LOUDSPEAKER PAGING SYSTEMS

CONNECTIONS

1. GENERAL

1.01 This section contains schematic and descriptive drawings covering the various equipment items used with loudspeaker paging systems.

1.02 The following sections cover additional information on loudspeaker paging systems:

C70.900.00 - Description

C70.900.01 - Installation (Also includes various circuit descriptions)

*C70.900.02 - Maintenance

*Under preparation as of this printing.

2. CONTENTS

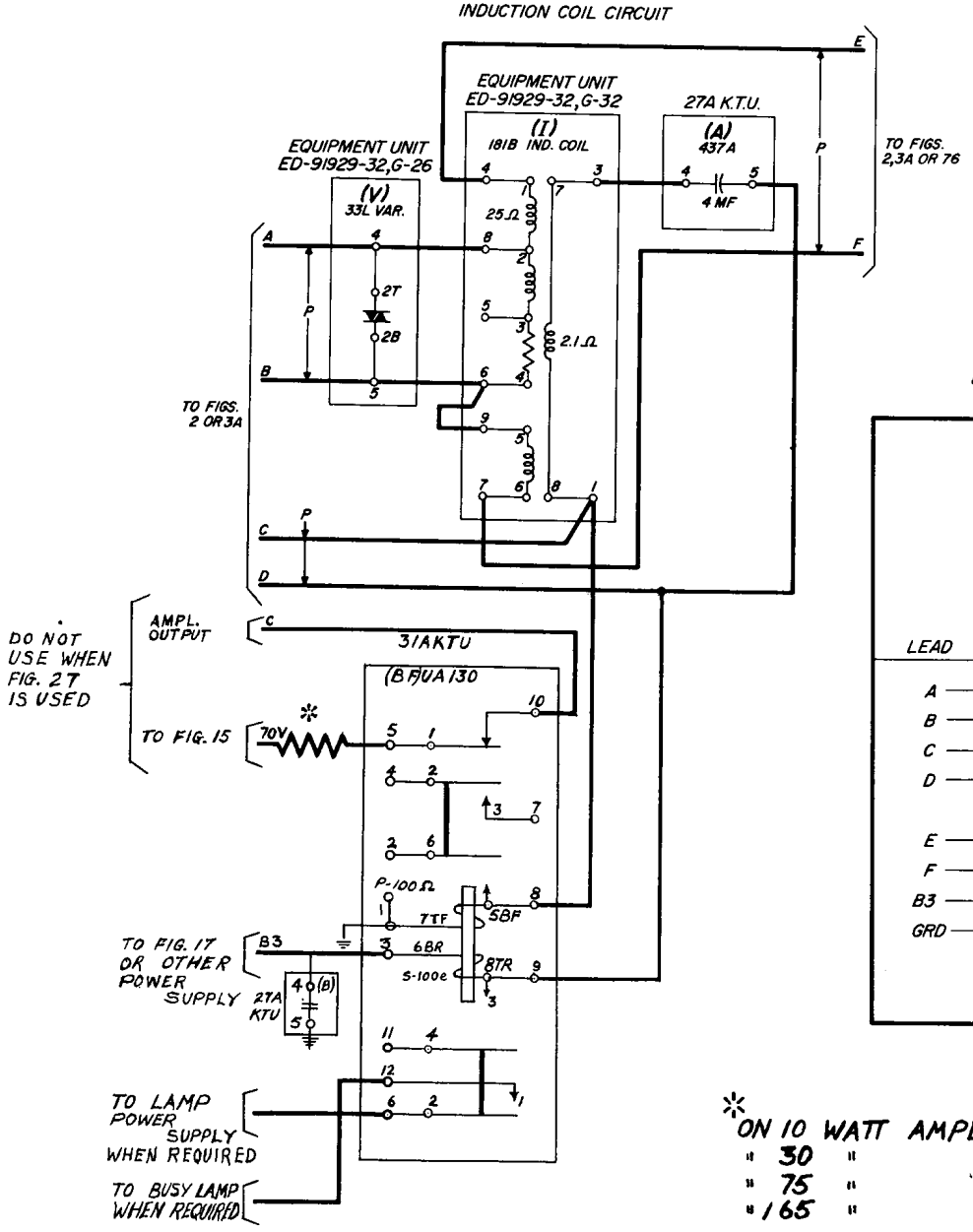
2.01 The following is a list of schematics and drawings found in this section:

Figure	Description
30	Adjustable alternate load for use with area selection
31	Tone generator control circuit
32	" " and power supply circuit
33	" " schematic (Du Kane)
34	Power supply schematic (DuKane)
35	RP-2 Preamplifier schematic (Bogen)
36A	P2A40 " " (DuKane)
36B	99A122 adapter box for P2A40
36C	Parts list and tube voltages for P2A40
37	436-A Compressor amplifier schematic (Altec)
38	439-A " " " (Altec)
39	438-A " " " (Altec)
40	141-A preamplifier schematic (W.E. Co.)
41	1510-A preamplifier schematic (Altec)
42	713-A apparatus unit schematic (W.E. Co.)
43	713-B " " " (W.E. Co.)
44	1550-A " " " (Altec)
45	140-A amplifier schematic (W.E. Co.)
46	142-A " " (W.E. Co.)
47	142-A " " converted for 25 watts
48	142-A " installation in cabinet
49A	P1A385 amplifier schematic (DuKane)
49B	99A120 adapter box for P1A385
49C	Parts list and tube voltages for P1A385
50A	P1A460 amplifier schematic (DuKane)
50B	99A121 adapter box for P1A460
50C	Parts list and tube voltages for P1A460
51	1568-A amplifier schematic (Altec)
52	143-A amplifier schematic (W.E. Co.)
53	1530-A " " (Altec)
54	1569-A " " (Altec)
55	1570-A " " (Altec)
56A	GB1026A dividing network
56B	Line level from 70 volt output
57A,B,C	Dial selective paging applique unit (Mfr. Disc.)
58	" " " " " mounting plate (Mfr.Disc.)
59	" " " " " (CS-25006)
60	" " " " " mounting plate (CE-25006)
61	" " " " " priority circuit
62	GB3302 amplifier shelf and backboard
63	KS12048 line matching transformer
64	KS14792, L-5 line matching transformer
65	KS14417 line matching transformer
66	TE6478 line matching transformer
67	GB3609 transformer assembly
68	GB3608 " "
69	710-3060 transformer and 5A105 loudspeaker
70	710-3050 " " 5A90 "
71	Loudspeaker auto-transformer combinations
72A	Line losses in 70V speaker lines for various types of wire and amplifier powers (chart)
72B	Line losses in 70V speaker lines (table)
73	Impedance and line currents as provided by 70V line operation of various amplifier wattages
74	Sound level outputs of various speakers
75	Shielded wire splice on a 44-A block

76	External volume control for single loudspeaker
77	Volume controls for music and paging
78	Loudspeaker coverage patterns
79	S1 loudspeaker assembly
80A	S2 " "
80B	S2 " " (detail)
81	Basic high-quality paging system
82	Paging system with high-quality and telephone quality inputs
83	Complex system with multiple microphones and amplifiers
84	Basic telephone quality paging system
85	Dial selection paging system
86	Volume measurements
87	Impedance measurements

FIG. 1

INDUCTION COIL CIRCUIT



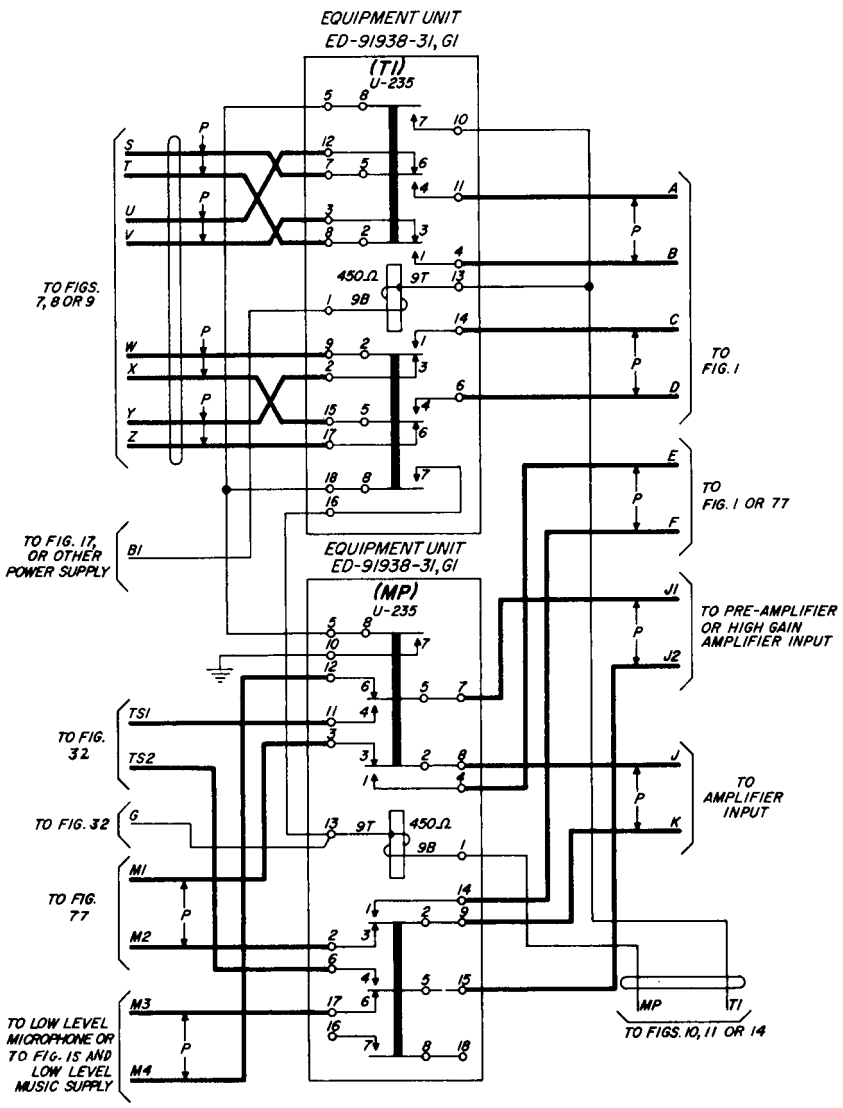
EQUIPMENT UNIT INTERCONNECTIONS FOR FIGURE 1

LEAD	(V)	(I)	(A)	(BF)	(B)	CONNECTS TO CIRCUIT
A	4	8				TRANSFER CKT., FIG. 2 OR 3A
B	5	6-9				TRANSFER CKT., FIG. 2 OR 3A
C		1		8		TRANSFER CKT., FIG. 2 OR 3A
D			5	9		TRANSFER CKT., FIG. 2 OR 3A
		3	4			
E		4				TRANSFER CKT., FIG. 2 OR 3A
F		7				TRANSFER CKT., FIG. 2 OR 3A
B3				3	4	BATTERY CKT., FIG. 17
GRD				1	5	

* ON 10 WATT AMPLIFIER USE 500 OHM, 10 WATT RESISTOR
" 30 " " " " 200 " , 20 " "
" 75 " " " " 100 " , 50 " "
" 165 " " " " 50 " , 100 " "

FIG. 2

TRANSFER CIRCUIT FOR ONE POSITION P.B.X.



EQUIPMENT UNIT INTERCONNECTIONS FOR FIGURE 2

LEAD	(T1)	(MP)	CONNECTS TO CIRCUIT
A	11		INDUCTION COIL CKT., FIG. 1
B	4		INDUCTION COIL CKT., FIG. 1
C	14		INDUCTION COIL CKT., FIG. 1
D	6		INDUCTION COIL CKT., FIG. 1
E		4	INDUCTION COIL CKT. FIG. 1 OR VOLUME CONTROL CKT. FIG. 77
F		14	INDUCTION COIL CKT. FIG. 1 OR VOLUME CONTROL CKT. FIG. 77
J		8	TO AMPLIFIER INPUT
K		9	TO AMPLIFIER INPUT
S	7		JACK CKTS., FIGS. 7, 8 OR 9
T	8		JACK CKTS., FIGS. 7, 8 OR 9
U	12		JACK CKTS., FIGS. 7, 8 OR 9
V	3		JACK CKTS., FIGS. 7, 8 OR 9
W	9		JACK CKTS., FIGS. 7, 8 OR 9
X	15		JACK CKTS., FIGS. 7, 8 OR 9
Y	2		JACK CKTS., FIGS. 7, 8 OR 9
Z	17		JACK CKTS., FIGS. 7, 8 OR 9
B1	1		BATTERY SUPPLY CKT., FIG. 17
M1		3	VOLUME CONTROL FIG. 77
M2		2	VOLUME CONTROL FIG. 77
M3		17	TO LOW LEVEL MICROPHONE
M4		12	TO LOW LEVEL MICROPHONE
J1		7	TO PRE-AMPLIFIER INPUT
J2		15	TO PRE-AMPLIFIER INPUT
T1	10-13		PAGING KEYS, FIGS. 10, 11 OR 14
MP		1	PAGING KEYS, FIGS. 10, 11 OR 14
TS1		11	TO TONE GENERATOR, FIG. 32 OR
TS2		6	TO TONE GENERATOR, FIG. 32 OR
GRD.		10	
STRAPS	5-18	5	
STRAPS	16	13	

FIG. 3A

TRANSFER CIRCUIT FOR TWO POSITION P.B.X.

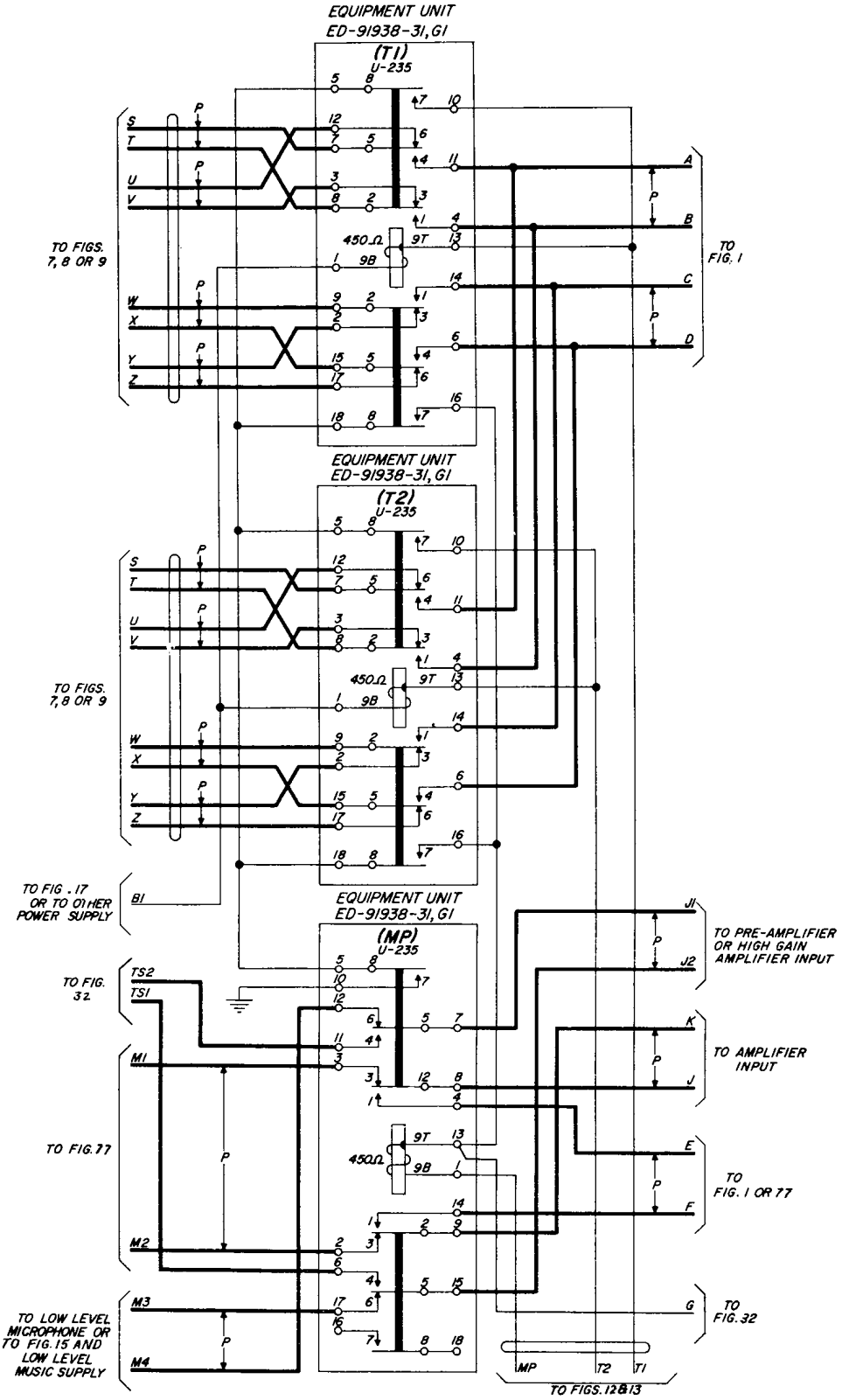


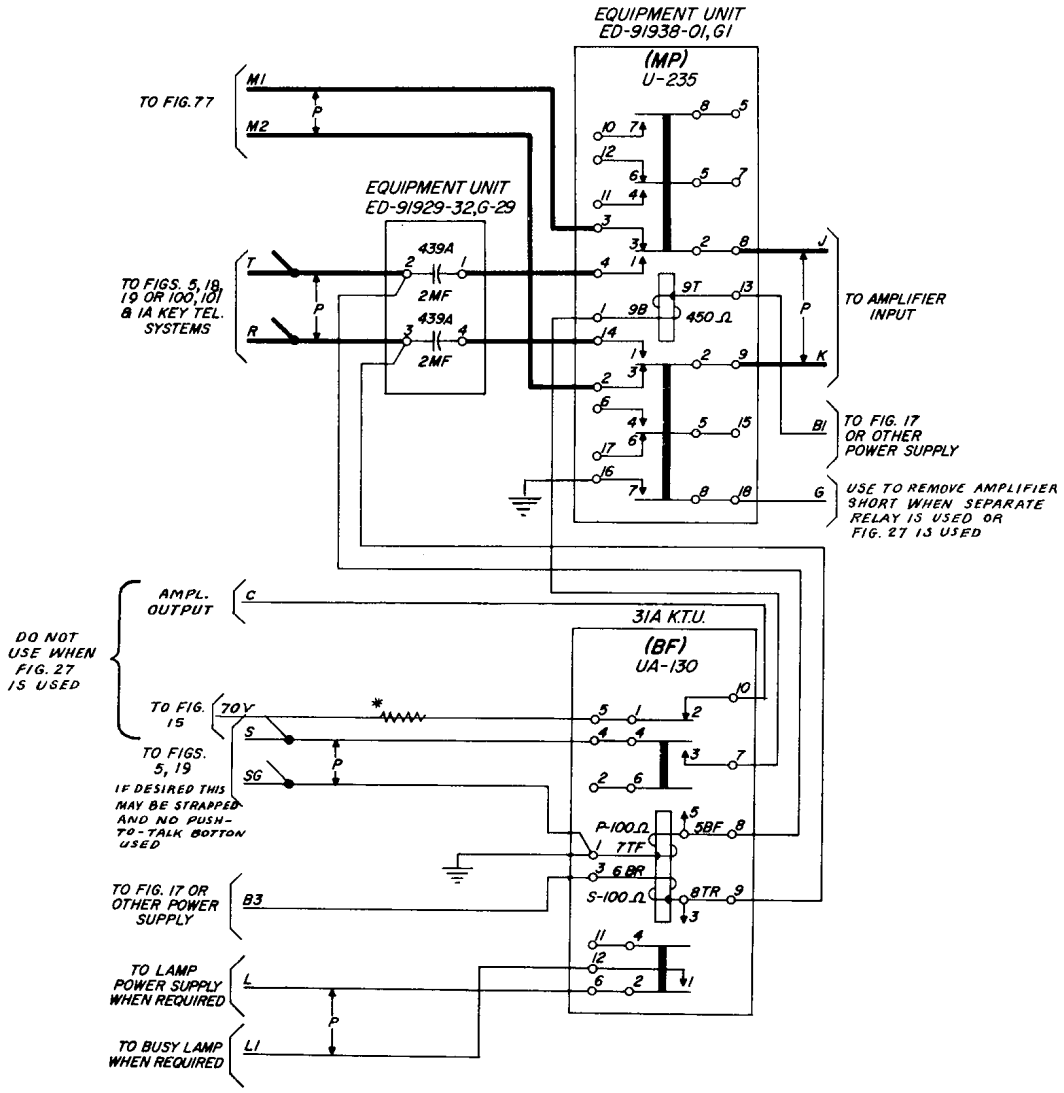
FIG. 3B

EQUIPMENT UNIT INTERCONNECTIONS FOR FIGURE 3A

LEAD	(T1)	(T2)	(MP)	CONNECTS TO CIRCUIT
A	11	11		INDUCTION COIL CKT., FIG. 1
B	4	4		INDUCTION COIL CKT., FIG. 1
C	14	14		INDUCTION COIL CKT., FIG. 1
D	6	6		INDUCTION COIL CKT., FIG. 1
E			4	INDUCTION COIL CKT., FIG. 1 OR VOLUME CONTROL CKT., FIG. 77
F			14	INDUCTION COIL CKT., FIG. 1 OR VOLUME CONTROL CKT., FIG. 77
J			8	TO AMPLIFIER INPUT
K			9	TO AMPLIFIER INPUT
S (POS. 1)	7			JACK CKT., FIGS. 7, 8 OR 9
S (POS. 2)		7		JACK CKT., FIGS. 7, 8 OR 9
T (POS. 1)	8			JACK CKT., FIGS. 7, 8 OR 9
T (POS. 2)		8		JACK CKT., FIGS. 7, 8 OR 9
U (POS. 1)	12			JACK CKT., FIGS. 7, 8 OR 9
U (POS. 2)		12		JACK CKT., FIGS. 7, 8 OR 9
V (POS. 1)	3			JACK CKT., FIGS. 7, 8 OR 9
V (POS. 2)		3		JACK CKT., FIGS. 7, 8 OR 9
W (POS. 1)	9			JACK CKT., FIGS. 7, 8 OR 9
W (POS. 2)		9		JACK CKT., FIGS. 7, 8 OR 9
X (POS. 1)	15			JACK CKT., FIGS. 7, 8 OR 9
X (POS. 2)		15		JACK CKT., FIGS. 7, 8 OR 9
Y (POS. 1)	2			JACK CKT., FIGS. 7, 8 OR 9
Y (POS. 2)		2		JACK CKT., FIGS. 7, 8 OR 9
Z (POS. 1)	17			JACK CKT., FIGS. 7, 8 OR 9
Z (POS. 2)		17		JACK CKT., FIGS. 7, 8 OR 9
B1	1	1		BATTERY SUPPLY CKT., FIG. 17, OR TO OTHER POWER SUPPLY
M1			3	VOLUME CONTROL CKT., FIG. 77
M2			2	VOLUME CONTROL CKT., FIG. 77
M3			17	TO LOW LEVEL MICROPHONE
M4			12	TO LOW LEVEL MICROPHONE
J1			7	TO PRE-AMPLIFIER INPUT
J2			15	TO PRE-AMPLIFIER INPUT
T1	10-13			PAGING KEYS, FIGS. 12 OR 13
T2		10-13		PAGING KEYS, FIGS. 12 OR 13
MP			1	PAGING KEYS, FIGS. 12 OR 13
TS1			6	TO TONE GENERATOR, FIG. 32
TS2			11	TO TONE GENERATOR, FIG. 32
GRD.			10	
STRAP	5-18	5-18	5	
STRAP	16	16	13	

FIG. 4

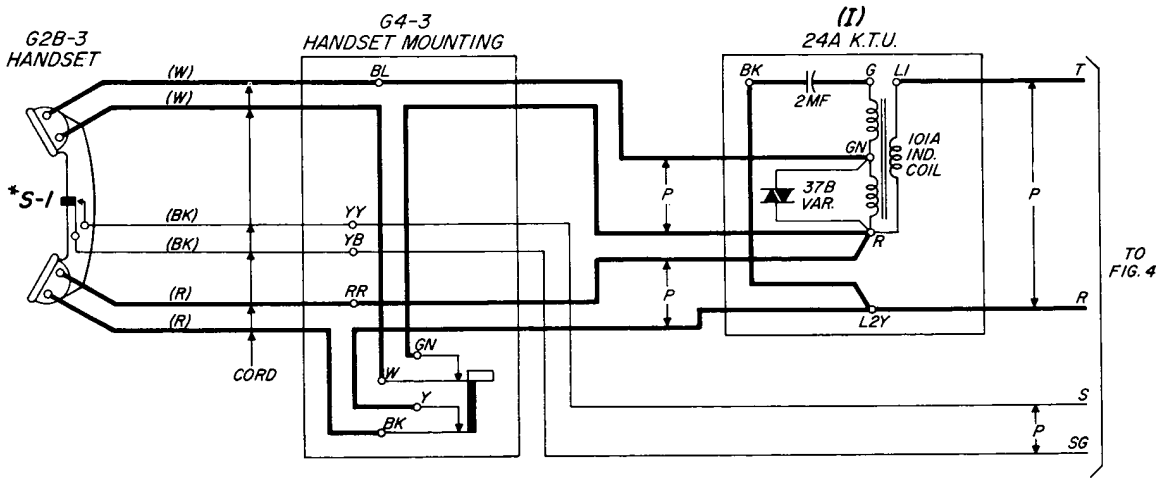
TRANSFER CIRCUIT FOR 100 AND 101 TYPE KEY EQUIPMENTS
1A AND 1A1 KEY TELEPHONE SYSTEMS OR SUSPENSION HANDSETS



* ON 10 WATT AMPLIFIER USE 500 OHM, 10 WATT RESISTOR
30 " " " 200 " , 20 " "
75 " " " 100 " , 50 " "
165 " " " 50 " , 100 " "

FIG. 5

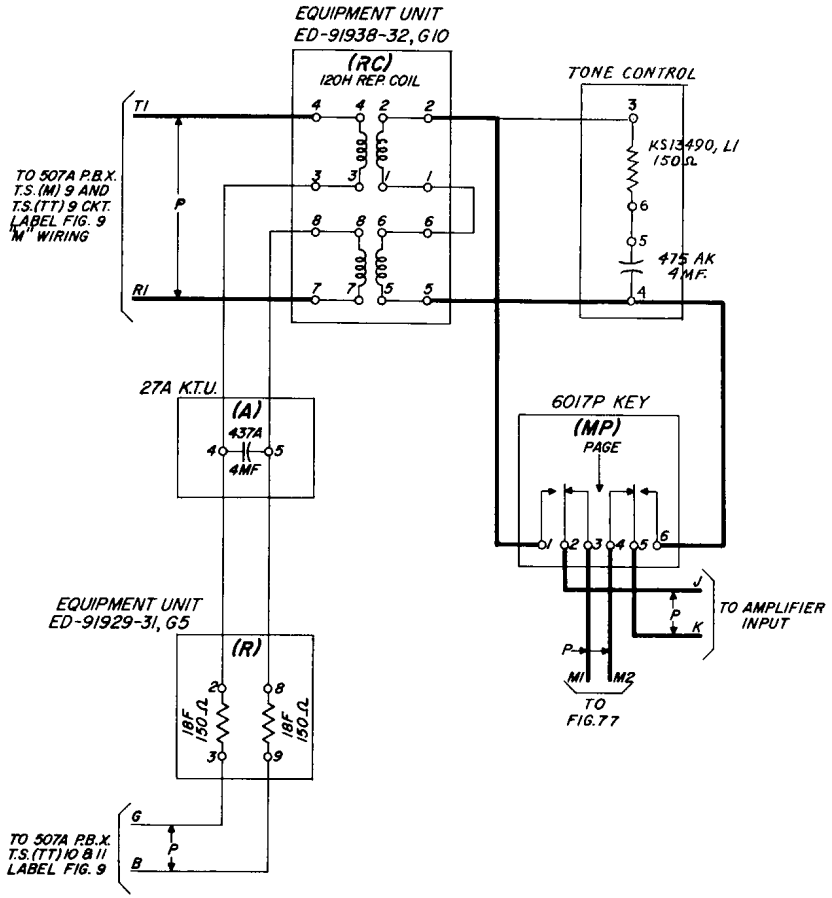
HANDSET AND INDUCTION COIL CIRCUIT



*EXTERAL BUTTON OR FOOTSWITCH MAY BE USED

FIG. 6

TRANSFER CIRCUIT FOR 507A OR 507B P.B.X.



NOTES:

1. PROVIDE "W" OPTION ONLY AS A LAST RESORT WHEN REQUIRED TO MEET ACOUSTIC CONDITIONS.

EQUIPMENT UNIT INTERCONNECTIONS FOR FIGURE 6

LEAD	(RC)	KS 13490 (KS)	6017P KEY (MP)	27A K.T.U. (A)	(R)	CONNECTS TO CIRCUIT
J			2			TO AMPLIFIER INPUT
K			5			TO AMPLIFIER INPUT
M1			3			TO TONE CONTROL (FIG. 77)
M2			4			TO TONE CONTROL (FIG. 77)
TI	4					TO 507A P.B.X.
RI	7	2 — 3	1			TO 507A P.B.X.
		5 — 4	6			
G					3	TO 507A P.B.X.
	3			4	2	
B					9	TO 507A P.B.X.
	8			5	8	
STRAP	1-6					

FIG. 7

MODIFIED WIRING TO TEL. SET JACKS
FOR 555 P.B.X. SEE SD-66520-011, FIG. 7
FOR 556A P.B.X. SEE SD-65658-011, FIG. 5

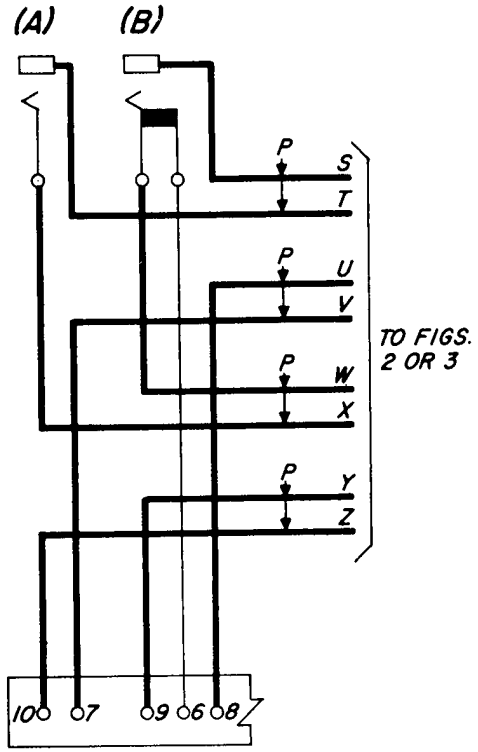


FIG. 8

MODIFIED WIRING TO TEL. SET JACKS
FOR 552A, 552D OR 605A P.B.X. SEE
SD-66425-011, FIG. B

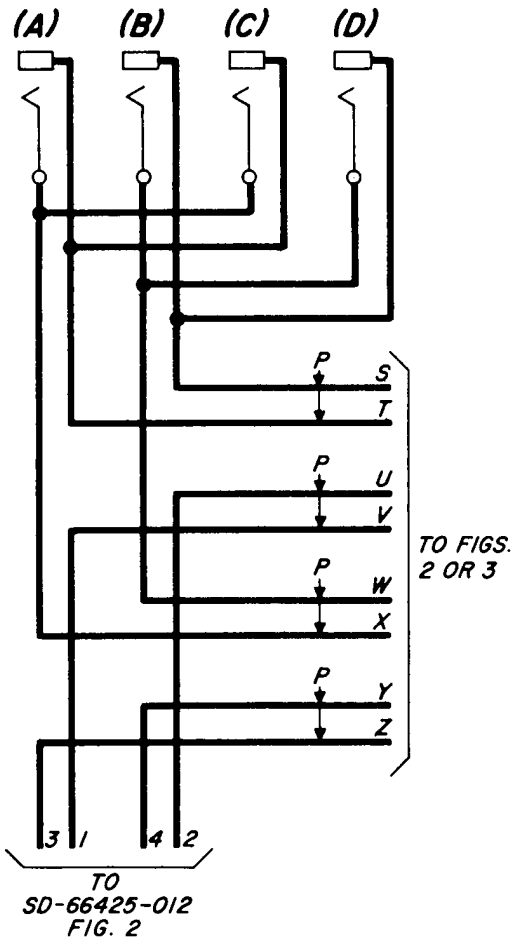


FIG. 9

MODIFIED WIRING TO TEL. SET JACKS
FOR 550C P.B.X. SEE SD-66023-011 FIG. 1
FOR 551A, 551B OR 551D P.B.X. SEE
SD-66180-01 FIG. 1

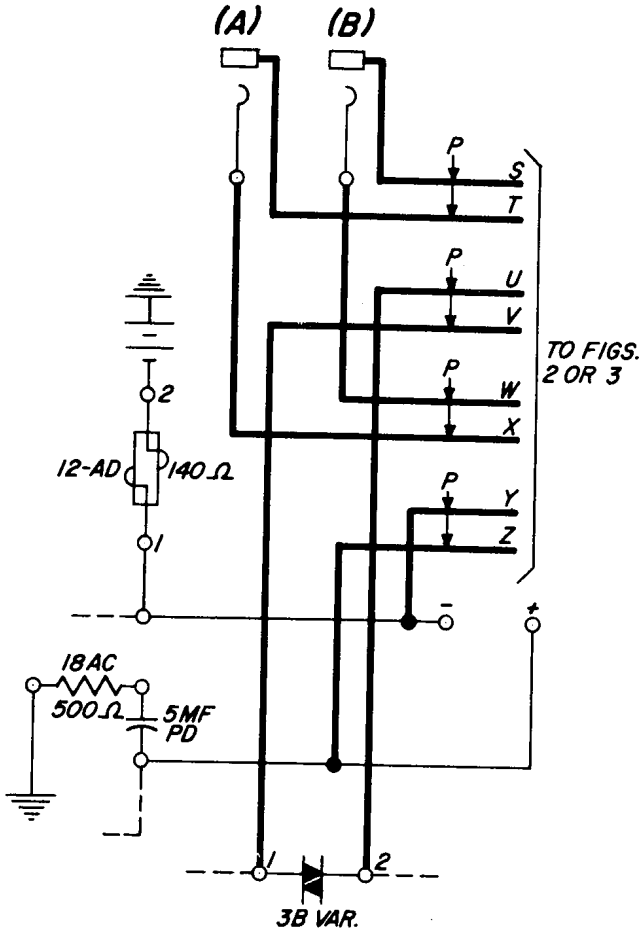
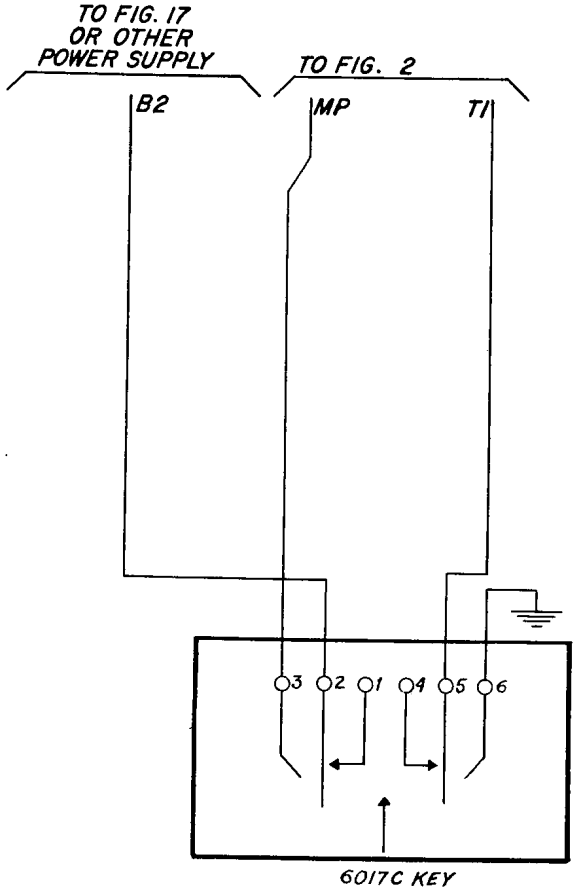
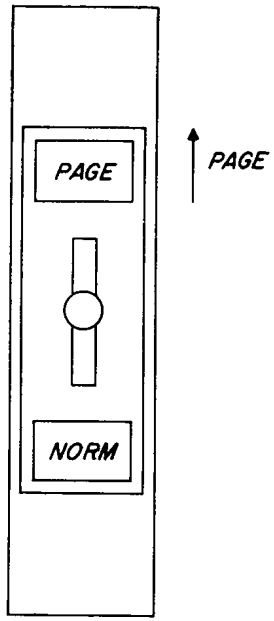


FIG. 10

PAGING KEY FOR 555 OR 556A P.B.X.
(1 POSITION)

