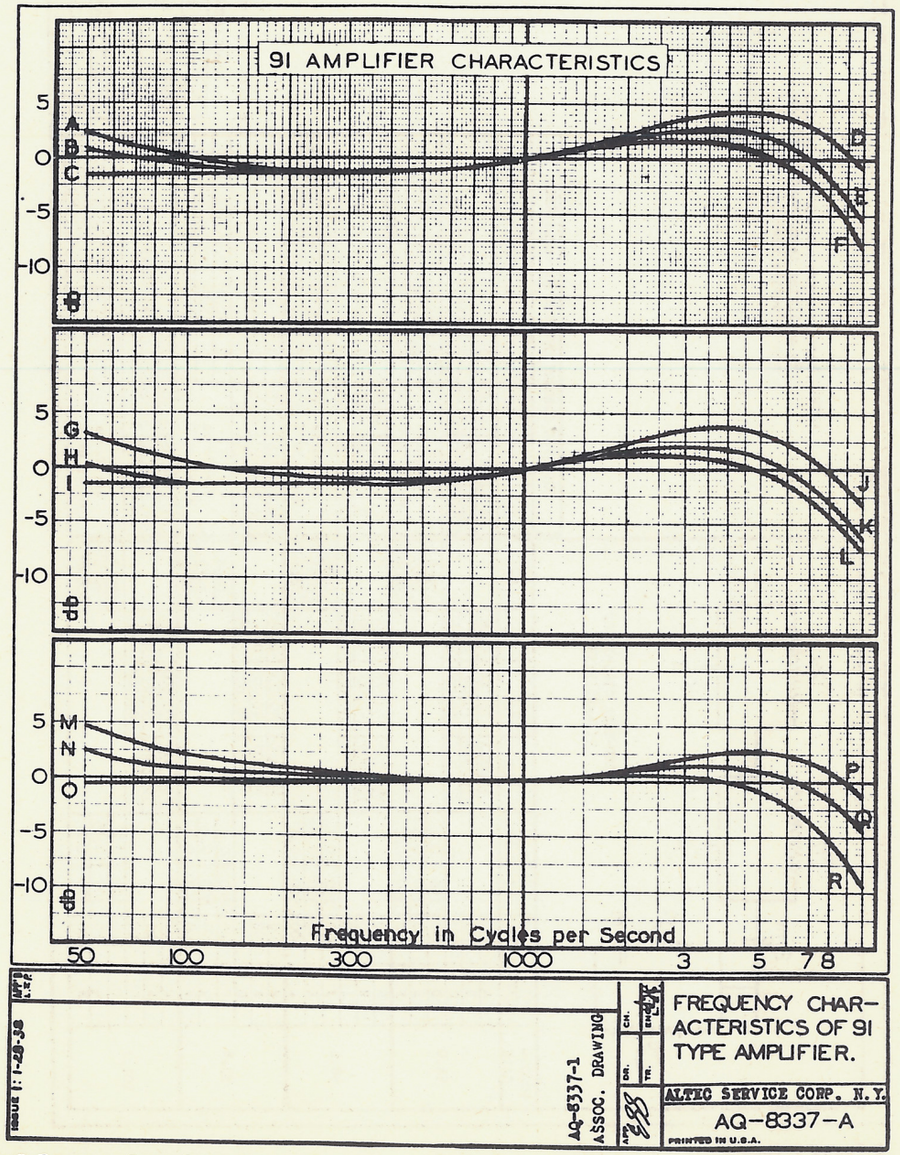
EQUALIZER CHARACTERISTICS
A-126 AMPLIFIER
with Simplified Equalizer

ALTEC SERVICE CORPORATION NEW YORK

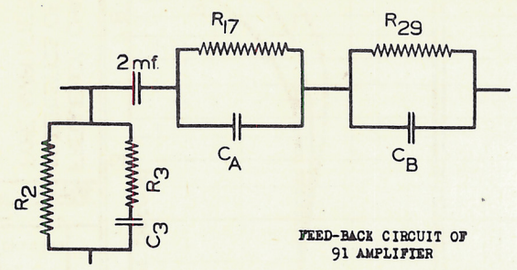
AQ-1936

50.03 Amplifier, A-126

Issued by
Engineering Department
Printed in U. S. A.


91 AMPLIFIER CHARACTERISTICS
5
0
-5
-10
db
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
Frequency in Cycles per Second
50
100
300
1000
3
5
7
8
ISSUE 1: 1-28-38
AQ-8337-1 ASSOC. DRAWING
FREQUENCY CHARACTERISTICS OF 91 TYPE AMPLIFIER.
ALTEC SERVICE CORP. N.Y.
AQ-8337-A
PRINTED IN U.S.A.

ISSUE 1:1-28-38 APP'D



FEED-BACK CIRCUIT OF 91 AMPLIFIER

NOTE: Response runs should be made with 91 amplifier terminated in 12 ohm non-inductive resistor.

1000 ~ GAIN	CURVE	R_2	R_3	C_3	R_{17}	R_{29}	C_A	C_B
93.0	A	350			70,000	70,000	0.05	
	B	350			70,000	70,000	0.1	
	C	350			0	70,000	open	
	D	350	150	0.2				open
	E	350	150	0.2				.0003
	F	350	350	0.2				.0003
98.6	G	400			150,000	150,000	0.05	
	H	400			150,000	150,000	0.02	
	I	400			0	150,000	open	
	J	400	150	0.2				.0001
	K	400	300	0.2				.0001
	L	400	500	0.2				.0001
93.8	M	200			40,000	40,000	0.05	
	N	200			40,000	40,000	0.1	
	O	200			0	40,000	open	
	P	200	200	0.2				open
	Q	200	500	0.1				open
	R	200	500	0.1				.0005
101.1	M	200			100,000	100,000	0.02	
	N	200			100,000	100,000	0.04	
	O	200			0	100,000	open	
	P	200	100	0.2				open
	Q	200	300	0.15				open
	R	200	300	0.2				.00025

RESPONSE CORRECTIONS FOR 91 AMPLIFIER

55	130	300	1000	3000	5000	7000	8000
-2.1	0	+ .9	0	Use Curve D, E, or F			
-0.8	+0.8	+1.0	0				
+1.4	+1.4	+1.1	0				
Use Curve A, B, or C			0	-3.8	-4.6	-3.4	-2.2
			0	-2.8	-2.5	-0.3	+1.1
			0	-1.9	-0.7	+2.0	+3.7
-2.5	0	+0.8	0	Use Curve J, K, or L			
0	+1.5	+1.5	0				
+1.4	+1.5	+1.5	0				
Use Curve G, H, or I			0	-3.5	-3.4	-1.3	+0.1
			0	-2.1	-0.9	+1.5	+2.8
			0	-1.0	+0.3	+2.8	+4.2
-4.0	-1.6	-1.0	0	Use Curve P, Q, or R			
-2.0	+6.0	+0.5	0				
+0.5	+0.3	0.	0				
Use Curve M, N, or O			0	-2.0	-2.6	-1.8	- .9
			0	-1.5	-1.0	+0.5	+1.5
			0	-0.5	+1.0	+3.6	+5.5
-4.0	-1.6	-1.0	0	Use Curve P, Q, or R			
-2.	+0.6	+0.5	0				
+0.5	+0.3	0	0				
Use Curve M, N, or O			0	-2.0	-2.6	-1.8	- .9
			0	-1.5	-1.0	+0.5	+1.5
			0	-0.5	+1.0	+3.6	+5.5

