

ISSUE NO.

* SECTION B SHEETS WITH SUFFIX (A) WERE FORMERLY WITHOUT A SUFFIX LETTER.

NO.

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.

DWG ISSUE	CD ISSUE	DATE ISSUED	Drawn	APPD
1	1	1-24-64	JR SJS	JRD RHW DOB
2A	2A	2-16-65	RE NC	VEN RHW DOB
3A	3A	10-25-65	NC NC	KES RHW DOB
4D	3A APP 1D	4-26-65	NC NC	KES RHW DOB
5A	3A APP 2A	1-28-67	CS GAS	VER MR DOB
6B	3A APP 3B	1-24-67	CS GAS	VER MR DOB
7A	4A	5-2-68	NC LL	GWR HORN PD
8AC	4A APP 1AC	5-2-68	PD NC LL	GWR HORN PD
9B	4A APP 2B	5-2-68	DS NC LL	GWR HORN PD
10B	5B	11-12-69	CS GAS HORN	VER MR DOB
11A	5B APP 1A	9-23-70	RPR/KRF JCS/LCB CED/SEB	
12B	5B APP 2B	4-20-71	RPR/KRF SAX/LCB EWS/SEB	
13AR	5B APP 3AR	4-20-71	RPR/KRF SAX/LCB JAS/SEB	
14A	5B APP 4A	6-9-71	ROZ/KRF PJS/LCB EWS/SEB	
15D	6D	6-21-73	RPR/KRF SAX/LCB EWS/SEB	
16D	6D APP 1D	2-12-74	TFO/KRF SAX/LCB RLS/SEB	
17B	6D APP 2B	11-15-74	EC/AM SAX/PLS SJS/SEB	
18B	6D APP 3B	1-24-75	TFO/KRF PJS/PLS EWS/SEB	
19AC	7AC	10-1-75	SAX/CRB EWS/SEB PHG/APP	
20B	7AC APP 1B	2-18-77	PJS/PLS EWS/SEB	

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

ISSUE
20B

SD-99311-01

INIO

COMMON SYSTEMS

AT&TCD
STANDARD

REMOTE TESTING CIRCUIT - FAR END
FOR STEP-BY-STEP, CROSSBAR NO. 1,
CROSSBAR NO. 5, PANEL OR
ESS OFFICES

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S - 99311-01-A1
82 SHEETS

BELL TELEPHONE LABORATORIES
INCORPORATED

69

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SHEET INDEX (CONT)

[illegible]

* SECTION J SHEETS WITH SUFFIX (C) WERE FORMERLY WITHOUT A SUFFIX LETTER.

SD-99311-01-A2

ISSUE
20B

REMOTE TESTING CIRCUIT - FAR END

SD-993 -CI-A2

BELL TELEPHONE LABORATORIES
INCORPORATED

DR. B. SIZE
6S

NO APPARATUS INDEX

DESIG	CPS	APP FIG	
		NO	SH NO
CIRCUIT PACKS			
24V	10	3	C5
ABC	D3	1	C1
AND	6	1	C1
BIAS AMP	1	1	C1
GRP A	3	1	C1
GRP B	4	1	C1
GRPC	5	1	C1
ORI	6	1	C1
OR2	7	1	C1
PREAMP	2	1	C1
RT	9	3	C5
SO	1	1	C1
TF	D3	8	C8
TMR	CF1	3	C5

DESIG	LOCATION		
	FS	APP FIG	EQPT
RELAYS			
3WU	13A/C2	3	
3WOR	13A/H2	3	
6CV	10C8	3	
6OVR	10F8	3	
A1	5B5	2	
A2	5B5	2	
A3	5C5	2	
A4	5D5	2	
A5	5D5	2	
ANS	1A/A1	3	
BI-4	5E2	2	
B5	5F1	2	
C1	5G5	2	
C2	5G5	2	
C3	5H5	2	
C4	5H5	2	
CC	9E2	3	
CCR	9G2	3	
CN	9C6	3	
CR	9F2	3	
CRR	9H2	3	
CT	1B/G2	1	
CTR	1B/F2	1	

DESIG	LOCATION		
	FS	APP FIG	EQPT
RELAYS			
D	13A/C6	3	
DIS	1B/E2	3	
DL	12F8	3	
DLI	12G8	3	
DP	12F2	3	
DPI	12F8	3	
DS	12C1	3	
DSI	12C	3	
DSI	12H3	3	
E	1A/E1	3	
E1	1B37	8	
ED	16A8	7	
ED	16D4	7	
ELL	15G5	7	
ETK	16D9	7	
ERT	16A2	7	
ERTR	16C3	7	
ERTS	1503	7	
ERY	16A5	7	
F	9C2	3	
FR	9G1	3	
G	7G5	3	
GR	7F5	3	
GT	4A8	1	
GT1	5A8	1	
HR	13B/F1	7	
IN	13A/E2	3	
INR	13A/A2	3	
K1A	5A1	2	
K1C	5G2	2	
K2A	5B1	2	
K2C	5G2	2	
K3A	5B1	2	
K3C	5G2	2	
K4A	5C1	2	
K4C	5G2	2	
K5A	5D1	2	
K5C	5C9	2	
KP	7H0	3	
KPI	7C5	3	
KPI	7C6	3	
KPR	7E3	3	
LL	14B8	3	
LLI	14G4	3	
LP	12D6	3	
LRP	10E8	3	
LRPR	10G7	3	
LS	13A/A7	9	
LS*	13A/B8	9	

DESIG	LOCATION		
	FS	APP FIG	EQPT
RELAYS			
M	7G0	3	
MA	10B8	3	
MAR	10F8	3	
MDF	13A/D2	3	
MDFR	13A/B2	3	
MR	7E5	3	
NC	18E8	8	
NC1	18G2	8	
NC2	18F2	8	
NP	13B/F2	3	
NT	13A/T2	3	
NT1	15E2	7	
NT2	13A/E4	1	
NTR	13A/A2	1	
ON	1A/A3	3	
ON1	1A/B3	3	
ON2	1A/B3	3	
P	7C4	3	
PR	10D8	3	
PRR	10F7	3	
+R	11D1	3	
+RR	11G2	3	
-R	11C1	3	
-RR	11F1	3	
RC	11D3	3	
RCC1	7E0	3	
RCCIR	7D0	3	
RCRM	7D0	3	
REX	11H1	3	
REX1	11H4	3	
REXR	11H1	3	
REXS	11F5	3	
RG	11E2	3	
RGR	11F1	3	
RL	10B4	3	
ROH	12G2	3	
ROH1	12E8	3	
ROH2	12D8	3	
ROH3	12C7	1	
ROHR	12G2	3	
RT	11B/C1	3	
RV	11G6	3	
RVM	10E3	3	
RVMR	10D8	3	
RVR	10G7	3	
	10F3	3	
XN	12G3	3	

DESIG	LOCATION		
	FS	APP FIG	EQPT
RELAYS			
S	12B4	3	
S	12C4	3	
SL	13B/C2	3	
SO	1A/B1	1	
SRT	8D7	3	
SRTR	8G7	3	
ST	1B/D2	3	
STA	8F7	3	
STR	1B/H3	3	
+STA	8E7	3	
+STAR	8G8	3	
-STA	8F7	3	
-STAR	8G7	3	
+T	11D1	3	
-T	11B1	3	
T9	11B3	3	
T0	13A/B2	3	
TDR	13A/G2	2	
TF	18C8	8	
TF1	18G7	8	
TF2	18D8	8	
TFR	18C8	8	
TK	7G0	3	
TKM	7E8	3	
TKR	7F5	3	
TP	11B6	3	
	11B/C5	3	
+TR	11G2	3	
-TR	11F1	3	
TRG	11C3	3	
TS	13A/C2	3	
TS1	15E2	7	
TS2	13A/D4	1	
TSR	13A/G2	3	
TT	13A/F2	3	
TTR	13A/H2	3	
VR	9D2	3	
VRR	9G2	3	
XN	12G3	3	

DESIG	LOCATION		
	FS	APP FIG	EQPT
AMPLIFIERS			
AMP	1A/C3	1	
AMP1	17B4	7	
AMP 2	17D4	7	
M	7C7	3	

BATTERIES			
BI	14F1	4	
B2	14G1	4	
B3	14F3	5	

CAPACITORS			
C2	1A/D8	1	
C3	1A/D9	1	
C6	7C3	3	
C7	12B2	3	
C8	8D2	3	
C9	3D2	3	
C10	9B4	3	
C11	12C5	3	
C13	7D7	3	
C14	1A/G8	3	
C15	1B/B3	3	
C16	17D3	7	
C17	17D8	7	
C18	18F7	8	
C19	18C3	8	
C20	18C3	8	
C21	13B/D4	1	
C22	13B/C4	1	

DESIG	LOCATION		
	FS	APP FIG	EQPT
DIODES			
CR1	2F1	1	
CR2	1A/C6	1	
CR3	1A/D6	1	
CR4	1A/D9	1	
CR5	4A8	1	
CR8	10E3	3	
CR9	7E2	3	
CR10	7E1	3	
CT	1B/G2	1	
CTR	1B/E2	1	
D1	7A9	3	
D2	11B3	3	
D3	7A8	7	
D4	7G8	3	
D5	16B3	3	
D6	8B2	3	
D7	8B2	3	
D8	8C2	7	
D9	8C2	7	
D10	16C2	3	
D11	1B/E2	3	
HR	15C6	7	
KP	7F9	3	
ON	1A/H3	3	
RT	11G6	3	
SL	11B/C1	1	

FILTERS			
BRF	2A1	1	
CAF	3A1	1	
LPF	1A/C5	1	

FUSES			
+20	14G0	4	
+50	14G0	4	
+100	14F0	4	
+116	14F1	4	
-116	14F3	5	

P/O APPARATUS INDEX

DESIG	LOCATION		
	FS	APP FIG	EQPT
INDUCTORS			
BR	10C5	3	
L	10D5	3	
OSC	1A/G4	1	
RT	8D1	3	

JACKS			
DS		3	
HYD	SEE APP FIG.	3	
HYL		3	
KPI		3	
TJI		3	

LAMPS			
B	10E1	3	
HR	15F7	7	
M	1A/F2	3	
N	9E4	3	
P	9E5	3	
R1	11C7, 11B/D7	3	
R2	11E7, 11B/C7	3	
R1	0E2	3	
S+	14F2	4	
S+	14F9	6	
S-	14F4	5	
S-	14F9	6	

NETWORKS			
Z1	5A4	2	

OSCILLATORS			
CCO	1A/C8	1	

DESIG	LOCATION		
	FS	APP FIG	EQPT
PAD			
REC	2A0	1	

POTENTIOMETERS			
ADJ	232	1	
DTM	17C0	3	
II	1B/B9	3	
SENS	1A/D7	1	
SO	1A/F4	1	
ZERO	1A/D7	1	

RESISTORS			
HR	12C8	3	
HT	12C8	3	
R1	1A/C2	1	
R2	1A/D2	1	
R3	1A/C3	1	
R4	1A/D3	1	
R6	2E1	1	
R9	1A/B5	1	
R10	1A/D7	1	
R13	1A/E7	1	
R14	4A8	1	
R15	4B8	1	
R16	1A/C7	1	
R17	1A/B7	1	
R18	1A/B7	3	
R20	1A/B5	1	
R22	1A/F1	3	
R23	1B/C7,R7	3	
R24	7C1	3	
R25	12C0	3	
R26	12B2	3	
R28	8C2	3	
R29	8B3	3	
R30	9B4	3	
R31	1A/B7	3	
R32	1A/B6	3	
R33	10B4	3	
R34	10D5	3	
R35	13B/F1	3	
R36	13B/F1	3	
R37	13B/C1	3	
R38	13B/G3	3	

DESIG	LOCATION		
	FS	APP FIG	EQPT
RESISTORS			
R41	13B/C7	3	
R42	13B/E7	3	
R43	7D7	3	
R44	12D1	3	
R45	12D1	3	
R46	12E1	3	
R47	13B/E6	3	
R48	2E1	1	
R49	11B3	3	
R50	1B/B3	3	
R60	5A9	1	
R61	5A6	1	
R62	9A4	3	
R63	11B/C4, 11F7	3	
R64	7A5	3	
R65	15B7	7	
R66	15C7	3	
R67	15B6	7	
R68	17F5	3	
R69	15B3	7	
R70	15A8	7	
R71	15B8	7	
R72	1B/C8	3	
R73	1B/F8	8	
RT	11B/C1	3	
RT1	11B/B1	3	

SELECTORS			
OD	SEE APP FIG.	7	

DESIG	LOCATION		
	FS	APP FIG	EQPT
SWITCH			
SS	1A/E7	1	

TEST POINTS			
-22V	1A/E9	1	
-34V	2G0	1	

THERMISTOR			
EDR	1C92	7	

TRANSFORMERS			
T1	1A/F9	1	
T2	1A/C6	1	
T3	1A/C6	1	
T4	1B/B6	3	
T5	1B/B7	3	
T6	7C3	3	
T7	8D2	3	
T8	12C5	3	
T9	17C2	7	
T10	17C7	7	

TRANSISTORS			
Q1	2G1	1	

VARISTORS			
RV1	1B/A6	3	
RV2	1B/A6	3	

SD-99311-01-A4

REMOTE TESTING CIRCUIT - FAR END

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SD-99311-01-A4

BELL TELEPHONE LABORATORIES
INCORPORATED

85

PRINTED IN U.S.A.

ISSUE
19AC

LEAD INDEX

DESIG	LOCATION	
	FS	CAD
±130V POWER DISTRIBUTING CKT (ESS)		
+130V	9F4, 13B/E8	4D1
-130V	9F4	4G1

COIN CONTROL SUPPLY		
CC+	9F4	4F1
CC-	9F4	4G1

NO. 1 ESS SCANNER APPLIQUE CKT		
NC	18B9	1D7

FAR END TEST TRK OR LINE CKT		
ANS	1B/D0	2E8
DIS	1B/D0	2A8
E	1A/F0, 18F0	4A3, 1D5
E(N)	18F0	3F8
M	1A/F0, 18F0	4A3
NC	18B9	1D6
ON	1B/D0	4C3
ON:	1B/D0	4E3
R	1B/B0, 18F0	4A3, 1G6
RI	18F0	1G6, 7C3
RS	1B/D0	1F0
T	1B/B0, 18F0	4A3, 1G6
TI	18F0	1G6, 7C3

EXTENDED REM TEST TRK CONTY CKT		
RR/RV	15E9	7D0
LL/XN	15E9	7D0
LC1	15C0	7D0
LG2	15C0	7D0
NT/MDF	15E9	7D0
R	15C0	7D0
S	15E9	7D0
T	15C0	7D0
TS/LS	15E9	7D0
YT/D	15E9	7D0

DESIG	LOCATION	
	FS	CAD
FAR END TEST TRK FOR INC REM TEST FROM LTD		
BY	1B/G0	4F3
CO	1A/E5	1A0
CO1	1A/E5	1C3
CT	1B/G0	1C3
CT6	1B/G0	1C3
CT1	1B/G0	1C3
DIS	1B/G0	1C3
E1	1A/E0	4F3
E(IN)	18F0	1E6
NC	18A9	1C6
R	1B/B0, 18F0	1F6, 4A3
RI	18F0	1F6
R2	14C2	1F0
T	1B/B0, 18F0	1F6, 4A3
TI	18F0	1F6
T2	14C2	1F0
TM	1B/C0	4F3

INCOMING TRK (NO-TEST)		
G	13B/D8	5C1
LL	14B9	4C7
LLG	14B9	5E6
R	13B/D8	4C7, 4D7, 5C1
S	13B/D8	4C7, 4D7, 5C1
T	13B/D8	4C7, 4D7, 5C1
XN	13B/G8	4D7

INCOMING TRK (NON-TEST)		
G	13B/B8	5B1
LL	13B/B8	4B7
LLG	13B/B8	5E6
R	13B/B8	4A7, 4B7, 5B1
S	13B/B8	4A7, 4B7, 5B1
T	13B/B8	4A7, 4B7, 5B1
XN	13B/G8	4A7

DESIG	LOCATION	
	FS	CAD
MDF TEST TRUNK CKT		
G	13B/E8	5D1
R	13B/E8	4E7, 5D1
S	13B/E8	4E7, 5D1
T	13B/E8	4E7, 5D1

MISC CKT FOR MISC INT FRAME		
BT3	18C0	1D6
LBT	18C0	1D6
ST	18C0	3A5

TEST VOLTAGE POWER SUPPLY CKT OR REMOTE TEST VOLTAGE SUP CKT		
20V	14F6	3C5
50V	14F6	3C5
100V	14F6	3C5
-116V	14F8	4E1
+116V	14F8	4E1
+GRD OR -GRD	14F6	3E5

RINGING SUPPLY		
105V±	8E0	3G7
AC-DC	11A/D8, 11B/D7	3H0, 3F5
AC-DC AUD		3F5
RING G		3H5
SUP+		
SUP+ AUD		3F5
SUP-		
SUP- AUD		
RAC	11A/D8	3H0
RING G	8E0	3H7

DESIG	LOCATION	
	FS	CAD
RINGING & TONE CKT		
R(LT 60)	18A0	1C6
R(BT 60)	18A0	1C6
T(LT 60)	18A0	1C6
T(BT 60)	18A0	1C6

TEST DISTRIBUTOR CONTROL		
R	13B/B8	4B7
S	13B/B8	4B7
T	13B/B8	4B7

TEST TRK 1ST SELECTOR (NO-TEST)		
R	13B/D8	4C7
S	13B/D8	4C7
T	13B/D8	4C7

TEST TRK 1ST SELECTOR (NON-TEST)		
R	13B/B8	4B7
S	13B/B8	4B7
T	13B/B8	4B7

TEST TRK & SELECTOR CKT		
R	13B/G8	4F7
S	13B/G8	4F7
T	13B/G8	4F7

TIMER CKT		
EC-	12C8	3B2
R-	12C8	3B2
ST-	12C8	3B2
T-	12C8	3B2

DESIG	LOCATION	
	FS	CAD
TONE DISTRIBUTING (ESS)		
R (ROM)	12B9	3B2
R (LT60)	18A0	1C6
R (BT60)	18A0	1C6
T (ROM)	12B9	3B2
T (LT60)	18A0	1C6
T (BT60)	18A0	1C6

TOUCH-TONE FREQUENCY TEST APPLIQUE		
R	13B/B8	4B7
P	13B/D8	4C7
S	13B/B8	4B7
S	13B/D8	4C7
T	13B/B8	4B7
T	13B/D8	4C7
TT1	13B/B8	3B0
YT2	13B/D8	3B0
LL	13B/B8	3D0
LL	14B9	3D0
LLG	13B/B8	3D0
LLG	14B9	3D0

TRANSMISSION FACILITIES		
E	1A/F0, 18F0	7A4
E(N)	18F0	7C4
M	1A/F0, 18F0	7A4
M(N)	18F0	7C4
R	1B/B0, 18F0	4A7, 5A1
RI	18F0	7A4
T	1B/B0, 18F0	4A7, 5A1
TI	18F0	7A4

TONE SUPPLY (SXS)		
BT2 60 IPM	18B0	1D6
LT1 60 IPM BT	18B0	1D6
LT4 60 IPM BR4	18B0	1D6
LT5 60 IPM BR2	18B0	1D6

DESIG	LOCATION	
	FS	CAD
VOICE OPERATED SWITCHED GAIN AMPL CKT		
RA	7A2	3F0
RB	7A2	3F0
TA	7A1	3F0
TB	7A2	3F0

REMOTE TESTING MDF TEL AND LOUDSPEAKER CIRCUIT - FAR END		
G	13B/F8	7B9
R	13B/F8	7A9
S	13B/F8	7A9
T	13B/F8	7A9

DESIG	LOCATION	
	FS	CAD

REMOTE TESTING CIRCUIT - FAR END

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SD-99311-01-A5

BELL TELEPHONE LABORATORIES

65

INCORPORATED

20B

OPTION INDEX

APP OR WRG	RATED ON ISSUE	REFERENCE NOTES	LOCATION
5	STD 24	III	APP FIG. 5
7	STD 15D		APP FIG. 7
8	STD 15D		APP FIG. 9, 1A/F1, 1B/A1, 1B/B2, 1B/G5
Z	STD 8AC MD 15D	313	1B/B4
Y	STD 2		9B3, 9B5, 9C3, 9C5, 9D4, 9D5
X	STD 2		9C3, 9C5, 9D4
W	STD 2	III	8E4, 8E5, 14F4, 14F8
V	STD 2	III	8E4, 8E5, 8E4
T	STD 6B		9E4, 9E5
S	STD 6B MD 15D		APP FIG. 3, 12C7, 13B/C6, 13E/C7, 13B/E7, 13S/F7
R	STD 6B MD 15D		APP FIG. 3, 12C7, 13B/C6, 13E/C7, 13B/E7, 13S/F7
Q	STD 8C MD 15D	313	APP FIG. 3, 1B/B4, 1B/C4
N	STD 9B		APP FIG. 3, 7C2, 11H4, 11F3, 14B8
M	STD 9B MD 15D		1A/H8, 7C2, 11C4, 11C7, 7B9
K	MD 8AC		1B/B4
J	STD 10B	105	9A5
H	STD 10B	105	APP FIG. 3, 9A5
G	STD 10B		APP FIG. 1, 1A/E9
F	MD 10B		APP FIG. 3, 1A/B5, 1A/C8, 7B4, 7C4, 7D1, 7G9, 10B2, 10D2
E	STD 10B	106	APP FIG. 3, 1A/B5, 1A/C8, 7C4, 7D1, 7D2, 7G9, 10B2, 10D2, 10E5
B	MD 10B		APP FIG. 3, 11C2, 11D2, 11E2, 11F1, 11F2, 11G1
A	STD 10B	106, 107	11C2, 11D2, 11E2, 11F1, 11G1
ZA	MD 10B		14A5, 14B5, 14A2, 14E1
ZB	STD 10B		14A5, 14B5, 14A2, 14B1
ZC	MD 11B		APP FIG. 1
ZD	STD 11B		APP FIG. 1
ZE	MD 10B		13A/B1
ZF	STD 10B		13A/B1

APP OR WRG	RATED ON ISSUE	REFERENCE NOTES	LOCATION
ZG	ABM 10B		APP FIG. 1
ZH	STD 10B		APP FIG. 1
ZI	STD 12B	109	APP FIG. 3, 7A8, 11E7, 11C4
ZJ	STD 12B MD 13AC	109	APP FIG. 3, 7A8, 11A/B4, 13B/D7, 14B8
ZK	MD 12B		11H2, 11H3, 11H4
ZL	STD 12B		11H2, 11H3, 11H4, 11H5
ZM	STD 12B	11C	11E8
ZN	STD 12B MD 13AC	106	11E8
ZO	STD 15D		1A/E6, 14A2, 14B2
ZP	STD 15D		APP FIG. 1, 3, 1A/E1
ZQ	STD 15D	III	APP FIG. 3, 7H1, 7F8, 8D5, 12E0, 13A/C2, 13A/E2, 13B/E1, 13B/C2, 14A-B4, SHEETS 15, 16, 17E2, 17E4, 17B5, 17D5, 17E7
ZR	STD 15D		7H1, 7B8, 7F8, 7G8, 13B/E1, 13B/C2, 14A-B4
ZS	STD 15D		APP FIG. 3, 11H4, 14B8
ZT	STD 15D		7C2
ZU	STD 15D		1A/H8, 7B9, 11C4, 11C7
ZV	MD 15D		APP FIG. 3, 7F8
ZW	STD 15D		APP FIG. 3, 7F8
ZX	STD 15D		7A8
ZY	STD 15D		APP FIG. 3, 7A6, 7A8
ZZ	MD 15D	112	APP FIG. 3
YA	STD 15D	112	APP FIG. 3
YB	STD 15D		1A/E1, 1A/F1, 1B/A1, 1B/B1, 1B/B5, 1B/C5, 1B/C9
YC	STD 15D		1A/F1, 1A/C5, 1B/C3, 1B/C7, 1B/G1, 1B/H2, 1A/A4, 1B/E9
YD	STD 15D	313	1B/C1, 1B/B4
YE	STD 15D	313	APP FIG. 6, 1B/B3
YF	MD 15D		1B/B8, APP FIG. 3
YG	STD 15D	313	APP FIG. 3
YH	STD 15D	312	1B/B4, 1B/C8
YI	STD 15D	312	1B/B5, 1B/B8
YJ	STD 15D	312	1B/B5, 1B/C5, 1B/C8
YK	STD 15D	313	APP FIG. 8
YL	STD 15D	313	APP FIG. 8
YM	STD 15D	313	APP FIG. 8
YN	MD 15D		APP FIG. 3, 8C1, 8C2
YO	STD 15D		APP FIG. 3
YP	STD 15D		8B0, 8A2, 8C2
YQ	STD 15D		APP FIG. 3, 12B7, 12C7, 13B/C6, 13B/C7, 13B/E7, 13B/F7
YR	STD 15D		APP FIG. 3, 13B/C6
YS	STD 16D		APP FIG. 9
YT	STD 16D		13B/A4, 13B/B4, 13B/C4