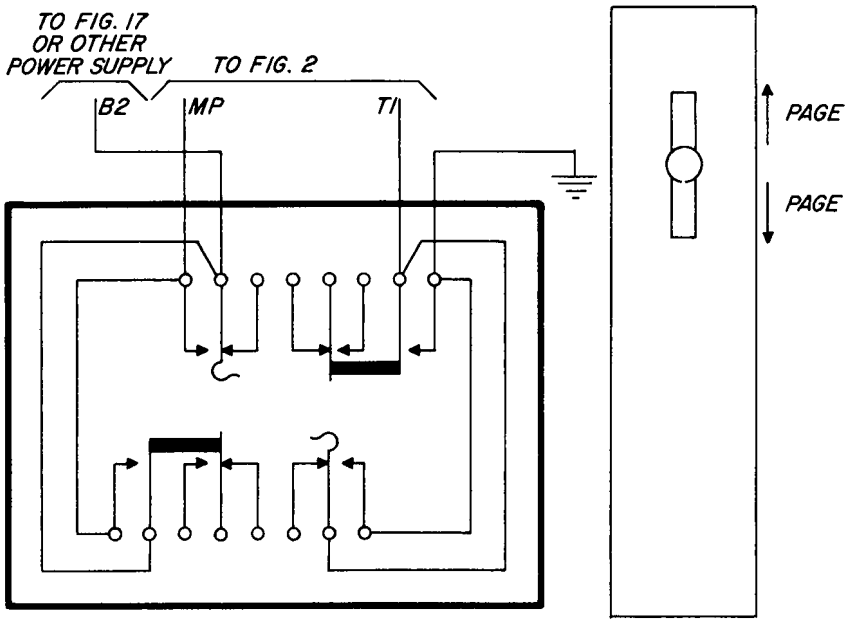




6017 C KEY E/W
P-132718 HANDLE (RED)
98A DESIGNATION STRIP

FIG. 11

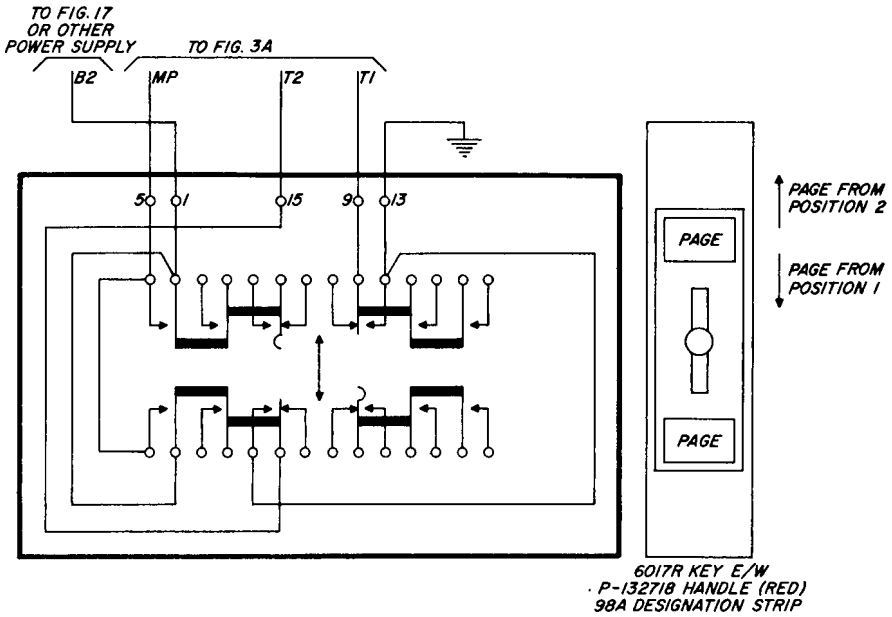
PAGING KEY FOR INSTALLATION IN A KEYSHELF
(1 POSITION)



2AW KEY UNIT E/W
P-136558 KEY TOP
38A SHIELD
P-214045 SCREWS
P-132718 HANDLE (RED)
P-136555 KEY BASE
AND MTG. STUD

FIG. 12

PAGING KEY FOR 555 OR 556A P.B.X.
(2 POSITION)



6017R KEY E/W
P-132718 HANDLE (RED)
98A DESIGNATION STRIP

FIG. 13

PAGING KEY FOR INSTALLATION IN A KEYSHELF
(2 POSITION)

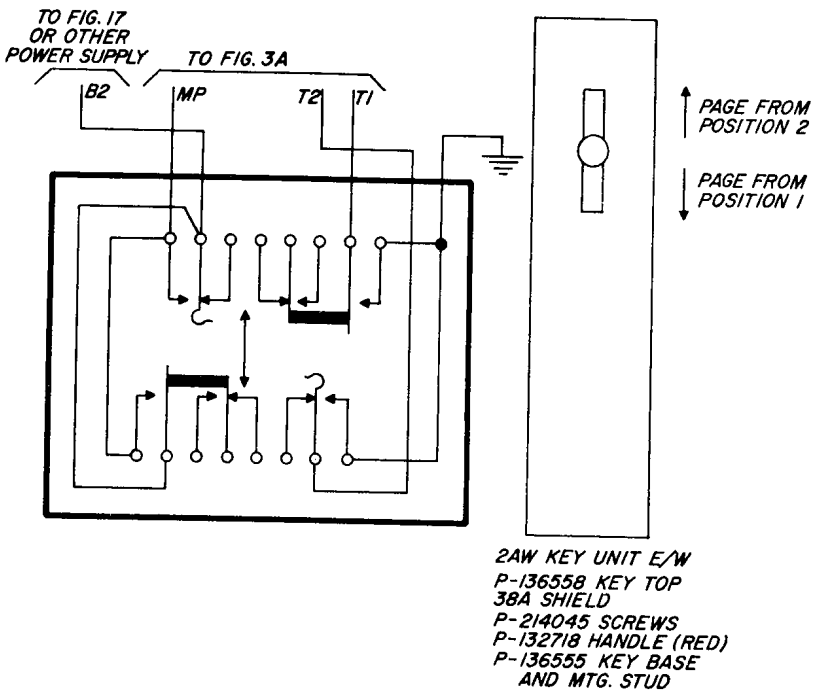


FIG. 14

BIJB PAGING & AREA SELECTION KEY FOR
USE IN KEYSHELF

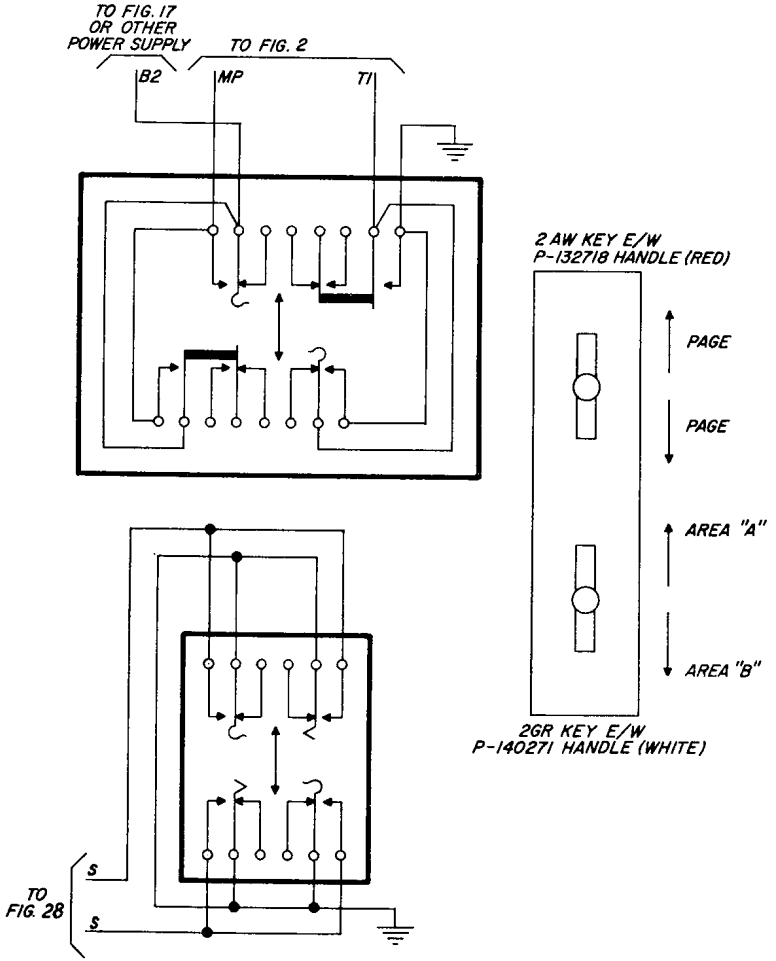
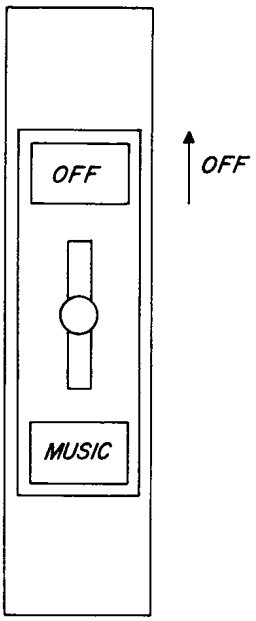


FIG. 15

MUSIC CUT-OFF KEY



6017 J KEY E/W
P-132718 HANDLE (RED)
98A DESIGNATION STRIP

TO FIG. 77 FOR LINE LEVEL
TO FIG. 2-3A-4-6 OR 57 FOR LOW LEVEL MUSIC SUPPLY (M1-M2)

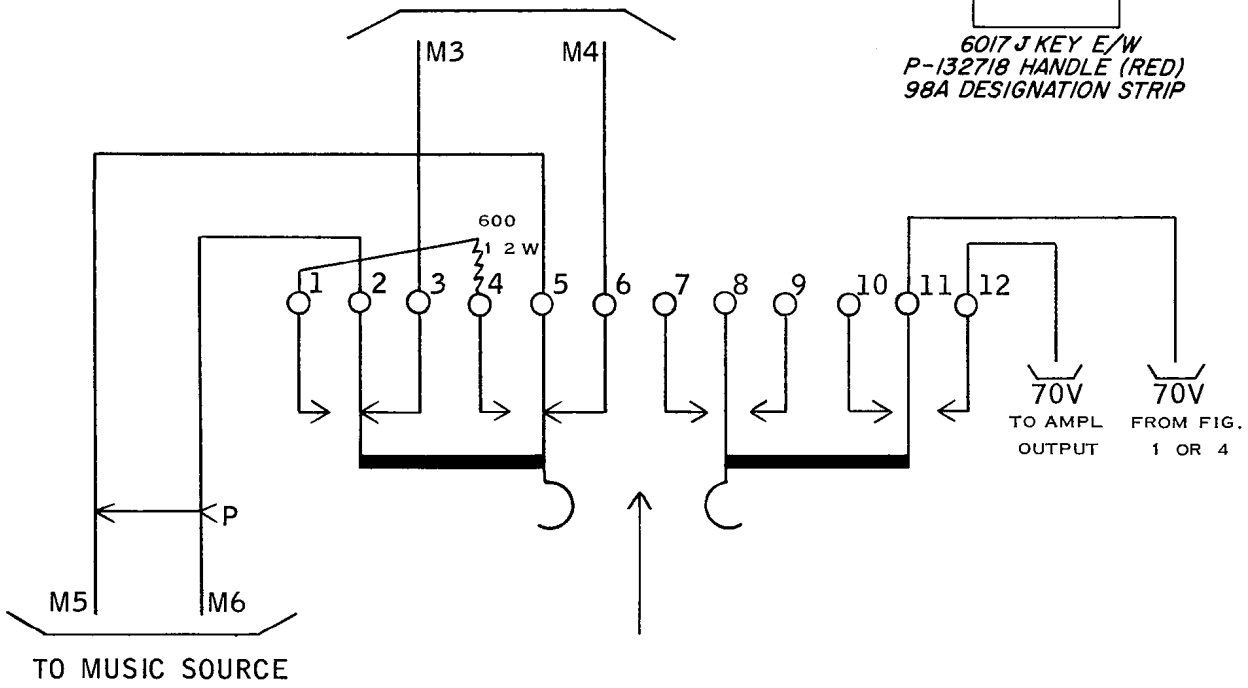


FIG. 16

6017E KEY FOR 2 AREA SELECTION
(EXTERNAL MOUNT)

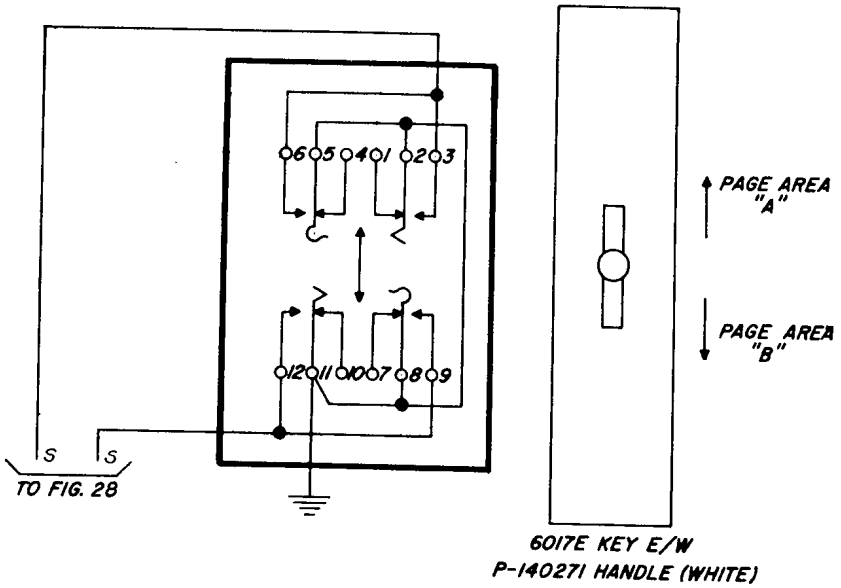
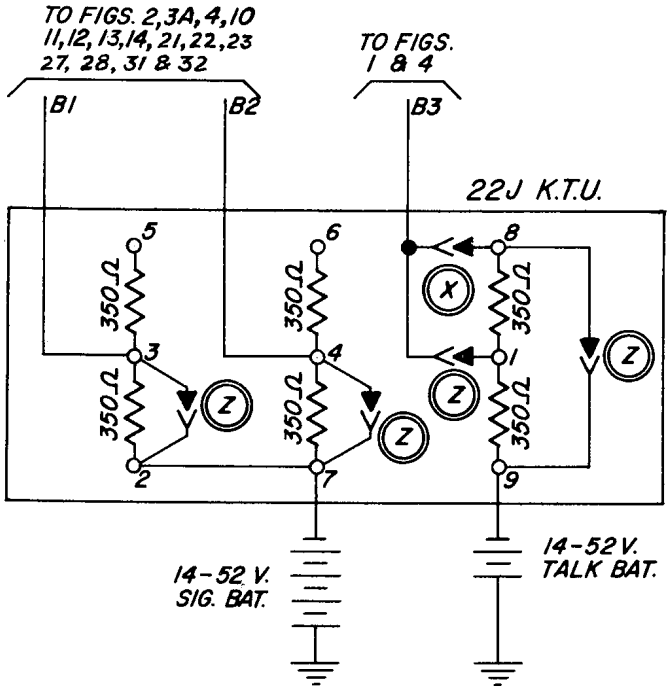


FIG. 17

BATTERY SUPPLY



NOTES:

1. USE "X" WIRING FOR 46-52V BATTERY.
   USE "Z" WIRING FOR 14-26V BATTERY.

2. A RECTIFIER OR POWER PLANT MAY BE
   USED WHERE REQUIRED.

FIG. 18

PAGING KEY FOR ANY TELEPHONE SET INPUT

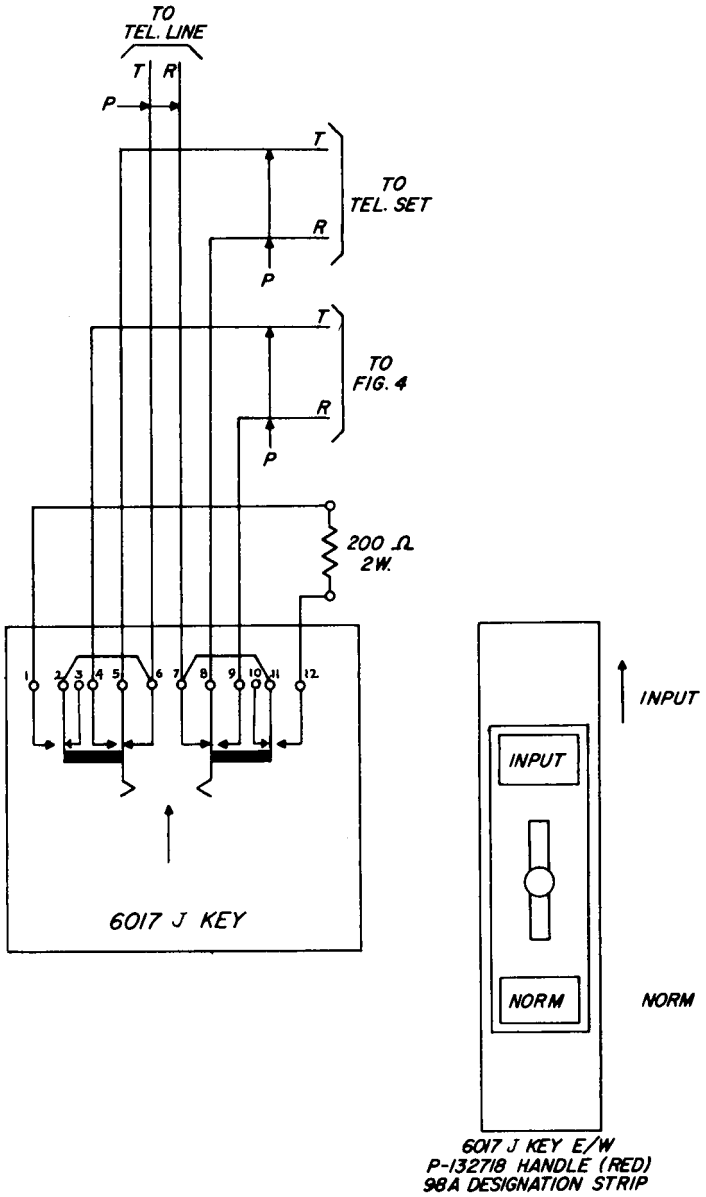


FIG. 19

MODIFICATION OF PICK-UP KEY FOR KEY TELEPHONE SYSTEMS

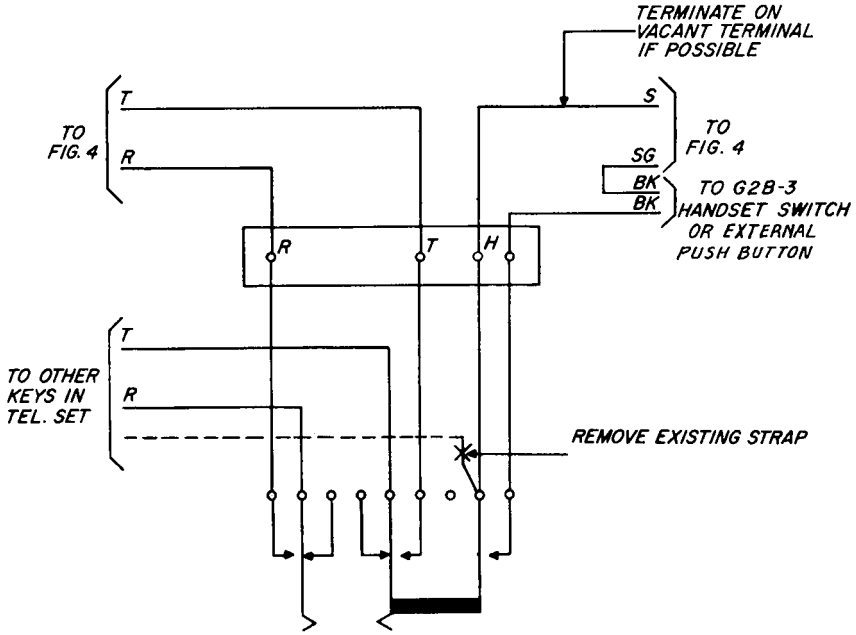
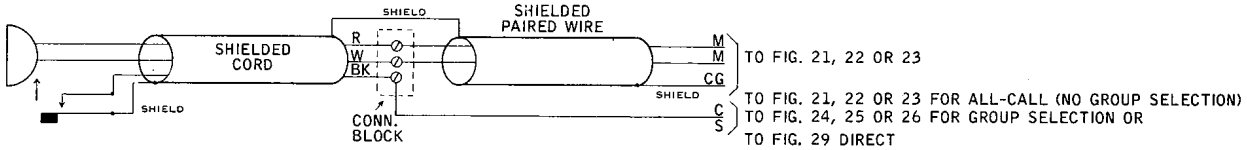


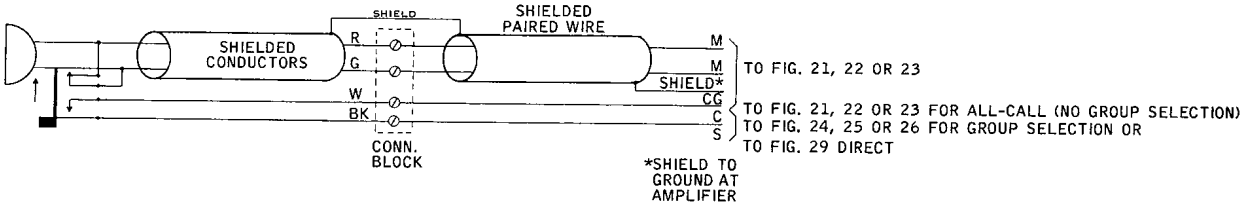
FIG. 20

HI QUALITY MICROPHONES

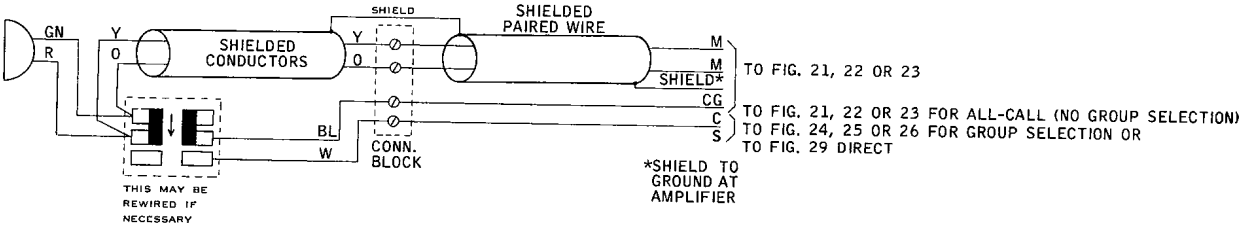
P-1 MICROPHONE ASSEMBLY (MFD.)



GB-1060A MICROPHONE ASSEMBLY GB-1064A OR GB-1065A TELESCOPING MICROPHONE ARM



E-V 602 D DYNAMIC MICROPHONE



TURNER 58-A DYNAMIC MICROPHONE

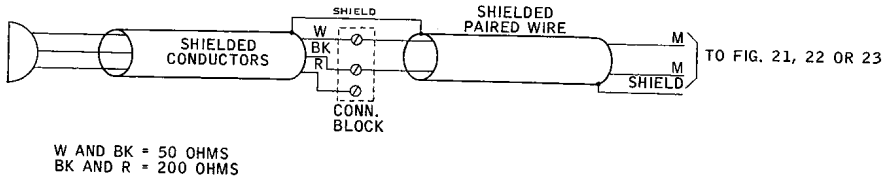


FIG. 21

MULTIPLE MIKE — SIMULTANEOUS ACCESS

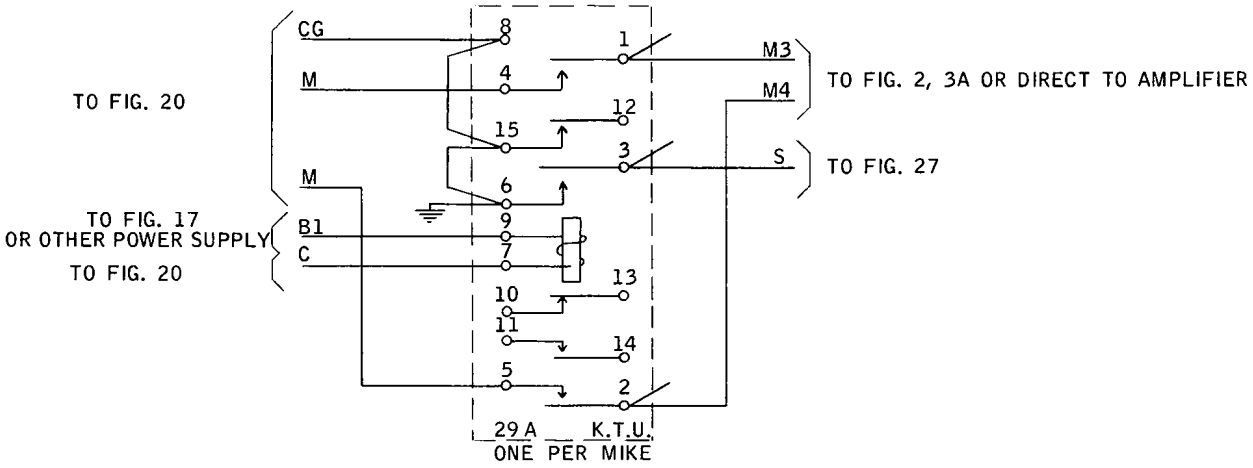


FIG. 22

MULTIPLE MIKE — AUTOMATIC EXCLUSION

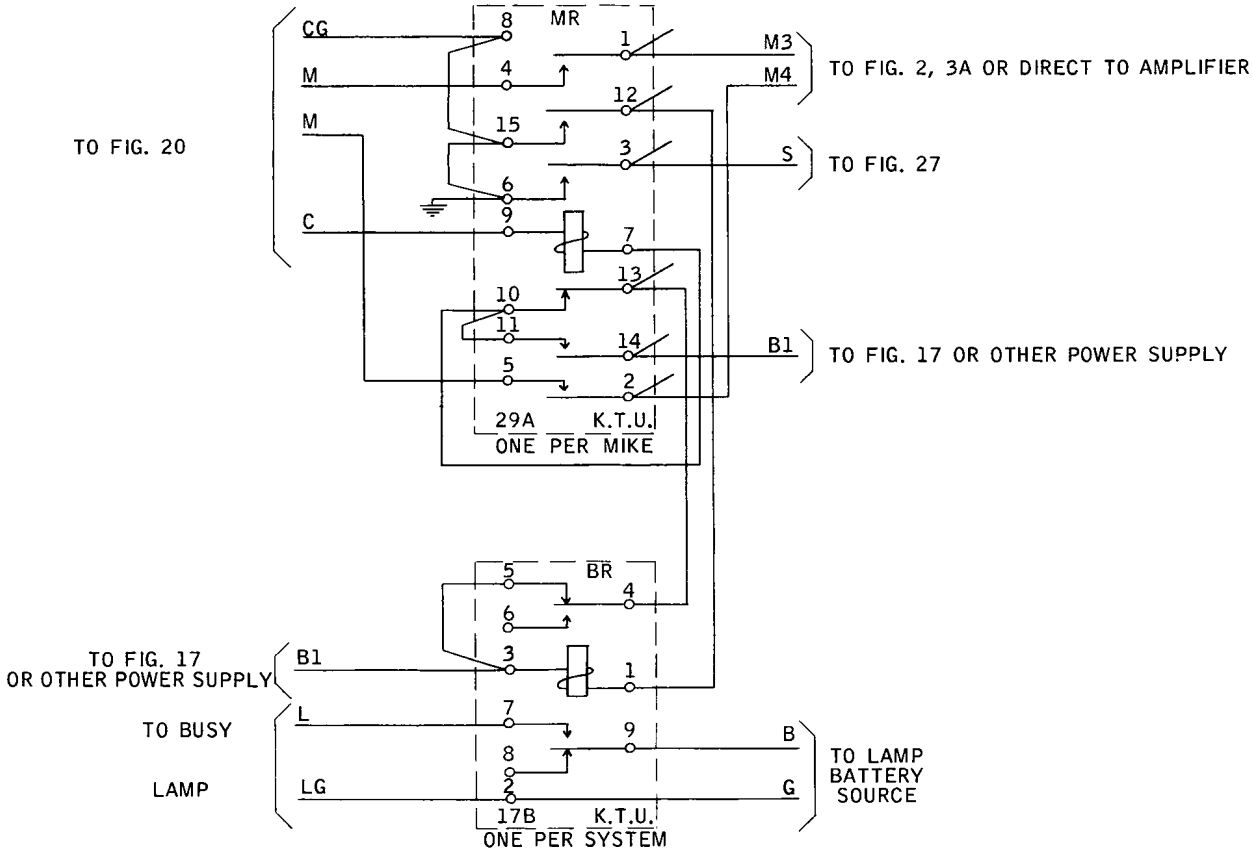


FIG. 23

MULTIPLE MIKE - PRIORITY CIRCUIT (3 MIKE INPUTS SHOWN)

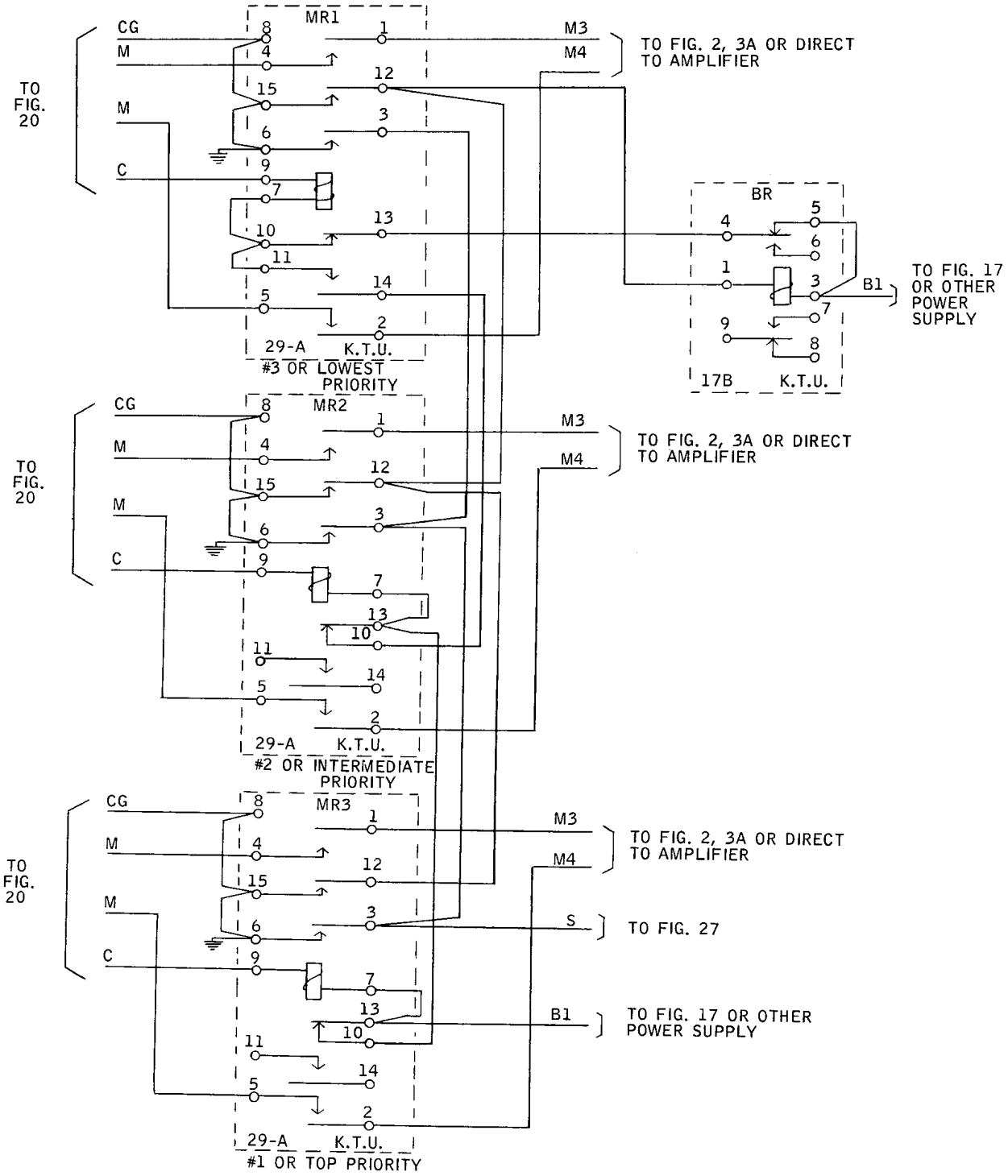


FIG. 24

GB-1030 OR GB-1042 AREA SELECTION KEY
(ACCUMULATIVE LOCK-IN)

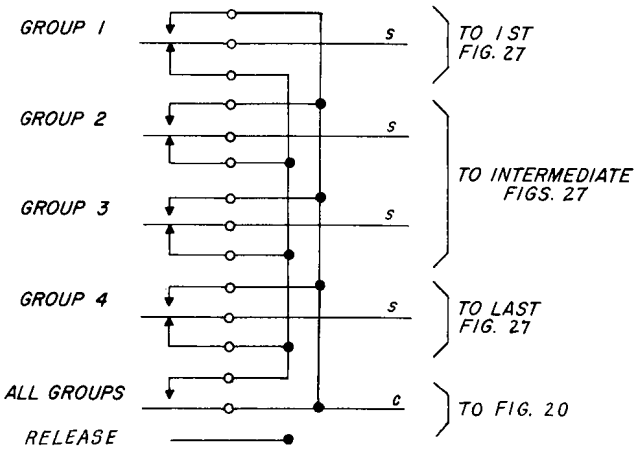


FIG. 25

GB 1209 OR GB 1043 AREA SELECTION KEY
(ACCUMULATIVE LOCK-IN)

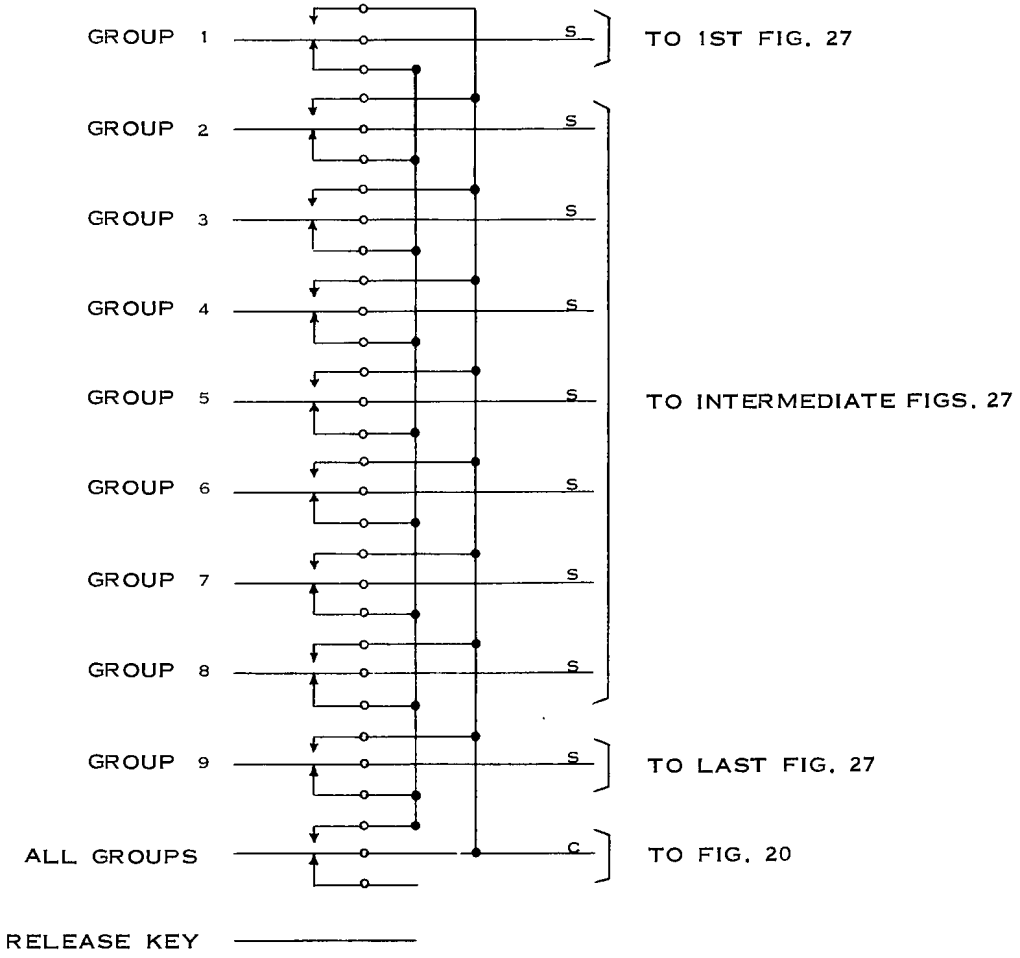


FIG. 26

GB-1040 OR GB-1041 AREA SELECTION KEY

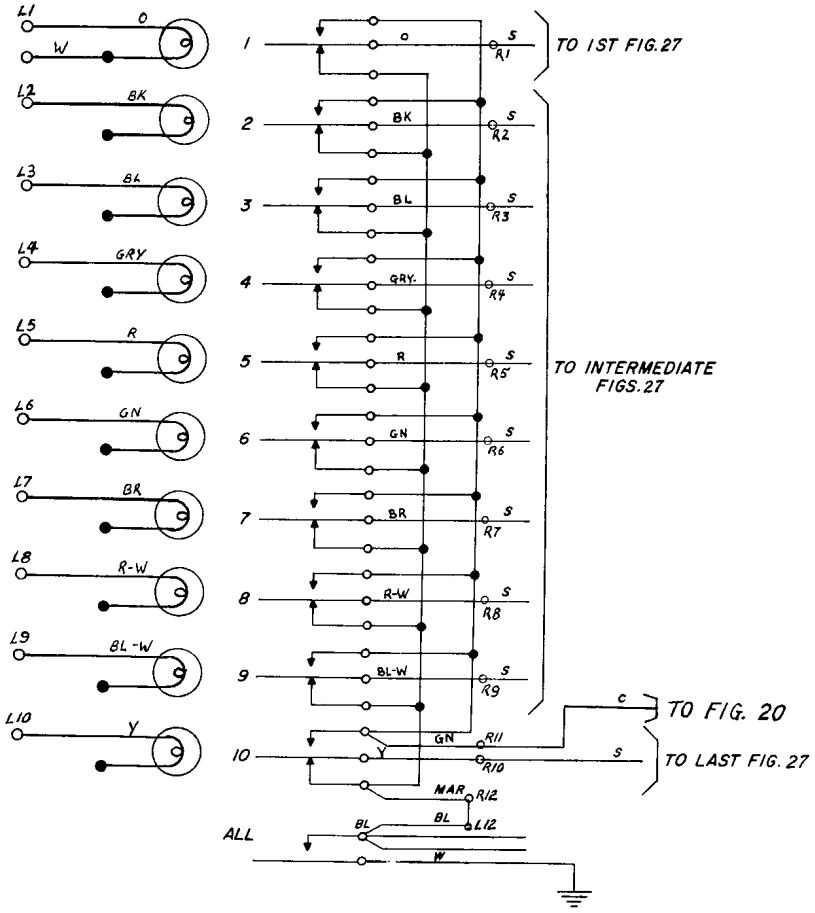
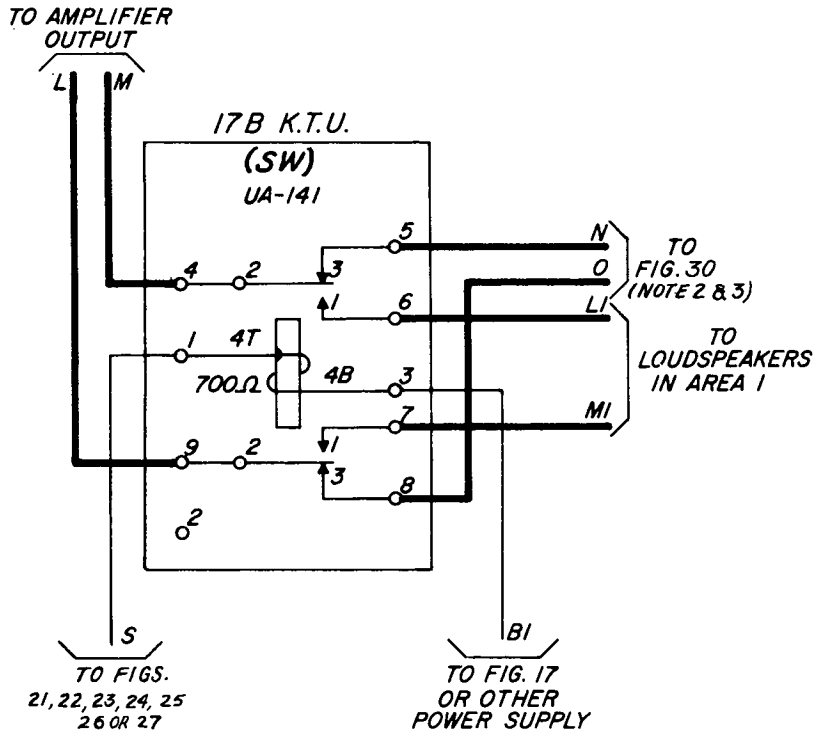


FIG. 27

INDIVIDUAL AREA SELECTION RELAY



NOTES:

1. ONE REQUIRED PER AREA.

2. "N" - "O" ALTERNATE LOAD SHOULD APPROXIMATE THE SPEAKER GROUP THAT IS REPLACED. IT MUST BE NON-INDUCTIVE.

