SD-95277-01

DRAWING INDEX TABLE

	71A GENERATOR		71B GENERATOR		71C GENERATOR		71D NETWORK PANEL		71E NETWORK PANEL	
	FIG.	SHEET	FIG.	SHEET	FIG.	SHEET	FIG.	SHEET	FIG.	SHEET
CIRCUIT SCHEMATICS	1	2	2		8,9	2				
SIMPLIFIED CIRCUIT DIAGRAM	101	3			102	3				
MW SYSTEM BLOCK DIAGRAMS	103	3			104	3	104	3	104	3
CABLING DIAGRAMS	CAD. 1,7 CAD. 2	4			CAD. 3,4 CAD. 8	4 4	CAD. 5	5	CAD. 6	5
DISTRIBUTING NETWORKS (ADJUSTABLE)	6,7	3					6,7	3	6,7	3
DISTRIBUTING NETWORK MODIFICATION FOR +0.5 DBM	7,10,11	3					7,10,11	3	7,10,11	3
DISTRIBUTING NETWORKS (NONADJUSTABLE)	4,5	3								
CIRCUIT NOTES EQUIPMENT NOTES INFORMATION NOTES		1				1		1		1
LIST OF CONNECTING CIRCUITS	TABLE C	1			TABLE C	1	TABLE C	1	TABLE C	1
APPARATUS TERMINAL AND WIRING LOCATION TABLES A B, AND D		6								

DWG NO	CD NO	DWG NO	CD NO	DWG NO	CD NO
1	1	2A	2A	3D	3D
4D	4D	5D	4D APP 2B	6D	4D APP 2B
7A	4D APP 2A	8D	5D	9A	6B APP 1A
10B	5D APP 2B				

DWG NO	CD ISSUE	DATE ISSUED	DRAWN	APPD
11B	6B	10-1-62	TMS RA	PJK BCB MEJ
12B	6B APP 1B	12-22-64	JF AEZ	PJK BCB TEB
13B	6B APP 2B	8-25-66	GS DJG	PJK AJK WFO
14B	6B APP 3B	8-7-72	GRL GWW	PJK TCA MEJ

J94071E ( )
J94071D ( )
J94071C ( )
J94071B ( )
J94071A ( )
EQUIPMENT INFO.

ISSUE 14B

REPLACING SD-95000-01 & SD-95000-02

SD-95277-01 1N20

COMMON SYSTEMS

TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CKT

USING 71 TYPE MILLIWATT REFERENCE GENERATOR

(71A,71B & 71C MW REF GEN)
(71D & 71E NETWORK PANELS)

AT&TCO STANDARD

SD-95277-01-A
7 SHEETS

BELL TELEPHONE LABORATORIES INCORPORATED

6S

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SD-95277-01-A

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
A	1-1/3	48V SIG	MAX.ONE FIG.1 OR MAX.ONE FIGS.8 & 9

BATTERY SYMBOL	VOLTAGE RANGE
-48	45-50V SIG

71A-CURRENT DRAIN IS ABOUT 23 MA AT 48 VOLTS
71C-CURRENT DRAIN IS ABOUT 80 MA AT 48 VOLTS

102.

FEATURE OR OPTION		PROVIDE FIG.	PROVIDE APP OR WIR	PROVIDE QUANTITY
GENERATOR	GEN(J94071A)	1,CAD 1 *	SEE TABLES B & D	ONE PER 1-4 NETWORKS
	(J94071C)	8,9		ONE PER 1-50 NETWORKS
KS-16744 DISTRIB NETWORKS	900Ω NON-ADJUSTABLE	4(MD)		AS SPEC 1-4 SERVED BY FIG.1
	600Ω NON-ADJUSTABLE	5(MD)		
	900Ω ADJUSTABLE	6(MD),10(MD)	SEE NOTE 111	1-50 SERVED BY FIG.9
	600Ω ADJUSTABLE	7,11		

*PRIOR TO ISSUE 3D, CAD 1 WAS FIG.3.

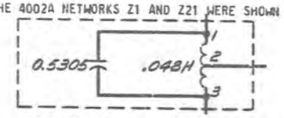
103. DISTRIBUTING NETWORKS FOR ONE TO FOUR OUTLETS ARE PROVIDED AND INSTALLED AS SHOWN IN NOTE 102 AND TABLES A,B AND D.

104. RESISTOR (R33) IS FOR "A" OR "B" OPTION AS DETERMINED BY FACTORY TEST. NO RECORD REQUIRED.

105. FOR RECORD OF FIGURES, WIRING AND APPARATUS CHANGES, SEE TABLE ON EXTREME RIGHT SIDE OF THIS SHEET.

106. PRIOR TO ISSUE 3D THE (CR1) DIODES IN FIG.1 AND SIMILARLY IN FIG.2 FOR (CR21). THE DIODES WERE SHOWN THUSLY AND WERE ELECTRICALLY EQUIVALENT TO THE 433A BY SELECTION.

ALSO THE 4002A NETWORKS Z1 AND Z21 WERE SHOWN THUSLY:



107. PROVIDE "LL" OPTION IN FIGS.4,5,6 AND 7. WHEN THE DISTRIBUTING NETWORK IS CONNECTED TO THE GENERATOR AND NOT SERVING A CONNECTING CIRCUIT.

108. ON ISSUE 4D, FIG.9 WAS PART OF FIG.8.

109. PRIOR TO ISSUE 6D THE JACK DESIGNATIONS IN FIGS.1,8,101 AND 102 WERE SHOWN THUSLY:
(600 / OUTPUT), AND IN FIG.2 THUSLY: (OUTPUT) (600) J21, (900) J22

110. PRIOR TO ISSUE 6D THE THERMISTOR IN FIG.8 WAS SHOWN AS TWO 3A THERMISTORS, RT1 AND RT2.

111. DESIGNATIONS "T,R" BECOME "T1,R1" WHEN ANY NETWORK PER FIG.7 IS USED WITH FIG. 11 TO PROVIDE 0.5 DBM INTO 600 OHMS AS REQUIRED BY SD-68446-01 AND SD-95698-01 (ISSUE 9 OR LATER).

112. F51618 TRANSISTORS WITH A MAXIMUM BASE RESISTANCE OF 60 OHMS WERE USED IN EARLY PRODUCTION UNITS.

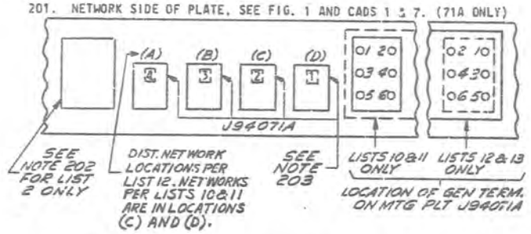
113. LOOP RESISTANCE OF WIRING BETWEEN THE TERMINAL STRIP ON THE MW REF. GEN. AND THE TERMINAL STRIP ON THE DISTRIBUTING NETWORK PANEL SHALL BE LESS THAN 0.5 OHM.

114. THE DISTRIBUTING NETWORK IN FIG. 7 IS USED FOR 600-OR 900-OHM APPLICATIONS OR AS A SPARE. A PARTICULAR APPLICATION DETERMINES CONNECTIONS OF THE NETWORK ACCORDING TO OPTIONS "D" AND "LL". REFER TO TABLE E FOR NETWORK OPTIONS.

115. THE "C" STRAPS ON FIG. 6 AND 7 ARE CONNECTED ACCORDING TO BSP 103-335-513 TO COMPENSATE FOR OFFICE WIRING AND EQUIPMENT LOSS.

EQUIPMENT NOTES:

201. NETWORK SIDE OF PLATE, SEE FIG. 1 AND CADS 1 & 7. (71A ONLY)



202. THE UNIT TERMINAL STRIP AND ASSOCIATED BRACKET MAY BE MOUNTED EITHER ON APPARATUS SIDE OR ON WIRING SIDE, IN ACCORDANCE WITH 71A, DEPENDING UPON TYPE OF BAY IN WHICH UNIT IS INSTALLED.

203. DISTRIBUTING NETWORK DESIGNATIONS (1,2,3,4) SHALL BE RUBBER STAMPED BY THE INSTALLER IN 1/8 INCH CHARACTERS ON EACH NETWORK IN APPROXIMATE LOCATION SHOWN.

204. TWO SEPARATE T9-R9 PAIRS SHALL BE RUN FROM TERMINALS 2-1 OF THE T1 REPEATING COIL TO THE UNIT TERMINAL STRIP AND TWO SEPARATE PAIRS SHALL BE USED TO CONNECT TERMINALS 5-6 OF THE T1 REPEATING COIL TO RESISTORS R11 TO R18 INCLUSIVE AND TO RESISTORS R7 AND R8.

205. EARLY PRODUCTION UNITS OF THE 71A WERE WIRED PER CAD.1 AND CAD.2 EXCEPT THAT NUMBERING OF TERMINALS 1 TO 32 STARTED AT BOTTOM OF TERMINAL STRIP. CAD.7 APPLIED ON ISSUE 8D WITH BATTERY AND GROUND LEADS CONNECTED IN BOTTOM ROW WITH UNUSED TERMINAL 3 BETWEEN.

206. WHEN PRACTICAL, THE GENERATOR AND NETWORK PANELS SHOULD BE MOUNTED AT A CONVENIENT WORKING LEVEL TO FACILITATE INITIAL AND PERIODIC TESTS PER BSP 103-335-300.

207. DISTRIBUTING NETWORKS PER FIG. 7 ARE MOUNTED AND MULTIPLIED IN GROUPS OF FIVE (5) ON 71D AND 71E NETWORK PANELS, WITH A MAXIMUM OF TWO (2) GROUPS PER PANEL. NETWORKS PER FIG. 6 AND 7 OF THIS DRAWING ARE IDENTICAL TO THAT OF FIG. 3 OF SD-95277-02.

208. PRIOR TO ISSUE 14B,263A RESISTORS WERE 145C OR 221A RESISTORS. IN ALL CASES OF REPAIR OR REPLACEMENT, WHEN 145C OR 221A RESISTORS ARE REPLACED THEY SHALL BE REPLACED WITH 263A RESISTORS.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.

302. OFFICE RECORD NEED NOT BE MAINTAINED FOR "C","D" OR "LL" OPTIONS ON DISTRIBUTING NETWORKS (NOTE 115). RECORD OF THESE OPTIONS SHALL BE KEPT IN MILLIWATT RECORD BOOK ED-95166.

