

SHEET INDEX

CONTENTS	SHEET NO.	ISSUE NO.																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
SHEET INDEX	A1	1	2	3	4	5	6	7	8																		
SUPPORTING INFORMATION																											
OPTION INDEX																											
FS 1 TRANSMISSION PATH	B1	1	1	1	1	1	1	1	1																		
FS 2 "A" LEAD CONTROL	B2	1	1	1	1	1	1	1	1																		
FS 3 SPEAKERPHONE CONTROLS & POWER SUPPLY	B3	1	1	1	1	1	1	1	1																		
FS 4 RINGER CUTOFF AND AUXILIARY RELAY OPTIONS USING 82A CONNECTING BLOCK	B4	1	1	1	1	1	1	1	1																		
FS 5 RINGER CUTOFF AND AUXILIARY RELAY OPTIONS USING 223A ADAPTER	B5	1	1	1	1	1	1	1	1																		
FS 6 } 680A TYPE TRANSMITTER FS 6A } CIRCUIT	B6	1	2	3	3	3	3	4	4																		
FS 7 108A LOUDSPEAKER SET	B7	1	2	2	2	2	2	2	2																		
FS 6B 680A TRANSMITTER MODIFIED PER X4207/680AR	B8	-	-	3	4	4	4	4	4																		
FS 7B 108A LOUDSPEAKER MODIFIED/108AR	B9	-	-	3	4	4	4	4	4																		
FS 7B 108AR LOUDSPEAKER MODIFIED	B10	-	-	-	-	5	6	7	7																		
FS 6C 680AD TRANSMITTER																											
FS 6D 680AE TRANSMITTER	B11	-	-	-	-	-	-	7	8																		
FS 6E 680AE TRANSMITTER																											
FS 7C 108AA LOUDSPEAKER	B12	-	-	-	-	-	-	7	8																		
APP FIG. 1,2,3	C1	1	2	2	2	2	6	7	7																		
APP FIG. 4,5	C2	-	-	3	3	3	6	7	7																		
APP FIG. 6 AND APP FIG. 10	C3	-	-	-	-	5	6	7	8																		
APP FIG. 7																											
APP FIG. 8	C4	-	-	-	-	-	-	7	8																		
APP FIG. 9																											
CIRCUIT NOTES																											
INFORMATION NOTES	D1	1	2	2	2	2	6	7	8																		
CONNECTIONS USING 82 TYPE CONN. BLOCK	D2	1	2	2	2	2	2	2	2																		
CONNECTIONS USING 223A & 223C ADAPTERS	D3	1	2	2	2	2	2	7	8																		
CAD 1,2	G1	1	1	1	1	1	1	2	2																		
CAD 3	G2	-	-	-	-	-	-	7	7																		
BD1	H1	1	1	1	1	1	1	2	2																		

CONTENTS	SHEET NO.	ISSUE NO.																									

4A SPEAKERPHONE

DWG ISSUE	CD ISSUE	DATE ISSUED	Drawn	APPRO
1	1	11-26-73	ADC	EVK
2B	1	6-9-75	HAE	AB
3D	1	6-9-75	JJC	EVK
4B	1	6-9-75	JJC	AB
5D	1	6-9-75	JJC	EVK
6D	2D	6-9-75	JJC	AB
7D	3D	6-29-77	JJC	AB
8D	3D	8-21-79	JJC	AB

APP OR WRG	LOCATION	1. WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.	2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.	3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.	4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.	5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.
Z	1B4,1C4					
Y	1B4,1C4					
X	4D4,4E4,5C4-5E4, 5C5-5E5					
W	4D4,4E4,5C4-5C5, 5D4,5D5					
V	7C2,7E4,9C2,9D4, 10E4,10E2					
U	7C2,7E3,9C2,9E3, 10E3					
T	10H5,10F6					
S	10H5,10F6					
R	6C1,8C1					
P	6C1,8C1					
N	7F6,9F6,10F6					
M	7F2,9F2,10F2					
L	11E1					
K	11E1					

NOTICE
NOT FOR USE OR DISCLOSURE
OUTSIDE THE BELL SYSTEM
EXCEPT UNDER WRITTEN AGREEMENT

STATION SYSTEMS
SPEAKERPHONE SYSTEM NO. 4A
TELEPHONE AND SPEAKERPHONE CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

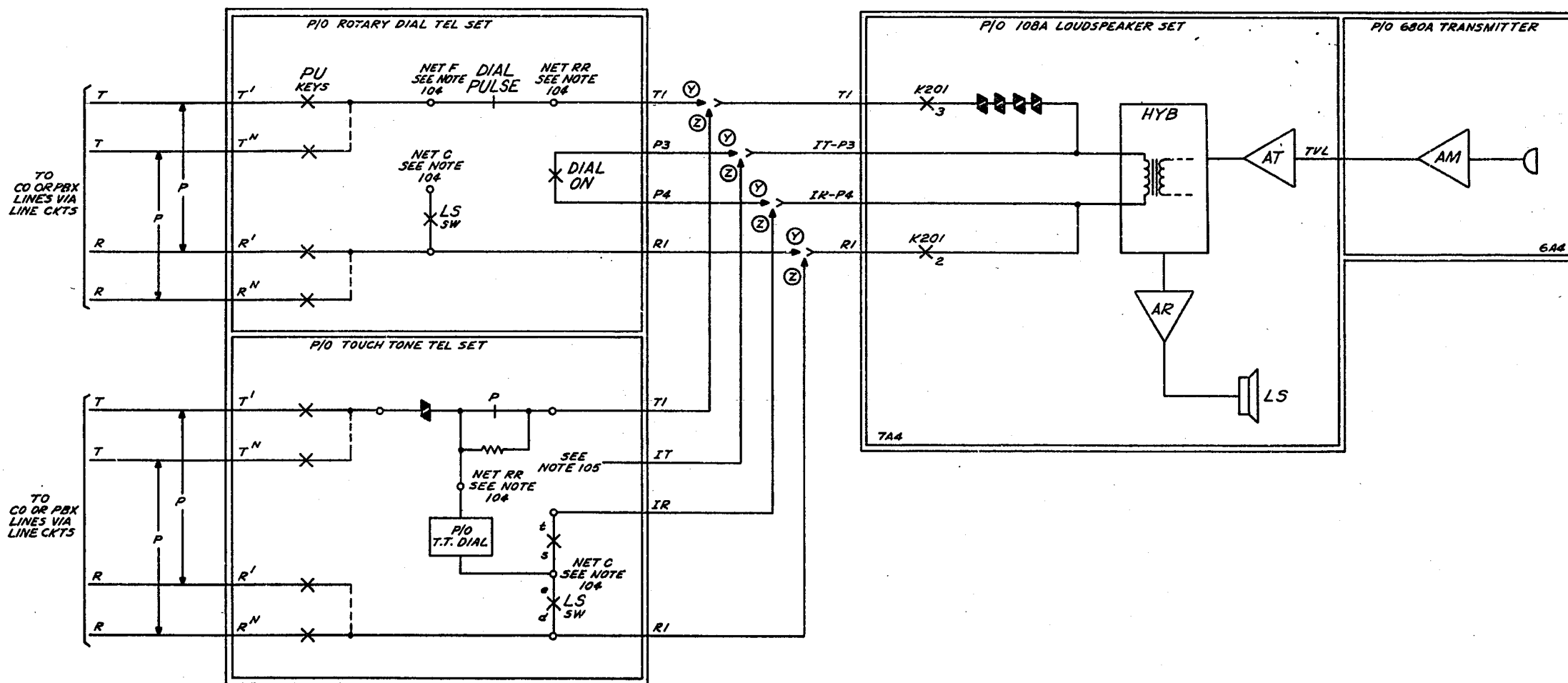
AT&T CO
STANDARD

SD-69909-01-A1
23 SHEETS

65

SD-69909-01-A1

FSI
TRANSMISSION PATH



TO CO OR PBX LINES VIA LINE CKTS

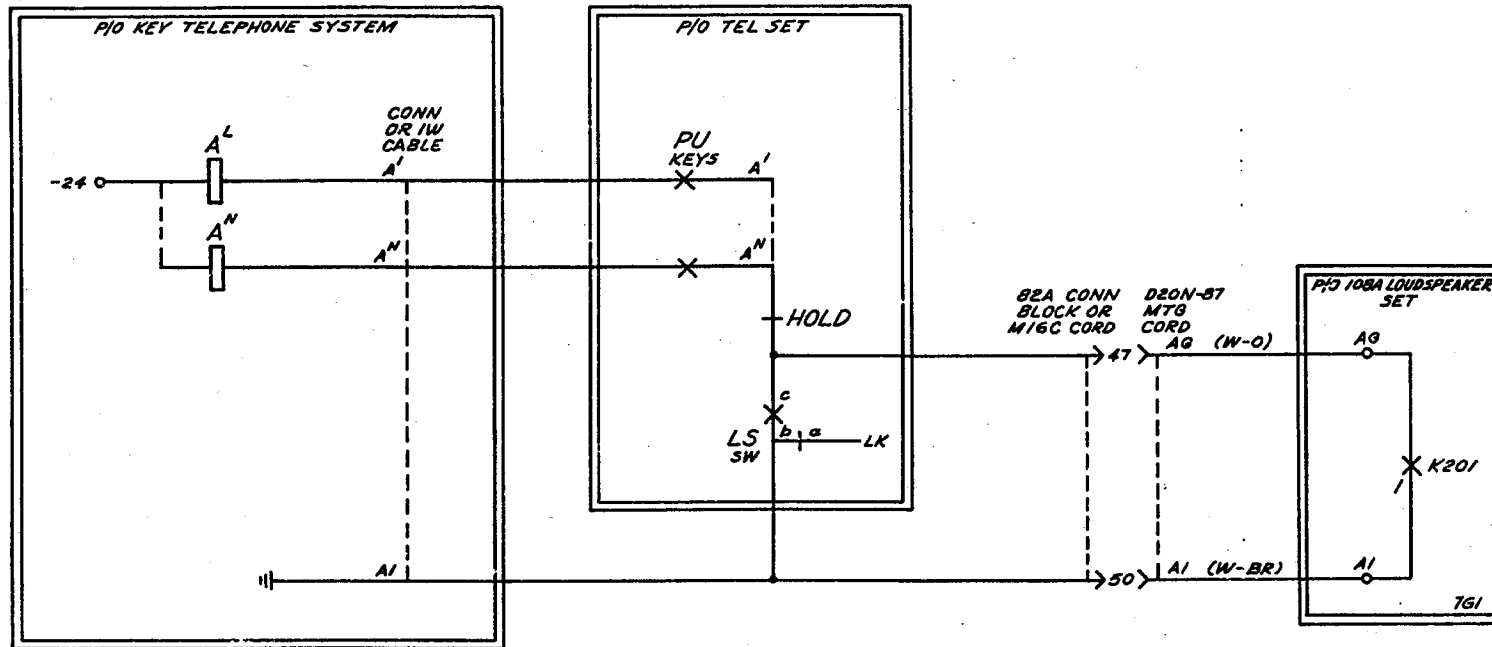
TO CO OR PBX LINES VIA LINE CKTS

SD-69909-01-B1

SPEAKERPHONE SYSTEM NO. 4A	
BELL TELEPHONE LABORATORIES INCORPORATED	6S
SD-69909-01-B1	

0 1 2 3 4 5 6 7 8 9

FS2 "A" LEAD CONTROL



SD-69909-01-B2

SPEAKERPHONE SYSTEM NO. 4A

BELL TELEPHONE LABORATORIES
INCORPORATED

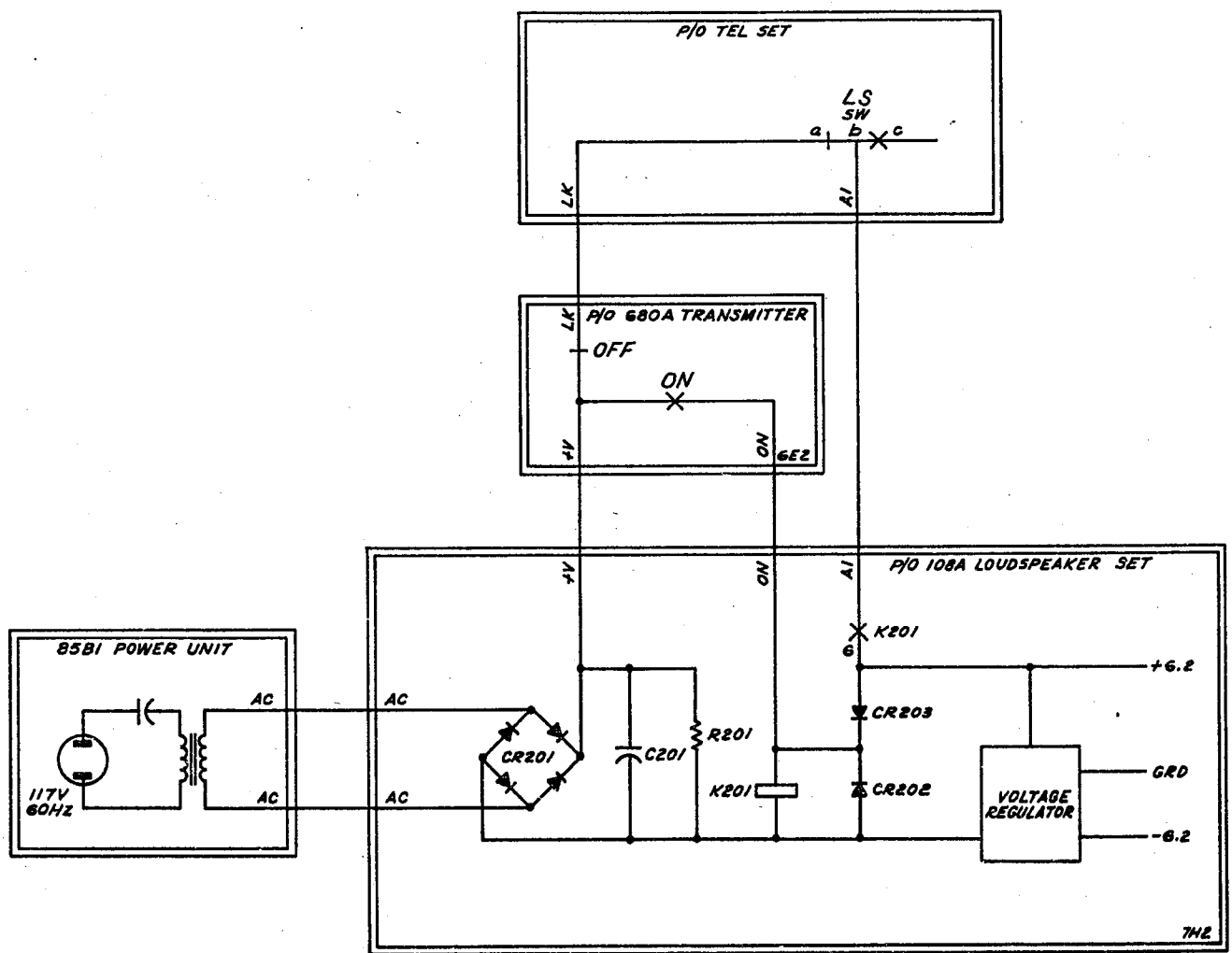
SD-69909-01-B2

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MADE IN U.S.A.