AQ-8337-1 Correction Factors

ASSOCIATED DRAWINGS

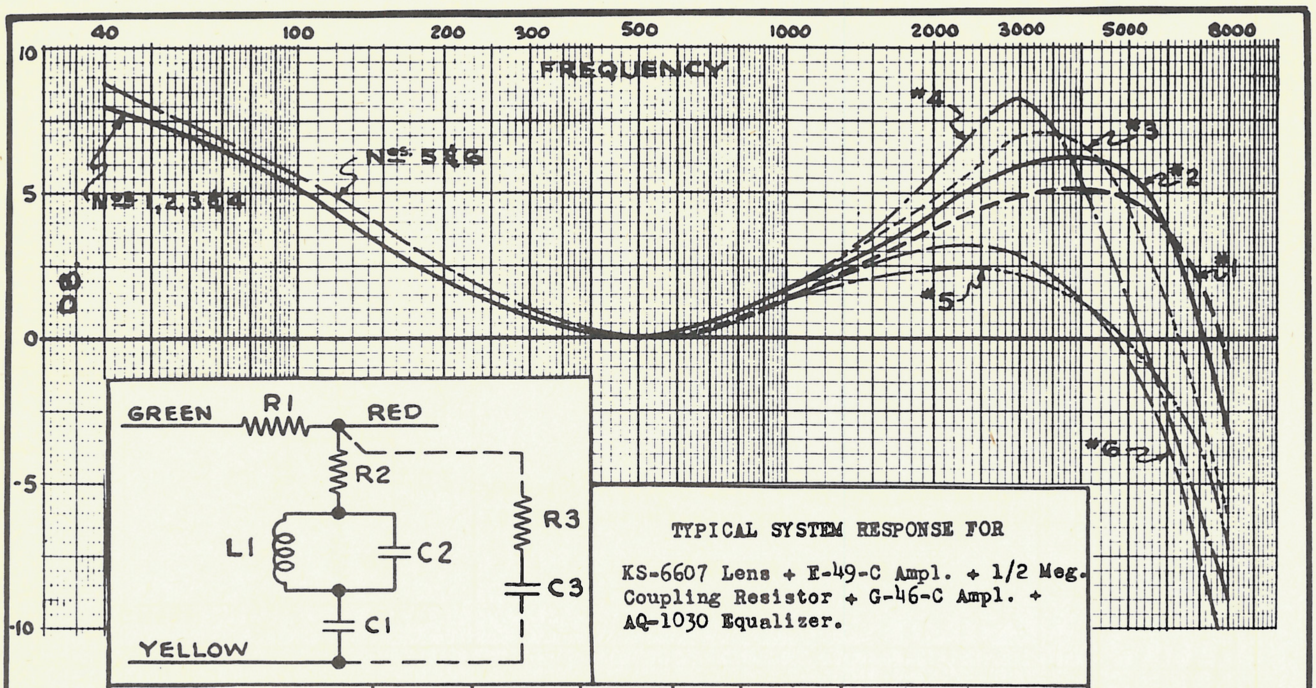
CH. SUP
DR. TR.
APP

FREQUENCY CHARACTERISTICS OF 91 TYPE AMPLIFIER.

ALTEC SERVICE CORP N.Y.

AQ-8337-B

PRINTED IN U.S.A.

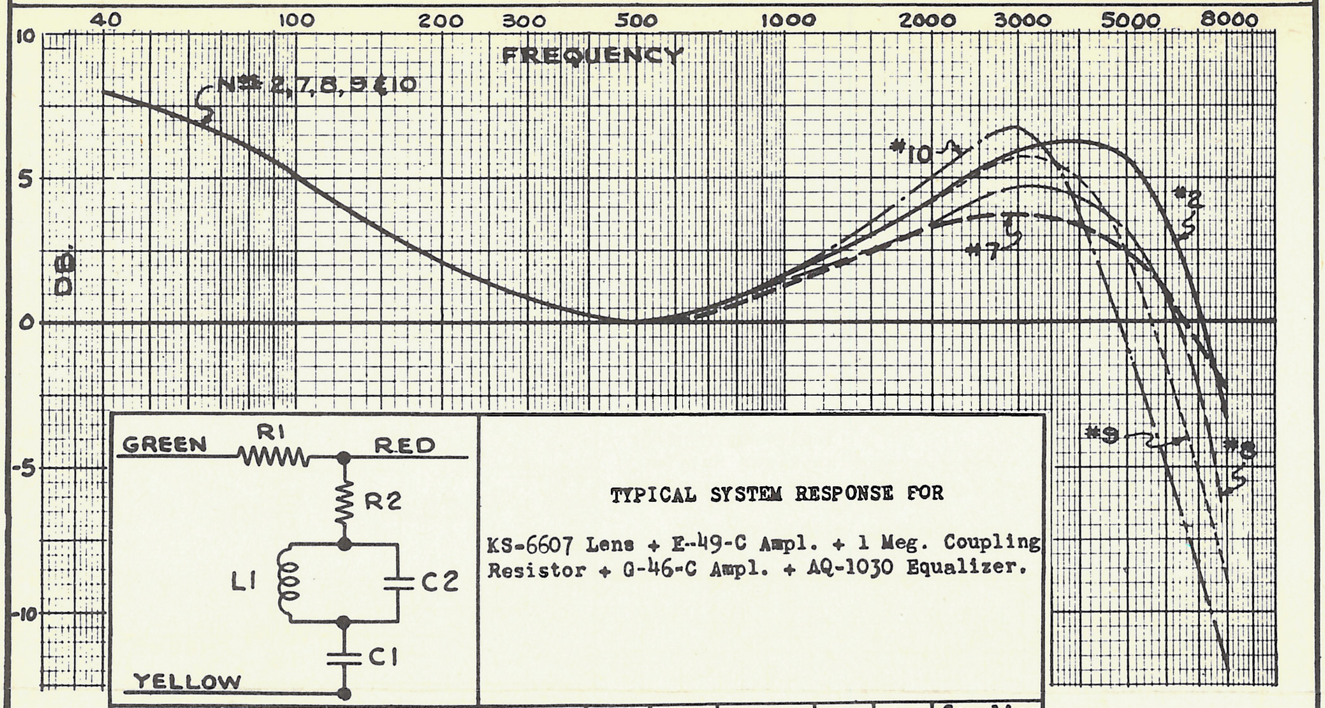


TYPICAL SYSTEM RESPONSE FOR

KS-6607 Lens + E-49-C Ampl. + 1/2 Meg. Coupling Resistor + G-46-C Ampl. + AQ-1030 Equalizer.

Curve	Classification*				R_1	R_2	R_3	C_1	C_2	C_3	L_1	Coupling Resistor
1	3,	02,	C,	18	15,000	7,500		.1	.0005		1	1/2 meg.
2	3,	02,	D,	18	15,000	7,500		.1	.001		1	1/2 meg.
3	3,	02,	E,	18	15,000	7,500		.1	.0015		1	1/2 meg.
4	3,	02,	F,	18	15,000	7,500		.1	.0025		1	1/2 meg.
5	3,	02,	G,	18	15,000	7,500	20,000	.1	.001	.01	1	1/2 meg.
6	3,	02,	H,	18	15,000	7,500	20,000	.1	.0025	.01	1	1/2 meg.

*Use classification numbers for obtaining correction factors.
See AASO-8337, Testing Procedures General, File 4.64.



TYPICAL SYSTEM RESPONSE FOR

KS-6607 Lens + E-49-C Ampl. + 1 Meg. Coupling Resistor + G-46-C Ampl. + AQ-1030 Equalizer.