APP OR WRG	RATED ON ISSUE	REFERENCE NOTES	LOCATION
YU	STD 16D		13A/G5
YV	STD 16D		APP FIG. 1
YW	STD 17B	114	8B2, 8C3
YX	STD 17B	114	APP FIG. 3, 8C2, 8C3
YY	MD 18B	115	APP FIG. 1, 7C3, 7D3, 10C5, 12B1, 12B3, 13B/CQ, 13B/C1, 13B/DQ, 13B/E1, 16D7
YZ	STD 18B MD 19AC	115	7D3, 10B4, 10C5, 10B6, 12A3, 12B1, 12H3, 13B/C1, 13B/D1, 13B/E1, 16D7
XA	MD 19AC	116	1A/E6, 7B6, 7C1, 7D6, 7E9
XE	STD 19AC	116	1A/E6, 7B1, 8B6, C1, C3, D6, 10B4-6, C5, 12A3, 12B1, 12H7, 13B/C1, 13B/D1, 13B/E1, 16D7
XC	MD 19AC		1B/F1
XD	STD 19AC		1A/B4, 1B/F1
XE	MD 19AC		7G9, 15B2, 16E8, 17B4, 17D5, 15CC
XF	STD 19AC		APP FIG. 3(C5), 15B2, 6, 16D8, 17B4, 17D5
XG	MD 19AC		18E7
XH	STD 19AC		18E8
XI	STD 19AC		APP FIG. 3, 11A/A5, 84, 86, C4, U3
XJ	STD 19AC		APP FIG. 3, 7A6, 8, 11A/A4, A5, B4, B6, D3, SH 11B, 13S/D7, 14B8
XK	STD 19AC		13B/F8
XL	STD 19AC		13B/F8
XM	STD 20B		APP FIG. 1, 2, 3, 7, 8, 9

SD-9311-01-A6

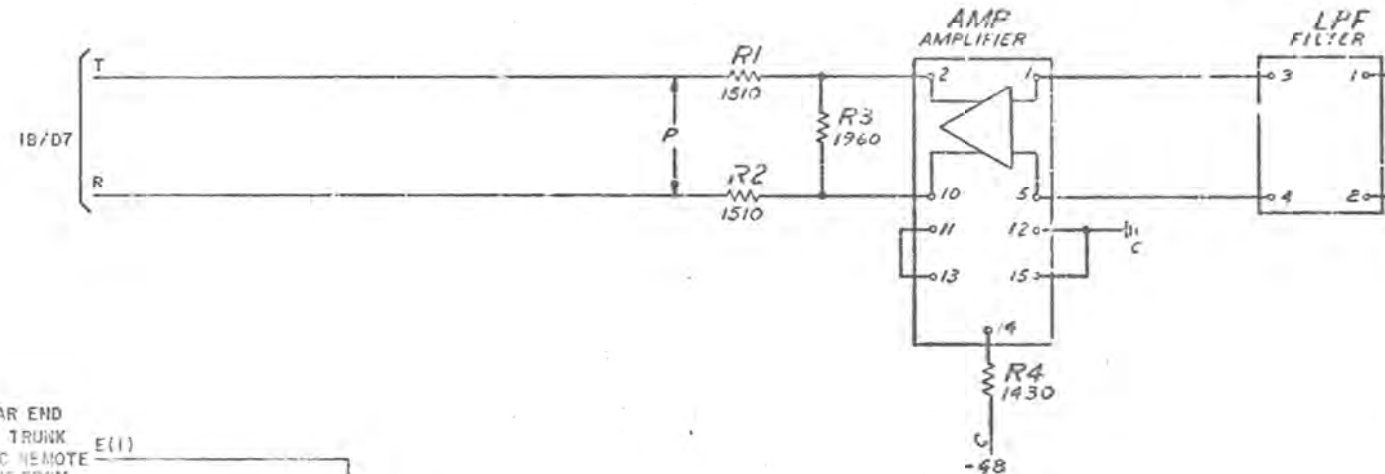
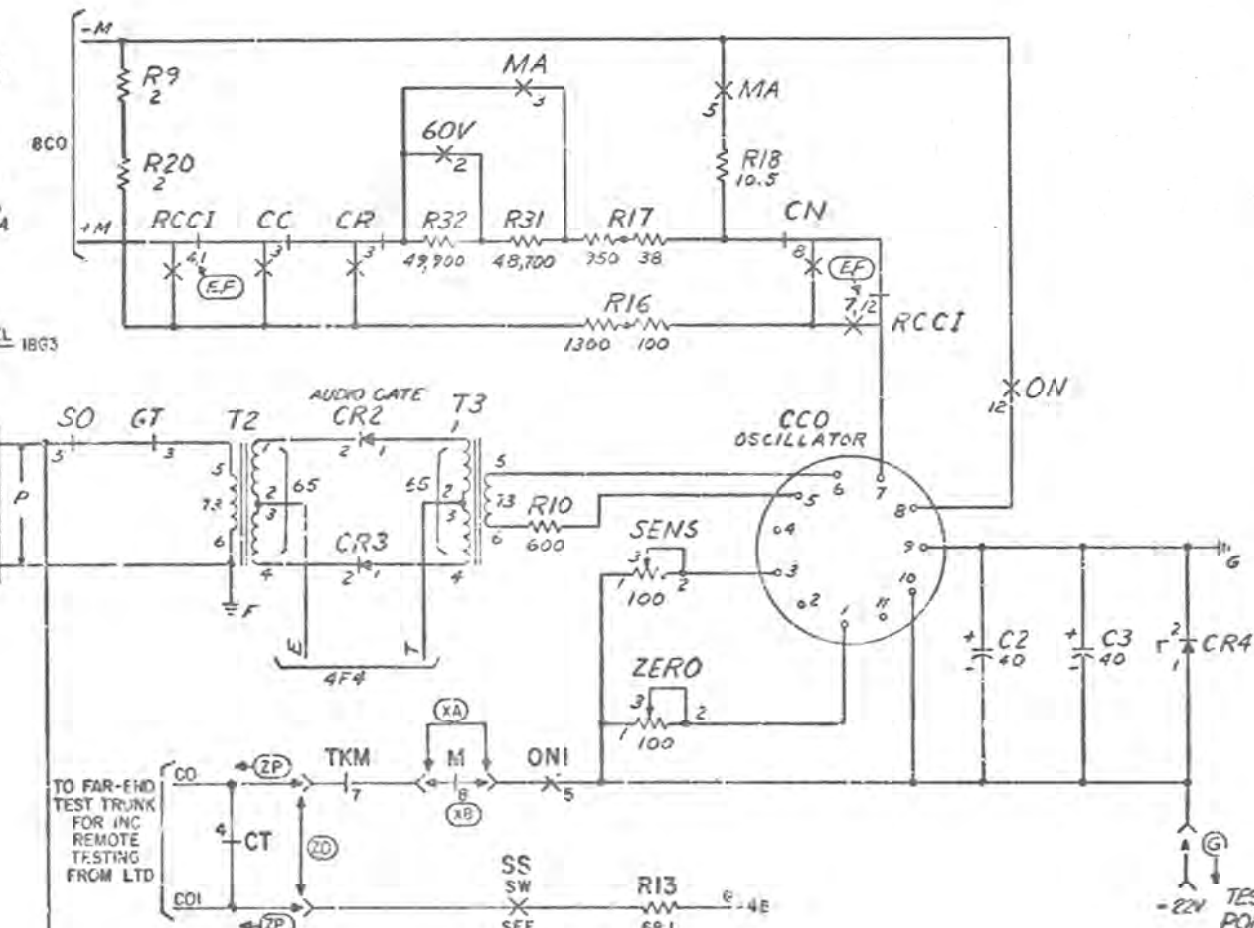
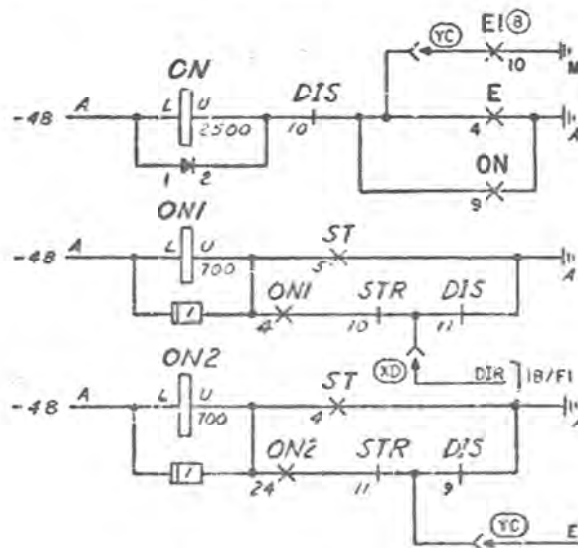
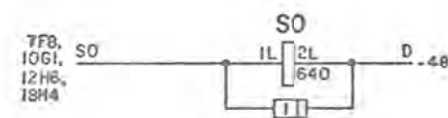
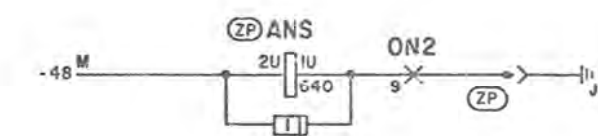
REMOTE TESTING CIRCUIT-FAR END
BELL TELEPHONE LABORATORIES
INCORPORATED

②
65

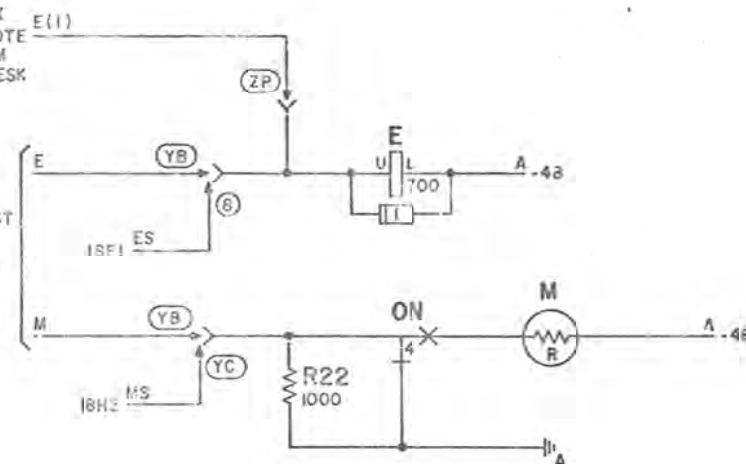
SD-9311-01-A6

ISSUE
20B

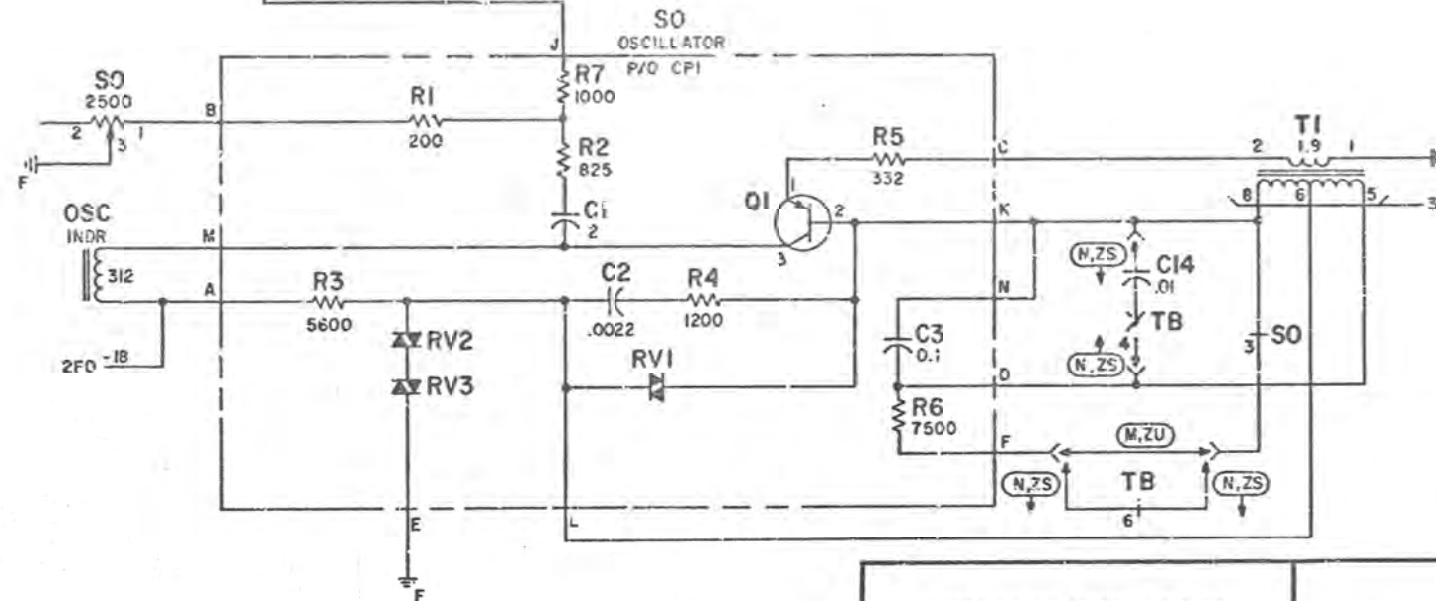
PART OF FS I HYBRID, SUPERVISORY OSCILLATOR AND CURRENT CONTROLLED OSCILLATOR



TO FAR END
TEST TRUNK
FOR INC REMOTE
TESTING FROM
LOCAL TEST DESK



TO FAR END TEST
TRUNK OR LINE
CKT OR TRNSN
FACILITIES



NOTES:
1. THE (SS) SWITCH IS HELD OPERATED BY THE (C70)
OSCILLATOR BEING PLUGGED INTO ITS SOCKET.

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES
INCORPORATED

9311-01-BIA

PART OF FS I

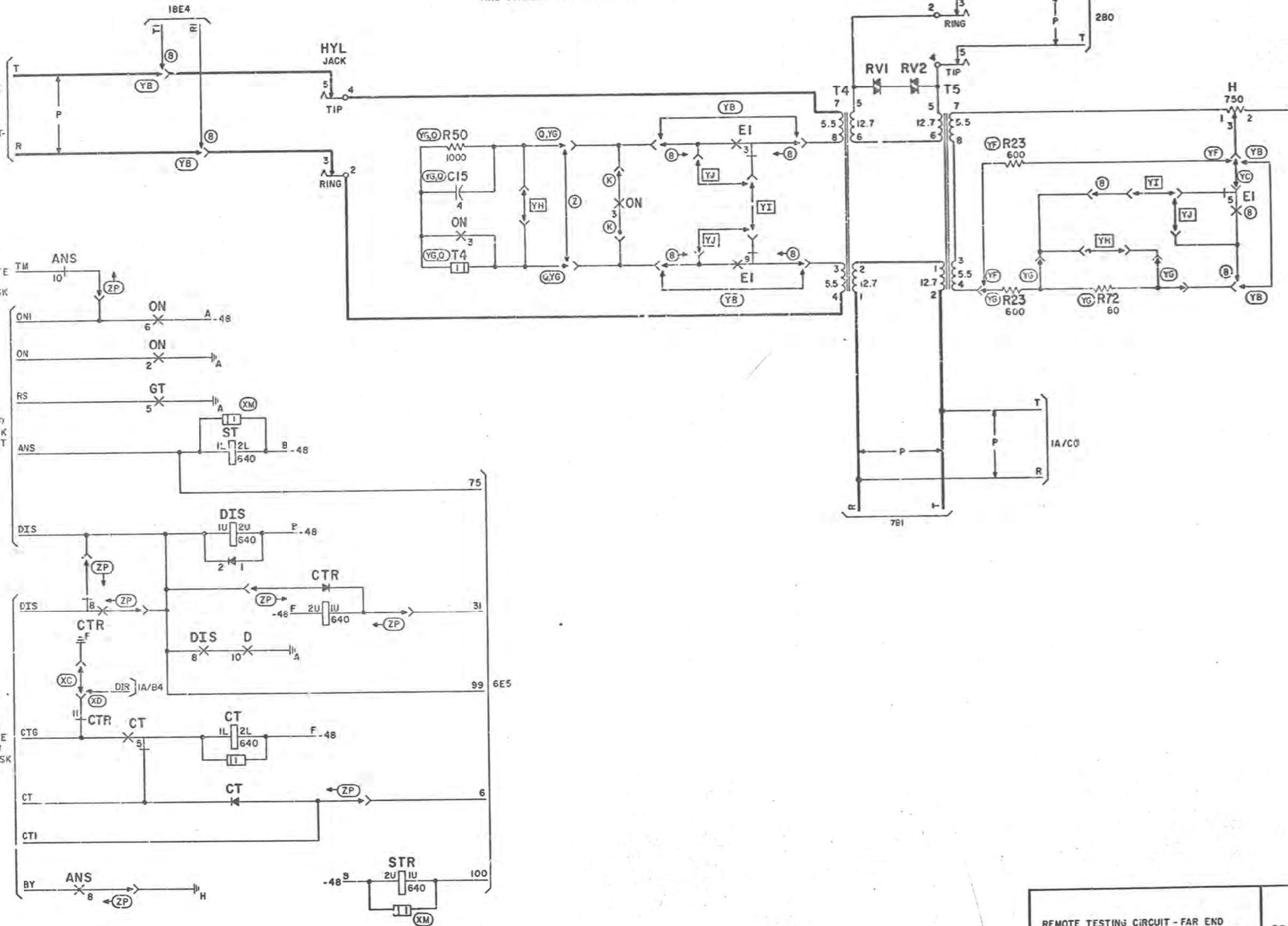
HYBRID, SUPERVISORY OSCILLATOR
AND CURRENT CONTROLLED OSCILLATOR

TO FAR-END TEST TRK
OR LINE CKT, TRMSN
FACILITIES, OR FAR-
END TEST TRUNK FOR
INCOMING REMOTE TEST-
ING FROM LOCAL TEST
DESK

TO FAR-END
TEST TRUNK
FOR INC. REMOTE
TESTING FROM
LOCAL TEST DESK

TO FAR-END
TEST TRUNK
OR LINE CKT

TO FAR-END
TEST TRUNK
FOR INC. REMOTE
TESTING FROM
LOCAL TEST DESK



REMOTE TESTING CIRCUIT - FAR END

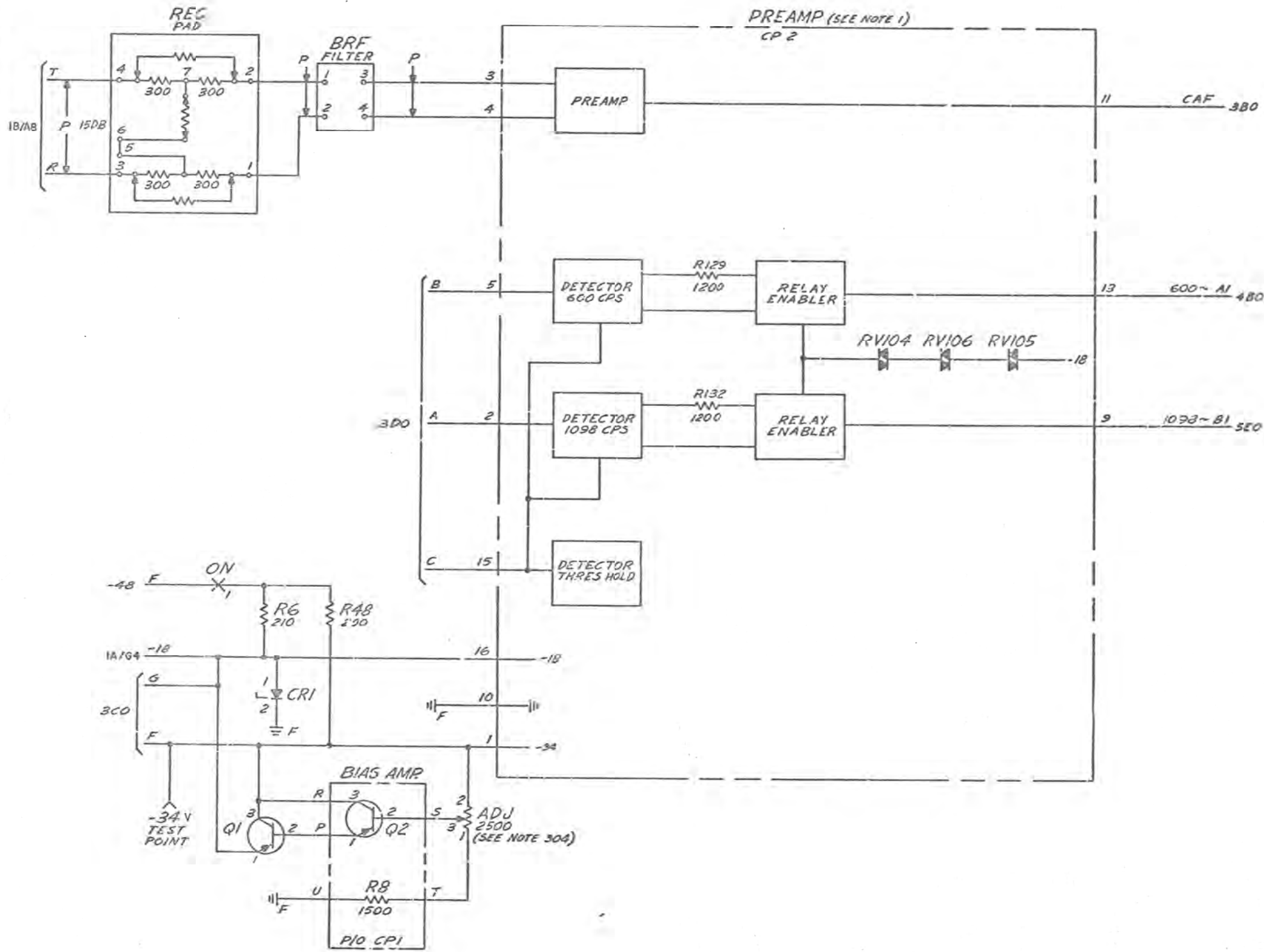
BELL TELEPHONE LABORATORIES
INCORPORATED

②

6S

SD-9311-01-B18

FS 2
MULTITONE PREAMPLIFIER



SHEET NOTES:

1. SEE EQUIPMENT NOTE 202 BEFORE REPLACING CP2.

FS3 LIMITER AND DETECTOR (SEE NOTE 1)

GRP A
CP3 SEE TABLE A

CAF
CUT APART FILTER

2B6 CAF

2F0
F
G

2D2
B
C

AMPLIFIER
AND
LIMITER

DETECTOR
a

RELAY
ENABLER

DETECTOR
b

RELAY
ENABLER

DETECTOR
c

RELAY
ENABLER

DETECTOR
d

RELAY
ENABLER

5 697~ A2

6 700~ A3

7 852~ A4

8 941~ A5

4B0

GRP B
CP4
SEE TABLE A

F
1
16

5 1209~ B2
6 1336~ B3
7 1477~ B4
8 1633~ B5

5F0

GRP C
CP5
SEE TABLE A

F
1
16

NC 9
15

8 1950~ C1
5 2050~ C2
6 2150~ C3
7 2250~ C4

4E0

TABLE A

DETECTOR	CP 3	CP 4	CP 5
a	697~	1209~	1950~
b	700~	1336~	2050~
c	852~	1477~	2150~
d	941~	1633~	2250~

SHEET NOTES:

- SEE EQUIPMENT NOTE 202 BEFORE REPLACING CP3, CP4, OR CP5.

