10-66044-01

SHEET INDEX

CONTENTS	SHEET NO.	CODE 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 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	SHEET NO.
SHEET INDEX SUPPORTING INFORMATION	A1	1 2 3 4 5 6	A1
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FS 2 FS 3 FS 4	B2	1 1 1 1 5 6	B2
APP FIG. 1, 2	C1	1 2 2 2 5 6	C1
CIRCUIT NOTES EQUIPMENT NOTES INFORMATION NOTES	D1	1 2 2 2 5 6	D1
CIRCUIT REQUIREMENTS TABLE	F1	1 1 1 1 1 1	F1
CAD 1-7	G1	1 2 3 3 5 5	G1
CAD 8	G2	1 2 2 2 5 6	G2
BD 1	H1	1 2 2 2 5 5	H1
BD 2	H2	1 2 2 2 5 5	H2
BD 3	H3	1 2 2 2 5 5	H3
BD 4	H4	1 2 2 2 5 5	H4
CPS 1 TONE DISABLER	J1A	1 2 2 2 5 6	J1A
	J1B	1 1 1 1 1 1	J1B
CPS 2 BRIDGING AMPLIFIERS	J2A	1 1 1 4 4 4	J2A
	J2B	1 1 1 1 1 1	J2B
CPS 3 LOGIC	J3A	1 2 2 2 5 6	J3A
	J3B	1 2 3 3 5 6	J3B
	J3C	1 2 2 2 2 2	J3C
CPS 4 LOGIC PLUG	J4	6	J4

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWINGS	
11'6" X 23" BAY FOR 56 ECHO SUPP.	J68914AA
10'6" X 23" BAY FOR 52 ECHO SUPP.	J68914AB
TONE DISABLER	J68914AA
BRIDGING AMPLIFIER UNIT	J68914AB
LOGIC UNIT	J68914AC
LOGIC PLUG	J68914AD
FUSE AND FUSE ALARM UNIT	ED-61403

SHEET INDEX NOTES

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.

C-108
RT. #510

SD-1C 290

ISSUE 6AR

SD-66044-01 1184

TOLL SYSTEMS

4A ECHO SUPPRESSOR CIRCUIT

AT&TCO STANDARD

SD-66044-01-A1
21 SHEETS

BELL TELEPHONE LABORATORIES INCORPORATED

REVISION 6S

SD-66044-01-A1

APPARATUS INDEX

DESIG	LOCATION NO.	LOCATION SH NO.
CIRCUIT PACKS		
CP1	1	C1
CP2	1	C1
CP3	1	C1
CP4	1	C1

DESIG	LOCATION FS	LOCATION APP FIG.	LOCATION EQPT
FUSE			
ALM	2B2	1	
F1	2B4		
F2	2B4		
F3	2B4		
F4	2B4		
F5	2C4		
F6	2C4		
F7	2C4		
F8	2D4		
F9	2D4		
F10	2D4		
F11	2E4		
F12	2E4		
F13	2F4		
F14	2F4		
F15	2F4		
F16	2F4		
P1	2A1		
P2	2C1		
P3	2B1		
P4	2C1		
PF1	2B4		
PF2	2D4		
PF3	2E4		
PF4	2F4	1	

DESIG	LOCATION S	LOCATION APP FIG.	LOCATION EQPT
RESISTOR			
R1	2C0	1	
R2	2B1		
R3	2B1		
RA1	2B7		
RA2	2C7		
RA3	2E7		
RA4	2G7		
RC1	2B7		
RC2	2D7		
RC3	2E7		
RC4	2G7		
RD1	2B8		
RD2	2C8		
RD3	2E8		
RD4	2F8	1	