Curve	Classification*				R_1	R_2	R_3	C_1	C_2	C_3	L_1	Coupling Resistor
2	3,	02,.	D,	18	15,000	7,500		.1	.001		1	1/2 meg.
7	3,	02.1,	C,	18	15,000	7,500		.1	.0005		1	1 meg.
8	3,	02.1,	D,	18	15,000	7,500		.1	.001		1	1 meg.
9	3,	02.1,	E,	18	15,000	7,500		.1	.0015		1	1 meg.
10	3,	02.1,	H,	18	15,000	7,500		.1	.0025		1	1 meg.

*Use classification numbers for obtaining correction factors.
See AASO-8337, Testing Procedures General, File 4.64.

ISSUE: 1 1-18-39 APP'D

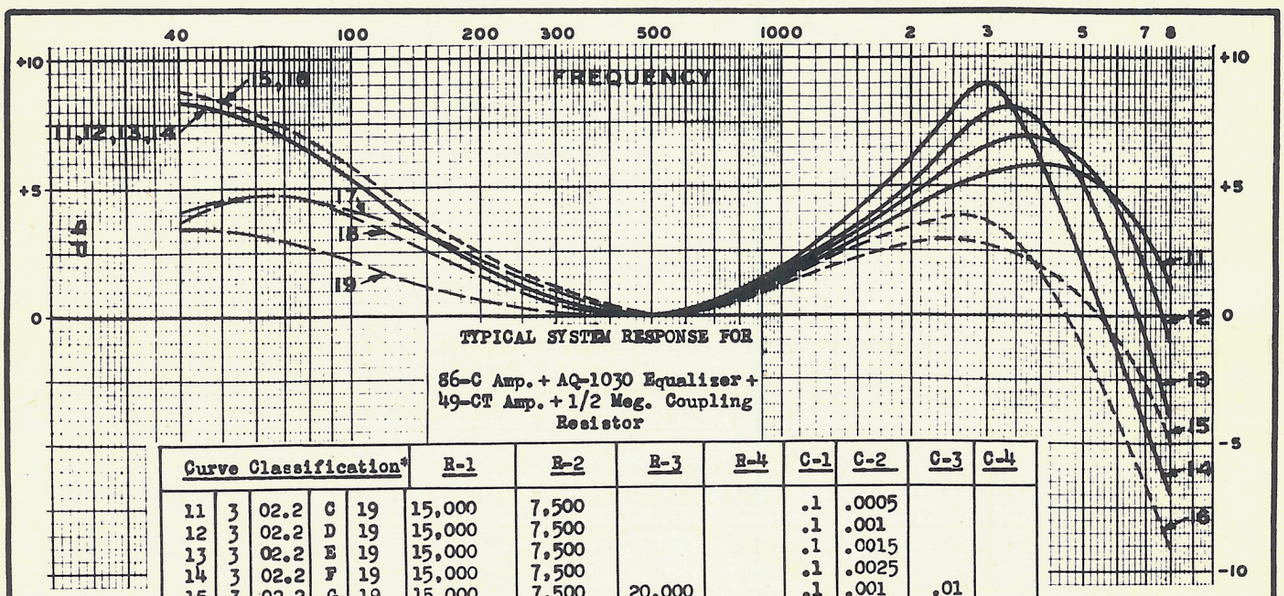
DRAWN BY W.J.Kernicky DATE 1-18-39

APP'D DATE

TYPICAL SYSTEM REPONSE AQ-1030 EQUALIZER WITH 46 TYPE AMPL.

ALTEC SERVICE CORPORATION
NEW YORK

AQ-8337-C

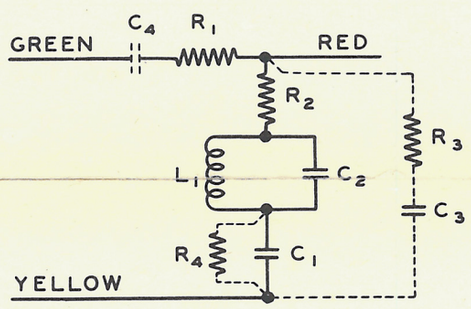


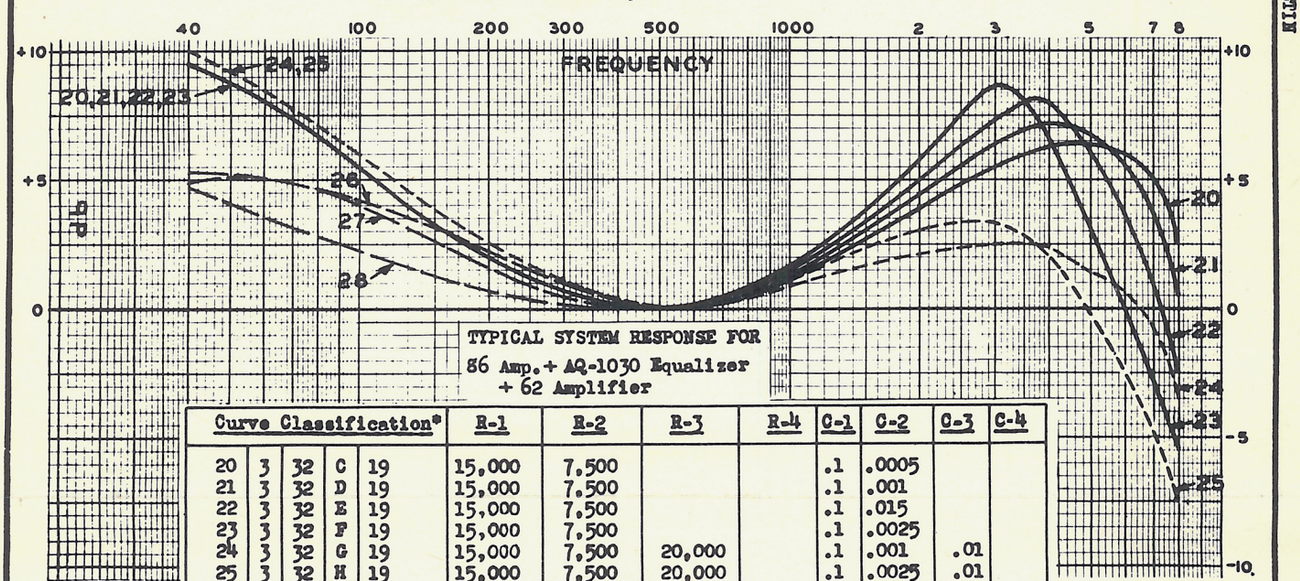
TYPICAL SYSTEM RESPONSE FOR

86-C Amp. + AQ-1030 Equalizer + 49-CT Amp. + 1/2 Meg. Coupling Resistor

Curve Classification*					R-1	R-2	R-3	R-4	C-1	C-2	C-3	C-4
11	3	02.2	C	19	15,000	7,500			.1	.0005		
12	3	02.2	D	19	15,000	7,500			.1	.001		
13	3	02.2	E	19	15,000	7,500			.1	.0015		
14	3	02.2	F	19	15,000	7,500			.1	.0025		
15	3	02.2	G	19	15,000	7,500	20,000		.1	.001	.01	
16	3	02.2	H	19	15,000	7,500	20,000		.1	.0025	.01	
**17	3	02.2	I	19	15,000	7,500		20,000	.1	.001		
**18	3	02.2	J	19	15,000	7,500			.1	.001		.02
**19	3	02.2	K	19	15,000	7,500		20,000	.2	.001		

*Use classification numbers for obtaining correction factors - See AASO-8337-2 Testing Procedures General, File 40.64.