ISSUE
17B

REMOTE TESTING CIRCUIT-FAR END

SD-99311-01-83

BELL TELEPHONE LABORATORIES
INCORPORATED

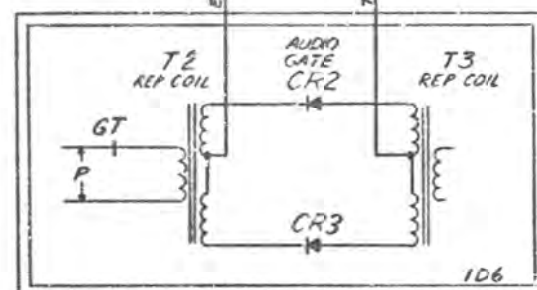
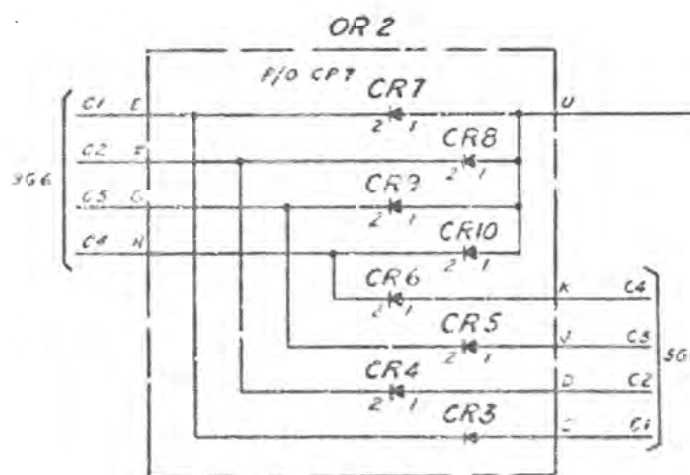
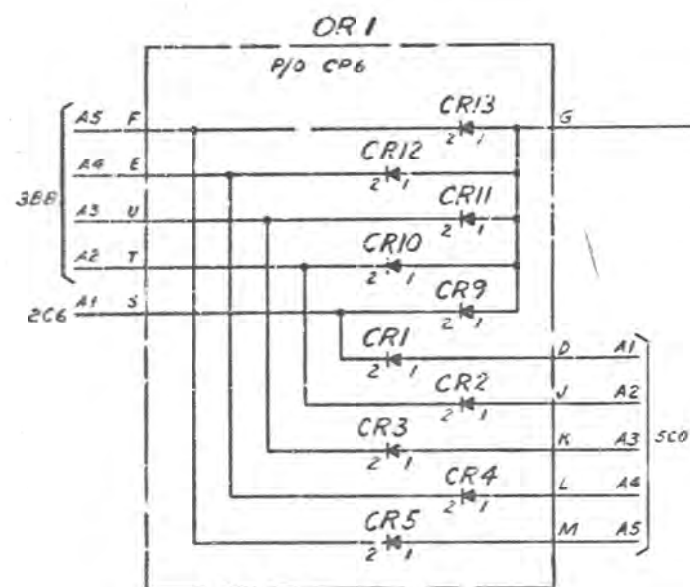
2

6S

SD-99311-01-83

FS 4 DC & AUDIO GATE

AND (SEE NOTE 1)



SHEET NOTES:
1. NOMINAL VOLTAGES AT TEST POINTS IN
(AND) PACKAGE (CKT PACK 8) ARE:

TP	GATE NORMAL	GATE OPERATED
1	-30V	-30V
2	-17V	-2.5V
3	-2V	-2V
4	-15V	-15V
TERM. T	-29V	-48V

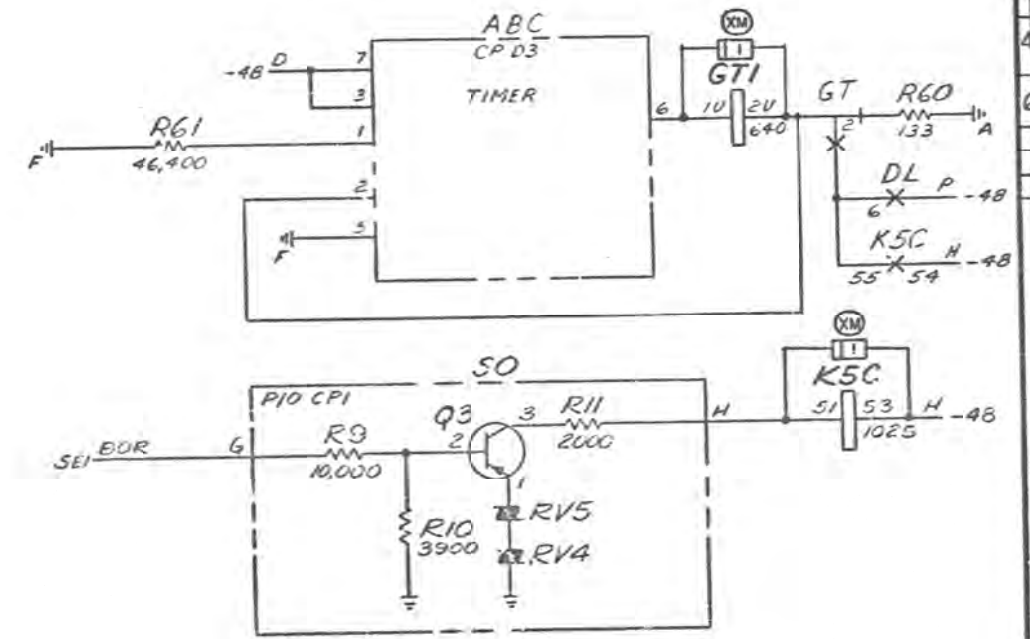
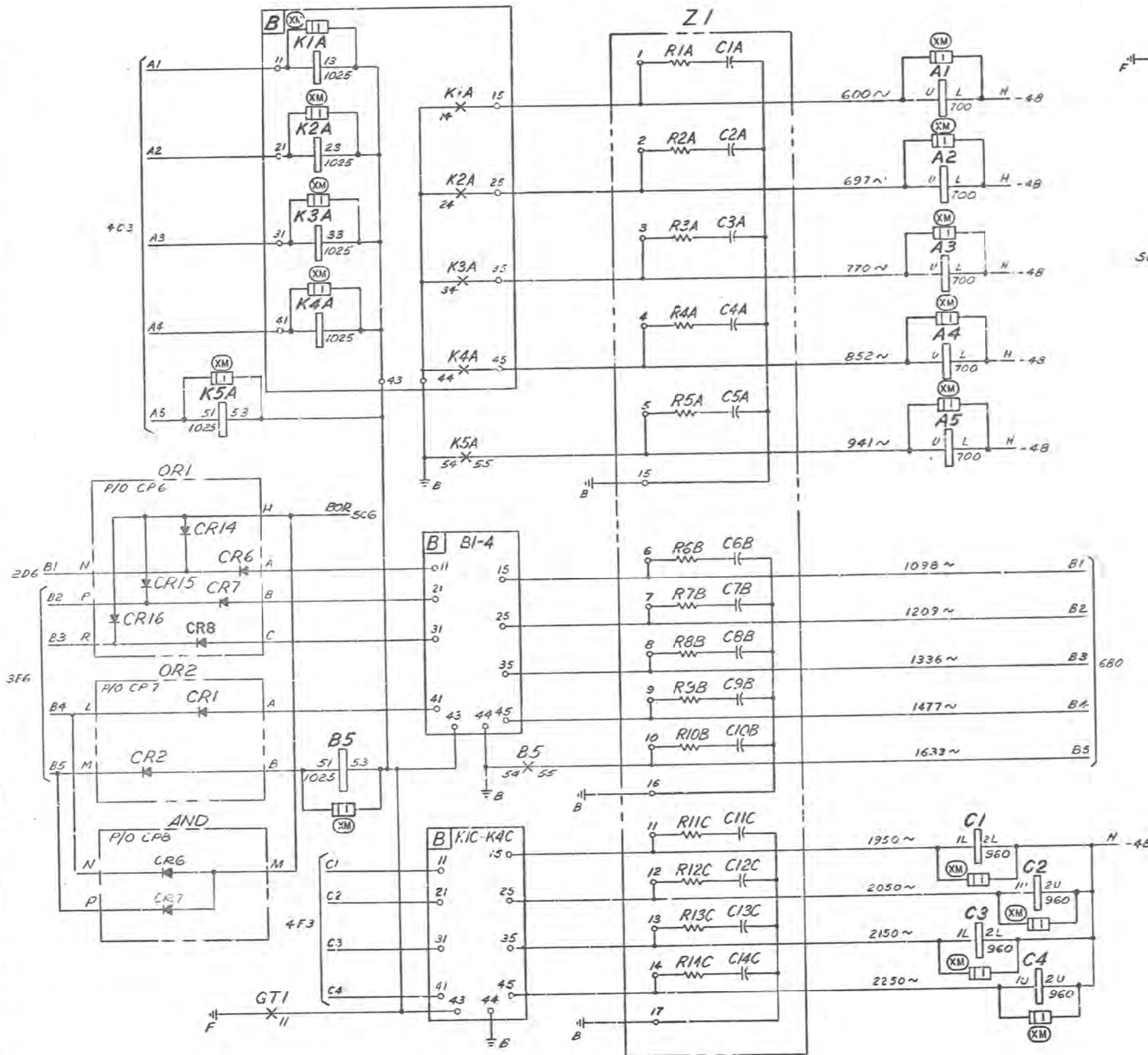
REMOTE TESTING CIRCUIT - FAR END

SD-99311-01-B4

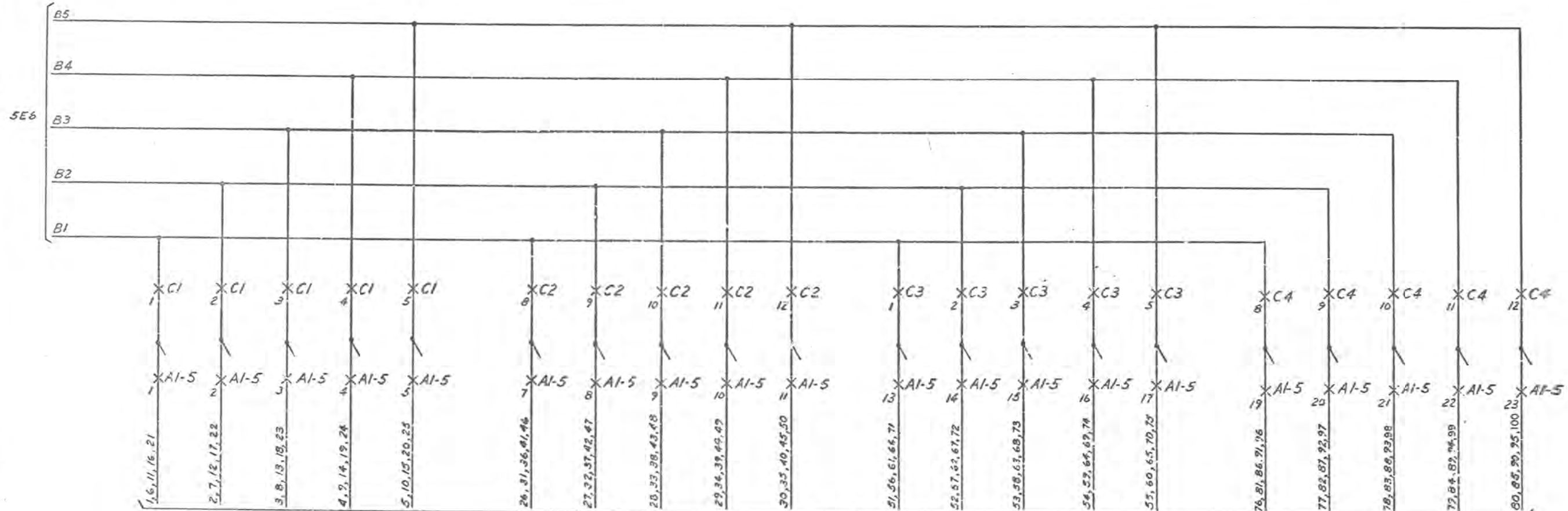
BELL TELEPHONE LABORATORIES

6S

FS 5 MULTITONE RECEIVER READOUT



FS 6 MULTITONE TRANSLATOR



SEE TABLE A

TABLE A

RELAY	LEAD	LOC	LEAD	LOC	LEAD	LOC	LEAD	LOC
A1	1		26		51	13A/F1	76	13A/A1
	2	13A/B1	27	13A/G1	52	13A/F1	77	13A/G1
	3		28		53	80J	78	80B
	4	13A/C1	29	13A/G1	54	11D1	79	11G1
	5	12F1	30		55	11D1	80	11G1
A2	6	1B/G4	31	1B/F4	56		81	
	7	11E1	32	11F1	57	9E1	82	9H1
	8	12G1	33	12G1	58	9F1	83	9H1
	9	9C1	34	9G1	59	8E8	84	8G8
	10	10B8	35	10F8	60	8F8	85	8G8
A3	11	10C8	36	10F3	61		86	
	12	13A/D1	37	13A/B1	62		87	
	13	13A/E1	38	12A/A1	63		88	
	14		39		64	18C6	89	18C6
	15	9D1	40	9G1	65		90	
A4	16	11B1	41	11F1	66	11H1	91	11H1
	17	11C1	42	11G1	67		92	
	18		43		68	13A/A8	93	13A/B8
	19	7G6	44	7G6	69	16B1	94	16B1
	20		45		70		95	
A5	21	7G2	46	7E6	71	7F2	96	7D2
	22	10D8	47	10G8	72	1CD8	97	10G8
	23	13A/C1	48	13A/G1	73	10E8	98	10G8
	24	7H2	49	7E6	74		99	16B1, 13/F4
	25	7H2	50	7F6	75	1B/E4	100	1B/H4

DRAWING
ISSUE
3A
4D
7A
9B

ISSUE
17B

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES
INCORPORATED

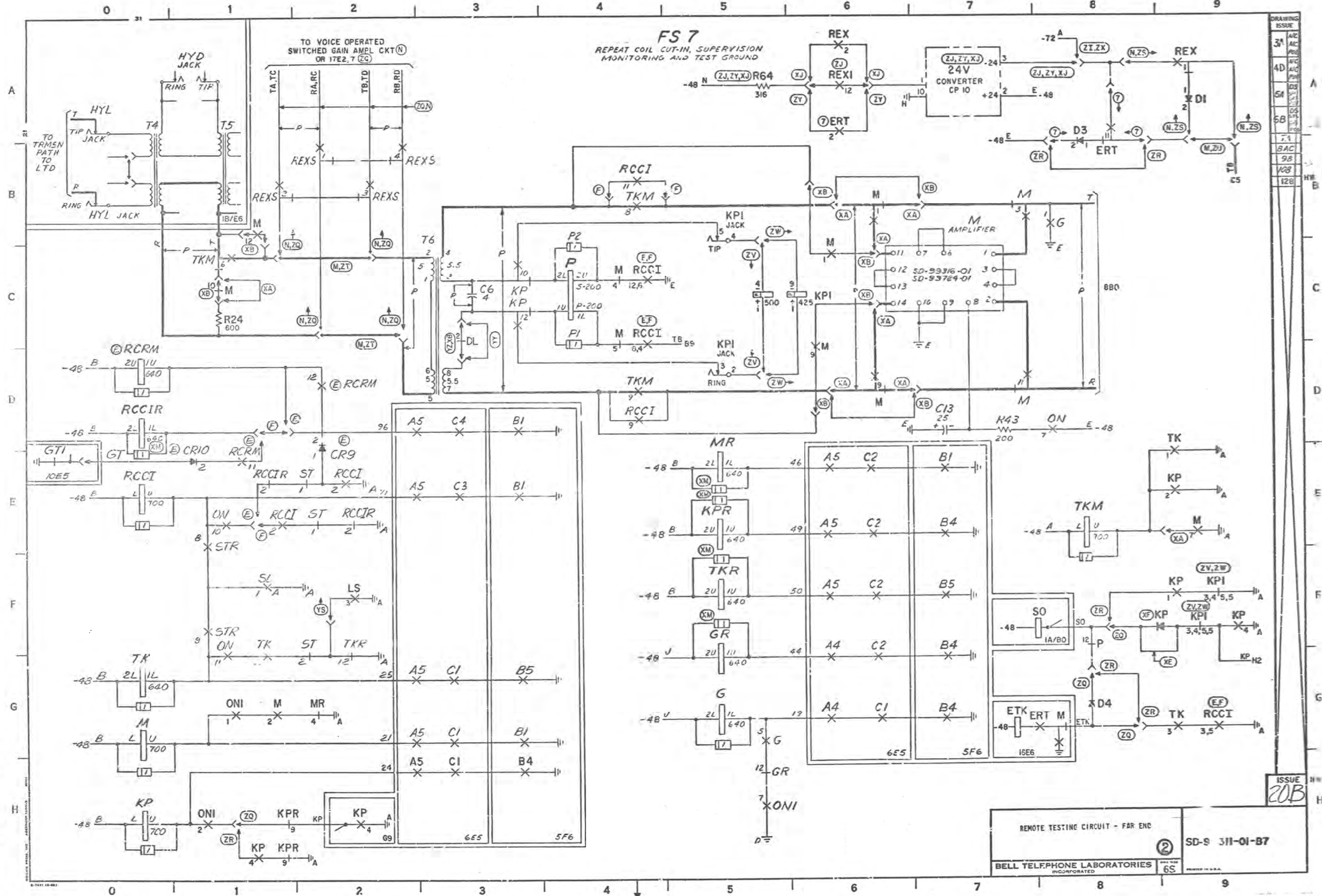
SD-99311-01-B6

6S

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SD-99311-01-B6

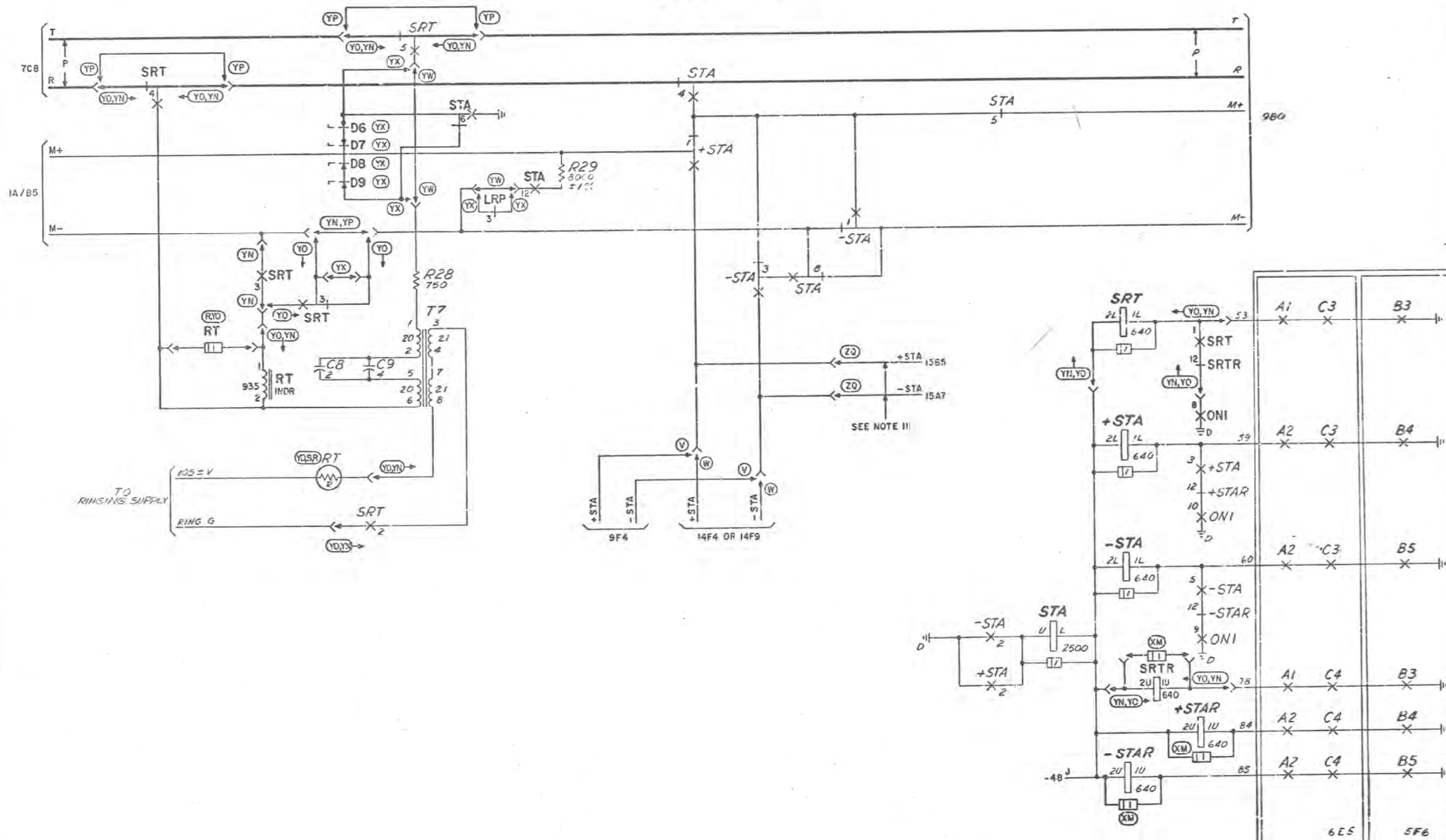
FS 7
REPEAT COIL CUT-IN, SUPERVISION
MONITORING AND TEST GROUND



SD-9311-01-B7

FS 8

SUBSCRIBER DELAY TEST
& STATION RINGER TEST



REMOTE TESTING CIRCUIT - FAN END

②

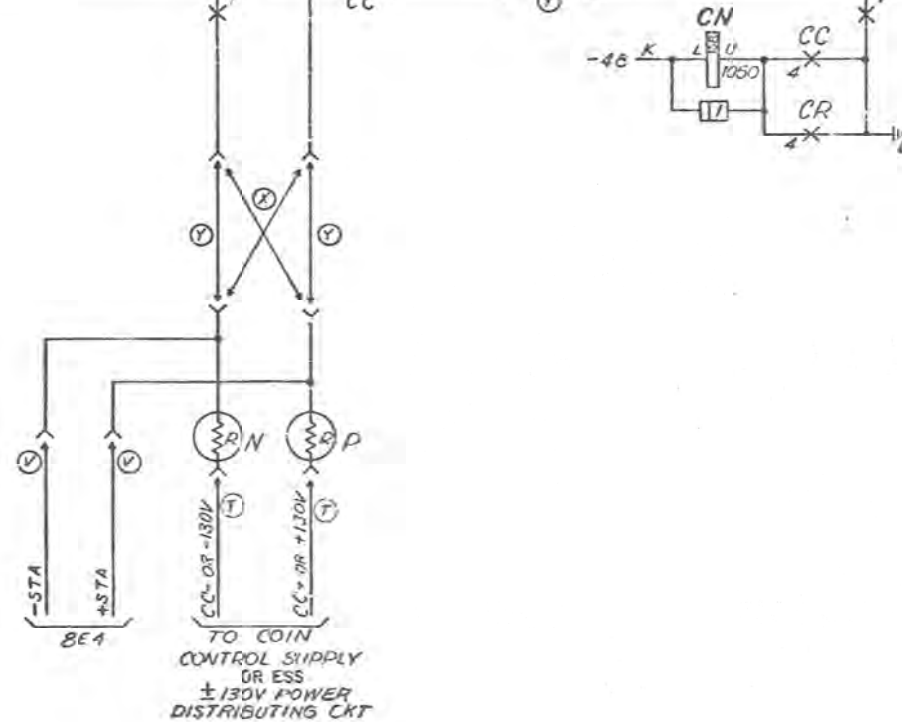
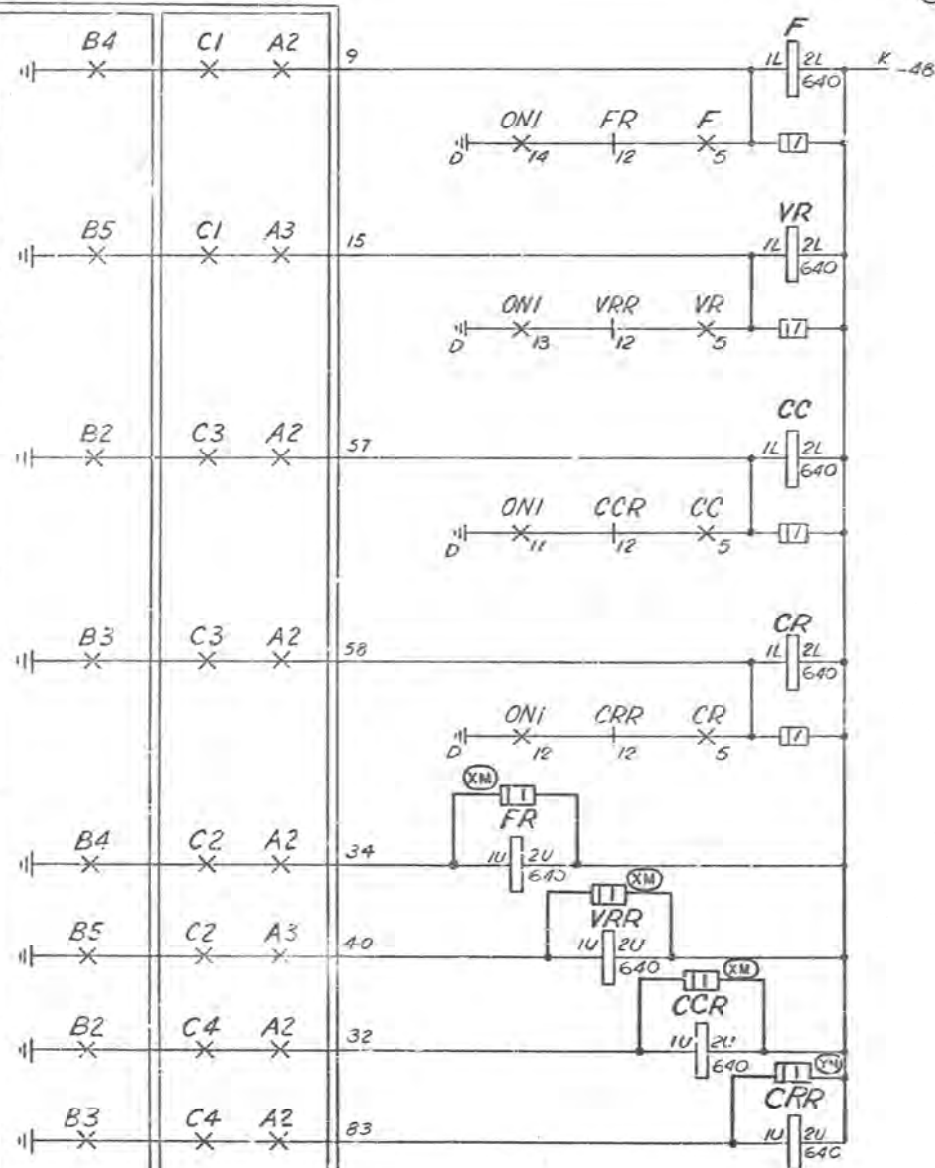
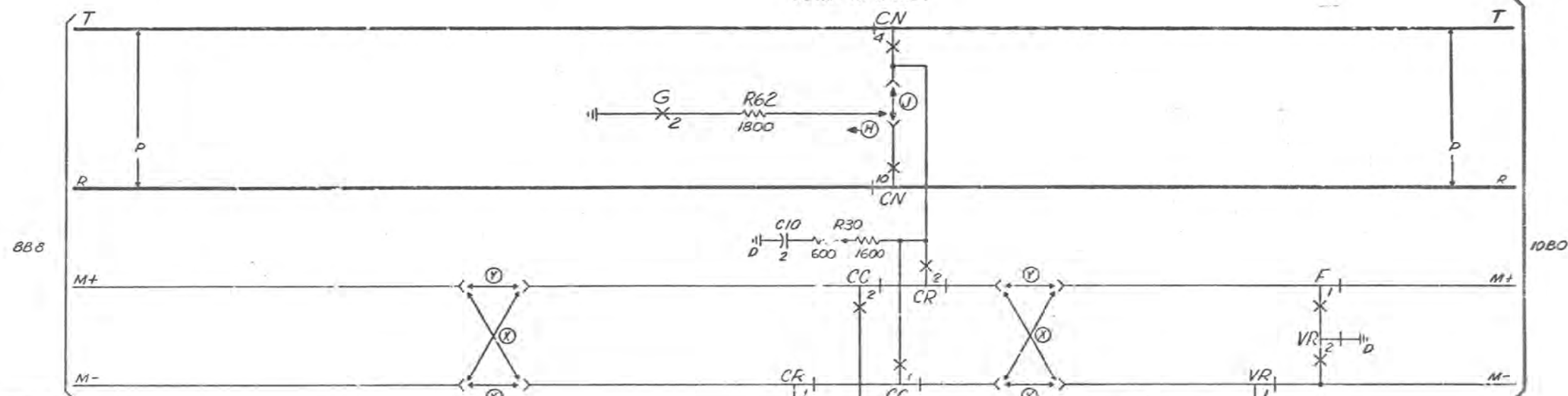
SD 311-01-BB