3. WHEN THE AMPLIFIER OUT-PUT IS TO ONE GROUP ONLY, "N" - "O" SHOULD BE AS FOLLOWS:

ON 10 WATT AMPLIFIER USE 500 OHM, 10 WATT RESISTOR
ON 30 WATT AMPLIFIER USE 200 OHM, 20 WATT RESISTOR
ON 75 WATT AMPLIFIER USE 100 OHM, 50 WATT RESISTOR
ON 165 WATT AMPLIFIER USE 50 OHM, 100 WATT RESISTOR

FIG. 28

TWO AREA SELECTION RELAYS

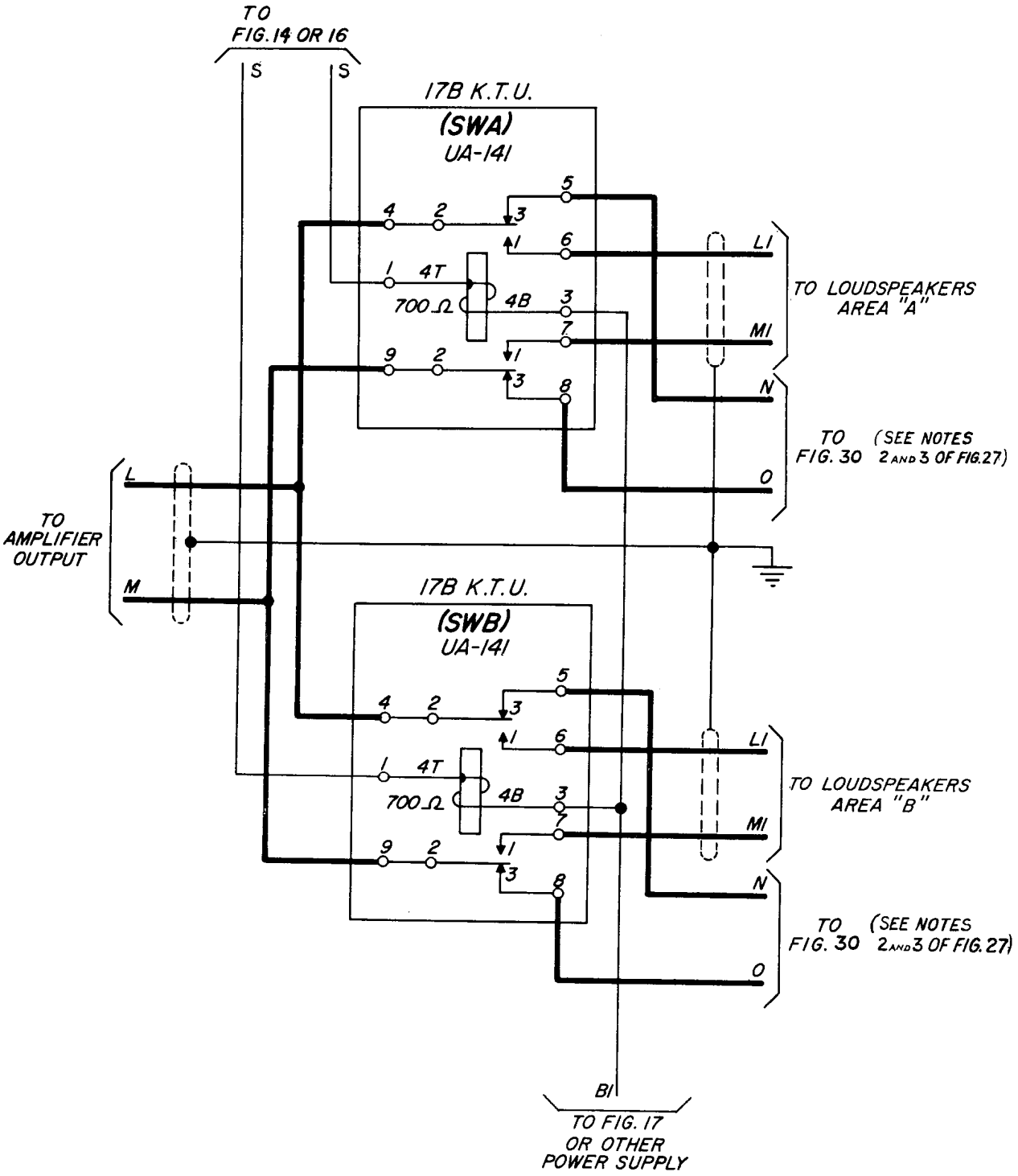


FIG. 29

SIMPLEX CONTROL OF AMPLIFIER AND SHORT

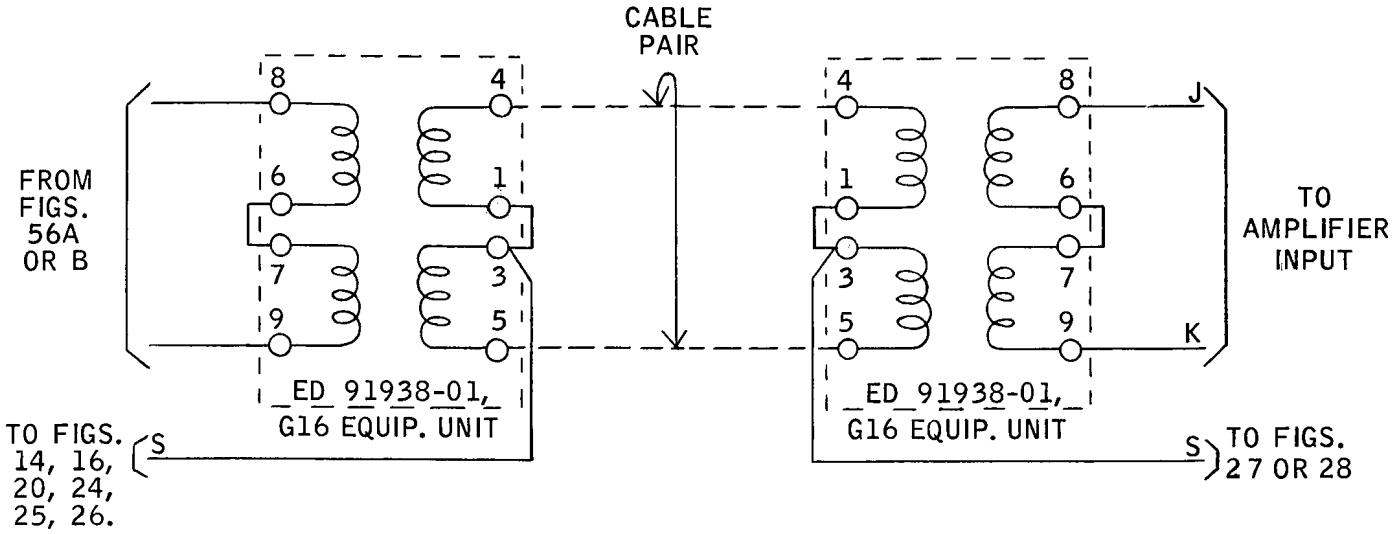
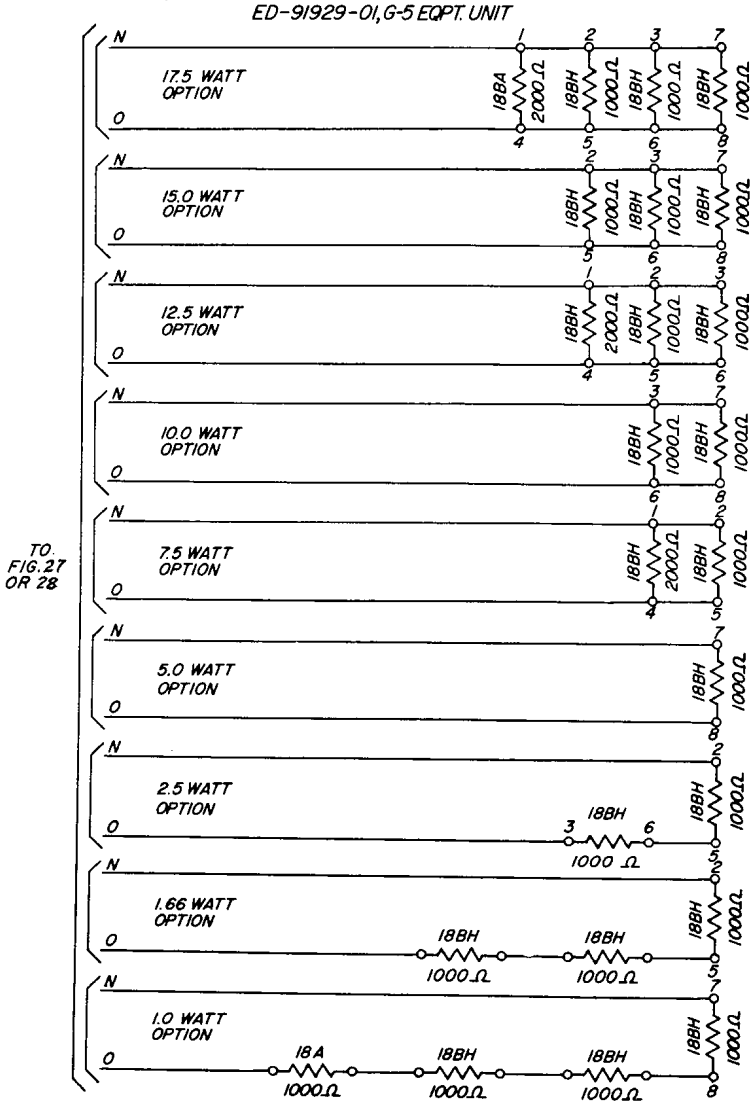


FIG. 30

ADJUSTABLE ALTERNATE LOAD FOR USE WITH AREA SELECTION CKT.

1, 18 8A & 3, 18BH RESISTANCES MTD. ON ED-91929-01, G-5 EQPT. UNIT



NOTES

1. SWT AND SWS MUST BE LOCATED WITHIN 18 INCHES OF DUKANE 1SU20 TONE GENERATOR.

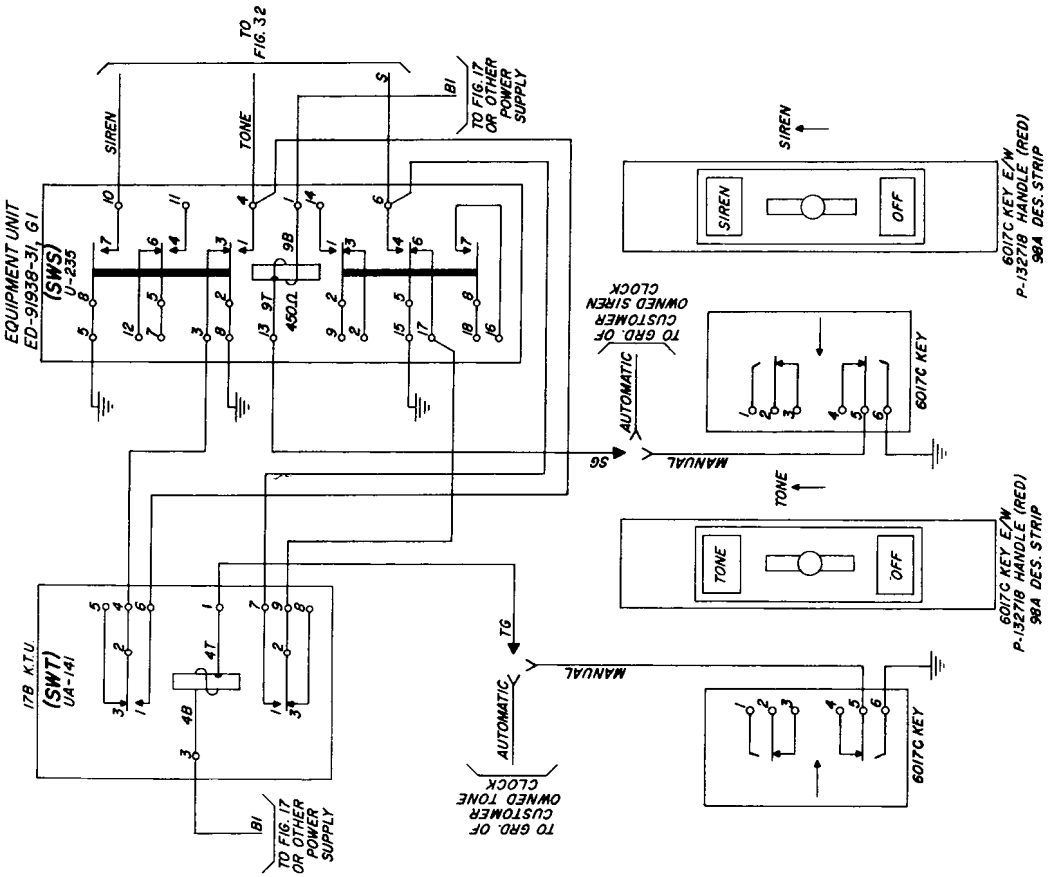


FIG. 31

TONE GENERATOR CONTROL CIRCUIT

FIG.32

DUKANE 15U20 TONE GENERATOR

NOTES

1. STRAP 1 AND 2 FOR STEADY TONE.
2. STRAPS 1, 2 AND 3 FOR WARBLE TONE.

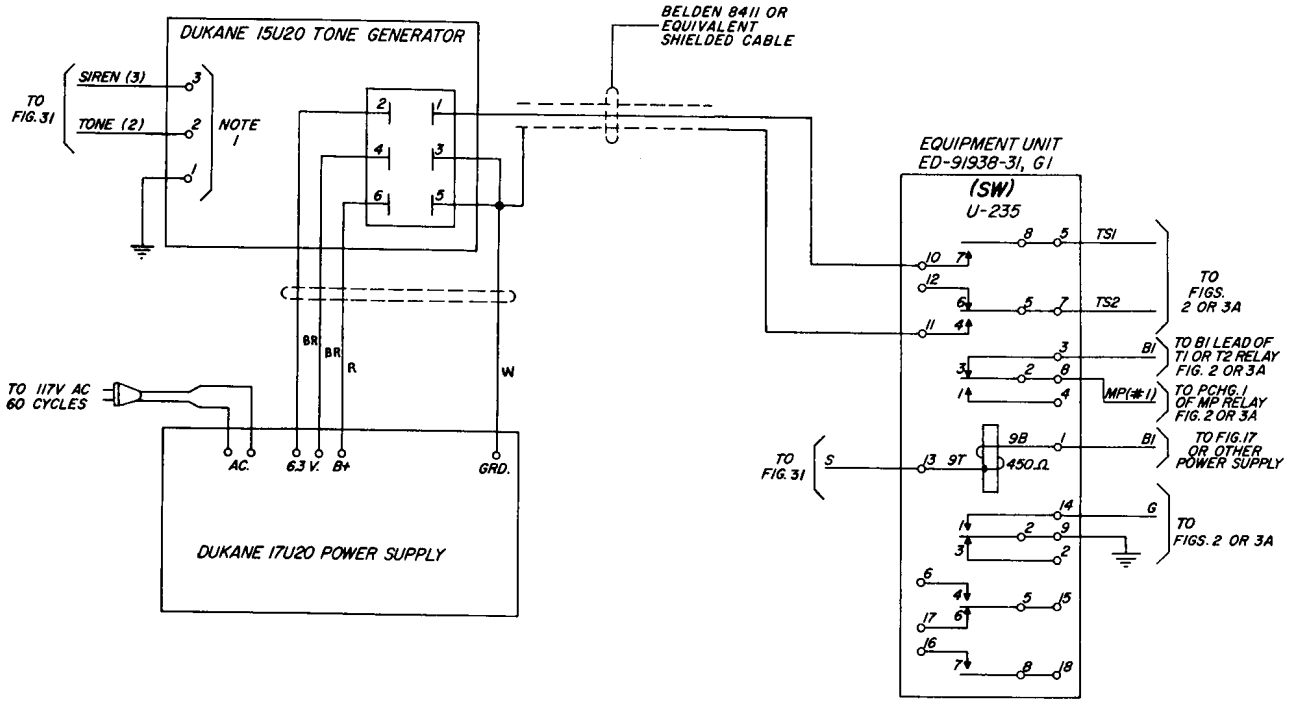


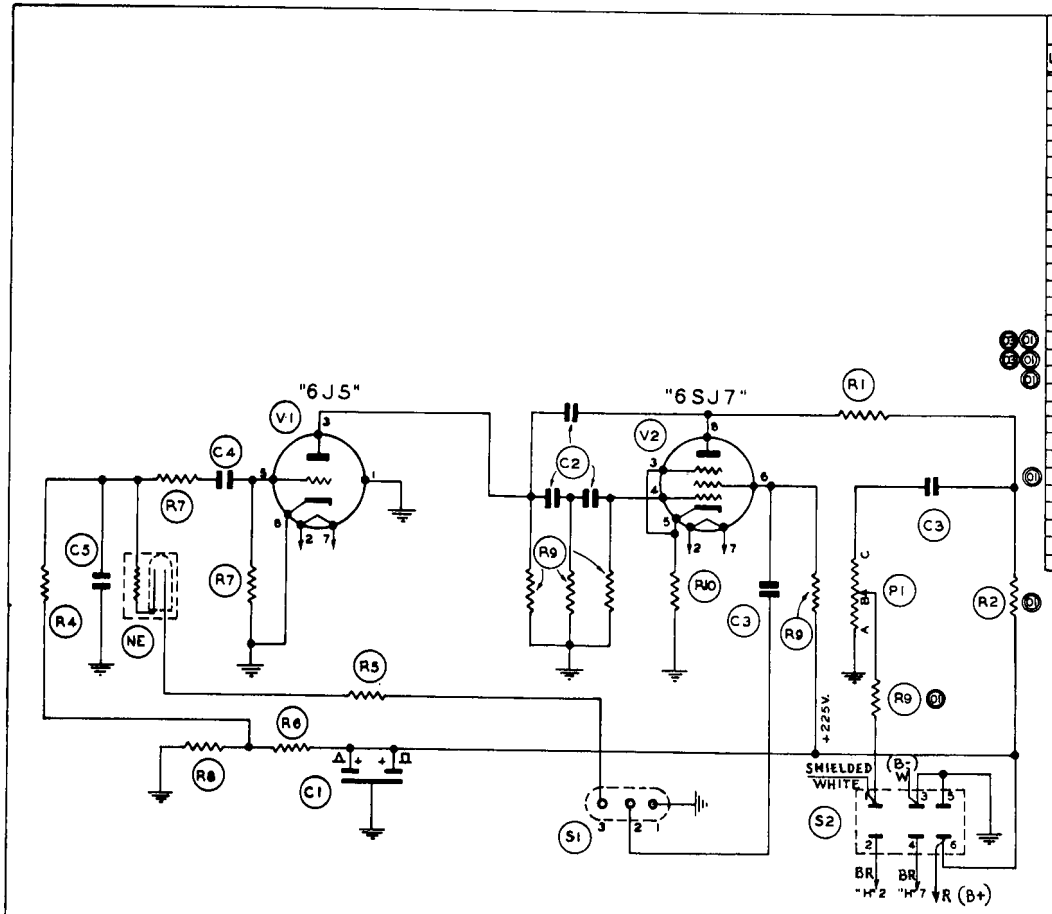
FIG. 33

15U20 DU KANE TONE GENERATOR

190-303

LIST OF ELECTRICAL PARTS

LEGEND	DESCRIPTION	QNTY	PART NO.
C1	CAPACITOR 10-10 MFD. 450 V.	1	199-2902-00
C2	" .00025 MFD. 500 V.	3	199-3001-251
C3	" .02 MFD. 400 V.	2	199-4020-203
C4	" .2 MFD. 400 V.	1	199-4022-204
C5	" .5 MFD. 400 V.	1	199-4022-504
V1	ELECTRON TUBE "6J5"	1	262-6J5
V2	" " "6SJ7"	1	262-6SJ7
NE	NEON LAMP ASSEMBLY	1	566-30-00
PL1	PLUG FOR S2 NOT SHOWN	1	570-50
PL2	" " S1 " "	1	570-77
S1	RECEPTACLE	1	597-66
S2	"	1	597-12700
R1	RESISTOR 82000 OHM 1W.	1	600-0116-823
R2	" 100000 OHM 1W.	1	600-0116-104
R4	" 10 MEGOHM 1W.	1	600-0116-106
R5	" 150000 OHM 1W.	1	600-0116-154
R6	" 180000 OHM 1W.	1	600-0116-184
R7	" 2.2 MEGOHM 1W.	2	600-0116-225
R8	" 270000 OHM 1W.	1	600-0116-274
R9	" 470000 OHM 1W.	5	600-0116-474
R10	" 820 OHM 1W.	1	600-0116-821
P1	POTENTIOMETER 500 M OHM	1	601-3289



TUBE VOLTAGES

TUBE TYPE	SOCKET PIN NUMBER 2	3	4	5	6	7	8
6J5	A.C. 6.3V.			D.C. -7 V.		A.C. 6.3V.	
6SJ7	A.C. 6.3V.	D.C. 1.6V.		D.C. 1.6 V.	D.C. 36 V.	A.C. 6.3V.	D.C. 10V.

USE 20000 OHMS PER V.D.C. METER.
ALL D.C. VOLTAGES MEASURED TO GND.
NOTE: ALL FILAMENT VOLTAGES MEASURED BETWEEN PINS MARKED -O

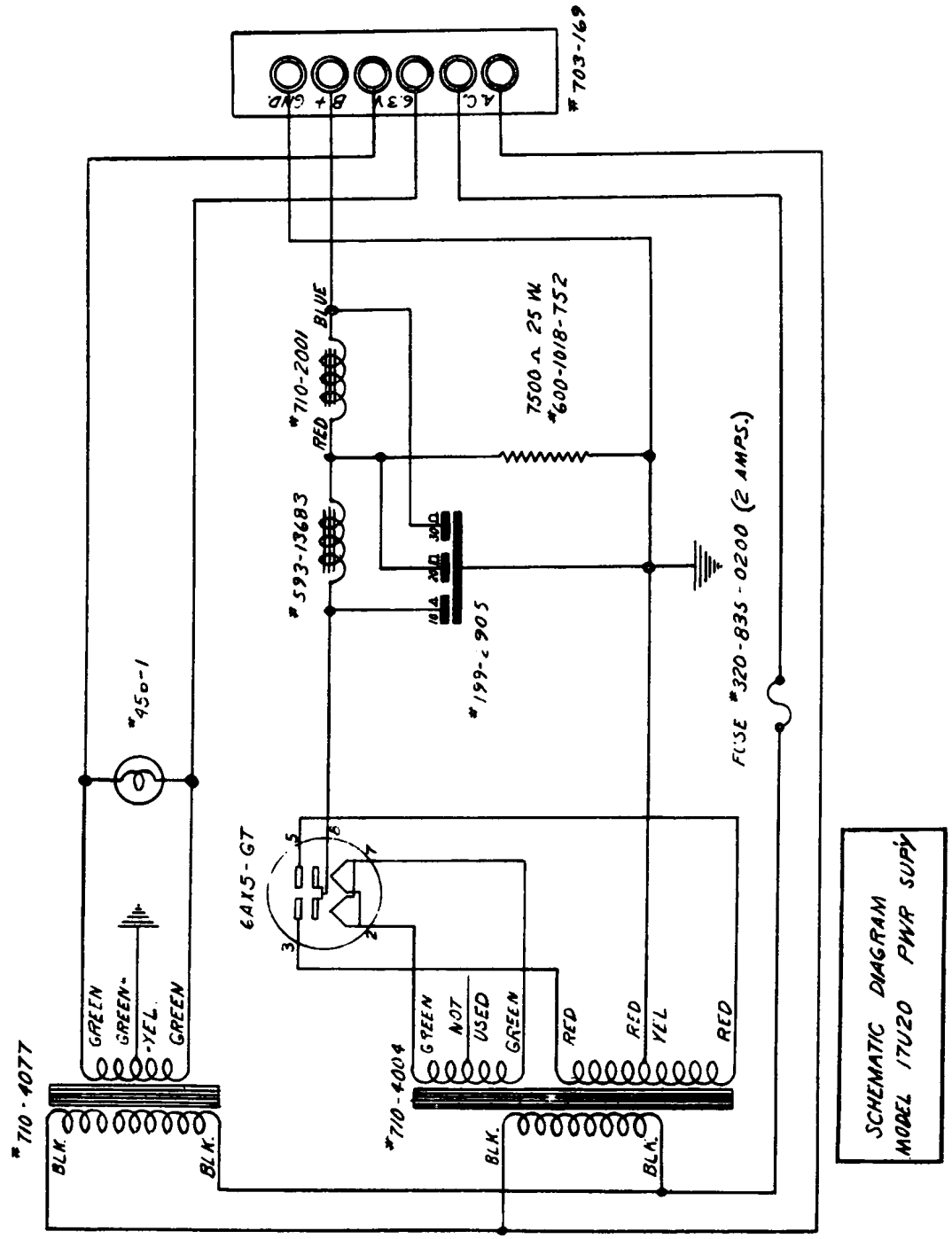
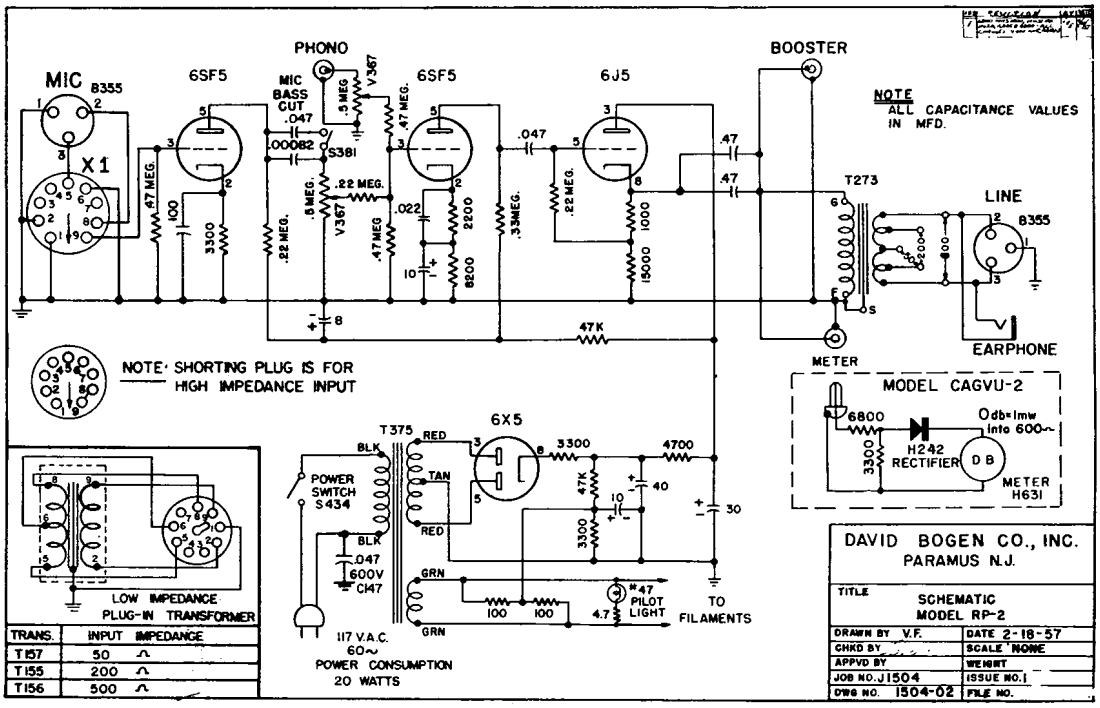


FIG. 34
17U20 DU KANE POWER SUPPLY

FIG. 35

BOGEN RP2 PRE AMPLIFIER



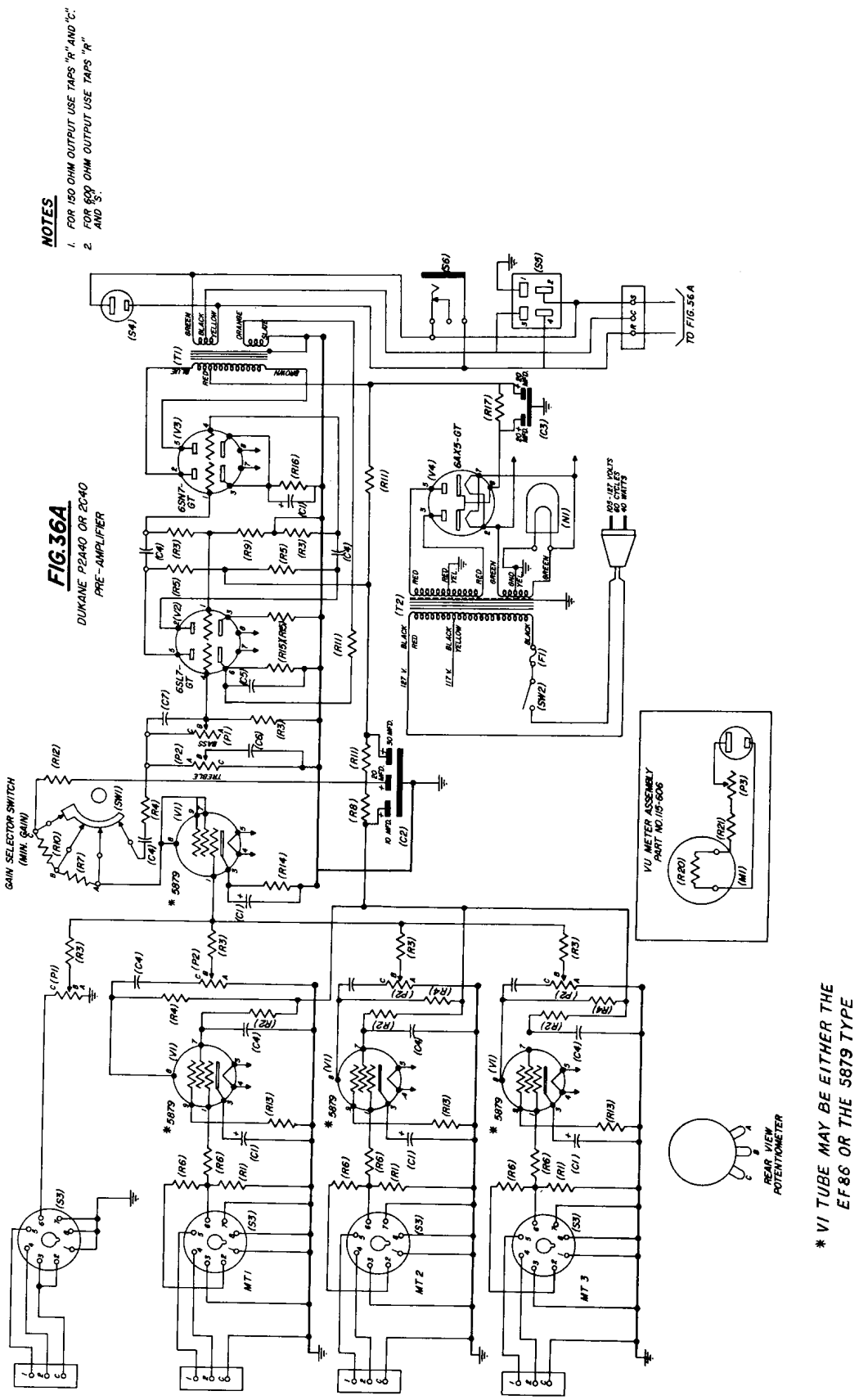


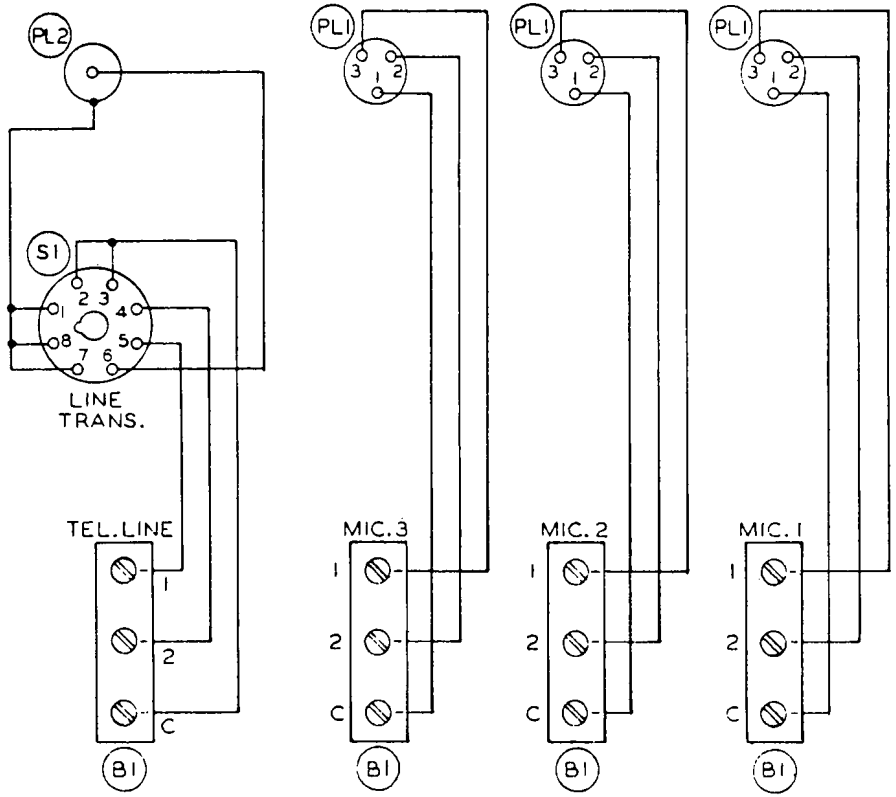
FIG. 36B

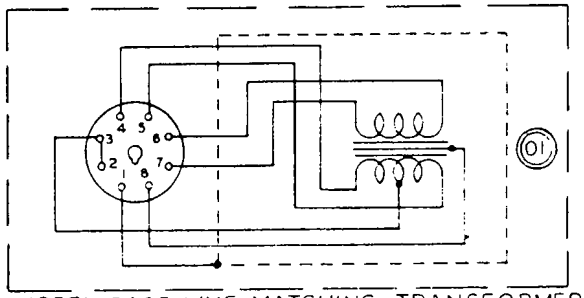
190-727

NO. REQ'D	USED ON
	P2A40

LIST OF ELECTRICAL PARTS

LEGEND	DESCRIPTION	QNTY.	PART NO.
PL1	PLUG - MIC.	3	570-92
PL2	" - PHONO	1	570-9159
S1	SOCKET	1	635-03-08653
B1	TERMINAL STRIP	4	703-229





MODEL 3A65 LINE MATCHING TRANSFORMER

MATERIAL _____ FINISH _____

UNLESS OTHERWISE SPECIFIED DECIMAL DIMENSIONS TO BE ± FRACTIONAL DIMENSIONS TO BE ±

ISSUE	WAS	DATE	APPR
01	ADD SCHEMATIC	3-11-57	

DuKane CORPORATION
ESTABLISHED AS OPERADIO 1922
ST. CHARLES, ILLINOIS U. S. A.