TYPICAL SYSTEM RESPONSE FOR

86 Amp. + AQ-1030 Equalizer + 62 Amplifier

Curve Classification*					R-1	R-2	R-3	R-4	C-1	C-2	C-3	C-4
20	3	32	C	19	15,000	7,500			.1	.0005		
21	3	32	D	19	15,000	7,500			.1	.001		
22	3	32	E	19	15,000	7,500			.1	.015		
23	3	32	F	19	15,000	7,500			.1	.0025		
24	3	32	G	19	15,000	7,500	20,000		.1	.001	.01	
25	3	32	H	19	15,000	7,500	20,000		.1	.0025	.01	
**26	3	32	I	19	15,000	7,500		20,000	.1	.001		
**27	3	32	J	19	15,000	7,500			.1	.001		.02
**28	3	32	K	19	15,000	7,500		20,000	.2	.001		

**I, J. and K are low-end curves only and independent of C-2. The value of C-2 will determine which high-end curve, C,D,E, or F, is combined with the selected low-end curve.

APP'D WMS		DRAWN BY Kernicky DATE 11-10-39	TYPICAL SYSTEM REPONSE AQ-1030 EQUALIZER WITH 86 TYPE AMPL.
ISSUE 1 11-10-39		APP'D R.C.G. DATE 11-10-39	ALTEC SERVICE CORPORATION NEW YORK
			AQ-8337-D

ALTEC SERVICE CORPORATION
EQUIPMENT BULLETIN

AQ-8337-D-1
TESTING PROCEDURES. GENERAL

1. INTRODUCTION

1.1 The variety of equalizer curves which satisfies all possible requirements is, of course, limitless. To realize most of such curves would require complicated network configurations and the design mathematics would be extremely involved. Furthermore, since coils would very often be required, it would frequently be very difficult or time-consuming to obtain the required elements.

1.2 There is a type of equalizer, however, employing only resistors and condensers, the design of which can be readily calculated from charts. Such equalizers are of particular value in the field since the elements are readily available, the design can be completed in a few minutes, and their properties are such that a large part of the equalizer problem can be solved with them. The purpose of this memorandum is to describe the methods of design of such equalizers.

2. DESCRIPTION OF CURVES

2.1 The curves obtainable from these two-terminal R-C equalizers are given on AP-1076, attached. There are four general types:

2.11 Low Droop or High Rise. (The difference is only a matter of location on the frequency axis.) Note that this family of curves is flat at the low and high extremities and rises with frequency over an intermediate range. These curves are distinguished from each other by overall db difference between the transmission at the two extremities and by the "Frequency of the half-way point". The curves are drawn with the half-way point falling at 1000 cps., but this point may be shifted to any frequency by proper choice of the elements used. A particular curve labeled "LD 6 db, f 1/2= 400 cps." has 6 db overall difference between extreme highs and extreme lows, and at 400 cps. the transmission is 3 db above the extreme lows or 3 db below the extreme highs. LD or HR curves are obtained by a parallel R-C pair connected in series with the line.

2.12 Low Rise or High Droop. These curves have the same shape as the LD, HR curves but drop off as frequency rises. They are obtained by connecting a series R-C pair across the line.

2.13 High Cutoff. Sharp cutoffs are not given by these curves but either the "single" or the "double" serves in most cases. The "single" curves are defined by the frequency at which transmission is down 3 db, and the "double" curves by the frequency of 6 db attenuation. The "single" cutoff is obtained by connecting a condenser across the line. The "double" cutoff is provided by two similar "single" cutoffs at isolated parts of the circuit.

2.14 Low Cutoff. These are similar to the high cutoffs but affect the low end of spectrum. The "single" low cutoff is obtained by connecting a condenser in series with the line.

3. METHOD OF DESIGN

3.1 An equalizer design problem usually begins with two curves: the response of the system unequalized, and the desired response. Subtract the actual from the desired characteristic to obtain the required insertion characteristic of the equalizer. Plot this to the same scale as AP-1076.

3.2 By inspection, determine which curve type on AP-1076 best fits the required insertion characteristic. Place the sheet containing the required insertion curve over AP-1076; hold the combination between the eye and a light source; adjust the two sheets, keeping the 0 db axis of both sheets aligned, until the best fit of some curve of AP-1076 with the insertion curve is obtained. Note the number of db overall of the selected curve on AP-1076 and the frequency at which its half-way point (1000 cps. on AP-1076) falls on the scale of the insertion curve. Call this the "frequency of the half-way point."

3.3 We have now found the values of "DB Overall" and "frequency of the half-way point" of the desired curve. One additional item must be evaluated: the value of R_O' for LR, HD or HC or the value of $R_O + R_L$ for LD, HR or LC. These values apply to the circuit into which the equalizer will be connected.

(a) R_O' is the parallel combination of all impedances to ground at the part of the circuit across which (to ground) the equalizer will be connected. This section begins with the plate of a tube or a loss device like a fader and the grid of the next tube or a loss device.

(b) $R_O + R_L$ is required when the equalizer is inserted in series with the ungrounded side of the circuit. R_O is the parallel combination of the impedances to the left (toward the source) and R_L is the combination of impedances to the right of the point where the equalizer will be inserted.

Example: An HD equalizer is to be inserted between V1 and V2 of the 46 type amplifier. Combine the plate impedance (15,000 ohms) of V1, the plate feed resistance (100,000 ohms) and the resistance of the voltage divider (180,000 ohms) all in parallel. This gives a value of 12,000 ohms for R_o'. If HR or LD or LC is required, combine 12,000 and 100,000 ohms in parallel to obtain 13,000 ohms for R_o, and, since R_L is 180,000 ohms, $R_o + R_L$ is 193,000 ohms.

(c) When it is more convenient to measure than compute these values, the procedure is as follows: Connect a variable resistance between the two points to which the proposed equalizer will be connected. Vary the resistance until the signal at the system output drops 6 db. The resistance at this setting equals the value of R_o' or of $R_o + R_L$. A 120 cycle signal is usually suitable for this purpose. This method should always be used when the equipment is available for the measurement. When the equalizer is to be connected in series in the line, the line must, of course, be opened to obtain the two points for the measurement.

3.4 If a LR, HD or a LD, HR curve meets the requirements, AP-1074 and 1075 may now be used to evaluate the resistor and condenser required. Select the appropriate sheet and locate the slant line which is labelled with the full amplitude of the desired curve. Read the factor "A" on the left hand scale opposite the point where the selected slant line crosses the "frequency of the half-way point". Divide this factor by R_o' or $R_o + R_L$ (whichever applies) in Kilohms to obtain the capacity of the condenser in mf. Read the value of K from the selected slant line and multiply it by R_o' or $R_o + R_L$ in ohms to obtain the resistor value in ohms. The formulae given on AP-1074 and 1075 will minimize the danger of error in arithmetic.

3.5 If the requirements are best met with a cutoff curve, compute the required condenser value from the formulae:

Single HC - $X_C = R_o'$, or

$$C = \frac{160{,}000}{f\ R_o'} \text{ mf., where f is the frequency of the 3 db point.}$$

Single LC - $X_C = R_o + R_L$, or

$$C = \frac{160{,}000}{f(R_o + R_L)} \text{ mf.}$$

4. MISCELLANEOUS NOTES

4.1 Do not use the above methods within the feedback loop in feedback amplifiers.

4.2 Gain reserve must be available to accommodate any equalizer type which raises the response at the low or high end relative to the "voice-volume" range which is about 300 to 800 cps., and the amount of such reserve is equal to the elevation of either extremity relative to this mid-range. The droops and cutoffs introduce no volume loss unless the curve runs through the mid-region.