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

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FS9
COIN TEST
FEMF & VMREV

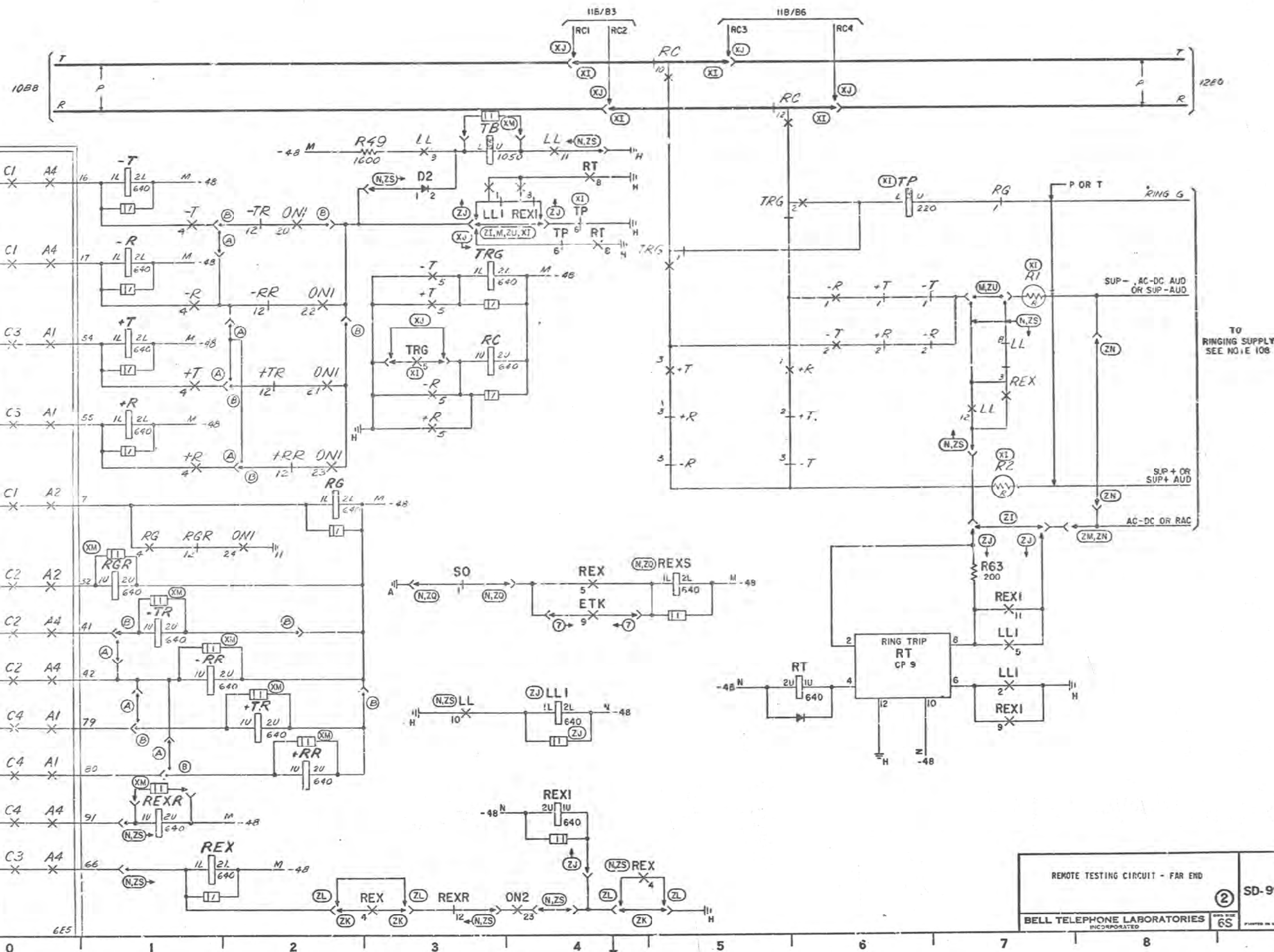


TEST BATTERY, REVERSE, WAIL TONE TEST
& PERMANENT SIGNAL RELEASE



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PART OF FS II
RINGING CONTROL CIRCUIT



TO
RINGING SUPPLY
SEE NO. E 108

SUP + OR
SUP+ AUD

AC-DC OR RAC

RING TRIP
RT
CP 9

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES

SD-993 -OI-BIIA

OWN SIZE
6S

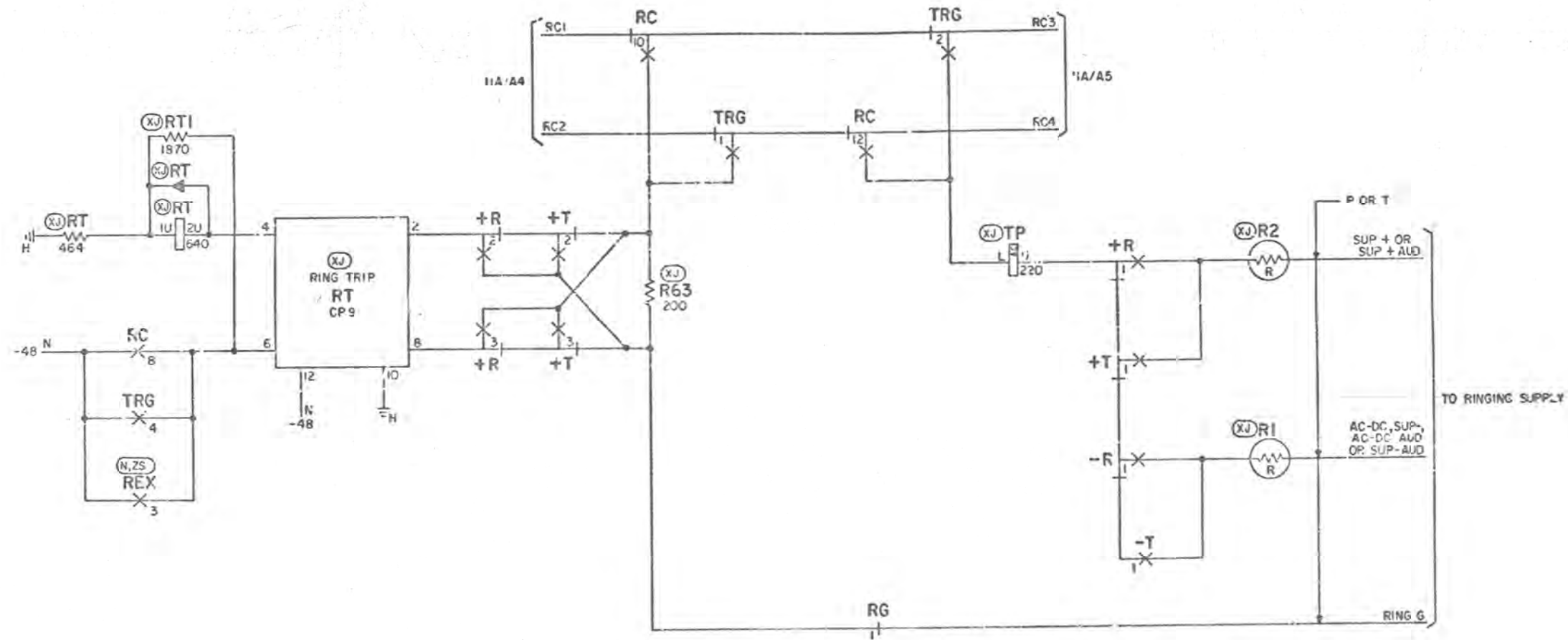
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SD-99311-01-B11A

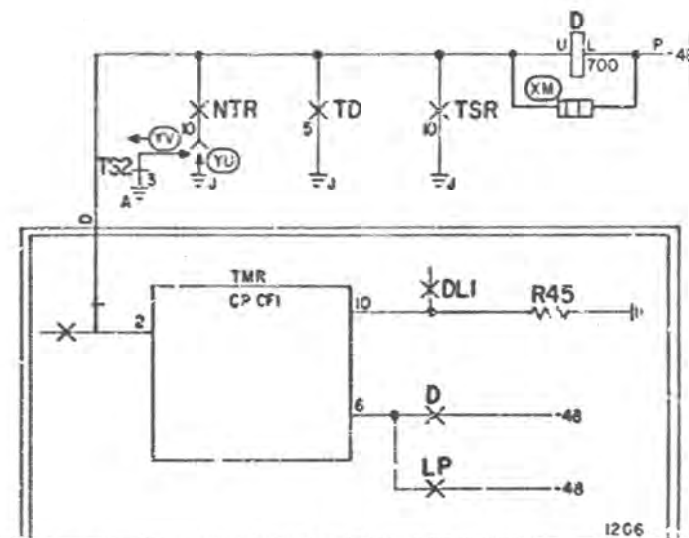
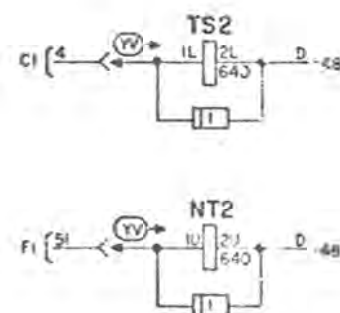
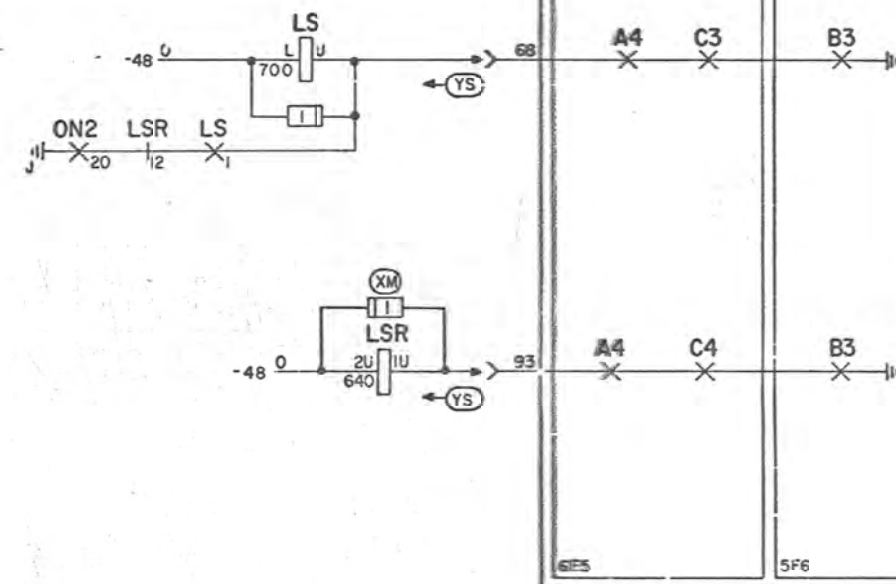
DRAWING ISSUE	
2A	92A M. PMB
3A	NO NO PMB
4D	NO NO PMB
6B	OS SRL L-25 POLH
9B	
10B	
11A	
12B	
14A	

ISSUE
20B

PART OF FS II RINGING CONTROL CKT



PART OF FS 13 REMOTE TEST TRUNK CONTROL



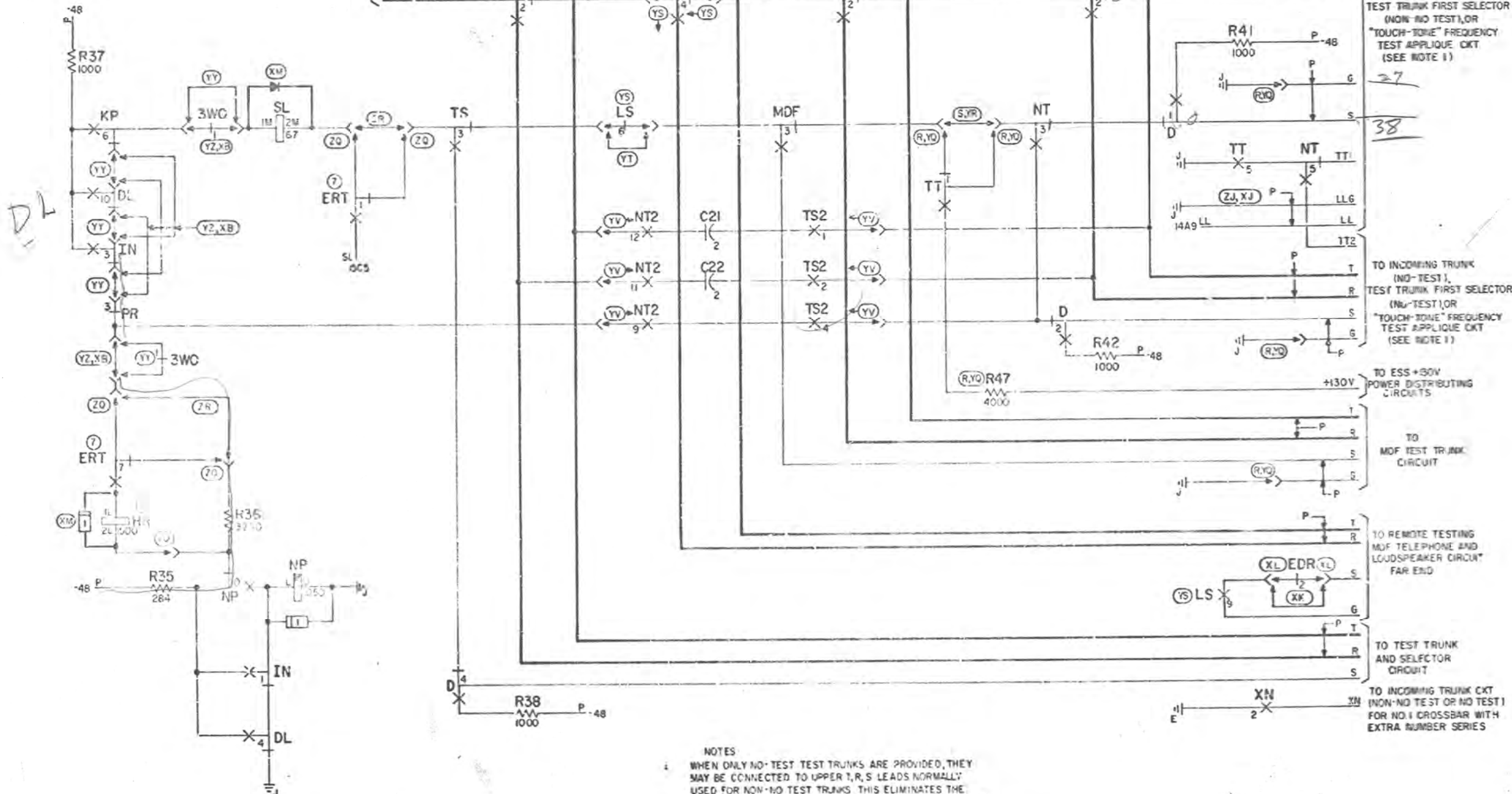
REMOTE TESTING CIRCUIT - FAR END
BELL TELEPHONE LABORATORIES
INCORPORATED

20B

311-01-B13A

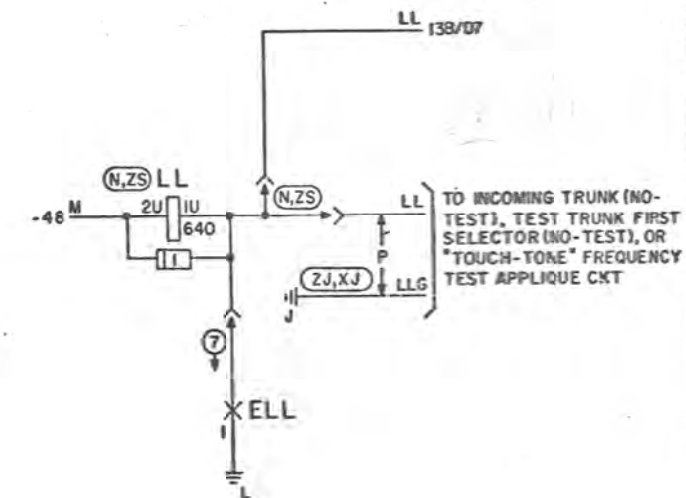
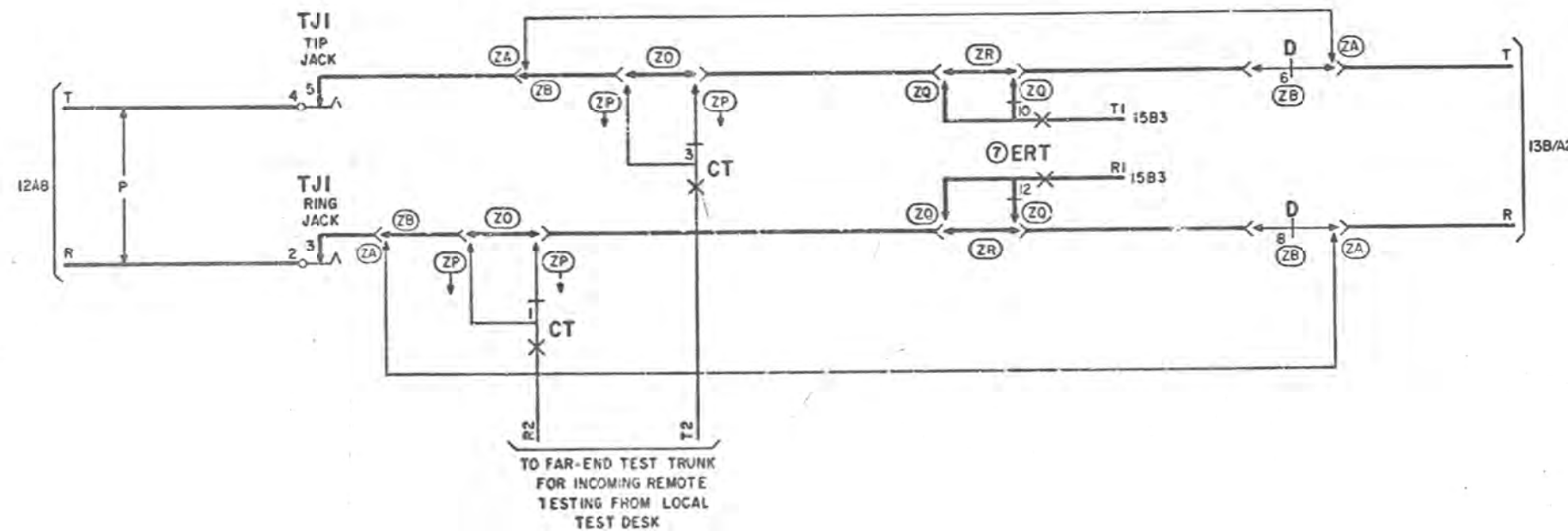
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PART OF FS 13 REMOTE TEST TRUNK CONTROL

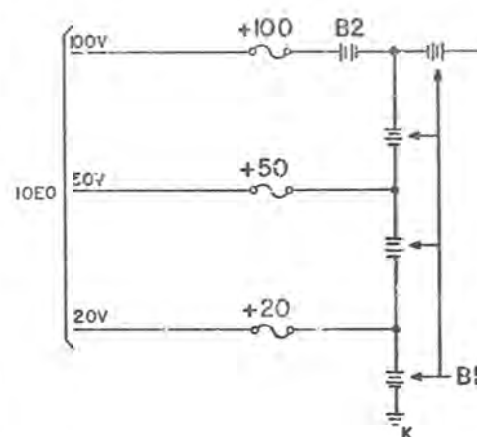


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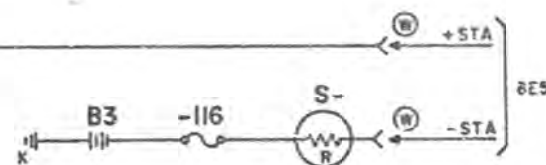
PART OF FS 13 REMOTE TEST TRUNK CONTROL



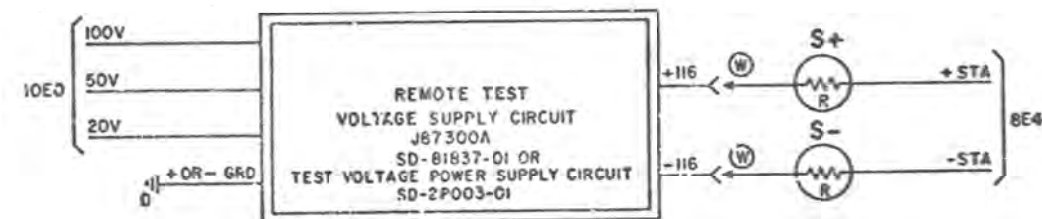
④ FS 14
POSITIVE TEST BATTERY
SEE NOTE 302