0 1 2 3 4 5 6 7 8 9

FS3
SPEAKERPHONE CONTROLS & POWER SUPPLY

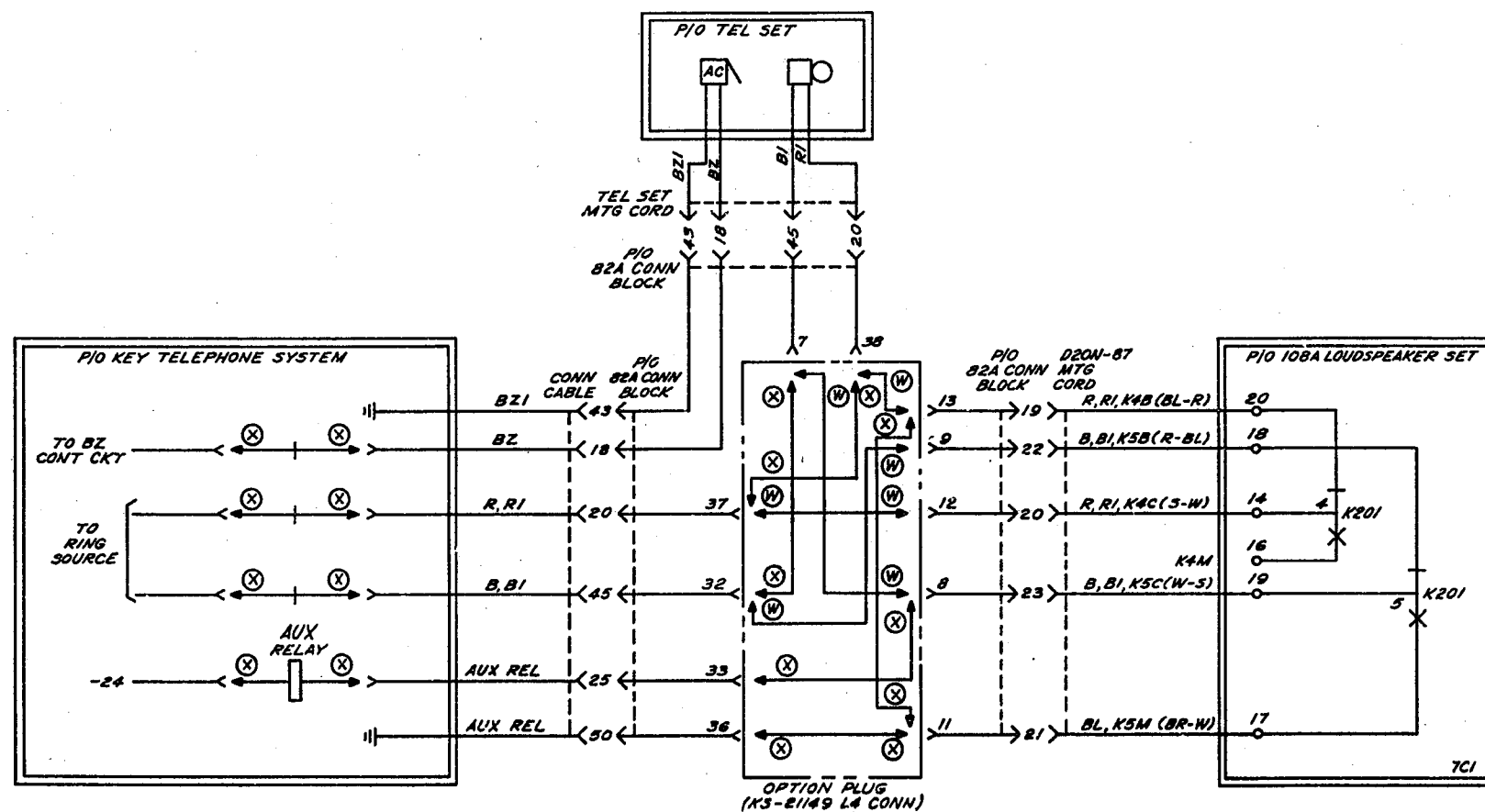


SD-69909-01-B3

SPEAKERPHONE SYSTEM NO. 4A	SD-69909-01-B3
BELL TELEPHONE LABORATORIES INCORPORATED	6S

7

FS 4
 RINGER CUTOFF AND AUXILIARY RELAY OPTIONS
 USING 82A CONNECTING BLOCK
 (SEE NOTE 1)



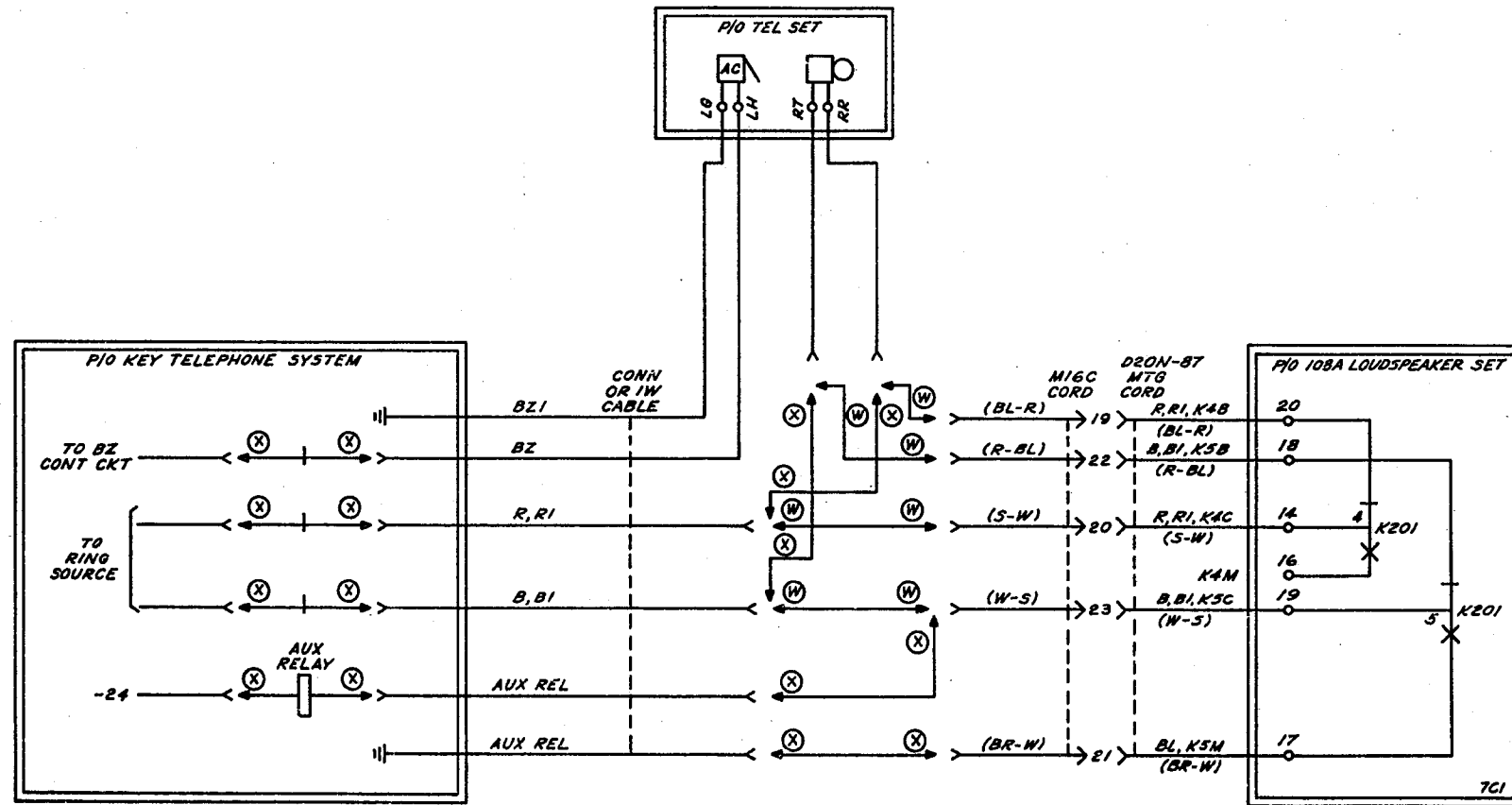
NOTES:

1. THE DESIRED OPTION IS SELECTED BY POSITION OF THE OPTION PLUG IN THE 82A CONNECTING BLOCK. IF NO AUDIBLE SIGNAL CUTOFF IS DESIRED, THE AUX RELAY OPTION IS CHOSEN, HOWEVER NO RELAY IS PROVIDED.

SD-69909-01-B4

SPEAKERPHONE SYSTEM NO. 4A		SD-69909-01-B4
BELL TELEPHONE LABORATORIES INCORPORATED		
65	65	

FS5
 RINGER CUTOFF AND AUXILIARY RELAY OPTIONS
 USING 223A ADAPTER
 (SEE NOTE 1)



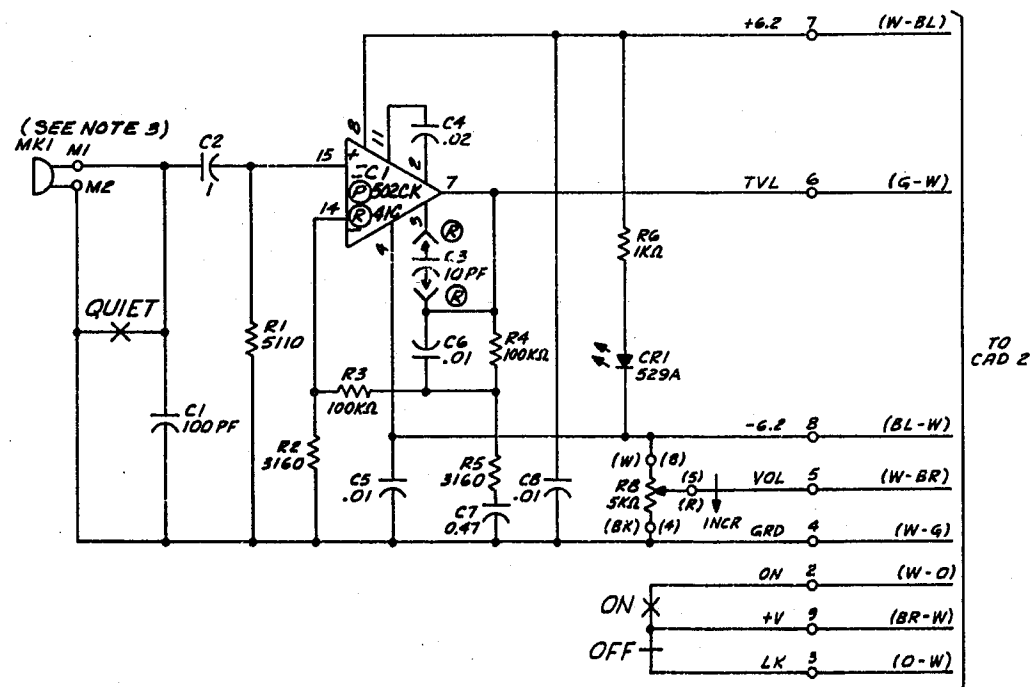
NOTES:

1. OPTIONS ARE WIRED BY PROPER LOCATION OF SPADE TIPS OF M16C CORD. THESE CONNECTIONS MAY BE MADE EITHER (1) INSIDE THE TEL SET OR (2) AT THE CONN BLOCK

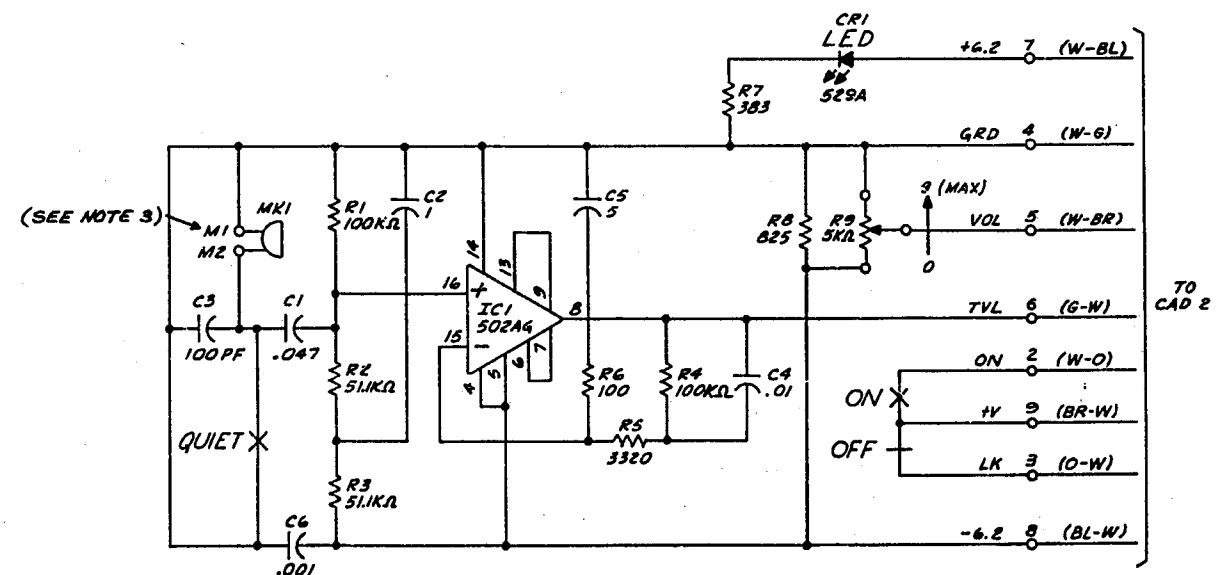
SD-69909-01-B5

SPEAKERPHONE SYSTEM NO. 4A	
BELL TELEPHONE LABORATORIES INCORPORATED	6S
SD-69909-01-B5	

FS 6
680A TYPE TRANSMITTER CKT
(APP FIG 1)
(SEE NOTES 1 & 3)



FS 6A
680A TYPE TRANSMITTER CKT
(APP FIG 3)
(SEE NOTES 1, 2 & 3)



SHEET NOTES:

1. TRANSMITTERS HAVING DATE OF MANUFACTURE STAMPING OF 8-73 ARE FURNISHED WITH CIRCUIT PER
2. THE 502AG INTEGRATED CIRCUIT PACK FURNISHED WERE SELECTED TO MEET THE NOISE REQUIREMENTS OF THE 502BS INTEGRATED CIRCUIT PACK.
3. TERMINAL DESIGNATIONS M1, M2 & 2 THRU 9 ARE SOLDER CONNECTIONS TO LAND AREAS OF THE PRINTED WIRING BOARD.