4.3 Distortion may result with LR or HD if a tube works into a low impedance, and in selecting a point for inserting an R-C pair for LR or HD do not cause a tube to work into an impedance less than its own plate impedance. Any handicap resulting from this prohibition can be removed with little or no gain loss by introducing a resistor in series with the line between the tube and the point of application of the equalizer. For example, assume the requirements call for a 10,000 ohm resistor and a .04 mf condenser based on insertion between grid and ground of V2 of the 86 type amplifier. Since V1 will be working into an impedance less than its own value above about 300 cps., this is an undesirable arrangement. However, if a 15,000 ohm resistor is connected in series with the grid, and the equalizer connected between the grid end of the resistor and ground, the tube will work into an impedance well above its own value. Naturally, the equalizer elements must be recalculated for the new value of R_o'.

4.4 Overloading will result from LR or HR if, due to loss in the equalizer, the level at the preceding tube is raised above the tube overload point. To determine whether this applies in a particular case, install only the equalizer resistor and increase the system input signal until full output is obtained. Overloading, if any, will be evidenced in the usual way.

4.5 The predicted curve will not be obtained if the circuit at the insertion point contains reactance. The design charts AP-1074 and 1075 are based on circuit impedances which are pure resistances. Reactance is encountered in three general forms:

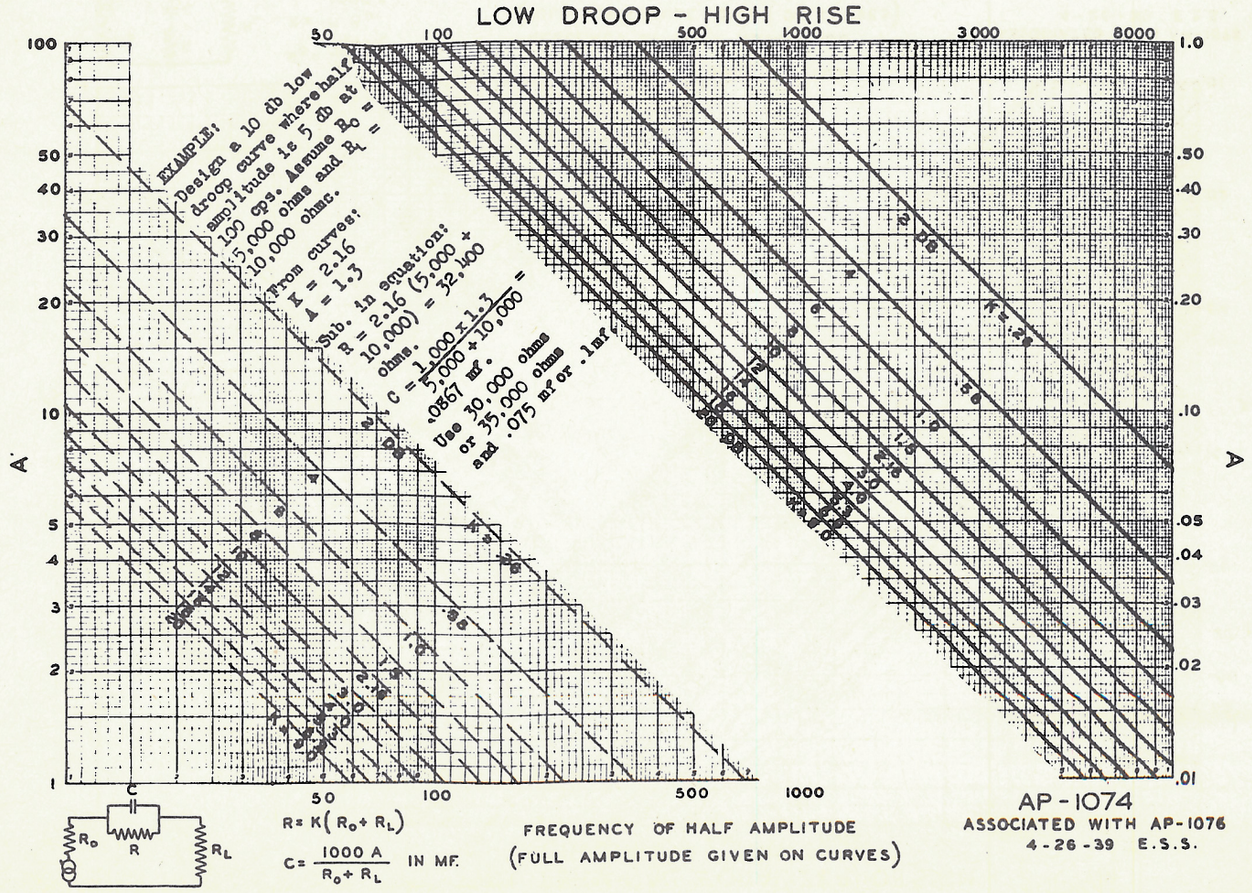
(a) Blocking (coupling) condenser between stages. These affect only the extreme low end and may usually be ignored.

(b) A filter or equalizer already installed in the same portion of the circuit. In this case, either find another location for the proposed equalizer or determine experimentally the effect of a trial combination.

(c) A transformer. If unterminated on the far side, its impedance may be treated as infinite, except perhaps at extreme frequencies. The characteristic of the transformer will change if the impedance from which it works is changed. If this impedance is lowered, the transformer characteristic will rise at 5000-6000 cps. and if the impedance is increased it will fall in the same region. The amount depends upon the transformer. If the transformer is loaded substantially, the reflected impedance may be assumed to apply.

4.6 The curves AP-1076 were drawn with the frequency of the half-way point at 1000 cps. to facilitate their interpretation for any frequency by multiplying the frequency scale by a factor: e.g., to shift from 1000 to 300 cps. multiply all abscissae by 0.3. A more convenient method is to use a folded blank sheet having the same log scale as AP-1076, placing this under the curves so that 300 cps. on the blank sheet corresponds to 1000 cps. on the plotted sheet. All points on the curves may then be read off above this adjustable frequency scale.