303. ALL CONNECTING CIRCUITS ON WHICH DC MAY, UNDER ANY CIRCUMSTANCES, BE PRESENT SHALL BE EQUIPPED WITH BLOCKING-CAPACITORS. AN EXCEPTION TO THIS IS GROUND CROSS DETECTING CIRCUIT SD-1A231-01.

304. ALL CONNECTING UNITS SHALL BE TERMINATED IN 600 OR 900 OHMS RESISTANCE AT ALL TIMES, SUCH AS A CIRCUIT UNDER TEST, EXCEPT WHEN PROVIDED WITH A SENDING PAD OF 15 DB OR MORE LOSS.

305. ALL CONNECTING CIRCUITS USED FOR TESTING WHERE AN OPEN CIRCUIT, A SHORT CIRCUIT OR A LOW IMPEDANCE TERMINATION MAY OCCUR ACROSS THE CONNECTING CIRCUIT SHALL BE PROVIDED WITH A SENDING PAD OF 15 DB OR MORE LOSS.

306. SENDING APPEARANCES FOR CONNECTING CIRCUITS SHALL NOT BE MULTIPLED EXCEPT AT MANUAL SWITCHBOARDS HAVING ADEQUATE BUSY TEST FEATURES.

307. THE FOLLOWING AREAS SHOULD HAVE EXCLUSIVE USE OF A MILLIWATT DISTRIBUTING SYSTEM: TOLL TESTBOARD, SWITCHING, MANUAL SWITCHBOARD, VOICE FREQ PATCH BAY, CARRIER EQUIPMENT, PRIVATE LINE TESTBOARD, PROGRAM, TELEGRAPH TEST AND ANY EQUIPMENT AREA NOT LOCATED NEAR OR UNDER CONTROL OF THE AREAS LISTED ABOVE. THIS LATTER EQUIPMENT AREA MAY CONTAIN THE FOLLOWING GROUPS OF EQUIPMENT: ECHO SUPPRESSOR BAYS, REPEATER BAYS, SIGNALING BAYS, ANNOUNCEMENT SYSTEMS, SERVICE OBSERVING EQUIPMENT, ATTC AND ASSOCIATED TEST FRAMES, AND MANUAL AND/OR AUTOMATIC TEST FRAMES.

308. THE ADMINISTRATION OF ALL OUTLETS FROM ONE MILLIWATT DISTRIBUTING SYSTEM SHOULD BE LIMITED TO A SINGLE PLANT ORGANIZATION WITHIN AN OPERATING COMPANY, ON THE SAME FLOOR AND IN THE SAME AREA OF THE BUILDING.

309. ALL CIRCUIT COMPONENTS ON THIS DRAWING HAVE BEEN CHOSEN FOR TEMPERATURE PERFORMANCE. COMPONENTS OF A DIFFERENT CODE OR UNCERTAIN TEMPERATURE CHARACTERISTICS SHOULD NOT BE SUBSTITUTED IN THE CIRCUIT COVERED BY THIS DRAWING WITHOUT CONSIDERATION OF THE EFFECTS ON OVERALL MILLIWATT DISTRIBUTING STABILITY.

310. ON DRAWING COVERING CIRCUITS CONNECTING TO AN OUTLET OF THE 71-TYPE GENERATOR, THE FREQUENCY, LEVEL, AND IMPEDANCE REQUIRED BY THE CONNECTING CIRCUIT SHOULD BE DESIGNATED AS FOLLOWS:

TO MILLIWATT DIST CKT

(FREQUENCY) (LEVEL) (IMPEDANCE)

TABLE C

A PARTIAL LIST OF CONNECTING CKTS TO M.W. DIST CKT SEE NOTES 304,305,306 & 310

SD-59432-01	TRANS.MEAS.CKT.(VF CHAN PATCH BAYS)
SD-59433-01	NOISE MEAS.CKT.(VF CHAN PATCH BAYS)
SD-59972-01	MAINT.CKT.(T&SI)
SD-68095-01	TEST LINE CKT.(4W INTERTOLL)(MFR DISC.)
SD-68445-01	ANNOUNCEMENT SYSTEM NO. 5A
SD-68446-01	AUTOMATIC TRANS.T&C CKT.(SEE NOTE 111)
SD-68544-01	JACK CKT. T.T. UNIT NO. 5
SD-95101-01	SENDING JACK CKTS.
SD-95147-01	SENDING PAD CKTS.
SD-95162-01	REPEATER MEAS.CKT.(V_1 & V_3)
SD-95162-02	1000 CPS OUTLETS,REC.JACKS & CONTROLS
SD-95608-01	ANNOUNCEMENT SYSTEM NO 6A
SD-95698-01	TRANS.& NOISE CHK.CKT. SEE NOTE 111)
SD-95900-01	TRANS.& NOISE MEAS.CKT.(TESTBOARDS)
SD-96519-01	TEST & MON.CKT.(FOR SIGNALING)
SD-97118-01	N2 CARRIER TELEPHONE APPLICATION SCHEM.
SD-98100-01	TRANS.TEST LINE CKTS.
SD-95779-01	MF PULSING RECEIVER ADJUSTING CKT
SD-96000-01	TEST LINE CIRCUIT
SD-32521-01	SXS ROTL CIRCUIT

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES

CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT STD	A&M	MD
3D	FIG.6 OR 7	FIG.4 OR 5		FIG.6 & 7		FIG.4 & 5
	433A DIODE	420A DIODE	106	433A DIODE		420A DIODE
	LL	NONE	107	LL		
4D	FIG. 8	NONE		FIG. 8		
5D	FIG. 9		108	FIG. 9		
6D	FIG.10,11	NONE	111	FIG.10,11		
8D	E OR F IN FIGS.1 & 2	E		F		E
10B	G OR H	G	112	H		G
11B	FIG.6 OR 7	FIG. 6	114	FIG. 7		FIG. 6
	J OR K	J		K		J
	M OR N	M		N		M
12B	P OR Q	P		Q		P
	R OR S	R		S		R,FIG.10
14B	T OR U	T		U		T
	RESISTORS		208	263A		145C,221A

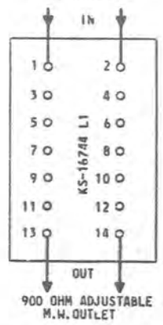
DWG ISS	CD ISS	DWG ISS	CD ISS	DWG ISS	CD ISS
1	1	2A	2A	3D	3D
4D	4D	5D	4D APP'D	6D	4D APP'D

DWG ISS	CD ISSUE	DATE ISSUED	DRAWN	APP'D
7A	4D APP 3A	6-19-61	FHJ	FHJ BCB JJM
8D	5D	6-19-61	FHJ	FHJ BCB JJM
9A	5D APP 1A	5-11-62	FHJ	PJK BCB JJM
10B	5D APP 2B	5-11-62	PJK	PJK BCB JJM

DRAWING ISSUE

11B	TRANS AN REC
12B	JF AEZ TEB
13B	GS DJG WPD

SK 6A (MFR DISC.)



SK 7A (MFR DISC.) (SHOWING "D" OPTION-FIG.7)

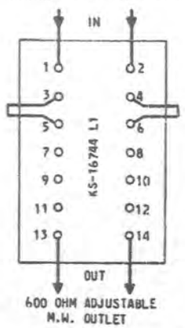


TABLE E (SEE NOTE 114 AND FIG. 7)

IF ORDER SPECIFIES NETWORK APPLICATION FOR:	FURNISH OPTION
600 OHMS	D AND REMOVE LL
900 OHMS	REMOVE LL
SPARE	LL

HIGHEST RES AND CAP. USED ON THIS DWG			
FIGS.1 & 2		FIGS.8,9,10 & 11	
R36	C22	R25	C2
NOT USED		NOT USED	
R7-R9	C3-C20		
R14-R20			
R27-R29			

CHASSIS GRD

ISSUE 14B

MILLIWATT DISTRIBUTING CKT (2)

SD-95277-01-1

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SHEET SIZE 6S

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SD-95277-01-1

E1 EAGLE

FIG. 1
J94071A LI
SEE NOTES 201 & 202

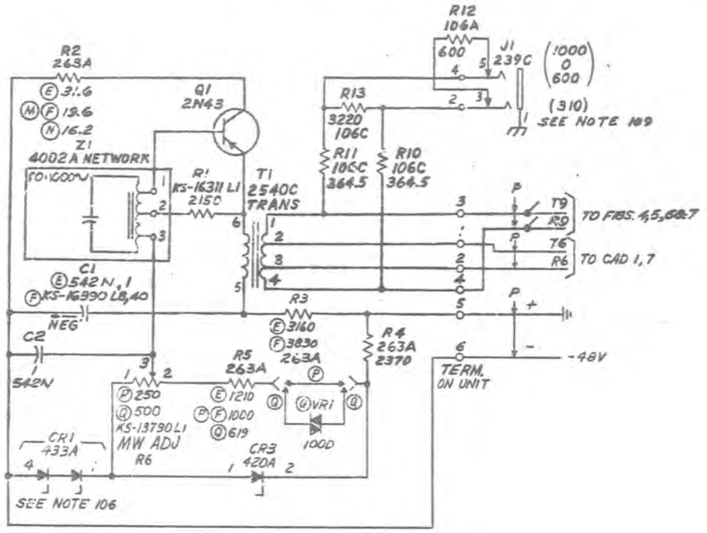
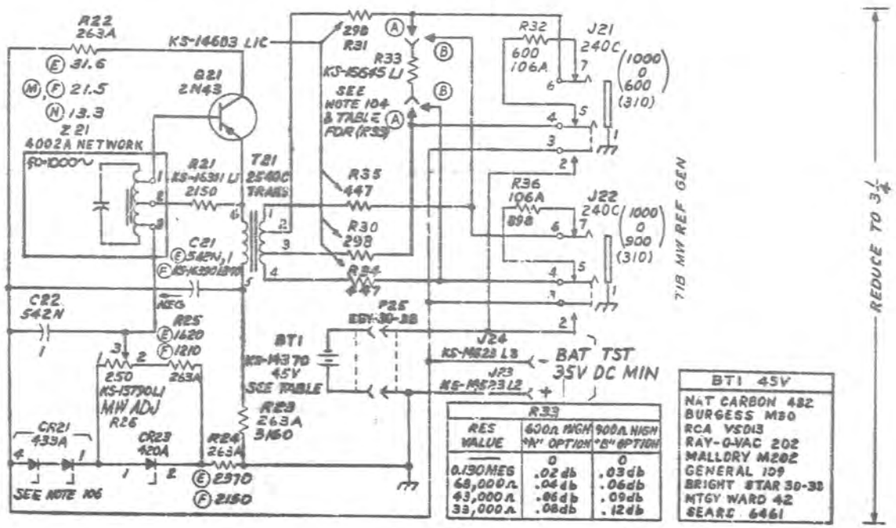