DESIG	LOCATION FS	LOCATION APP FIG.	LOCATION EQPT
RELAY			
MJ	2C0	1	
MN	2B0		
PF1	2B8		
PF2	2D8		
PF3	2E8		
PF4	2F8	1	

CAPACITOR			
CA1	2B8	1	
CA2	2C8		
CA3	2E8		
CA4	2F8	1	

KEY			
PF1	2B6	1	
PF2	2C6		
PF3	2D6		
PF4	2F6	1	

CONVERTER			
PC1	SEE APP FIG.	1	
PC2			
PC3			
PC4		1	

LAMP			
F ALM	2B1	1	
PC ALM	2A0		
PF1	2B6		
PF2	2C6		
PF3	2E6		
PF4	2F6	1	

DIODE			
CR1	2C1	1	
CR2	2A1		
CR3	2G3		
CR4	2E3		
CR5	2D3		
CR6	2C3	1	
CRA1	2B8	1	
CRA2	2C8		
CRA3	2E8		
CRA4	2F8	1	

POTENTIOMETER			
RB1	2C8	1	
RB2	2D8		
RB3	2E8		
RB4	2G8	1	

OPTION INDEX

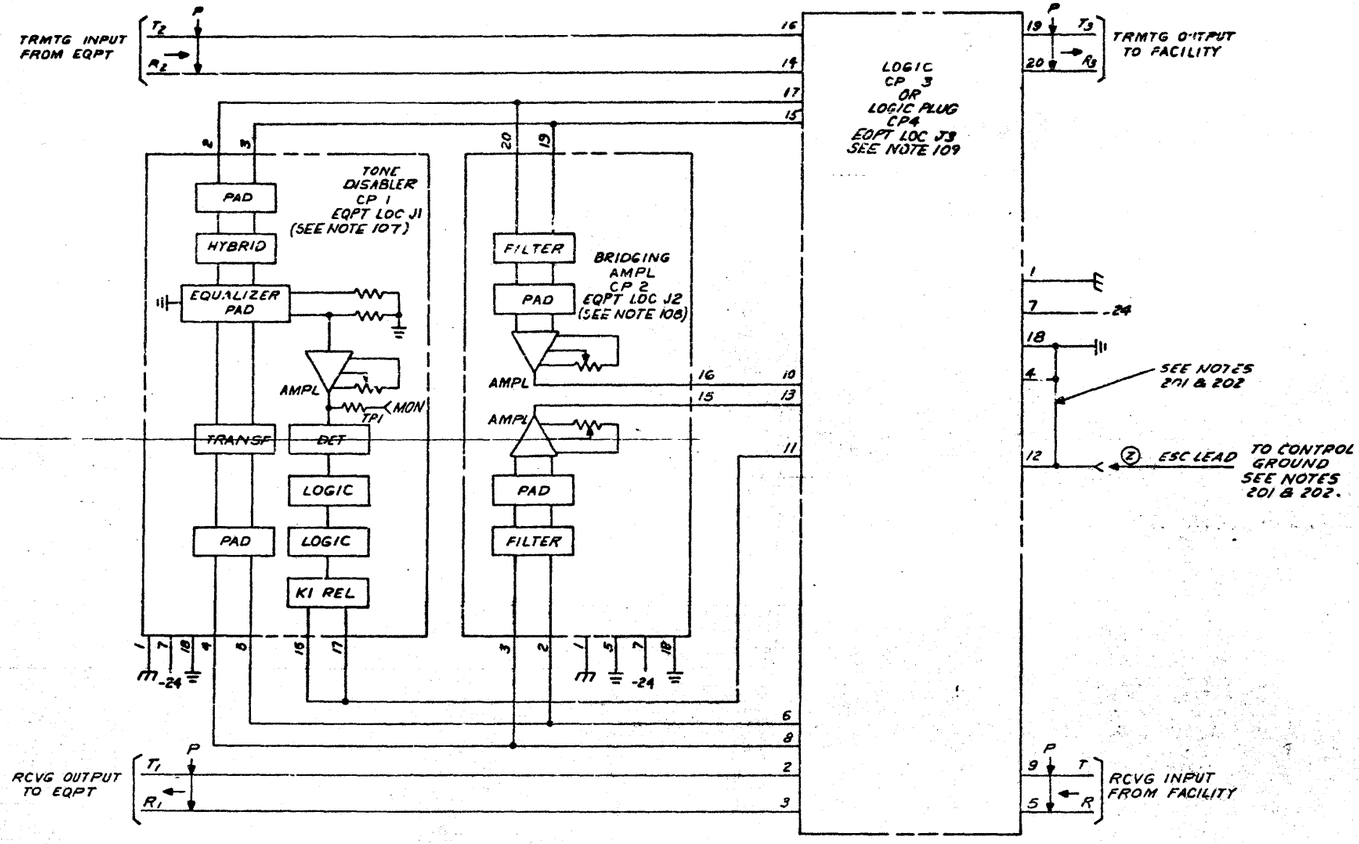
APP OR WRG	RATED ON ISSUE	REF NOTES	LOC
Z	STD 1		1C5,CAD 2
Y	STD 5		2B9,CAD 8
X	STD 5		2B4, 2C4 2E4, 2F4

4A ECHO SUPPRESSOR CIRCUIT (2) SD-6G044-01-A2

BELL TELEPHONE LABORATORIES INCORPORATED

SD-6G044-01-A2

FS 1
4A ECHO SUPPRESSOR
(REFER TO BDI-4 FOR APPLICATIONS)



SD-6G044-01-BI

ISSUE 6A

4A ECHO SUPPRESSOR CIRCUIT (2)	SD-6G044-01-BI	
BELL TELEPHONE LABORATORIES INCORPORATED	6S	

FS 2

PC ALM
-48 BAT A
GRD A
CR2
P1
P3
5 AMP
5 AMP
TO SIG. CKTS WHEN REQD
X
Y
Z
MN
1U 2U
R2 511
R3 681
ALM
1 1/3 AMP
F ALM
MJ
1L 2L
R1 1K
CR1
P2
P4
5 AMP
5 AMP
-48 BAT B
GRD B
CR6
CR5
CR4
CR3
PC-1
PC-2
PC-3
PC-4
20
2
10,11
13,14
F1 F2 F3 F4 PF1 — 2 AMP, .5 AMP
F5 F6 F7 F8 PF2 — 2 AMP, .5 AMP
F9 F10 F11 F12 PF3 — 2 AMP, .5 AMP
F13 F14 F15 F16 PF4 — 2 AMP, .5 AMP
-24 GRD
SHELF 1
SHELF 2
SHELF 3
SHELF 4 1ST TWO SUP
SHELF 4 LAST TWO SUP
SHELF 5
SHELF 6
SHELF 7
SHELF 8
SHELF 9
SHELF 10
SHELF 11 1ST TWO SUP
SHELF 11 LAST TWO SUP
SHELF 12
SHELF 13
SHELF 14
MJ
MJR
MJV
MJVR
MN
MNR
MNV
MNVR
TO OFFICE ALARM CIRCUIT
SEE TABLE B
PF1 PF2 PF3 PF4
RA1 RA2 RA3 RA4 681
RC1 RC2 RC3 RC4 121
CA1 CA2 CA3 CA4 1
RD1 RD2 RD3 RD4 43
RB1 RB2 RB3 RB4 500
CRA1 CRA2 CRA3 CRA4
CW
960

TABLE B

RELAY	CONTACT	
	b	c
PF1,3	2	3
PF2,4	11	10

DRAWING ISSUE 1

ISSUE 6A

4A ECHO SUPPRESSOR CIRCUIT

BELL TELEPHONE LABORATORIES INCORPORATED

SD-6G044-01-B2

SD-6G044-01-B2

APF FIG. 1

CIRCUIT PACK

EQPT LOC	J1*				J2*				J3*	
DESIG	CP1		CP1**		CP2		CP ***		CP3	
CODE	J68914AA		J68881AA-1, L-1,2,A		J68914AB		J68881AB-1, L-1,2,A,3			
OPTION										
ELEM IDENT	TERM		TERM		TERM		TERM		TERM	
TERM.	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC
20						1B2		1B2		1A4
19						1B2		1B2		1A4
18		1D0		1D0		1D3		1D3		1C4
17		1D1		1D1						1A3
16						1C3		1C3		1A3
15		1D1		1D1		1C3		1C3		1B3
14										1A3
13										1C3
12										1C4
11										1C3
10										1C3
9										1E4
8										1E3
7		1D0		1D0		1D2		1D2		1C4
6										1E3
5		1D1		1D1		1D2		1D2		1E4
4		1D0		1D0						1C4
3		1B1		1B1		1D2		1D2		1E3
2		1B0		1B0		1D2		1D2		1E3
1		1D0		1D0		1D2		1D2		1B4

* INDICATES THE MATING CONNECTOR DESIGNATION STAMPED ON THE FRAME UNIT.
** CONTROLLED BY SD5G022-01, SEE NOTE 107.
*** CONTROLLED BY SD5G022-01, SEE NOTE 108.