TWO TERMINAL EQUALIZER DESIGN
LOW DROOP - HIGH RISE



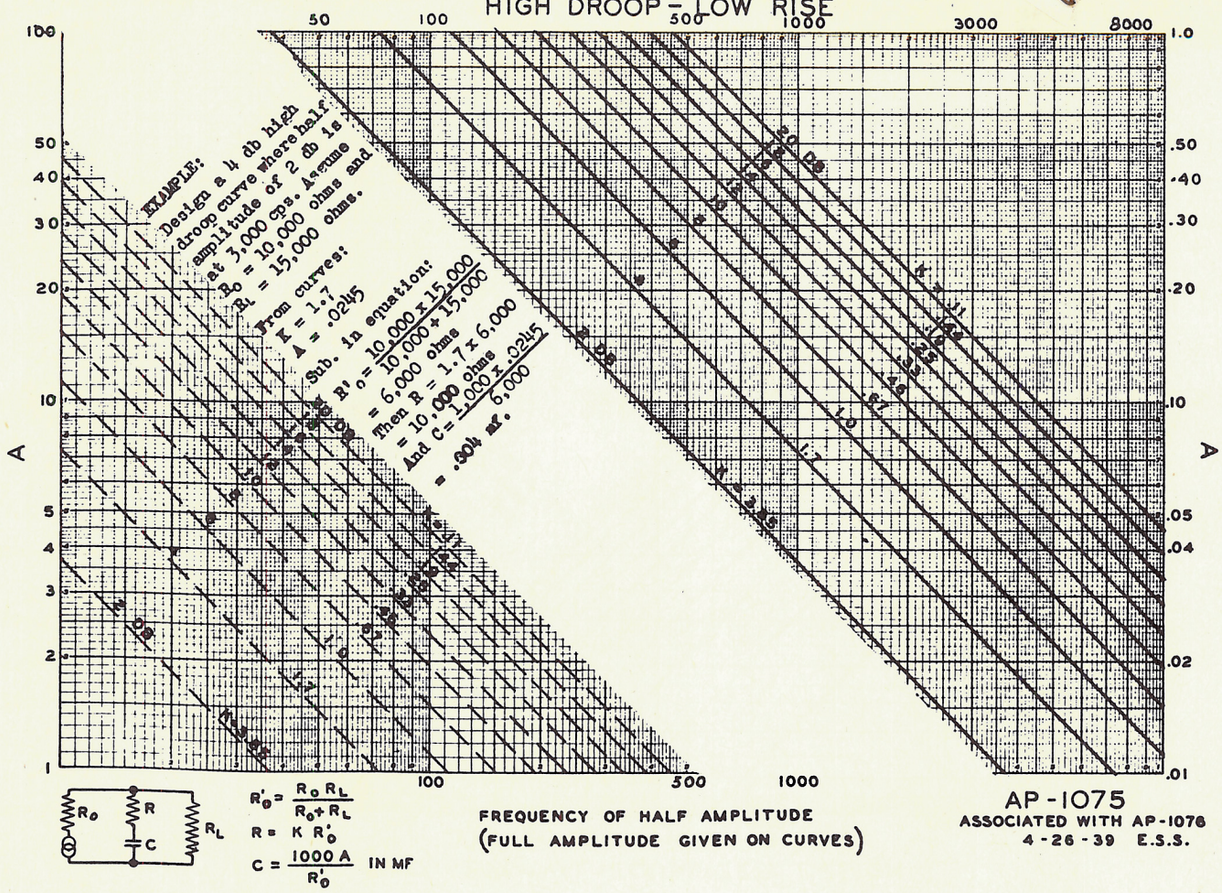
AP-1074
ASSOCIATED WITH AP-1076
4-26-39 E.S.S.

AP-1074

AP-1074

4.64

TWO TERMINAL EQUALIZER DESIGN
HIGH DROOP - LOW RISE



$$R'_o = \frac{R_o R_L}{R_o + R_L}$$

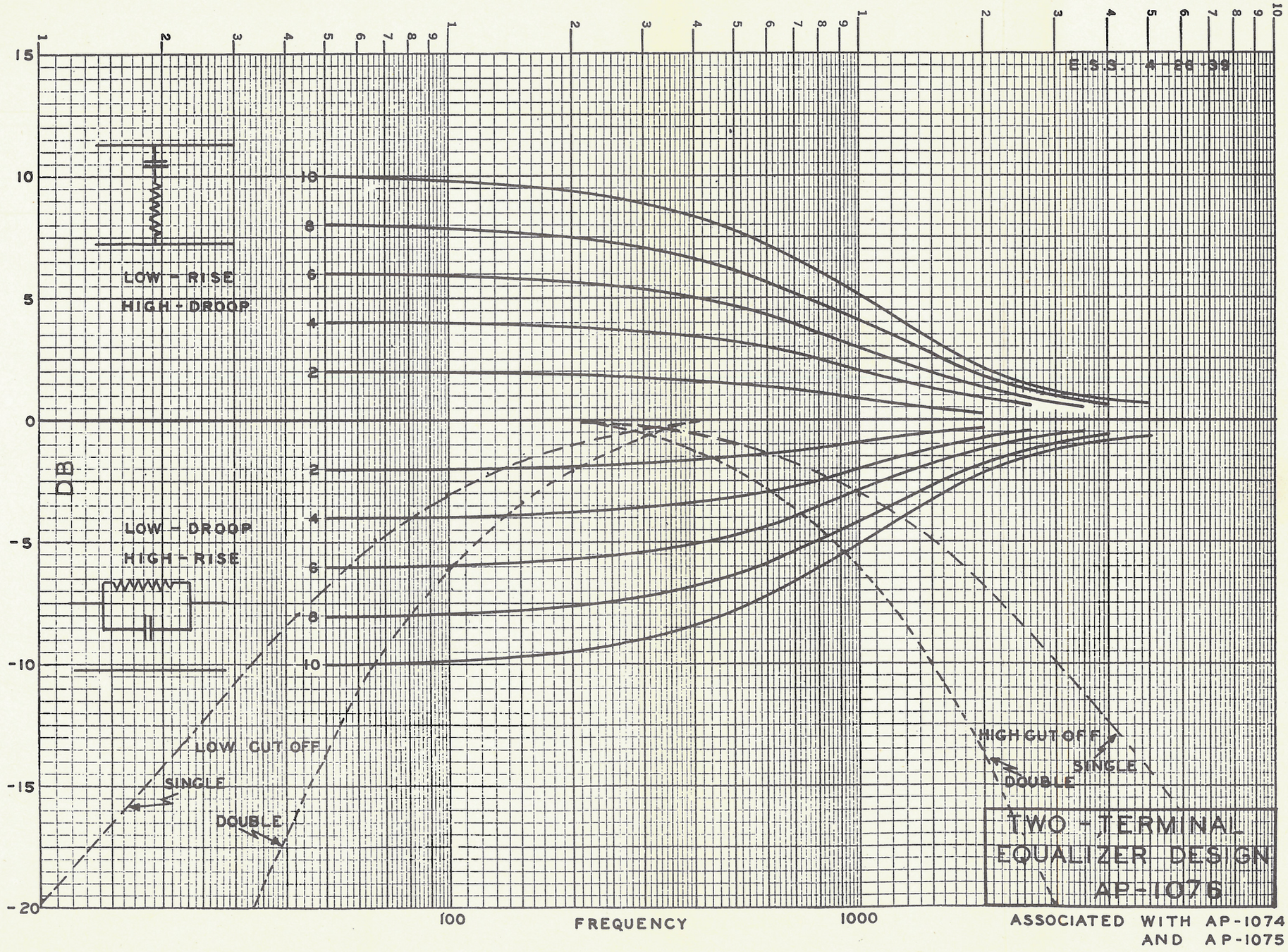
$$R = K R'_o$$

$$C = \frac{1000 A}{R'_o} \text{ IN MF}$$

FREQUENCY OF HALF AMPLITUDE
(FULL AMPLITUDE GIVEN ON CURVES)

AP-1075
ASSOCIATED WITH AP-1076
4-26-39 E.S.S.

AP-1075


U.S.S. 4-26-39
15
10
5
0
-5
-10
-15
-20
DB
LOW - RISE
HIGH - DROOP
LOW - DROOP
HIGH - RISE
LOW CUT OFF
SINGLE
DOUBLE
HIGH CUT OFF
SINGLE
DOUBLE
100
FREQUENCY
1000
TWO - TERMINAL
EQUALIZER DESIGN
AP-1076
ASSOCIATED WITH AP-1074
AND AP-1075

1. ABSTRACT — Replaces Addendum #5, "Testing Procedures, General" (4.604)

1.1. The Transmission Test, Intermediate Points, is for use where the usual methods are unsuccessful in bringing a system within limits of gain or response. It facilitates the identification of the particular part or parts which are functioning abnormally.

1.2 References: The drawings associated with Testing Procedures, General, File 4.604.

1.3 Test Equipment and Materials Required.

Form ERPI-596
Multi-frequency test reel
1000 cps - 8000 cps test loop
TA-7310 Test Amplifier
TA-4145 Output Meter

2. PROCEDURE

2.1 This test is similar to that of the full-system transmission test except, in this test: (a) two frequencies only will be considered; (b) readings will be taken not merely at the system output, but at any selected point within the system; and (c) Variations from Normal will be derived which apply to that portion of the system between the test film and the Point of Measurement. By comparing the Variations from Normal at consecutive points, the local circuit in which the irregularity exists will be readily discovered.