FIG. 2
J94071B LI
PORTABLE UNIT



R33		
RES VALUE	600Ω HIGH "M" OPTION	900Ω HIGH "S" OPTION
0.190MEG	0	0
68,000Ω	.02 db	.03db
43,000Ω	.04 db	.06db
33,000Ω	.06db	.09db
	.08db	.12db

BT1 45V
NAT CARBON 482
BURGESS M30
RCA VS013
RAY-O-VAC 202
MALLORY M202
GENERAL 109
BRIGHT STAR 30-3B
MTGY WARD 42
SEARS 6461

FIG. 8 (MFR DISC.)
GENERATOR CIRCUIT
J94071C LI

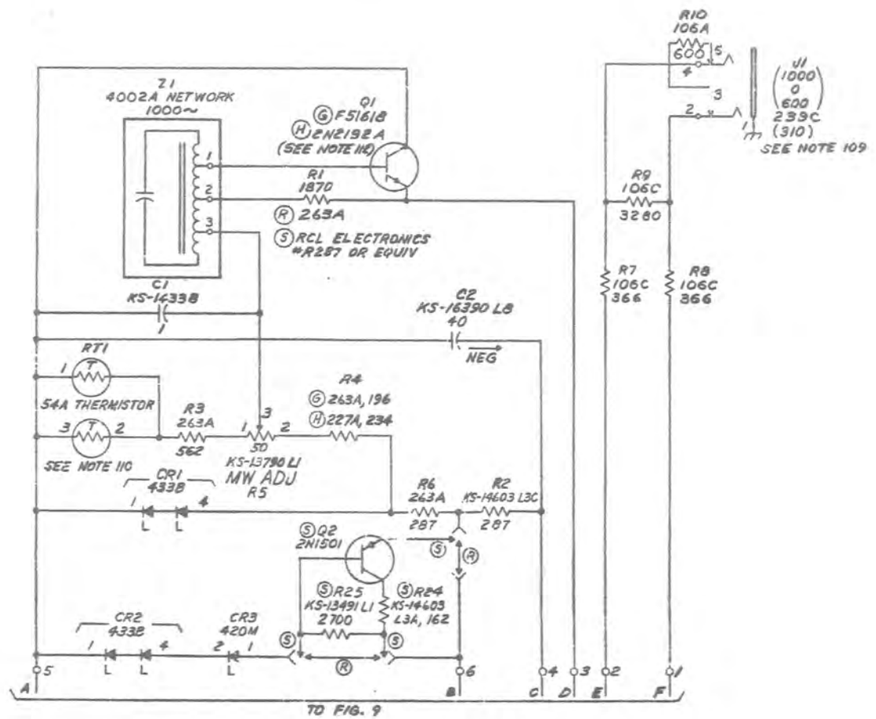
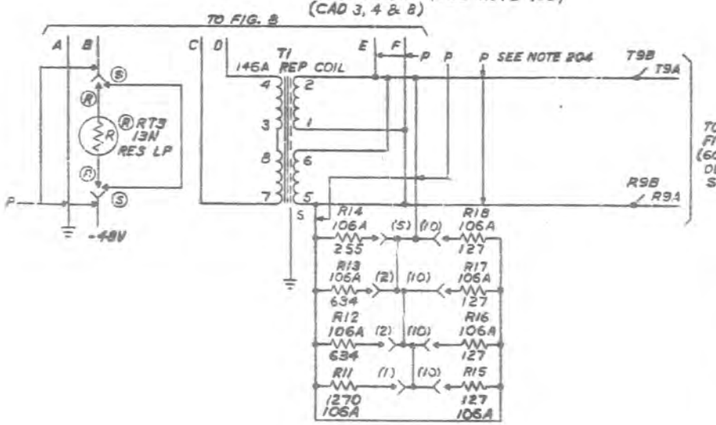


FIG. 9 (MFR DISC.)
BATTERY SUPPLY & LOAD CIRCUIT
J94071C L2, L3 (SEE NOTE 108)
(CAD 3, 4 & 8)



ATYPICIAL LOAD STRAPPING: TO DETERMINE RESISTOR STRAPPING CONNECTIONS, SUBTRACT FROM 50 THE NUMBER OF NETWORKS CONNECTED TO THE GENERATOR. CONNECT RESISTORS SO THAT THE TOTAL ARTIFICIAL LOAD, IN EQUIVALENT NETWORKS, IS EQUAL TO THE NUMBER OBTAINED BY SUBTRACTION. THE EQUIVALENT NETWORK LOAD OF EACH RESISTOR IS GIVEN BY THE NUMBER IN ( ) ON THE CIRCUIT. FOR EXAMPLE, SUPPOSE THE ACTUAL LOAD IS 35 NETWORKS (EITHER 600 OR 900 OHM) THEN 50 LESS 35 IS 15 AND THE EQUIVALENT OF 15 NETWORKS IS CONNECTED: I.E., R15 (10) AND R14(5) ARE CONNECTED.

DRAWING ISSUE	
1	BW
2A	NJS
3D	KJ
4D	KF AA
5D	AHS
6D	AHV
7A	JJM
8D	JJM
9A	JJM
10B	JJM
11B	MCJ
12B	VF LEZ LEB
13B	GS WS VFD

ISSUE 14B

MILLIWATT DISTRIBUTING CKT (2)

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-95277-01-2

SD-95277-01-2

FIG. 4 (MFR DISC)

900Ω NON-ADJUSTABLE DISTRIBUTING NETWORK SEE NOTE 105

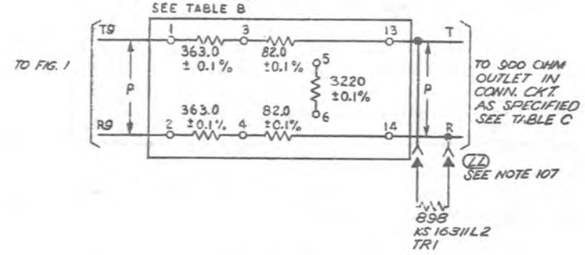


FIG 5 (MFR. DISC)

600Ω NON-ADJUSTABLE DISTRIBUTING NETWORK SEE NOTE 105

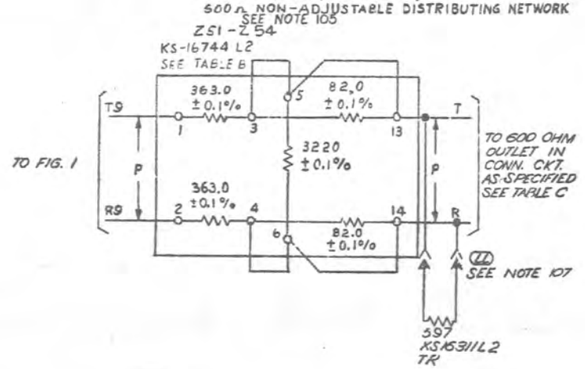


FIG. 6 (MFR DISC)