CONVERTER

EQPT LOC	*			
DESIG	PC1-PC4			
CODE	J97304A **			
OPTION				
ELEM IDENT	TERM		TERM	
TERM.	DESIG	FS LOC	DESIG	FS LOC
20		2A3-F3		
19				
18				
17				
16				
15				
14		2A3-F3		
13		2A3-F3		
12				
11		2A3-F3		
10		2A3-F3		
9				
8				
7				
6				
5				
4				
3				
2		2A3-F3		
1				

* SEE NOTE 105
** SEE NOTE 106

RELAY

DESIG	MJ		MN								PF1,PF3		PF2,PF4			
CODE	AK2										AK38					
OPTION																
	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC
12			M				BM						BM			
11			M	2E0			BM						BM	2C7,2F7		
10			M	2E0			BM						B	2C7,2F7		
9			M				BM									
8			M				BM									
7																
6																
5	M				BM				BM							
4	M				BM				BM							
3	M				BM				BM		B	2A7,2D7				
2	M	2E0			BM				BM		BM	2B7,2E7				
1	M	2D0			BM				BM		BM					
COIL	2B0		2C0				2B8		2D8		2B8,2E8		2D8,2F8			

CAPACITOR

DESIG	LOC	CODE
CA1	2B8	600A, 1
CA2	2C8	↓
CA3	2E8	
CA4	2F8	600A, 1

DIODE

DESIG	LOC	CODE
CR1	2C1	441J
CR2	2A1	↓
CR3	2G3	
CR4	2E3	
CR5	2D3	
CR6	2C3	441J
CRA1	2B8	443D
CRA2	2C8	443D
CRA3	2E8	443D
CRA4	2F8	443D

FUSE

DESIG	LOC	CODE
ALM	2B2	70A 1⅓ AMP
F1	2B4	70B, 2 AMP
F2	2B4	
F3	2B4	
F4	2B4	
F5	2C4	
F6	2C4	
F7	2C4	
F8	2D4	
F9	2D4	
F10	2D4	
F11	2E4	
F12	2E4	
F13	2F4	
F14	2F4	
F15	2F4	
F16	2F4	70B, 2 AMP
P1	2A1	70D, 5 AMP
P2	2C1	↓
P3	2B1	
P4	2C1	70D, 5 AMP
PF1	2B4	70G, .5 AMP
PF2	2D4	↓
PF3	2E4	
PF4	2F4	70G, .5 AMP

KEY

DESIG	LOC	CODE
PF1	2B6	630C4
PF2	2C6	↓
PF3	2D6	
PF4	2F6	630C4
PC ALM	2A0	630C4
F ALM	2B1	630C4

LAMP

DESIG	LOC	CODE
F ALM	2B1	A1
PC ALM	2A0	M1
PF1	2B6	A1
PF2	2C6	A1
PF3	2E6	A1
PF4	2F6	A1

POTENTIOMETER

DESIG	LOC	CODE
RB1	2C8	ALLEN BRADLEY CO. PART NO. LA2L040S501UC
RB2	2D8	
RB3	2E8	
RB4	2G8	

RESISTOR

DESIG	LOC	CODE
R1	2C0	KS-16266 L3A, 1K
R2	2B1	KS-14603 L3A, 511
R3	2B1	KS-14603 L3A, 681
RA1	2B7	KS-14603 L3A, 681
RA2	2C7	↓
RA3	2E7	
RA4	2G7	KS-14603 L3A, 681
RC1	2B7	KS-14603 L3A, 121
RC2	2D7	↓
RC3	2E7	
RC4	2G7	KS-14603 L3A, 121
RD1	2B8	KS-19150 L1, 43
RD2	2C8	↓
RD3	2E8	
RD4	2F8	KS-19150 L1, 43

APP FIG 2

CIRCUIT PACK

EQPT LOC	J3*	
DESIG	CP4	
CODE	J68914AD	
OPTION		
ELEM IDENT	TERM	
TERM	DESIG	FS LOC
20		
19		1A4
18		
17		
16		1A3
15		
14		1A3
13		
12		
11		
10		
9		1E4
8		
7		
6		
5		1E4
4		
3		1E3
2		1E3
1		

*INDICATES MATING CONNECTOR STAMPED ON FRAME UNIT.

DRAWING ISSUE 1
2A

ISSUE 6AR

4A ECHO SUPPRESSOR CIRCUIT

BELL TELEPHONE LABORATORIES INCORPORATED

6S

SD-66044-01-C1

SD-66044-01-C1

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
F1-16	2	-24V	4 ECHO SUPPRESSORS SHELVES 1-3,5-10,12-14 2 ECHO SUPPRESSORS SHELVES 4,11.
P1-A	5	-48V	POWER SUPPLY CONVERTER
PF1-A	5	-24V	POWER SUPPLY CONVERTER

BATTERY SYMBOL	VOLTAGE RANGE
-24V	-23 - -24.75
-48V	SEE NOTE 106

102.

FEATURE OR OPTION	PROVIDE: APP FIG.	APP OR WRG	QUANTITY
1. 4A ECHO SUPPRESSOR FOR -48V OPERATION	1		1-56
2. REMOTE ENABLING WITH GROUND APPLIED TO ESC LEAD. SEE NOTE 201		Z	
ALARM CONNECTION IN SOME CONSOL. BAY APPLICATIONS		Y	
POWER CONVERTERS W.FR GRD		X	
IN CONSOL. BAYS, ECHO SUPR NOT REQD (SEE NOTE 109)	2		1 PER OMITTED LOGIC UNIT

103.

RECORD OF APP FIGURES, WIRING AND APPARATUS CHANGES							
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USED IN CIRCUIT: STD	A&M	MD	
5B	X	NONE		X			
	Y	NONE		Y			

CIRCUIT NOTES: (CONT)

104.

APPLICATION	SEE NOTE	PROVIDE: APP FIG.	OPTION

105.

FEATURES SEE NOTE 105A	EQUIPMENT LOCATIONS: *J1	*J2	*J3	*J4
1-14 ECHO SUPPRESSOR	A1			
15-28 ECHO SUPPRESSOR	A1	A2		
29-42 ECHO SUPPRESSOR	A1	A2	A3	
43-56 ECHO SUPPRESSOR	A1	A2	A3	A4

A1,A2,A3,A4 = -48 TO -24V CONVERTERS, APP FIG. 1

* = INDICATES THE MATING CONNECTOR DESIGNATION STAMPED ON THE FRAME UNIT.