SD-69909-01-B6

3D

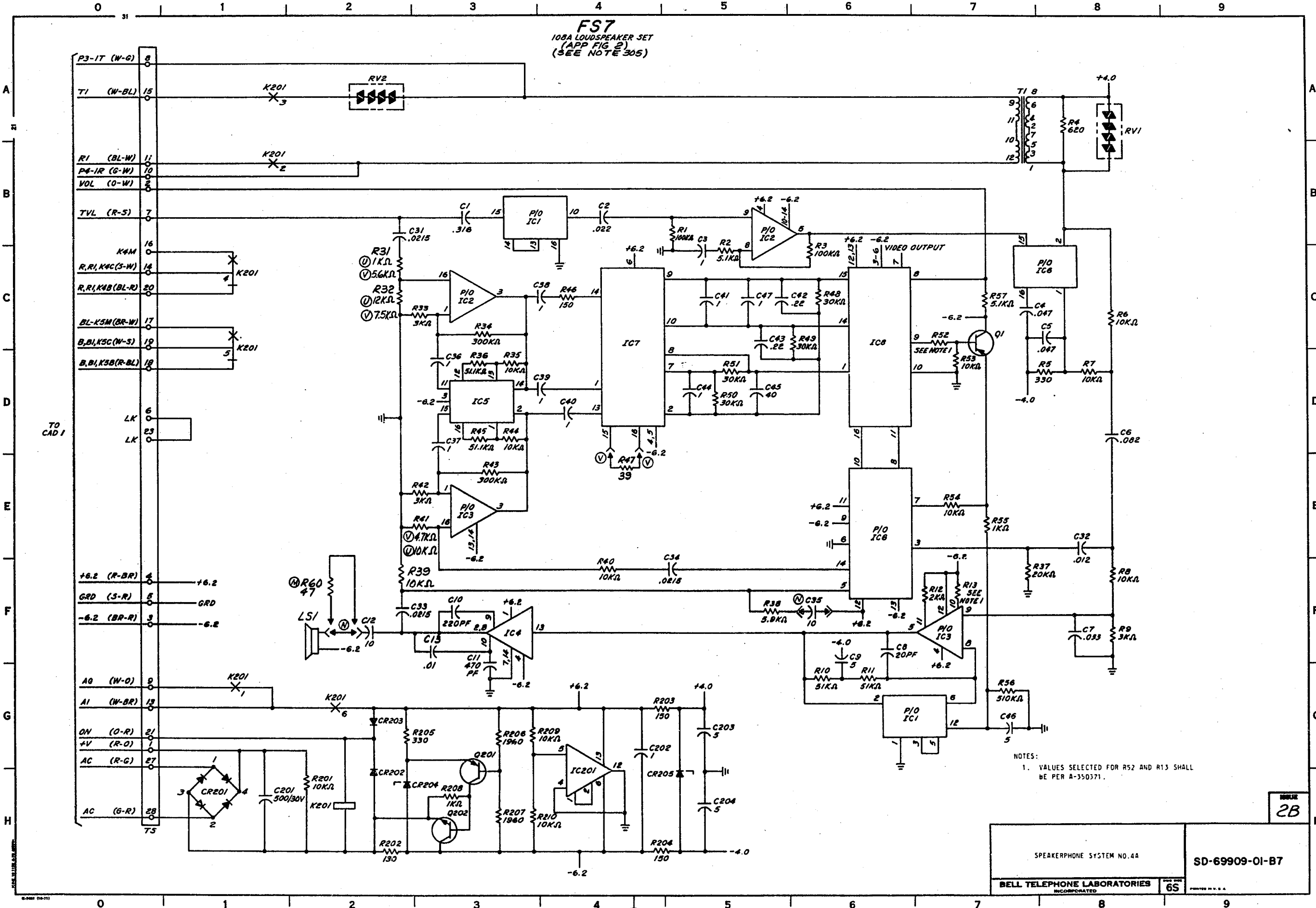
SPEAKERPHONE SYSTEM NO.4A

SD-69909-01-B6

BELL TELEPHONE LABORATORIES
INCORPORATED

65

FS7
108A LOUDSPEAKER SET
(APP FIG 2)
(SEE NOTE 305)



NOTES:
1. VALUES SELECTED FOR R52 AND R13 SHALL BE PER A-350371.

TABLE
2B

SD-69909-01-B7

0 1 2 3 4 5 6 7 8 9

A A

B B

C C

D D

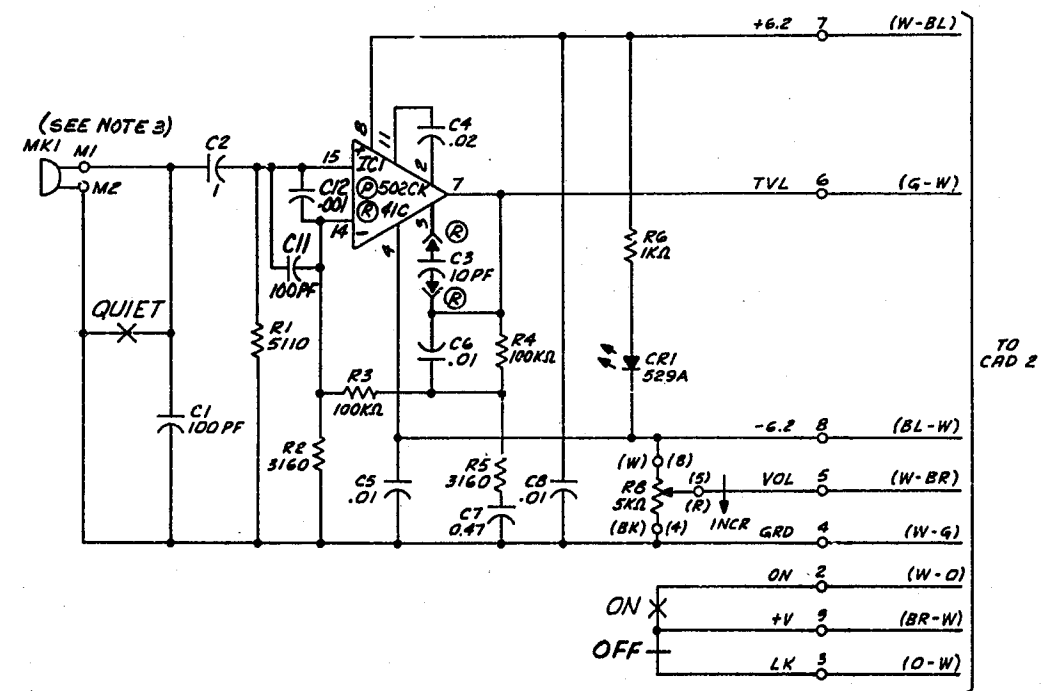
E E

F F

G G

H H

FS 6B
 680A TYPE TRANSMITTER CKT
 MODIFIED PER SPEC. X4207
 AND
 680AR TYPE TRANSMITTER CKT
 (APP FIG. 4)
 (SEE NOTES 1, 2 AND 3)



SHEET NOTES:

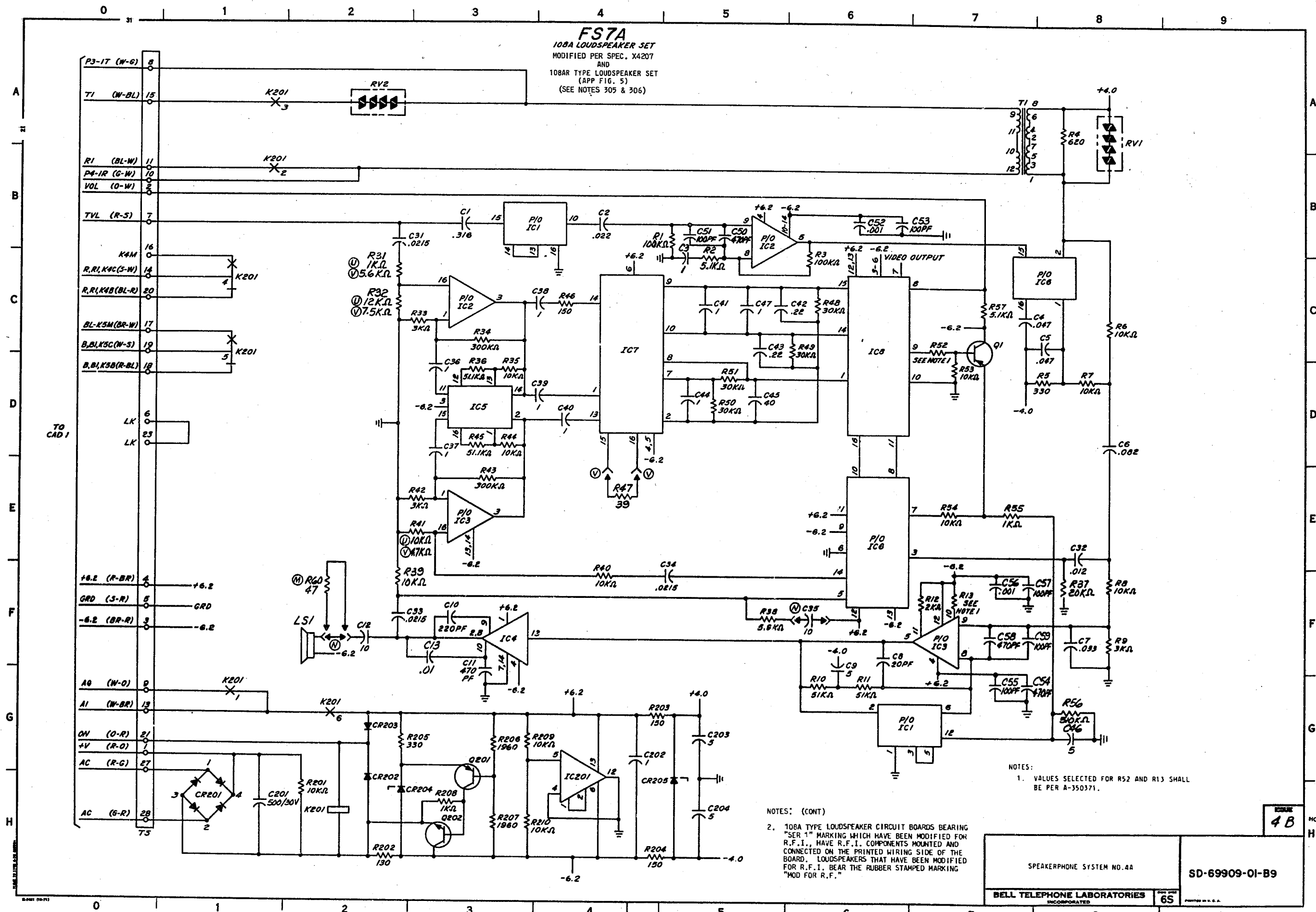
1. 680A TYPE TRANSMITTERS BEARING DATE OF MANUFACTURE STAMPING 8-73 SHALL NOT BE MODIFIED.
2. 680A TYPE TRANSMITTER CIRCUIT BOARDS BEARING "SER 1" MARKING WHICH HAVE BEEN MODIFIED FOR R.F.I., HAVE R.F.I. COMPONENTS MOUNTED AND CONNECTED ON THE PRINTED WIRING SIDE OF THE BOARD. TRANSMITTERS THAT HAVE BEEN MODIFIED FOR R.F.I. BEAR THE RUBBER STAMPED MARKING "MOD FOR R.F."
3. TERMINAL DESIGNATIONS M1, M2, AND 2 THRU 9 ARE SOLDER CONNECTIONS TO LAND AREAS OF THE PRINTED WIRING BOARD.

SD-69909-01-B8

4B

SPEAKERPHONE SYSTEM NO. 4A		SD-69909-01-B8
BELL TELEPHONE LABORATORIES INCORPORATED		
6S		PRINTED IN U.S.A.

0 1 2 3 4 5 6 7 8 9



FS7A
 108A LOUDSPEAKER SET
 MODIFIED PER SPEC. X4207
 AND
 108AR TYPE LOUDSPEAKER SET
 (APP FIG. 5)
 (SEE NOTES 305 & 306)

NOTES:
 1. VALUES SELECTED FOR R52 AND R13 SHALL BE PER A-350371.

NOTES: (CONT)
 2. 108A TYPE LOUDSPEAKER CIRCUIT BOARDS BEARING "SER 1" MARKING WHICH HAVE BEEN MODIFIED FOR R.F.I., HAVE R.F.I. COMPONENTS MOUNTED AND CONNECTED ON THE PRINTED WIRING SIDE OF THE BOARD. LOUDSPEAKERS THAT HAVE BEEN MODIFIED FOR R.F.I. BEAR THE RUBBER STAMPED MARKING "MOD FOR R.F."