900Ω ADJUSTABLE DISTRIBUTING NETWORK SEE NOTE 114

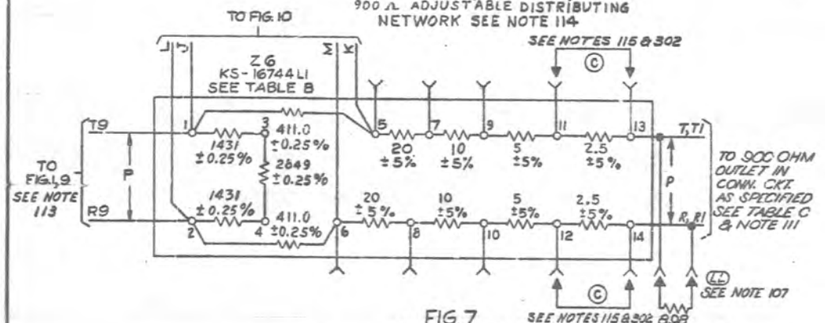


FIG. 7

600 OR 900Ω ADJUSTABLE DISTRIBUTING NETWORK SEE NOTE 114

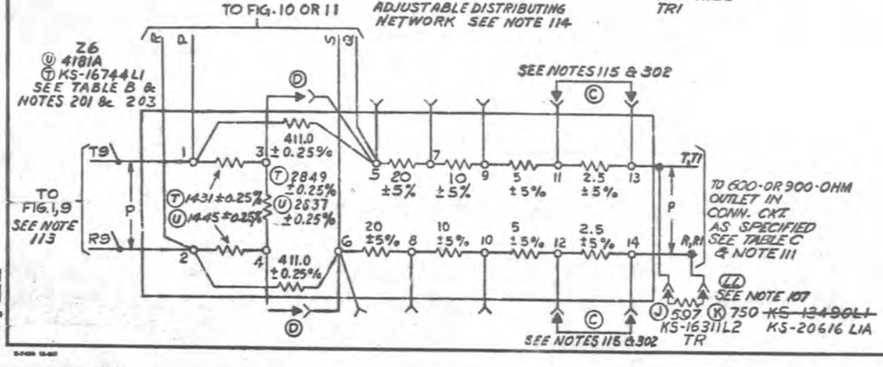


FIG. 101

71A SIMPLIFIED CKT ARRANGEMENT

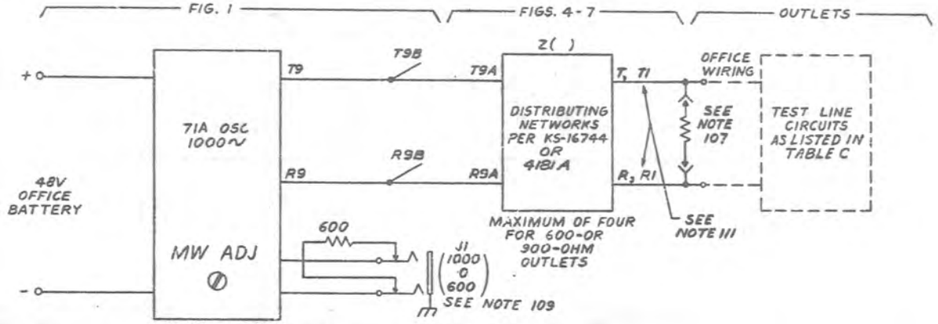


FIG. 102

71C SIMPLIFIED CKT ARRANGEMENT

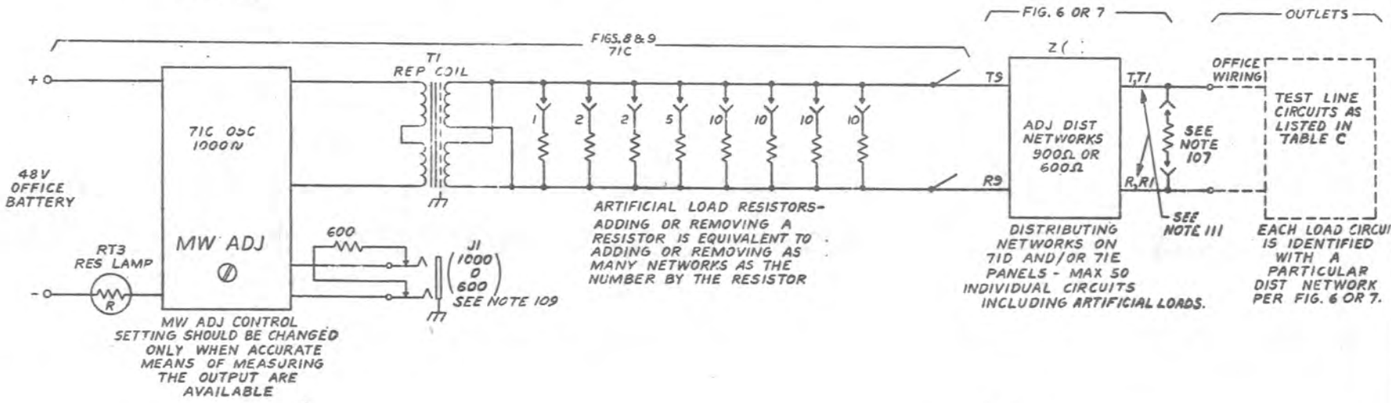


FIG. 103

71A MW SYSTEM BLOCK DIAGRAM

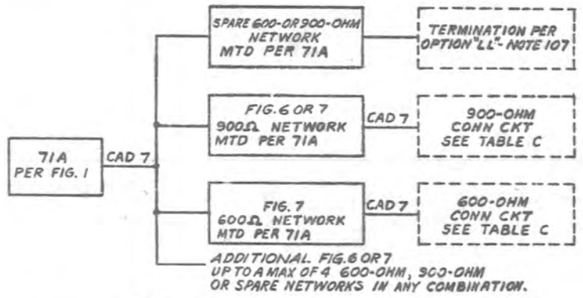


FIG. 104

71C MW SYSTEM BLOCK DIAGRAM

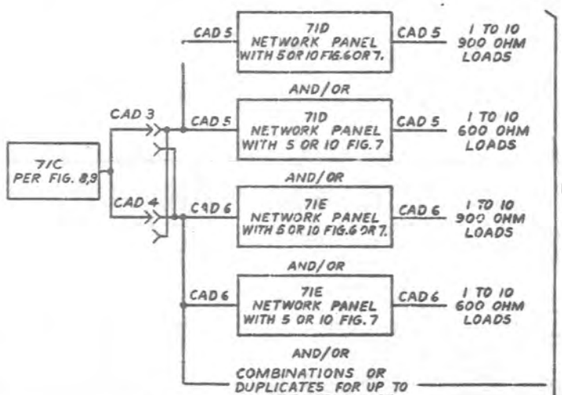


FIG. 10

TO OBTAIN 0.5 dbm INTO 900 OHMS FROM TERMINALS 13 & 14 OF FIG. 6 OR 7. SEE NOTE 111

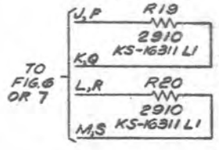
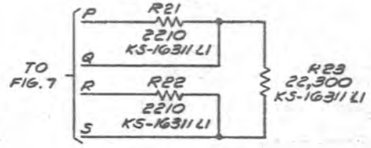


FIG. 11

TO OBTAIN +0.5 dbm INTO 600 OHMS FROM TERMINALS 13 & 14 OF FIG. 7. SEE NOTE 111



DRAWING ISSUE
1
2A
3D
4D
5D
6D
7A
8D
9A
10B
11B
12B
13B

ISSUE 14B

MILLIWATT DISTRIBUTING CKT

SD-95277-01-3

BELL TELEPHONE LABORATORIES INCORPORATED

SD-95277-01-3

CAD 1 (MFR DISC.)
(FOR FIGS. 1, 4, 5, 6, & 7)
SEE NOTE 102 & 205

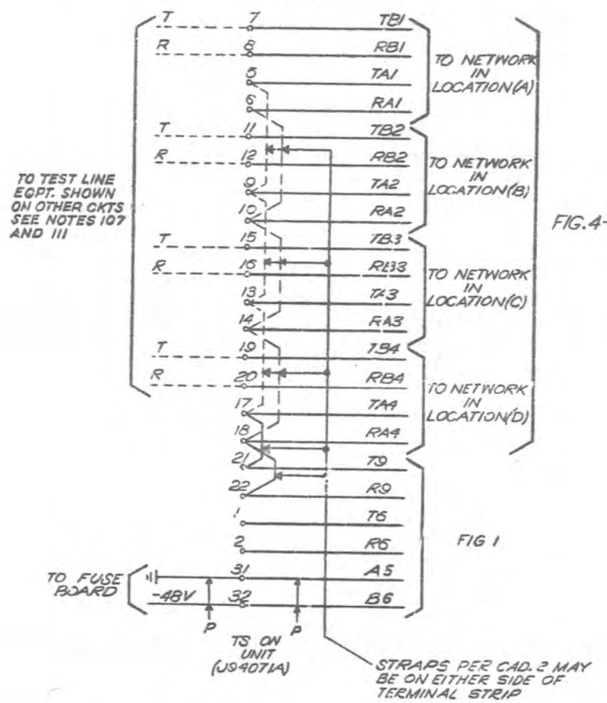
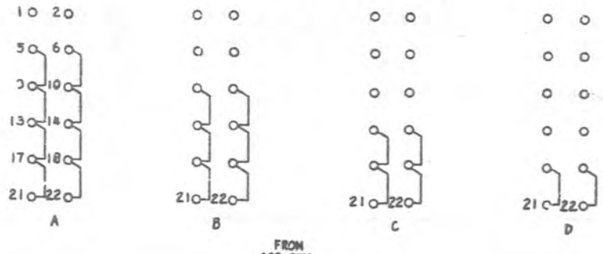
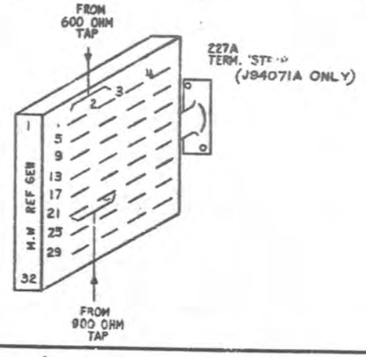


FIG. 4-7

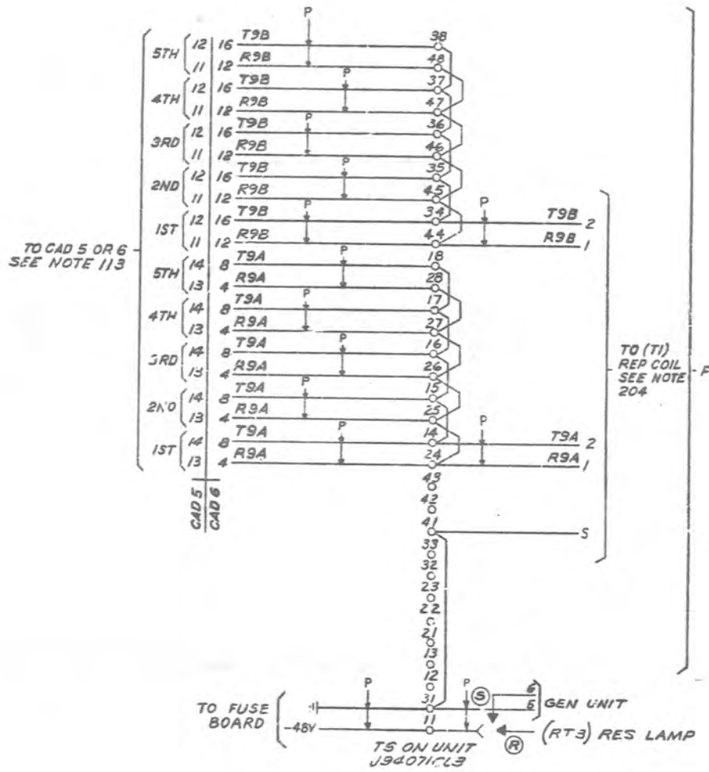
FIG 1

CAD 2 (MFR DISC)
(FOR CAD 1)
TERMINAL BLOCK STRAPPING FOR DISTRIBUTING NETWORKS
SEE TABLES A & B
(J94071A ONLY)
SEE NOTE 205