A. ASSUME EACH CONVERTER IS FULLY LOADED BEFORE AN ADDITIONAL CONVERTER IS USED. A FULLY LOADED CONVERTER SUPPLIES 14 ECHO SUPPRESSORS. A 4A ECHO SUPPRESSOR HAS A LIST 2 CURRENT DRAIN OF 0.3 AMPS AT -24V. A -48 TO -24V CONVERTER HAS A LIST 2 CURRENT DRAIN OF (.4+.189N) AMPS, WHERE N IS THE NUMBER OF ECHO SUPPRESSORS THE CONVERTER IS SUPPLYING. FOR EXAMPLE: A CONVERTER SUPPLYING 14 ECHO SUPPRESSORS WOULD HAVE A LIST 2 CURRENT DRAIN OF 3.045 AMPS.

106. THE POWER SUPPLY CONVERTER IS INTENDED FOR USE WITH 23-CELL POWER PLANTS, AND 24-CELL POWER PLANTS, AND 24-CELL POWER PLANTS WITH A COUNTER CELL. THE PARTICULAR POWER PLANT TO BE USED MUST BE SPECIFIED WHEN ORDERING THE POWER SUPPLY CONVERTER.

CIRCUIT NOTES: (CONT)

107. WHEN SURPLUS 3A ECHO SUPPRESSOR TONE DISABLERS (J68881AA-1,L-1,2,A) ARE AVAILABLE, THEY CAN BE USED IN PLACE OF THE 4A ECHO SUPPRESSOR TONE DISABLER. IF THE 4A ECHO SUPPRESSOR TONE DISABLER SHELF CONNECTOR (911A) HAS A CODING KEY, IT MUST BE REMOVED BEFORE INSERTION OF THE 3A ECHO SUPPRESSOR TONE DISABLER. THE SENSITIVITY OF THE 3A ECHO SUPPRESSOR TONE DISABLER MUST BE ADJUSTED AFTER IT IS INSERTED INTO THE 4A ECHO SUPPRESSOR BAY. THIS IS ACCOMPLISHED BY USE OF J68914TA 4A ECHO SUPPRESSOR TEST EXTENDER, PCP332-412-500 (SECTION ON DISABLER SENSITIVITY), AND A KNOWLEDGE OF THE FACT THAT THE (SUPR OUT) JACK JUST ABOVE THE (.AC IN) JACK ON THE 3A ECHO SUPPRESSOR BAY JACK FIELD CORRESPONDS TO THE (OUT) JACK OF THE (SUPR FAC SIDE) COLUMN OF THE TEST EXTENDER JACK FIELD, AND THE (SUPR IN) JACK, JUST BELOW THE (EQPT OUT) JACK, OF THE 3A ECHO SUPPRESSOR BAY JACK FIELD CORRESPONDS TO THE (IN) JACK OF (SUPR EQPT SIDE) COLUMN OF THE TEST EXTENDER JACK FIELD.

108. WHEN SURPLUS 3A ECHO SUPPRESSOR BRIDGING AMPLIFIERS (J68881AR-1L-1,2,A,3) ARE AVAILABLE, THEY CAN BE USED IN PLACE OF THE 4A ECHO SUPPRESSOR BRIDGING AMPLIFIERS. IF THE 4A ECHO SUPPRESSOR BRIDGING AMPLIFIER SHELF CONNECTOR (911A) HAS A CODING KEY, IT MUST BE REMOVED BEFORE THE INSERTION OF THE 3A ECHO SUPPRESSOR BRIDGING AND AMPLIFIER.

109. IN CONSOLIDATED BAY SYSTEMS WHEN AN ECHO SUPPRESSOR IS NOT REQUIRED THE TONE DISABLER (J68914AA) BRIDGING AMPLIFIER (J68914AB) AND LOGIC UNIT (J68914AC) MAY BE REMOVED AND TRANSMISSION CONTINUITY PROVIDED BY PUTTING THE LOGIC PLUG (J68914AD) IN PLACE OF THE LOGIC UNIT (J68914AC).

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS,
CAPACITANCE VALUES ARE IN MICROFARADS,
VALUES PRECEDED BY THE SYMBOL + (PLUS)
OR – (MINUS) ARE IN VOLTS.

302. POWER CONVERTER FAILURE DETECTOR STATE TABLE (TYPICAL FOR CONVERTER NUMBER 1)

	PF1 FUSE	POWER CONVERTER	PF1 FUSE	PF1 KEY	PF1 RELAY	PF1 LAMP	PC ALARM LAMP	MAJOR ALARM
1	OUT	OUT	OUT	NO	NO	OFF	OFF	OFF
2	OUT	OUT	OUT	0	NO	ON	ON	ON
3	IN	OUT	OUT	NO	NO	ON	OFF	OFF
4	IN	OUT	OUT	0	NO	ON	ON	ON
5	IN	IN	OUT	NO	NO	ON	OFF	OFF
6	IN	IN	OUT	C	NO	ON	ON	ON
7	IN	IN	IN	NO	0	ON	OFF	OFF
8	IN	IN	IN	0	0	OFF	OFF	OFF
9	BLOWN	IN	IN	NO	NO	OFF	ON	ON
10	BLOWN	IN	IN	0	NO	ON	ON	ON
11	IN	LOW	IN	NO	NO	ON	OFF	OFF
12	IN	LOW	IN	0	NO	ON	ON	ON
13	IN	HIGH	IN	NO	NO	ON	OFF	OFF
14	IN	HIGH	IN	0	NO	ON	ON	ON

THE NORMAL STATE FOR AN UNEQUIPPED POSITION IS 1
THE NORMAL STATE FOR AN EQUIPPED POSITION IS 8
STATES 10,12 AND 14 ARE NORMAL ALARM CONDITIONS
STATES 9,11 AND 13 ARE NORMAL ALARM CLEARING CONDITIONS

EQUIPMENT NOTES:

201. THE MAXIMUM LOOP RESISTANCE THAT MAY BE USED WHEN GROUNDING THE (ESC) LEAD TO ENABLE THE ECHO SUPPRESSOR IS 100 OHMS.

202. WHEN A GROUND IS APPLIED TO THE ESC LEAD TO ENABLE THE ECHO SUPPRESSOR, THE LEAD BETWEEN THE (ESC) AND (GRD) TERMINALS ON TS (1) IS CUT FOR THE APPROPRIATE ECHO SUPPRESSOR.