SCHEMATIC DIAGRAM
ADAPTER BOX
99A122

SCALE _____ DATE 11-28-56

DRAWN [illegible] APP'D _____

CHECKED _____ ENGR. _____

NO. 190-727 01 ISSUE

FIG. 36C

PARTS LIST & TUBE VOLTAGES FOR
DUKANE P2A40 OR 2C40
PRE-AMPLIFIER

LIST OF ELECTRICAL PARTS			
LEGEND	DESCRIPTION	Q'NTY.	PART NO.
C1	CAPACITOR 20 MFD. 25V.	5	199-2001-206
C2	CAPACITOR 30-20-10 MFD. 350V.	1	199-2905
C3	CAPACITOR 20-20 MFD. 500V.	1	199-2914
C4	CAPACITOR .1 MFD. 400V.	9	199-4021-104
C5	CAPACITOR .02 MFD. 400V.	1	199-4020-203
C6	CAPACITOR .001 MFD. 600V.	1	199-4030-102
C7	CAPACITOR .0005 MFD. 500V.	1	199-3001-501
R1	RESISTOR 1MEG. OHM. 1/4W	3	600-0043-105
R2	RESISTOR 1MEG. OHM. 1W	3	600-0116-105
R3	RESISTOR 470K OHM. 1W	7	600-0116-474
R4	RESISTOR 270K OHM. 1W	4	600-0116-274
R5	RESISTOR 100K OHM. 1W	2	600-0116-104
R6	RESISTOR 47K OHM. 1/4W	6	600-0043-473
R7	RESISTOR 33K OHM. 1W	1	600-0116-333
R8	RESISTOR 27K OHM. 1W	1	600-0116-273
R9	RESISTOR 18K OHM. 1W	1	600-0116-183
R10	RESISTOR 15K OHM. 1W	1	600-0116-153
R11	RESISTOR 10K OHM. 1W	3	600-0116-103
R12	RESISTOR 9100 OHM. 1W	1	600-0110-912
R13	RESISTOR 2700 OHM. 1W	3	600-0116-272
R14	RESISTOR 1500 OHM. 1W	1	600-0116-152
R15	RESISTOR 1000 OHM. 1W	2	600-0116-102
R16	RESISTOR 470 OHM. 1W	1	600-0116-471
R17	RESISTOR 5000 OHM. 10W	1	600-1011-502
P1	POTENTIOMETER 2.5 MEGOHM.	2	601-3589
P2	POTENTIOMETER 500K OHM.	4	601-3289
V1 #	ELECTRON TUBE 5879	4	262-5879
V2	ELECTRON TUBE 6SL7-GT	1	262-6SL7-GT
V3	ELECTRON TUBE 6SN7-GT	1	262-6SN7-GT
V4	ELECTRON TUBE 6AX5-GT	1	262-6AX5-GT
F1	FUSE 2 AMPERE TYPE 3AG	1	20-835-0200
N1	LAMP-PILOT MAZDA NO. 47	1	456-1
SW1	SWITCH GAIN SELECTOR	1	680-133
SW2	SWITCH AC LINE	1	680-74

LIST OF ELECTRICAL PARTS			
LEGEND	DESCRIPTION	Q'NTY.	PART NO.
T1	TRANSFORMER OUTPUT	1	710-2039
T2	TRANSFORMER POWER	1	710-4030-02
S1	RECEPTACLE	1	597-7299
S2	RECEPTACLE	3	597-7219
S3	RECEPTACLE	3	635-03-08653
S4	RECEPTACLE	1	597-9696
S5	RECEPTACLE	1	597-8686
S6	RECEPTACLE JACK	1	415-4
B1	TERMINAL STRIP	1	703-22
	VU METER ASSEMBLY PART NO. 115-606		
M1	METER	1	485-2003
R20	RESISTOR 6800 OHMS 1W	1	600-0116-682
R21	RESISTOR 3900 OHMS 1W	1	600-0116-392
P3	POTENTIOMETER 3000 OHM	1	601-43
PL1	PLUG	1	570-9614

TUBE VOLTAGES								
TUBE TYPE	SOCKET PIN NUMBER							
	2	3	4	5	6	7	8	9
5879 *		1.2V. D.C.	6.3 V. A.C.	6.3V. A.C.		24V. D.C.	28V. D.C.	1.2V. D.C.
5879 +		2.2V. D.C.	6.3 V. A.C.	6.3V. A.C.		70V. D.C	70V. D.C.	70V. D.C.
6SL7-GT	90V. D.C.	1V. D.C.		90V. D.C.	1V. D.C.	6.3V.A.C.	6.3V.A.C.	
6SN7-GT	220V. D.C.			220V. D.C.	7V. D.C.	6.3V.AC.	6.3V.A.C.	
6AX5-GT	6.3V.A.C.	290V. A.C.		290V. A.C.		6.3V. A.C.	320V. D.C.	
USE 20,000 OHMS. PER V.D.C. METER. ALL D.C. VOLTAGES MEASURED TO GND.								

NOTE:
ALL FILAMENT VOLTAGES MEASURED BETWEEN PINS MARKED -
* 3-INPUT TUBES
+ 1 SECOND STAGE TUBE
# V1 TUBE MAY BE EITHER THE EF86 OR THE 5879

FIG. 37

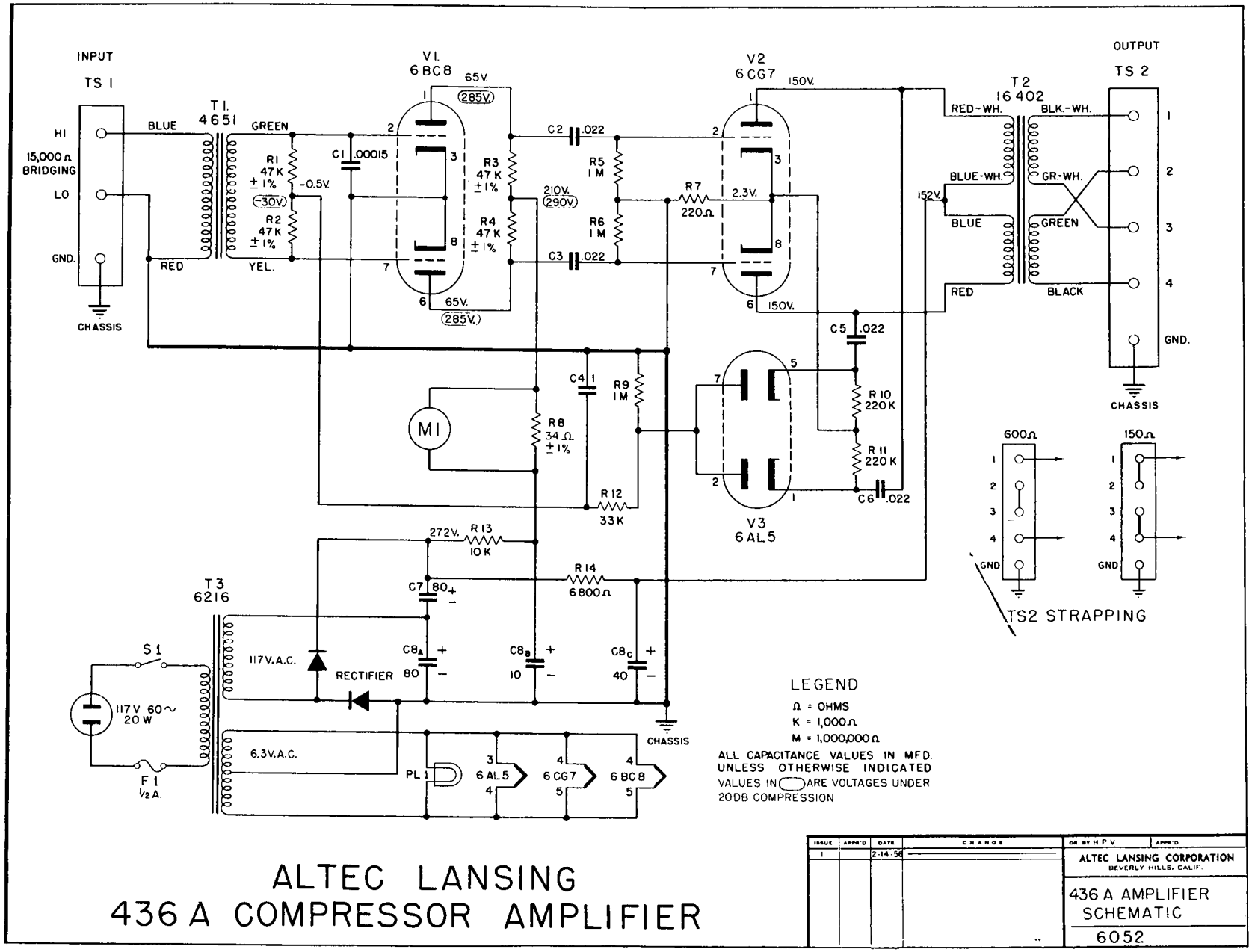
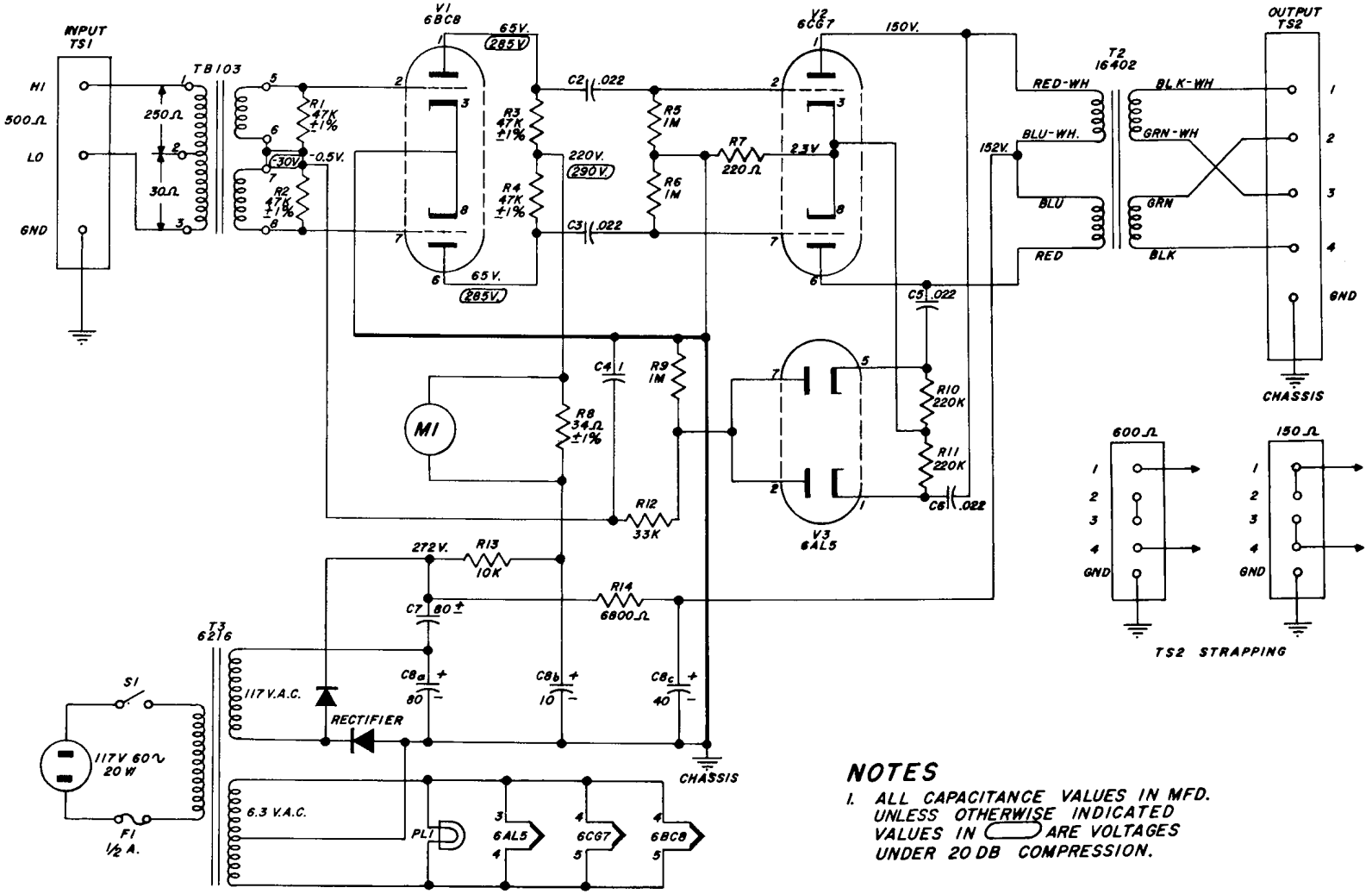


FIG. 38

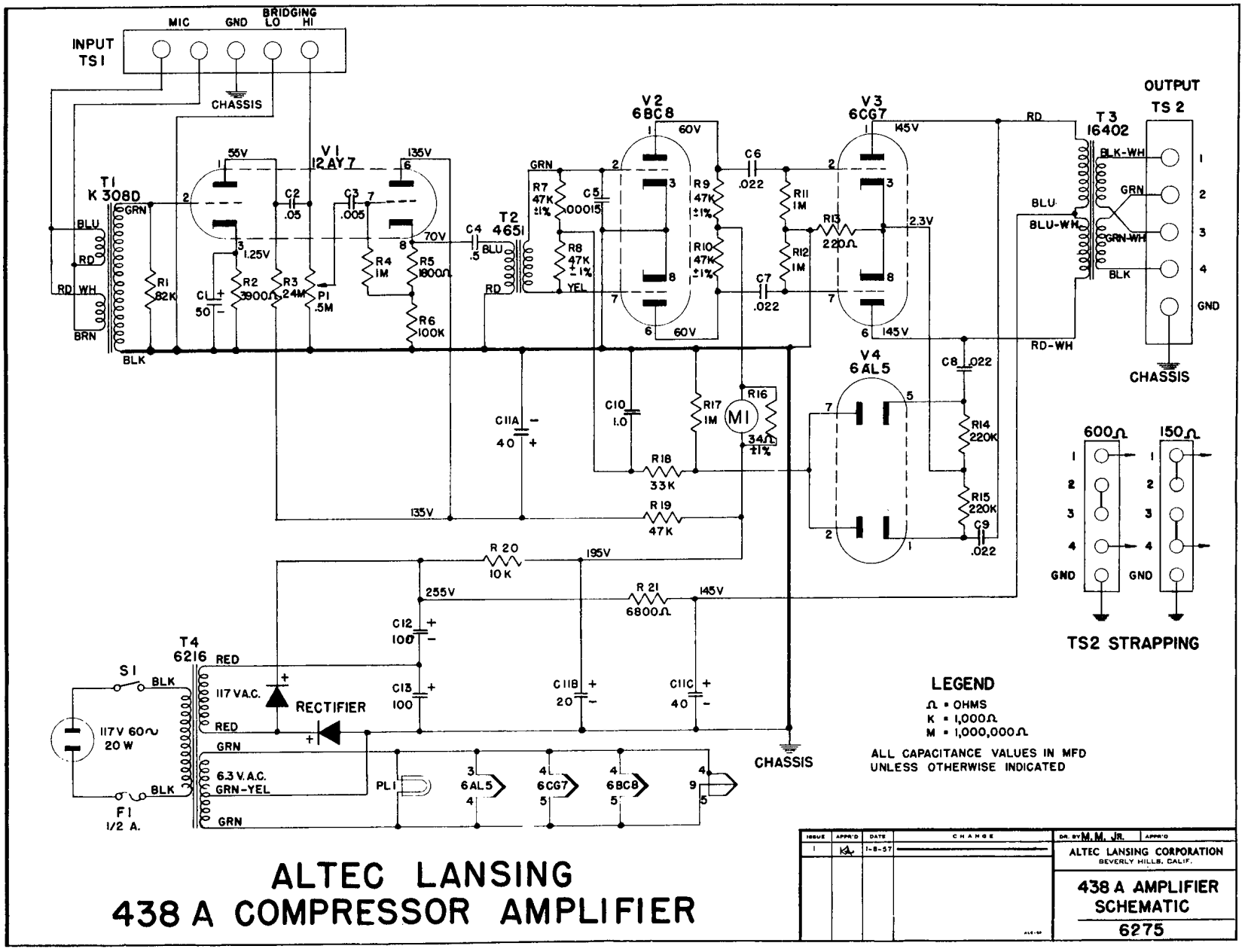
ALTEC LANSING
439 A COMPRESSOR AMPLIFIER



NOTES

1. ALL CAPACITANCE VALUES IN MFD. UNLESS OTHERWISE INDICATED VALUES IN ( ) ARE VOLTAGES UNDER 20 DB COMPRESSION.

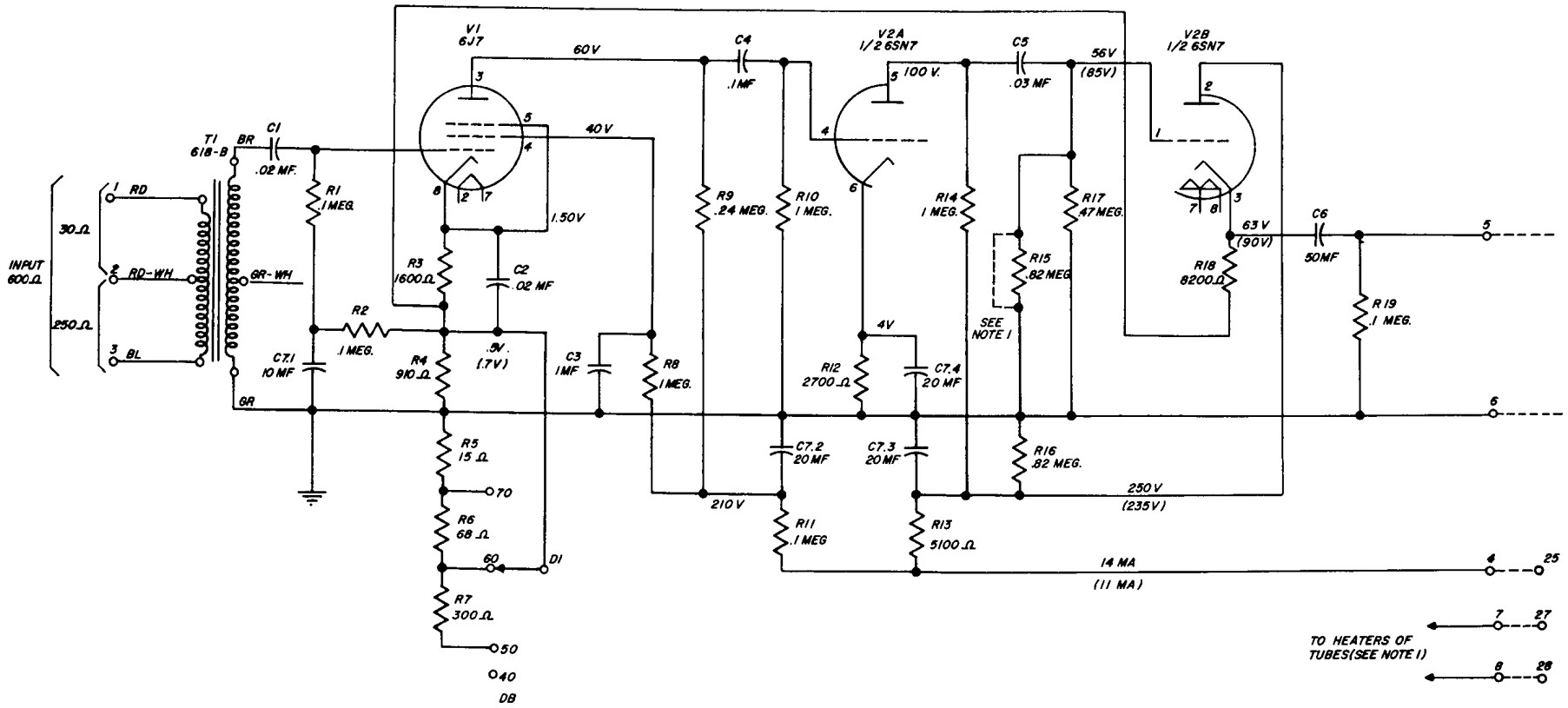
FIG. 39



ALTEC LANSING
438 A COMPRESSOR AMPLIFIER

FIG.40

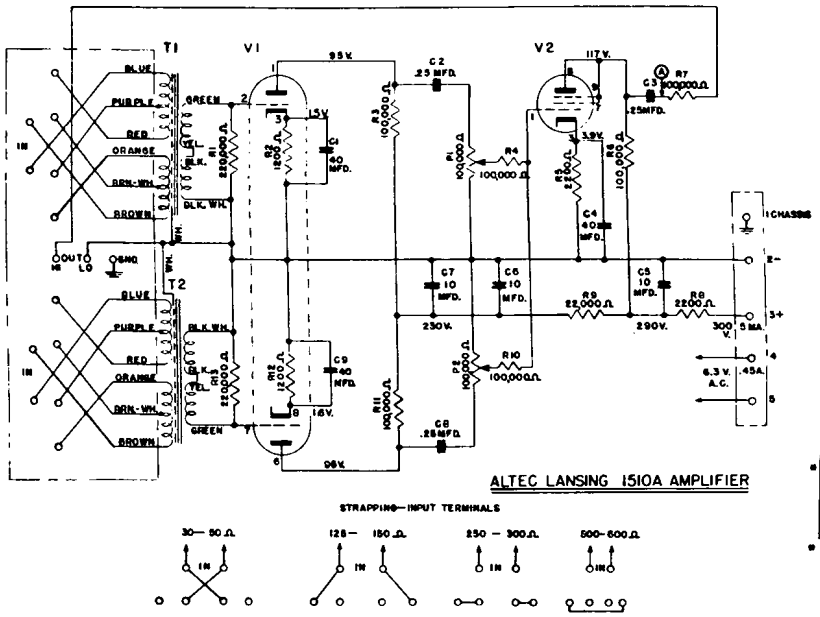
W.E.141A AMPLIFIER



NOTES:

1. THE NUMBERS IN PARENTHESES ARE THE VOLTAGES WITH R15 SHORTED.

FIG. 41



PARTS LIST	
C 1,4,9	(1) 40-40-40MFD. 25V. ASTRON-EY
C 2,3,8	.25 MFD. 400V. ASTRON ML-4-25
C 5,6,7	(1) 10-10-10MFD. 350V. AETRON-EY
R1,13	220,000 OHMS 1/2 WATT ± 10%
R2,12	1200 " 1/2 " " "
R3,6,11	100,000 " 1 " " "
R4,7,10	100,000 " 1/2 " " "
R 5	2200 " 1/2 " " "
R 8	2200 " 1 " " "
R 9	22,000 " 1 " " "
P1,2	100,000 OHMS ALLEN BRADLEY JA-1041
V1	12AY7 (G.E.)
V2	5879 (R.C.A.)
T1,2	PEERLESS 4629

POWER REQUIREMENTS
300 V.D.C. AT 5MA.
6.3 V.A.C. AT .45A.

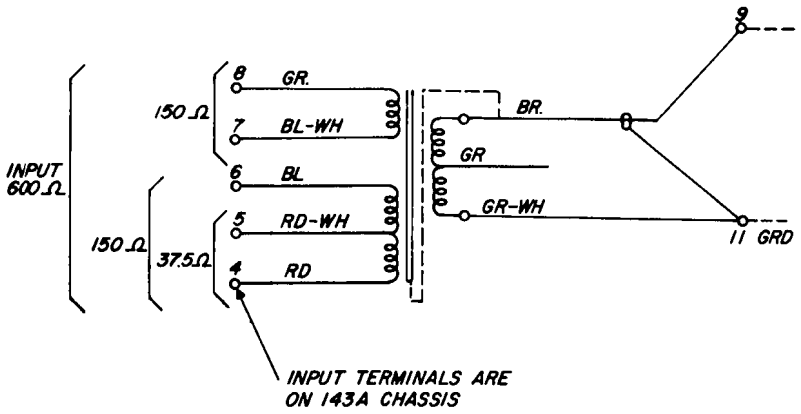
OPERATING DATA

* GAIN	47DB.
FREQUENCY RESPONSE	± 1DB. 30-15,000 CPS.
MAX. INPUT SIGNAL	-25 DBM.
EQUIVALENT INPUT NOISE LEVEL	-120 DBM.
REF. 0 DB = .006W. 0 DBM = .001W.	

* CALCULATED FOR 100,000 OHM LOAD CONNECTED BETWEEN POINT (A) AND GROUND.

FIG. 42

713A APPARATUS UNIT

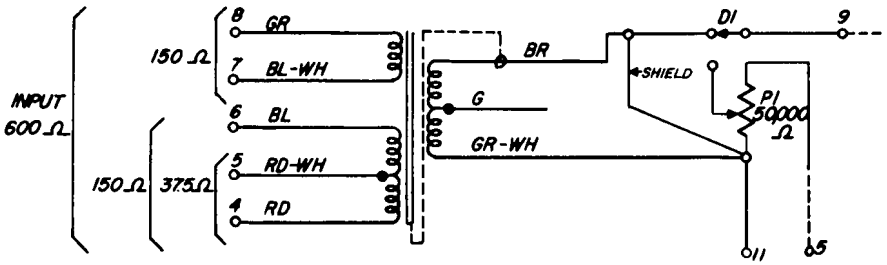


LINE INPUT CONNECTIONS

SOURCE OHMS	STRAP TERMINALS	CONNECT TO
600 Ω	6-7	4 & 8
150 Ω	—	7 & 8
150 Ω	—	4 & 6

FIG. 43

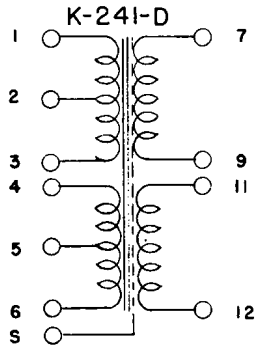
713B APPARATUS UNIT



LINE INPUT CONNECTIONS

SOURCE OHMS	STRAP TERMINALS	CONNECT TO
600 Ω	6 - 7	4 AND 8
150 Ω		4 AND 6
150 Ω		7 AND 8
37.5Ω		4 AND 5

FIG. 44



TEST VOLTAGE:
PRIMARY 500 V RMS
SECONDARY 1,000 V RMS

IMPEDANCE	CONN. TO	STRAP
30/50	1-6	1-5 2-6
125V 150	1-6	1-4 3-6 (FOR C.T. STRAP 2-5)
250/300	1-6	2-4 3-5
500/600	1-6	3-4 (C.T.)
70,000/84,000	7-12	9-11 (C.T.)
17,500/21,000	7-12	7-11 9-12

COILS ARE IN SERIES AIDING CONNECTIONS WHEN 3-4, 6-7 AND 9-11 ARE STRAPPED

90 DB OF MAGNETIC SHIELDING PROVIDED BY CASE

SECONDARY WINDINGS BALANCED MAY BE USED SINGLE ENDED OR PUSH-PULL

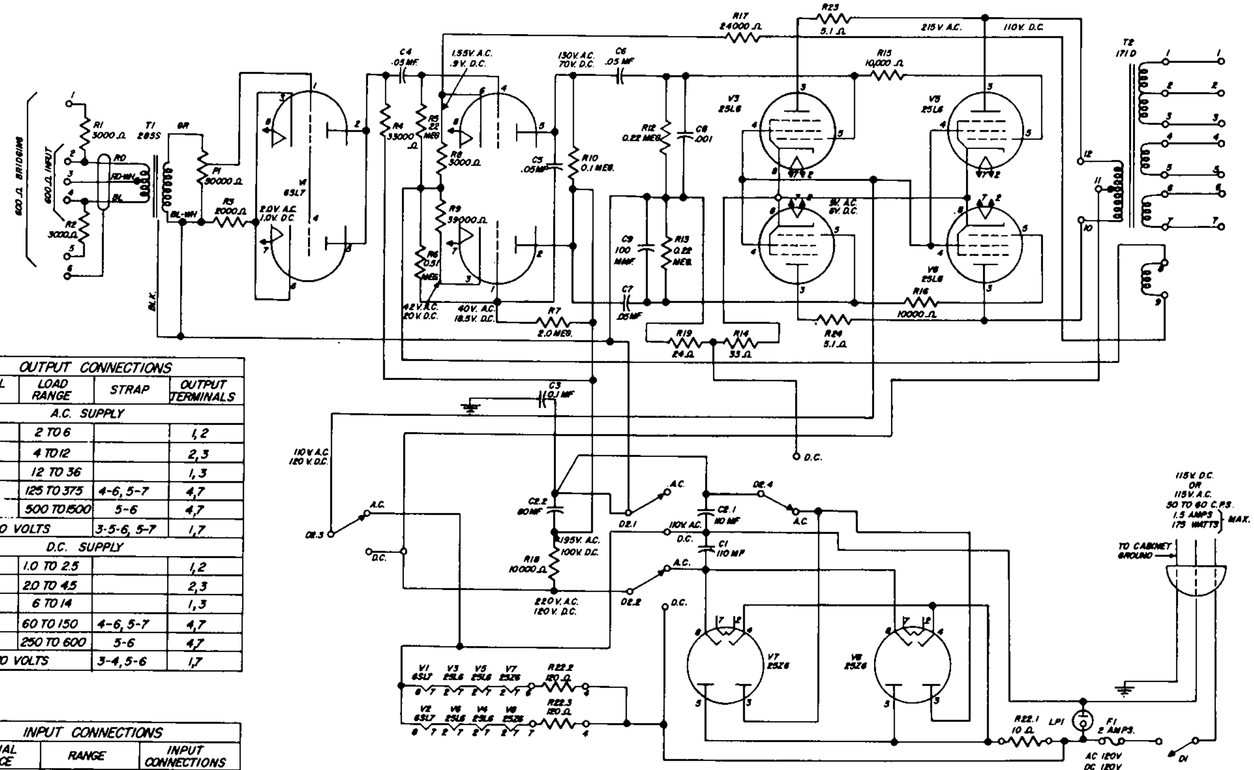
FREQUENCY RESPONSE ±1 DB – 10 TO 30,000 CPS

MAXIMUM OPERATING LEVEL + 8 DBM

ALTEC LANSING 1550A APPARATUS UNIT

FIG. 45 (MFG. DISC.)

140A AMPLIFIER



OUTPUT CONNECTIONS			
NOMINAL LOAD	LOAD RANGE	STRAP	OUTPUT TERMINALS
A.C. SUPPLY			
4 Ω	2 TO 6		1,2
8 Ω	4 TO 12		2,3
24 Ω	12 TO 36		1,3
250 Ω	125 TO 375	4-6, 5-7	4,7
1000 Ω	500 TO 1500	5-6	4,7
70 VOLTS		3-5-6, 5-7	1,7
D.C. SUPPLY			
1.5 Ω	1.0 TO 2.5		1,2
3 Ω	2.0 TO 4.5		2,3
8 Ω	6 TO 14		1,3
100 Ω	60 TO 150	4-6, 5-7	4,7
400 Ω	250 TO 600	5-6	4,7
70 VOLTS		3-4, 5-6	1,7

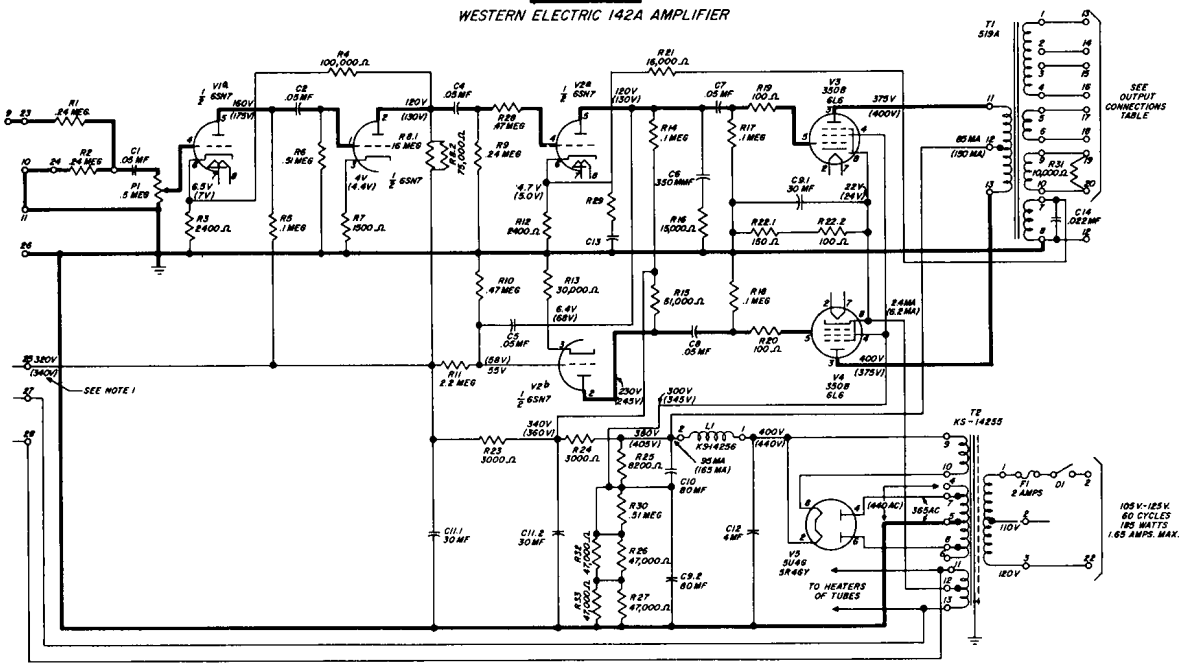
INPUT CONNECTIONS		
NOMINAL SOURCE	RANGE	INPUT CONNECTIONS
150 Ω	75 TO 300	2,3
600 Ω	300 TO 1200	2,4
600 Ω /BRIDGING	0 TO 10000	1,5

NOTES:

1. VOLTAGES SHALL BE MEASURED BETWEEN POINT INDICATED & B-(NOT CHASSIS). VALUES SHOWN ARE FOR 120V. LINE VOLTAGE MEASUREMENTS WITH VOLTMETER WHICH HAS RESISTANCE OF AT LEAST 20,000 OHMS PER VOLT. MEASURED VALUES MAY DEPART ±10% FROM VALUES SHOWN.

FIG. 46 (MFR. DISC.)

WESTERN ELECTRIC 142A AMPLIFIER



NOTES

1. CIRCUIT SHOWN FOR 12 WATTS POWER SUPPLY OUTPUT. THE NUMBERS IN PARENTHESES ARE THE VALUES FOR THE 25 WATT CONDITION.
2. WHEN FIG. 35 IS ADDED IT BECOMES A 142B AMPLIFIER.
3. WHEN FIG. 36 IS ADDED IT BECOMES A 142C AMPLIFIER.
4. WHEN FIG. 37 IS ADDED IT BECOMES A 142D AMPLIFIER.

OUTPUT CONNECTIONS TABLE

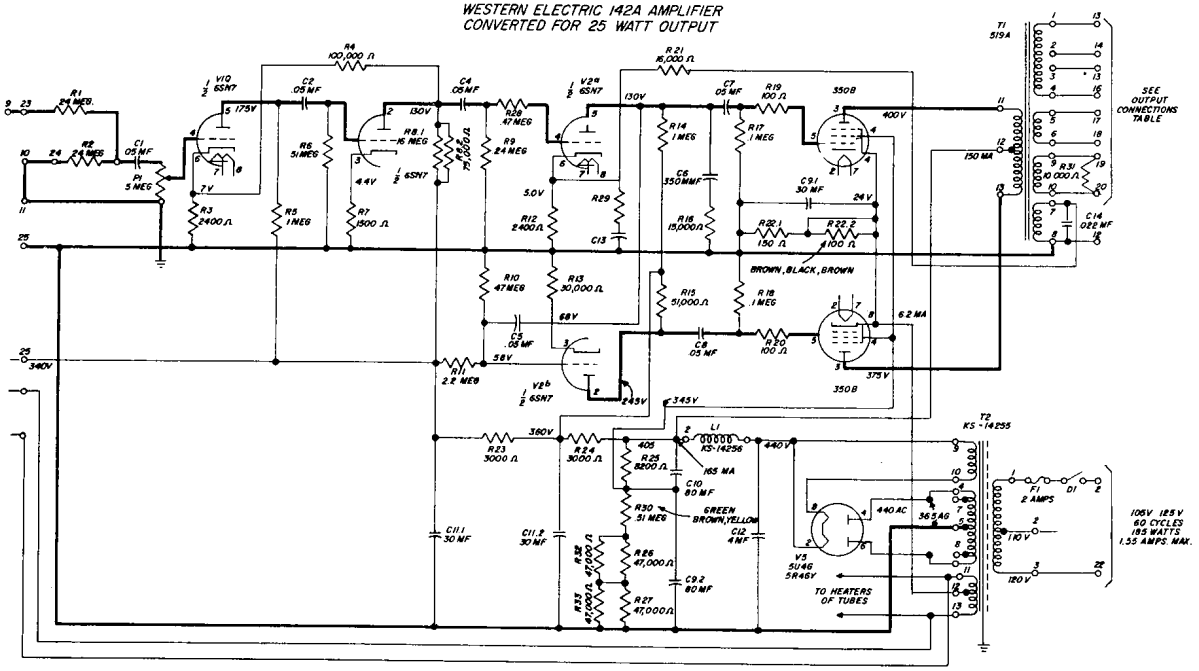
NOMINAL LOAD IMPEDANCE	WORKING RANGE OF LOAD IMPEDANCE	STRAP TERMINALS	OUTPUT CONNECTIONS
200 Ω	150 Ω TO 300 Ω	———	19 & 20
24 Ω	18 Ω TO 36 Ω	14-15, 16-17	13 & 18
12 Ω	9 Ω TO 18 Ω	13-15, 14-16-17	15 & 18
8 Ω	6 Ω TO 12 Ω	14-15	13 & 16
4 Ω	3 Ω TO 6 Ω	———	17 & 18
2 Ω	1.5 Ω TO 3 Ω	13-15, 14-16	13 & 16
400 Ω	300 Ω TO 600 Ω	14-15, 16-17, 18-19	13 & 20

70 V. LOUDSPEAKER DISTRIBUTION LINE CONNECTIONS

POWER OUTPUT CONDITION	STRAP TERMINALS	OUTPUT CONNECTIONS
12 WATTS	14-15, 16-17, 18-19	13 & 20
25 WATTS	———	19 & 20

FIG. 47 (MFR. DISC.)

WESTERN ELECTRIC 142A AMPLIFIER
CONVERTED FOR 25 WATT OUTPUT



OUTPUT CONNECTIONS TABLE

NOMINAL LOAD IMPEDANCE	WORKING RANGE OF LOAD IMPEDANCE	STRAP TERMINALS	OUTPUT CONNECTIONS
200 Ω	150 Ω TO 300 Ω		19 & 20
24 Ω	18 Ω TO 36 Ω	14-15, 16-17	13 & 18
12 Ω	9 Ω TO 18 Ω	13-15, 14-16-17	15 & 18
8 Ω	6 Ω TO 12 Ω	14-15	13 & 16
4 Ω	3 Ω TO 6 Ω		17 & 18
2 Ω	1.5 Ω TO 3 Ω	13-15, 14-16	13 & 16
400 Ω	300 Ω TO 600 Ω	14-15, 16-17, 18-19	13 & 20

70 V. LOUDSPEAKER DISTRIBUTION LINE CONNECTIONS

POWER OUTPUT CONDITION	STRAP TERMINALS	OUTPUT CONNECTIONS
12 WATTS	14-15, 16-17, 18-19	13 & 20
25 WATTS		19 & 20

NOTES

1. FOR 25 WATTS OUTPUT THE FOLLOWING CHANGES ARE NECESSARY:
   - A. USE 350B TUBES.
   - B. SHORT R 22.2.
   - C. AT TRANSFORMER T2 TRANSFER LEAD FROM TERMINAL 7 TO TERMINAL 4 AND LEAD FROM TERMINAL 8 TO TERMINAL 6.
   - D. REMOVE SHORT ACROSS R30

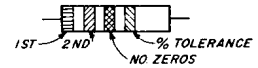
2.

LINE INPUT CONNECTIONS 142C & 142D		
SOURCE OHMS	STRAP TERMINALS	CONNECT TO
600 Ω	6 - 7	4 AND 8
150 Ω	4-7 , 6 - 8	4 AND 8

3.