2.2 The system is set up to provide readings of convenient value (see Sect. 3); the test amplifier is connected at the Point of Measurement (4.); the calibrated test loop is reproduced (5.), and the readings recorded on form ERPI-596. Corrections for the system components prior to the measurement point (6.) are entered on the form and the Variation from Normal derived in the usual way.

3. GAIN SETTINGS - The following settings, together with the test amplifier R-2 values listed on ASP-6244, will normally provide levels easily read on the TA-4145 Output Meter yet below the gain-load point (8 db) of the test amplifier.

3.1 Set the exciter lamp current at approximately -5 db level (3.2 amperes for the 4 amp. lamp)(see ASP-6237).
3.2 Set all attenuators on Step "1" (0 loss).
3.3 Set the fader for approximately 15 db loss (see ASP-6240).
3.4 Set the gain control of 46 type Amplifiers at -15 db.

Note: Normally, with these settings, the 1000 cps reading at the output of the film amplifier will be around 0 db, using the test amplifier 1/2 meg. R-2 resistor. If this level is not obtained the exciter lamp current may be readjusted to approach this value.

4. TEST AMPLIFIER CONNECTIONS

4.1 (Refer to Sect. 3 of E.B."TA-7310 Test Amplifier", Issue #1, File 4.03). Connect the input terminal of the test amplifier to the "Point of Measurement" with as short a lead as possible. (Connect the test amplifier ground connection to the ground terminal of the amplifier under test.) Switch D1 should be in "Test" position and resistor R2 selected as indicated on ASP-6244.

4.2 When measuring at the input of the film amplifier (PEC terminal) a mica condenser (.005 mf to 0.1 mf) must be connected in series with the test amplifier input lead to avoid a dc flow through the test amplifier input circuit and the accompanying reduction of PEC polarizing voltage. This condenser will not appreciably change the test amplifier calibration corrections at 1000 cps or above. Do not disconnect the PEC lead at the anode terminal block nor throw D2 switch to "PEC".

4.3 When measuring at the output of the film amplifier, it will be necessary to check the terminals to find which one is ungrounded. If neither terminal is grounded a temporary ground connection should be made for this test. In the case of the 398 type Control Cabinet, due to the insertion of the balanced attenuation pad between the fader ground connection point and the film amplifier, it will be necessary to disconnect the cabinet, replace it with a 500 ohm resistance load, and make a temporary ground connection at one terminal of the amplifier. Normal connections should be restored for measurements at points beyond the fader.

5. TEST LOOP

5.1 The 1000-8000 cps dual frequency loop may be made from stock now carried by or available to all service inspectors. The recommended loop consists of about 4 feet of 1000 cps and 7 feet of 8000 cps film. The shorter 1000 cps strip serves to identify the frequency. In cases where the 1000 cps and 8000 cps sections reproduce at so near the same level as to render the change in frequency difficult to detect, about 6 inches on one end of the 8000 cps sound track may be blacked out with wax pencil or India ink in order that the V.I. needle will return to zero between sections.

5.2 To calibrate the loop, run it in the machine, follow with a regular test reel run and finally, rerun the loop to detect any changes in the system. Repeat this order if necessary, until consecutive loop runs check. (Space is provided on the form ERPI-596 for repeat runs if they are necessary.)

6. CORRECTIONS - The response corrections and gain values on ASP-6244 are valid for the R2 resistor values listed. Higher resistor values may be used without affecting the

validity of any of these figures except at those points where a bridging loss has been included as is indicated in the foot-notes on the drawing. If lower R2 values must be used, these may introduce a bridging loss which will require changes in the figures listed.

Bridging loss is the amount by which the level existing in the circuit prior to connecting a test amplifier is decreased when the test amplifier is bridged across the circuit. If a different resistor from the one specified is used, the bridging loss should be measured by taking readings at the system output before and after connecting in the test amplifier. The former reading (or response) minus the latter is the bridging loss in gain (or response). This value shall be used as follows to modify the "Gain, 1000 cps" or "Response Correction, 8000 cps" on ASP-6244.

"Gain, 1000 cps"

New gain value = tabulated gain + foot noted bridging loss in gain (if any) - measured bridging loss in gain.

"Response Correction, 8000 cps"

New response correction = tabulated correction - foot noted bridging loss in response (if any) + measured bridging loss in response.

7. MISCELLANEOUS NOTES

7.1 Points to be Measured.

(a) When the system output is not normal in response or gain, it may not always be necessary to check all intermediate points. Tests made at the film amplifier input (PEC terminal) furnish a check on the lens adjustment, the PEC sensitivity, and the grid resistors. A comparison of the "Variation from Normal" obtained from tests made at the film amplifier output and at the PEC terminal will give a check on the film amplifier as a whole from (but not including) the grid resistors to (and including) the fader input. Similarly, a comparison between the main amplifier output and the film amplifier output checks the main amplifier as a whole, plus the fader (except that faults in the input impedance of the fader will affect the film amplifier output reading, and hence, may not be revealed by this test).

(b) When thus the individual piece of equipment at fault is located, then checks should be made at the internal points of that unit. If there is an appreciable change in the "Variation from Normal" at two successive points, it is evident that there must be some abnormal condition affecting the second point. An analysis of the local circuit at that point will usually indicate the individual item at fault. A fault in any part of the local circuit to which the test amplifier is connected, may affect the readings. This local circuit must be considered as starting with the plate of one tube and ending at the grid of another tube. For instance, if the fault appears at the output of a 49 type Amplifier, but not at the V2 grid, the circuit involves the tube, the output transformer, the fader and the input transformer of the main amplifier. A check of the fader impedance (ASP-6248), and another measurement at the film amplifier output, terminated this time in a known 500 ohm resistor instead of with the fader, would serve to localize the fault. If the fault appears at the grid of the first tube in the main amplifier it may be the attenuators, the fader or the input transformer of the amplifier.

(c) Under normal conditions, the readings obtained at the grid of one tube of a push-pull stage should be duplicated at the other tube. However, a defect in only one half of the winding of the transformer feeding the push-pull stage may result in normal measurements at one tube grid, while measurements made at the amplifier output would be abnormal. Under such conditions a check at the grid of the other tube in the push-pull stage is desirable. There are sufficient blank spaces on the test form (ERPI-596) for such additional points, for points in additional main amplifiers, or for repeated readings. For instance, with the 41-42 amplifier combination, the column headed "V4 Grid" could be used for the grid of V1 tube in the 42 amplifier, while measurements at V2 of the 42 could be listed in one of the blank spaces. Likewise the measurements on a 43 amplifier may be listed in the blank spaces.

(d) Measurement is not recommended at the primary terminals of transformers. Readings at such points are subject to large variations, even with satisfactory transformers, and are no indication of the true effect of the transformer in the circuit.