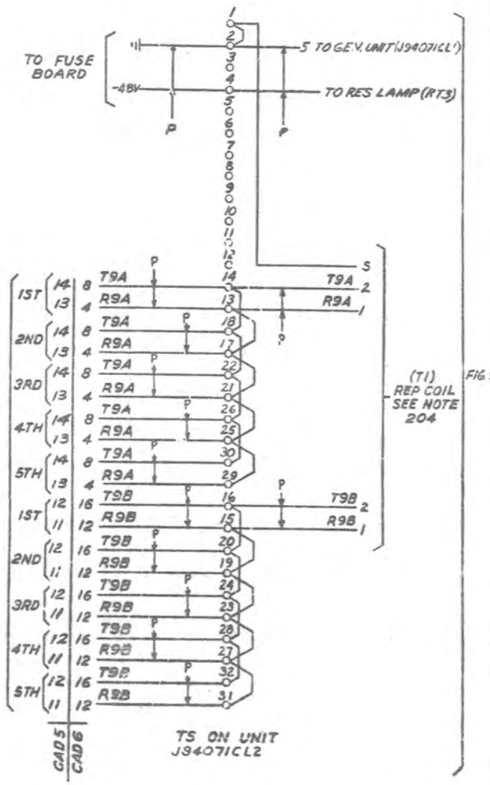




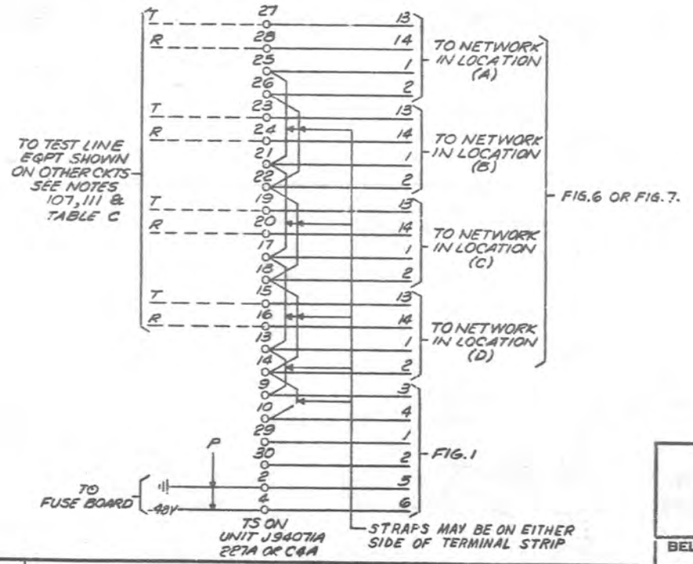
CAD 3 (MFR DISC.)
FOR FIG. 8



CAD 4 (MFR DISC.)
FOR FIG. 9



CAD 7
FOR FIGS 1, 6 & 7
SEE NOTES 102 & 205



DRAWING ISSUE
3D
4D
5D
6D
7A
8D
9A
10B
11B
12B
13B

ISSUE 14B

MILLIWATT DISTRIBUTING CKT

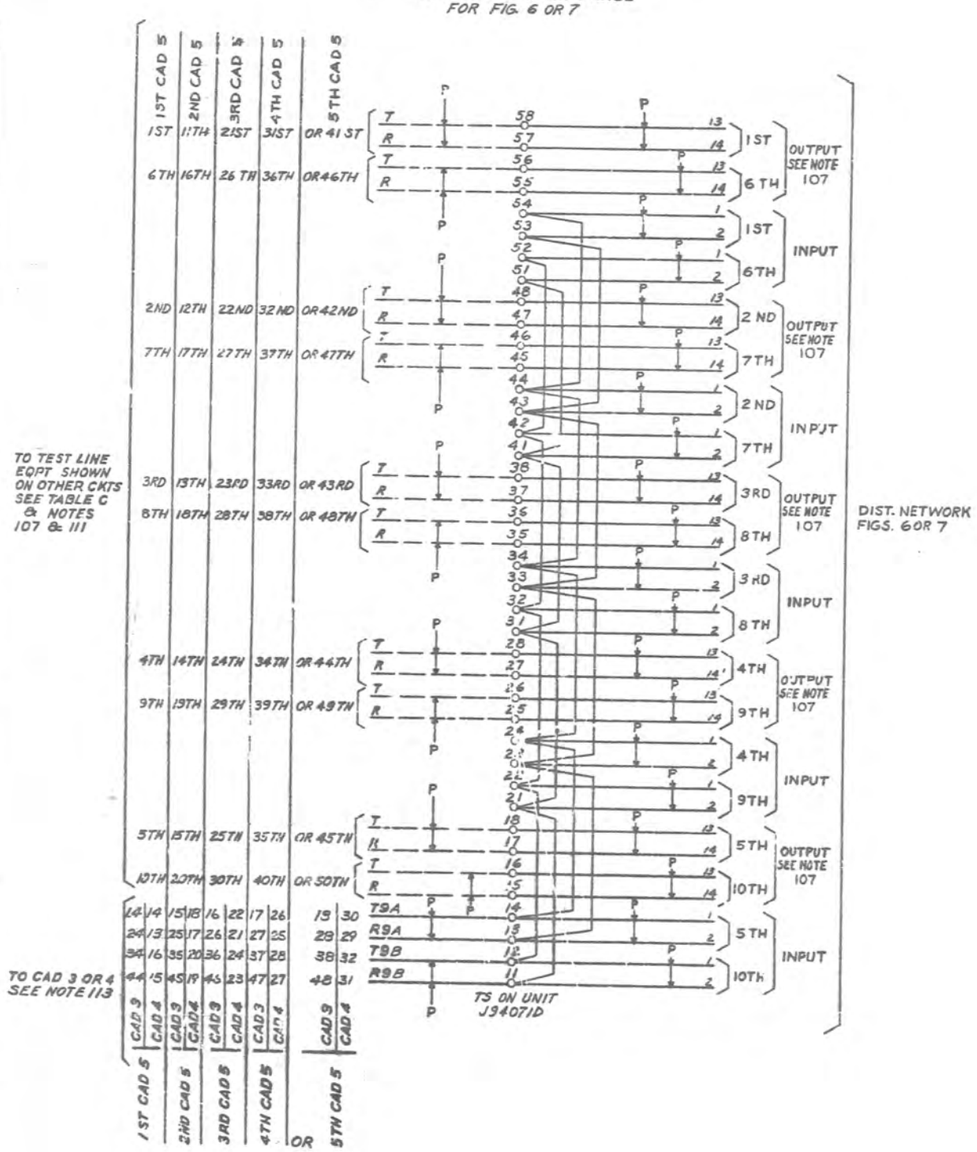
BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

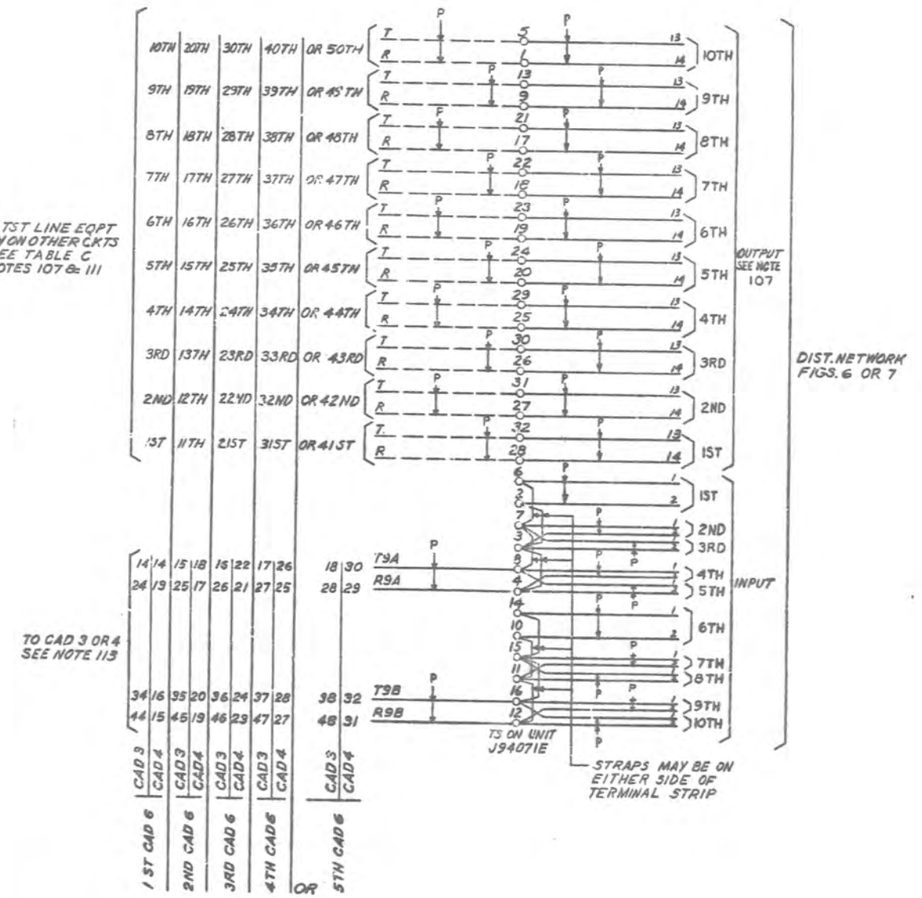
SD-95277-01-4

SD-95277-01-4

CAD 5
J94071D NETWORK PANEL
FOR FIG. 6 OR 7



CAD. 6
(J94071E NETWORK PANEL)
FOR FIG. 6 OR 7



DRAWING ISSUE
4D
5D
6D
7A
8D
9A
10B
11B
12B
13B

ISSUE 14B

TRANSMISSION MEASURING
MILLIVOLT DISTRIBUTING CKT
(2)
SD-95277-01-5
BELL TELEPHONE LABORATORIES INCORPORATED
6S

SD-95277-01-5

TABLE A (MFR DISC)
(REPLACED B" TABLE D)
(J94071A ONLY)

NO. OF OUTLETS EQUIPPED	NO. OF FIGURES SEE NOTE 1 FIG.4	FIG.5	FIG.6	FIG.7	SKETCH SHOWING APPARATUS TERMINALS & WIRING LOCATION SEE NOTE 201 (A)	(B)	(C)	(D)	USE TERM. BLOCK STRAPPING PER CAD.2
4	4000				4A	4A	4A	4A	A
	3100							5A	
	3010							6A	
	3001							7A	
	2200						5A	5A	
	2110							6A	
	2101							7A	
	2020						6A	6A	
	2011							7A	
	2002						7A	7A	
	1300					5A	5A	5A	
	1210							6A	
	1201							7A	
	1120						6A	6A	
	1111							7A	
	1102						7A	7A	
	1030					6A	6A	6A	
	1021							7A	
	1012					7A	7A	7A	
	1003							7A	
	0400				5A	5A	5A	5A	
	0310							6A	
	0301							7A	
	0220						6A	6A	
	0211							7A	
	0202						7A	7A	
	0130						6A	6A	
	0121							7A	
	0112						7A	7A	
	0103							7A	
4	0040				6A	6A	6A	6A	A
	0031							7A	
	0022						7A	7A	
	0013					7A		7A	
	0004				7A				
3	3000				4A		4A	4A	B
	2100							5A	
	2010							6A	
	2001							7A	
	1200					4A	5A	5A	
	1110							6A	
	1101							7A	
	1020						6A	6A	
	1011							7A	
	1002						7A	7A	
	0300					5A	5A	5A	
	0210							6A	
	0201							7A	
	0120				X	5A	6A	6A	
	0111							7A	
	0102						7A	7A	
3	0030				X	6A	6A	6A	B
	0021							7A	
	0012						7A	7A	
	0003					7A		7A	
2	2000						4A	4A	C
	1100							5A	
	1010							6A	
	1001							7A	
	0200					6A	5A	5A	
	0110							6A	
	0101							7A	
2	0020					X	6A	6A	C
	0011							7A	
	0002				X		7A	7A	
1	1000							5A	D
	0100						X	6A	
1	0010				X	X	X	6A	D
	0001							7A	
NONE	0000							X	NONE

NOTES:

1. ~~FIRST DIGIT (LEFT HAND) IS THE NUMBER OF NON-ADJUSTABLE 900Ω NETWORKS (FIG.4) INSTALLED. SECOND DIGIT IS THE NUMBER OF NON-ADJUSTABLE 600Ω NETWORKS (FIG.5) INSTALLED.~~ THIRD DIGIT IS THE NUMBER OF ADJUSTABLE 900Ω NETWORKS (FIG.6) INSTALLED. FOURTH DIGIT IS THE NUMBER OF ADJUSTABLE 600Ω NETWORKS (FIG.7) INSTALLED.
2. "X" INDICATES UNEQUIPPED POSITION.
3. THE (LL) OPTION SHOWN IN FIGS.4,5,6 AND 7 SHALL BE PROVIDED ON NETWORKS WHICH ARE USED AS SPARES AND NOT SERVING CONNECTING CIRCUITS.