203. SEGREGATED CABLES ARE REQUIRED WHEN THE CONNECTING CIRCUITS ARE NOT CONTAINED WITHIN THE SAME BAY.

204. EITHER DIRECT CABLING TO CONNECTING CIRCUITS OR CABLING TO A DISTRIBUTING FRAME MAY BE USED AS APPROPRIATE.

205. EXTRA LOOP OF WIRE SHOULD BE USED IN STRAPPING THE (ESC) AND (GRD) TERMINALS IN CAD. 5 TO FACILITATE CUTTING STRAP BY INSTALLER IF REQUIRED.

DRAWING ISSUE: 1 D5; 2A

ISSUE 6AR

4A ECHO SUPPRESSOR CIRCUIT

BELL TELEPHONE LABORATORIES INCORPORATED

SD-66044-01-01

6S

SD-66044-01-01

CAD 8

TSB ON ED6G403

K

7 P — (F1) FUSE
P — J1 ON SHELF TERM. NO. 10 & 11
5 — J1 ON SHELF TERM. NO. 13 & 14
GRD A ON FUSE BLOCK
3 P — J1 ON SHELF TERM. NO. 2
1 — (P1) FUSE
J1 ON SHELF TERM. NO. 20
(ROW 0) 18 GA
E

6 P — (F5) FUSE
P — J2 ON SHELF TERM. NO. 10 & 11
4 — J2 ON SHELF TERM. NO. 13 & 14
GRD B ON FUSE BLOCK
2 P — J2 ON SHELF TERM. NO. 2
0 — (P2) FUSE
J2 ON SHELF TERM. NO. 20
(ROW 1) 18 GA
E

7 P — (F9) FUSE
P — J3 ON SHELF TERM. NO. 10 & 11
5 — J3 ON SHELF TERM. NO. 13 & 14
GRD A ON FUSE BLOCK
3 P — J3 ON SHELF TERM. NO. 2
1 — (P3) FUSE
J3 ON SHELF TERM. NO. 20
(ROW 2) 18 GA
E

6 P — (F13) FUSE
P — J4 ON SHELF TERM. NO. 10 & 11
4 — J4 ON SHELF TERM. NO. 13 & 14
GRD B ON FUSE BLOCK
2 P — J4 ON SHELF TERM. NO. 2
0 — (P4) FUSE
J4 ON SHELF TERM. NO. 20
(ROW 3) 18 GA
E

7 -24 P — (F1) FUSE
SHELF 1 ALL TERM. NO. 7
TSI ROW 57 TERM. NO. 0
5 LCB — SHELF 1 ALL TERM. NO. 18
GRD A ON FUSE BLOCK
3 -24 P — (F2) FUSE
SHELF 2 ALL TERM. NO. 7
1 — GRD
SHELF 2 ALL TERM. NO. 18
(ROW 4) 18GA — TSI ROW 58 TERM. NO. 0
LCB
E

6 -24 P — (F3) FUSE
SHELF 3 ALL TERM. NO. 7
SHELF 3 ALL TERM. NO. 18
4 LCB GRD — TSI ROW 59 TERM. NO. 0
GRD A ON FUSE BLOCK
2 -24 P — (F4) FUSE
SHELF 4 TERM. NO. 7 IST TWO SUP
0 — SHELF 4 TERM. NO. 18 IST TWO SUP
(ROW 5) 18GA — TSI ROW 60 TERM. NO. 0
LCB
E

7 -24 P — (F5) FUSE
SHELF 4 TERM. NO. 7 LAST TWO SUP
TSI ROW 60 TERM. NO. 6
5 LCB GRD — SHELF 4 TERM. NO. 18 LAST TWO SUP
GRD B ON FUSE BLOCK
3 -24 P — (F6) FUSE
SHELF 5 ALL TERM. NO. 7
1 — GRD
SHELF 5 ALL TERM. NO. 18
(ROW 6) 18GA — TSI ROW 61 TERM. NO. 0
LCB
E

6 -24 P — (F7) FUSE
SHELF 6 ALL TERM. NO. 7
TSI ROW 62 TERM. NO. 0
4 LCB GRD — SHELF 6 ALL TERM. NO. 18
GRD B ON FUSE BLOCK
2 -24 P — (F8) FUSE
SHELF 7 ALL TERM. NO. 7
0 — GRD
SHELF 7 ALL TERM. NO. 18
(ROW 7) 18GA — TSI ROW 63 TERM. NO. 0
LCB
E

7 -24 P — (F9) FUSE
SHELF 8 ALL TERM. NO. 7
TSI ROW 64 TERM. NO. 0
5 LCB GRD — SHELF 8 ALL TERM. NO. 18
GRD A ON FUSE BLOCK
3 -24 P — (F10) FUSE
SHELF 9 ALL TERM. NO. 7
0 — GRD
SHELF 9 ALL TERM. NO. 18
(ROW 8) 18GA — TSI ROW 65 TERM. NO. 0
LCB
E

6 -24 P — (F11) FUSE
SHELF 10 ALL TERM. NO. 7
TSI ROW 66 TERM. NO. 0
4 LCB GRD — SHELF 10 ALL TERM. NO 18
GRD A ON FUSE BLOCK
2 -24 P — (F12) FUSE
SHELF 11 TERM. NO. 7 IST TWO SUP
0 — GRD
SHELF 11 TERM. NO. 18 IST TWO SUP
(ROW 9) 18GA — TSI ROW 67 TERM. NO. 0
LCB
E

7 -24 P — (F13) FUSE
SHELF 11 TERM. NO. 7 LAST TWO SUP
TSI ROW 67 TERM. NO. 6
5 LCB GRD — SHELF 11 TERM. NO. 18 LAST TWO SUP
GRD A ON FUSE BLOCK
3 -24 P — (F14) FUSE
SHELF 12 ALL TERM. NO. 7
1 — GRD
SHELF 12 ALL TERM. NO. 18
(ROW 10) 18GA — TSI ROW 68 TERM NO. 0
LCB
E

6 -24 P — (F15) FUSE
SHELF 13 ALL TERM. NO. 7
TSI ROW 69 TERM. NO. 0
4 LCB GRD — SHELF 13 ALL TERM. NO 18
GRD B ON FUSE BLOCK
2 -24 P — (F16) FUSE
SHELF 14 ALL TERM. NO. 7
0 — GRD
SHELF 14 ALL TERM. NO. 18
(ROW 11) 18GA — TSI ROW 70 TERM. NO. 0
LCB
E