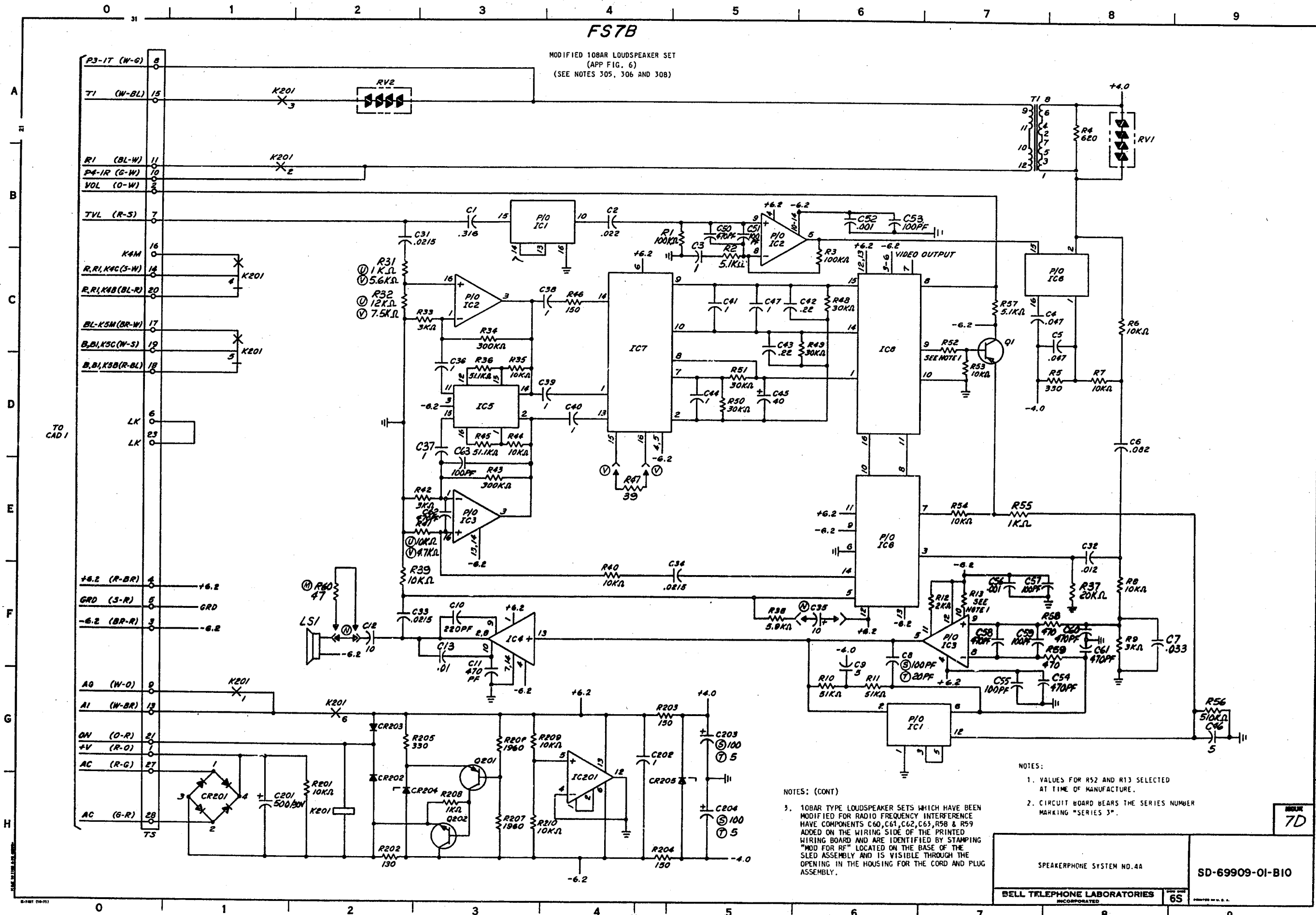
SPEAKERPHONE SYSTEM NO. 4A		SD-69909-01-B9
BELL TELEPHONE LABORATORIES INCORPORATED		

SD-69909-01-B9

4B

FS7B

MODIFIED 10BAR LOUDSPEAKER SET
(APP FIG. 6)
(SEE NOTES 305, 306 AND 308)



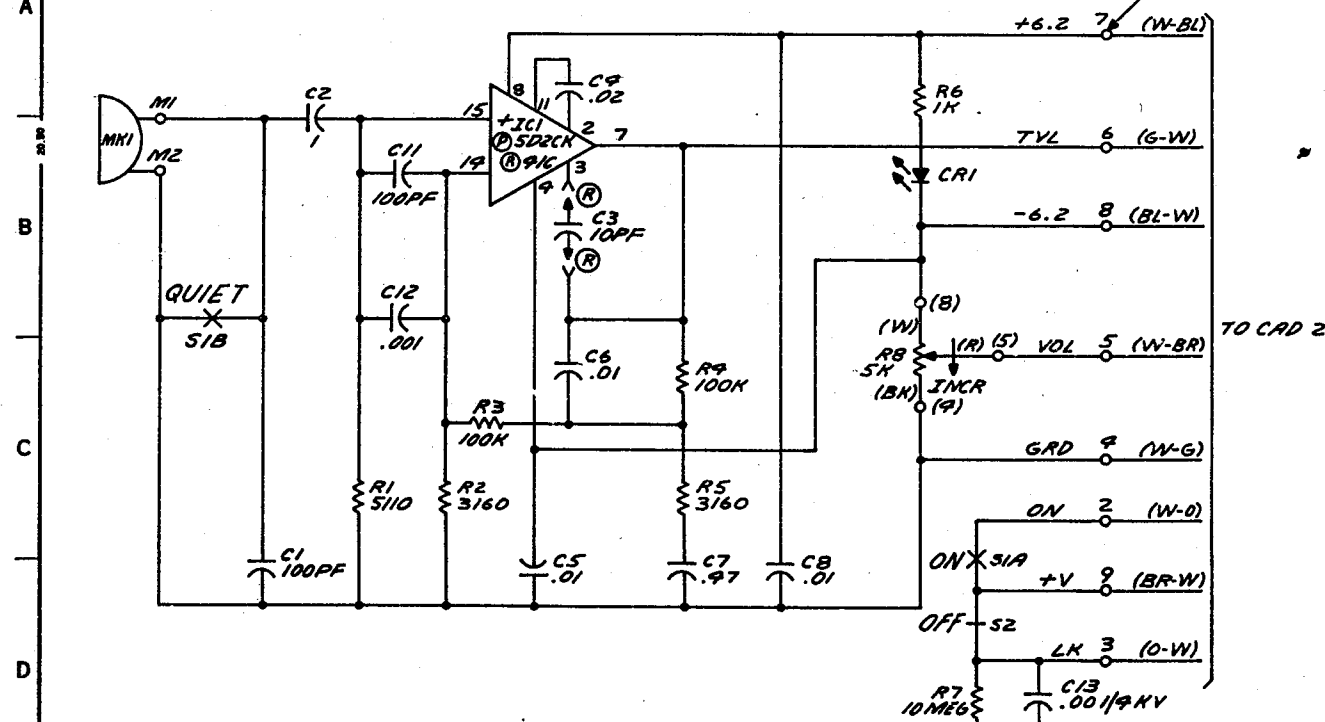
- NOTES:
- VALUES FOR R52 AND R13 SELECTED AT TIME OF MANUFACTURE.
 - CIRCUIT BOARD BEARS THE SERIES NUMBER MARKING "SERIES 3".

NOTES: (CONT)

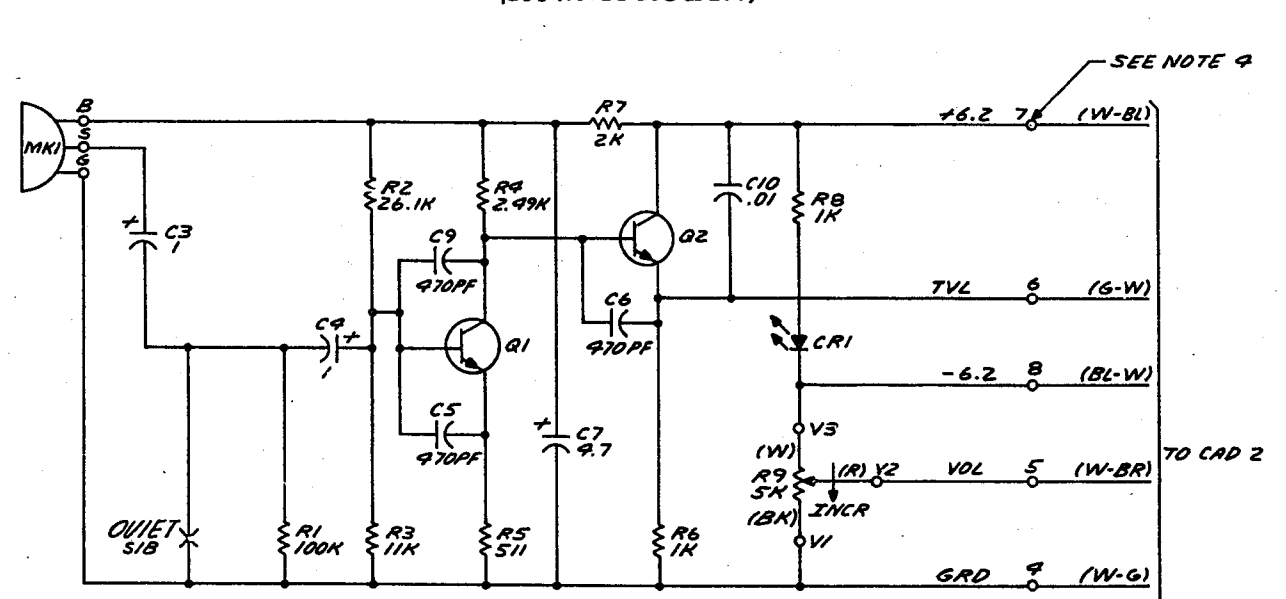
- 10BAR TYPE LOUDSPEAKER SETS WHICH HAVE BEEN MODIFIED FOR RADIO FREQUENCY INTERFERENCE HAVE COMPONENTS C60, C61, C62, C63, R58 & R59 ADDED ON THE WIRING SIDE OF THE PRINTED WIRING BOARD AND ARE IDENTIFIED BY STAMPING "MOD FOR RF" LOCATED ON THE BASE OF THE SLED ASSEMBLY AND IS VISIBLE THROUGH THE OPENING IN THE HOUSING FOR THE CORD AND PLUG ASSEMBLY.

SPEAKERPHONE SYSTEM NO.4A		7D
BELL TELEPHONE LABORATORIES INCORPORATED		
SD-69909-01-B10		65

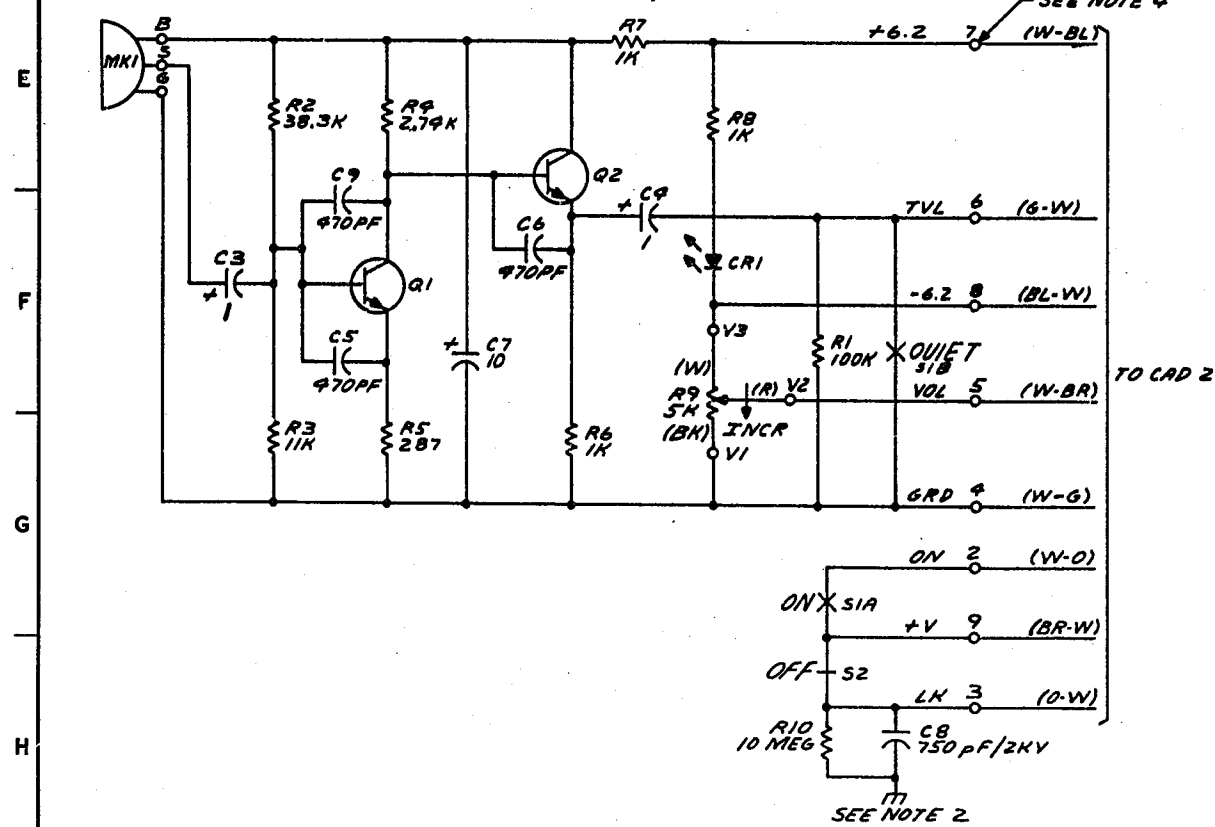
FS 6C
680AD TRANSMITTER CKT
(APP FIG. 7)
(SEE NOTE 309)



FS 6D
680AE TRANSMITTER CKT
(APP FIG. 8)
(SEE NOTES 308 & 309)



FS 6E
680AE TRANSMITTER CKT
(APP FIG. 10)
(SEE NOTES 308 & 309)



NOTES:

1. TERMINAL DESIGNATIONS M1, M2, AND 2 THRU 9 ARE SOLDER CONNECTIONS TO LAND AREAS OF THE PRINTED WIRE BOARD.
2. SYMBOL Δ DESIGNATES CONNECTION TO METALLIC CHASSIS.
3. ON SOME EARLY PRODUCTION UNITS, AND ON 680AD TRANSMITTERS CONVERTED FROM 680A AND 680AR TRANSMITTERS USING D180703 KIT OF PARTS, R9 AND C13 IS A NETWORK LOCATED IN THE BASE OF THE PEDESTAL AND CONNECTED TO THE PRINTED WIRING BOARD BY MEANS OF A LEAD.
4. TERMINAL DESIGNATIONS B, S, G AND 2 THRU 9 ARE SOLDER CONNECTIONS TO LAND AREAS ON THE PRINTED WIRING BOARD.