TABLE D (MFR DISC)
(71A ONLY)

NO. OF OUTLETS EQUIPPED	NO. OF FIGURES SEE NOTE 1 FIG.4	FIG.5	FIG.6	FIG.7	SKETCH SHOWING APPARATUS TERMINALS & WIRING LOCATION SEE NOTES 2,3 & 201 (A)	(B)	(C)	(D)	USE TERM. BLOCK STRAPPING PER CAD.7
4	0	0	0	4	7A	7A	7A	7A	
2	0	0	0	2	X	X	7A	7A	

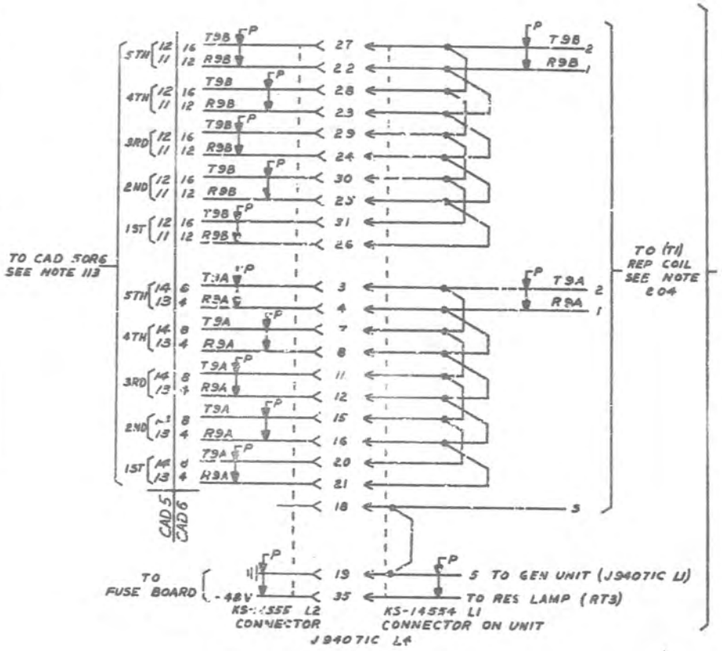
NOTES:

1. UNLESS OTHERWISE STATED ALL POSITIONS ARE INITIALLY EQUIPPED WITH NETWORKS STRAPPED PER SK 7A. WHEN INSTALLED AND ASSIGNED FOR 900 OHM OUTLETS THE STRAPS FROM 3-5 AND 4-6 ON NETWORKS SHALL BE CUT.
2. "X" INDICATES UNEQUIPPED POSITION.
3. "LL" OPTION SHOWN IN FIGS. 6 AND 7 SHALL BE PROVIDED ON NETWORKS WHICH ARE USED AS SPARES AND NOT SERVING CONNECTING CIRCUITS.

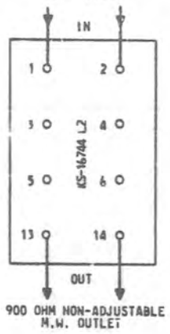
TABLE B (MFR DISC)
SEE NOTE 203
(71A ONLY)

LOCATION SEE NOTE 201	NETWORK FUNCTIONAL DESIGNATIONS KS-16744 L2 FIG. 4	FIG. 5	KS-16744 L1 FIG. 6	FIG. 7
(A)	Z41	Z51	Z61	Z71
(B)	Z42	Z52	Z62	Z72
(C)	Z43	Z53	Z63	Z73
(D)	Z44	Z54	Z64	Z74

CAD 8 (A&M)
FOR FIG.9

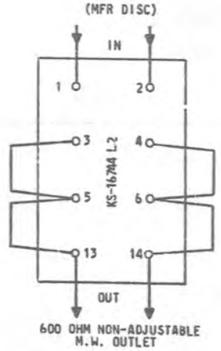


SK 4A
(MFR DISC)



900 OHM NON-ADJUSTABLE M.W. OUTLET

SK 5A
(MFR DISC)



600 OHM NON-ADJUSTABLE M.W. OUTLET

DRAWING ISSUE
80 JJH
94 JJH
10B JJH
11B AA MW
12B JF AEZ TEC
13B GP DHG MPG

ISSUE 14B

SD-95277-01-6

MILLIWATT DISTRIBUTING CKT (2)
BELL TELEPHONE LABORATORIES INCORPORATED
SIZE 6S
SD-95277-01-6
PRINTED IN U.S.A.

E. EAGLE

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
A	1-1/3	-48V SIGNAL	MAX ONE PER FIGS. 1 & 2

BATTERY SYMBOL: -48 — VOLTAGE RANGE: 44-52.5V SIGNAL, EMER MIN: 42.75V

71F CURRENT DRAIN: APPROX 85 MA AT 48 VOLTS

102. THE DISTRIBUTING NETWORK IN FIG. 3 IS USED FOR 600- OR 900-OHM APPLICATIONS OR AS A SPARE. A PARTICULAR APPLICATION DETERMINES CONNECTIONS ON THE NETWORK ACCORDING TO OPTIONS D AND LL. REFER TO TABLE B FOR NETWORK OPTIONS.

103. THE C STRAPS ON FIG. 3 ARE CONNECTED ACCORDING TO BSP 103-335-313 TO COMPENSATE FOR OFFICE WIRING AND EQUIPMENT LOSS.

104. EACH NETWORK ON A DISTRIBUTING NETWORK PANEL MAY BE STRAPPED FOR 600 OR 900 OHMS. EACH GROUP OF FIVE NETWORKS MAY BE CONNECTED TO SEPARATE GENERATOR OUTPUT LEVELS (PAIRS T3R3, T4R4, OR T5R5 OF FIG. 2).

105. DESIG (T) AND (R) OF FIG. 3 BECOME (T1) AND (R1) WHEN THE DISTRIBUTING NETWORK PER FIG. 3 IS USED WITH FIG. 5 TO OBTAIN +0.5 DBM AS REQUIRED BY SD-68446-01 AND SD-95698-01 (ISSUE 9 OR LATER); OR WHEN USED WITH FIG. 4 AS REQUIRED BY SD-27727-01 AND SD-32521-01).

106. FIGS 4 AND 5 SHALL BE USED TO OBTAIN +0.5 DBM FROM FIG. 3 ONLY WHEN FIG. 3 IS CONNECTED TO PAIR (T5), (R5) OF FIG. 2, OR TO PAIR (T9), (R9) OF FIG. 9, SD-95277-01.

107. PROVIDE LL OPTION INITIALLY IN FIG. 3, RETAIN WHEN THE DISTRIBUTING NETWORK IS USED AS A SPARE CONNECTED TO THE GENERATOR AND NOT SERVING A CONNECTING CIRCUIT.

108. PAIRS T( ) AND R( ) WHEN CONNECTED TO A DISTRIBUTING NETWORK PER FIG. 3, PROVIDE THE FOLLOWING OUTPUT LEVELS FROM THE NETWORK:

T3, R3,	+7 DBM
T4, R4,	+0 DBM
T5, R5,	0 DBM
T7, R7	-10 DBM

PAIR T8 OF FIG. 2 CONNECTED TO TERMINALS 26 & 31, 25 & 30, 24 & 29, 23 & 28, AND 22 & 27 OF CAD1 MAY BE USED TO FEED A COMBINED TOTAL OF FIFTY (50) DISTRIBUTING CIRCUITS OR NETWORKS OF SD-95000-01, OR SD-95000-02. THESE TERMINALS SHALL NOT BE USED TO FEED FIG. 3 OF THIS DRAWING.

109. WHEN A MAXIMUM OF TEN NETWORKS ARE CONNECTED TO PAIR T3R3, PAIRS T8 AND T5R5 SHALL NOT FEED A COMBINED TOTAL OF MORE THAN TEN NETWORKS PER FIG. 3 OF THIS DRAWING OR DISTRIBUTING CIRCUITS PER SD-95000-01 AND -02. WHEN A MAXIMUM COMBINED TOTAL OF FIFTY NETWORKS AND DISTRIBUTING CIRCUITS ARE FED BY PAIRS T, R AND T5,R5 NO NETWORKS SHALL BE CONNECTED TO PAIR T3,R3. UP TO FIFTY NETWORKS PER FIG. 3 MAY BE CONNECTED TO PAIR T4,R4 WITHOUT REGARD TO THE NUMBER OF OTHER LEVELS BEING SUPPLIED. SEE NOTE 112

110. THE NUMBER IN PARENTHESIS NEXT TO THE ARTIFICIAL LOAD RESISTORS IS THE NUMBER OF 0 DBM NETWORKS THAT RESISTOR REPRESENTS. THE CONNECTION OF THESE RESISTORS DEPENDS ON THE NUMBER OF +7 AND 0 DBM CIRCUITS CONNECTED TO THE GENERATOR. REFER TO TABLE C FOR APPROPRIATE ARTIFICIAL LOAD RESISTOR CONNECTIONS. REFER ALSO TO NOTE 112.

111. THE WIRE PAIR FOR LEADS E AND F TO FIG. 1 SHALL ORIGINATE AT TRANSFORMER (T1), FIG. 2.

112. PAIR T5,R5 MAY ALSO FEED DISTRIBUTING NETWORKS PER FS 1 OF SD-1C372-01. IN DETERMINING THE ARTIFICIAL LOAD TO BE CONNECTED TO FIG. 2, EACH NETWORK PER FS 1 OF SD-1C372-01 SHOULD BE CONSIDERED AS 1.5 NETWORKS PER FIG. 3 OF THIS DRAWING.