7 P — 1 MJ (MJ) RELAY TO TSI
5 — 1M MJR (MJ) RELAY TO TSI
3 P LCB — 2 MJV (MJ) RELAY TO TSI
1 — 2M MJVR (MJ) RELAY TO TSI
(ROW 12)
E
LCB (22GA)

6 P — 10 MN (MN) RELAY TO TSI
4 — 10M MNR (MN) RELAY TO TSI
2 P LCB — 11 MNV (MN) RELAY TO TSI
0 — 11M MNVR (MN) RELAY TO TSI
(ROW 13)
LCB (22 GA)

X 4 X — (ALM) FUSE
Y 1 Y — (MN) REL
Z 0 Z — (MJ) REL
ROW 14
Y

DRAWING ISSUE 1
2A

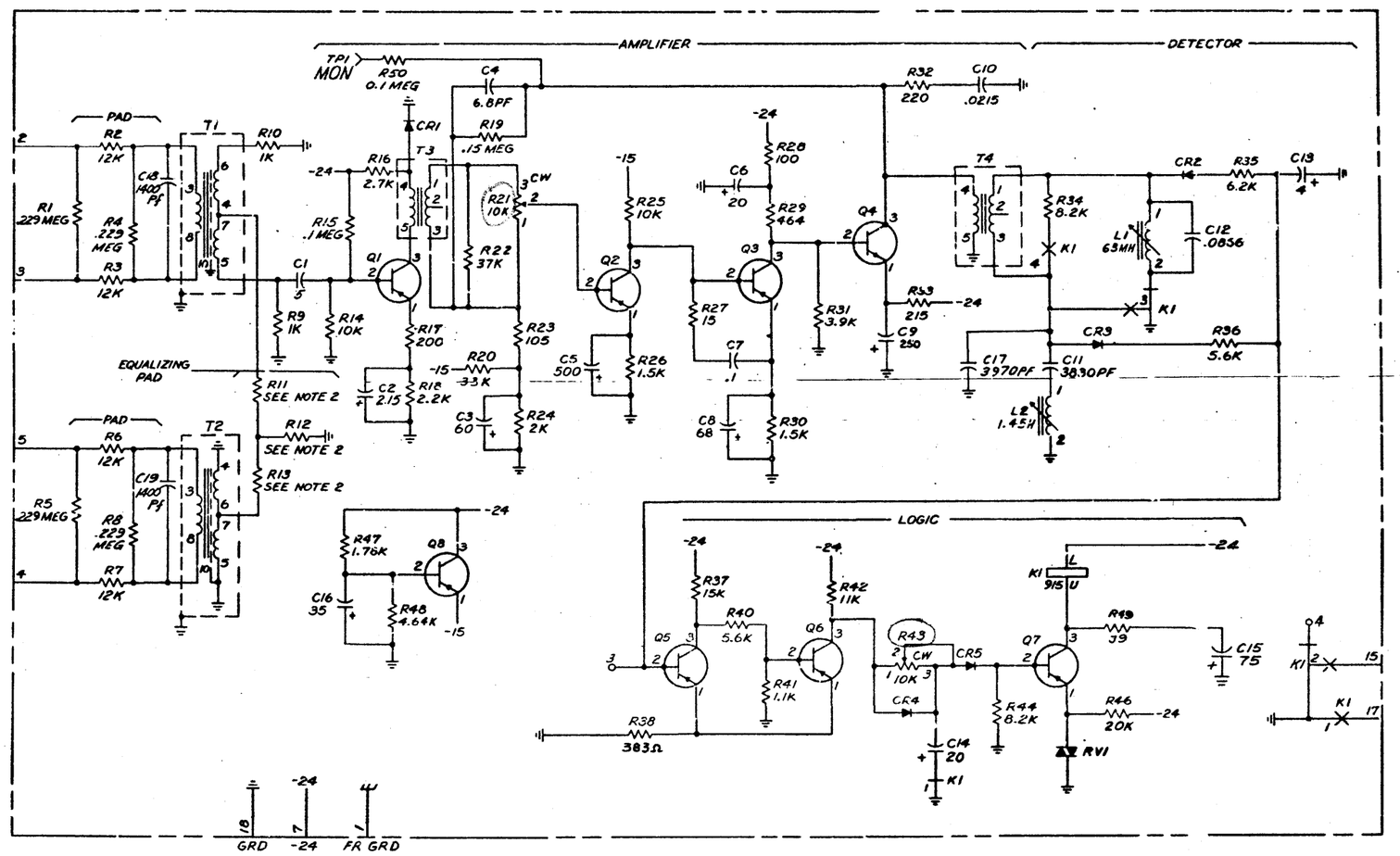
ISSUE 6AR

4A ECHO SUPPRESSOR CIRCUIT (2) SD-6G044-01-G2

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-6G044-01-G2

PART OF CPS I
TONE DISABLER
(SEE NOTE 2)



COMPONENT LIST

RELAY

DESIG	K1
CODE	MA1A
OPT:DM	
CONT ARR	LOC
6	
5	
4 EBM	1B7
3 EBM	1C7
2 EBM	1E8
1 EBM	a
COIL	106
a	1E8 1F6

RELAY NOT ADJUSTABLE, REPLACE WHEN THERE IS A MALFUNCTION.

CAPACITOR

DESIG	CODE
C1	601A, 5
C2	596C, 2.15
C3	KS-16390, L5, 60
C4	KS-14056, L2, 6.8PF
C5	KS-16390, L13, 500
C6	KS-16390, L4, 20
C7	542L, .1
C8	KS-19524, L6, 68
C9	KS-19688, L40, 250
C10	542AA, .0215
C11	KS-16591, L3, 3830PF
C12	535AF, .0866
C13	542G, 4
C14	602C, 20
C15	KS-16390, L42, 75
C16	KS-16390, L16, 35
C17	KS-13368, L11, 3970 PF
C18	KS-16742, L3, 1400
C19	KS-16742, L3, 1400