SPEAKERPHONE SYSTEM NO. 4A		DWG SIZE	ISSUE
		65	8DI
BELL LABORATORIES	SD-69909-01	-B11	

APP FIG. 1

CAPACITOR		
DESIG	LOC	CODE
C1	6D0	KS-19774, L2, .100PF
C2	6C1	KS-19107, L4, .47
C3	6C2	KS-19774, L2, .10PF
C4	6C2	KS-19774, L6, .02
C5	6E1	KS-19774, L2, .01
C6	6D2	KS-19774, L2, .01
C7	6E2	KS-20736, L1, .47
C8	6E2	KS-19774, L2, .01

DIODE		
DESIG	LOC	CODE
CRI	6D2	529A (NOTE 2)

INTEGRATED CIRCUIT		
DESIG	LOC	CODE
IC1	6C1	502CK
IC1	6C1	41C

POTENTIOMETER		
DESIG	LOC	CODE
R8	6E2	840169361, .5K

RESISTOR		
DESIG	LOC	CODE
R1	6D1	257A, 5110
R2	6E1	257A, 3160
R3	6D1	257A, 100K
R4	6D2	257A, 100K
R5	6E2	257A, 3160
R6	6C2	257A, 1K

SWITCH		
DESIG	LOC	CODE
OFF	6E2	
ON	6E2	
QUIET	6D0	

TRANSMITTER		
DESIG	LOC	CODE
MK1	6C0	AF1

RELAY		
DESIG	LOC	CODE
K201		
M85		
OPTION		
CONT	LOC	
ARR		
6	EMB	7G2
5	EBM	7C1
4	EBM	7C1
3	EBM	7B1
2	EBM	7B1
1	EMB	7G1
COTL		7HZ

CAPACITOR		
DESIG	LOC	CODE
C1	7B3	702H, .316
C2	7B4	KS-20736, L4, .022
C3	7C5	542H, 1
C4	7C7	KS-20300, L3, .047
C5	7C8	KS-20300, L3, .047
C6	7D8	KS-20300, L2, .082
C7	7F8	KS-20300, L2, .033
C8	7F6	KS-13477, L8, 20PF
C9	7F6	600B, 5
C10	7F3	KS-19774, L2, 220PF
C11	7F3	KS-19774, L2, 470PF
C12	7F2	601B, 10
C13	7F3	KS-19774, L2, .01 (SEE NOTE 3)
C31	7B2	542AA, .0215
C32	7E8	542T, .012
C33	7F2	542AA, .0215
C34	7F5	542AA, .0215
C35	7F6	601B, 10
C36	7D3	KS-19107, L4, 1
C37	7D3	702H, 1
C38	7C4	600A, 1
C39	7D4	600A, 1
C40	7D4	600A, 1
C41	7C5	KS-19107, L4, 1
C42	7C5	542B, .22
C43	7C5	542B, .22
C44	7D5	600A, 1
C45	7D5	602A, 40
C46	7G7	600B, 5

CONNECTOR		
DESIG	LOC	CODE
2C5, 4C5, 5C5		D20M-87 MFG CORD
2C4, 4C3, 4C5		82A CONN BLOCK
2C4, 5C5		H16C CORD
C47	7C5	KS-19107, L4, 1
C201	7H1	KS-19658, L16, 500
C202	7G5	600A, 1
C203	7G5	600B, 5
C204	7H5	600B, 5

CONNECTOR		
DESIG	LOC	CODE
2C5, 4C5, 5C5		D20M-87 MFG CORD
2C4, 4C3, 4C5		82A CONN BLOCK
2C4, 5C5		H16C CORD

DIODE		
DESIG	LOC	CODE
CR201	7H1	491A
CR202	7H3	446F
CR203	7G2	446F
CR204	7H2	459C
CR205	7H5	459E

APP FIG. 2

INTEGRATED CIRCUITS		
DESIG	LOC	CODE
IC1	7B3, 7G6	502L
IC2	7B5, 7C3	502H
IC3	7E3, 7F7	502H
IC4	7F3	535C
IC5	7D3	502H
IC6	7C8, 7E6	502H
IC7	7C4	502K
IC8	7C6	502J (SEE NOTE 305)
IC201	7F4	502B

LOUDSPEAKER		
DESIG	LOC	CODE
LS1	7F2	KS-20958, L1

RESISTOR		
DESIG	LOC	CODE
R1	7B5	KS-16645, L1, 100K
R2	7C5	KS-16645, L1, 5.1K
R3	7C6	KS-16645, L1, 100K
R4	7A8	KS-16645, L1, 620
R5	7D8	KS-16645, L1, 330
R6	7C8	KS-16645, L1, 10K
R7	7D8	KS-16645, L1, 10K
R8	7F8	KS-16645, L1, 10K

R9	7F8	KS-16645, L1, 3K
R10	7G6	KS-16645, L1, 51K
R11	7G6	KS-16645, L1, 51K
R12	7F7	KS-16645, L1, 2K
R13	7F7	257A, SEE NOTE 1
R31	7C2	KS-16645, L1, 1K
R32	7C2	KS-16645, L1, 5.6K
R33	7C2	KS-16645, L1, 12K
R34	7C3	KS-16645, L1, 7.9K
R35	7C3	KS-16645, L1, 3K
R36	7C3	KS-16645, L1, 300K
R37	7D3	257A, 10K
R38	7F7	257A, 5.9K
R39	7F5	KS-16645, L1, 20K
R40	7F4	KS-16645, L1, 10K
R41	7E3	KS-16645, L1, 10K
R42	7E3	KS-16645, L1, 4.7K
R43	7E3	KS-16645, L1, 3K
R44	7D3	257A, 10K
R45	7D3	257A, 51.1K

R46	7C4	KS-16645, L1, 150
R47	7E4	KS-16645, L1, 39
R48	7C6	KS-16645, L1, 30K
R49	7C6	KS-16645, L1, 30K

R50	7D5	KS-16645, L1, 30K
R51	7D5	KS-16645, L1, 30K
R52	7C7	257A, SEE NOTE 1
R53	7D7	KS-16645, L1, 10K

R54	7E7	KS-16645, L1, 10K
R55	7E7	KS-16645, L1, 1K
R56	7G7	KS-16645, L1, 510K
R57	7C7	KS-16645, L1, 5.1K
R60	7F2	KS-16645, L1, 47
R201	7H2	KS-16645, L1, 10K
R202	7H2	KS-13492, L1, 130
R203	7G5	KS-16645, L1, 150
R204	7H5	KS-16645, L1, 150

R205	7G2	KS-16645, L1, 330
R206	7G3	257A, 1960
R207	7H3	257A, 1960
R208	7H3	KS-16645, L1, 1K

R209	7G3	257A, 10K
R210	7H3	257A, 10K

TRANSFORMER		
DESIG	LOC	CODE
T1	7A7	2663G

TRANSISTOR		
DESIG	LOC	CODE
Q1	7C7	51A
Q201	7G3	51A
Q202	7H3	24D

VARISTOR		
DESIG	LOC	CODE
RV1	7A8	106A
RV2	7A2	106A

APP FIG. 3

CAPACITOR		
DESIG	LOC	CODE
C1	6D5	KS-19107, L1, .047
C2	6C6	600A, 1
C3	6D5	KS-19774, L2, .100PF
C4	6D7	KS-19774, L1, .01
C5	6C6	600B, 5
C6	6E5	KS-19774, L2, .001

DIODE		
DESIG	LOC	CODE
CRI	6B7	529A

INTEGRATED CIRCUIT		
DESIG	LOC	CODE
IC1	6D6	502AG

POTENTIOMETER		
DESIG	LOC	CODE
R9	6C7	840169361, 5K

RESISTOR		
DESIG	LOC	CODE
R1	6C5	257A, 100K
R2	6D5	257A, 51.1K
R3	6E5	257A, 51.1K
R4	6D7	257A, 100K
R5	6D7	257A, 3320
R6	6D6	257A, 100
R7	6C7	257A, 383
R8	6C7	257A, 825

TRANSMITTER		
DESIG	LOC	CODE
MK1	6C5	AF1

- NOTES:
- VALUES FOR R52 AND R13 SELECTED AT TIME OF MANUFACTURE.
 - IN EARLY PRODUCTION, CRI WAS 517A DIODE.
 - C13 WAS NOT PROVIDED IN SETS MANUFACTURED PRIOR TO 11-74, BUT IS BEING ADDED TO ALL SETS RETURNED FOR REPAIR.

7D

SD-69909-01-C1

SPEAKERPHONE SYSTEM NO. 4A

SD-69909-01-C1

BELL TELEPHONE LABORATORIES

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PRINTED IN U.S.A.

APP FIG. 4

APP FIG. 5

CAPACITOR

DESIG	LOC	CODE
C1	8D0	KS-19774, L2, 100PF
C2	8C1	KS-19107, L4, 1
C3	8D2	KS-19774, L2, 10PF
C4	8C2	KS-19774, L6, .02
C5	8E1	KS-19774, L2, .01
C6	8D2	KS-19774, L2, .01
C7	8E2	KS-20736, L1, .47
C8	8E2	KS-19774, L2, .01
C11	8D1	KS-19774, L2, 100PF
C12	8C1	KS-19774, L2, .001

DIODE

DESIG	LOC	CODE
CR1	8D2	529A

INTEGRATED CIRCUIT

DESIG	LOC	CODE
IC1	8C1	41C
IC1	8C1	502CK

POTENTIOMETER

DESIG	LOC	CODE
R8	8E2	840169361 .5K

RESISTOR

DESIG	LOC	CODE
R1	8D1	257A, 5110
R2	8D1	257A, 3160
R3	8D1	257A, 100K
R4	8D2	257A, 100K
R5	8E2	257A, 3160
R6	8C2	257A, 1K

SWITCH

DESIG	LOC	CODE
OFF	8E2	
ON	8E2	
QUIET	8D0	

TRANSMITTER

DESIG	LOC	CODE
MK1	8C0	AF1

RELAY

DESIG	K201
CODE	MBS
OPTION	
CONT	LOC
ARR	
6	EMB 9G2
5	EBM 9C1
4	EBM 9C1
3	EBM 9A1
2	EBM 9B1
1	EMB 9G1
COIL	9HZ

CAPACITOR

DESIG	LOC	CODE
C1	9B3	702H, .316
C2	9B4	KS-20736, L4, .022
C3	9B5	702H, 1
C4	9C7	KS-20300, L3, .047
C5	9C8	KS-20300, L3, .047
C6	9D8	KS-20300, L2, .082
C7	9F8	KS-20300, L2, .033
C8	9F6	KS-13477, L8, .20PF
C9	9F6	600B, 5
C10	9F3	KS-19774, L2, 220PF
C11	9F3	KS-19774, L2, 470PF
C12	9F2	601B, 10
C13	9F3	KS-19774, L2, .01
C31	9B2	570L, .0215
C32	9E8	570B, .012
C33	9F2	570L, .0215
C34	9F5	570L, .0215
C35	9F6	601B, 10
C36	9D3	KS-19107, L4, 1
C37	9D3	702H, 1
C38	9C4	600A, 1
C39	9D4	600A, 1
C40	9D4	600A, 1
C41	9C5	KS-19107, L4, 1
C42	9C5	542B, .22
C43	9C5	542B, .22
C44	9D5	600A, 1
C45	9D5	602A, 40
C46	9G8	600B, 5
C47	9C5	KS-19107, L4, 1
C50	9B5	KS-19774, L2, 470PF
C51	9B5	KS-19774, L2, 100PF
C52	9B6	KS-19774, L2, .001
C53	9B6	KS-19774, L2, 100PF
C54	9G7	KS-19774, L2, 470PF
C55	9G7	KS-19774, L2, 100PF
C56	9F7	KS-19774, L2, .001
C57	9F7	KS-19774, L2, 100PF
C58	9F7	KS-19774, L2, 470PF
C59	9F7	KS-19774, L2, 100PF
C201	9H1	KS-19658, L16, 500
C202	9G4	600A, 1
C203	9G5	600B, 5
C204	9H5	600E, 5

CONNECTOR

DESIG	LOC	CODE
	2C5, 4C5, 5C5	D20N-87 MTG CORD
	2C4, 4C3, 4C5	82A CONN BLOCK
	2C4, 5C5	M16C CORD

DIODE

DESIG	LOC	CODE
CR201	9H1	491A
CR202	9H2	446F
CR203	9G2	446F
CR204	9H2	459C
CR205	9H5	459E

INTEGRATED CIRCUITS

DESIG	LOC	CODE
IC1	9B3 9G6	502L
IC2	9B5 9C3	502H
IC3	9E3 9F7	502H
IC4	9F3	535C
IC5	9D3	502M
IC6	9C8 9E6	502N
IC7	9C4	502K
IC8	9C6	502J (SEE NOTE 305)
IC201	9G4	502B

LOUDSPEAKER

DESIG	LOC	CODE
LS1	9F2	KS-20958, L1

RESISTOR

DESIG	LOC	CODE
R1	9B5	KS-16645, L1, 100K
R2	9C5	KS-16645, L1, 5.1K
R3	9C6	KS-16645, L1, 100K
R4	9A8	KS-16645, L1, 620
R5	9D8	KS-16645, L1, 330
R6	9C8	KS-16645, L1, 10K
R7	9D8	KS-16645, L1, 10K
R8	9F8	KS-16645, L1, 10K
R9	9F8	KS-16645, L1, 3K
R10	9G6	KS-16645, L1, 51K
R11	9G6	KS-16645, L1, 51K
R12	9F7	KS-16645, L1, 2K
R13	9F7	257A, SEE NOTE 1

RESISTOR

R31	9C2	KS-16645, L1, 5.6K
R31	9C2	KS-16645, L1, 1K
R32	9C2	KS-16645, L1, 7.5K
R32	9C2	KS-16645, L1, 12K
R33	9C3	KS-16645, L1, 3K

RESISTOR

R34	9C3	KS-16645, L1, 300K
R35	9D3	257A, 10K
R36	9D3	257A, 51, 1K
R37	9F8	KS-16645, L1, 20K
R38	9F5	257A, 5.9K
R39	9F2	KS-16645, L1, 10K
R40	9F4	KS-16645, L1, 10K
R41	9E3	KS-16645, L1, 4.7K
R41	9E3	KS-16645, L1, 10K
R42	9E3	KS-16645, L1, 3K
R43	9E3	KS-16645, L1, 300K
R44	9D3	257A, 10K
R45	9D3	257A, 51, 1K
R46	9C4	KS-16645, L1, 150
R47	9E4	KS-16645, L1, 39
R48	9C6	KS-16645, L1, 30K
R49	9C6	KS-16645, L1, 30K
R50	9D5	KS-16645, L1, 30K
R51	9D5	KS-16645, L1, 30K
R52	9C7	257A, SEE NOTE 1
R53	9D7	KS-16645, L1, 10K
R54	9E7	KS-16645, L1, 10K
R55	9E7	KS-16645, L1, 1K
R56	9G8	KS-16645, L1, 510K

RESISTOR

R57	9C7	KS-16645, L1, 5.1K
R60	9F2	KS-16645, L1, 47
R201	9H2	KS-16645, L1, 10K
R202	9H2	KS-13492, L1, 130
R203	9G5	KS-16645, L1, 150
R204	9H5	KS-16645, L1, 150
R205	9G2	KS-16645, L1, 330
R206	9G3	257A, 1960
R207	9H3	257A, 1960
R208	9H3	KS-16645, L1, 1K
R209	9G3	257A, 10K
R210	9H3	257A, 10K

TRANSFORMER

DESIG	LOC	CODE
T1	9A7	2663G

TRANSISTOR

DESIG	LOC	CODE
Q1	9C7	51A
Q201	9G3	51A
Q202	9H3	240

VARIATOR

DESIG	LOC	CODE
RV1	9A8	106A
RV2	9A2	106A

NOTES:
1. VALUES FOR R52 AND R13 SELECTED AT TIME OF MANUFACTURE.