⑤ FS 15
NEGATIVE TEST BATTERY
SEE NOTE 302

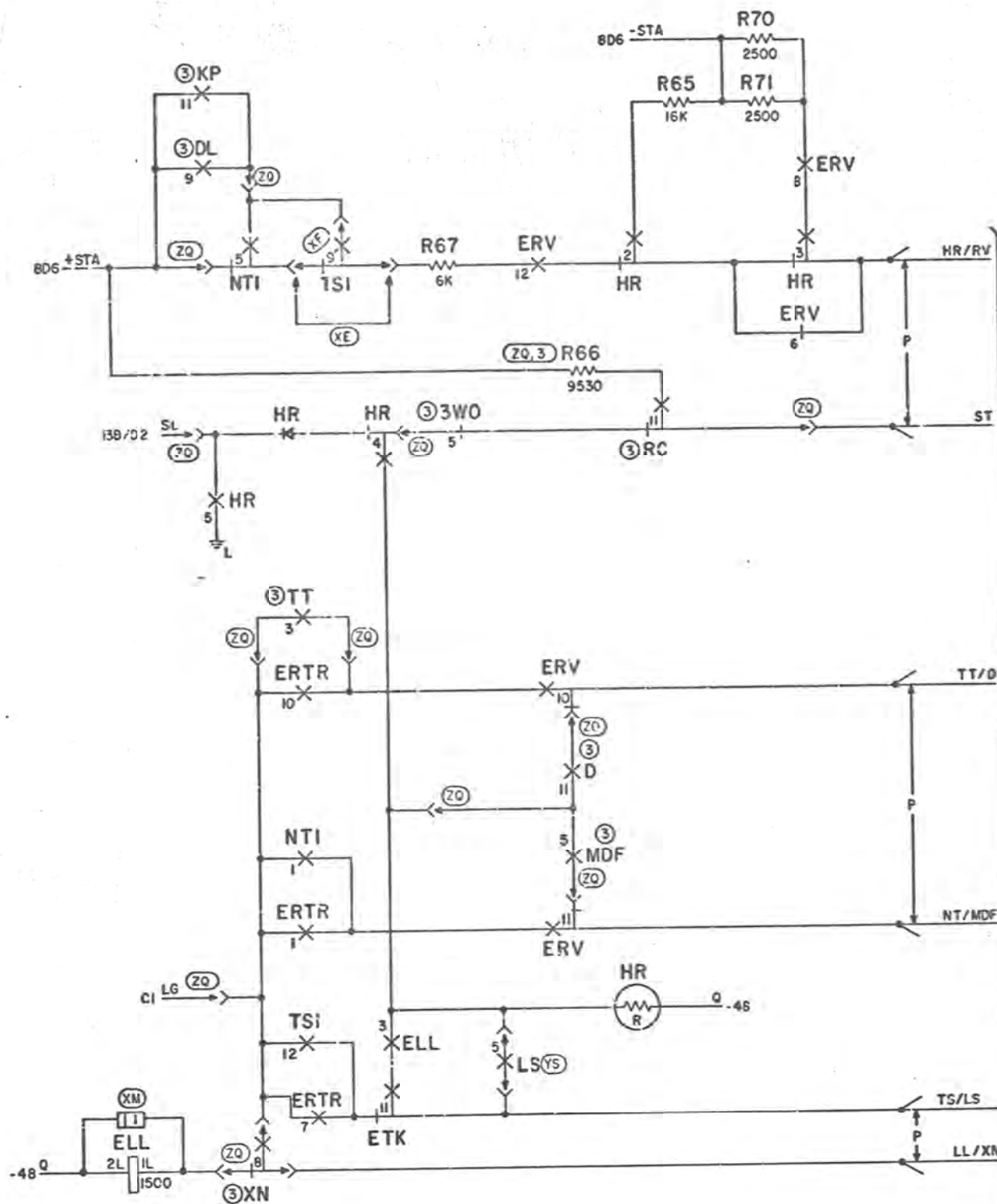
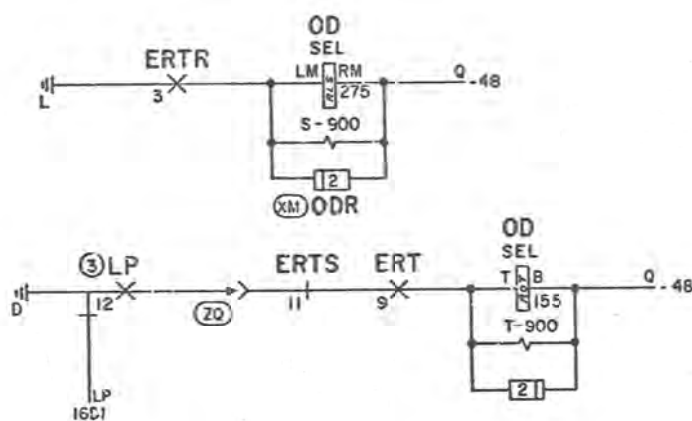
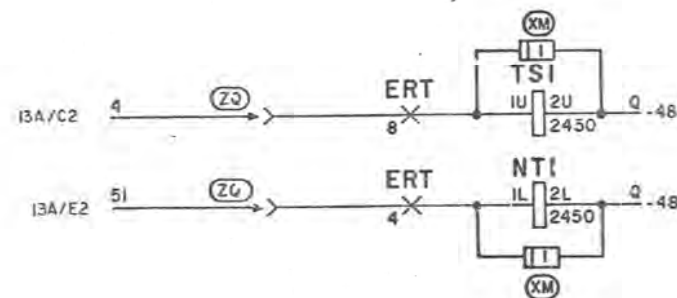
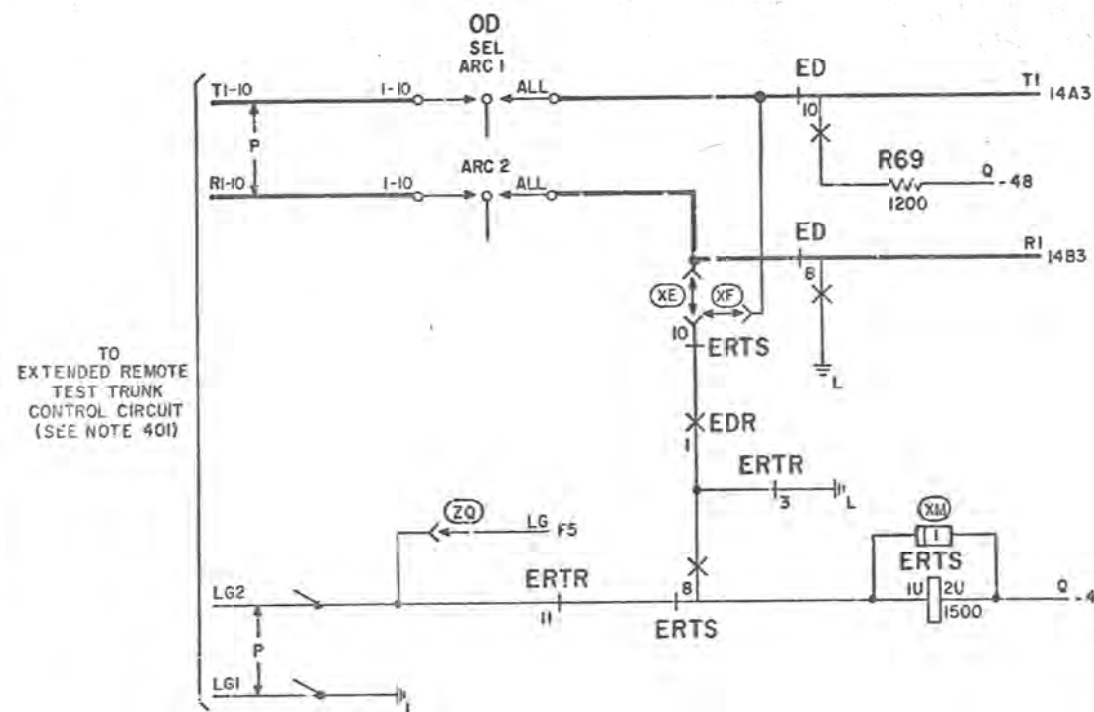


⑥ FS 16
POWER SUPPLY

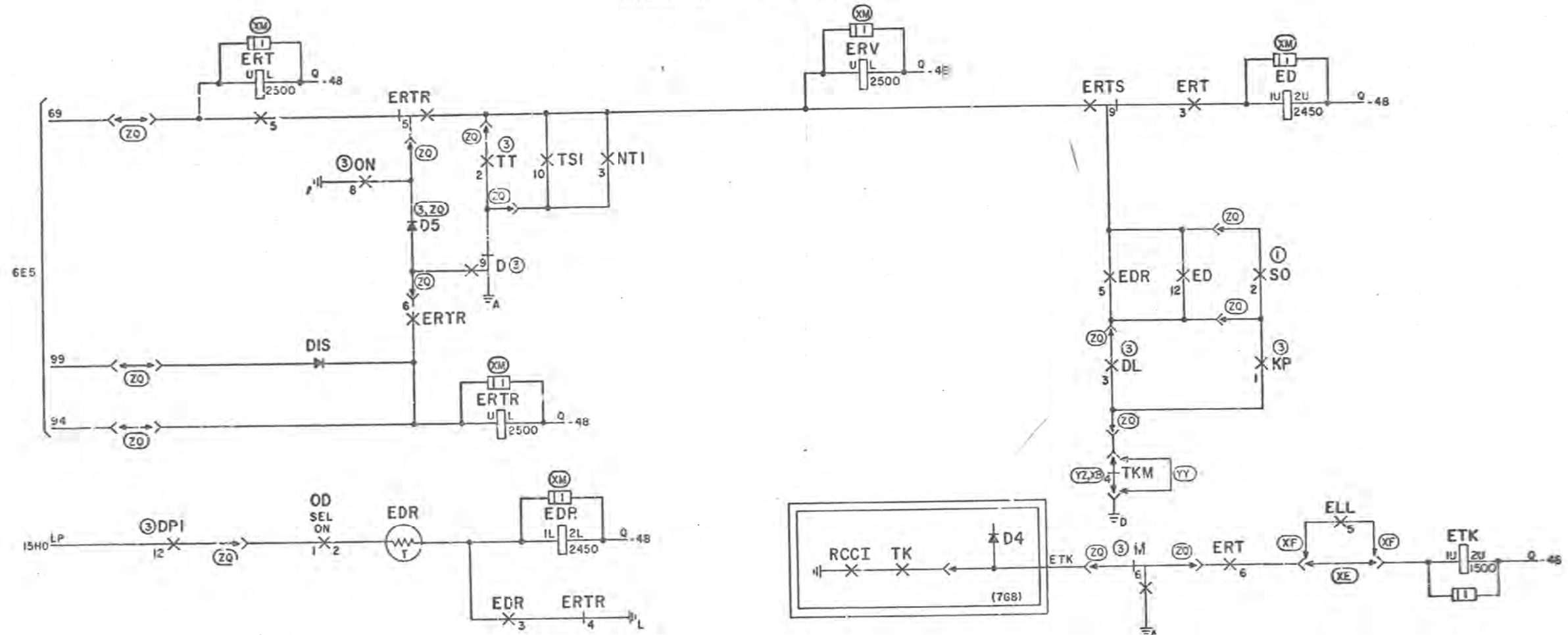


⑦PART OF FS 17

EXTENDED TEST TRUNK CONTROL



⑦PART OF FS 17
EXTENDED TEST TRUNK CONTROL

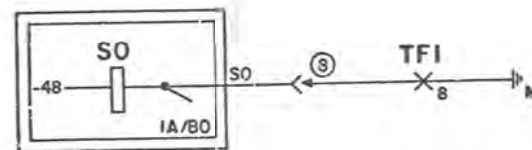
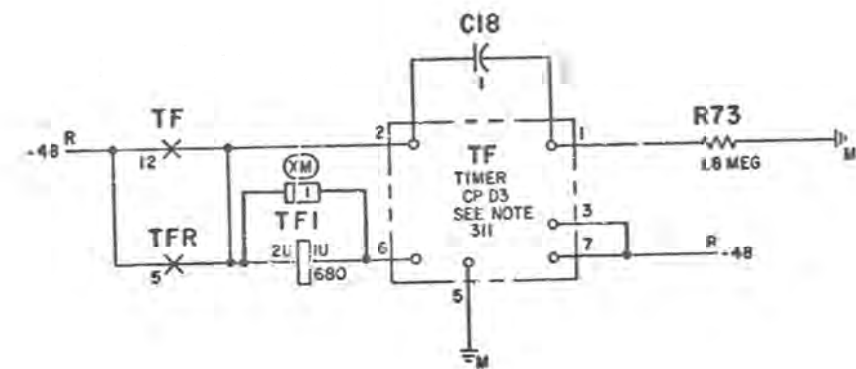
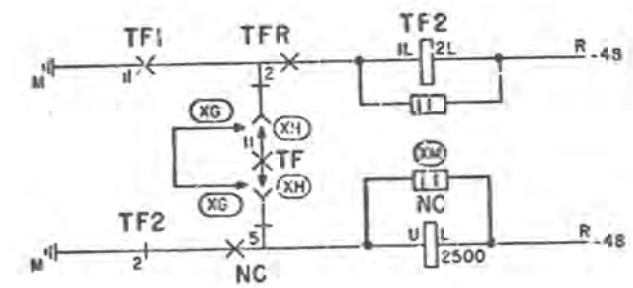
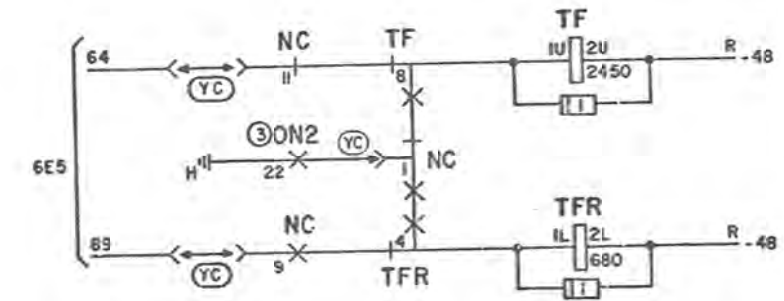
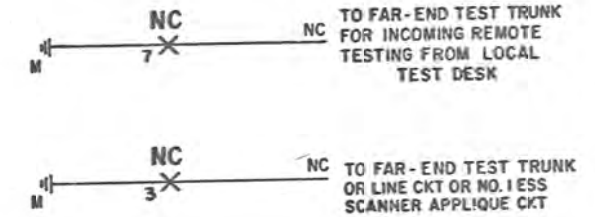
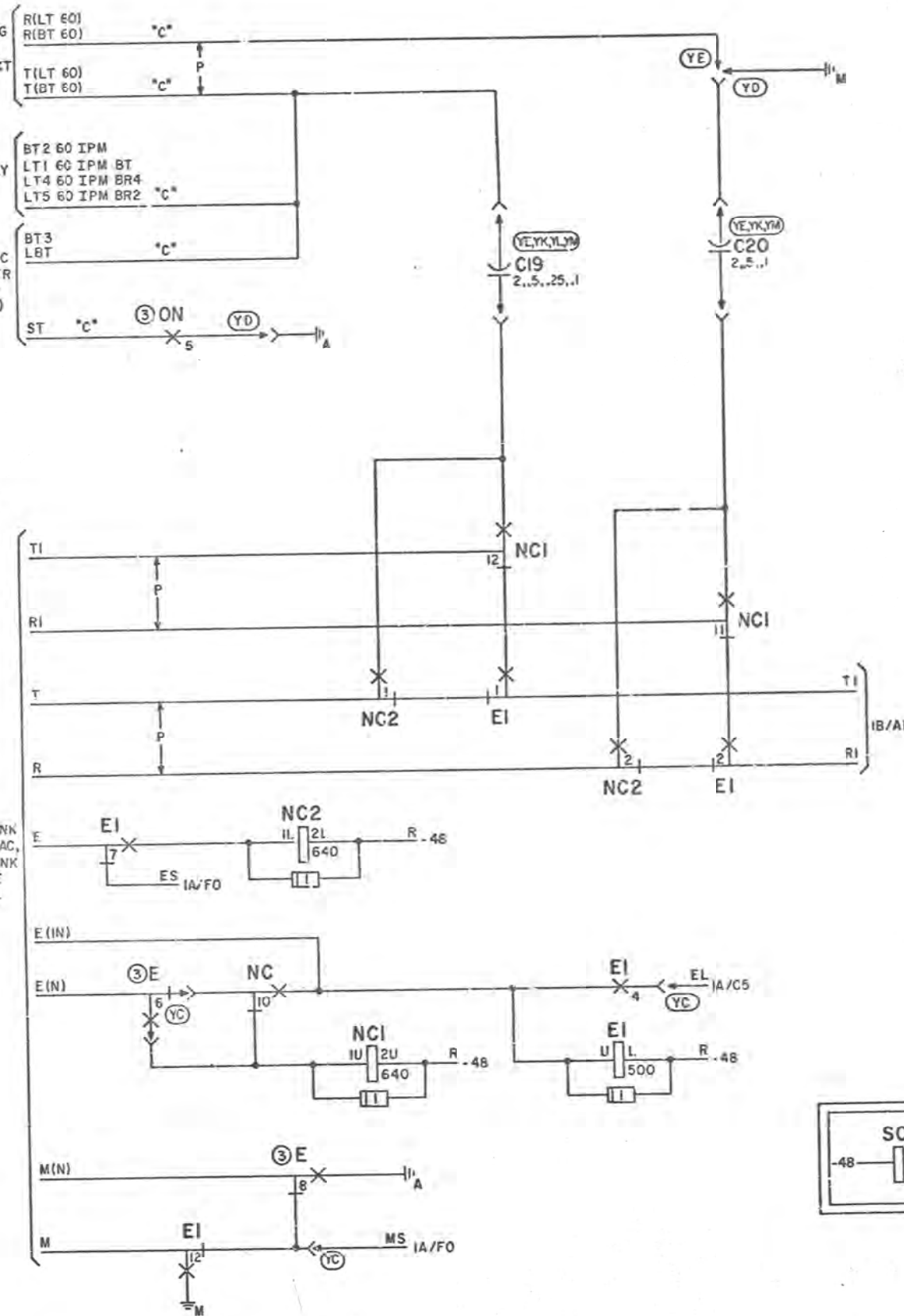


⑧FS 19
NIGHT TEST TRANSFER

TO TONE DISTRIBUTING
CKT (NO. 1 ESS) OR TO
RINGING AND TONE CKT
(NO. 2 & NO. 3 ESS)

TO TONE SUPPLY
(XSX)

TO MISC CKT FOR MISC
INT FR (PANEL), INT FR
(CSBR 1), INT CKT 60
OR 120 IPM (CSBR 5)



REMOTE TESTING CIRCUIT - FAR END ② SD-3 311-01-B18
BELL TELEPHONE LABORATORIES
INCORPORATED 6S

9-99311-01-B18

20B

APP FIG. 1

RELAY	CT		CTR				GT		GT1		NT2		1 2		S0		ROHD				DESIG				
CODE	AK22								AK13				AK 22				AK22								CODE
OPT(I)	ZP		ZP										YV		YV								OPT(I)		
	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC	CONT ARR	LCC			
12			EBM								EBM	138/D4					EBM	1227					12		
11			EBM	1B/G1							EBM	5H1	EBM	138/D4			EBM						11		
10			EBM								EBM	10E5	EBM				EBM						10		
9			EMB								EM		EMB	138/D4			EMB						9		
8			EMB	1B/F1							EM		EMB				EMB						8		
7																							7		
6																							6		
5			EMB	1B/G1					EM	1B/D1				EMB			EMB	1A/C5					5		
4			EMB	1A/E6					EM				EMB	138/D5			EMB						4		
3			EBM	14B3					EBM	1A/C5			EBM	13A/G5			EBM	1A/G9					3		
2			EBM						EBM	5A9			EBM	13B/D5			EBM	16C7					2		
1			EBM	14B2					EBM	4A8			EBM	13B/D6			EBM	11F3					1		
COIL			1B/G2		1B/F2					4A8			5A9	13A/E4			13A/D4			1A/B1		1227	COIL		

CIRCUIT PAGE										CIRCUIT PAGE	
DESIG		AND (CPS 3)		OR1 (CPS 6)		OR2 (CPS 7)		(CPS1)		DESIG	LOC
CODE		ED-99435		ED-99435		ED-99437		ED-99435		ABC	58
X	TERM	LOC	TERM	LOC	TERM	LOC	TERM	LOC	DESIG	LOC	
	A-F	445	A-C	500	A,B	5F1	A-F		SO	1A/FB	
	K-L	10E4	D-G	481	C-K	452	D,H			50B	
	M,N	500	J-M	481	L,M	5F1	J-N			1A/FB	
	P	500	N	500	N	500	P	BIAS		202	
	T,U	485	P	500	P	1206	R-U	EMP		202	
			R	500	R-T	1206					
			S-U	481							

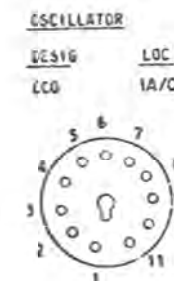
DESIG	LOC	CODE
ABC	5A8	DB (OWNER)
GRP A	3AC	GRP (CPS 3)
GRP B	3D3	GRP (CPS 4)
GRP C	3F3	GRP (CPS 5)
PREAMP	2A4	GRP (CPS 2)

DIODE		
DES16	LOC	CODE
CR1	2F1	ZG 125D ZH 485D
CR2	1A/C6	446A
CR3	1A/D6	446A
CR4	1A/D9	ZG 425C ZH 485C
CR5	4A8	446F

FILTER		
DESIG	LOC	CODE
BRF	221	736A
CAF	321	637B
LPF	1A/C5	201K

INDUCTOR		
DESIG	LDC	CODE
DSC	IA/G4	1594A.1.45H

NETWORK		
DESIG	LOC	CODE
2P CT	1B/G2	185A
VV NT2	13A/E4	185A
SO	1A/B1	185A
YV TS2	13A/E4	185A
GM GT1	5A8	185A
RGHD	12C7	185A



<u>PRO</u>	<u>DESIG</u>	<u>LOC</u>	<u>CODE</u>	<u>TE/M</u>
	REC	240	YC	1993L REC

POTENTIOMETER		
DESIG	LOC	CODE
AQJ	262	ICS-VICB01 L5, 2500
SENS	1A/D7	ICS-TICB01 L3, 100
S0	1A/F4	ICS-IACB01 L5, 2500
ZERO	1A/D7	ICS-TICB01 L3, 100

TEST POINTS		
DESIG	LOC	CODE
⑥ -22V	1A/E9	KS-WR23,L2
-34V	260	KS-WR23,L2

RESISTORS		
DESIG	LOC	CODE
R1	1A/C2	180A
R2	1A/D2	180A
R3	1A/C3	220A, 1960
R4	1A/D3	220A, 1430

<u>SWTCH</u>	<u>LOC</u>	<u>CODE</u>
<u>DESIG</u>		
SS	IA/E7	17ACT-T MICRO-SWITCH CO. FREEPORT, ILL.