DIODE

DESIG	CODE
CR1	459E
CR2-CR4	400A
CR5	459J

INDUCTOR

DESIG	CODE
L1	1586A, 63MH
L2	1586A, 1.45H

JACK

DESIG	CODE
TP1	EP67-7708

POTENTIOMETER

DESIG	CODE
R21	1RC CIRCUITRIM 100 SERIES, 10K
R43	1RC CIRCUITRIM 100 SERIES, 10K

RESISTOR

DESIG	CODE
R1	237A, .229 MEG
R2, R3	237A, 12K
R4, R5	237A, .229 MEG
R6, R7	237A, 12K
R8	237A, .229 MEG
R9, R10	238A, 1K
R11-R13	221A, SEE NOTE 2
R14	KS-19150, L1, 10K
R15	KS-19150, L1, .1 MEG
R16	KS-19150, L1, 2.7K
R17	KS-19150, L1, 200
R18	KS-19150, L1, 2.2K
R19	237A, .15 MEG
R20	KS-19150, L1, 33K
R22	237A, 37K
R23	237A, 105
R24	KS-19150, L1, 2K
R25	KS-19150, L1, 10K
R26	KS-19150, L1, 1.5K
R27	221A, 15
R28	237A, 100
R29	237A, 464
R30	KS-19150, L1, 1.5K
R31	KS-19150, L1, 3.9K

RESISTOR (CONT)

DESIG	CODE
R32	KS-19150, L1, 220
R33	227A, 215
R34	KS-19150, L1, 8.2K
R35	KS-19150, L1, 6.2K
R36	KS-19150, L1, 5.6K
R37	KS-19150, L1, 15K
R38	227A, 383Ω
R40	KS-19150, L1, 5.6K
R41	KS-19150, L1, 1.1K
R42	KS-19150, L1, 11K
R44	KS-19150, L1, 8.2K
R46	KS-19150, L1, 20K
R47	237A, 1.78K
R48	237A, 4.64K
R49	KS-19150, L1, 39
R50	238A, 100K

TRANSFORMER

DESIG	CODE
T1, T2	2578T
T3, T4	2532AM

TRANSISTOR

DESIG	CODE
Q1	12H
Q2	12M
Q3	12B
Q4	24D
Q5-Q7	12H
Q8	12D

VARISTOR

DESIG	CODE
RV1	100A

DRAWING ISSUE
1
2A

ISSUE 6AR

CPS I

4A ECHO SUPPRESSOR CIRCUIT

SD-66044-01-J!A

BELL TELEPHONE LABORATORIES INCORPORATED

SHEET NO. 6S

PART OF CPS 3

LOGIC

SUPPRESSION-BREAKIN | 6 DB PAD | TRANSMIT SIDE AMPLIFIER | RECEIVE SIDE AMPLIFIER | 6DB PAD AND SCRAMBLED SPEECH | SUPPRESSION-BREAKIN

THRESHOLD DETECTOR | SPEECH SCRAMBLER

HOLDOVER CKT | RELAYS AND SWITCHES | NO.1 AND GATE | DIFFERENTIAL DETECTOR | NO.2 AND GATE | RELAYS AND SWITCHES | HOLDOVER CIRCUIT

SWITCHABLE PAD | ENVELOPE DETECTOR | ENVELOPE DETECTOR | SWITCHABLE PAD

-24 GRD FRAME GRD

DRAWING ISSUE 1 DS 2A

ISSUE 6AR

CPS 3

4A ECHO SUPPRESSOR CIRCUIT

SD-66044-01-J3A

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-66044-01-J3A

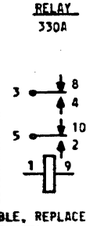
PART OF CPS 3
LOGIC

COMPONENT LIST

RELAY

DESIG	K1
CODE	MA3A
OPTION	
CONT ARR	LOC
6	
5	
4	
3	
2	
1	3A/DD
COIL	3A/DD

RELAY 330A



K2	K3	K4	K5
3A/B7	3A/G7	3A/G2	3A/A8
3A/A0	3A/B8	3A/A1	3A/A0
3A/E1	3A/E1	3A/E8	3A/E8

RELAY NOT ADJUSTABLE, REPLACE WHEN THERE IS MALFUNCTION.

CAPACITOR

DESIG	CODE
C1	535CN
C2	KS-16390 L6, 100
C3	602A, 40
C4	602B, 100
C5	535CN
C6	KS-19953 L3, OR KS-19107, L1, .022
C7	542C, .25
C8	KS-16390 L9, 100
C9	608B, 40
C10	KS-19658 L3, 150
C11	602A, 40
C12	535CN
C13	600A, 1
C14	602A, 40
C15	(Z) 535EH, 0.124 (Y) 535CL, .193
C16	602A, 40
C17	600A, 1
C18	602A, 40
C19	542A, .50
C20	535HC, 3.24
C21	542C, .25
C22, C23	535JM, 3.83
C24	KS-16390 L5, 60
C25	535HC, 3.24
C26	542C, .25
C27	KS-19774 L5, .082UF
(Y) C28	KS-19774 L2, .01
(Y) C29	KS-19774 L2, .01

DIODE

DESIG	CODE
CR1	446C
CR2-CR5	1N3666
CR7, CR8	1N3666
CR9	1/4(483A)
CR10	458C
CR11, CR12	458C
CR13, CR14	459F
CR15	446L
CR16	1N3666
CR17	446L
CR18	1N3666
CR19	446T
CR20, CR21	459F
CR22, CR23	459C
CR24	456C
CR25	458A

POTENTIOMETER

DESIG	CODE
R11	KS-19069, 100
R20	1RC100, 1K
R81	1RC100, 10K

RESISTOR

DESIG	CODE
R1	238A, 549
R2	238A, 16.9K
R3	238A, 549
R4	KS-16312 L6A, 1130
R5	238A, 274
R6	KS-16312 L6A, 2.15K
R7	238A, 1K
R8	KS-16312 L6A, 2.15K

COMPONENT LIST (CONT)

RESISTOR (CONT)