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7D

SPEAKERPHONE SYSTEM NO. 4A

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BELL TELEPHONE LABORATORIES

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APP FIG. 10
(SEE NOTE 309)

APP FIG. 6

CAPACITOR

DESIG	LOC	CODE
C3	11F0	650B, 1
C4	11F2	650B, 1
C5	11F1	KS-19774, L2, 470PF
C6	11F1	KS-19774, L2, 470PF
C7	11F1	650A, 10
C8	11H3	KS-21774, L1750PF/2KV
C9	11E1	KS-19774, L2, 470PF
C10	11H2	KS-19774, L2, .01

RELAY

DESIG	K201
CODE	MBS
OPTION	
6	EMB 10G2
5	EBM 10C1
4	EBM 10C1
3	EBM 10A1
2	EBM 10B1
1	EMB 10G1
CD1L	10H2

INTEGRATED CIRCUITS

DESIG	LOC	CODE
IC1	10B3, 10G6	502L
IC2	10B3, 10C3	502H
IC3	10E3, 10F7	502H
IC4	10F3	535C
IC5	10D3	502M
IC6	10C8, 10E6	502N
IC7	10C4	502K
IC8	10C6	502J (SEE NOTE 305)
IC201	10F4	502B

TRANSFORMER

DESIG	LOC	CODE
T1	10A7	2663G

TRANSISTOR

DESIG	LOC	CODE
Q1	10C7	51A
Q201	10G3	51A
Q202	10H3	24D

DIODE

DESIG	LOC	CODE
CR1	11F2	529A

CAPACITOR

DESIG	LOC	CODE
C1	10B3	702H, .316
C2	10B4	KS-20736, L4, .022
C3	10C5	702H, 1
C4	10C7	KS-20300, L3, .047
C5	10C8	KS-20300, L3, .047
C6	10D8	KS-20300, L2, .082
C7	10F8	KS-20300, L2, .053
C8	10F6	KS-13477, L8, .20PF
C8	10F6	KS-19774, L2, 100PF
C9	10F6	600B, 5
C10	10F3	KS-19774, L2, 220PF
C11	10F3	KS-19774, L2, 470PF
C12	10F2	601B, 10
C13	10F3	KS-19774, L2, .01
C31	10B2	570L, .0215
C32	10E8	570L, .0215
C33	10F2	570L, .0215
C34	10F5	570L, .0215

LOUDSPEAKER

DESIG	LOC	CODE
LS1	10F2	KS-20958, L1

VARIATOR

DESIG	LOC	CODE
RV1	10A8	106A
RV2	10A2	106A

POTENTIOMETER

DESIG	LOC	CODE
R9	11F3	840169361, 5K

RESISTOR

DESIG	LOC	CODE
R1	11F2	KS-16645, L1, 100K
R2	11E0	KS-20616, L1A, 38.3K
R3	11G0	KS-20616, L1A, 11K
R4	11E1	KS-20616, L1A, 2.74K
R5	11G1	KS-20616, L1A, 287
R6	11G2	KS-16645, L1, 1K
R7	11E2	KS-16645, L1, 1K
R8	11E2	KS-16645, L1, 1K
R10	11H2	KS-16645, L1, 10MEG
C43	10C5	542B, .22
C44	10D5	600A, 1
C45	10D5	602A, 40
C46	10G9	600B, 5
C47	10C5	KS-19107, L4, 1
C50	10B5	KS-19774, L2, 470PF
C51	10B5	KS-19774, L2, 100PF
C52	10B6	KS-19774, L2, .001
C53	10B6	KS-19774, L2, 100PF
C54	10G7	KS-19774, L2, 470PF
C55	10G7	KS-19774, L2, 100PF
C56	10F7	KS-19774, L2, .001
C57	10F8	KS-19774, L2, 100PF
C58	10F7	KS-19774, L2, 470PF
C59	10F7	KS-19774, L2, 100PF
C60	10F8	KS-19774, L2, 470PF
C61	10F8	KS-19774, L2, 470PF
C62	10E3	KS-19774, L2, 470PF
C63	10D3	KS-19774, L2, 100PF
C201	10H1	KS-19658, L16, 500
C202	10G4	600A, 1
C203	10C5	600B, 5
C203	10C5	602B, 100
C204	10H5	600B, 5
C204	10H5	602B, 100

RESISTOR

DESIG	LOC	CODE
R1	10B5	KS-16645, L1, 100K
R2	10C5	KS-16645, L1, 5.1K
R3	10C6	KS-16645, L1, 100K
R4	10A8	KS-16645, L1, 620
R5	10D8	KS-16645, L1, 330
R6	10C8	KS-16645, L1, 10K
R7	10D8	KS-16645, L1, 10K
R8	10F8	KS-16645, L1, 10K
R9	10F8	KS-16645, L1, 3K
R10	10G6	KS-16645, L1, 51K
R11	10G6	KS-16645, L1, 51K
R12	10F7	KS-16645, L1, 2K
R13	10F7	257A, SEE NOTE 1
R31	10C2	KS-16645, L1, 5.6K
R31	10C2	KS-16645, L1, 1K
R32	10C2	KS-16645, L1, 7.5K
R32	10C2	KS-16645, L1, 12K
R33	10C3	KS-16645, L1, 3K
R34	10C3	KS-16645, L1, 300K
R35	10D3	257A, 10K
R36	10D3	257A, 51, 1K
R37	10F8	KS-16645, L1, 20K
R38	10F5	257A, 5.9K
R39	10F2	KS-16645, L1, 10K
R40	10F4	KS-16645, L1, 10K
R41	10E3	KS-16645, L1, 4.7K
R41	10E3	KS-16645, L1, 10K
R42	10E3	KS-16645, L1, 3K
R43	10E3	KS-16645, L1, 300K
R44	10D3	257A, 10K
R45	10D3	257A, 51, 1K
R46	10C4	KS-16645, L1, 150
R47	10E4	KS-16645, L1, 39
R48	10C6	KS-16645, L1, 30K
R49	10C6	KS-16645, L1, 30K
R50	10D5	KS-16645, L1, 30K
R51	10D5	KS-16645, L1, 30K
R52	10C7	257A, SEE NOTE 1
R53	10D7	KS-16645, L1, 10K
R54	10E7	KS-16645, L1, 10K
R55	10E7	KS-16645, L1, 1K
R56	10G9	KS-16645, L1, 510K
R57	10C7	KS-16645, L1, 5.1K
R58	10F8	KS-20200, L1, 470
R59	10F8	KS-20200, L1, 470
R60	10F2	KS-16645, L1, 47
R201	10H2	KS-16645, L1, 10K
R202	10H2	KS-13492, L1, 130
R203	10G4	KS-16645, L1, 150
R204	10H4	KS-16645, L1, 150
R205	10G2	KS-16645, L1, 330
R206	10G3	257A, 1960
R207	10H3	257A, 1960
R208	10H3	KS-16645, L1, 1K
R209	10G3	257A, 10K
R210	10H3	257A, 10K

RESISTOR

DESIG	LOC	CODE
R1	11F2	KS-16645, L1, 100K
R2	11E0	KS-20616, L1A, 38.3K
R3	11G0	KS-20616, L1A, 11K
R4	11E1	KS-20616, L1A, 2.74K
R5	11G1	KS-20616, L1A, 287
R6	11G2	KS-16645, L1, 1K
R7	11E2	KS-16645, L1, 1K
R8	11E2	KS-16645, L1, 1K
R10	11H2	KS-16645, L1, 10MEG

SWITCH

DESIG	LOC	CODE
S1A	11G2	NOTE 1
S1B	11F3	NOTE 1
S2	11H2	NOTE 2

TRANSISTOR

DESIG	LOC	CODE
Q1	11F1	66AH
Q2	11E2	66AH

TRANSMITTER UNIT

DESIG	LOC	CODE
MK1	11E0	EL2

CONNECTOR

DESIG	LOC	CODE
	2C4, 4C5, 5C5,	D20N-87MTG CORD
	2C4, 4C3, 4C5	82A CONN BLOCK
	2C4, 5C4	M16C CORD

DIODE

DESIG	LOC	CODE
CR201	10H1	491A
CR202	10H2	446F
CR203	10G2	446F
CR204	10H2	459C
CR205	10H5	459E

NOTES:

- THE "ON" OR "QUIET" SWITCHES (S1A AND S1B) EACH CONSIST OF TWO LAND AREAS ON THE PRINTED WIRING BOARD AND SHORTING SPRINGS INSTALLED ON THE ROCKER BUTTON CAP. WHEN THE "ON" OR "QUIET" EDGE OF THE CAP IS DEPRESSED CONTACT CLOSURE OF EACH SWITCH IS MADE.
- THE "OFF" SWITCH (S2) CONSISTS OF A PAIR OF LEAF SPRING CONTACTS MOUNTED ON THE PRINTED WIRING BOARD. WHEN THE "OFF" EDGE OF THE ROCKER BUTTON CAP IS DEPRESSED S2 IS OPERATED BY A SMALL ACTUATOR ROD MOLDED ON THE UNDER SIDE OF THE CAP.

NOTES:
1. VALUES FOR R52 AND R13 SELECTED AT TIME OF MANUFACTURE.

8D1

SPEAKERPHONE SYSTEM NO.4A

SD-69909-01-C3

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

PRINTED IN U.S.A.

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APP FIG 7

APP FIG 8
(SEE NOTE 309)

APP FIG 9

CAPACITOR

DESIG	LOC	CODE
C1	11C0	KS-19774, L2, 100PF
C2	11A0	KS-19107, L4, 1
C3	11B2	KS-19774, L2, 10PF
C4	11A2	KS-19774, L2, .02
C5	11D1	KS-19774, L2, .01
C6	11C2	KS-19774, L2, .01
C7	11D2	KS-20736, L1, .47
C8	11D2	KS-19774, L2, .01
C11	11B1	KS-19774, L2, 100PF
C12	11B1	KS-19774, L2, .001
C13	11D3	KS-21744, L1, .001-4KV

DIODE

DESIG	LOC	CODE
CR1	11B3	529A

INTEGRATED CIRCUIT

DESIG	LOC	CODE
IC1	11B1	41C
IC1	11B1	502CK

POTENTIOMETER

DESIG	LOC	CODE
R8	11C3	840169361, .5K

RESISTOR

DESIG	LOC	CODE
R1	11C1	257A, 5110
R2	11C1	257A, 3160
R3	11C1	257A, 100K
R4	11C2	257A, 100K
R5	11C2	257A, 3160
R6	11A3	257A, 1K
R7	11D3	KS-16645, L1, 10MEG

SWITCH

DESIG	LOC	CODE
S1A	11C3	NOTE 1
S1B	11C0	NOTE 1
S2	11D3	NOTE 2

TRANSMITTER UNIT

DESIG	LOC	CODE
MK1	11B0	AF1

CAPACITOR

DESIG	LOC	CODE
C3	11B5	650B, 1
C4	11B6	650B, 1
C5	11C6	KS-19774, L2, 470PF
C6	11B7	KS-19774, L2, 470PF
C7	11C7	650A, 4.7
C8	11E8	KS-21744, L1, .001 -1/4KV
C9	11B6	KS-19774, L2, 470PF
C10	11B8	KS-19774, L2, .01

DIODE

DESIG	LOC	CODE
CR1	11B8	529A

POTENTIOMETER

DESIG	LOC	CODE
R9	11C8	840169361, 5K

RESISTOR

DESIG	LOC	CODE
R1	11C6	KS-16645, L1, 100K
R2	11B6	KS-20616, L1A, 26.1K
R3	11C6	KS-20616, L1A, 11K
R4	11B7	KS-20616, L1A, 2.49K
R5	11C7	KS-20616, L1A, 511
R6	11C7	KS-16645, L1, 1K
R7	11A7	KS-16645, L1, 2K
R8	11B8	KS-16645, L1, 1K
R10	11E8	KS-16645, L1, 10MEG

SWITCH

DESIG	LOC	CODE
S1A	11D8	NOTE 1
S1B	11C5	NOTE 1
S2	11D8	NOTE 2

TRANSISTOR

DESIG	LOC	CODE
Q1	11C7	66AH
Q2	11B7	66AH

TRANSMITTER UNIT

DESIG	LOC	CODE
MK1	11B5	EL2

CAPACITOR

DESIG	LOC	CKT DESIG
C1		
CODE 726N		
1-1	12D4	C40
2-2	12D4	C39
3-3	12C4	C38
4-4	12D3	C36
5-5	12D3	C37
6-6	12C7	C48
7-7	12B2	C31
8-8	12B3	C70

DESIG	LOC	CKT DESIG
C2		
CODE 726P		
1-1	12C5	C41A
2-2	12C5	C41B
3-3	12C5	C42
4-4	12C5	C43
5-5	12D5	C44
6-6	12C5	C57
7-7	12B4	C66
8-8	12C4	C67

DESIG	LOC	CKT DESIG
C3		
CODE 726R		
1-1	12E8	C32
2-2	12B9	C6
3-3	12D8	C56
4-4	12F9	C7
5-5	12G4	C202

DESIG	LOC	CODE
C8	12F6	KS-19774, L2, 100PF
C9	12F6	600B, 5
C12	12F2	601B, 10
C33	12F2	KS-20736, L4, .022
C34	12F5	KS-20736, L4, .022
C45	12D5	602A, 40
C46	12G7	600B, 5
C49	12B5	KS-19774, L2, 470PF
C50	12G7	KS-19774, L2, 470PF
C51	12F7	KS-19774, L2, 470PF
C52	12F7	KS-19774, L2, 470PF
C53	12F8	KS-19774, L2, 470PF
C54	12G8	KS-19774, L2, 470PF
C55	12E2	KS-19774, L2, 470PF
C60	12F3	KS-19774, L2, .01
C61	12F3	KS-19774, L2, .01
C62	12C2	KS-19774, L2, 470PF
C63	12C3	KS-19774, L2, 100PF
C64	12E3	KS-19774, L2, 100PF
C65	12C8	KS-19774, L2, 100PF
C71	12B8	KS-19774, L2, .001
C201	12H1	KS-19658, L17, 500-40V