TRANSFORMER		
DESIG	LOC	CODE
T1	1A/F9	2576G
T2	1A/C6	139G (RPT COIL)
T3	1A/C6	139G (RPT COIL)

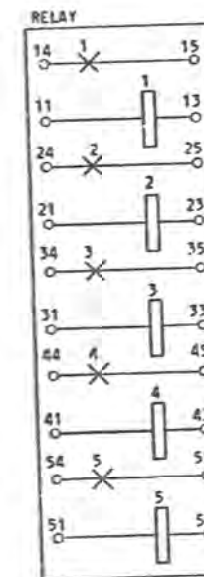
TRANSISTOR		
DESIG	LOC	CODE
Q1	2G1	9A

R6	2E1	18H
R9	1A/B5	18HL
R10	1A/D7	18JC
R13	1A/E7	KS-8512, L17C, 68-1
R14	4B8	KS-16266, L3A, 100D
R15	4B8	18BA
R16	1A/C7	19RE

R20	1A/B5	18HL
R43	2E1	18BT
R60	5A9	2274 , KS-20810, LIA, 133
R61	5A6	2274 , KS-20616, LIA, 46, 400

[illegible]

DESIGN	A1	A2	A3	A4	A5			DESIGN
CODE	AJ202	AJ202	AJ202	AJ202	AJ202			CODE
OPTION								OPTION
	LOC	LOC	LOC	LOC	LOC	LOC	LOC	
24								24
23	609	609	609	609	609			23
22	608	608	608	608	608			22
21	609	609	609	609	609			21
20	609	609	609	609	609			20
19	607	607	607	607	607			19
18								18
17	606	606	606	606	606			17
16	606	606	606	606	606			16
15	606	606	606	606	606			15
14	605	605	605	605	605			14
13	605	605	605	605	605			13
12								12
11	604	604	604	604	604			11
10	604	604	604	604	604			10
9	604	604	604	604	604			9
8	603	603	603	603	603			8
7	603	603	603	603	603			7
6								6
5	602	602	602	602	602			5
4	602	602	602	602	602			4
3	601	601	601	601	601			3
2	601	601	601	601	601			2
1	601	601	601	601	601			1
COL	505	505	505	505	505			COL



DESIG	B1	B2	B3	B4	B5
CODE	293E				
OPTION					
CDIL	POS 1	2	3	4	5
LOC	SE2	SE2	SE2	SE2	SE1
CONT	POS	SE2	SE2	SE2	SE2

DESIG	K1A	K2A	K3A	K4A	K5A
CODE	293E				
OPTION					
COIL	POS 1	2	3	4	5
LOC	5A1	5B1	5B1	5C1	5D1
CONT	POS 5B2	5B2	5E2	5C2	5D2

DESIG		K1C	K2C	K3C	K4C	K5
CODE		293E				
OPTION						
COIL	POS	1	2	3	4	5
	LOC	5G2	5G2	5G2	5G2	5G2
CONT	POS	5G2	5G2	5G2	5G2	5G2

NETWORK		
DESIG	LOC	CODE
A1, A2	5B5	185A
A3, A4	5C5	
A5	5D5	
B1, B2	5E2	
B3, B4	5F2	
B5	5F1	
C1, C2	5G5	
C3, C9	5H5	
K1A	5A1	
K2A, K3A	5B1	
K4A	5C1	
K5A	5D1	
K1C, K2C, K3C	5G2	4C3
K4C	5H2	
K5C	5B9	
Z1	5A4	

PART OF APP FIG. 3

RELAY		3-0		3-05		6-0		6-04		C-0		C-04		C-05		C-06		C-07		C-08		C-09		C-10		C-11		C-12		C-13		C-14		C-15		C-16		C-17		C-18		C-19		C-20		C-21		C-22		C-23		C-24		C-25		C-26		C-27		C-28		C-29		C-30		C-31		C-32		C-33		C-34		C-35		C-36		C-37		C-38		C-39		C-40		C-41		C-42		C-43		C-44		C-45		C-46		C-47		C-48		C-49		C-50		C-51		C-52		C-53		C-54		C-55		C-56		C-57		C-58		C-59		C-60		C-61		C-62		C-63		C-64		C-65		C-66		C-67		C-68		C-69		C-70		C-71		C-72		C-73		C-74		C-75		C-76		C-77		C-78		C-79		C-80		C-81		C-82		C-83		C-84		C-85		C-86		C-87		C-88		C-89		C-90		C-91		C-92		C-93		C-94		C-95		C-96		C-97		C-98		C-99		C-100		C-101		C-102		C-103		C-104		C-105		C-106		C-107		C-108		C-109		C-110		C-111		C-112		C-113		C-114		C-115		C-116		C-117		C-118		C-119		C-120		C-121		C-122		C-123		C-124		C-125		C-126		C-127		C-128		C-129		C-130		C-131		C-132		C-133		C-134		C-135		C-136		C-137		C-138		C-139		C-140		C-141		C-142		C-143		C-144		C-145		C-146		C-147		C-148		C-149		C-150		C-151		C-152		C-153		C-154		C-155		C-156		C-157		C-158		C-159		C-160		C-161		C-162		C-163		C-164		C-165		C-166		C-167		C-168		C-169		C-170		C-171		C-172		C-173		C-174		C-175		C-176		C-177		C-178		C-179		C-180		C-181		C-182		C-183		C-184		C-185		C-186		C-187		C-188		C-189		C-190		C-191		C-192		C-193		C-194		C-195		C-196		C-197		C-198		C-199		C-200		C-201		C-202		C-203		C-204		C-205		C-206		C-207		C-208		C-209		C-210		C-211		C-212		C-213		C-214		C-215		C-216		C-217		C-218		C-219		C-220		C-221		C-222		C-223		C-224		C-225		C-226		C-227		C-228		C-229		C-230		C-231		C-232		C-233		C-234		C-235		C-236		C-237		C-238		C-239		C-240		C-241		C-242		C-243		C-244		C-245		C-246		C-247		C-248		C-249		C-250		C-251		C-252		C-253		C-254		C-255		C-256		C-257		C-258		C-259		C-260		C-261		C-262		C-263		C-264		C-265		C-266		C-267		C-268		C-269		C-270		C-271		C-272		C-273		C-274		C-275		C-276		C-277		C-278		C-279		C-280		C-281		C-282		C-283		C-284		C-285		C-286		C-287		C-288		C-289		C-290		C-291		C-292		C-293		C-294		C-295		C-296			
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YZXB 13B/CI
a YY 13B/EI

RELAY	D		DIS		RECIP		DL		LL1		LP		DP		DP1		DS1		E		F		FP		DESIGN		
CODE	A115		AK30		AG20		AK6						AK8				AG13		AF144		AK22				CODE		
OPTION																									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	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC			
12	EM	12E1	M	12E0			M	12H5			B	15H0			M	16D1								EBM	902	12	
11	B	15E7	EBM	1A/B4			M	12G3			B	10C5			M	12H2								EBM		11	
10	B	18/F2	EBM	1A/A4			EBM	13B/C1			B	12E1			EBM		ED1	12H5						EBM		10	
9	EBM	16B3	EBM	1A/B4				15B5			B				EBM	12E6								EBM		9	
8	B	14B5	EBM	1B/F2			EBM	15A/B1			B	12C2			EM									EBM		8	
7	EBM																		EBM	18G2						7	
6	EBM	14B5					EBM	5B9									EBM		EBM	18F1						6	
5	B							B	12C5			EM	12F7										EBM	902		5	
4	EBM	13B/G2					EBM	13B/G2	B	12G1					B			P1	1206	M	1A/A4		EBM			4	
3	EBM						M	16C7	EM	12D7			EBM										EBM			3	
2	EBM	13B/E6					EBM	7D3	B	12D2			EBM	12E7									EBM			2	
1	EBM	13B/C7					M	12G2	B	12B1			B	12E6									EBM	987		1	
COIL	EBM	13A/A6					700	11F5				12D6			12F2			12H6					12H3	1A/E1	9C2	9G1	COIL

a

$\textcircled{E}$	7E
$\textcircled{F}$	7E

[illegible]

(ZQ) 7F9 (ZR) 7HI	(ZQ) 7HI (ZR) 7HI
(ZQ) 16CI (ZR) 7F9	

RELAY		LAP		LAPD		M		MA		MAR		ZDF		MDFR		4P		NT		WTR		DESN
DESCH	CODE	AK 22				AJ516		AK 27				AK 22				2019		AK 22				CODE
OPTION		CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	OPTION
12							7BI				10L7				3A/D1							12
11							7BI				10L7				3A/D1							11
10							7CI				10L7				3A/D1							10
9							D				10L7				3A/D1							9
8							IA/L6				10L7				3A/D1							8
7							7BI				10L7				3A/D1							7
6							16D7				10L7				3A/D1							6
5							IA/B7				10L7				3A/D1							5
4							IA/B7				10L7				3A/D1							4
3							7GI				10L7				3A/D1							3
2							D				10L7				3A/D1							2
1							700				10L7				3A/D1							1
COIL							700				10L7				3A/D1							COIL

a	(XA) 7B6
	(XB) 7C6
b	(XA) 7D6
	(XB) 7D6

PART OF APP FIG. 3

RELAY		DN		P		PR		PRR		+R		a		-R		-RR		RC		TRG		DESIG
CODE	AJB3			AJ102		AK22				AK22				AK22				AK22				CODE
OPTION																						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	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC
12	EBM	IA/C8			B	7F8			EBM	10D7			EBM	b			EBM	11C2	EBM	b		12
11	EBM	7F1							EBM				EBM	7C1			EBM		EBM	15C7		11
10	EBM	7E1							EBM				EBM				EBM		EBM	a		10
9	EBM	IA/A4							EBM				EBM				EBM		EBM			9
8	EBM	16B2							EBM				EBM				EBM		EBM	11B/D1		8
7	EBM	7D8							EBM				EBM				EBM		EBM			7
6	EBM	1B/C1							EBM				EBM				EBM		EBM			6
5	EBM	18C1							EBM				EBM				EBM		EBM			5
4	EBM	IA/F2							EBM	10D7			EBM	11D3			EBM	11D3	EBM			4
3	EBM	a							EBM	10F2			EBM	11E1			EBM	11E1	EBM	11B/D1		3
2	EBM	1B/D1		M					EBM	1B/D1			EBM	b			EBM	11E1	EBM			2
1	EBM	2E1		M					EBM	10B4			EBM	a			EBM	11D3	EBM	b		1
COIL	IA/A3				7C4				EBM	10D8			EBM	c			EBM	11D3	EBM	a		COIL

Y3.0 IB/C3
2
(X) IB/B4

(XI) IID6	(B) 11R
(XJ) IIB/C3	(E) PCRM
(XI) IID5	(B) 11E2
(XJ) IIB/D3	(E) 702
(XI) IID6	(B) 11G2
(XJ) IIB/C6	(E) 700

(X _I) 11A5	(X _I) 11C5
(X _J) 11B/B3	(X _J) 11B/B4
(X _I) 11B5	(X _I) 11C5
(X _J) 11B/B5	(X _J) 11B/B5

[illegible]

a	(E) 7C4 (F) 1A/CB	a	(ZK) 11H3 (ZL) 11H4	b	(XJ) 11B7 (XJ) 11B/F
b	(E) 1A/CB (F) 10J2	b	(XI) 11D7 (XJ) 11B/E1		
c	(E) 10D2 (F) 7C4				
d	(E) 10B2 (F) 7C9				
e	(E) 1A/B5 (F) 7C4				
f	(E) 7D9 (F) 1CB2				
g	(E) 7E2 (F) 7E1				

[illegible]

a

YN	8C1
YO	8D2

[illegible]

a	(X1) IID6	a	(B) + TR	a	(X1) IIC7	a	(B) - TR
	(XJ) IIB/C/3		(ZP) AN5		(XJ) IIB/E/6		(ZJ, XJ) RT
b	(X1) IID5	b	(B) IIG2			b	(B) IIF
	(XJ) IIB/D/3		(ZP) IA/AI				(ZJ) IIG
c	(X2) IIC6	c	(ZP) IB/HI			c	(XJ) IIB/C
	(XJ) IIB/D/6	d	(ZP) IB/CI				(B) IIC2
		e	(B) IID2			d	(ZJ) IIA/B
							(XJ) IIA/C

DRAWING
ISSUE
7A
8AC
9B
10B
12B

ISSUE
19A

REMOTE TESTING CIRCUIT - FAR END

SD-S - 01-C4

BELL TELEPHONE LABORATORIES
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PART OF APP FIG. 3

RELAY	DESIG	TKM	TP	TS	TSR	TT	TTT	VR	VRR	XN	DESIG
CODE	FJ15	AJ119	AK22								CODE
OPTION		XI, XJ									OPTION
CONT	ARR	LOC	CONT	ARR	LOC	CONT	ARR	LOC	CONT	ARR	LOC
12	EBM	10C2									12
11	EBM										11
10	EBM	10C1									10
9	EBM	704									9
8	EBM	784									8
7	EBM	1A/E6									7
6	EBM	7E1	B	b							6
5	EBM										5
4	EBM	a									4
3	EBM	12N7									3
2	EBM	12A3									2
1	EBM	12B1									1
COIL		7E8	a								COIL

DESIG	LOC	CODE
YZ	12H2	11A/B6
YZXB	15D7	11B/C5
		11A/C4
		11A/C4

DESIG	LOC	CODE
C6	7C3	437A
C7	12B2	439A
C8	9D2	439A
C9	9D2	437A
C10	9B4	439A
C11	12C5	437A
C13	7D7	KS-16390 L1
C14	1A/G8	570LH
C15	1B/B3	542G

DESIG	LOC	CODE
CR8	10E3	458A
CR9	7E2	
CR10	7E1	
DI	7A9	446F
D2	11B3	
D4	7G8	
D5	16B3	
D6	8B2	459BF
D7		459BF
D8		459BF
D9	8C2	459BF
DIS	1B/E2	
KP	7F9	
ON	1A/A3	446F
RT	11G6	
	11B/C1	
SL	13B/C2	

DESIG	LOC	CODE
HR	12C8	KS-20810, LIA, 432
HT	12C8	KS-20810, LIA, 432
R18	1A/B7	106A, KS-20810, LIA, 10.5
R22	1A/F1	188H
R23	1B/C7, B7	188H
R24	7C1	13GH
R25	12C0	185
R26	12B2	18AE
R28	8C2	188L
R29	8B3	40AM
R30	9B4	188F
R31	1A/B7	188F, KS-20810, LIA, 40, 700
R32	1A/B6	188F, KS-20810, LIA, 40, 700
R33	10B4	188F
R34	10D5	18AP
R35	13B/F1	188F
R36	13B/F1	188N
R37	13B/C1	188H
R38	13B/G3	188H
R41	13B/C7	188H

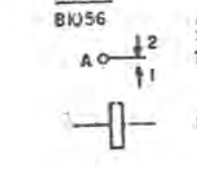
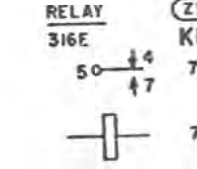
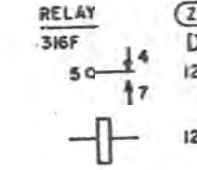
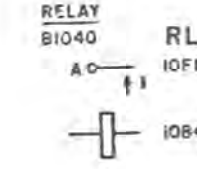
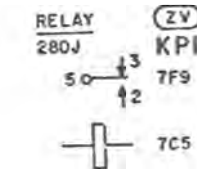
DESIG	LOC	CODE
R42	13B/E7	188H
R43	7D7	188
R44	12D1	KS-20810, LIA, 19, 600
R45	12D1	KS-20810, LIA, 169 MEG
R46	12E1	KS-13492, L1, 3300
R47	13B/E6	188F
R49	11B3	KS-13491, L1, 1600
R50	1B/B3	188H
R62	9A4	18TV
R63	11F7, 11B/C4	KS-14603, LIBC, 200
R64	7A5	KS-14603, LIBC, 316
R66	13C7	221B, 9530
R68	17F5	KS-14603, LIB 1430
R72	1B/C8	1/2 19 MD
RT	11B/C1	KS-20289, L4(C), 464
RT1	11B/B1	KS-20289, L4(C), 1570

DESIG	LOC	CODE
DTM	12C0	KS-13790, L2B
H	1B/B9	KS-14381, L10

DESIG	LOC	CODE
TA	1B/B6	120J(RPT COIL)
T5	1B/B7	120J(RPT COIL)
T6	7C3	120K(RPT COIL)
T7	8D2	176A(RPT COIL)
T8	12C5	94E(RPT COIL)

DESIG	LOC	CODE
RV1	1B/A6	100A
RV2	1B/A6	100A

DESIG	LOC	CODE
24	11E2	1A/B4
25	11E2	11H4
22	11C2	18C7
21	11D2	
20	11C2	3AA7
19	10E7	
18	10D7	
17	10E7	
15	10C7	
14	10D1	
13	9D1	
12	9E1	17F5
11	8E8	
10	8F8	1A/A1
9	8D8	13A/B1
7	7H5	13A/F1
6	1A/E7	13A/D1
4	1A/D4	13A/C1
3	7H1	13A/F1
2	7G1	12H1
COIL	1A/B2	1A/E3



DESIG	LOC	CODE
B	10C1	13B(RES)
N	1A/F2	13E(RES)
N	9E4	13L(RES)
P	9E5	13L(RES)
R1	11C7, 11B/D7	13D(RES)
R2	11E7, 11B/C7	13D(RES)
RT	8E2	13G(RES)
		13C(RES)

DESIG	LOC	CODE
TA	1B/B6	120J(RPT COIL)
T5	1B/B7	120J(RPT COIL)
T6	7C3	120K(RPT COIL)
T7	8D2	176A(RPT COIL)
T8	12C5	94E(RPT COIL)

DESIG	LOC	CODE
RV1	1B/A6	100A
RV2	1B/A6	100A

DESIG	LOC	CODE
3W0	13A/C2	
3W0R	13A/H2	
8D0	10C8	
8D0R	10F8	
ANS	1A/A1	
CC	9E2	
CCR	9G2	
CC	9C8	
CCR	9F2	
CC	9H2	
DL	13A/G6	
DL1	12F8	
DP	12F2	
DP1	12F8	
DS1	12H3	
E	1A/E1	
F	9C2	
FR	9G1	
GR	7F5	
IN	13A/E2	
INR	13A/A2	
KPR	7H5	
LL	14B8	
LL1	11G4	
LP	12D6	
LRP	10E8	
LRPR	10G7	
M	7H0	
MA	10B8	
MAR	10F8	
MDFR	13A/D2	
MR	13A/B2	
NP	13B/F2	
NT	13A/E2	
NTR	13A/A2	
ON1	1A/B3	
ON2	1A/B5	
P1	7C4	
P2	7C4	
PR	10D8	
PRR	10F7	
R	11D1	
RR	11G2	
RR	11C1	
RR	11F1	
RL	10C4	

DESIG	LOC	CODE
RC	11D3	
RCC1	7E0	
RCCM	7D0	
RCCM	11H1	
RCCM	11H4	
RCCM	11H1	
RCCM	11F5	
RCCM	11E2	
RCCM	11F1	
RCCM	12C2	
RCCM	12E8	
RCCM	12D6	
RCCM	12G2	
RCCM	8D1	
RCCM	10E7	
RCCM	10D8	
RCCM	10G7	
RCCM	10F3	
RCCM	12B4	
RCCM	12C4	
RCCM	8D7	
RCCM	10D2	
RCCM	9F7	
RCCM	8E7	
RCCM	8F7	
RCCM	8G8	
RCCM	8G7	
RCCM	11D1	
RCCM	11B1	
RCCM	11A/G2	
RCCM	11A/C3	
RCCM	11A/B3	
RCCM	13A/B2	
RCCM	13A/G2	
RCCM	7G0	
RCCM	7E8	
RCCM	7F3	
RCCM	11C3	
RCCM	11A/G2	
RCCM	13A/C2	
RCCM	13A/G2	
RCCM	13A/F2	
RCCM	13A/H2	
RCCM	9D2	
RCCM	9E2	
RCCM	12G3	

DESIG	LOC	CODE
TA	1B/B6	120J(RPT COIL)
T5	1B/B7	120J(RPT COIL)
T6	7C3	120K(RPT COIL)
T7	8D2	176A(RPT COIL)
T8	12C5	94E(RPT COIL)

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES

SD-11-01-C5

SD-99311-01-C5

ISSUE 20B

APP FIG. 4

BATTERY			FUSE			LAMP		
DESIG	LOC	CODE	DESIG	LOC	CODE	DESIG	LOC	CODE
B1	I4FI, I4GI	[6] KS-6573	+20	I4GO	70G 1/2 AMP	S+	I4F2	13L (RES)
B2	I4FI	EVEREADY NO. 773 OR KS-15998	+50	I4GO				
			+100	I4FO				
			+116	I4FI				

APP FIG. 5

BATTERY			FUSE			LAMP		
DESIG	LOC	CODE	DESIG	LOC	CODE	DESIG	LOC	CODE
B3	I4F3	[6] KS-6573	-116	I4F3	70G 1/2 AMP	S-	I4F4	13L (RES)

APP FIG. 6

LAMP		
DESIG	LOC	CODE
S+	I4F9	13L (RES)
S-	I4F9	13L (RES)

SD-99311-01-C6

REMOTE TESTING CIRCUIT - FAR-END		②	9311-01-C6
BELL TELEPHONE LABORATORIES INCORPORATED			
		6S	

ISSUE
15D

APP FIG. 7

RELAY		RELAY																RELAY				
DESIG						EDR		ED		ELL		ETK						ERT		ENV		DESIG
CODE						AK4				AK47								AJ15		AJ83		CODE
OPTION																						OPTION
	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC		
	ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR			
12							M	16C7			M				ERM	14B4	ERM	15C7			12	
11							EBM				EBM	15G6			EBM	7B8	EBM	15F7			11	
10							EBM	15B2			EBM				EBM	14B4	EBM	15E7			10	
9							EBM				EBM	11F4			EBM	15G1	EBM				9	
8							EBM	15B2			EBM				EBM	15E1	EBM	15B8			8	
7															EBM	13B/E1	EBM				7	
6															EBM	16D7	EBM	15C8			6	
5															EBM	16A2	EBM				5	
4						EBM	16C7			EBM	16C8				EBM	13E1	EBM				4	
3						EBM	16E3			EBM	15C6				EBM	16A7	EBM				3	
2						EBM	13B/F8			EBM					EBM	7A3	EBM				2	
1						M	15C2			M	14C8				EBM	13B/D2	EBM				1	
COIL							16D4				15G5			16D9			16A2			16A5	COIL	

RELAY		RELAY												RELAY									
DESIG	CODE	ERTR				HR				ERTS				NTI				TSI				DESIG	CODE
OPTION	OPTION	AJ15				AK47				AK4				AK4				AK4				OPTION	
		CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC		
		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR			
12	ERM	12E0						M						M	15G6							12	
11	ERM	15D1						EBM	15G1					EBM								11	
10	EBM	15E6						EBM	15C2					EBM	16B3							10	
9	EBM							EMB	16A7					EMB	15C6							9	
8	EMB							EMB	15D2					EMB								8	
7	EBM	15G6																				7	
6	EMB	16C3																				6	
5	EMB	16A3						EMB	15D5					EMB	15C5							5	
4	ERM	16E4						EMB	15C6					EMB								4	
3	ERM	15C2,15G1						EBM	15C8					EBM	16B4							3	
2	EBM							EBM	15C7					EBM								2	
1	EBM	15F6						M						M	15F6							1	
COIL		16C3						13B/F1	15D3						15E2			15E2				COIL	

AMPLIFIER		
DESIG	LOC	CODE
AMP 1	17B4	227D
AMP 2	17D4	227D

CAPACITOR		
DESIG	LOC	CODE
C16	17D3	439A
C17	17D8	439A

DIODE		
DESIG	LOC	CODE
D3	7A8	446F
D19	16C2	446F
HR	15C6	446F

LAMP		
DESIG	LOC	CODE
HR	15F7	13J(RES)

NETWORK		
DESIG	LOC	CODE
ED	16A8	185A
EDR	16D3	
ELL	15G5	
ERT	16A2	
ERTR	16C3	
ERTS	15C3	
ERV	16A5	
ETK	16D8	
HR	13B/F0	
NTI	15F2	
OD	15H2	177E
ODR	15G1	177E
TSI	15E2	185A

RESISTOR		
DESIG	LOC	CODE
R65	15B7	147A, 16000
R67	15B6	18EC, 6000
R69	15B3	18BJ, 1200
R70	15A8	18EF, 2500
R71	15B8	18CF, 2500



THERMISTOR		
DESIG	LOC	CODE
EDR	16D3	8C

TRANSFORMER		
DESIG	LOC	CODE
T9	17C2	181B (IND COIL)
T10	17C7	

REMOTE TESTING CIRCUIT - FAR END

2

SD-13 1-01-C7

BELL TELEPHONE LABORATORIES

6S

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APP FIG. 8

RELAY																		DESIG
DESIG					EI						NC		NC2		NC1			CODE
CODE					AJ43						AJ83		AK22					OPTION
OPTION	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC
ARR	ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR	
12					EBM	18H1					EBM				EBM	18D3		12
11					EBM						EBM	18C7			EBM	18E4		11
1J					EBM	1A/A4					EBM	18F1			EBM			10
9					EBM	18/C5					EBM	18C7			EBM			9
8					EBM						EBM				EBM			8
7					EBM	18F1					EBM	18A5						7
6					EBM						EBM							6
5					EBM	18/B9					EBM	18E7						5
4					EBM	18F3					EBM							4
3					EBM	18/95					EBM	18D8						3
2					EBM	18E3					EBM				EBM	19E3		2
1					EBM	18E2					EBM	18C8			EBM	19E2		1
COIL						18G3						18E3				18F2	18G2	

RELAY																		DESIG CODE OPTION
DESIG CODE OPTION							TF2		TF1		TFR		TF					
	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	
12									M				M	18F6				12
11									EBM	18D7			EBM	18E8				11
10									EBM				EBM					10
9									EMB				EMB					9
8									EMB	18G5			EMB	18G7				8
7																		7
6																		6
5								EMB				EMB	18G6					5
4								EMB				EMB	18D7					4
3								EBM				EBM						3
2								EBM	18E7			EBM	18D7					2
1								M				M						1
COIL									18D8			18G7		18C8				COIL

CIRCUIT PACK
DESIG LOC CODE
TF 18F7 D3

CAPACITORS
DESIG LOC CODE
C18 18F7 535G8
C19 18C3 441D (YL)
(1) C19 18C3 437E (YE)
C20 18C3 441C (YK)
441T (YM)

NETWORKS
DESIG LOC CODE
E! 18G3
(XM) NC 18L8
NC1 18G2
NC2 18F2
TF 18C8
(XM) TF1 18F7
TF2 18D8
TFR 18C8
185A

RESISTOR
DESIG LOC CODE
R73 18F8 KS-19150, 1.1, 1.8 MEG

APP FIG. 9

RELAY																		DESIG		
CODE																		CODE		
OPTION																		OPTION		
X	CONT	LOC	CONT	LOC	CONT	LOC	LS				SPARE				LSR				X	
	ARR		ARR		ARR		AJ516				AK22				YS					
	ARR		ARR		ARR		YS													
	ARR		ARR		ARR		LOC		LOC		LOC		LOC		LOC		LOC			
	12						EBM						ESM	I3A/A7						12
	11						EMB						EBM							11
	10						EBM						EBM							10
	9						EMB	I3B/F7					EMB							9
	8						EBM						EBM							8
	7						EBM													7
	6						ESM	I3B/F4												6
	5						EBM	I5G7					EMB							5
	4						EBM	I3E/B4					EMB							4
	3						EMB	F72					EBM							3
	2						EBM	I3B/A4					EBM							2
	1						EMB	I3A/A7					EBM							1
	COIL	X		X		X		I3A/A7	X						I3A/88	X		X		COIL

NETWORK
DESIG LOC CODE
(YS) LS 13A/A7 185A
(XM) LSR 13A/B8 185A

RELAY																					DESIG CODE OPTION
DESIG																					
CODE OPTION	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	
X	ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		X
12																					12
11																					11
10																					10
9																					9
8																					8
7																					7
6																					6
5																					5
4																					4
3																					3
2																					2
1																					1
COIL	X		X		X		X		X		X		X		X		X		X		COIL

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES
INCORPORATED

②

SD- 1-01-C8

65

ISSUE 20B

CIRCUIT NOTES (CONT)

105. OPTION "H" WAS ADDED ON ISSUE 10B TO PERMIT TESTING OF DIAL TONE FIRST COIN TELEPHONES. OPTION "H" ALLOWS TESTING OF COIN FIRST STATIONS ALSO. IT SHOULD BE NOTED THAT THE DIAL TONE FIRST COIN COLLECT AND RETURN FEATURE MAY BE MARGINAL WHEN USED TO TEST COIN STATIONS IN COIN FIRST AREAS WHERE GENERAL SERVICE REQUIRES 685B SUBSETS EQUIPPED WITH S-36 RELAYS TO BE USED WITH P-145749 COIN RELAYS.
106. OPTION "E" WAS ADDED ON ISSUE 10B TO PERMIT BALLISTIC TEST TO BE DONE WITH RCTI KEY. THIS FEATURE REQUIRES THE USE OF OPTION "A" TO MAKE A RELAY AVAILABLE.
107. OPTION "A" WAS ADDED ON ISSUE 10B TO SIMPLIFY THE RELEASE OF RINGING RELAYS. IT MAKES THREE HALVES OF AK RELAY SPARE. SEE NOTE 106.
- MFR DISC** 108. IN NO 2 ESS OFFICES WHERE RANGE EXTENSION FOR UNIGAUGE IS NOT PROVIDED, USE RINGING LEADS SUP+, SUP-, OR IF ONLY AC-DC RINGING IS PROVIDED USE OPTION 2N.
109. ON ISSUE 12B OPTIONS "ZI" AND "ZJ" WERE ADDED. PREVIOUSLY PART OF OPTION "ZI" WAS INCLUDED IN OPTION "N". OPTION "ZJ" OR "XJ" REQUIRES USE OF OPTIONS "A" AND "ZL".
110. ON ISSUE 12B OPTION "ZM" WAS DESIGNATED. PRIOR TO THIS ISSUE IT WAS PART OF OPTION "N".
111. TEST VOLTAGES +STA AND -STA ARE REQUIRED FOR EXTENDED REMOTE TESTING. (WIRING OPTION ZOL THESE VOLTAGES CAN BE OBTAINED FROM APP FIG 5 AND OPTION W, OR APP FIG 6 AND OPTION W, OR FROM THE REGULATED COIN CONTROL SUPPLY AND OPTION V.
112. ON ISSUE 15D OPTION YA WAS DESIGNATED AND RATED STD, AND OPTION ZJ WAS DESIGNATED AND RATED MD TO PERMIT EXTENDED REMOTE TESTING.
113. PRIOR TO ISSUE 15D, THE SUBSCRIBER RELAY TEST CIRCUITRY WAS ALWAYS PROVIDED WITH THIS CIRCUIT.
114. TO MODIFY EXISTING POSITION FOR CONTINUITY TESTING FROM TEST DESK TO RING ISOLATOR OR IIA RINGING EXTENDER AT STATION, MODIFY FROM OPTION YW TO YX. IN ADDITION, OPTION YH OR YO IS REQUIRED.
115. OPTION YZ PROVIDES THE DIAL ON SUBSCRIBER LINE FEATURE FOR USE ON DIAL ACCESS TRUNKS IN STEP BY STEP AND PANEL OFFICES AND FOR SHOE ACCESS IN CROSSBAR AND ESS OFFICES.
116. PRIOR TO ISSUE 19AC THE DIAL ON SUBSCRIBER LINE FEATURE WAS PROVIDED BY OPTION "YZ". OPTION "YZ" IS NOW RATED (MFR DISC) AND REPLACED BY OPTION "XB".