AMPLIFIER	REMOVE STRAP BETWEEN TERMS.	STRAP TERMINALS
142 B	9 - 23	10 TO 11
142 C	"	10 TO 11
142 D		10 TO 11

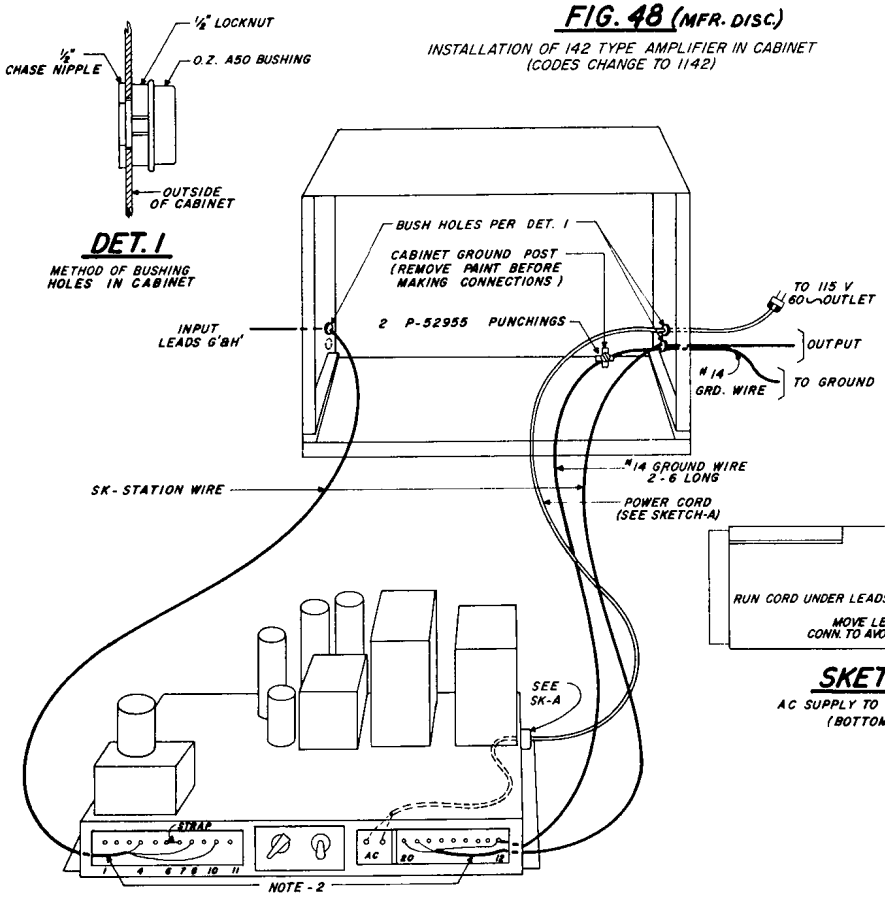
COLOR CODE FOR FIXED RESISTORS

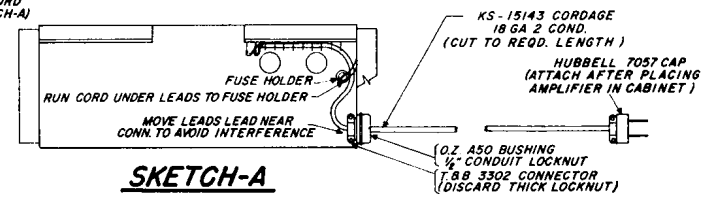


COLOR	1ST BAND	2 ND BAND	3 RD BAND	END BAND
BLACK	0	0	NONE	GOLD 5%
BROWN	1	1	0	SILVER 10%
RED	2	2	00	NONE 20%
ORANGE	3	3	000	
YELLOW	4	4	0000	
GREEN	5	5	00000	
BLUE	6	6	000000	
VIOLET	7	7	0000000	
GRAY	8	8	00000000	
WHITE	9	9	000000000	

FIG. 48 (MFR. DISC.)

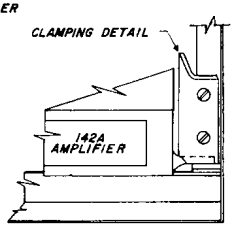
INSTALLATION OF 142 TYPE AMPLIFIER IN CABINET
(CODES CHANGE TO 1142)





SKETCH-A

AC SUPPLY TO 142A AMPLIFIER
(BOTTOM VIEW)



SKETCH-B

CLAMPING 142A AMPLIFIER IN KS-13625, L-4 CABINET

LIST OF MATERIAL

LINE	AMT.	ITEM	NOTE
1	1	T&B 3302 CONNECTOR	
2	4	½" CONDUIT LOCKNUT, GALVANIZED	
3	4	O.Z. A50 INSULATING BUSHING	
4	4	½" CHASE CONDUIT NIPPLE, GALVANIZED	
5	1	HUBBELL 7057 ARMORED CAP	
6	1	P-52955 TERMINAL PUNCHING	1
7	10 FT	KS-15143 18 GA. 2 COND. CORDAGE	
8	AS REQ'D	SK STATION WIRE (IVORY OR BROWN)	
9	AS REQ'D	#14 GROUND	
10	1	142 AMPLIFIER	
11	2	350B VACUUM TUBE	
12	2	6SN7 GT VACUUM TUBE	
13	1	5U4G VACUUM TUBE	
14	1	KS-13625, L-3 CABINET	
15	5	LITTLEFUSE 313002 2 AMP, "SLO-BLO" FUSE	
16	1	GO-678 AMPLIFIER SHELF & BACKBOARD	
17	1	ES-528772 CORD CLAMP BRACKET	
18	1	TINNERMAN 6A CORD CLAMP	

NOTES:

1. 1, P-52955 TERMINAL PUNCHING IS FURNISHED WITH CABINET.
2. REFER TO JOB SCHEMATIC DRAWING FOR CONNECTION OF INPUT AND OUTPUT LEAD.
3. THE CORD CLAMP & BRACKET LISTED SHALL BE INSTALLED TO HOLD THE CAP IN THE RECEPTACLE.

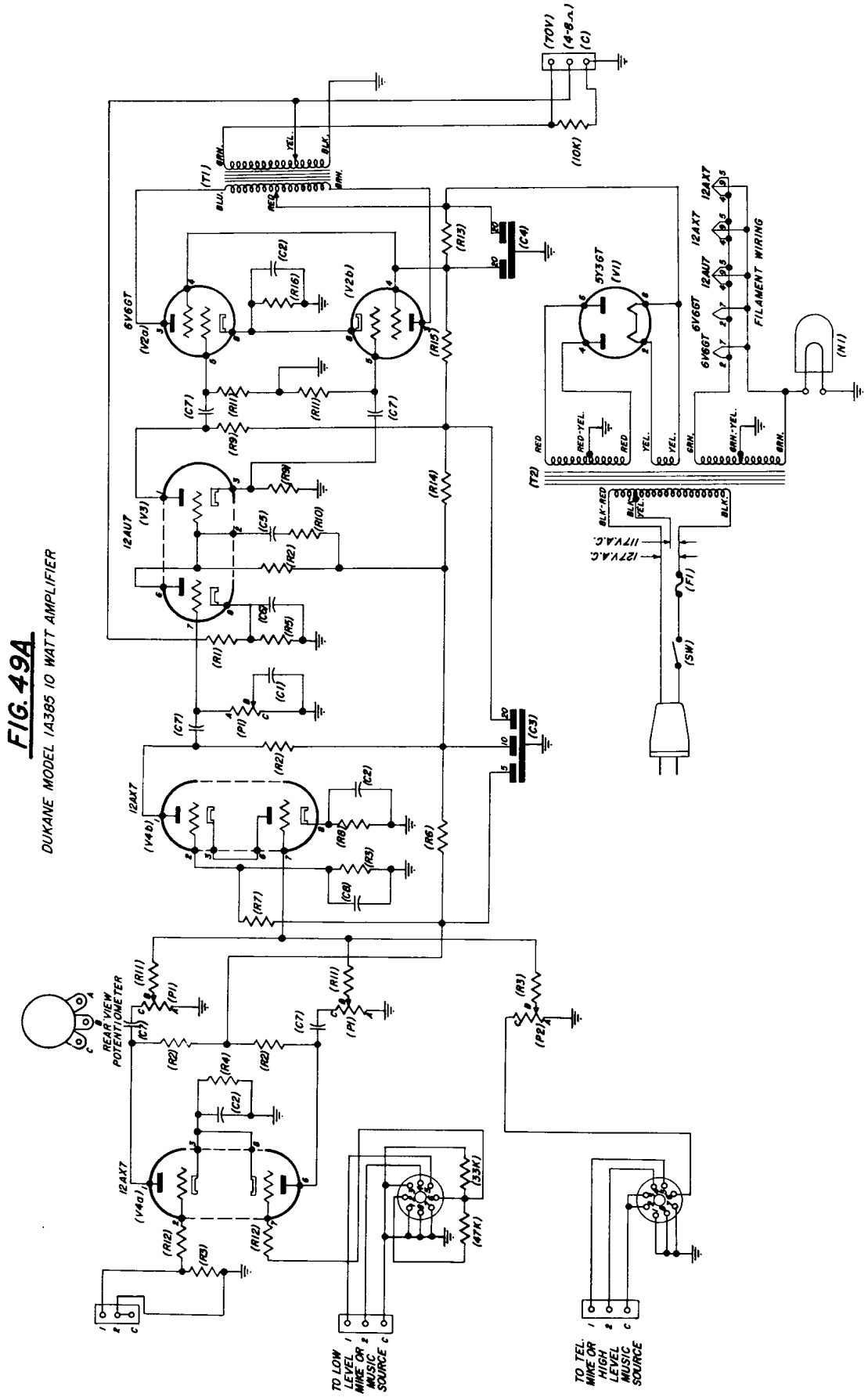


FIG. 49A

DUKANE MODEL 1A385 10 WATT AMPLIFIER

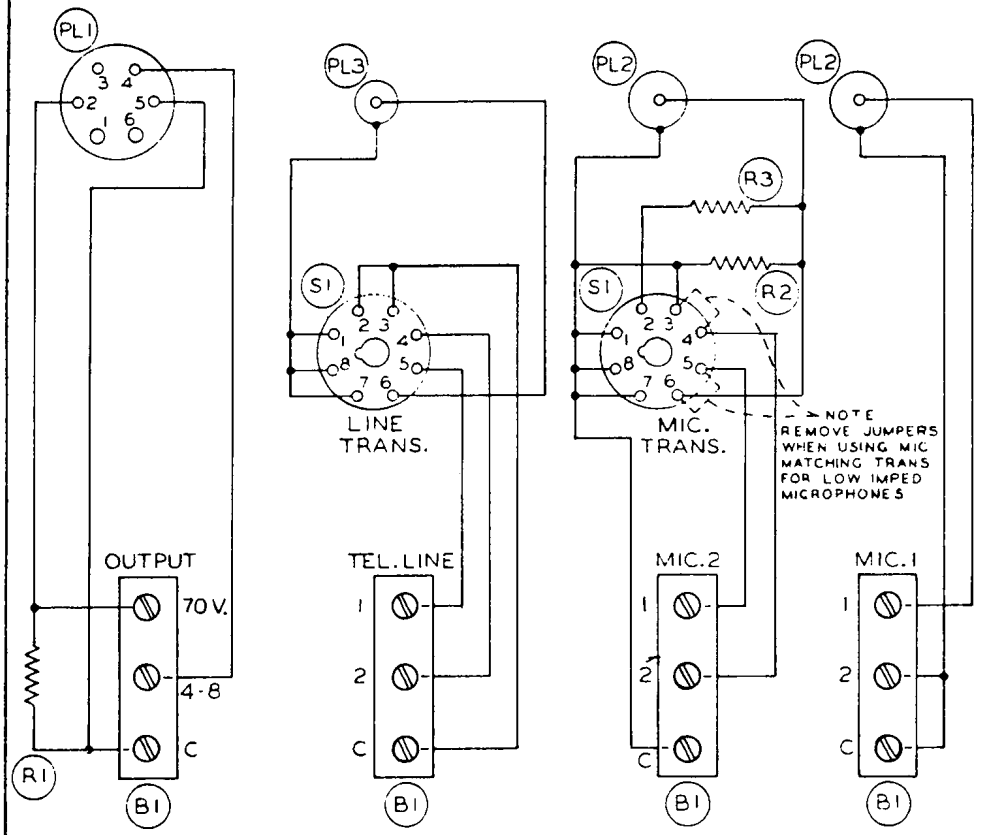
FIG. 49B

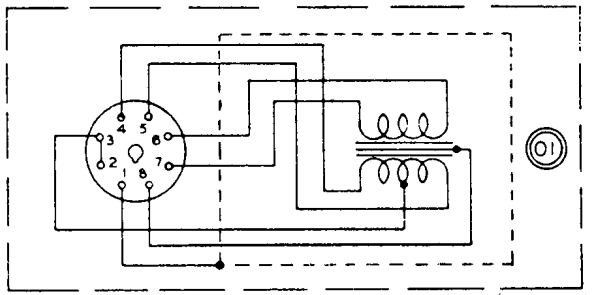
190-725

NO REQ'D | USED ON
PIA385

LIST OF ELECTRICAL PARTS

LEGEND	DESCRIPTION	QNTY.	PART NO.
PL1	PLUG-OUTPUT	3	570-4286
PL2	" - MIC.	2	570-9159
PL3	" - PHONO	1	570-9618
R1	RESISTOR 10K OHM 1W.	1	600-0116-103
R2	" 33K " "	1	600-0116-333
R3	" 47K " "	1	600-0116-473
S1	SOCKET	2	635-03-08653
B1	TERMINAL STRIP	4	703-229





MODEL 3A65-LINE MATCHING TRANSFORMER
" 3A25-MICROPHONE " "
" 3A55- " " "
" 3A60- " " "

MATERIAL _____ FINISH _____
UNLESS OTHERWISE SPECIFIED DECIMAL DIMENSIONS TO BE ± FRACTIONAL DIMENSIONS TO BE ±

ISSUE	WAS	DATE	APPR
01	ADD SCHEMATIC	3-11-57	

DUKANE CORPORATION
ESTABLISHED AS OPERADIO 1922
ST CHARLES ILLINOIS U S A

SCHEMATIC DIAGRAM
ADAPTER BOX
99A120

SCALE _____ DATE 11-29-56
DRAWN PW APP'D PL
CHECKED AK ENGR
NO. 190-725 01 ISSUE

FIG. 49C

PARTS LIST AND TUBE VOLTAGES FOR PIA385 DU KANE AMPL.

LIST OF ELECTRICAL PARTS

LEGEND	DESCRIPTION	QTY.	PART NO.
C1	CAPACITOR .0022 MFD. 500V.	1	199-1002-222
C2	" 25 " 25V.	3	199-2001-256
C3	" 5-10-20 "	1	199-2904
C4	" 20-20 " 500V.	1	199-2914
C5	" .00025 " 500V.	1	199-3001-251
C6	" .01 " 400V.	1	199-4025-103
C7	" .047 " 400V.	5	199-4025-473
C8	" .10 " 400V.	1	199-4025-104
V1	ELECTRON TUBE 5Y3GT	1	262-5Y3GT
V2	" " 6V6GT	2	262-6V6GT
V3	" " 12AU7	1	262-12AU7
V4	" " 12AX7	2	262-12AX7
F1	FUSE 2 AMPERE TYPE 3AG2	1	320-835-0200
N1	LAMP PILOT MAZDA 47	1	456-1
S1	RECEPTACLE MICROPHONE	2	597-7299
S2	" AUX.	1	597-12692-01
S3	" OUTPUT	1	635-03-09651
R1	RESISTOR 6800 OHM WATT	1	600-0080-682
R2	" 100K " " "	4	600-0080-104
R3	" 1 MEG. " " "	4	600-0080-105
R4	" 1200 " " "	1	600-0080-122
R5	" 1500 " " "	1	600-0080-152
R6	" 15K " " "	1	600-0080-153
R7	" 330K " " "	1	600-0080-334
R8	" 2700 " " "	1	600-0080-272
R9	" 33K " " "	2	600-0080-333
R10	" 4700 " " "	1	600-0080-472
R11	" 470K " " "	4	600-0080-474
R12	" 68K " " "	2	600-0080-683
R13	" 1K " 1 WATT	1	600-0116-102
R14	" 10K " 1 "	1	600-0116-103
R15	" 4700 " 1 "	1	600-0116-472
R16	" 200 " 5 "	1	600-1008-201
P1	POTENTIOMETER 500K	3	601-61
P2	" 2.5 MEG	1	601-94
SW	SWITCH A.C.	1	680-192
T1	TRANSFORMER - OUTPUT	1	710-2054
T2	" - POWER	1	710-4097

TUBE VOLTAGES

TUBE TYPE	SOCKET PIN NUMBERS								
	1	2	3	4	5	6	7	8	9
V4a 12AX7	161 V.D.C.		1.5 V.D.C.	6.3 V.A.C. x		161 V.D.C.		1.5 V.D.C.	6.3 V.A.C. o
V4b 12AX7	192 V.D.C.	152 V.D.C.	154 V.D.C.	6.3 V.A.C. x		154 V.D.C.		1.5 V.D.C.	6.3 V.A.C. o
V3 12AU7	210 V.D.C.	67 V.D.C.	74 V.D.C.	6.3 V.A.C. x		67 V.D.C.		2.3 V.D.C.	6.3 V.A.C. o
V2a 6V6GT		6.3 V.A.C. x	310 V.D.C.	305 V.D.C.			6.3 V.A.C. o	17 V.D.C.	
V2b 6V6GT		6.3 V.A.C. x	310 V.D.C.	305 V.D.C.			6.3 V.A.C. o	17 V.D.C.	
V1 5Y3GT		320 V.D.C.		305 V.A.C.		305 V.A.C.		320 V.D.C.	

USE A 10 MEGOHM INPUT V.T.V.M. FOR VOLTAGE MEASUREMENTS TO GROUND.

NOTE: ALL FILAMENT VOLTAGES MEASURED BETWEEN PINS MARKED o AND x

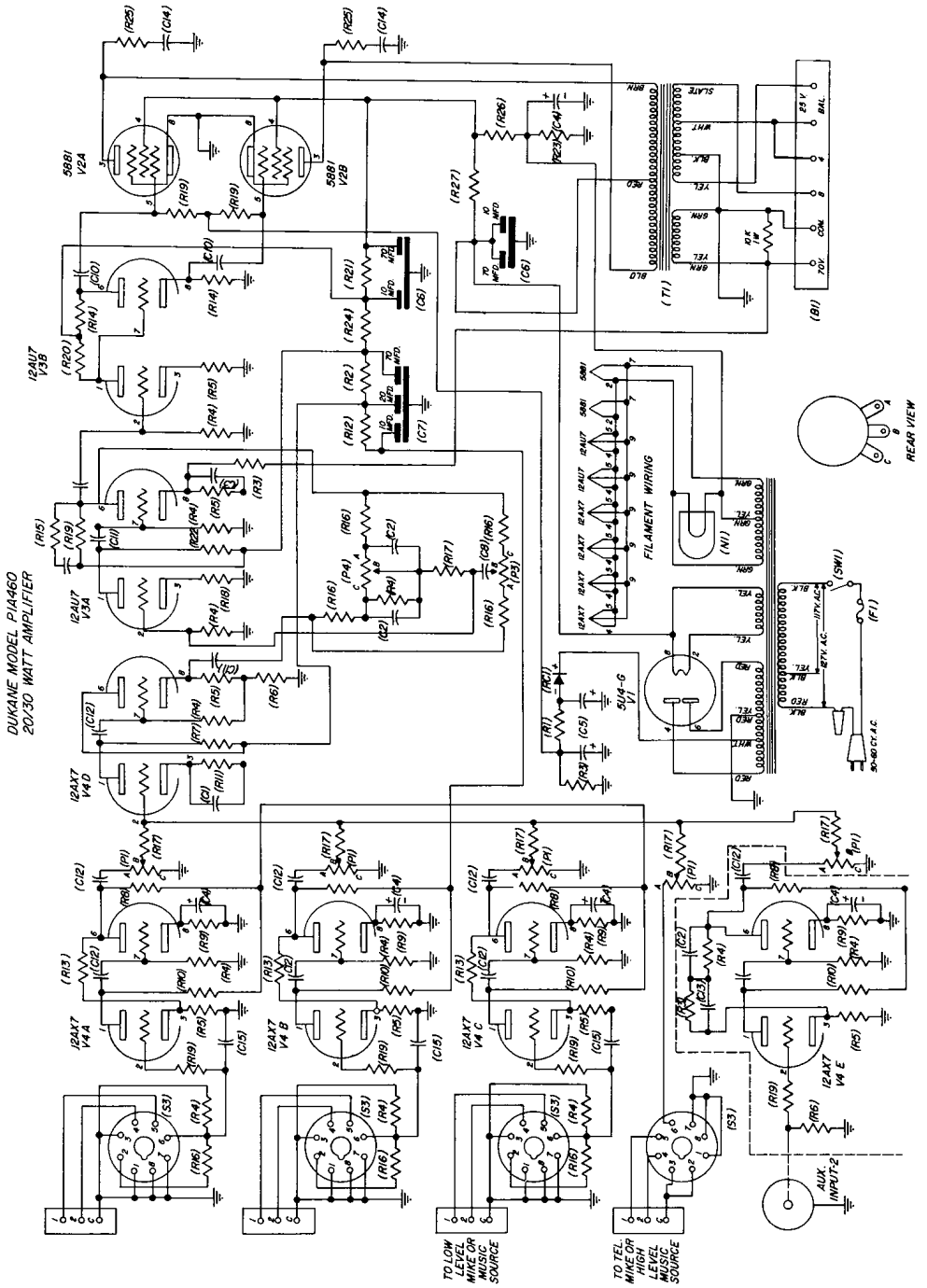


FIG. 50B

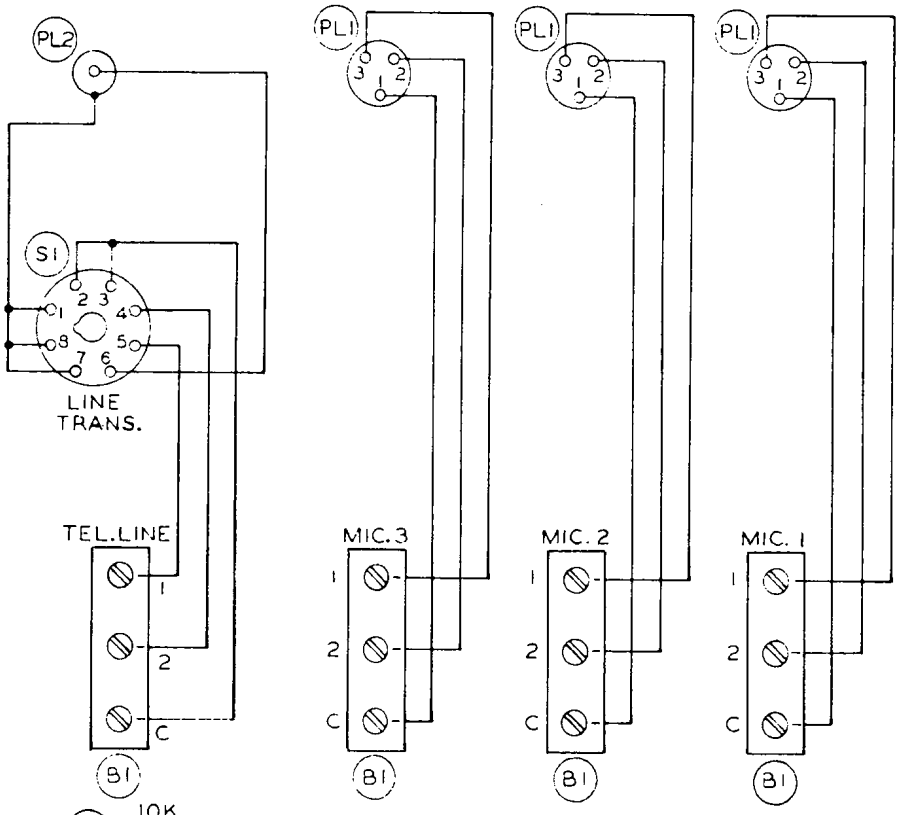
190 - 726

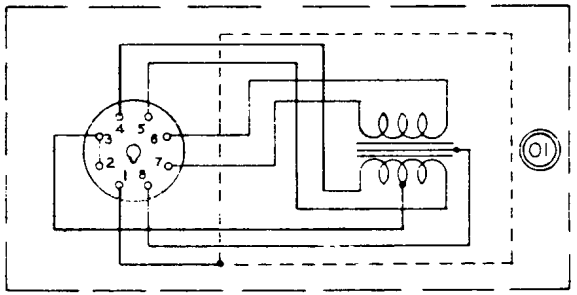
NO. REQ'D | USED ON

PIA460

LIST OF ELECTRICAL PARTS

LEGEND	DESCRIPTION	QNTY.	PART NO.
PL1	PLUG - MIC.	3	570 - 92
PL2	" - PHONO	1	570 - 9618
R1	RESISTOR 10K OHM 1W.	1	600 - 9618 - 103
S1	SOCKET	1	635 - 03 - 08653
B1	TERMINAL STRIP	4	703 - 229





MODEL 3A65 LINE MATCHING TRANSFORMER

MATERIAL _____ FINISH _____

UNLESS OTHERWISE SPECIFIED DECIMAL DIMENSIONS TO BE ± FRACTIONAL DIMENSIONS TO BE ±

ISSUE	WAS	DATE	APPR
01	ADD SCHEMATIC	3-11-57	

DuKane CORPORATION
ESTABLISHED AS OPERADIO 1922
ST. CHARLES, ILLINOIS, U. S. A.

SCHEMATIC DIAGRAM
ADAPTER BOX
99A121

SCALE _____ DATE 11 - 28 - 56

DRAWN _____ APP'D _____

CHECKED _____ ENG'R. _____

NO. 190 - 726 01 ISSUE

FIG. 50C

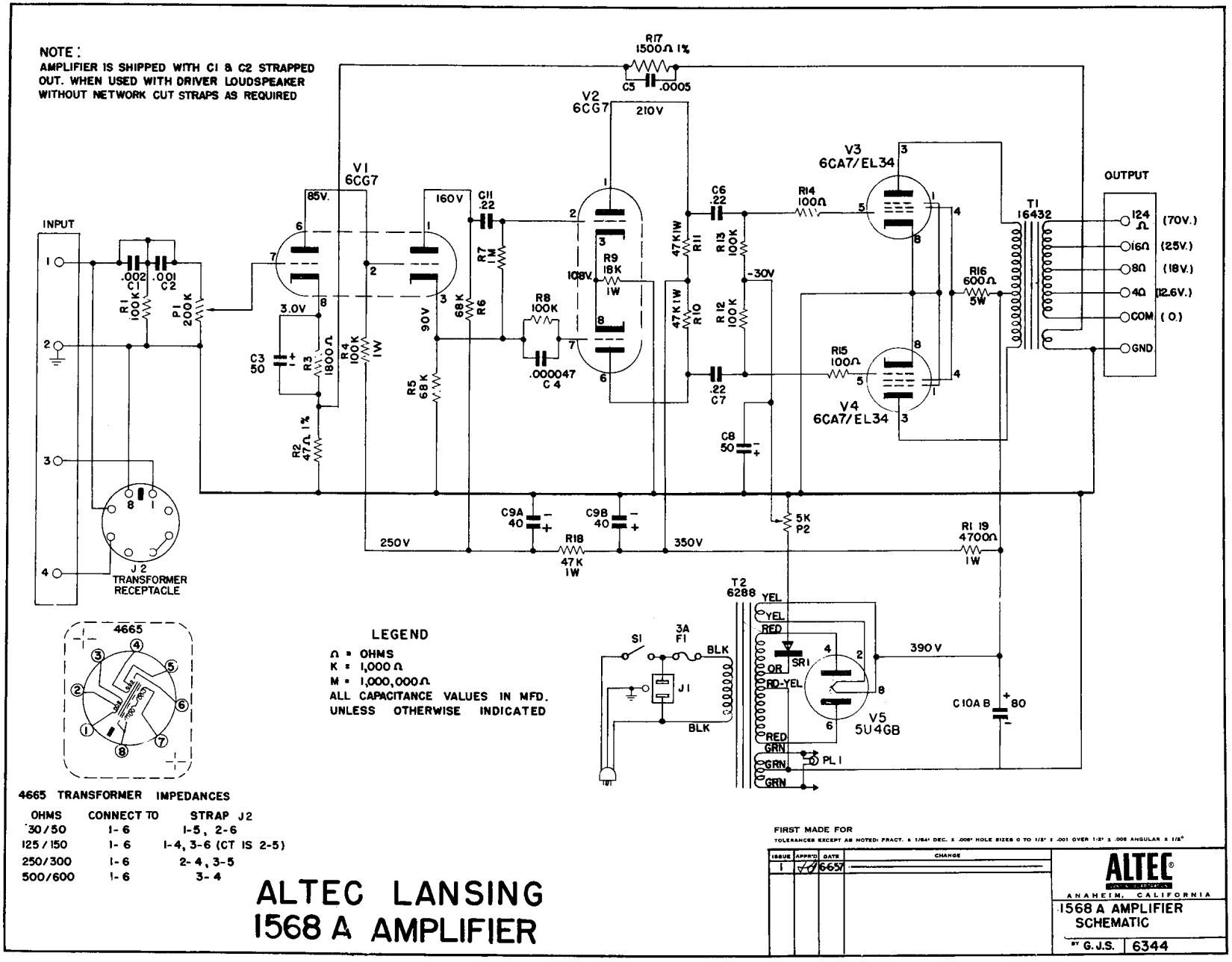
PARTS LIST AND TUBE VOLTAGES FOR
DUKANE MODEL PIA460 20/30 WATT
AMPLIFIER

LIST OF ELECTRICAL PARTS			
LEGEND	DESCRIPTION	QNTY.	PART NO.
C1	CAPACITOR .001 MFD. 500 V.	1	199-1002-102
C2	CAPACITOR .0047 MFD. 500 V.	2	199-1003-472
C3	CAPACITOR .0068 MFD. 500 V.	1	199-1003-682
C4	CAPACITOR 25 MFD. 25 V.	4	199-2001-256
C5	CAPACITOR 20 MFD. 150 V.	2	199-2016-206
C6	CAPACITOR 20-20 MFD. 500 V.	2	199-2914
C7	CAPACITOR 70-20-10 MFD. 350 V.	1	199-2933
C8	CAPACITOR .0001 MFD. 500 V.	1	199-3001-101
C9	CAPACITOR .00035 MFD. 500 V.	1	199-3001-351
C10	CAPACITOR .5 MFD. 400 V.	3	199-4022-504
C11	CAPACITOR .25 MFD. 400 V.	2	199-4022-254
C12	CAPACITOR .047 MFD. 400 V.	7	199-4025-473
C13	CAPACITOR .0005 MFD. 400 V.		199-4025-501
C14	CAPACITOR .003 MFD. 1600 V.	2	199-4060-302
C15	CAPACITOR .00005 MFD. 500 V.	3	199-3001-500
V1	VACUUM TUBE 5U4G	1	262-5U4G
V2	VACUUM TUBE 5881	2	262-5881
V3	VACUUM TUBE 12AU7	2	262-12AU7
V4	VACUUM TUBE 12AX7	4	262-12AX7
F1	FUSE 3 AMP. TYPE 3AG	1	320-835-0300
N1	LAMP-PILOT MAZDA # 47	1	456-1
RC1	RECTIFIER TYPE 4Y1L	1	595-21
S1	RECEPTACLE-MICROPHONE	3	597-7219
S2	RECEPTACLE- PHONO	2	597-1269-2
S3	RECEPTACLE	3	635-03-08653
R1	RESISTOR 1000 OHM. 1/2 W.	1	600-0080-102
R2	RESISTOR 10 K OHM. 1/2 W.	1	600-0080-103
R3	RESISTOR 100K OHM. 1/2 W.	2	600-0080-104
R4	RESISTOR 1MEG. OHM. 1/2 W.	11	600-0080-105
R5	RESISTOR 1500 OHM. 1/2 W.	6	600-0080-152
R6	RESISTOR 15K OHM. 1/2 W.	1	600-0080-153
R7	RESISTOR 150K OHM. 1/2 W.	1	600-0080-154
R8	RESISTOR 180K OHM. 1/2 W.	3	600-0080-184
R9	RESISTOR 2200 OHM. 1/2 W.	3	600-0080-222
R10	RESISTOR 220K OHM. 1/2 W.	3	600-0080-224
R11	RESISTOR 2700 OHM. 1/2 W.	1	600-0080-272
R12	RESISTOR 27K OHM. 1/2 W.	1	600-0080-273
R13	RESISTOR 270K OHM. 1/2 W.	3	600-0080-274
R14	RESISTOR 33K OHM. 1/2 W.	2	600-0080-333
R15	RESISTOR 4700 OHM. 1/2 W.	1	600-0080-472
R16	RESISTOR 47K OHM. 1/2 W.	7	600-0080-473
R17	RESISTOR 470K OHM. 1/2 W.	6	600-0080-474
R18	RESISTOR 560 OHM. 1/2 W.	1	600-0080-561
R19	RESISTOR 68K OHM. 1/2 W.	6	600-0080-683
R20	RESISTOR 100K OHM. 1 W.	1	600-0116-104
R21	RESISTOR 2700 OHM. 1 W.	1	600-0116-272
R22	RESISTOR 33K OHM. 1 W.	1	600-0116-333
R23	RESISTOR 470 OHM. 1 W.	1	600-0116-471
R24	RESISTOR 10K OHM. 2 W.	1	600-0153-103
R25	RESISTOR 1000 OHM. 10 W.	2	600-1012-102
R26	RESISTOR 10K OHM. 25 W.	1	600-1014-103
R27	RESISTOR 2000 OHM. 25 W.	1	600-1014-202

LIST OF ELECTRICAL PARTS			
LEGEND	DESCRIPTION	QNTY.	PART NO.
P1	POTENTIOMETER 500K	4	601-61
P2	POTENTIOMETER 2.5 MEG.	1	601-94
P3	POTENTIOMETER 1 MEG.	1	601-101
P4	POTENTIOMETER 2.5 MEG.	1	601-102
SW1	SWITCH S.P.S.T.	1	680-6615-01
B1	TERMINAL STRIP	1	703-219
T1	TRANSFORMER-OUTPUT	1	710-2062
T2	TRANSFORMER-POWER	1	710-4103

TUBE VOLTAGES									
TUBE TYPE	SOCKET PIN NUMBERS								
	1	2	3	4	5	6	7	8	9
V4 A-BC 12AX7	75 V.D.C.		0.8 V.D.C.	6.3 V.A.C.°	6.3 V.A.C.°	55 V.D.C.	-0.3 V.D.C.	0.5 V.D.C.	6.3 V.A.C. X
V4 D 12AX7	125 V.D.C.			6.3 V.A.C.°	6.3 V.A.C.°	175 V.D.C.			6.3 V.A.C. X
V3 A 12AU7	90 V.D.C.			6.3 V.A.C.°	6.3 V.A.C.°	75 V.D.C.			6.3 V.A.C. X
V3 B 12AU7	80 V.D.C.			6.3 V.A.C.°	6.3 V.A.C.°	210 V.D.C.			6.3 V.A.C. X
V2 A-B 5881		6.3 V.A.C.°	435 V.D.C.	340 V.D.C.	-39 V.D.C.	-39 V.D.C.	6.3 V.A.C. X		
V1 5U4-G		5 VAC 440 V.D.C.		370 V.A.C.		370 V.A.C.		5 V.A.C.	
USE A 10 MEGOHM INPUT V.T.V.M. FOR VOLTAGE MEASUREMENTS TO GROUND									
NOTE: ALL FILAMENT VOLTAGES MEASURED BETWEEN PINS MARKED O AND X									