113. IN FIG. 3, U OPTION CONSISTS OF FIVE (5) 4181A NETWORKS WITH FIVE (5) RESISTORS (R25) ASSEMBLED ON PRINTED WIRING BOARD ED-1C551-( ). R OPTION CONSISTS OF FIVE (5) 211A IC'S WITH FIVE (5) RESISTORS (R25) ASSEMBLED ON ANOTHER VINTAGE OF PWB ED-1C551-( ).

EQUIPMENT NOTES:

201. IT IS RECOMMENDED THAT THE GENERATOR AND NETWORK PANELS SHOULD BE MOUNTED AT A CONVENIENT WORKING LEVEL TO FACILITATE INITIAL AND PERIODIC TESTS PER BSP 103-335-300 AND 103-327-500.

202. WHEN THE 71F GENERATOR IS USED TO REPLACE THE 2A SENDING PANEL, IT SHALL BE MOUNTED IN THE SAME SPACE VACATED BY THE 2A PANEL ONLY WHEN THE DISTRIBUTING CIRCUITS HAVE BEEN PRECISELY ADJUSTED AND THE MOUNTING LOCATION IS AT A CONVENIENT WORKING HEIGHT PER NOTE 201. OTHERWISE, REPLACE THESE DISTRIBUTING CIRCUITS WITH 71D OR 71E NETWORK PANELS.

203. DISTRIBUTING NETWORKS PER FIG. 3 ARE MOUNTED AND MULTIPLED IN GROUPS OF FIVE (5) ON 71D AND 71E NETWORK PANELS, WITH A MAXIMUM OF TWO (2) GROUPS PER PANEL. NETWORKS PER FIG. 3 OF THIS DRAWING ARE IDENTICAL TO THOSE OF FIG. 6 AND 7 OF SD-95277-01.

204. NO MORE THAN FIVE (5) DISTRIBUTING NETWORKS PER FIG. 3 SHALL BE FED BY A SINGLE WIRE PAIR BETWEEN THE GENERATOR AND NETWORK PANEL. IN ADDITION, THE LOOP RESISTANCE OF THIS WIRE PAIR SHALL NOT BE MORE THAN 0.5 OHM.

205. PRIOR TO ISSUE 6B, 263A RESISTORS WERE 221A RESISTORS. IN ALL CASES OF REPAIR OR REPLACEMENT WHEN 221A RESISTORS ARE REPLACED, THEY SHALL BE REPLACED WITH 263A RESISTORS.

206. PRIOR TO ISSUE 6B, THE KS-14554L7 CONNECTOR IN CAD 1 WAS SHOWN AS KS-14554L1.

207. EACH T( ) AND R( ) PAIR APPEARANCE ON THE DISTRIBUTION PANEL SHALL CONNECT AS REQUIRED TO ONLY ONE T( ) AND R( ) PAIR APPEARANCE ON A TONE GENERATOR PER CAD 1 OF SD-96618-01.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.

302. OFFICE DRAWING RECORD NEED NOT BE MAINTAINED FOR C.O. OR LL OPTIONS ON DISTRIBUTING NETWORKS (NOTE 103). NETWORK CONDITIONING INFO SHALL BE KEPT IN MILLIWATT RECORD BOOK ED-95166. ONE BOOK SHALL CONTAIN RECORDS FOR ONE GENERATOR ONLY.

303. ALL CONNECTING CIRCUITS ON WHICH DC MAY BE PRESENT SHALL BE EQUIPPED WITH BLOCKING CAPACITORS. AN EXCEPTION TO THIS IS THE GROUND CROSS DETECTING CIRCUIT SD-1A231-01.

304. ALL CONNECTING UNITS SHALL BE TERMINATED IN 600 OR 900 OHMS RESISTANCE AT ALL TIMES, SUCH AS A CIRCUIT UNDER TEST, EXCEPT WHEN PROVIDED WITH A SENDING PAD OF 15 DB OR MORE LOSS, OR WHEN CONNECTED TO -16 DBM, OR SD-1C372-01.

305. ALL CONNECTING CIRCUITS USED FOR TESTING WHERE AN OPEN CIRCUIT, A SHORT CIRCUIT OR A LOW IMPEDANCE TERMINATION MAY OCCUR ACROSS THE CONNECTING CIRCUIT SHALL BE PROVIDED WITH A SENDING PAD OF 15 DB OR MORE LOSS, EXCEPT WHEN CONNECTED TO -16 DBM, OR SD-1C372-01.

306. SENDING APPEARANCES FOR CONNECTING CIRCUITS SHALL NOT BE MULTIPLED EXCEPT AT MANUAL SWITCHBOARDS HAVING ADEQUATE BUSY TEST FEATURES.

307. THE FOLLOWING AREAS SHOULD HAVE EXCLUSIVE USE OF A MILLIWATT DISTRIBUTING SYSTEM: TOLL TESTBOARD, SWITCHING, MANUAL SWITCHBOARD, VOICE FREQ PATCH BAY, CARRIER EQUIPMENT, PRIVATE LINE TESTBOARD, PROGRAM, TELEGRAPH TEST AND ANY EQUIPMENT AREA NOT LOCATED NEAR OR UNDER CONTROL OF THE AREAS LISTED ABOVE. THIS LATTER EQUIPMENT AREA MAY CONTAIN THE FOLLOWING GROUPS OF EQUIPMENT: ECHO SUPPRESSOR BAYS, REPEATER BAYS, SIGNALING BAYS, ANNOUNCEMENT SYSTEMS, SERVICE OBSERVING EQUIPMENT, ATTC AND ASSOCIATED TEST FRAMES, AND MANUAL AND/OR AUTOMATIC TEST FRAMES.

308. THE ADMINISTRATION OF ALL OUTLETS FROM ONE MILLIWATT DISTRIBUTING SYSTEM SHOULD BE LIMITED TO A SINGLE PLANT ORGANIZATION WITHIN AN OPERATING COMPANY, ON THE SAME FLOOR AND IN THE SAME AREA OF THE BUILDING.

309. ALL CIRCUIT COMPONENTS ON THIS DRAWING HAVE BEEN CHOSEN FOR TEMPERATURE PERFORMANCE. COMPONENTS OF A DIFFERENT CODE OR UNCERTAIN TEMPERATURE CHARACTERISTICS SHOULD NOT BE SUBSTITUTED IN THE CIRCUIT COVERED BY THIS DRAWING WITHOUT CONSIDERATION OF THE EFFECTS ON OVERALL MILLIWATT DISTRIBUTING STABILITY.

310. ON DRAWINGS COVERING CIRCUITS CONNECTING TO AN OUTLET OF THE 71 TYPE GENERATOR, THE FREQUENCY, LEVEL AND IMPEDANCE REQUIRED BY THE CONNECTING CIRCUIT SHOULD BE DESIGNATED AS FOLLOWS:

TO MILLIWATT DIST. CKT.

(FREQUENCY) (LEVEL) (IMPEDANCE)

DUP

TABLE A

A PARTIAL LIST OF CONNECTING CKTS TO MW DIST CKT SEE NOTES 308, 309, 306, & 310

SD-59432-01	TRANS MEAS CKT (VF CHAN PATCH BAYS)
SD-59433-01	NOISE MEAS CKT (VF CHAN PATCH BAYS)
SD-59972-01	MAINT CKT (TASI)
SD-68095-01	TEST LINE CKT (4W INTERTALL)
SD-68445-01	ANNOUNCEMENT SYSTEM NO. 5A
SD-68446-01	AUTOMATIC TRANS T&C CKT (SEE NOTE 105)
SD-68544-01	JACK CKT T T UNIT NO. 5
SD-95101-01	SENDING JACK CKTS
SD-95147-01	SENDING PAD CKTS
SD-95162-01	REPEATER MEAS CKT (V1 & V4)
SD-95162-02	1000 CPS OUTLETS, REC JACKS & CONTROLS
SD-95600-01	ANNOUNCEMENT SYSTEM NO. 6A
SD-95698-01	TRANS & NOISE CMX CKT (SEE NOTE 105)
SD-95900-01	TRANS & NOISE MEAS CKT (TESTBOARDS)
SD-96519-01	TEST & MON CKT (FOR SIGNALING)
SD-97118-01	N2 CARRIER TELEPHONE APPLICATION SCHEM
SD-98100-01	TRANS TEST LINE CKTS
SD-95779-01	MF PULSING RECEIVER ADJUSTING CKT
SD-1A231-01	GROUND CROSS DETECTING CKT
SD-1A225-01	MILLIWATT & LOOP AROUND TEST CKT
SD-1A129-01	MISC CKT FOR ALL FRAMES
SD-1A139-01	RECORDED ANNOUNCEMENT CIRCUIT
SD-27727-01	ROTL CKT (NO.5 CSBR) (SEE NOTE 105)
SD-32521-01	SXS ROTL CKT (SEE NOTE 105)
SD-1C585-01	71J ACCESS PANEL CKT
SD-96618-01	71G PRECISION TONE GENERATOR CKT

TABLE B
SEE NOTE 102

IF ORDER SPECIFIES NETWORK APPLICATION FOR:	FURNISH OPTION
600 OHMS	D AND REMOVE LL
900 OHMS	REMOVE LL
SPARE	LL

TABLE C
SEE NOTES 110 AND 112

NO. OF NETWORKS PER FIG. 3 CONNECTED TO PAIR T3, R3 OF FIG. 2	NO. OF NETWORKS PER FIG. 3 AND DISTRIBUTING CIRCUITS PER SD-95000-01,-02 AND EQUIVALENT NETWORKS PER FS1 OF SD-1C372-01 CONNECTED TO PAIRS T,R,& T5,R5 OF FIG.2 (COMBINED TOTAL)	ARTIFICIAL LOAD RESISTORS (R) WHICH SHOULD BE CONNECTED PER	
		FIG. A	FIG. B
NONE	0 TO 2.5	11,12,13,14,15,16,17,18	11,12,13
	3 TO 7.5	14,15,16,17,18	11,12,14
	8 TO 12.5	15,16,17,18	11,12
	13 TO 17.5	14,16,17,18	11,13,14
	18 TO 22.5	16,17,18	11,13
	23 TO 27.5	14,17,18	11,14
	28 TO 32.5	17,18	11
	33 TO 37.5	14,18	12,14
	38 TO 42.5	18	12
	43 TO 47.5	14,15	13,14
	48 TO 52.5	15	13
	53 TO 57.5	14	14
	58 TO 60	NONE	NONE
5	0 TO 2	14,17,18	11,14
	3 TO 7	17,18	11
	8 TO 12	14,18	12,14
	13 TO 17	18	12
	18 TO 22	14,15	13,14
	23 TO 27	15	13
	28 TO 32	14	14
	33 TO 35	NONE	NONE
10	0 TO 2	15	13
	3 TO 7	14	14
	8 TO 10	NONE	NONE