7.2 Gain Test.

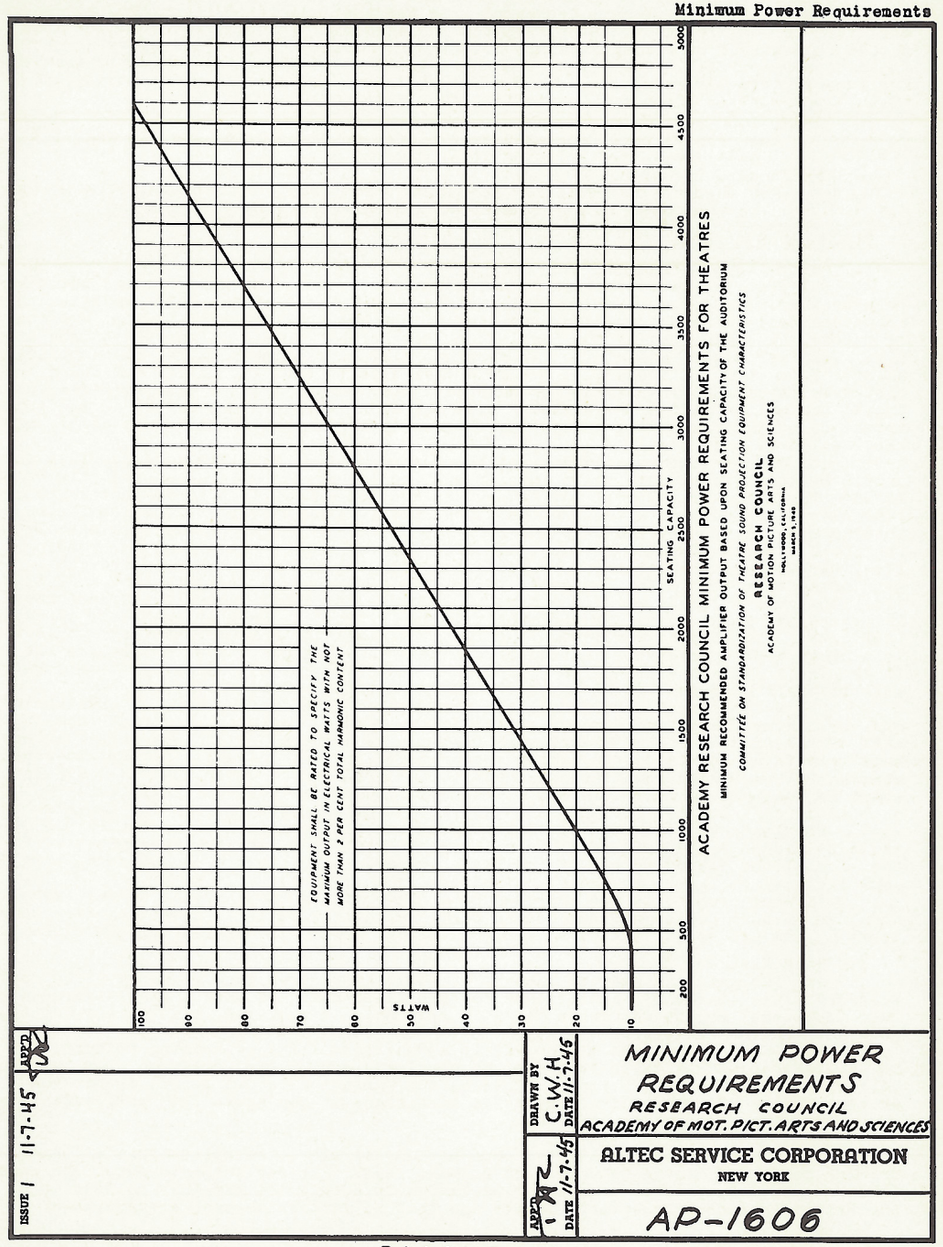
(a) The gain test may be thought of as separate from the frequency (8000 cps) response test. The only significance to this distinction is that a single frequency loop (1000 cps) may be used when the gain test only is required, with savings of time and inconvenience resulting thereby.

(b) Since the output of the PEC is a function of the polarizing voltage, the PEC voltage should be taken into account when considering the Variation from Normal Gain at the film amplifier input. This output variation is 0.1 to 0.2 db per volt above or below 90 volt. Also, extensive variations in the ac voltage will affect the characteristics of some amplifiers.

8. LIMITS - No definite limits have been set up for the intermediate points. Where two or more points are found to vary from normal, repairs or replacements should be made first at the point where the greater deviation is noted. It may then be found that the system is within acceptable limits and that no further changes are necessary.

Electrical Research Products Inc.
OPERATING DEPT. - EQUIPMENT DIV.
PRINTED IN U.S.A.

ISSUE 1
April 29, 1936



ISSUE 1 11-7-45 APP'D

DRAWN BY C.W.H. DATE 11-7-45

APP'D DATE 11-7-45

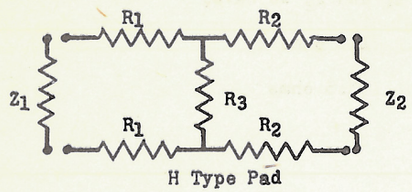
MINIMUM POWER REQUIREMENTS
RESEARCH COUNCIL
ACADEMY OF MOT. PICT. ARTS AND SCIENCES

ALTEC SERVICE CORPORATION
NEW YORK

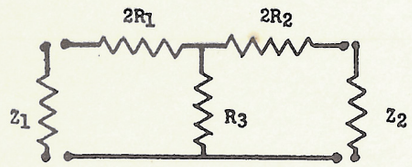
AP-1606

Printed in U.S.A.

THE DESIGN OF ATTENUATION NETWORK



H Type Pad



T Type Pad

$R_1 = (K_3 Z_1) - (K_4 \sqrt{Z_1 Z_2})$

$R_2 = (K_3 Z_2) - (K_4 \sqrt{Z_1 Z_2})$

$R_3 = 2 K_4 \sqrt{Z_1 Z_2}$

TABLE NO. 1

LOSS DB	K_3	K_4	K_5
1	4.34	4.34	1.013
2	2.21	2.15	1.05
3	1.51	1.43	1.12
4	1.16	1.05	1.23
5	.965	.82	1.37
6	.835	.67	1.56
7	.725	.525	1.79
8	.690	.476	2.10
9	.645	.406	2.50
10	.610	.352	3.03
12	.565	.269	4.45
14	.540	.208	6.76
15	.532	.184	8.35
16	.525	.163	10.43
18	.515	.128	16.74
20	.510	.101	25.40
25	.502	.056	79.80
30	.500	.0318	247.00
35	.500	.0178	784.00
40	.500	.0100	2401.00
45	.500	.00565	7921.00
50	.500	.00320	24964.00

The ratio (Z_1/Z_2 or Z_2/Z_1) of the larger terminal impedance of the pad to the smaller impedance cannot be greater than a quantity (K_5 in Table No. 1) which depends upon the loss. The minimum matching loss will occur at the point where this ratio and K_5 are equal in value.

EXAMPLE:

Design a 10 db pad working between a 400 ohm output and a 600 ohm input.

$Z_2/Z_1 = 600/400 = 1.5$ The combination is possible as K_5 for 10 db loss is 3.03 which is greater than Z_2/Z_1. (Incidentally, a minimum loss pad for this ratio would be where K_5 is equal to 1.5. Since 1.5 is not shown we will have to use the next larger number, or 1.56. The pad should be designed on the basis of 6 db loss.)

Then from Table No. 1 we see that for a loss of 10 db,

$K_3 = 0.610$
$K_4 = 0.352$

Substituting these and the given values of Z_1 and Z_2 we have,

R_1 = (.610 x 400) - (.352 x 490) = 71.5 ohms

R_2 = (.610 x 600) - (.352 x 490) = 193.5 ohms

R_3 = 2 x .352 x 490 = 345 ohms.

In practice we would make,

R_1 = 70 ohms

R_2 = 200 ohms

R_3 = 350 ohms.

(DON'T FORGET TO MULTIPLY R_1 AND R_2 BY TWO WHEN USED IN A "T" PAD. SEE SKETCH.)

NOTE:
The reader who is interested in the mathematical expressions will find a complete treatment of the subject in K.S. Johnson's "Transmission Circuits for Telephone Communication".