FIG. 51



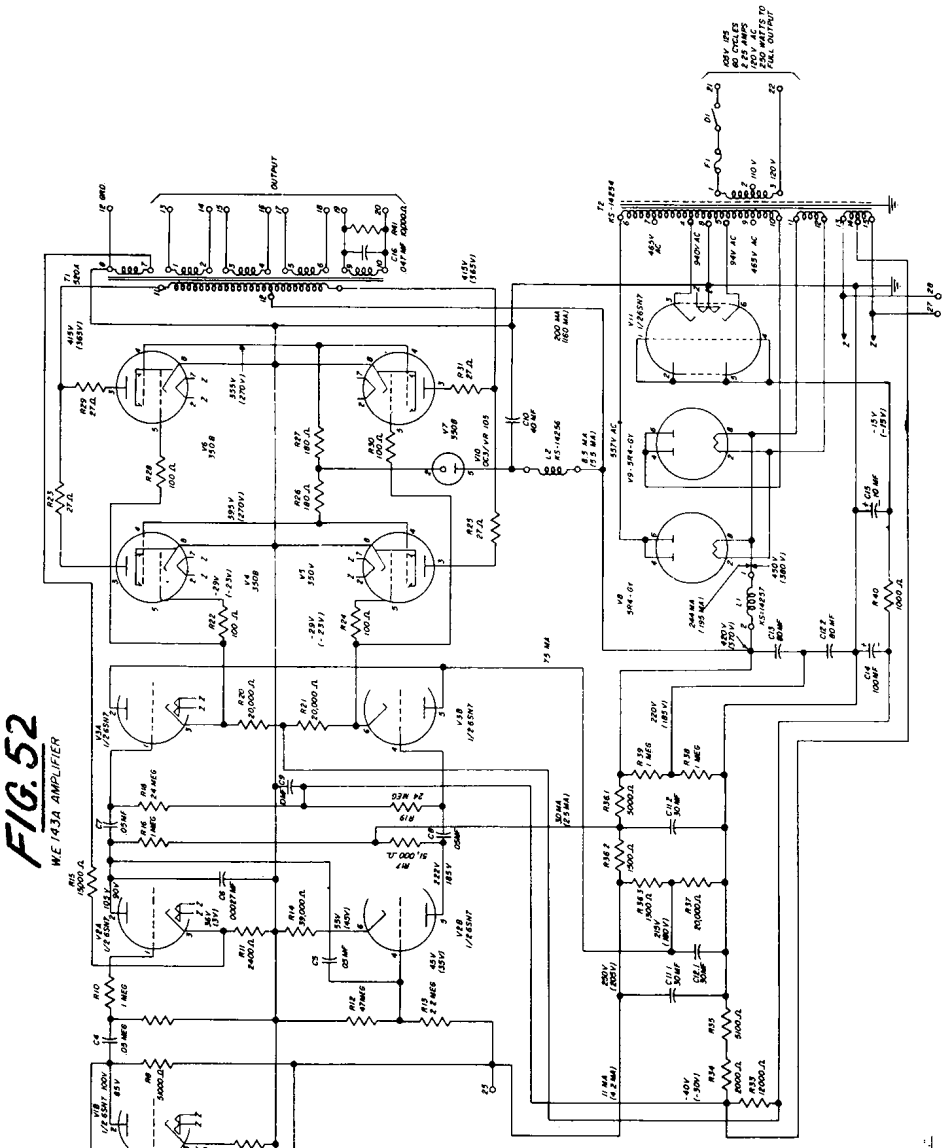


FIG. 52
WE 143A AMPLIFIER

OUTPUT CONNECTIONS

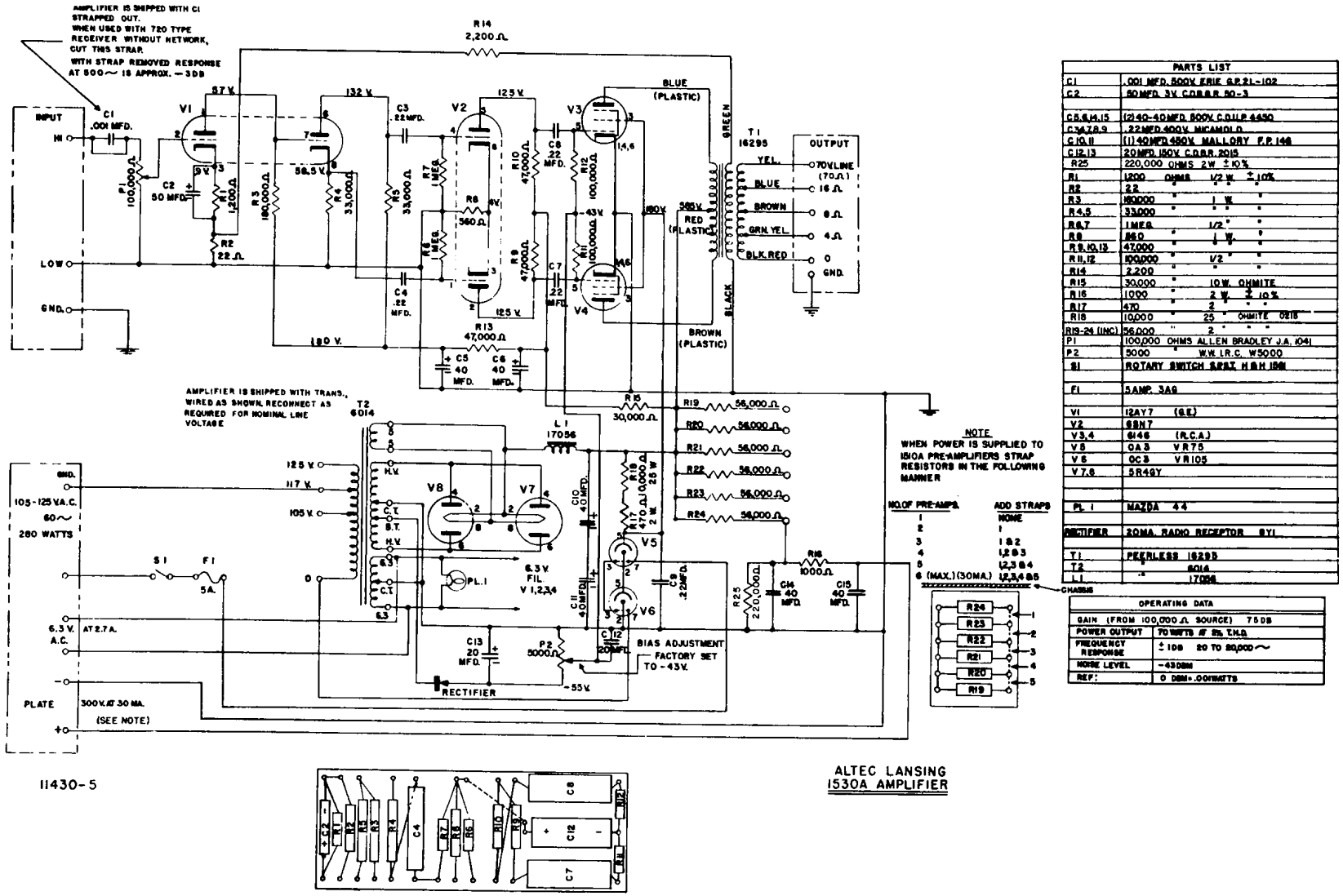
NOMINAL LOAD IMPEDANCE	WORKING RANGE OF LOAD IMPEDANCE	STRAP TERMINALS	OUTPUT CONNECTIONS
66.7 Ω	50 Ω TO 100 Ω	—	19 & 20
24 Ω	18 Ω TO 36 Ω	14–15, 16–17	13 & 18
12 Ω	9 Ω TO 18 Ω	13–15, 14–16–17	15 & 18
8 Ω	6 Ω TO 12 Ω	14–15	13 & 16
4 Ω	3 Ω TO 6 Ω	—	17 & 18
2 Ω	1.5 Ω TO 3 Ω	13–15, 14–16	13 & 16

FOR 70 VOLT LOUDSPEAKER DISTRIBUTION LINE CONNECTIONS

POWER OUTPUT CONDITION	STRAP TERMINALS	OUTPUT CONNECTIONS
50 WATTS	18–19	17 & 20
75 WATTS (SEE NOTE 3)	—	19 & 20

NOTE:
1. CIRCUIT SHOWN CONNECTED FOR USE WITH 350B TUBES (75 WATTS POWER OUTPUT)
2. TO USE 6L6 TUBES (50 WATTS POWER OUTPUT) THE FOLLOWING CHANGES ARE NECESSARY:
   A. SHORT CIRCUIT R34
   B. REMOVE STRAPS BETWEEN TERMINALS 3 AND 4 ON SOCKETS V8 AND V9 AND ADD STRAPS BETWEEN TERMINALS 6 AND 7
3. RATED 75 WATTS FOR PROGRAM SERVICE ONLY: MAXIMUM R.M.S. POWER OUTPUT RATING 75 WATTS ON 1-1/2 HOUR ON, 1-1/2 HOUR OFF BASIS.— (SEE TEXT)

FIG. 53



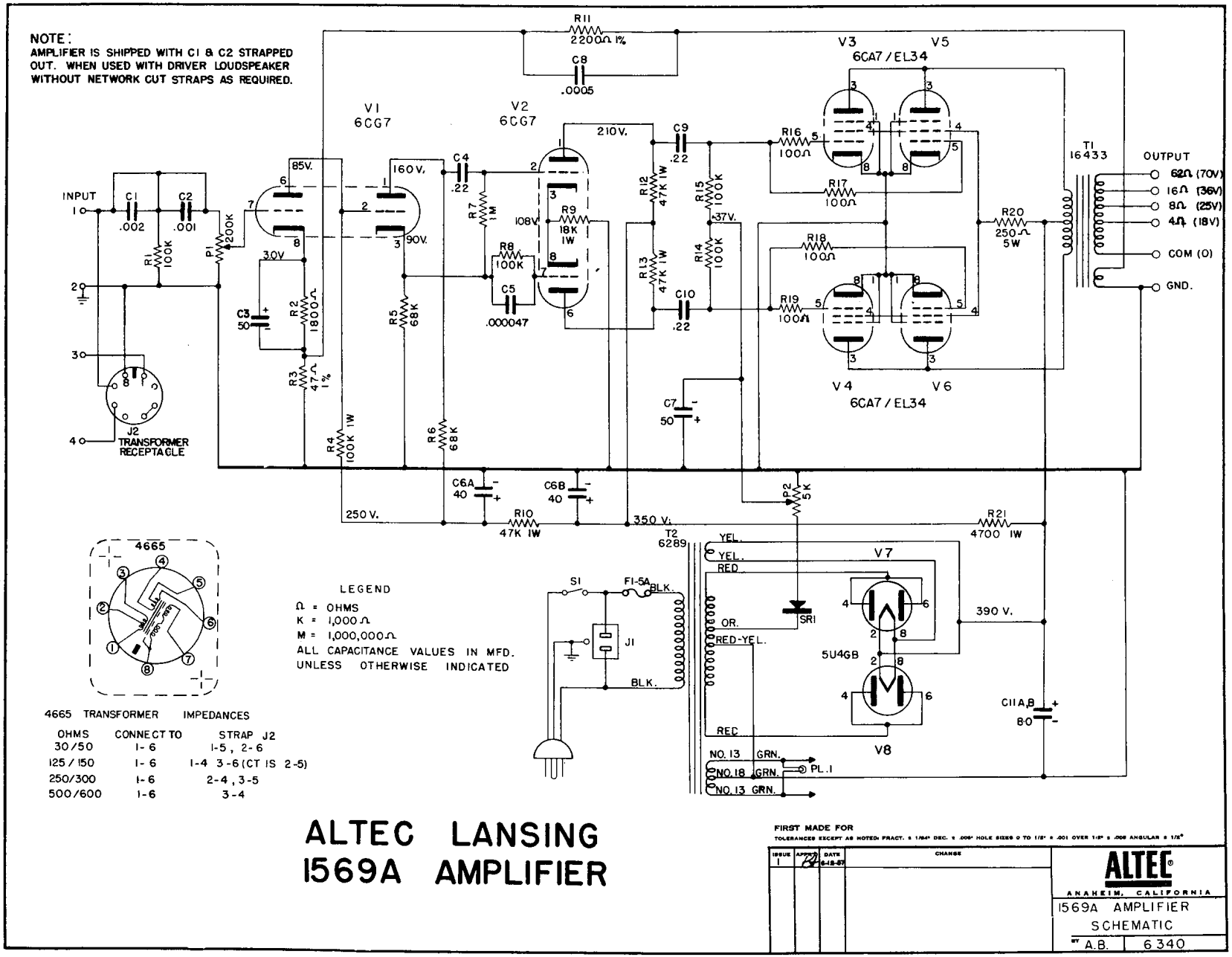
PARTS LIST	
C1	.001 MFD. 500V ERIE G.P.Z.L.-102
C2	50 MFD. 3V C.D.E.B.R. 50-3
C3,6,14,15	(2) 40-40 MFD. 500V C.D.U.P. 4450
C4,7,8,9	.22 MFD. 400V. MICAMOLD
C10,11	(1) 40 MFD 450V. MALLORY F.P. 148
C12,13	20 MFD. 150V. C.D.E.B. 2015
R25	220,000 OHMS 2W ±10%
R1	1200 OHMS 1/2 W. ±10%
R2	22 " " " "
R3	180000 " 1 W. "
R4,5	33,000 " " "
R6,7	1 MEG " 1/2 " "
R8	360 " 1 W. "
R9,10,13	47,000 " " "
R11,12	100,000 " 1/2 " "
R14	2,200 " " "
R15	30,000 " 10 W. OHMITE
R16	1000 " 2 W. ±10%
R17	470 " 2 " "
R18	10,000 " 25 " OHMITE 0218
R19-24 (INC)	56,000 " 2 " "
P1	100,000 OHMS ALLEN BRADLEY J.A. 1041
P2	5000 " W.W. I.R.C. W5000
S1	ROTARY SWITCH S.P.S.T. H.B.M. 1581
F1	5 AMP. 3AG
V1	12AY7 (G.E.)
V2	6BN7
V3,4	6146 (R.C.A.)
V5	OA3 VR75
V6	OC3 VR105
V7,8	5R4GY
PL. 1	MAZDA 44
RECTIFIER	20MA. RADIO RECEPTOR 8Y1
T1	PEERLESS 16295
T2	" 6014
L1	" 17056

OPERATING DATA	
GAIN (FROM 100,000Ω SOURCE)	75 DB
POWER OUTPUT	70 WATTS AT 5% T.H.D.
FREQUENCY RESPONSE	±1DB 20 TO 20,000~
NOISE LEVEL	-63DBM
REF:	0 DBM=.001 WATTS

11430-5

ALTEC LANSING
1530A AMPLIFIER

FIG. 54



4665 TRANSFORMER IMPEDANCES

OHMS	CONNECT TO	STRAP J2
30/50	1-6	1-5, 2-6
125/150	1-6	1-4 3-6 (CT IS 2-5)
250/300	1-6	2-4, 3-5
500/600	1-6	3-4

ALTEC LANSING 1569A AMPLIFIER

FIRST MADE FOR

TOLERANCES EXCEPT AS NOTED: FRACT. ± 1/64" DEC. ± .005" HOLE SIZES 0 TO 1/2" ± .001 OVER 1/2" ± .005 ANGULAR ± 1/2°

ISSUE	APPD.	DATE	CHANGE
1		6-12-57	

ALTEC
ANAHEIM, CALIFORNIA
1569A AMPLIFIER
SCHEMATIC
BY A.B. | 6340

FIG. 55

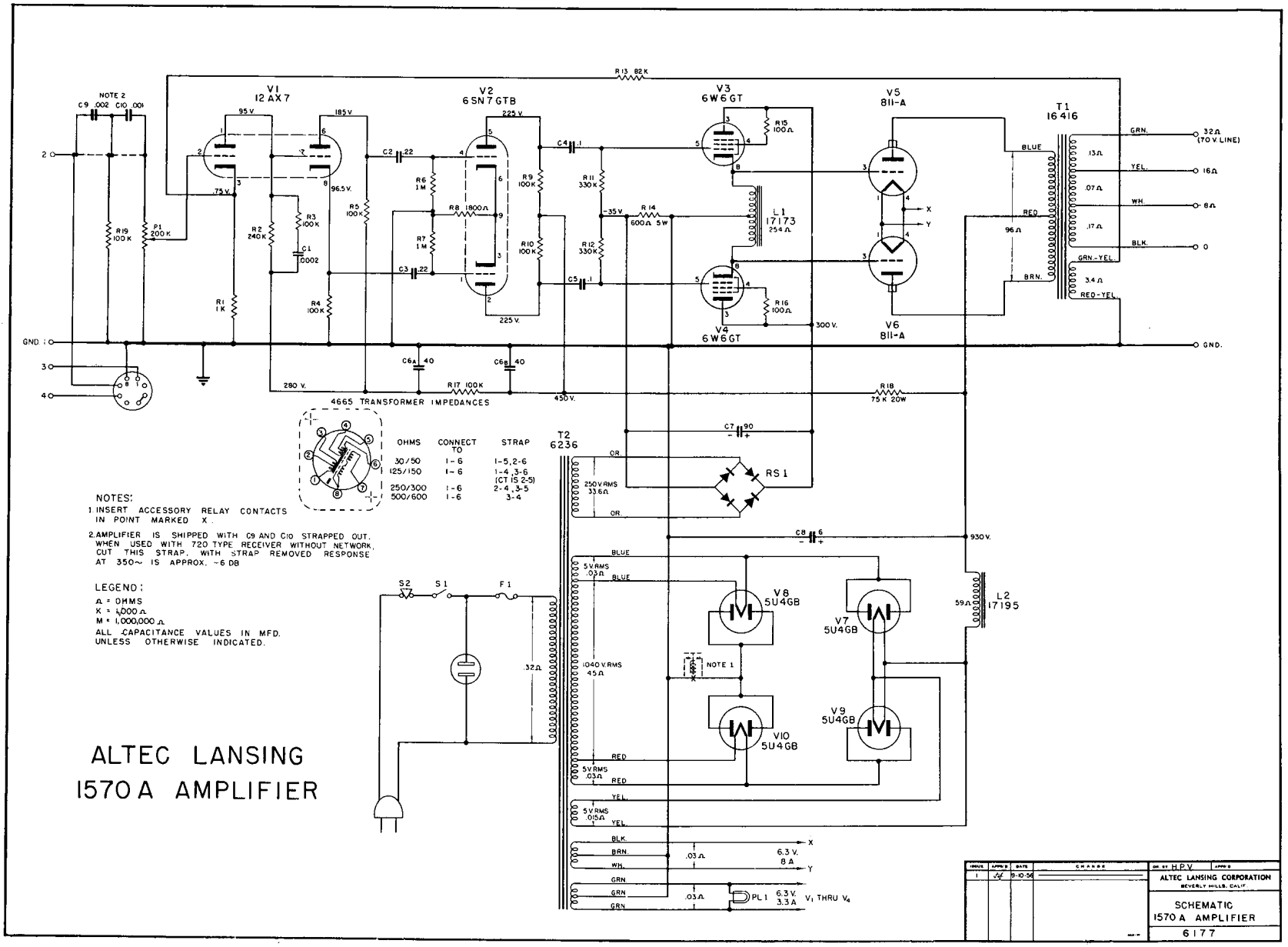


FIG. 56A

GRAYBAR GB-1026A DIVIDING NETWORK 600Ω/600Ω

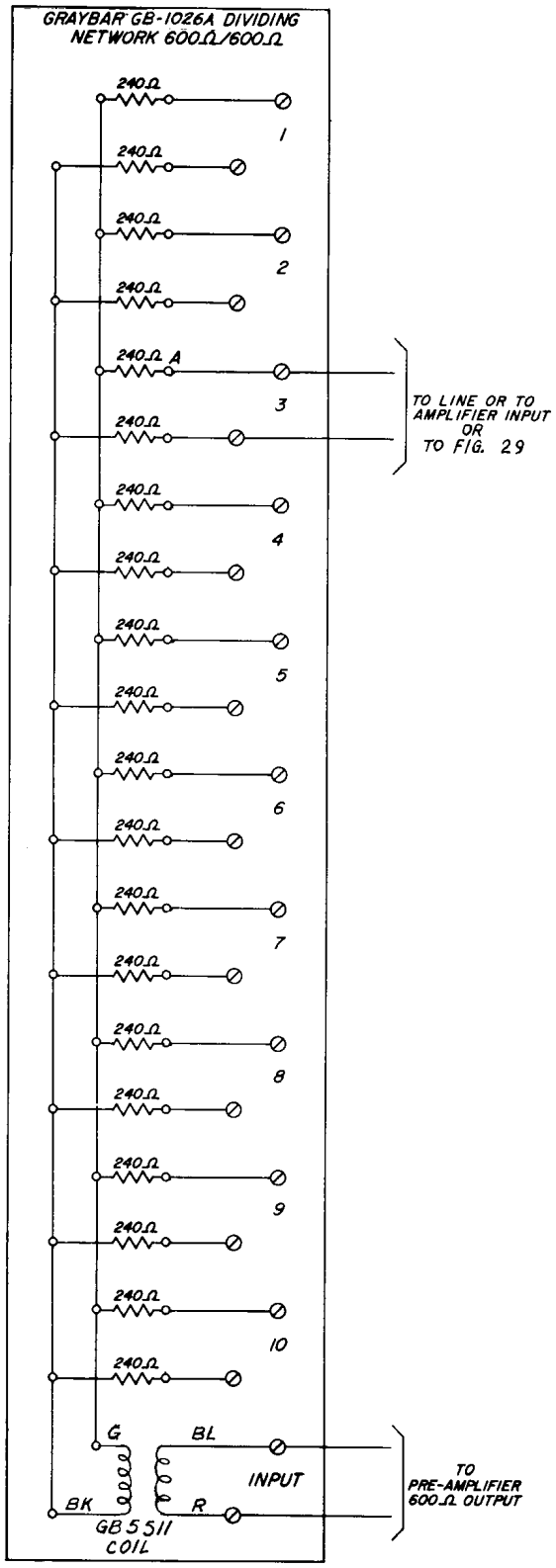
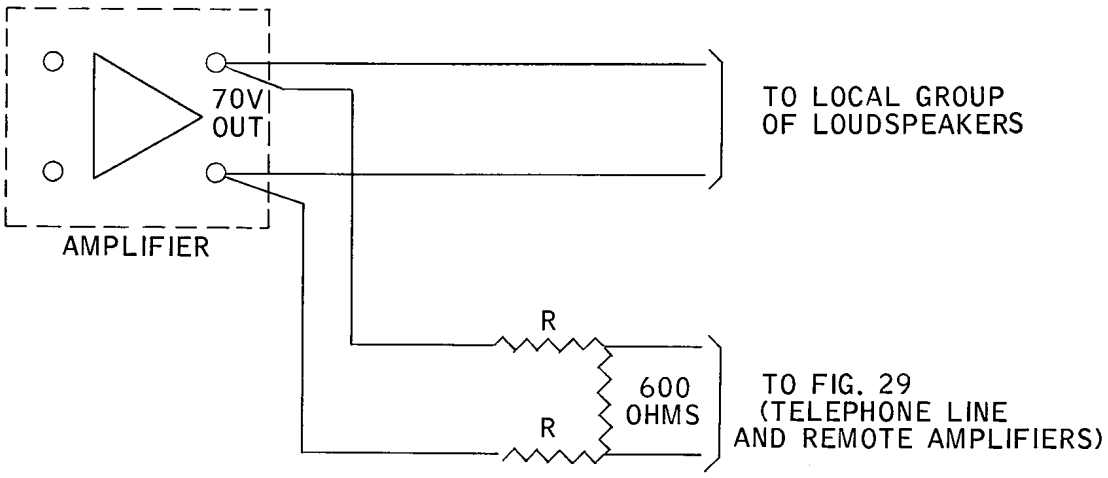


FIG. 56 B

LINE-LEVEL FROM 70 VOLT OUTPUT



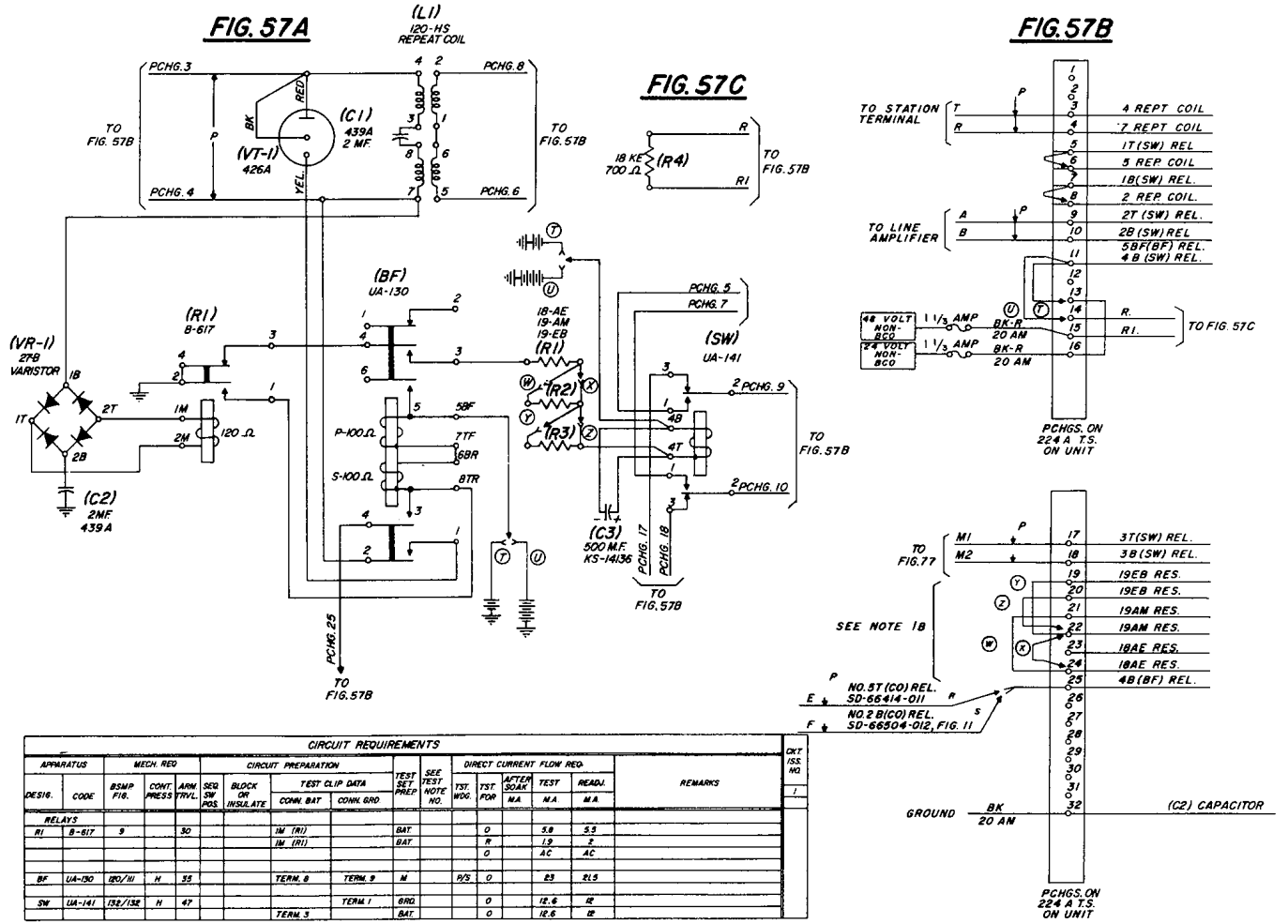
DB	R
15	1400
20	2700
25	5K
31	10K
34	15K
37	20K
41	33K

THE SHUNT RESISTOR IS ALWAYS 600 OHMS.

FIG. 57

KO602S

(MFR. DISC)



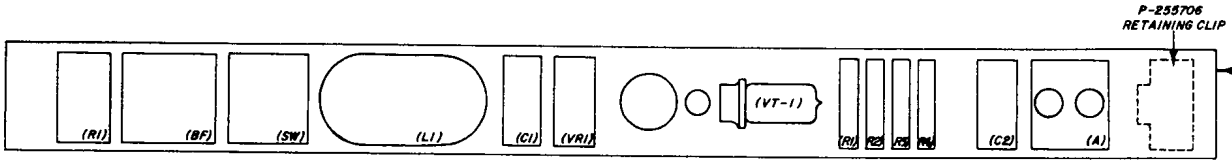
CIRCUIT REQUIREMENTS																CKT. ISS. NO.
APPARATUS		MECH. REQ.			CIRCUIT PREPARATION					DIRECT CURRENT FLOW REQ.					REMARKS	1
DESIG.	CODE	BSMP FIG.	CONT. PRESS	ARM. TRVL.	SEQ. SW POS.	BLOCK OR INSULATE	TEST CLIP DATA CONN. BAT	TEST CLIP DATA CONN. GRD	TEST SET PREP.	SEE TEST NOTE NO.	TST. WDG.	TST. FOR	AFTER SOAK M.A.	TEST M.A.	READJ. M.A.	
RELAYS																
R1	B-617	9		30			1M (R1)		BAT.			0		5.8	5.5	
							1M (R1)		BAT.			R		1.9	2.	
												0		AC	AC	
BF	UA-130	(20)/11	H	35			TERM. 8	TERM. 9	M		P/S	0		23	21.5	
SW	UA-141	132/132	H	47				TERM. 1	GRD.			0		12.6	12	
							TERM. 3		BAT.			0		12.6	12	

NOTES:

1. FOR USE WITH X-BAR P.B.X. SYSTEMS:
   (A) MODIFY LINE EQUIPMENT ASSOCIATED WITH PUBLIC ADDRESS TERMINAL FOR KEYLESS STATION IN ACCORDANCE WITH CIRCUIT NOTE 103 PER SD-66504-013, ISSUE 200 LEAVE "K" WIRING OF "CO" RELAY IN PLACE AND REMOVE WIRE FROM NO.2 BOTTOM CONTACT OF "CO" RELAY PER SD-66504-012, FIG. II. EXTEND "CO" LEAD, FIG. I, "S" OPTION, FROM NO. 4 BOTTOM CONTACT "BF" RELAY TO NO. 2 CONTACT "CO" RELAY PER SD-66504-012, FIG. II
   (B) STRAP IN RESISTANCES "R1" "R2" "R3" AS REQUIRED FOR PROPER TIME DELAY OF "SW" RELAY. OPTIMUM DELAY HAS BEEN ACCOMPLISHED WHEN NO DISTORTION IS HEARD IN SPEAKER DURING RINGING TRIP AND CUT-THROUGH.
2. FOR USE WITH STEP BY STEP P.B.X. SYSTEMS:
   (A) MODIFY "CO" RELAY IN LINE CIRCUIT TO SUPPLY GROUND TO NO. 4 BOTTOM CONTACT OF "BF" RELAY, FIG. I, "R" OPTION, WHEN "CO" RELAY IS OPERATED.
3. USE "T" OPTION ON 755A P.B.X. SYSTEMS. USE "U" OPTION ON STEP-X-STEP P.B.X. SYSTEMS.
4. REMOVE "M" OPTION WHEN THIS UNIT IS USED WITH DWG. KO-651S.

FIG. 58 (MFR. DISC.)

E096 - MOUNTING PLATE



189-A MTG. PLATE E/W	POSITION
B-617 RELAY	6
UA-130 RELAY E/W U-7 COVER	20
UA-141 RELAY E/W U-3 COVER	35
120-HS REPEAT COIL	56
439-A CAPACITOR	75
27B VARISTOR	85
KS-14136 CAPACITOR	96
103-D INSULATOR	104
426-A VACUUM TUBE	109
18-AE RESISTOR	127
19-AM RESISTOR	131
19-EB RESISTOR	135
18-KE RESISTOR	139
439-A CAPACITOR	150
224-A TERMINAL STRIP E/W 2-103-D INSULATORS	162
UNDRILLED	ALL OTHERS

ENGINEERING NOTES:

51. WHEN UNITS ARE MOUNTED ON FRAMES DRILLED FOR 1 3/4" MOUNTING PLATES, ADAPTER BARS PER ED-92243-01 WILL BE NECESSARY.

52. PROVIDE ONE P-255706 PLASTIC RETAINING CLIP WITH EACH MOUNTING PLATE HAVING A TERMINAL STRIP.

53. FOR WIRING DIAGRAM SEE FIG. 63.

MANUFACTURING NOTES:

1. THESE UNITS SHALL BE SURFACE WIRED.

2. DESIGNATIONS IN ( ) SHALL BE STAMPED IN ACCORDANCE WITH JOB REQUIREMENTS.

FIG. 59 DIAL SELECTIVE PAGING APPLIQUE UNIT

FIG. 59A

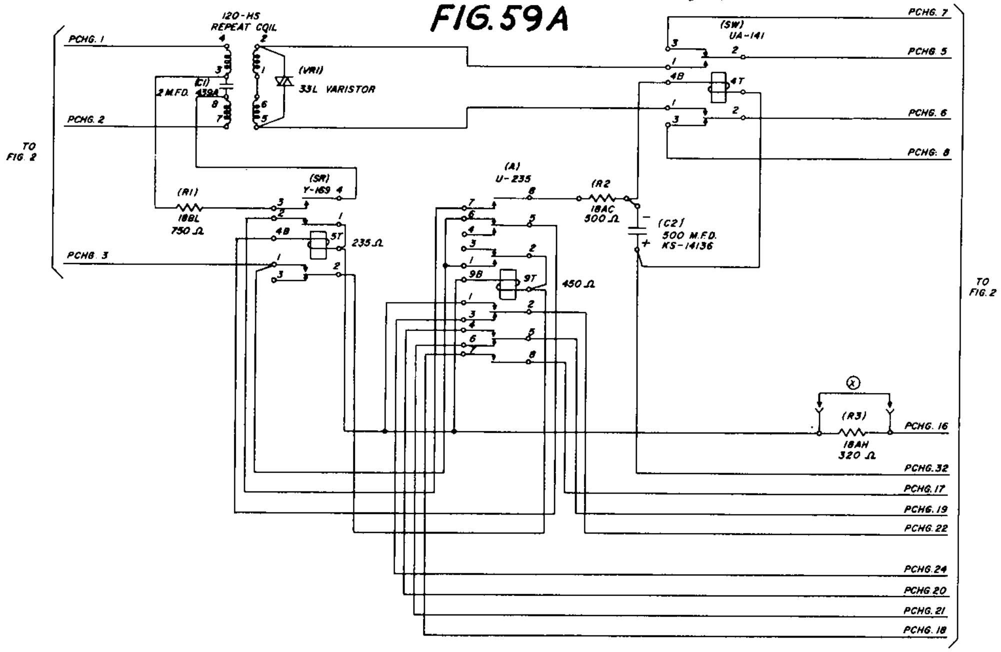


FIG. 59B

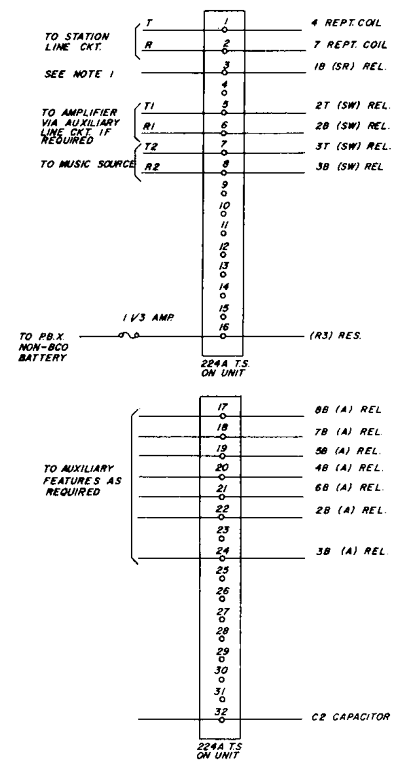


FIG. 59C

CIRCUIT REQUIREMENTS

APPARATUS		MECH REQ.			CIRCUIT PREPARATIONS				TEST	SEE	DIRECT CURRENT FLOW REQ.					REMARKS
							TEST CLIP DATA						AFTER SOAK	TEST	READJ.	
DESIG.	CODE	B.S.M.P. FIG.	CONT. PRESS	ARM TVL.	SEQ SW POS.	BLOCK	CONN. BAT	CONN. GRD.	SET PREP.	TEST NOTE NO.	TEST WDG.	TEST FOR	M.A.	M.A.	M.A.	
RELAYS																
SW	UA-141	132/132	H	47			4B		GRD			O		12.6	12	
A	U-235	118/118		50				9T	GRD.			O		24.5	23.5	
SR	Y-169	188/175	SPL	41				4B				O	54	44.5	42	
												H		5.6	5.3	
												R		1.9	2.5	

ISS. NO.

TEST NOTES:

Y-169 RELAY – MIN. TENSION 1T, 2B SPRINGS - READJ. 10 GRAMS, TEST 8 GRAMS.

NOTES:

1. CONNECT PUNCHING 3 OF THE 224A T.S. TO 5T (CO) RELAY OF SD-66414-011 OR TO 1T (CO) RELAY OF SD-65661-011 OR TO 2T (CO) RELAY OF SD-66124-011 OR TO 2B (CO) RELAY OF SD-66504-012, FIG. 11.

2. USE X OPTION IF P.B.X. BATTERY IS 24 VOLTS. OMIT X OPTION IF P.B.X. BATTERY IS 48 VOLTS.

ASSOCIATED DRAWING CHART

CE-25006-0101	EQUIPMENT DWG.
CT-25006-0103	T WIRING

REPLACES DWG KO-6025

THE PACIFIC TEL. & TEL. CO.
OFFICE OF CHIEF ENGINEER
PORTLAND

SIZE 6S

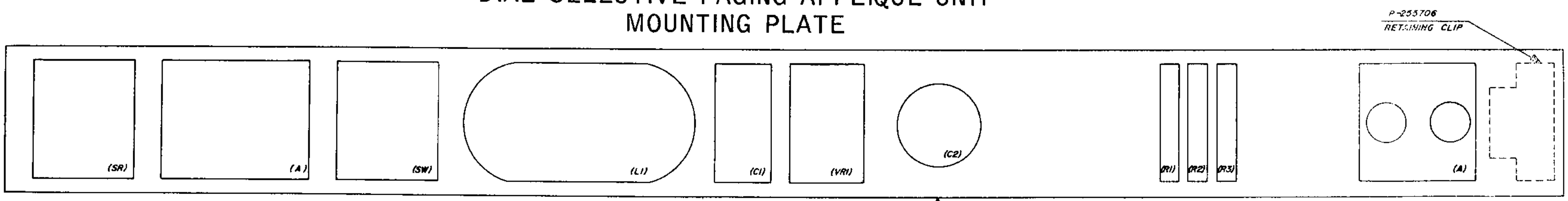
RATING

STATION SYSTEMS
701A, 711A, 740E, 740AX & 755A DIAL P.B.X.
DIAL SELECTION PAGING APPLIQUE UNIT

DRAFTSMAN	ENGINEER	SCALE
CHECKER	APPROVED	CS-25006-0102

FIG. 60

DIAL SELECTIVE PAGING APPLIQUE UNIT MOUNTING PLATE



NOTES:

1. THESE UNITS SHALL BE SURFACE WIRED.
2. DESIGNATIONS IN ( ) SHALL BE STAMPED IN ACCORDANCE WITH JOB REQUIREMENTS.

ENGINEERING NOTES

51. WHEN UNITS ARE MOUNTED ON FRAMES DRILLED FOR 1 3/4" MOUNTING PLATES, ADAPTER BARS PER ED-92243-01 WILL BE NECESSARY.
52. PROVIDE ONE P-255706 PLASTIC RETAINING CLIP WITH EACH MOUNTING PLATE HAVING A TERMINAL STRIP

189-A MTG. PLATE E/W	POSITION	UNDRILLED
Y-169 RELAY E/W U-3 COVER	7	
U-235 RELAY E/W U-7 COVER	23	
UA-141 RELAY E/W U-3 COVER	39	
120-HS REPEAT COIL	60	
439-A CAPACITOR	80	
33L VARISTOR	90	
KS-14136 CAPACITOR	101	
18BL RESISTOR	127	
18AC RESISTOR	131	
18AH RESISTOR	135	
224-A TERMINAL STRIP E/W 2-103-D INSULATORS	162	
UNDRILLED	ALL OTHERS	

ASSOCIATED DRAWING CHART

CS-25006-0102	SD WIRING DIAGRAM
CT-25006-0103	T WIRING DWG.