EQUIPMENT NOTES:

201. TO INSURE PROPER OPERATION OF SD-99311-01, THE J93016CJ AND J93016CK UNITS SHALL BE MOUNTED ON THE SAME BAY.
202. FOR FIELD MAINTENANCE AFTER ISSUE 2A, REPLACING ANY OF THE ED-99669-(30), ED-99670-(30), ED-99671-(30), OR ED-99672-(30) CIRCUIT PACKS WITH A NEW AAS, AAG, AAT OR AAB CIRCUIT PACK REQUIRES THAT ALL FOUR PACKS BE CHANGED TO THE AAS THRU AAB CIRCUIT PACKS.
203. THE NOMINAL VALUES IN CPS 2 FOR R145 B, R146 AND IN CPS 3, 4, 5 FOR 206 A, B, C, R211 A, B, C, R215 A, B, C AND R219 A, B, C: REPLACE NOMINAL VALUES ABOVE WITH 54,300 OHMS TO READJUST WIDE BANDWIDTHS AND 49,300 OHMS TO READJUST NARROW BANDWIDTHS TO WITHIN MANUFACTURING TESTING REQUIREMENTS.

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. MEASURED ACROSS 20V, 50V, 100V, +116V AND -116V TERMINALS WITH VOLTMETER OF A SENSITIVITY OF NOT LESS THAN 1000 OHMS PER VOLT.

RELAYS BLOCKED

SUPPLY	OPERATE	MIN	MAX
20V	VR, MA	18V	21V (AFTER 10 SEC DRAIN)
50V	VR, 60°	49V	51V
100V	VR	99V	101V
+116V	VR + STA	116V	118V (AFTER 5 SEC DRAIN)
-116V	VR - STA		

INFORMATION NOTES CONTINUED ON SHEET 102.

REMOTE TESTING CIRCUIT - FAR END

②

SL-3 311-01-DIB

BELL TELEPHONE LABORATORIES

6S

303.

TABLE A

MULTITONE FREQUENCY CODE ASSIGNMENT

R TERM & LEAD NO.	REG REL	OPERATE CODE	LTD KEYS	R TERM & LEAD NO.	REG REL	OPERATE CODE	LTD KEYS	R TERM & LEAD NO.	REG REL	OPERATE CODE	LTD KEYS	R TERM & LEAD NO.	REG REL	OPERATE CODE	LTD KEYS
1		A1 B1 C1		26		A1 B1 C2		51	NT	A1 B1 C3	NT	76	NTR	A1 B1 C4	NT
2	TD	A1 B2 C1	TD	27	TDR	A1 B2 C2	TD	52	TT	A1 B2 C3	TT	77	TTR	A1 B2 C4	TT
3		A1 B3 C1		28		A1 B3 C2		53	SRT	A1 B3 C3	SSRT	78	SSTR	A1 B3 C4	SSRT
4	TS	A1 B4 C1	TTS	29	TSR	A1 B4 C2	TTS	54	+T	A1 B4 C3	+T	79	+TR	A1 B4 C4	+T
5	DL	A1 B5 C1	DIAL	30		A1 B5 C2		55	+R	A1 B5 C3	+R	80	+RR	A1 B5 C4	+R
6	CT	A2 B1 C1	CT	31	CTR	A2 B1 C2	CT	56		A2 B1 C3		81		A2 B1 C4	
7	RG	A2 B2 C1	RG	32	RGR	A2 B2 C2	RG	57	CC	A2 B2 C3	CC	82	CCR	A2 B2 C4	CC
8	ROH	A2 B3 C1	H	33	ROHR	A2 B3 C2	H	58	CR	A2 B3 C3	CR	83	CRR	A2 B3 C4	CR
9	F	A2 B4 C1	FEMF	34	FR	A2 B4 C2	FEMF	59	+STA	A2 B4 C3	+STA	84	+STAR	A2 B4 C4	+STA
10	MA	A2 B5 C1	24MA	35	MAR	A2 B5 C2	24MA	60	-STA	A2 B5 C3	-STA	85	-STAR	A2 B5 C4	-STA
11	6DV	A3 B1 C1	6DV	36	6DVR	A3 B1 C2	6DV	61		A3 B1 C3		86		A3 B1 C4	
12	MDF	A3 B2 C1	MDF	37	MDFR	A3 B2 C2	MDF	62		A3 B2 C3		87		A3 B2 C4	
13	IN	A3 B3 C1	IN	38	INR	A3 B3 C2	IN	63		A3 B3 C3		88		A3 B3 C4	
14		A3 B4 C1		39		A3 B4 C2		64	TF	A3 B4 C3	NC	89	TFR	A3 B4 C4	NC
15	VR	A3 B5 C1	VMREV	40	VRR	A3 B5 C2	VMREV	65		A3 B5 C3		90		A3 B5 C4	
16	-T	A4 B1 C1	-T	41	-TR	A4 B1 C2	-T	66	REX	A4 B1 C3		91	REXR	A4 B1 C4	
17	-R	A4 B2 C1	-R	42	-RR	A4 B2 C2	-R	67		A4 B2 C3		92		A4 B2 C4	
18		A4 B3 C1		43		A4 B3 C2		68	LS	A4 B3 C3	RTLS	93	LSR	A4 B3 C4	RTLS
19	G	A4 B4 C1	G	44	GR	A4 B4 C2	G	69	ERT	A4 B4 C3	ERT	94	ERTR	A4 B4 C4	ERT
20		A4 B5 C1		45		A4 B5 C2		70		A4 B5 C3		95		A4 B5 C4	
21	H	A5 B1 C1	H	46	HR	A5 B1 C2	H	71	RCCI	A5 B1 C3	RCCI	96	RCPH	A5 B1 C4	RCCI
22	RVH	A5 B2 C1	REV	47	RVHR	A5 B2 C2	REV	72	PR	A5 B2 C3	PSRLS	97	PRR	A5 B2 C4	PSRLS
23	3WD	A5 B3 C1	3WD	48	3WDR	A5 B3 C2	3WD	73	LRP	A5 B3 C3	LRP	98	LRPR	A5 B3 C4	LRP
24	KP	A5 B4 C1	KP	49	KPR	A5 B4 C2	KP	74		A5 B4 C3		99	DIS	A5 B4 C4	DIS
25	TK	A5 B5 C1	T	50	TKR	A5 B5 C2	T	75	ANS/ST	A5 B5 C3		100	STR	A5 B5 C4	

*A-, B-, and C- REFER TO TRANSLATOR RELAYS AND ASSOCIATED OPERATING LEADS.

THE CORRESPONDING FREQUENCIES ARE:

A1 = 600~ B1 = 1098~ C1 = 1950~
A2 = 497~ B2 = 1209~ C2 = 2050~
A3 = 770~ B3 = 1336~ C3 = 2150~
A4 = 852~ B4 = 1477~ C4 = 2250~
A5 = 941~ B5 = 1633~

304. THE -34 VOLTS SHOULD BE ADJUSTED WITH THE (ADJ) POTENTIOMETER TO -34.0 ± 0.1 VOLTS.

305. TO ADJUST GAIN OF (AMP) AMPLIFIER AND LEVEL OF (SC) OSCILLATOR WITH (ON) AND (ON1) RELAYS, OPERATED INSERT 900 OHMS WITH VACUUM TUBE VOLTMETER ACROSS IT INTO (HYL) JACK. ADJUST AMP GAIN TO MEASURE -6 DBM (480MV RMS). OPERATE (SO) RELAY AND ADJUST (SO) POTENTIOMETER TO READ -6 DBM (480MV RMS).

306. TO ADJUST (CCO) OSCILLATOR CONNECT 72A METER TO (HYL) JACK. OPERATE (ON) AND (ON1) RELAYS. ADJUST ZERO POTENTIOMETER TO INDICATE 1100 ± 1 HZ. OPERATE RELAY (VR) AND ADJUST (SENS) POTENTIOMETER TO INDICATE 1517 HZ. OPERATE RELAY (VRR) TO RELEASE RELAY (VR). REPEAT ADJUSTMENTS OF (ZERO) AND (SENS) POTENTIOMETER UNTIL 1100Hz ± 1Hz IS INDICATED WHILE (VR) IS RELEASED AND 1517Hz ± 1Hz IS INDICATED WHILE (VRR) IS OPERATED.

307. TO ADJUST GAIN OF (M) AMPLIFIER CONNECT 72A OSCILLATOR INTO (TJ1) JACK. CONNECT 900 OHMS AND VACUUM TUBE VOLTMETER INTO (HYL) JACK. OPERATE (ON), (ON1) AND (TK) RELAYS AND ADJUST 72A SIGNAL LEVEL SO THAT VOLTMETER READS -5 DBM. OPERATE (N) RELAY. ADJUST (M) AMPLIFIER SO THAT VOLTMETER STILL READS -5 DBM.

308. TO ADJUST (H) POTENTIOMETER INSERT 900 OHMS INTO (HYL) JACK. INSERT 600 OHMS WITH VACUUM TUBE VOLTMETER INTO (HYD) JACK. OPERATE (ON), (ON1) AND (SO) RELAYS. ADJUST (H) POTENTIOMETER FOR MINIMAL READING ON VOLTMETER.

309. TO CHECK FREQUENCY OF (SO) OSCILLATOR INSERT 72A METER INTO (HYL) JACK. OPERATE (ON), (ON1) AND (SO) RELAYS. THE 72A METER SHOULD READ 1017 ± 1 HZ. IF NOT IT CAN BE ADJUSTED BY VARYING THE SLUG OF TRANSFORMER (T1).

310. TO ADJUST THE GAIN OF THE 2-WAY AMPLIFIER (FS18), CONNECT A 72A OSCILLATOR INTO JACK (HYL). CONNECT A VACUUM TUBE VOLTMETER, WITH 900 OHMS IN PARALLEL, AT THE (TJ1) JACK. OPERATE RELAYS (ON), (ON2) AND (TK), AND ADJUST THE OSCILLATOR SO THAT THE VOLTMETER READS -5 DBM. OPERATE RELAY (REX) AND ADJUST (AMP2) FOR A METER READING OF 0 DBM. REVERSE THE OSCILLATOR AND METER, AND REPEAT THE ABOVE PROCEDURE ADJUSTING (AMP1). REPEAT UNTIL BOTH AMPLIFIERS READ 0 DBM.

INFORMATION NOTES: (CONT)

311. THE TIMING CYCLE OF THE (TF) TIMER MAY BE CHECKED USING A WATCH BY MANUALLY OPERATING (TF) RELAY AND OBSERVING THAT (TF) RELAY OPERATES IN APPROXIMATELY 2 TO 3 SECONDS.

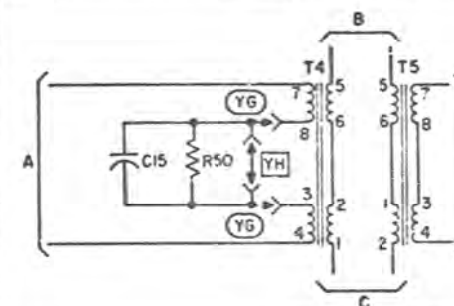
312. OFFICE JOB RECORDS NEED NOT BE MAINTAINED FOR YH, YI & YJ OPTIONS.

313. PRIOR TO ISSUE 150, OPTION Q WAS PROVIDED WITH APP FIG 1, 2 & 3 WHEN NON-DEDICATED FACILITIES WERE USED, WHILE OPTION Z WAS PROVIDED WHEN DEDICATED FACILITIES WERE USED. ON ISSUE 150, OPTIONS Q AND Z WERE RATED MFR DISC. AND REPLACED BY OPTION YG.

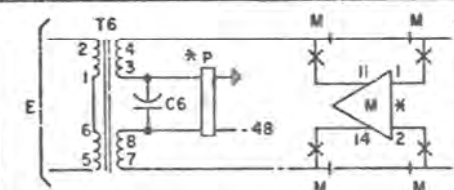
314. WHEN THIS CIRCUIT IS ARRANGED FOR DEDICATED DAY & NIGHT OR DEDICATED DAY & NON-DEDICATED NIGHT SERVICE, PROVIDE BUSY TONE AS FOLLOWS:

SYSTEM	OPTION
FSS	YE
SXS NON-PRECISE TONE	YK
SXS PRECISE TONE	YL
CSBR NON-PRECISE TONE	YD,YM
CSBR PRECISE TONE	YD,YK
PANEL	YD,YK

TRANSMISSION TEST REQUIREMENTS
(1KHz LOSS BETWEEN 600 OHM TERMINATIONS)



MAXIMUM ALLOWABLE CKT LOSS (dB)
A TO B 9.0
A TO C 5.0



MAXIMUM ALLOWABLE CKT LOSS (dB)
E TO F 0.3

ALLOWABLE INDIVIDUAL APPARATUS LOSSES (dB)

APPARATUS	DESIG	CODE	MAX LOSS	MIN LOSS	REMARKS
CAPACITOR	C6	4UF	19.5	17.4	TEST IN SHUNT
CAPACITOR	C15	4UF	18.8	16.1	TEST IN SHUNT
REPEATING COIL	T4,T5	120J	.4		
REPEATING COIL	T6	120K	.4		
RESISTOR	R50	18RH	5.2	5.0	

* APPARATUS FOR WHICH INDIVIDUAL LOSSES ARE NOT REQUIRED

CROSS CONNECTION INFORMATION NOTES:

401. PAIRED LEADS LG1-LG2, ST-HR/RV, TT/G-NT/MDF, ST/MDF-LL/XN ARE MULTIPLIED TO A MAXIMUM OF TEN EXTENDED OFFICES (SEE FS17).

REMOTE TESTING CIRCUIT - FAR END

2

SD-933 CI-D2

SELL TELEPHONE LABORATORIES

6S

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CROSS-CONNECTION INFORMATION:

402.



FIG. 1
UNIT TS FOR 424 DIAL

A. USE FIG. 2 WHEN THE LTD INCOMING REMOTE TESTING CIRCUIT IS ASSOCIATED WITH ONE NO. 14 LTD.

1. ASSUME THAT THE TELEPHONE NUMBER TO BE ASSIGNED TO THE LTD IS 765-9950.
2. THE TERMINALS SHOWN IN BLOCKS (1), (2), (3) AND (4) OF FIG. 2 ARE THOSE IN THE AREA OF LINE DESIGNATION IN FIG. 1.
3. THE ASSIGNED TELEPHONE NUMBER IS SEQUENTIALLY ASSOCIATED WITH THE LOWER AND UPPER SCAN SECTION SEGMENTS IN BLOCKS (1) AND (2). CROSS CONNECTION PAIRS (A) AND (E) INDICATE THAT THE BRUSH TERMINALS - BLOCK (3) - ARE ASSOCIATED WITH THE LOWER AND UPPER SCAN SEGMENTS - BLOCKS (1) AND (2).

a. CROSS CONNECT THE TELEPHONE NUMBER 765-9950 AS FOLLOWS:

FROM LOWER SCAN SECTION		TO BRUSH	
SEGMENT	TERMINAL	TERMINAL	DIGIT
1	A2	D8	7
2	A3	D9	6
3	A4	D0	5
4	A5	D9	9
5	A6	D8	9
6	A7	D0	5
7	B1	D0	0

NOTE: SEGMENT TERMINALS THAT USE THE SAME BRUSH TERMINAL SHOULD BE STRAPPED AS FOLLOWS:

FIRST MULTIPLE STRAP A3, A5 AND A6
SECOND MULTIPLE STRAP A4, A7 AND B1

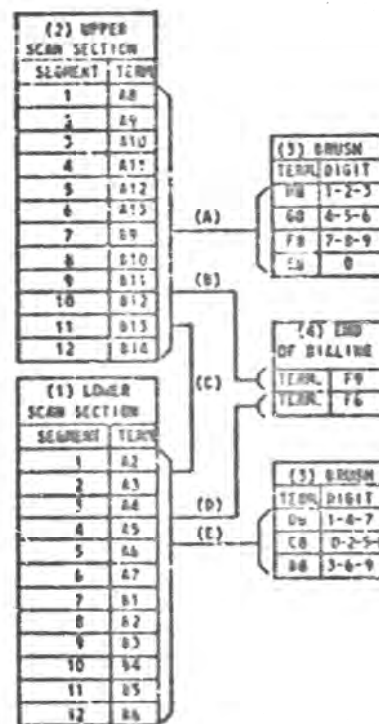


FIG. 2

3. (CONT)

FROM UPPER SCAN SECTION		TO BRUSH	
SEGMENT	TERMINAL	TERMINAL	DIGIT
1	A8	F8	7
2	A9	G8	6
3	A10	G9	5
4	A11	F8	9
5	A12	F9	9
6	A13	G8	5
7	B9	E0	0

NOTE: SEGMENT TERMINALS THAT USE THE SAME BRUSH TERMINAL SHOULD BE STRAPPED AS FOLLOWS:

FIRST MULTIPLE STRAP A8, A11 AND A12
SECOND MULTIPLE STRAP A9, A10 AND A13

4. END OF DIALING CROSS CONNECTIONS - PATH (D) AND (E), MUST BE INSTALLED ON SEGMENT TERMINAL 0 OF THE LOWER AND UPPER SCAN SECTIONS TO THE END OF DIALING TERMINALS IN BLOCK (4).
5. THE UNUSED SEGMENT TERMINALS OF THE LOWER AND UPPER SCAN SECTIONS SHALL BE STRAPPED TOGETHER - PATH (C).

B. USE FIG. 3 WHEN THE LTD INCOMING REMOTE TESTING CIRCUIT IS ASSOCIATED WITH TWO NO. 14 LOCAL TEST DESKS SHALL BE CROSS CONNECTED PER FIG. 3.

1. THE TERMINALS IN BLOCKS (5) AND (6) ARE ASSOCIATED WITH THE REGULAR TEST DESK AND THE TERMINALS IN BLOCKS (7) AND (8) ARE ASSOCIATED WITH THE SECOND OR ALTERNATE TEST DESK.
2. THE CROSS CONNECTIONS FOR FIG. 3 SHALL BE INSTALLED IN THE SAME MANNER AS THOSE IN FIG. 2.