DIODE

DESIG	LOC	CODE
CR202	12H2	533C
CR203	12G2	533C
CR204	12H2	459C
CR205	12H1	456F
CR206	12H1	456F
CR207	12H1	456F
CR208	12H1	456F

INTEGRATED CIRCUIT

DESIG	LOC	CODE
IC1	12B3, 12G6	502L
IC2	12E3, 12C3	502F
IC3	12B5, 12F7	502H
IC4	12F3	502DS
IC5	12D3	502M
IC6	12E6	502N
IC7	12C4	502K
IC8	12C6	502J
IC201	12C8, 12H4	502F

LOU/SPEAKER

DESIG	LOC	CODE
LS1	12E1	KS-20958, L1

RELAY

DESIG	LOC	CODE
K201		
CODE MB5		
OPTION		
6	EMB	12G2
5	EBM	12D1
4	EBM	12C1
3	EBM	12A1
2	EBM	12B1
1	EMB	12G1
COIL		12H2

RESISTOR

DESIG	LOC	CODE
R1	12B4	KS-16645, L1, 100K
R2	12C5	KS-20616, L1A, 2.61K
R3	12C6	KS-16645, L1, 100K
R6	12C9	KS-16645, L1, 10K
R7	12D8	KS-16645, L1, 10K
R8	12F9	KS-16645, L1, 10K
R9	12F9	KS-16645, L1, 3K
R10	12G6	KS-16645, L1, 51K
R11	12G6	KS-16645, L1, 51K
R12	12F7	KS-16645, L1, 2K
R13	12F7	KS-20616, L1A (SEE NOTE 3)
R31	12C2	KS-16645, L1, 1K
R32	12C2	KS-16645, L1, 12K
R33	12C2	KS-16645, L1, 3K
R34	12C3	KS-16645, L1, 300K
R35	12D3	KS-20616, L1A, 10K
R36	12D3	KS-20616, L1A, 51.1K
R37	12F8	KS-16645, L1, 20KΩ
R39	12F2	KS-16645, L1, 3.9KΩ
R40	12F4	KS-16645, L1, 10K
R41	12E2	KS-16645, L1, 10K
R42	12E2	KS-16645, L1, 3K
R43	12E3	KS-16645, L1, 300K
R44	12D3	KS-20216, L1A, 10K
R45	12D3	KS-20216, L1A, 51.1K
R46	12C4	KS-16645, L1, 150
R48	12C6	KS-16645, L1, 30K
R49	12C6	KS-16645, L1, 30K
R50	12D5	KS-16645, L1, 30K
R51	12D5	KS-16645, L1, 30K
R52	12C7	KS-20216, L1A (SEE NOTE 3)
R53	12D7	KS-16645, L1, 10K
R54	12E7	KS-16645, L1, 10K
R55	12E7	KS-16645, L1, 1K
R56	12C7	KS-16645, L1, 510
R57	12C7	KS-16645, L1, 5.1K
R58	12F8	KS-16645, L1, 470
R59	12G7	KS-16645, L1, 470
R60	12E2	KS-16645, L1, 47
R61	12H7	KS-16645, L1, 10K
R62	12B8	KS-16645, L1, 10K
R63	12C8	KS-16645, L1, 620
R64	12D8	KS-16645, L1, 620
R65	12D8	KS-16645, L1, 620
R201	12H2	KS-16645, L1, 10K
R202	12H2	KS-13491, L1, 220-1W
R205	12G3	KS-16645, L1, 330
R206	12G3	KS-20616, L1A, 1.96K
R207	12H3	KS-20616, L1A, 1.96K
R208	12H3	KS-16645, L1, 1K
R209	12G4	KS-20616, L1A, 10K
R210	12H4	KS-20616, L1A, 10K

TRANSFORMER

DESIG	LOC	CODE
T1	12A7	2663F

TRANSISTOR

DESIG	LOC	CODE
Q1	12C7	51A
Q201	12H3	51A
Q202	12H3	240

VARISTOR

DESIG	LOC	CODE
RV1	12A9	106A
RV2	12A2	106A
RV3	12B3	100A

NOTES:

1. THE "ON" OR "QUIET" SWITCHES (S1A AND S1B) EACH CONSIST OF TWO LAND AREAS ON THE PRINTED WIRING BOARD AND SHORTING SPRINGS INSTALLED ON THE ROCKER BUTTON CAP. WHEN THE "ON" OR "QUIET" EDGE OF THE CAP IS DEPRESSED CONTACT CLOSURE OF EACH SWITCH IS MADE.
2. THE "OFF" SWITCH (S2) CONSISTS OF A PAIR OF LEAF SPRING CONTACTS MOUNTED ON THE PRINTED WIRING BOARD. WHEN THE "OFF" EDGE OF THE ROCKER BUTTON CAP IS DEPRESSED S2 IS OPERATED BY A SMALL ACTUATOR ROD MOLDED ON THE UNDER SIDE OF THE CAP.
3. VALUES FOR R13 AND R52 ARE SELECTED AT TIME OF MANUFACTURE.

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SPEAKERPHONE SYSTEM NO. 4A

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CIRCUIT NOTES

DESIG	FUSE AMP	POTENTIAL	ONE PER

FEATURE OR OPTION	PROVIDE			
	APP FIG.	APP OR WRG	QUANTITY	RE-MOVE
DIAL TOUCHTONE	FS1	Z	1 PER SET	
DIAL ROTARY		Y		
AUDIBLE SIGNALS AUXILIARY RELAY	FS4	X	1 PER SET	
AUDIBLE SIGNALS RINGER CUTOFF	5	W		
INCREASED SWITCH GUARD SEE NOTE 306	FS7 FS7A FS7B	M	AS REQ	N
REPLACEMENT OF 41C INTEGRATED CIRCUIT PACK	FS6 FS6B	P	AS REQ	R
REPLACEMENT OF 502J INTEGRATED CIRCUIT SEE NOTE 305	FS7 FS7A FS7B	U	AS REQ	V
INCREASED SWITCH GUARD SEE NOTE 307	FS7C	L	AS REQ	K

RECORD OF APP FIGURES, WIRING & APPARATUS CHANGES						
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT		
				STD	A & M	ND

CIRCUIT NOTES (CONT)

- 104. TERMINAL DESIGNATION MIGHT BE DIFFERENT IN SOME SETS, BUT WILL CONNECT TO INDICATED NETWORK TERMINAL IN SOME MANNER.
- 105. INSULATE AND STORE OR CONNECT TO UNUSED TERMINALS.
- 106. WHEN USING THE 82A CONNECTING BLOCK, THE DESIRED AUDIBLE SIGNAL OPTION IS SELECTED BY THE RELATIVE POSITION OF THE OPTION PLUG (KS-21149 LA CONNECTOR).
- 107. IF NO AUDIBLE SIGNAL CUTOFF IS DESIRED, THE AUXILIARY RELAY OPTION IS CHOSEN, HOWEVER, NO RELAY IS PROVIDED.

EQUIPMENT NOTES:

INFORMATION NOTES:

- 301. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS K IS FOR KILOHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.
 - 302. REMOTE POWER SOURCE RANGE USING 85B1 POWER UNIT IS 7Ω LOOP RESISTANCE.
- | GAUGE OF CONNECTING CABLE | MAXIMUM REMOTE DISTANCE (FT) |
|---------------------------|------------------------------|
| 26 | 85 |
| 24 | 125 |
| 22 | 210 |
| 20 | 335 |
| 18 | 540 |
- 303. SPEAKERPHONE CONNECTIONS USING THE 82-TYPE CONNECTING BLOCK ARE SHOWN ON SHEET D2.
 - 304. SPEAKERPHONE CONNECTIONS USING THE 223-TYPE ADAPTER ARE SHOWN ON SHEET D3.
 - 305. DESIGNATION ① INDICATES A CHANGE IN CIRCUIT COMPONENTS OF THE 108A-TYPE LOUDSPEAKER SET TO PERMIT A SPECIFICATION CHANGE FOR THE 502J INTEGRATED CIRCUIT (ICB), TO INCREASE THE MANUFACTURING YIELD OF THAT DEVICE. WHEN REPLACING THE 502J INTEGRATED CIRCUIT IT SHOULD BE NOTED THAT 502J INTEGRATED CIRCUITS DATE-CODED "E III-74" OR LATER MAY ONLY BE USED IN CIRCUIT BOARDS INCORPORATING THE ① OPTION.
 - 306. CLIPPING OF RECEIVE SPEECH MAY OCCASIONALLY BE ENCOUNTERED IN SOME SPEAKERPHONE INSTALLATIONS DUE TO REVERBERATION AND/OR LOW LEVEL NOISE, SUCH AS PAPER RUSTLING WHEN USING 108A AND 108AR LOUDSPEAKER SETS. THIS MAY BE PREVENTED BY INCREASING THE AMOUNT OF SWITCH GUARD ACTION IN THE VOICE SWITCH CIRCUIT BY REMOVAL OF C35 (601B-10UF) AND ADDITION OF A 47Ω RESISTOR IN SERIES WITH ONE LEAD TO THE LOUDSPEAKER AS SPECIFIED IN PAR. 2.03 OF BSRS 455.217. LOUDSPEAKER SETS SO MODIFIED ARE IDENTIFIED BY THE STAMPING "MOD FOR NOISE" LOCATED ON THE UNDER SIDE OF THE FACEPLATE ON THE FRONT OF THE SET. A REDUCTION IN LOUDSPEAKER OUTPUT (APPROX 6 dB) WILL RESULT FROM THIS MODIFICATION, REQUIRING A SLIGHTLY HIGHER VOLUME CONTROL SETTING FOR COMPARABLE RECEIVE SPEECH LOUDNESS.
 - 307. 108AA LOUDSPEAKER SETS ARE FURNISHED WITH OPTION ② AT TIME OF MANUFACTURE. WHEN CLIPPING OF RECEIVE SPEECH IS ENCOUNTERED DUE TO REVERBERATION AND/OR A LOW LEVEL BACKGROUND NOISE, IT MAY BE PREVENTED BY INCREASING THE AMOUNT OF SWITCH-GUARD ACTION IN THE VOICE SWITCH CIRCUIT BY PROVIDING OPTION ③. THIS CONNECTS RESISTOR R60 IN SERIES WITH THE LOUDSPEAKER AND CAUSES A REDUCTION IN OUTPUT LEVEL OF APPROXIMATELY 6 dB. THE LOSS MAY BE COMPENSATED FOR BY A SLIGHTLY HIGHER VOLUME CONTROL SETTING FOR COMPARABLE RECEIVE SPEECH LOUDNESS.
 - 308. 680AD AND 680AE TRANSMITTERS HAVE FEATURES TO PROVIDE PROTECTION AGAINST DAMAGE DUE TO DISCHARGE OF STATIC ELECTRICITY WHICH MAY OCCUR, FOR EXAMPLE, FROM THE USER'S FINGER TOUCHING THE TRANSMITTER PEDESTAL WHEN ADJUSTING VOLUME CONTROL OR OPERATING CONTROL BUTTON. CIRCUITS IN ASSOCIATED 108A AND 108AR LOUDSPEAKER SETS ARE EXPOSED TO DAMAGE FROM DISCHARGE OF STATIC ELECTRICITY TO THE TRANSMITTER AND MUST BE PROTECTED BY ADDING A 106A VARISTOR BETWEEN TERMINALS 7 AND 5 OF THE LOUDSPEAKER SET. THIS VARISTOR IS BEING ADDED TO 108A AND 108AR LOUDSPEAKER SETS WHEN RETURNED FOR REPAIR. A VARISTOR AND AN INSTRUCTION SHEET FOR INSTALLATION IS CURRENTLY BEING SHIPPED WITH ALL NEW AND REPAIRED 680AD AND 680AE TRANSMITTERS. THE 108AA LOUDSPEAKER SET HAS PROTECTION INCLUDED IN ITS DESIGN AND DOES NOT REQUIRE THE ADDITIONAL VARISTOR.

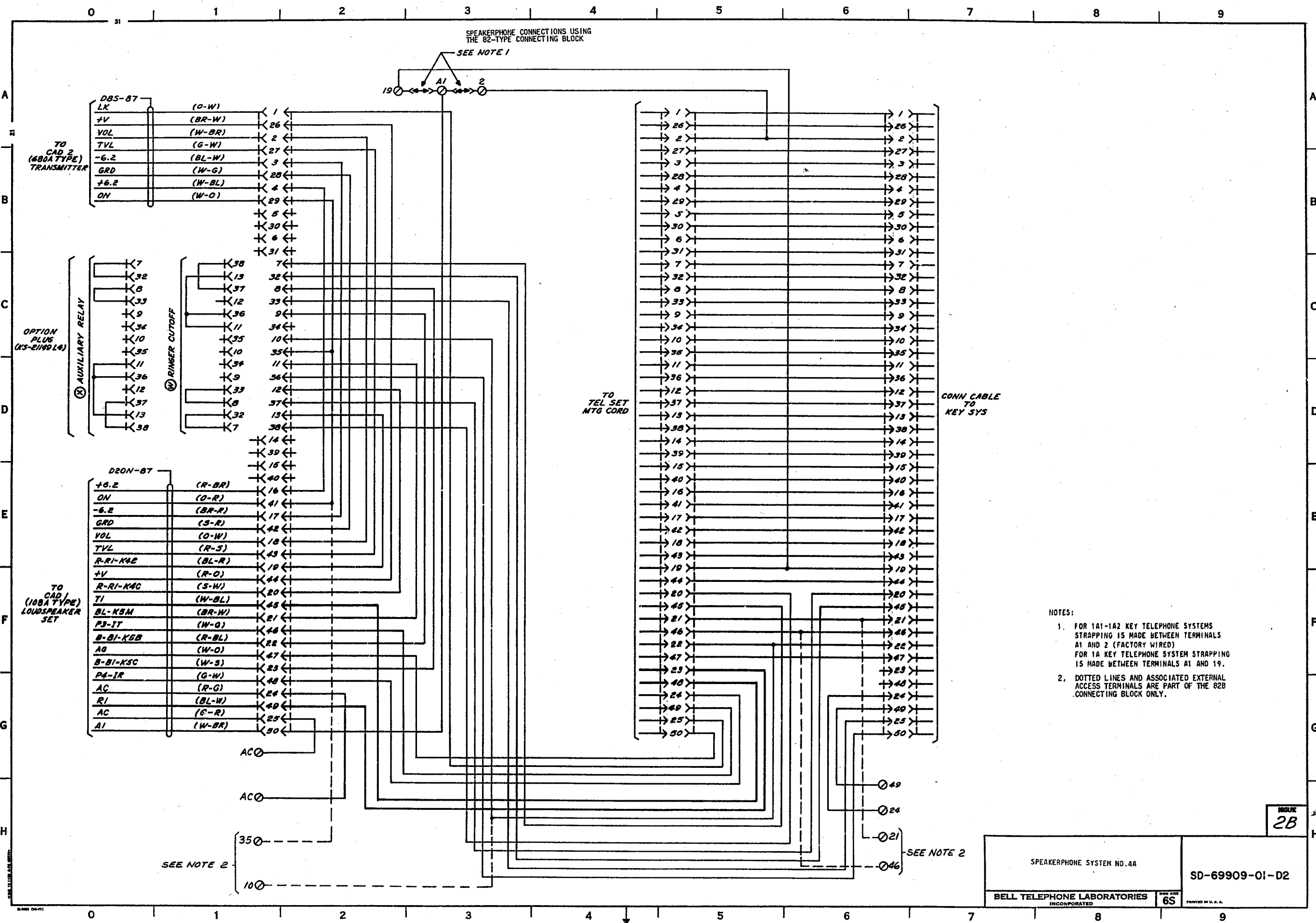
INFORMATION NOTES (CONT)

- 309. AN INITIAL PRODUCTION LOT OF APPROXIMATELY ONE THOUSAND 680 AE TRANSMITTERS, MANUFACTURED DURING 1977, WERE MADE IN ACCORDANCE WITH FS6D AND APP FIG. 8. ALL SUBSEQUENT PRODUCTION HAS BEEN IN ACCORDANCE WITH FS6E AND APP FIG. 10.