REPLACES DWG. EO-96

THE PACIFIC TEL. & TEL. CO. OFFICE OF CHIEF ENGINEER PORTLAND	SIZE 6S
STATION SYSTEMS 701A, 711A, 740E, 740AX & 755A DIAL PBX DIAL SELECTION PAGING APPLIQUE UNIT	RATING
DRAFTSMAN Shirley Fullaton / CHECKER [illegible] — ENGINEER R.E. Stephenson / APPROVED [illegible]	SCALE — CE-25006-0101

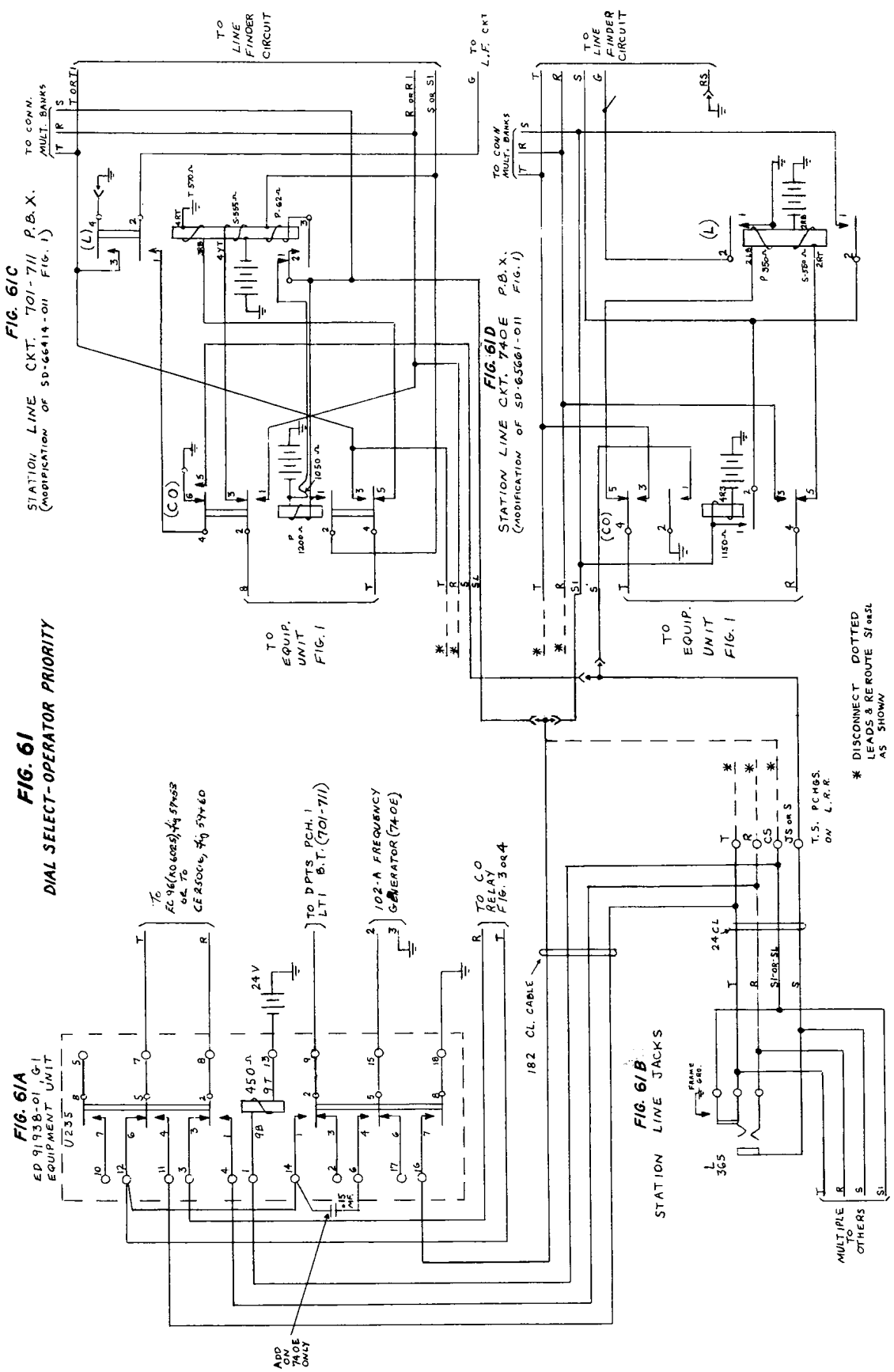
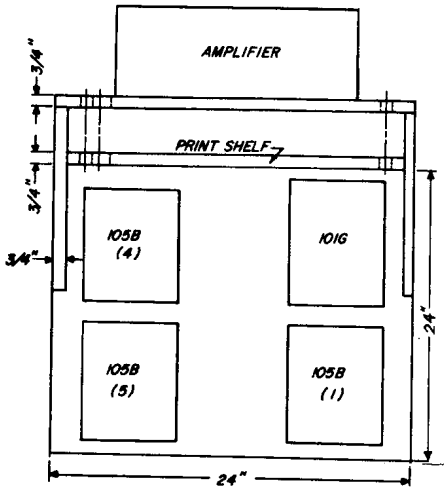


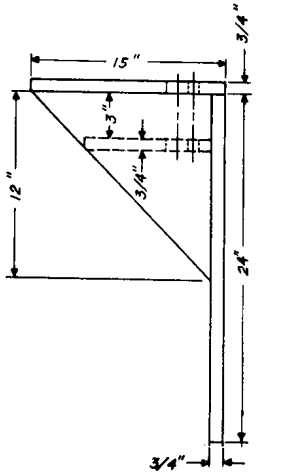
FIG.62

GB 3302 , AMPLIFIER SHELF AND BACKBOARD



FRONT VIEW

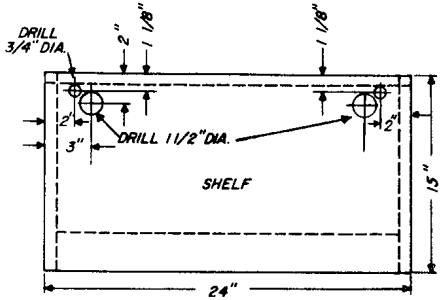
EQUIPMENT MOUNTED IN PLACE (TYPICAL)



SIDE VIEW

NOTES:

1. SHELF ASSEMBLY TO BE MADE OF 3/4" INTERIOR PLYWOOD.
2. ALL JOINTS ARE TO BE SCREWED & GLUED.
3. FINISH WITH LIGHT GREY ENAMEL.
4. SHELF ASSEMBLY TO BE STAMPED "DWG. KCO-380" WITH BLACK LETTERS OF NOT LESS THAN 1/2" HEIGHT IN THE CENTER OF THE AREA DESIGNATED.
5. HOLES TO EXTEND THROUGH PRINT SHELF.



TOP VIEW

FIG. 63

LINE MATCHING TRANSFORMER KS-12048

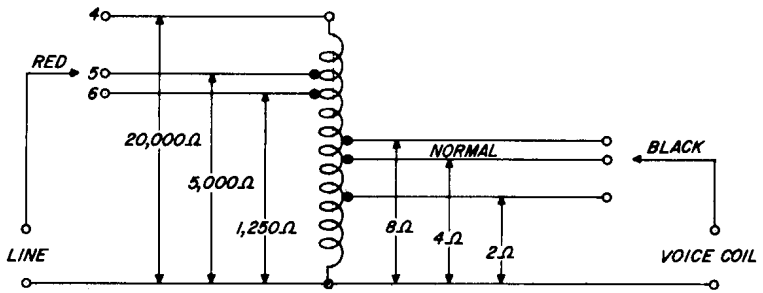
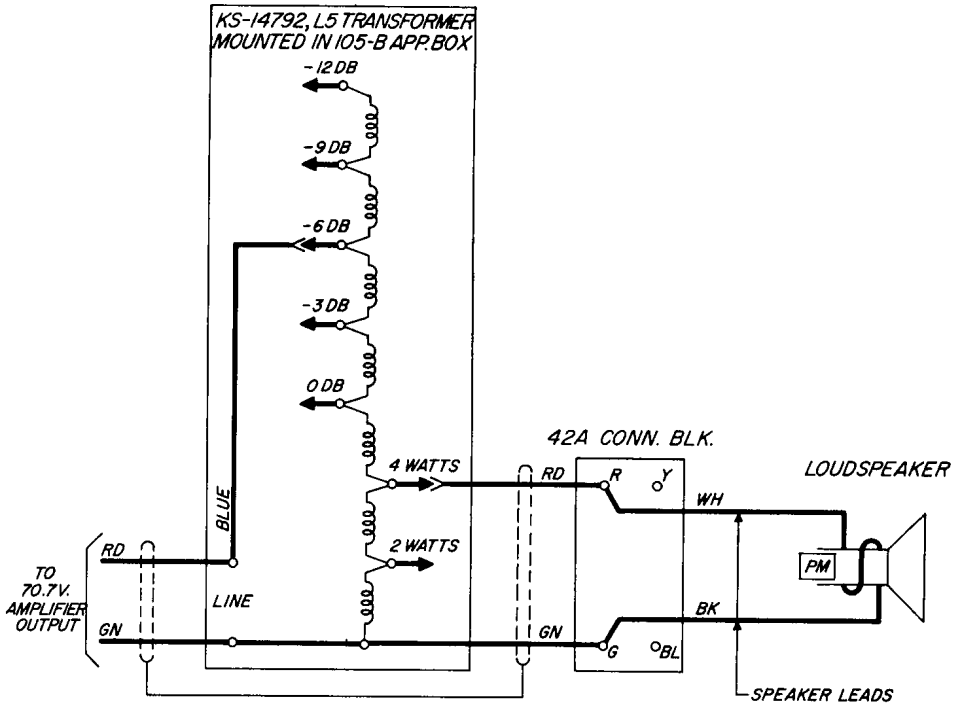


FIG. 64

KS-14792,L5 LINE MATCHING TRANSFORMER FOR INDOOR USE



VOLUME ADJUSTMENT CHART

*DESIRED VOLUME	PRIMARY TAP	SECONDARY TAP	NOMINAL WATTAGE
4 N	0	4 WATTS	4
2N	-3 DB	4 WATTS	2
N	-6 DB	4 WATTS	1
1/2 N	-9 DB	4 WATTS	1/2
1/4 N	-12 DB	4 WATTS	1/4
1/8 N	-12 DB	2 WATTS	1/8

*N= NORMAL LOUDNESS OF LOUDSPEAKER

FIG. 66

TE-6478 LINE TRANSFORMER
(PART OF 51)

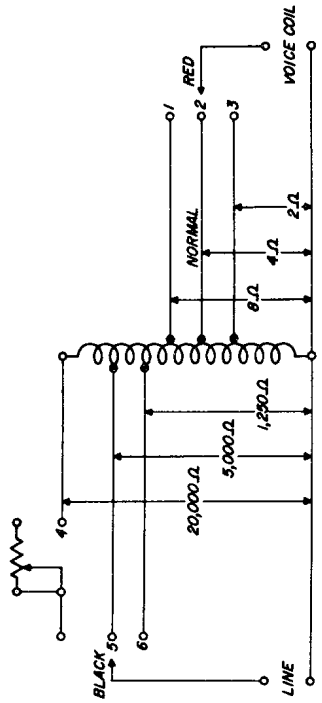
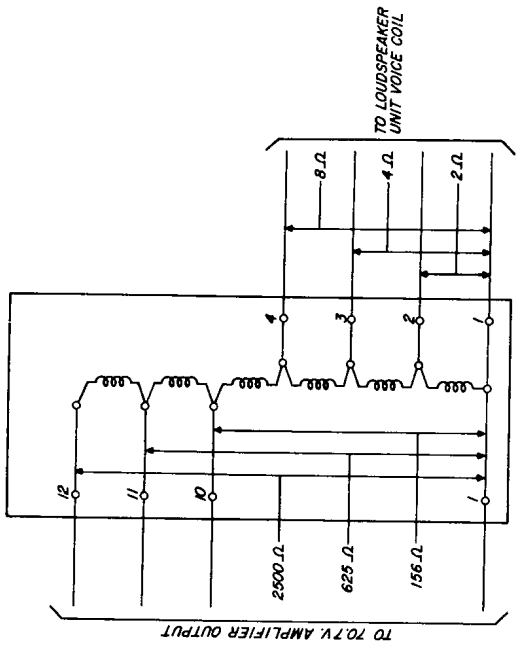


FIG. 65

KS-14417 LINE TRANSFORMER



CONNECTION CHART

POWER DELIVERED TO 8Ω LOUDSPEAKER IN WATTS	CONNECT LINE TO TERMINALS	CONNECT LOUDSPEAKER TO TERMINALS
1	1-12	1-3
2	1-12	1-4
4	1-11	1-3
8	1-11	1-4
16	1-10	1-3
32	1-10	1-4

FIG. 67

GB-3609 TRANSFORMER ASSEMBLY

(PART OF S3 & S5)

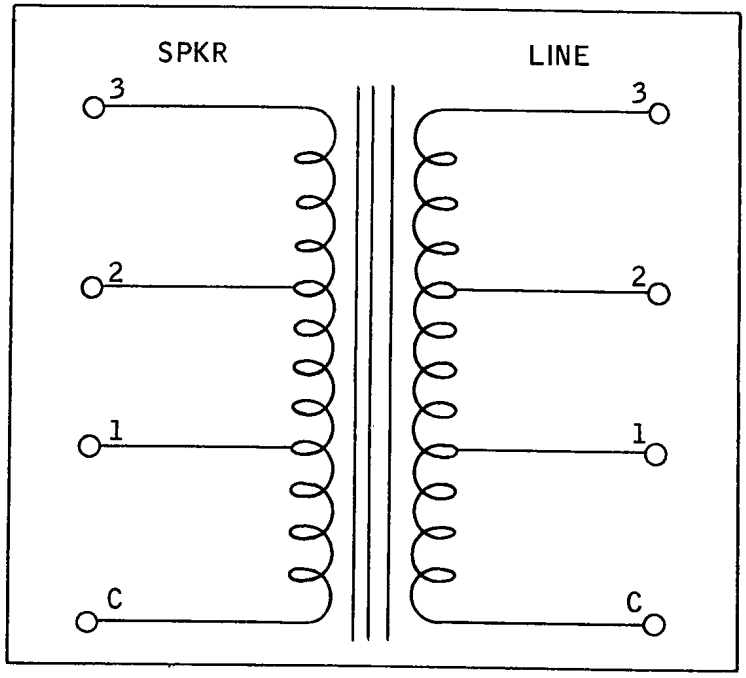


FIG. 68

GB-3608 TRANSFORMER ASSEMBLY

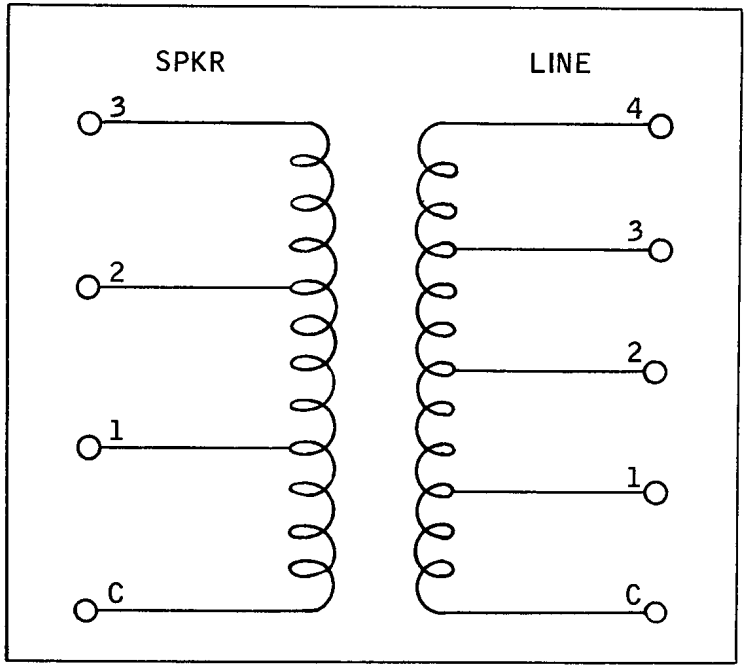


FIG. 69

DUKANE 710-3060 TRANSFORMER AND 5A105 LOUDSPEAKER

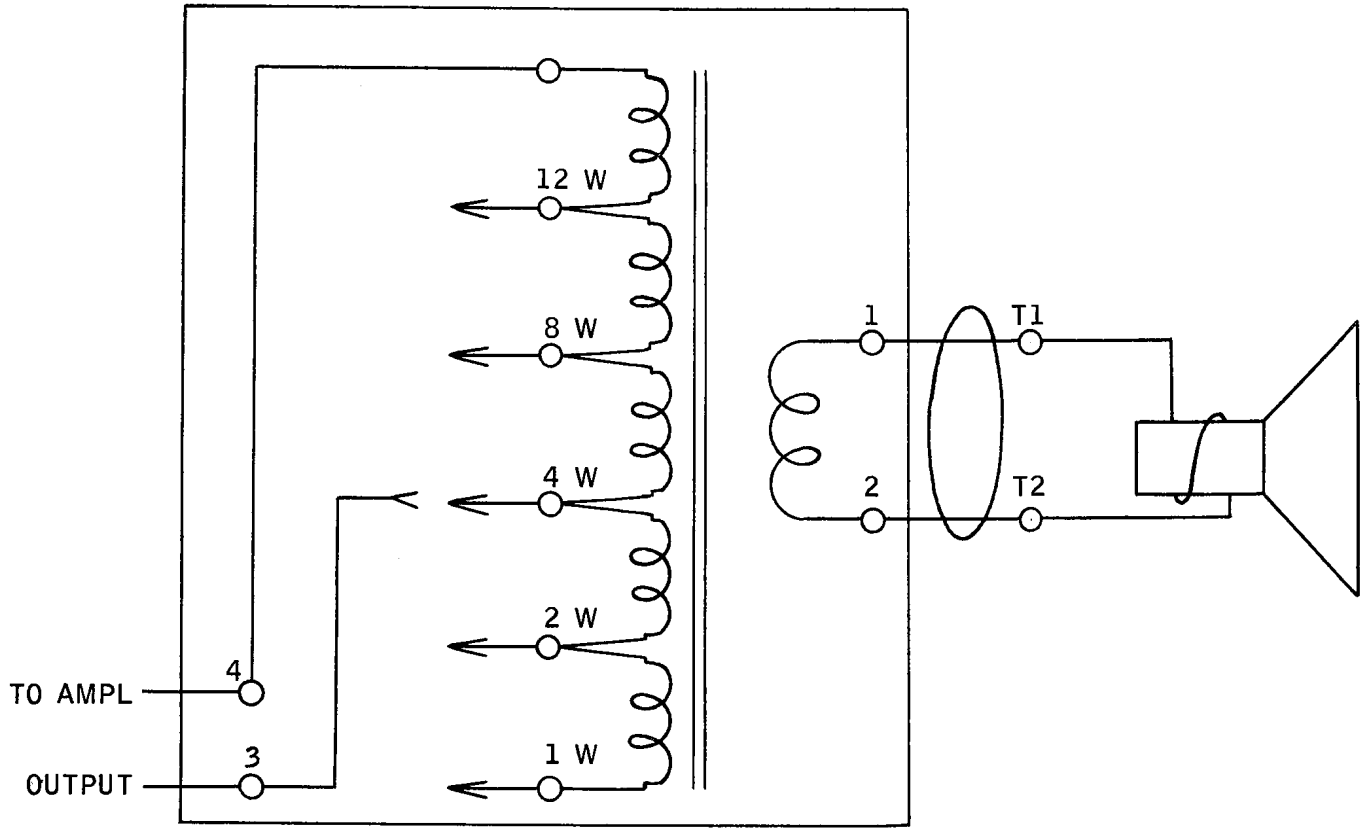


FIG. 70

DUKANE 710-3050 TRANSFORMER AND
5A90 LOUDSPEAKER

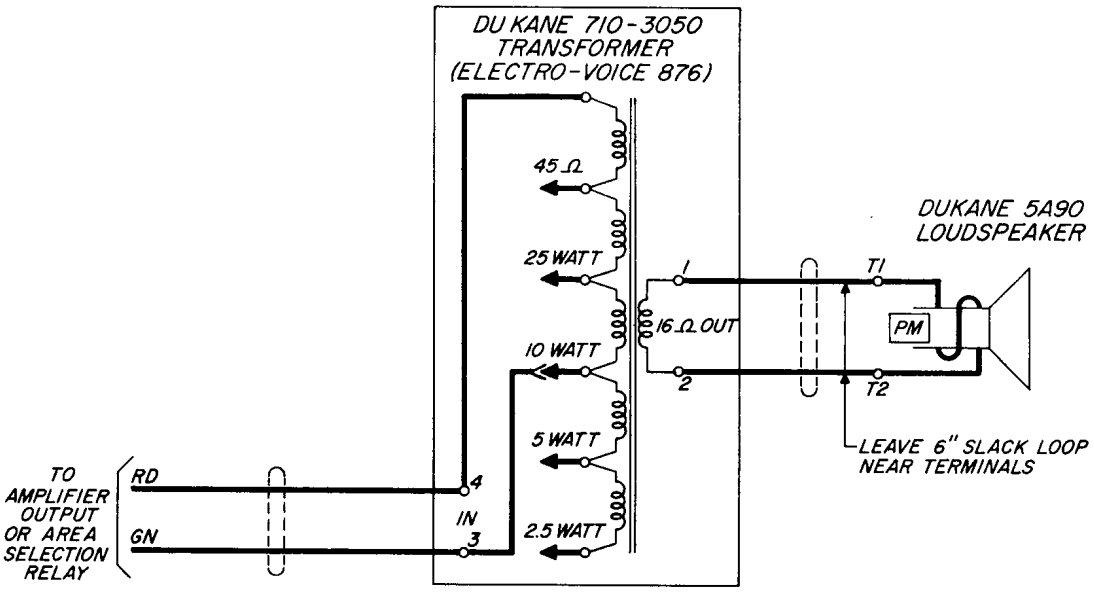


FIG. 71

LOUDSPEAKER AUTO-TRANSFORMER COMBINATIONS

LOUDSPEAKER TYPE	IB8	KS-14705 HORN AND KS-14704 REC. UNIT				S-1		S-2 OR KS-12046		S-3 S-4 S-5		KS-14792-L1		IMPEDANCE PRESENTED TO LINE (OHMS)	WATTAGE TO SPEAKER FROM 70 VOLT LINE
IMPEDANCE (OHMS)	8	8				4		4		8		8			
MAX. POWER (WATTS)	12	30				4		8		4		4			
AUTO-TRANSFORMER	KS-12048	KS-14417		27A		#TE-6478		#KS-12048		GB-3609 ASSEMBLY		KS-14792-L5			
	AUTO-TRANSFORMER CONNECTIONS														
	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	PRI	SEC	LINE	SPKR.	PRI	SEC	
	4	2					4*	3	4	3			-12 db	2 Watts	40,000	1/8*
	4	1					4	2	4	2	C-1	C-1	-12 db	4 Watts	20,000	1/4
	5	2			1-12	1-2	4	1	4	1	C-1	C-2	- 9 db	4 Watts	10,000	1/2
	5	1	1-12	1-3	1-12	1-3	5	2	5	2	C-1	C-3	- 6 db	4 Watts	5,000	1
	6	2	1-12	1-4	1-12	1-4	5	1	5	1	C-2	C-3	- 3 db	4 Watts	2,500	2
	6	1	1-11	1-3	1-11	1-4	6	2	6	2	C-3	C-3	0	4 Watts	1,250	4
	**		1-11	1-4	1-10	1-4			6	1					625	8
			1-10	1-3	1-9	1-4									312	16
			1-10	1-4	1-8	1-4									156	32

* - The S-1 loudspeaker has a potentiometer which may be connected between the black line wire and terminal 4 for variable volume control below 1/8 Watt (See PT-729).

** - For 8 Watts use 27A or KS-14417 auto-transformer and connect as shown for KS-14704 Receiver Unit.

\# - S-1 and S-2 loudspeakers, assembled by Webster Electric, have auto-transformers of different code but identical electrical characteristics.

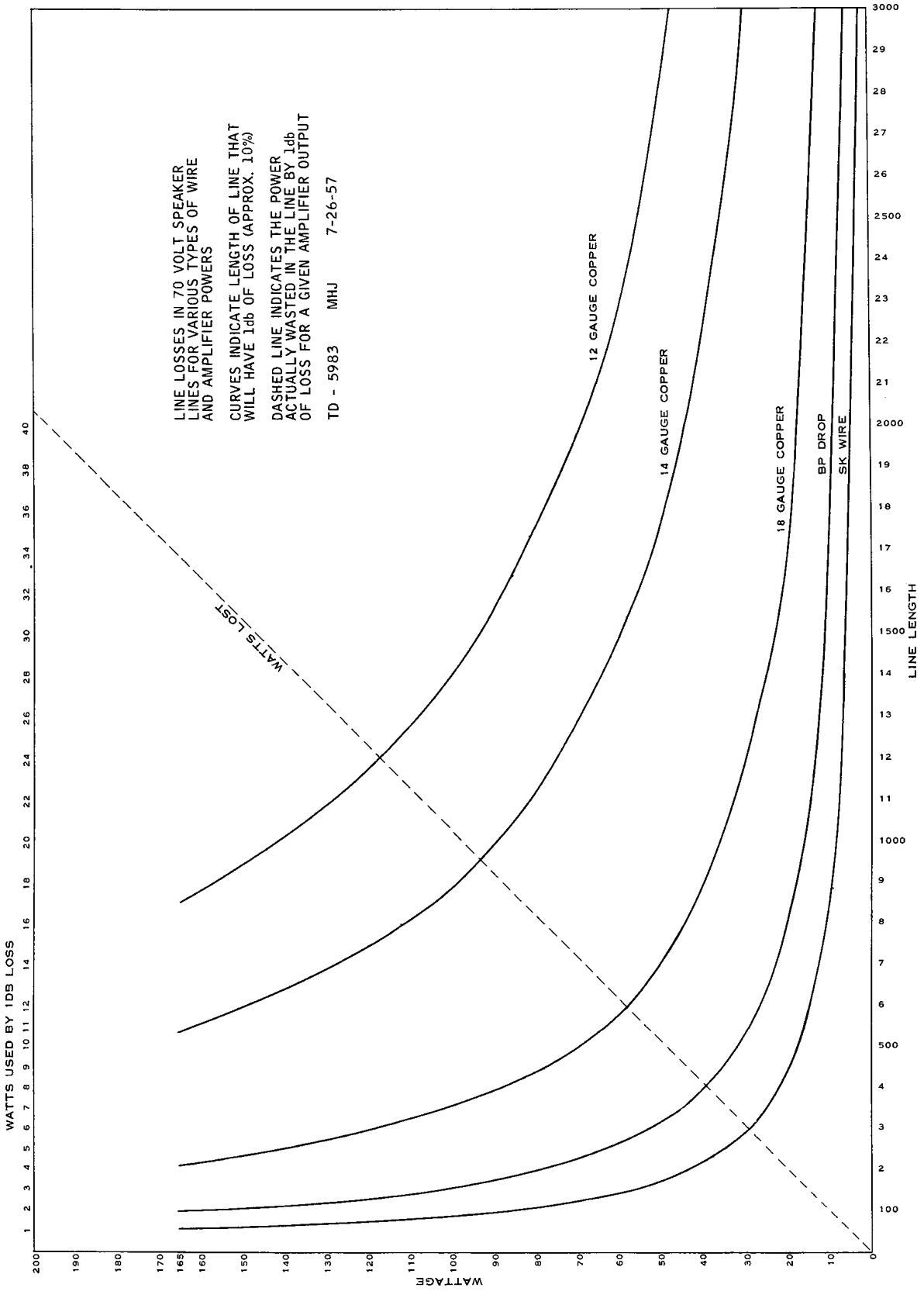


FIG. 72A

FIG. 72 B

AMPLIFIER OUTPUT TAPS FEEDING SPEAKERS	MAXIMUM LENGTH OF SPEAKER CABLE - FEET			
	#20 AWG PAIR	#18 AWG PAIR	#16 AWG PAIR	#14 AWG PAIR
500 OHM	1200	2000	3000	4000
250 OHM	700	1100	2000	3000
70 VOLTS (10 WATT AMPL)	1200	2000	3000	4000
70 VOLTS (30 WATT AMPL)	450	750	1200	2000
70 VOLTS (50 WATT AMPL)	290	450	750	1200
70 VOLTS (100 WATT AMPL)	150	230	360	560

These maximum lengths are one-way distances from the amplifier to the line matching transformer. They are the maximum lengths speaker leads can be run without exceeding a 10% power loss in the line.

FIG. 73

IMPEDANCES AND LINE CURRENTS AS PROVIDED BY 70.7 VOLT LINE OPERATION OF VARIOUS AMPLIFIER WATTAGES.

WATTS MAX. OUTPUT	IMPEDANCE	LINE CURRENT IN AMPERES
1 WATT	4980 OHMS	.0142 AMPERES
5	1000	.0707
10	498	.142
15	334	.212
20	250	.283
25	200	.354
30	166	.424
35	142	.495
40	125	.567
45	111	.637
50	100	.707
55	91	.778
60	83	.85
65	77	.92
70	71	.99
75	67	1.06
80	62.5	1.13
85	59	1.20
90	56	1.27
95	53	1.34
100	50	1.41
125	40	1.77
150	33	2.12
17.5	30	2.34

FIG. 74

SOUND LEVEL OUTPUTS OF VARIOUS SPEAKERS

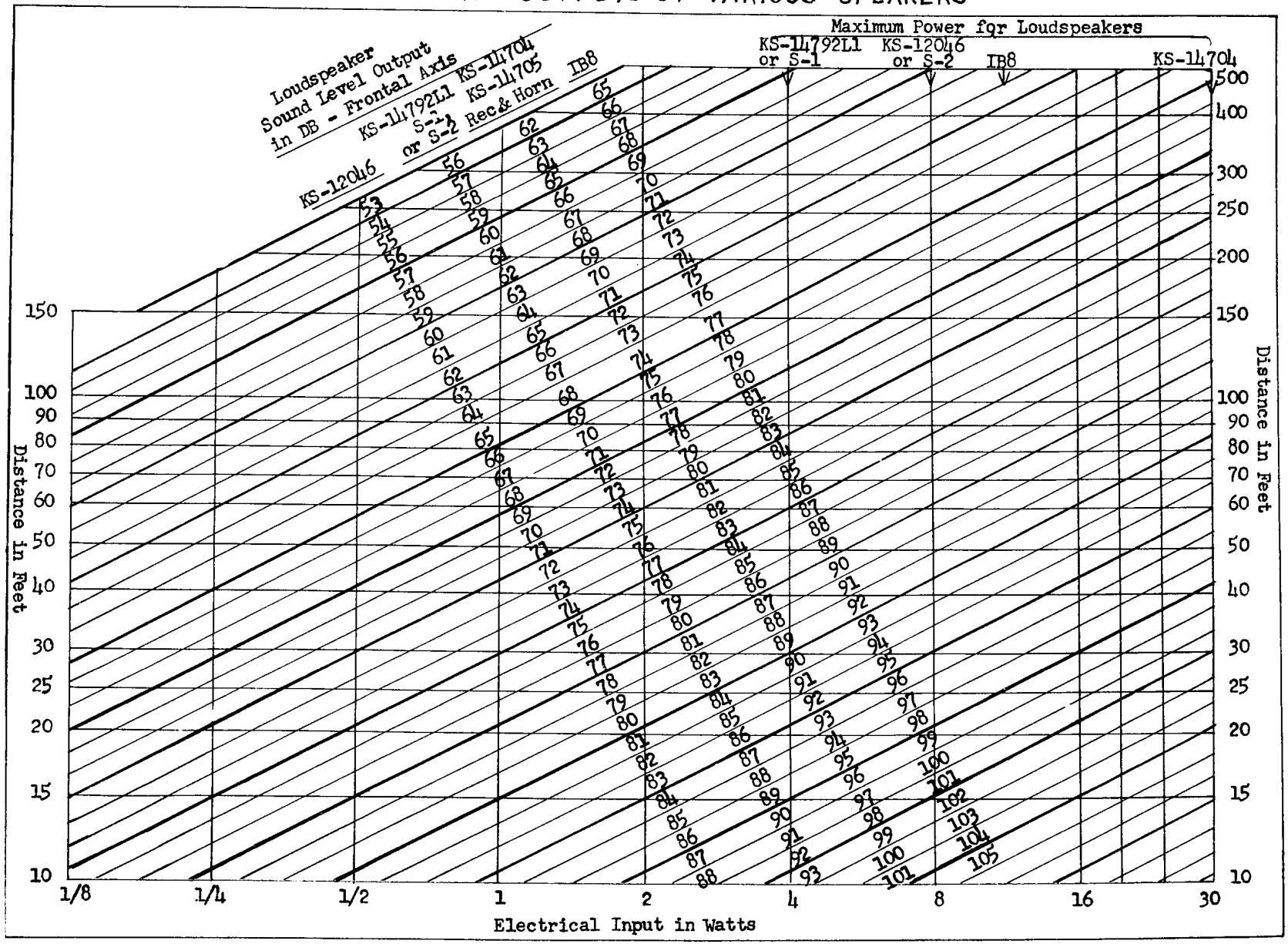


FIG. 75

SHIELDED WIRE SPLICE
ON 44 TYPE BLOCK

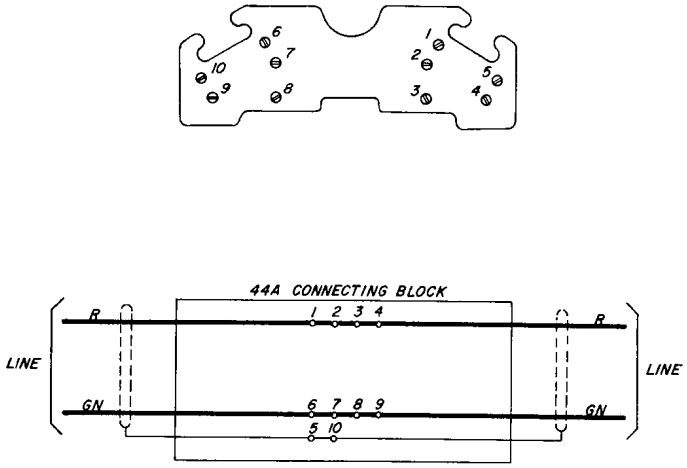
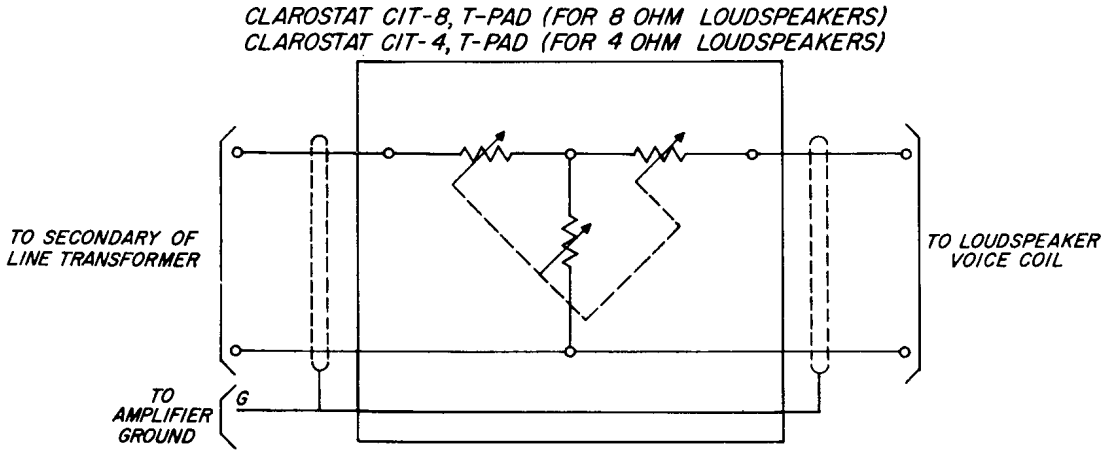


FIG. 76

EXTERNAL VOLUME CONTROL
FOR SINGLE LOUDSPEAKER



NOTES:

1. THE MAXIMUM POWER RATING FOR "CIT" PADS IS 10 WATTS. CIB-4 OR CIB-8 PADS MAY BE USED UP TO 30 WATTS.

2. MOUNTING INFORMATION TO BE SUPPLIED BY DISTRICT TECHNICAL MAN OR CHIEF ENGINEER'S DEPARTMENT.

FIG. 77

VOLUME CONTROLS
FOR MUSIC AND PAGING

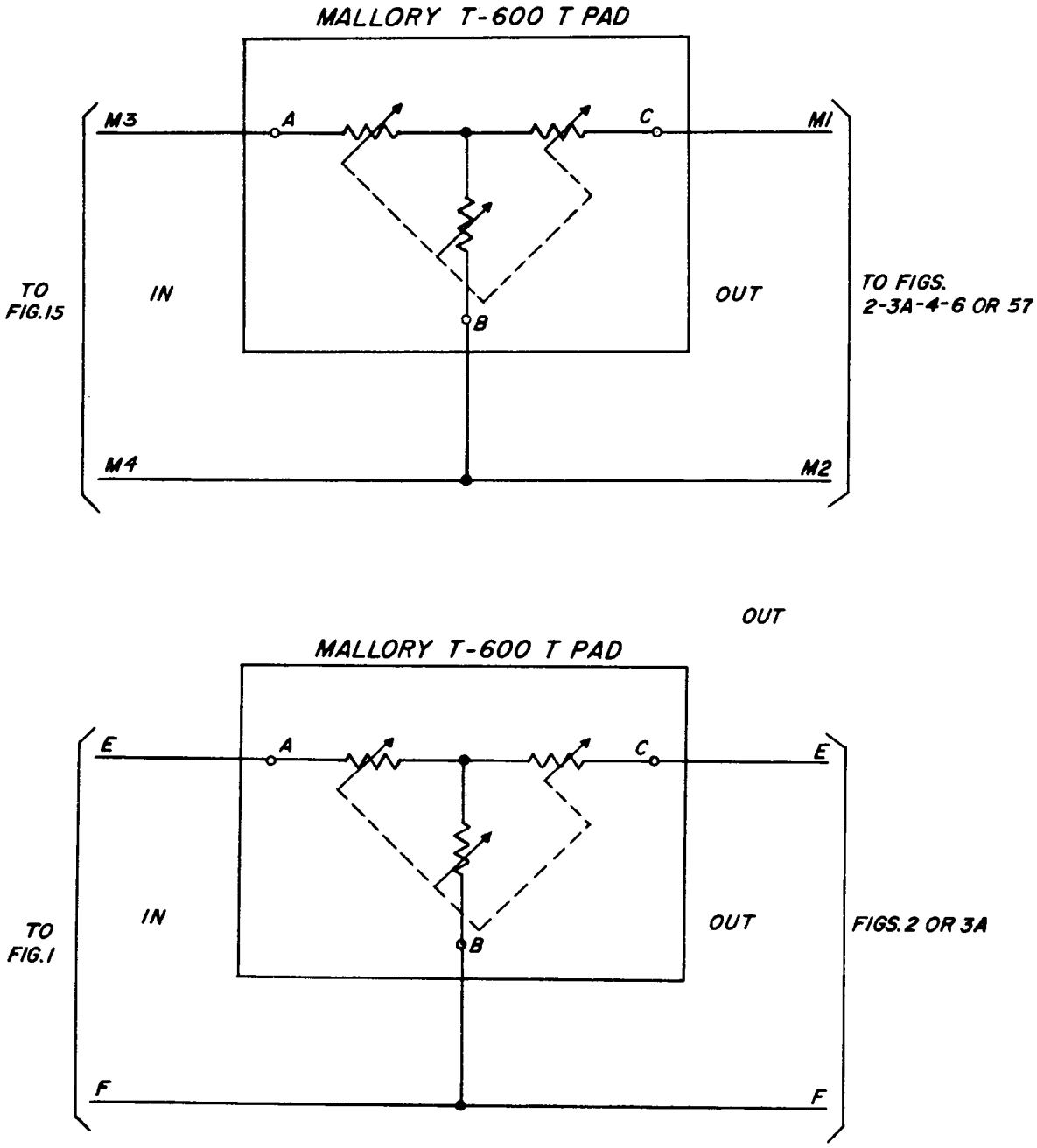


FIG. 78

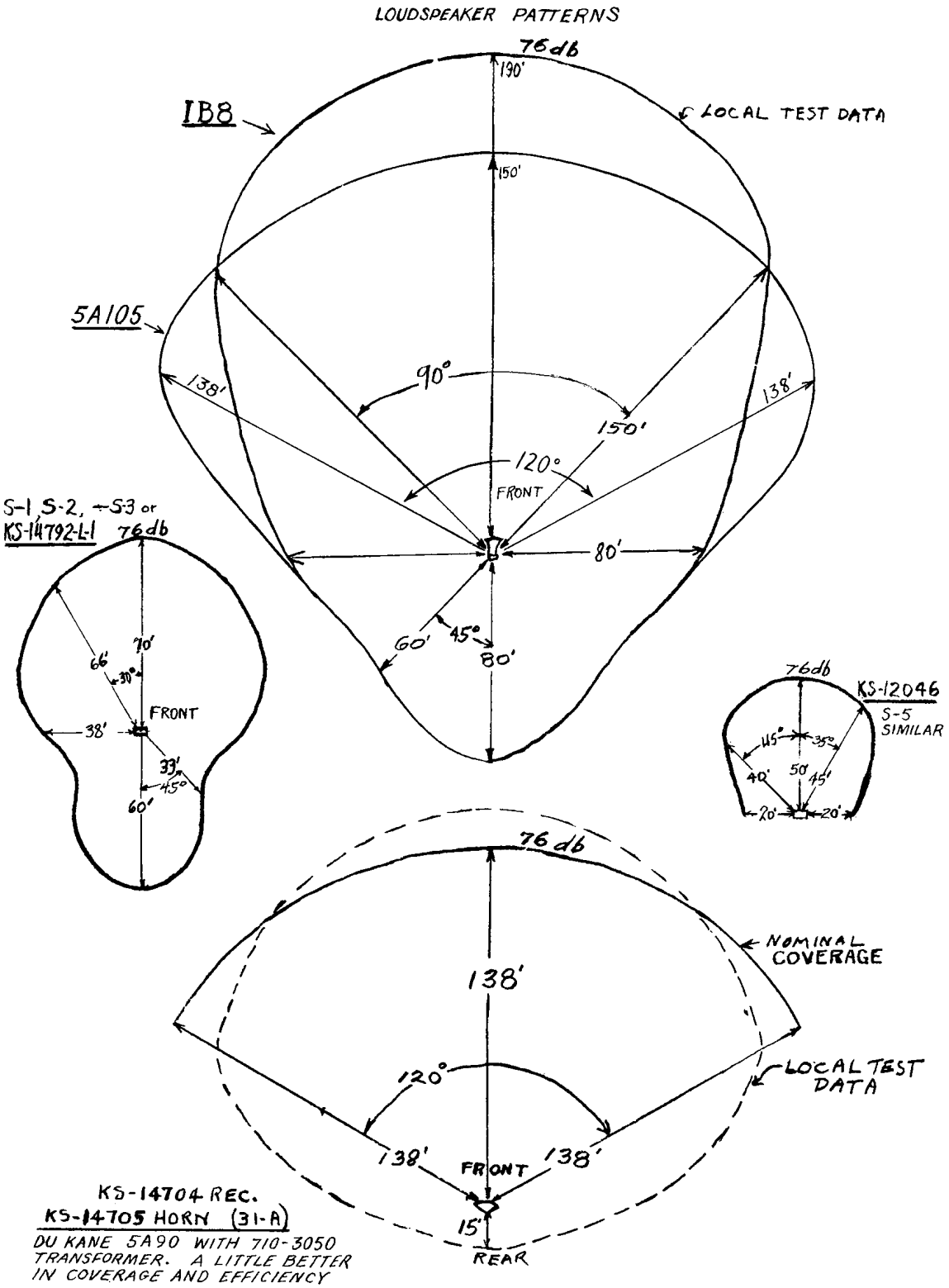
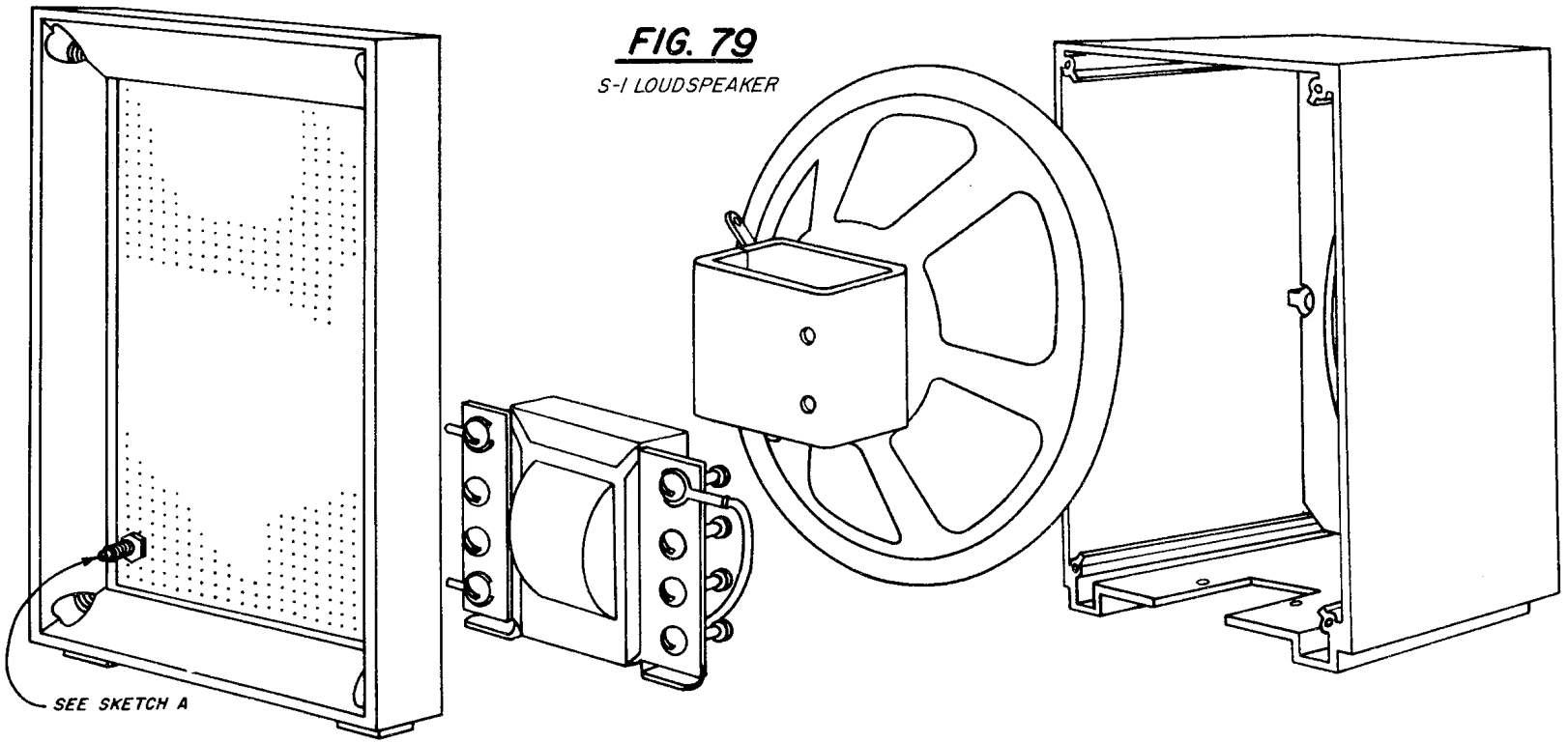
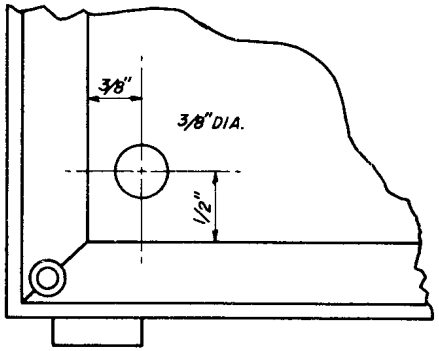


FIG. 79

S-1 LOUDSPEAKER





SKETCH A

NOTE: ON LATER MODELS THE POTENTIOMETER IS LOCATED IN THE TOP LEFT CORNER (REAR)

REQ.	DET. OR PIECE PART NO.	DESCRIPTION	NOTE	ITEM
1	211-16292	CABINET (WEBSTER ELEC. CO. TELETALK)		
1	211-15479	CABINET BACK (WEBSTER ELEC. CO. TELETALK)		
1	211-15486	FRONT SCREEN (WEBSTER ELEC. CO. TELETALK)		
1	211-15485-1	BACK SCREEN (WEBSTER ELEC. CO. TELETALK)		
1	211-15480	SPEAKER BAFFLE (WEBSTER ELEC. CO. TELETALK)		
1	5CMS	SPEAKER OXFORD MODEL		
1	RQ 13-123	POTENTIOMETER I.R.C.		
1	TE 6478	TRANSFORMER TRANS. ENGINEERS		

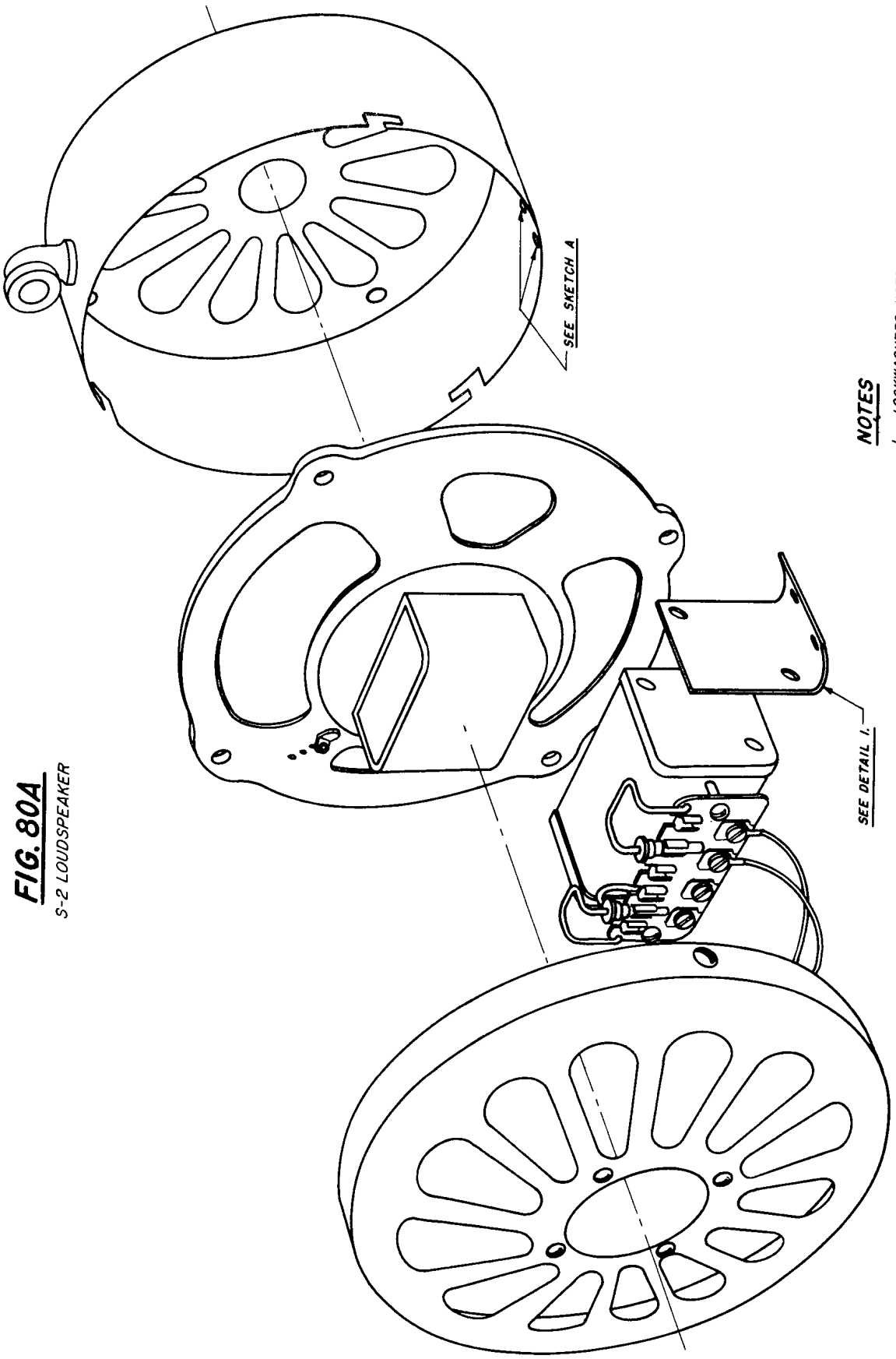


FIG. 80A

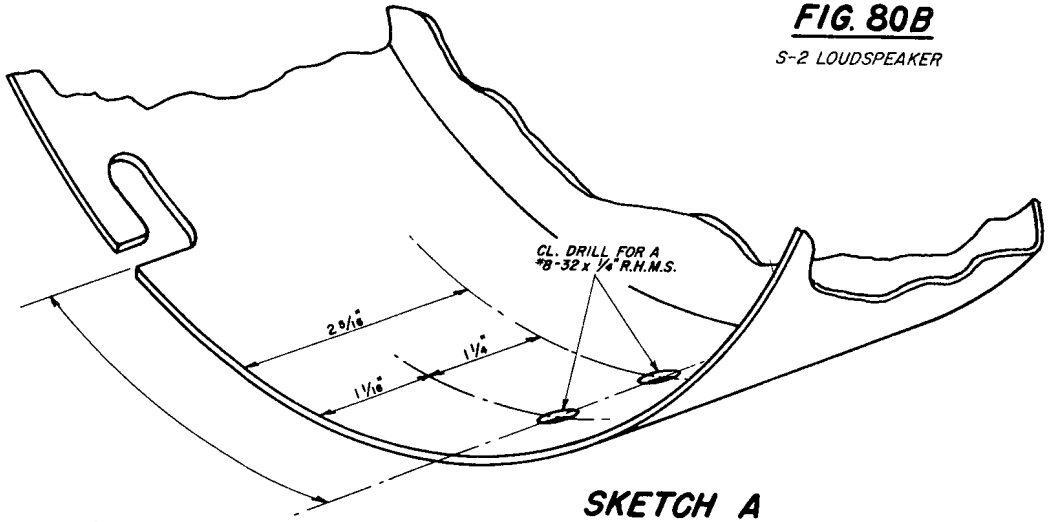
S-2 LOUDSPEAKER

NOTES

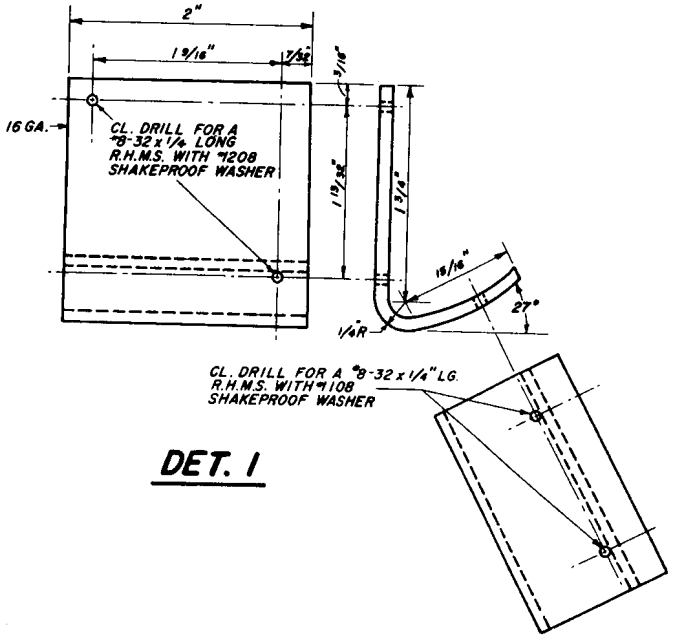
1. LOCKWASHERS USED TO MOUNT TRANSFORMER ON DETAIL 1.
2. FOUR (4) LOCKWASHERS REQ. FOR MOUNTING SPEAKER. TWO (2) LOCKWASHERS REQ. FOR MOUNTING DETAIL 1 TO CASE.
3. FASTEN NAME PLATE ON FRONT OF SPEAKER HOUSING CENTERED ABOVE GRILL OPENING.

FIG. 80B

S-2 LOUDSPEAKER



SKETCH A



DET. 1

REQ.	DET. OR PIECE PART NO.	DESCRIPTION	NOTE	ITEM
1	164 A	BACKBOARD		
1	P-30401	NAME PLATE SIG. ENG. & MFG. CO.		
2	P-29973	MACHINE SCR. R.H. NICK. PLATED 256 x 1/8		
4	P-139469	HEX NUT 10/32		
4	P-182113	BINDING HD. M.SC - 10/32 x 3/4		
3	P-287906	SELF TAPPING SCREWS		
4	P-205651	8-32 x 1/4" LONG R.H.M.S.		
2	1208	SHAKEPROOF LOCK WASHER	1	
6	1108	SHAKEPROOF LOCK WASHER	2	
2	P-206518 164-32	HEX NUT		
1	211-30280	FLOOR FLG. WEBSTER ELEC. CO. TELETALK		
1	P-8814	COUPLING " "		
1	P-8813	ELL " "		
1	211-30229	SCREEN " "		
1	P-8809	NIPPLE " "		
1	P-8811	LOCKNUT " "		
1	P-9456	NIPPLE, CLOSE " "		
1	S-6122-1	REAR COVER ASSEMBLY "		
1	P-6924-3	SPEAKER HOUSING "		
1	P8T	SPEAKER (JENSEN)		
1	KS-12048	TRANSFORMER (W.E. CO.)		
1	DET. 1	BRACKET (W.E. CO.) 16 GA.		

FIG. 81

SIMPLE SYSTEM USING ONE HIGH QUALITY LOW LEVEL MICROPHONE AND ONE HIGH GAIN AMPLIFIER

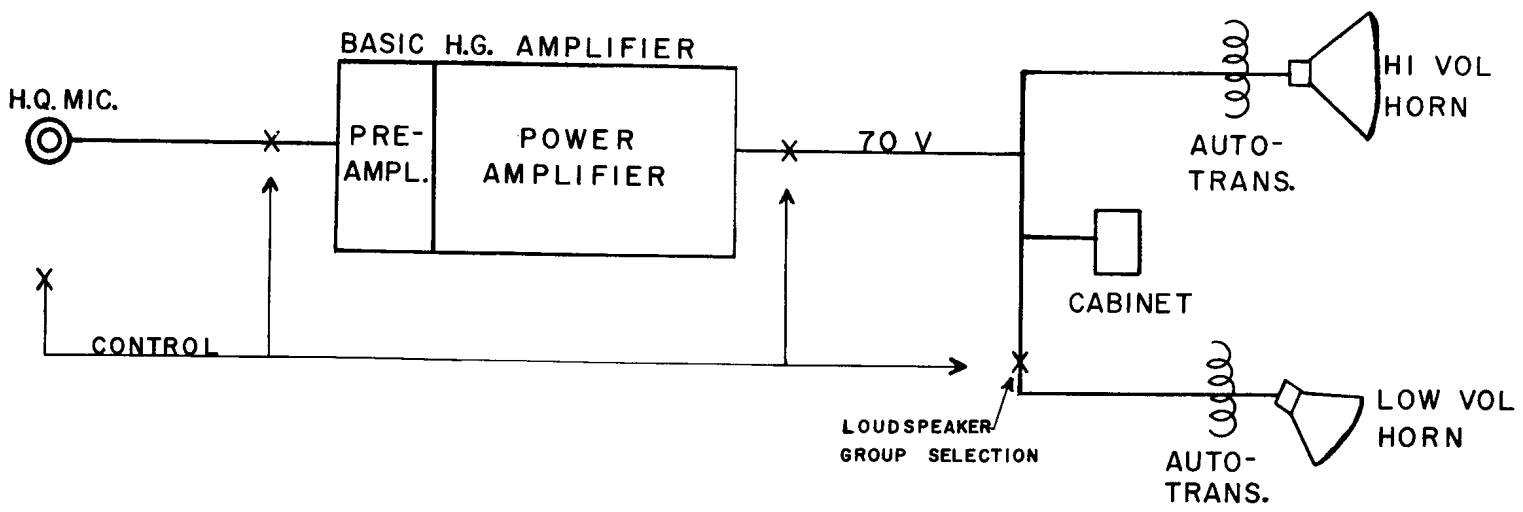
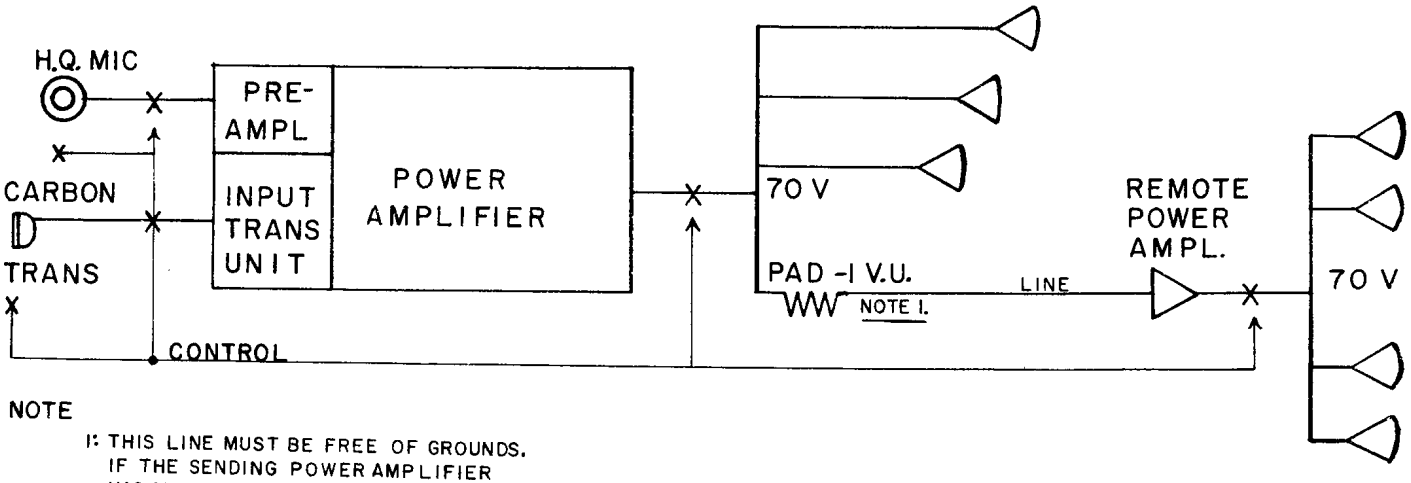


FIG. 82

WITH ALTERNATE HIGH QUALITY MICROPHONE AND CARBON TRANSMITTER—ALSO REMOTE AMPLIFIER AND SPEAKER GROUP



NOTE

1: THIS LINE MUST BE FREE OF GROUNDS. IF THE SENDING POWER AMPLIFIER HAS AN UNBALANCED OUTPUT (E.G. DU KANE TYPE) PLACE A 1:1 REPEATING COIL AT THE PAD OUTPUT.

FIG. 83

WITH MULTIPLE MICROPHONE LOCATIONS, MULTIPLE LOCAL OR REMOTE LOUDSPEAKER GROUPS, AND GROUP SELECTING CONSOLES

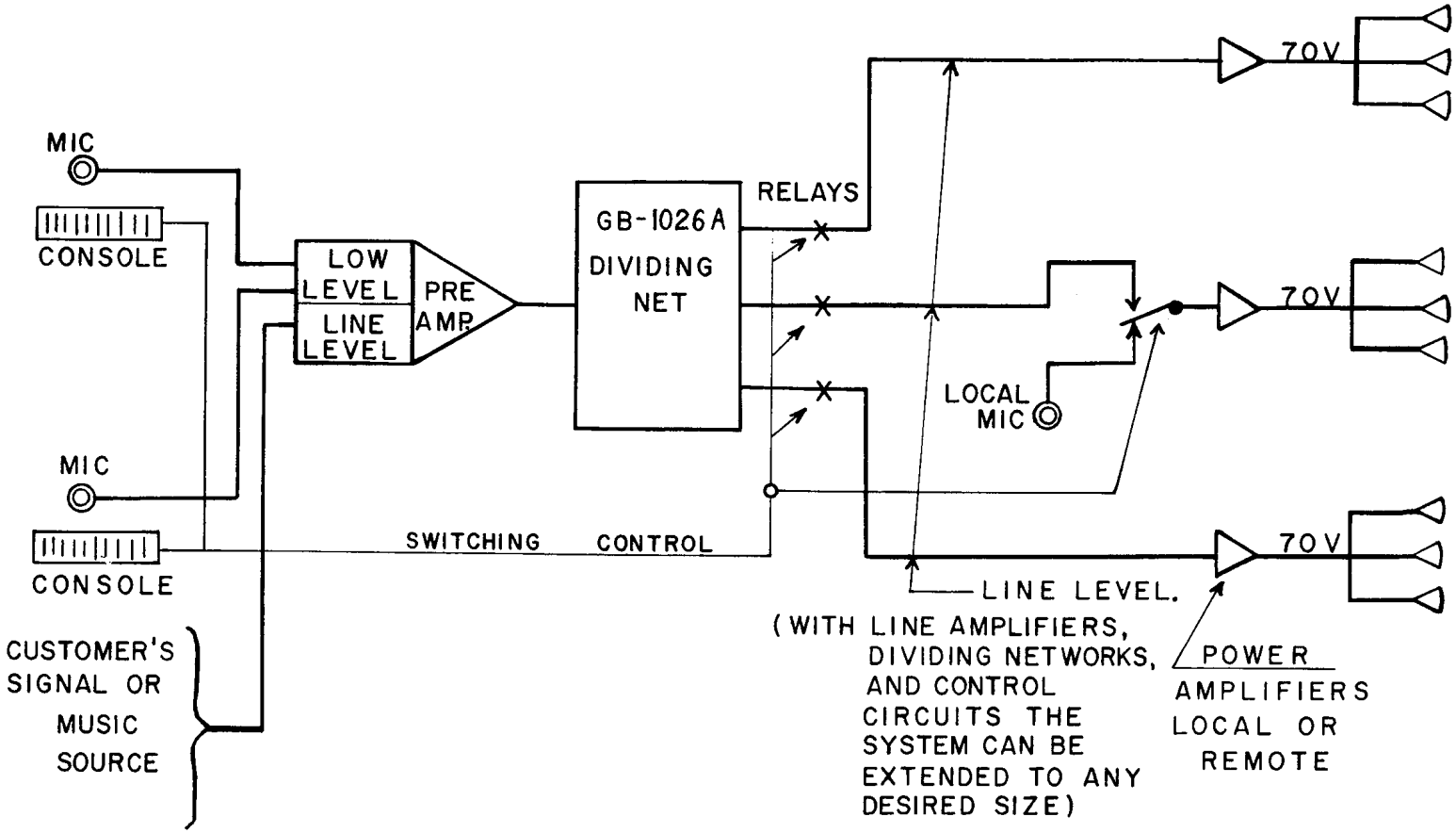
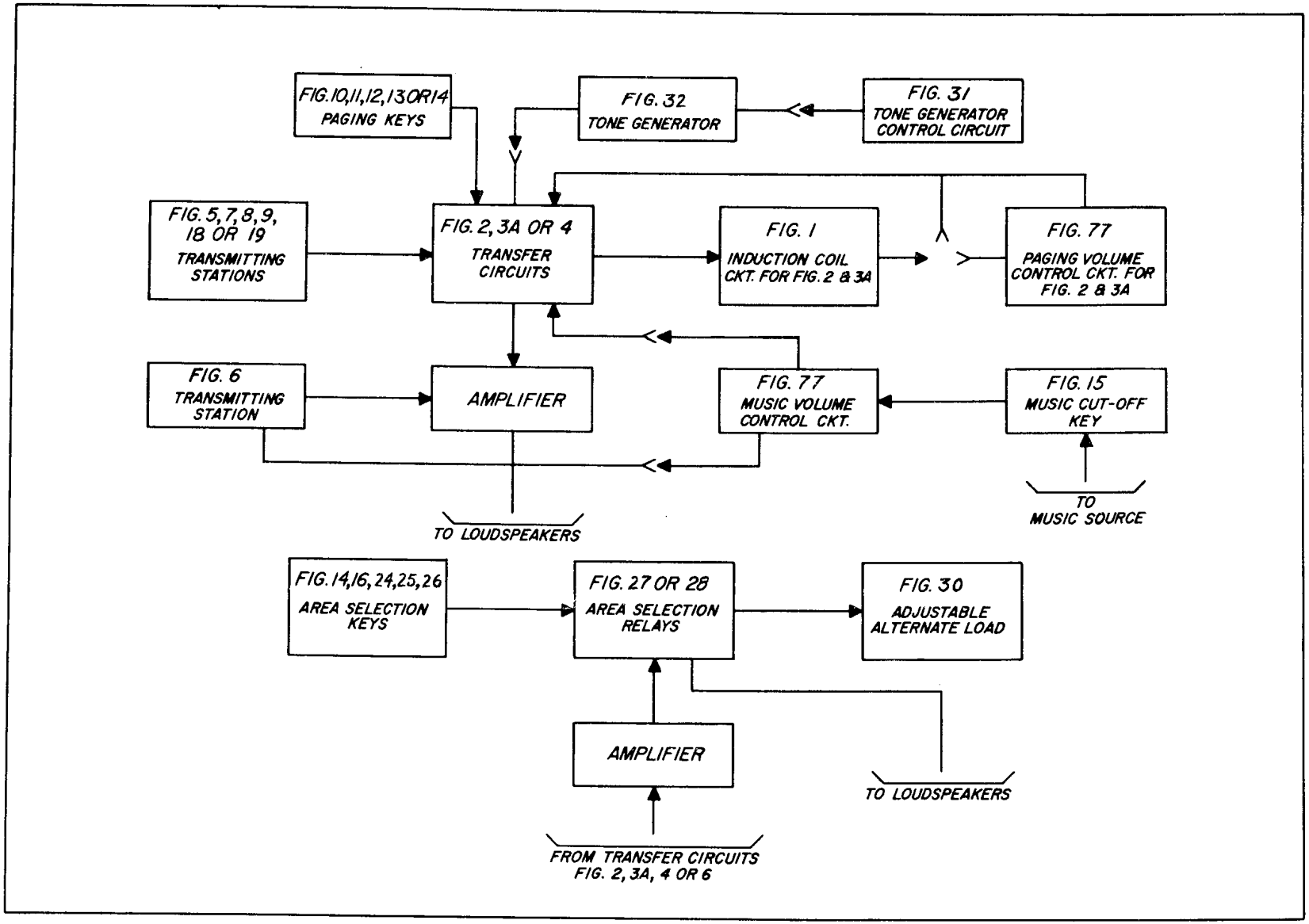


FIG. 84



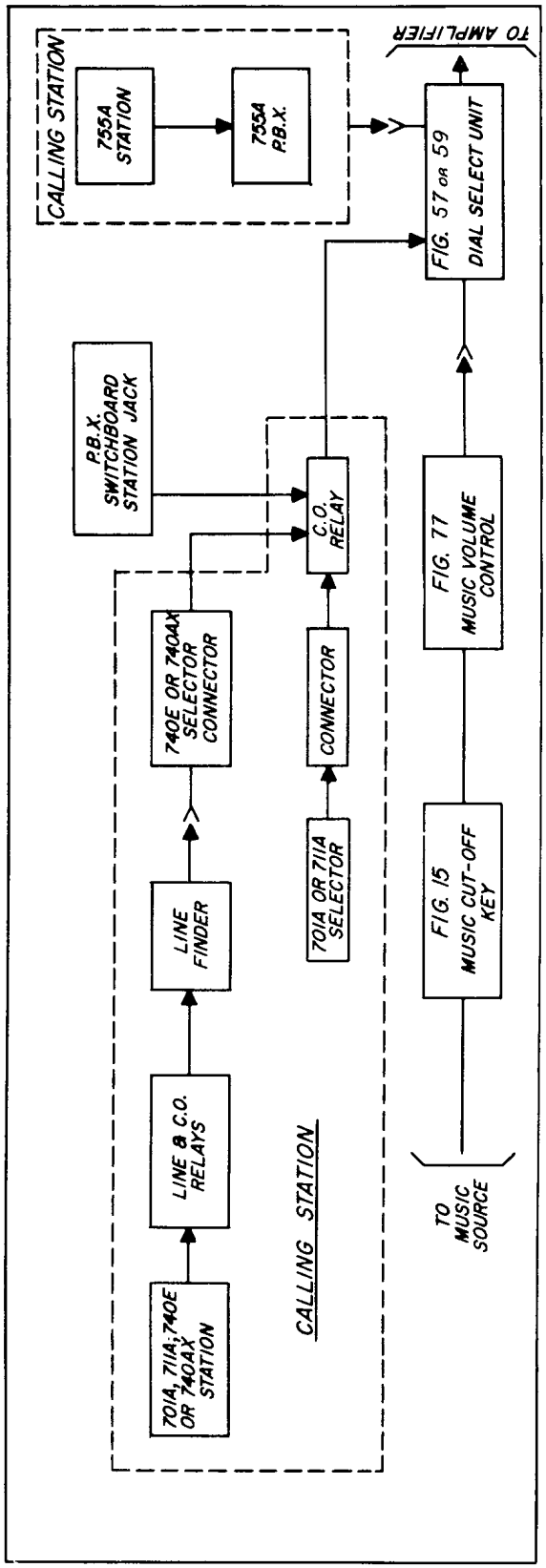
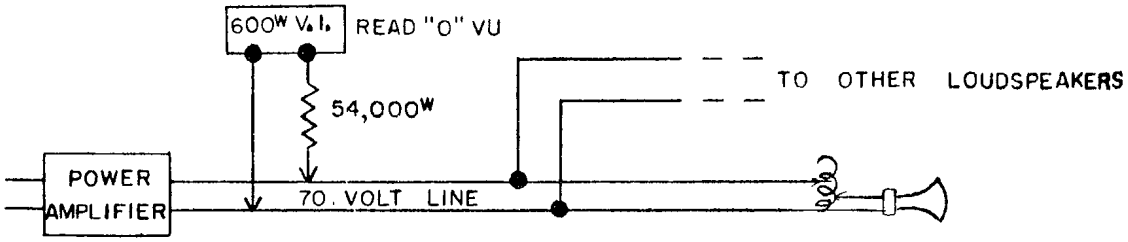


FIG. 85

FIG. 86

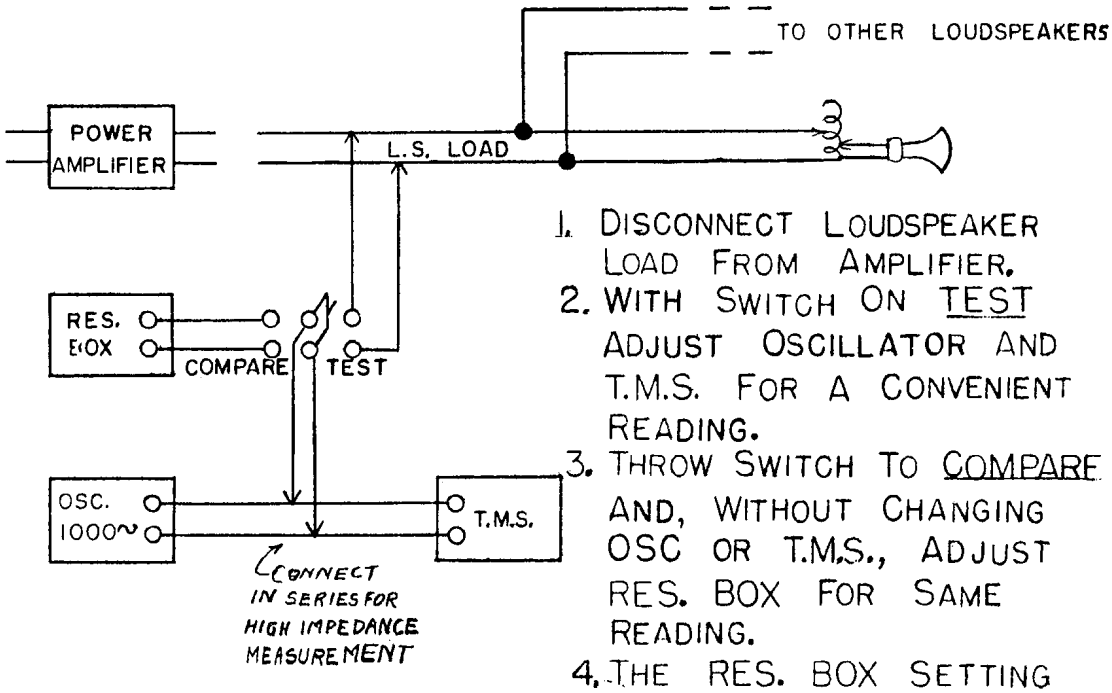
VOLUME MEASUREMENT



CAUTION: DO NOT CONNECT V.I. ACROSS 70 VOLT LINE WITHOUT 54,000 OHM RESISTOR; DO NOT OPERATE V.I. KEY TO HIGH IMPEDANCE.

FIG. 87

IMPEDANCE MEASUREMENT OF LOUDSPEAKER LOAD



1. DISCONNECT LOUDSPEAKER LOAD FROM AMPLIFIER.
2. WITH SWITCH ON TEST ADJUST OSCILLATOR AND T.M.S. FOR A CONVENIENT READING.
3. THROW SWITCH TO COMPARE AND, WITHOUT CHANGING OSC OR T.M.S., ADJUST RES. BOX FOR SAME READING.
4. THE RES. BOX SETTING IS THE APPROXIMATE 1000 CYCLE IMPEDANCE OF THE LOUDSPEAKER LOAD.