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES

CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT			
				STD	A&M	MO	
3B	Z OR Y	Z		Y		Z	
4B	W OR X	X		W		X	
6B	U OR V	V		U		V	
	FIG. B	FIG. A		FIG.B		FIG.A	
	RESISTORS		205	263A		221A	
7B	N OR M	N		M		N	
	T OR S	T		S		T	
	R OR U	U		R		U	

DWG ISSUE	TC OR CD ISSUE	DATE ISSUED		
1	1	1-23-67		
2A	1 APP 1A	12-20-67		
3B	1 APP 2B	12-20-68		
4B	1 APP 3B	8-20-69		
5D	2D	10-7-69		
6B	3B	10-27-72		
7B	2B APP 1B	4/1/73		

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

EQUIPMENT INFORMATION
J94071D
J94071E
J94071F
ED-1C551-( )
ED-99702-( )

ISSUE 7B

REPLACES SD-95277-01 FOR 71C MW REF GEN AND 71D & 71E NETWORK PANELS

SD-95277-02 IN2D

COMMON SYSTEMS
TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CKT
USING 71F MILLIWATT REFERENCE GENERATOR

AT&TCO STANDARD

SD-95277-02-1
4 SHEETS

BELL TELEPHONE LABORATORIES INCORPORATED

SD-95277-02-1

FIG. 1
GENERATOR CIRCUIT
J94071F

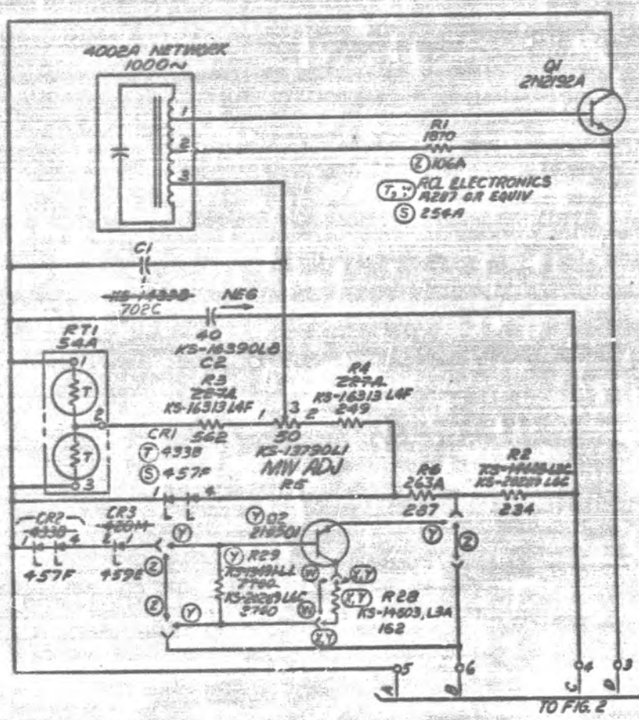


FIG. 3
600-OR-900-OHM DISTRIBUTING NETWORK
SEE NOTES 102, 104, 113, & 203

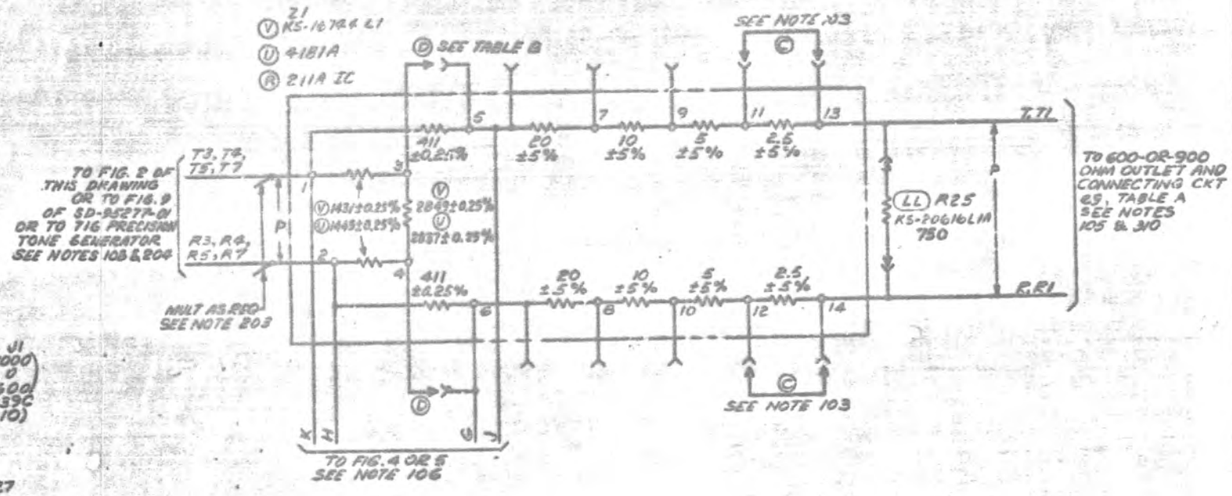
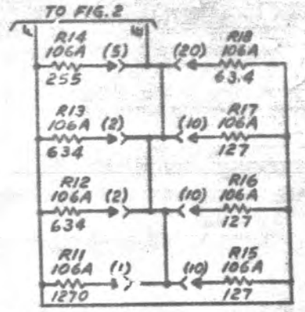


FIG. A (MFR DISC.)
ARTIFICIAL LOAD STRAPPING
SEE NOTES 110 & 112 AND TABLE C



HIGHEST RES. & CAP USED ON THIS DWG	
R29	C2
NOT USED	

FIG. 2
BATTERY SUPPLY & LOAD CIRCUIT

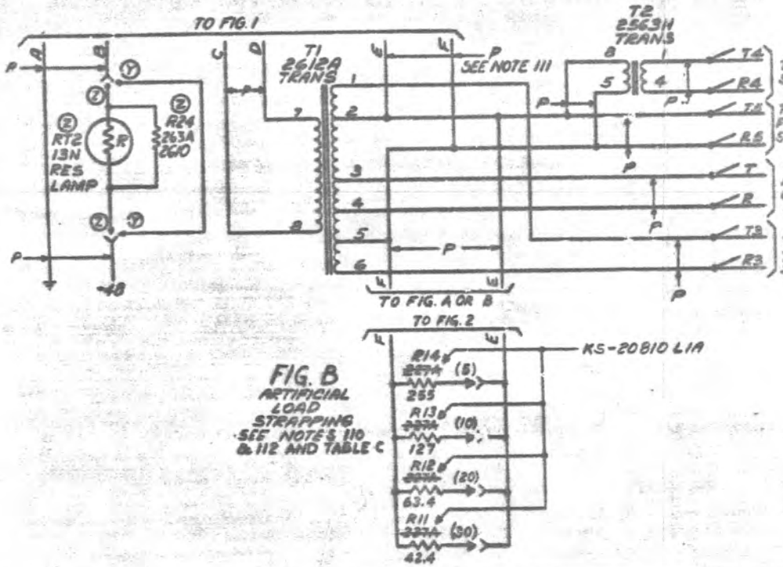


FIG. B
ARTIFICIAL LOAD STRAPPING
SEE NOTES 110 & 112 AND TABLE C

FIG. 4
TO OBTAIN 0.5 dBM INTO 900 OHMS FROM TERMINALS 13 AND 14 OF FIG. 3 SEE NOTE 106.

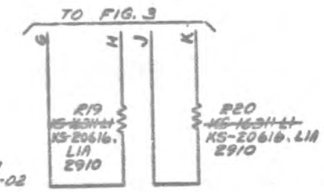
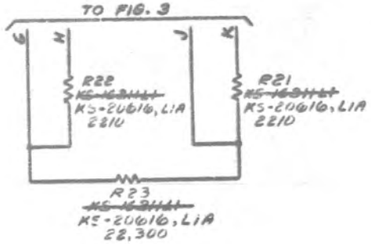


FIG. 5
TO OBTAIN +0.5 dBM INTO 600 OHMS FROM TERMINALS 13 AND 14 OF FIG. 3 WHEN USING OPTION D, SEE NOTE 106.



DRAWING ISSUE		
1	1971	AA
		AB
2A		AC
		AD
3B		AE
		AF
4B		AG
		AH
5D		

ISSUE 7B

MILLIWATT DISTRIBUTING CKT.
USING 71F MILLIWATT REFERENCE GENERATOR

SD-95277-02-2

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-95277-02-2

CAD. 1
FOR FIG. 2

TO CAD. 4 OR 7 SEE NOTE 204

TO FIG. AK, AL, EK, FK, FM, JK, JM, LL, 2M, RES(T), RES(T2), R2), (T3, R3), ON SD-95000-01 OR TO MW DIST NETWORK CKTS CAD. 2, 4, 5, OR 7 ON SD-95000-02 OR AS SPEC SEE NOTE 109

TO CAD. 3 OR 6 SEE NOTE 204 OR TO CAD 1 OR 2 OF SD-1C372-01

TO CAD. 2 OR 5 SEE NOTE 204

TO (T2) TRANS

TO (T1) TRANS

TO FRAME FUSE PNL FOR CROSS-BAR NOS AND ESS NO. 1 -48V, GRD

TO FUSE PNL OTHER THAN CROSSBAR NO. 5 AND ESS NO. 1 GRD, -48V

KS-14555 L2 CONNECTOR

KS-14554 L1 CONN ON UNIT SEE NOTE 206

J94071F L1, L2

GEN UNIT

(RT2) RES LAMP

CAD. 2
FOR FIG. 3

TO TEST LINE EQPT SHOWN ON OTHER CKTS AS SPEC. (SEE TABLE A & NOTE 107)

TO CAD. 1 SEE NOTE 204

OUTPUT

INPUT

DIST. NETWORK FIG. 3

TS ON UNIT J94071D

SD-95277-02-3

ISSUE 7B

MILLIWATT DISTRIBUTING CKT USING 71F MILLIWATT REFERENCE GENERATOR (2)

BELL TELEPHONE LABORATORIES INCORPORATED

SD-95277-02-3