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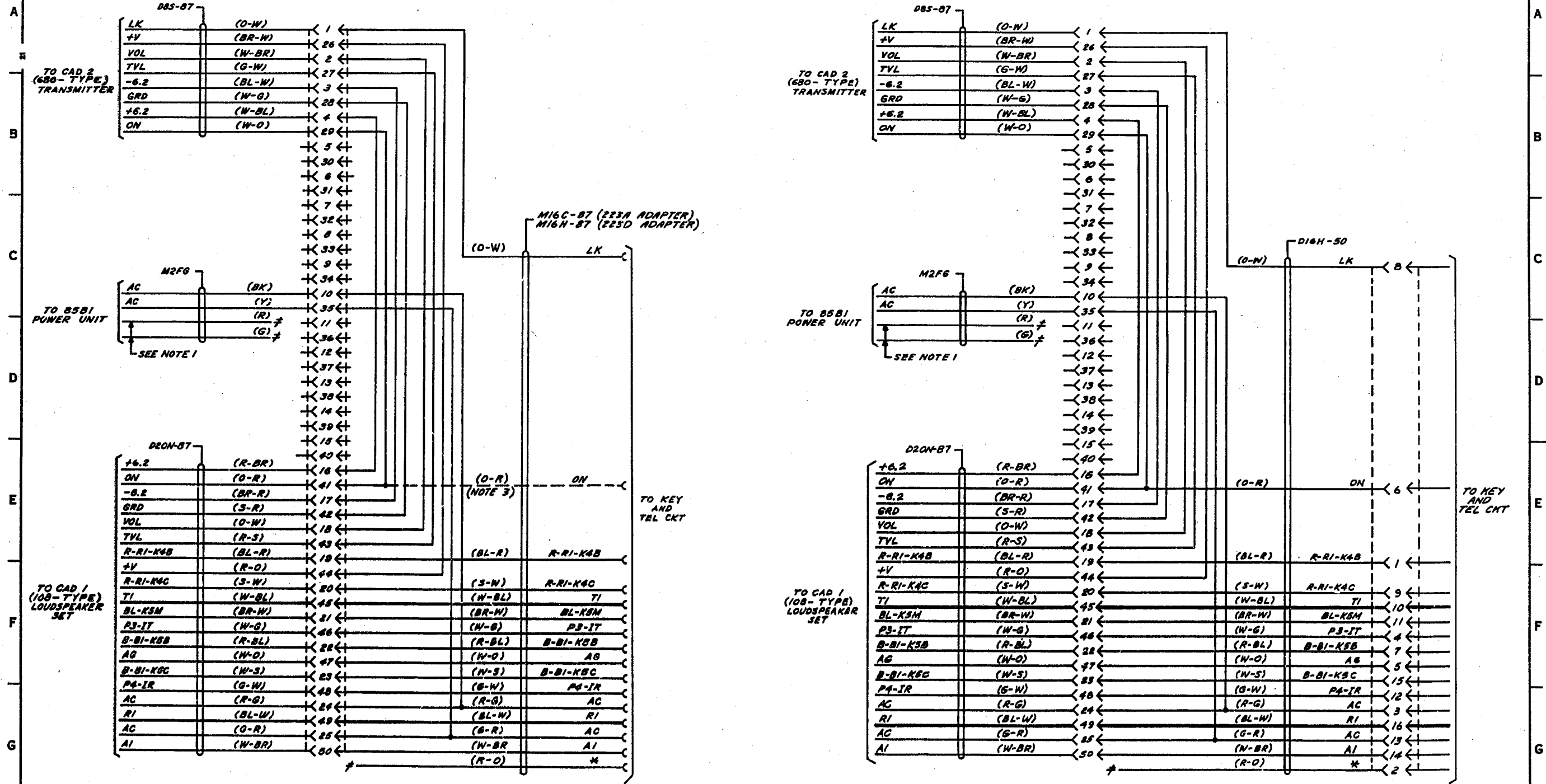
- NOTES:
- FOR 1A1-1A2 KEY TELEPHONE SYSTEMS STRAPPING IS MADE BETWEEN TERMINALS A1 AND 2 (FACTORY WIRED) FOR 1A KEY TELEPHONE SYSTEM STRAPPING IS MADE BETWEEN TERMINALS A1 AND 19.
 - DOTTED LINES AND ASSOCIATED EXTERNAL ACCESS TERMINALS ARE PART OF THE 82B CONNECTING BLOCK ONLY.

SPEAKERPHONE SYSTEM NO. 4A	FIGURE 2B
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SPEAKERPHONE CONNECTIONS
USING THE 223A AND 223D
ADAPTER

SPEAKERPHONE CONNECTIONS
USING THE 223C ADAPTER



- NOTES:
1. THE R AND G LEADS OF THE M2FG CORD ARE CUT BACK AT THE 85B1 POWER UNIT AND ARE NOT CONNECTED AT THE PLUG-END.
 2. SYMBOL (*) INDICATES LEAD END INSULATED AND STORED. SYMBOL (‡) INDICATES LEAD END "DEAD DRESSED".
 3. O-R LEAD CONNECTED AS SHOWN FOR 223D ADAPTER. FOR 223A ADAPTER, O-R LEAD IS "DEAD DRESSED" AT CONNECTOR AND IS INSULATED AND STORED AT SPADE TIP END.

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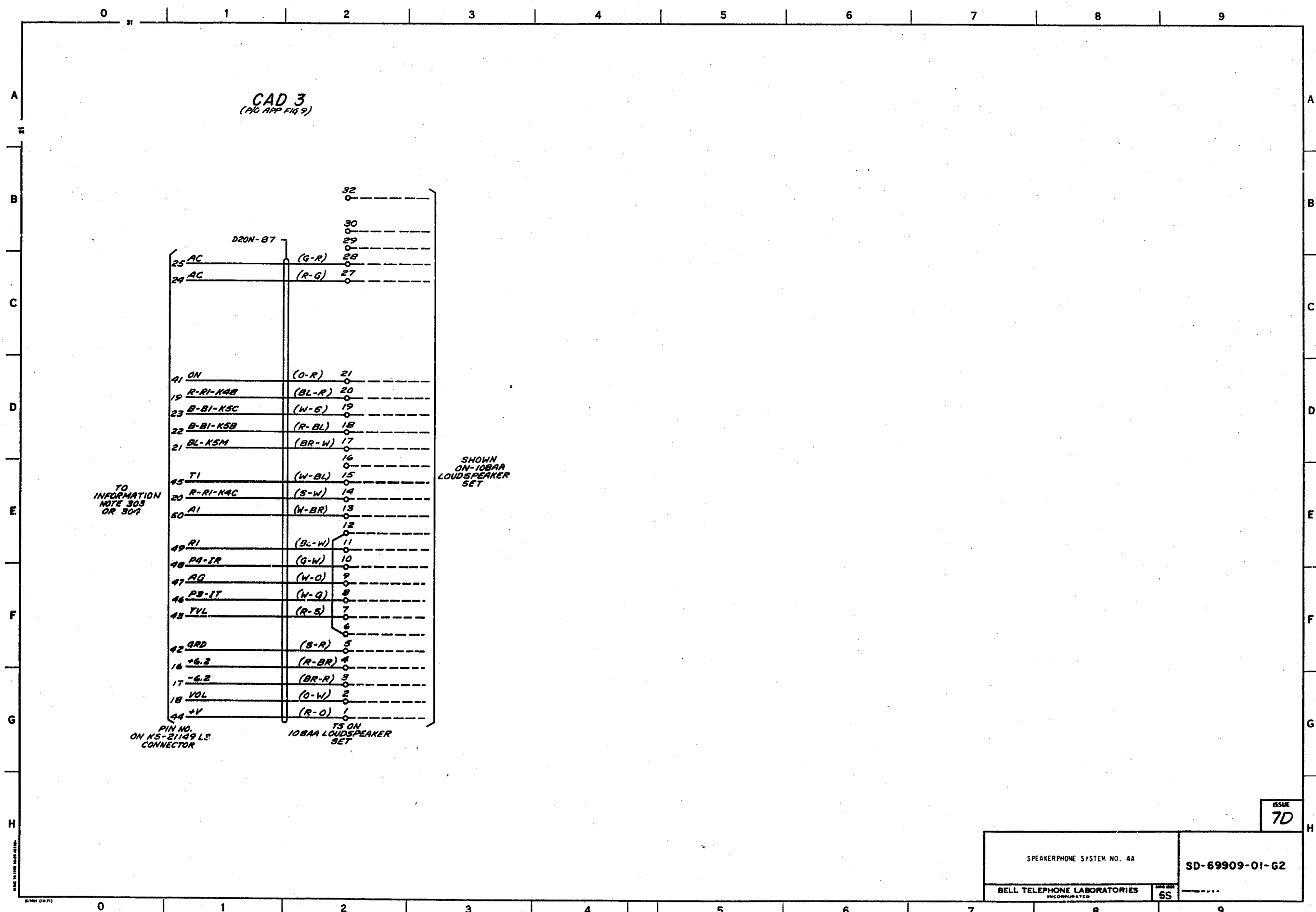
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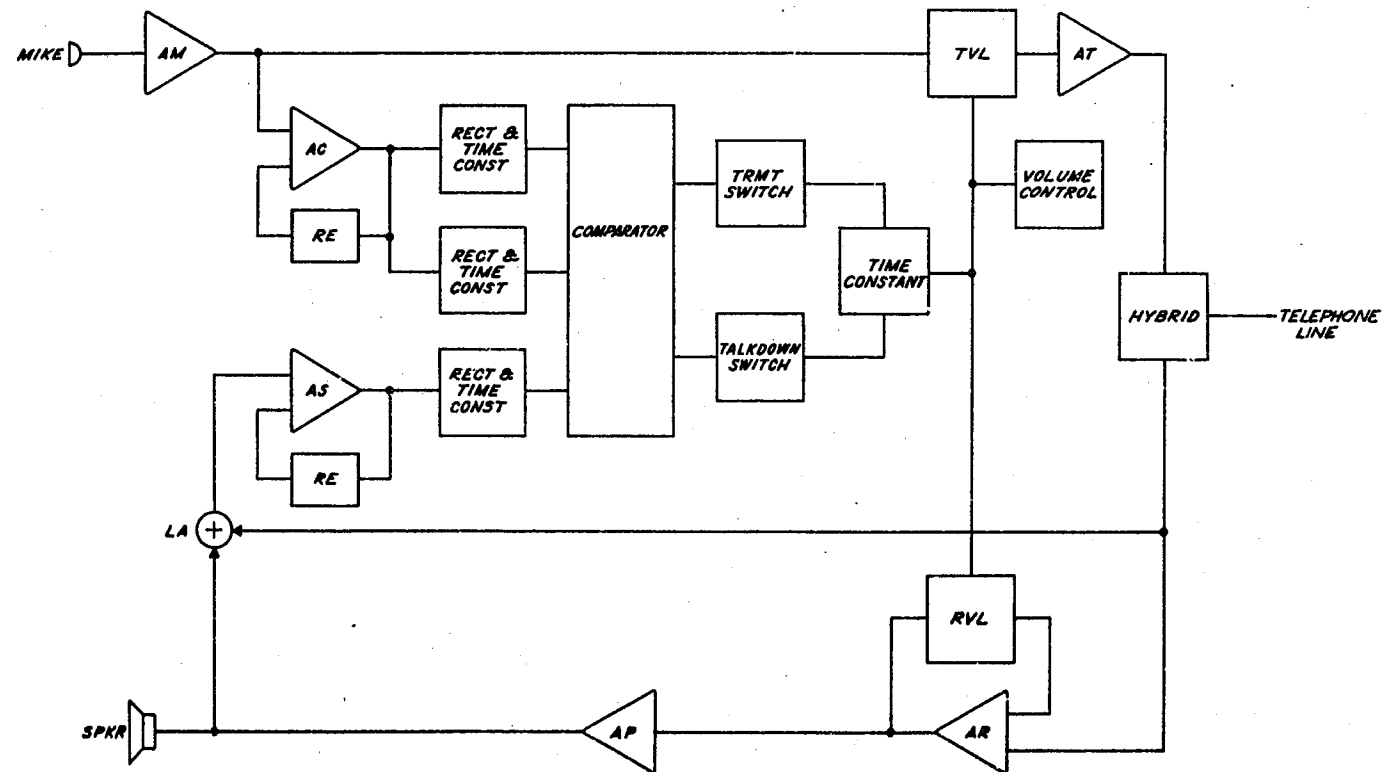
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6-7021 (10-71)

BD 1
BLOCK DIAGRAM
4A SPEAKERPHONE SYSTEM



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SPEAKERPHONE SYSTEM NO. 4A
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