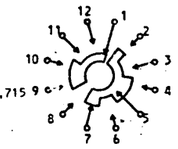
DESIG	CODE
R9	KS-16312 L6A, 723
R10	KS-16312 L6A, 196
R12	238A, 1.47K
R13	238A, 121
R14	238A, 68.1
R15	238A, 5.3K
R16	238A, 8.25K
R17	238A, 46.4
R18	238A, 18.7
R21	238A, 178
R22	238A, 51.1
R23	238A, 365
R24	238A, 20K
R25	238A, 1.87K
R26	238A, 22.6K
R27	238A, 280
R28	238A, 750
R29	238A, 549
R30	(Z) 238A, 715 (Y) KS-20289 L6A, 715
R31	238A, 10K
R32	238A, 21.5K
R33	238A, 10K
R34	238A, 21.5K
R35	238A, SEE NOTE 4
R36	238A, 4.02K
R37	238A, SEE NOTE 4
R38	238A, 681
R39	238A, 9.2K
R40	KS-16312 L6A, 14.7K
R41	238A, 7.5K
R42	238A, 17.8K
R43	KS-16312 L6A, 30.1
R44	238A, 1.47K
R45	KS-16312 L6A, 30.1
R46	238A, 1.47K
R47	238A, 17.8K
R48	238A, 7.5K
R49	238A, 6.81K
R50	238A, 1.33K
R51	KS-16312 L6A, 28.7
R52	238A, 215
R53	238A, 681
R54	238A, 5.11K
R55	KS-16312 L6A, 88.7K
R56	238A, 511K
R57	238A, 1.62K
R58	238A, 5.11K
R59	238A, 8.25K
R60, R61	238A, 10K
R62, R63	238A, 2.61K
R64	238A, 121
R65	KS-16312 L6A, 5.9K
R66	KS-16312 L6A, 15.2K
R67	238A, 10K
R68	238A, 121
R69	238A, 5.11K
R70	238A, 10K
R71	238A, 18.7K
R72	238A, 4.42K
R73	238A, 4.02K
R74	238A, 14K
R75	KS-16312 L6A, 90.9K
R76	KS-16312 L6A, 15K
R77	238A, 9.2K
R78	KS-16312 L6A, 46.4K
R79	KS-16312 L6A, 15K
R80	238A, 9.2K
R82	238A, 4.02K
R83	238A, 14K
R84	238A, 4.42K
R85	238A, 18.7K
R86	KS-16312 L6A 46.4K
R87	KS-16312 L6A 90.9K
R88	238A, 10K
R89	238A, 1.62K
R90	KS-16312 L6A, 15.2K

COMPONENT LIST (CONT)

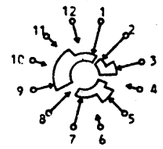
RESISTOR (CONT)

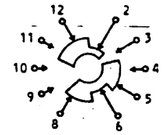
DESIG	CODE
R91	KS-16312 L6A, 5.9K
R92	238A, 10K
R93	238A, 2.61K
R94, R95	238A, 10K
R96	238A, 2.61K
R99	238A, 1.62K
R100	KS-16312 L6A, 88.7K
R101-R103	238A, 5.11K
R104	238A, 90.9K

SECT.1, FRONT

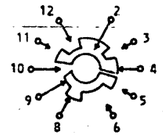


SECT.2, FRONT





SECT.1, REAR



SECT.2, REAR

DESIG		S1		
CODE		KS-19819 L29		
OPTION				
CIRCUIT		A	B	C
SECT 1	FRONT	3A/86	3A/A1	3A/C5
	REAR	3A/G5	3A/A1	
SECT 2	FRONT	3A/66	3A/B7	
	REAR	3A/G4	3A/A7	

TRANSFORMER

DESIG	CODE
T1	2532AU
T2, T3	2568C
T4	2532AU
T5-T7	2564W
T8, T9	2532AW

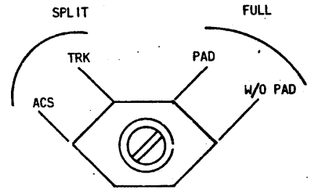
TRANSISTOR

DESIG	CODE
Q1	51A
Q2	43A
Q3	12B
Q4-Q7	16G
Q8-Q13	51A
Q14, Q15	16K
Q16, Q17	16G
Q19, Q20	51A
Q21, Q32 (NOTE 3)	22B
Q22	51A
Q23, Q29 (NOTE 3)	22B
Q24	51A
Q25, Q27 (NOTE 3)	22B
Q26	KS-20102
Q28, Q30	51A
Q31, Q33	51A
Q34, Q35	16G
Q37, Q38	16K
Q39, Q40	170 (Z), 51D (Y)

COMPONENT LIST (CONT)

VARISTOR

DESIG	CODE
RV2	100D
RV3	(Z) 105A, (Y) 106A
RV4-RV6	100D
RV7	(Z) 100D, (Y) 100J
RV8	(Z) 105A, (Y) 106A



MANUFACTURING REFERENCES

CATEGORY	NO.
LOGIC UNIT	J68914AC
CIRCUIT PACK CODE AND ASSEMBLY DRAWING	ED-66470 ED-66471
CONNECTOR ON FRAME	911A

INPUT/OUTPUT INFORMATION

SHOWN ON CD-66044-01

NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.
2. ⏚ GROUND RETURN.
3. MATCHED PAIR.
4. THE VALUES OF (R35) AND (R37) ARE CHOSEN TO MEET X-SPEC REQUIREMENTS AT THE FACTORY DURING FINAL TESTING. THE POSSIBLE COMBINATIONS ARE:

R37 238A TYPE	R35 238A TYPE
12.4K	6.19K
12.7K	5.90K
12.9K	5.76K
13.0K	5.62K
13.2K	5.49K
13.3K	5.36K
13.4K	5.23K
13.5K	5.11K
13.7K	4.99K
13.8K	4.87K

5. RECORD OF CHANGES

DWG ISS	PREV FURN	STD	MFR DISC	SEE NOTE
5B	Z	Y	Z	

DRAWING ISSUE 1 OS; 2A; 3B

ISSUE 6AR

CPS 3

4A ECHO SUPPRESSOR CIRCUIT

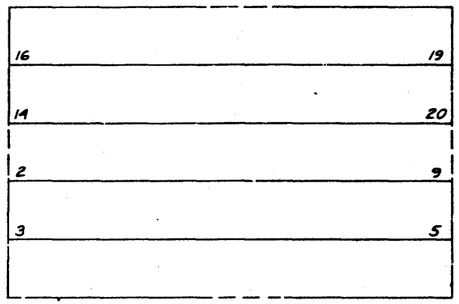
SD-66044-01-J3B

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-66044-01-J3B

CPS 4

LOGIC PLUG



MANUFACTURING REFERENCES

CATEGORY	NO.
LOGIC PLUG	J68914AD
CONNECTOR ON FRAME	711A

CIRCUIT DESCRIPTION

REPLACES LOGIC UNIT TO PROVIDE TRANSMISSION CONTINUITY IN CONSOLIDATED BAY SYSTEM WHEN ECHO SUPPRESSOR IS NOT REQUIRED.

ISSUE 6AR

4A ECHO SUPPRESSOR CIRCUIT

SD-66044-01-J4

BELL TELEPHONE LABORATORIES INCORPORATED

6S

SD-66044-01-J4