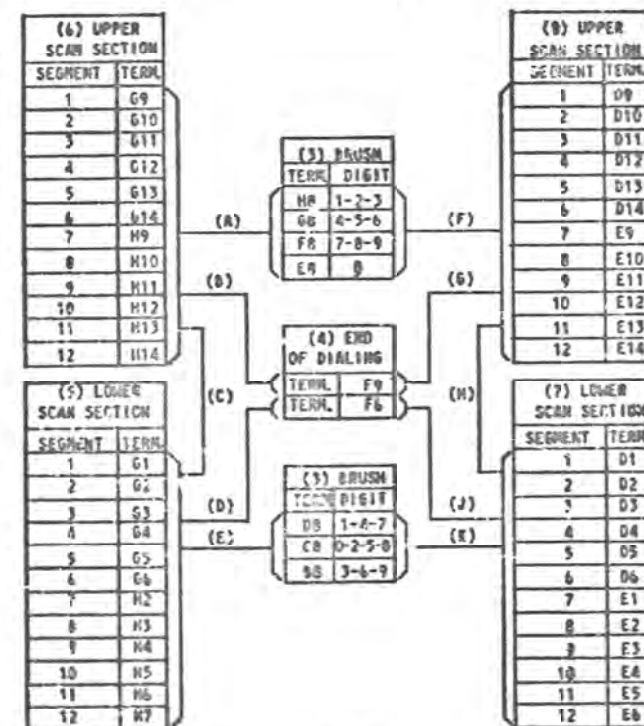
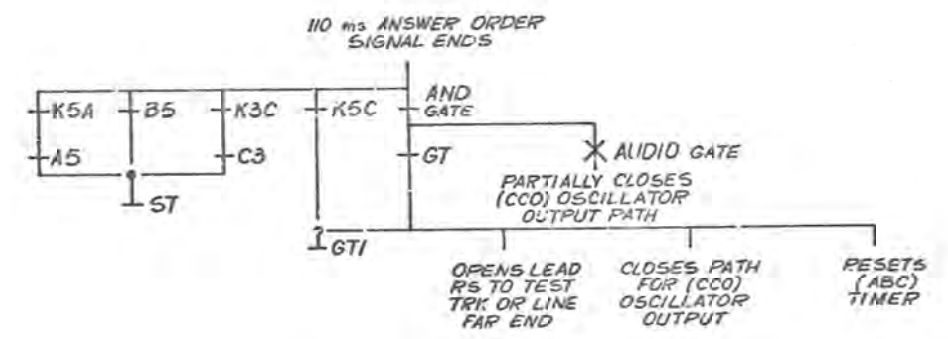
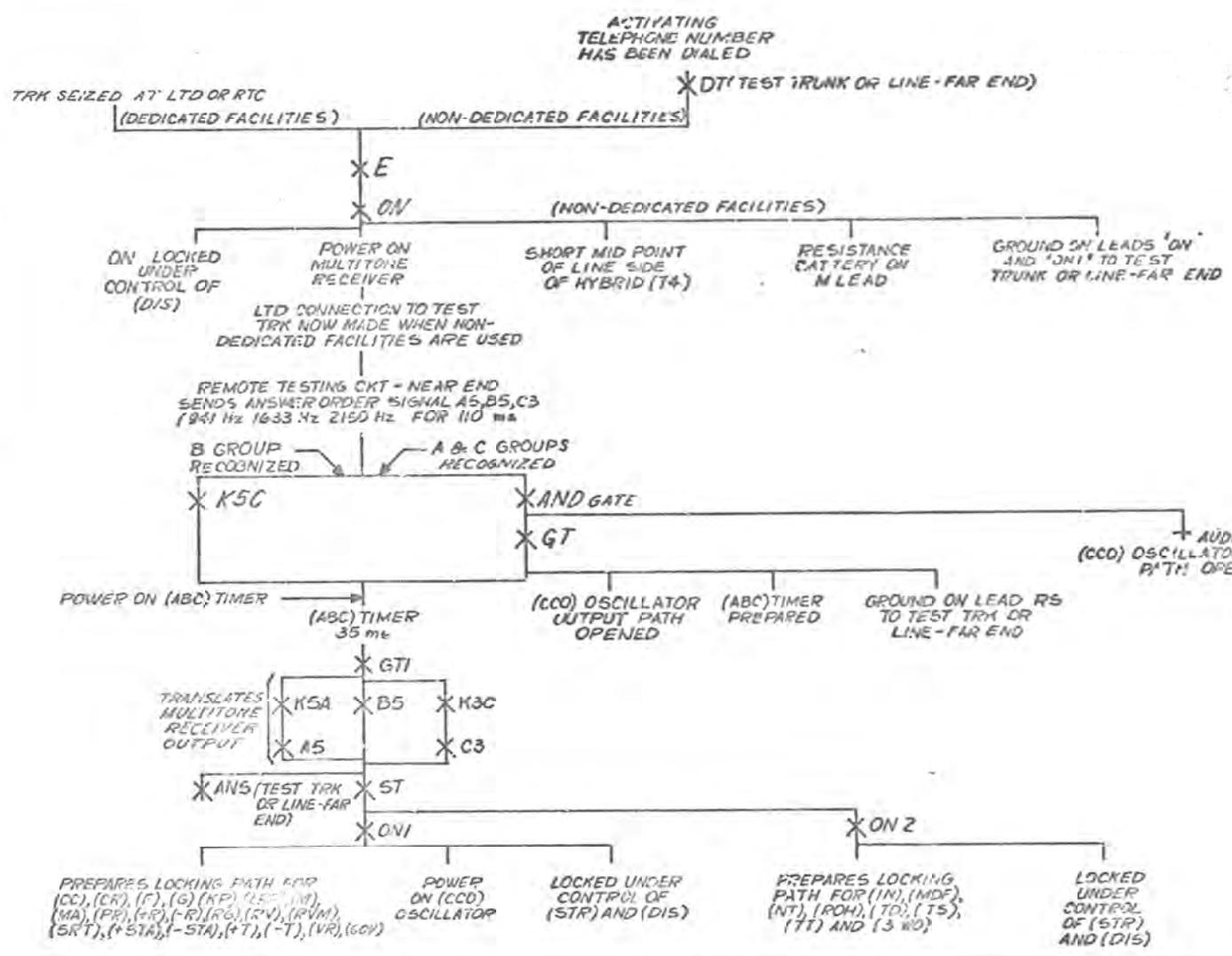


FIG. 3

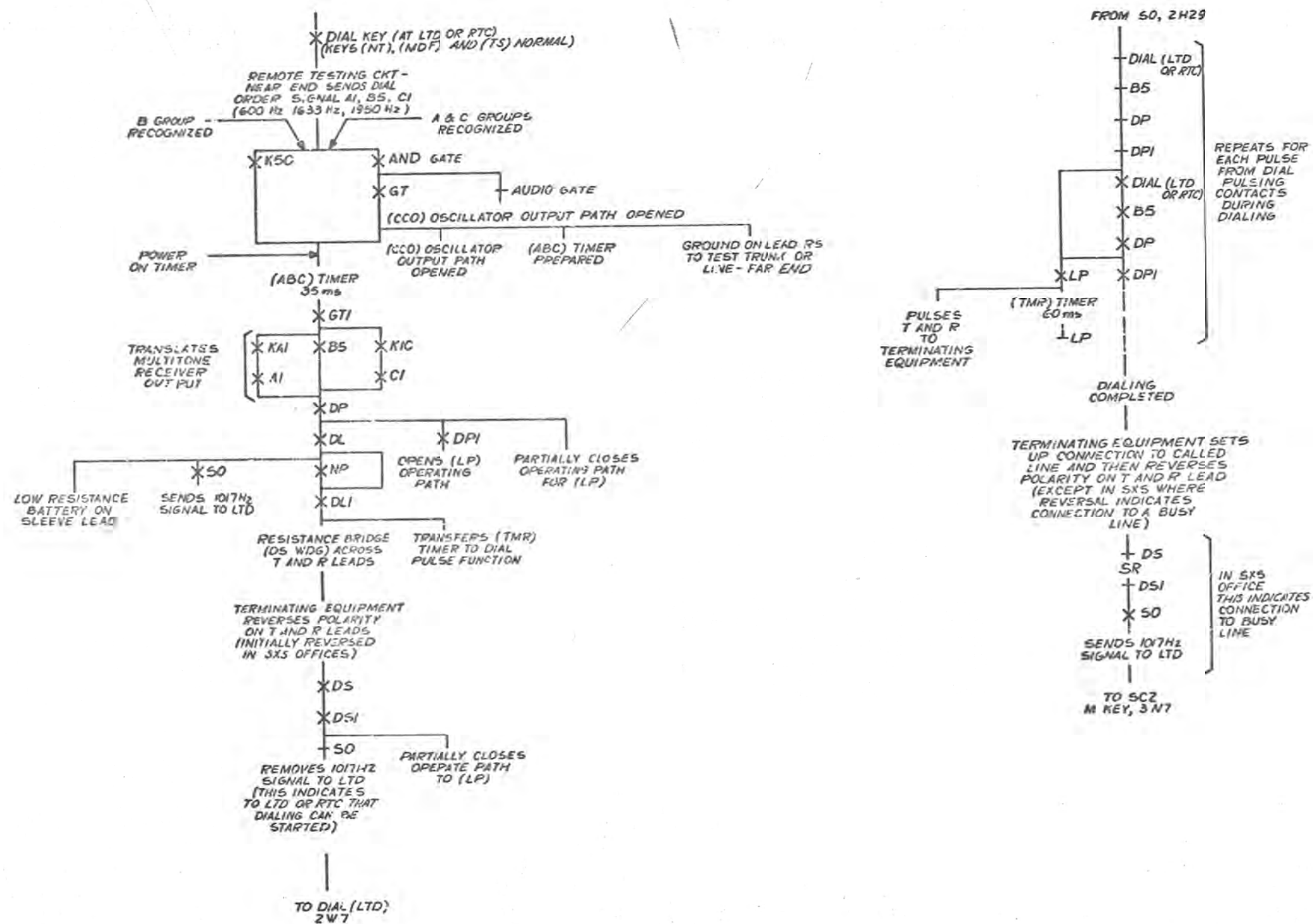
SCI ACTIVATION OF CKT



CKT IS NOW READY TO ESTABLISH A CONNECTION TO A SUBSCRIBER LINE OR THE EXTENDED REMOTE TEST CKT

SD-99311-01-EI

PART OF SC2
ESTABLISHING A TEST CONNECTION
TO A SUBSCRIBER LINE
(DP TERMINATING EQUIPMENT)



SD-9931-01-E2

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES
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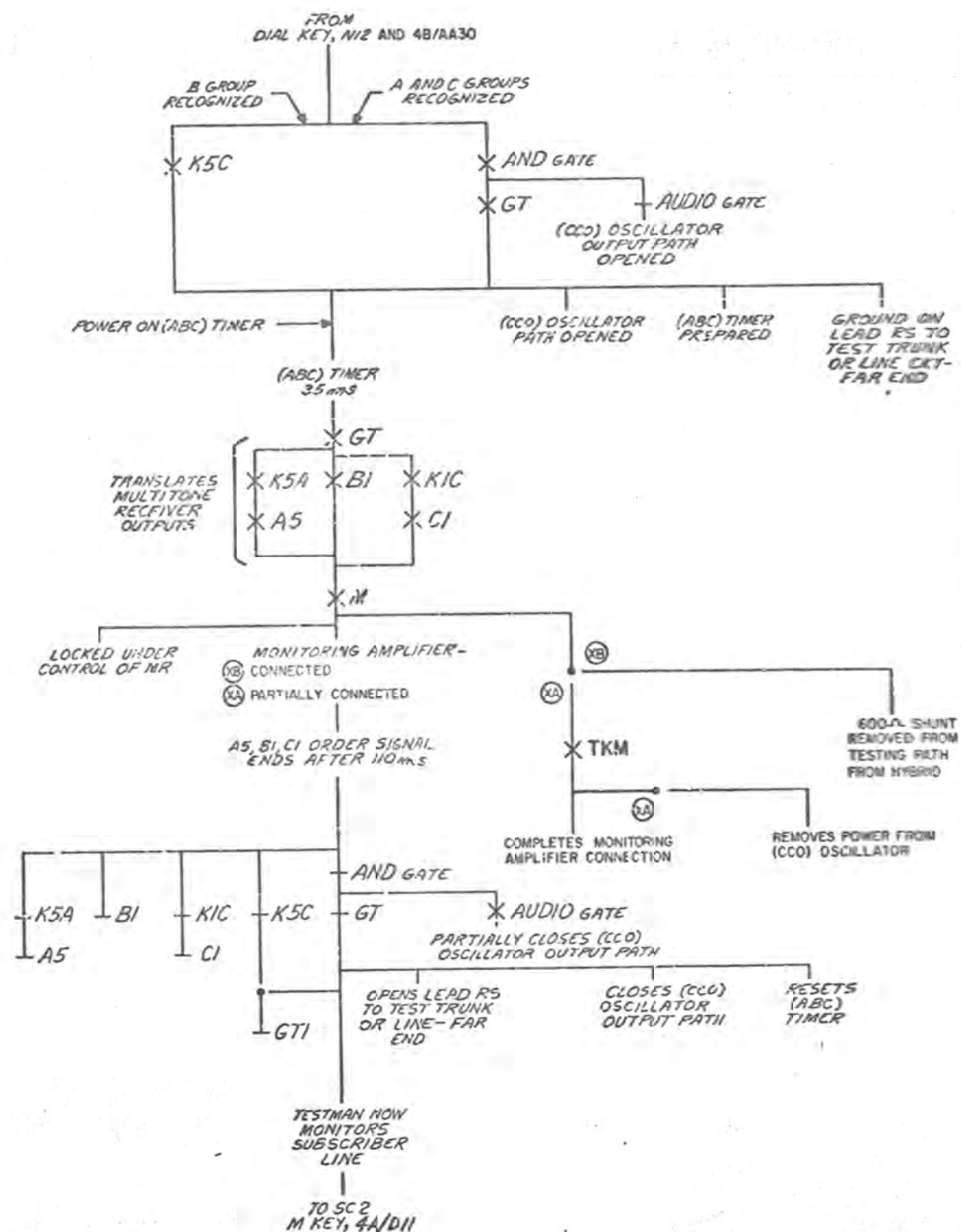
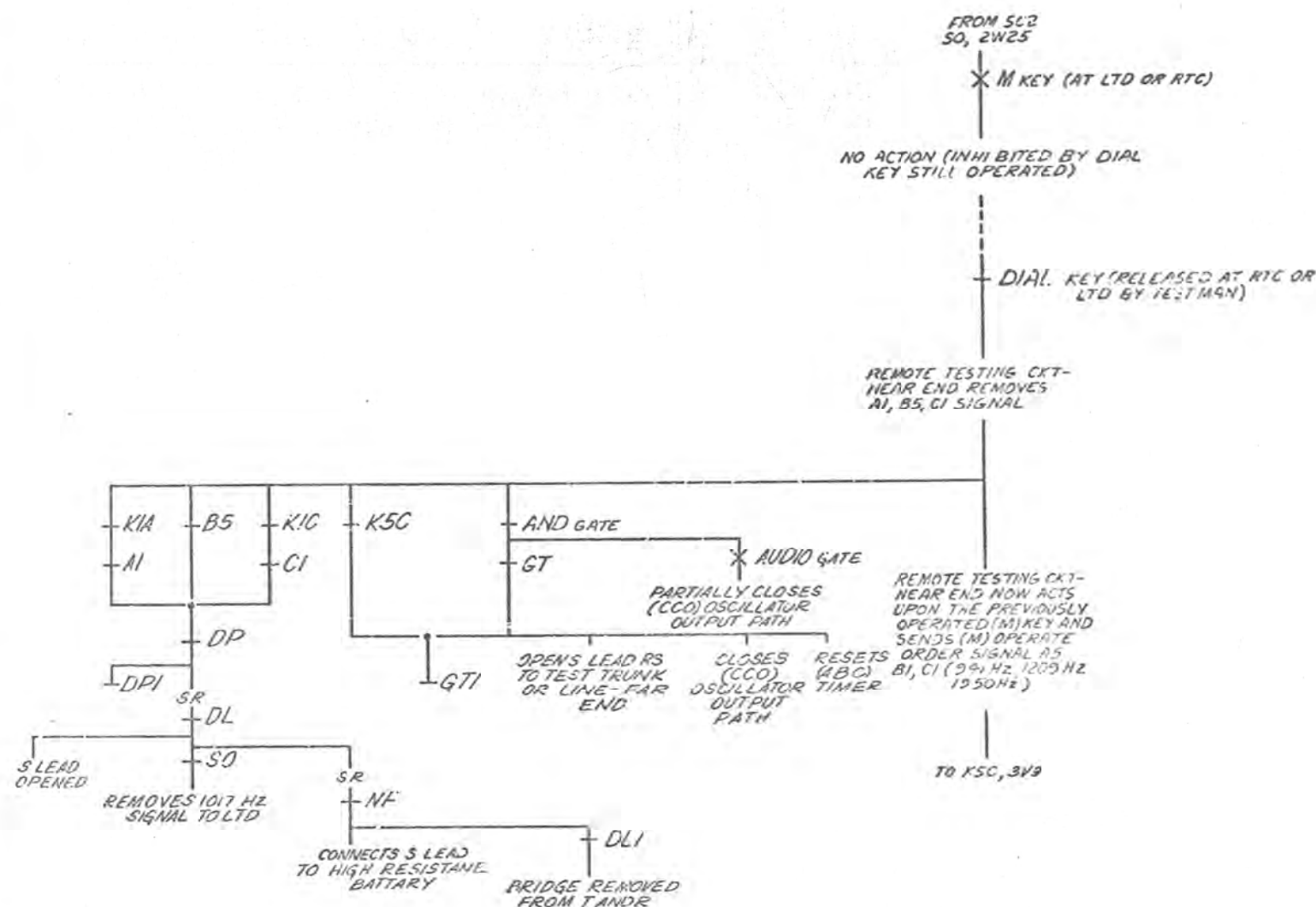
SD-9931-01-E2

6S

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PART OF SC2 ESTABLISHING A TEST CONNECTION TO A SUBSCRIBER LINE (DP TERMINATING EQUIPMENT)



REMOTE TESTING CIRCUIT - FAR END

SD-9 311-01-E3

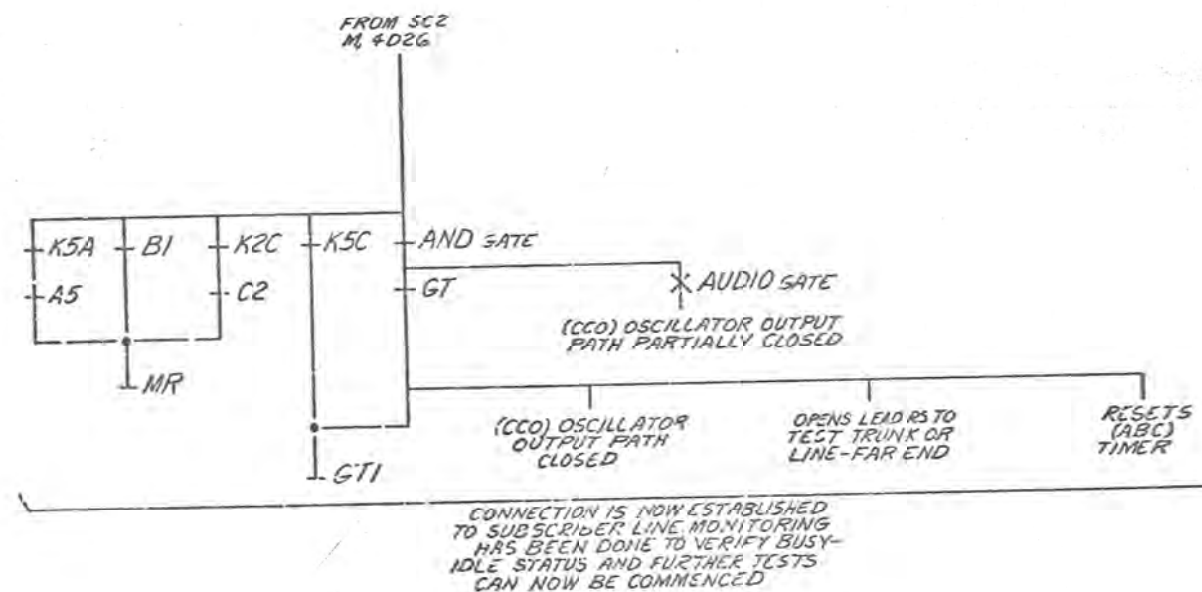
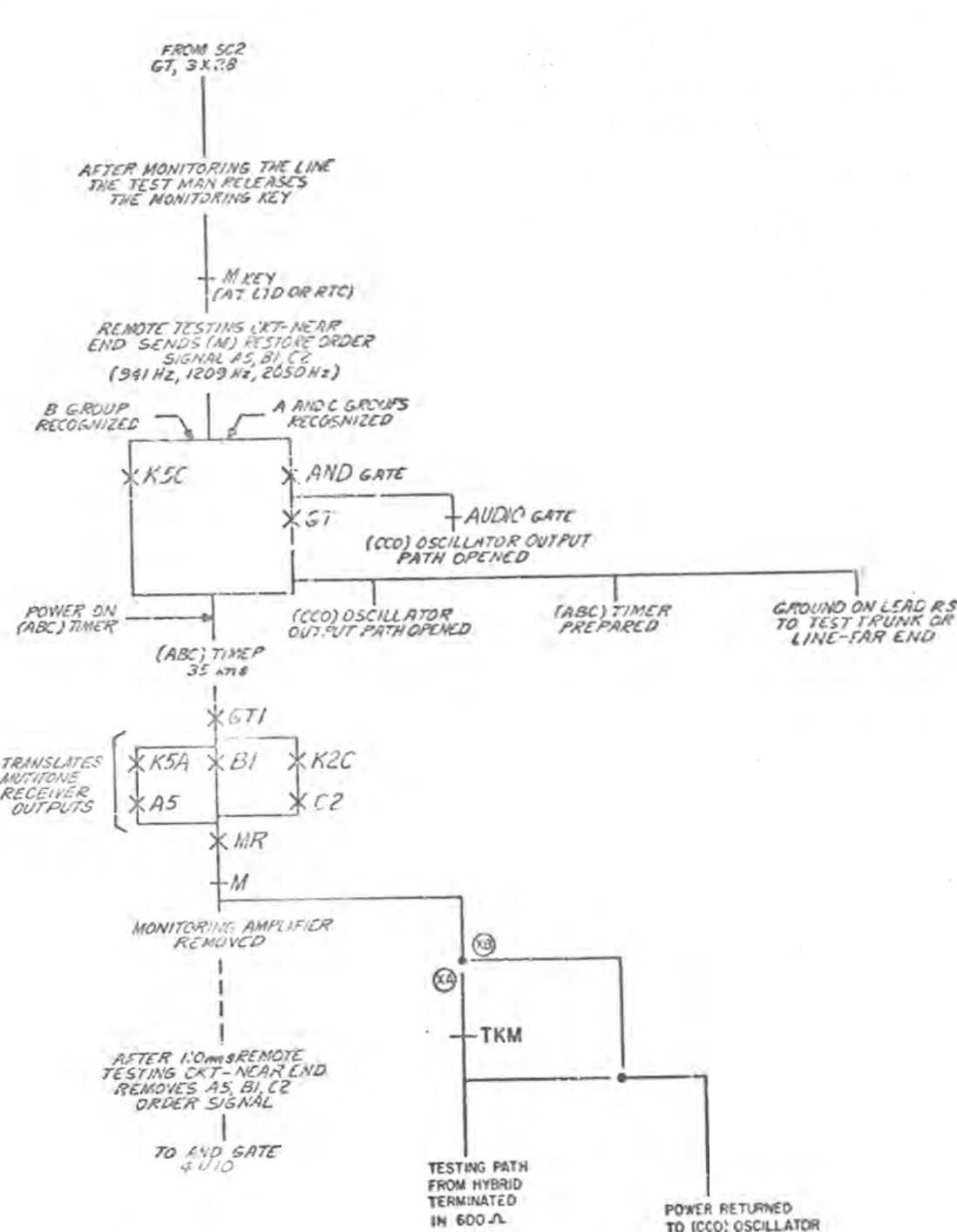
BELL TELEPHONE LABORATORIES
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65

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PART OF SC2 ESTABLISHING A TEST CONNECTION TO A SUBSCRIBER LINE (DP TERMINATING EQUIPMENT)

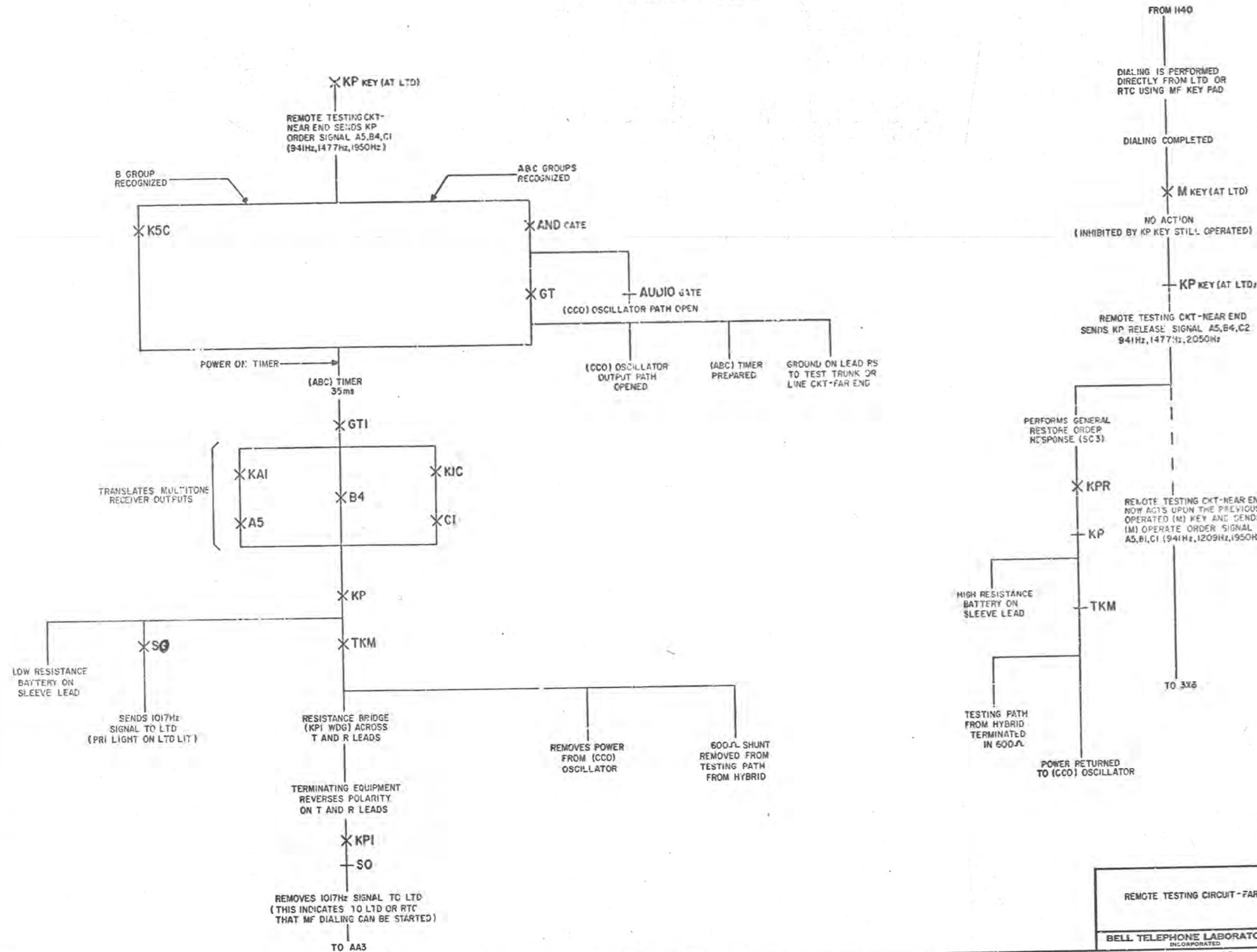
DRAWING
ISSUE
108
1
2
3
4
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SD-99311-01-E4A

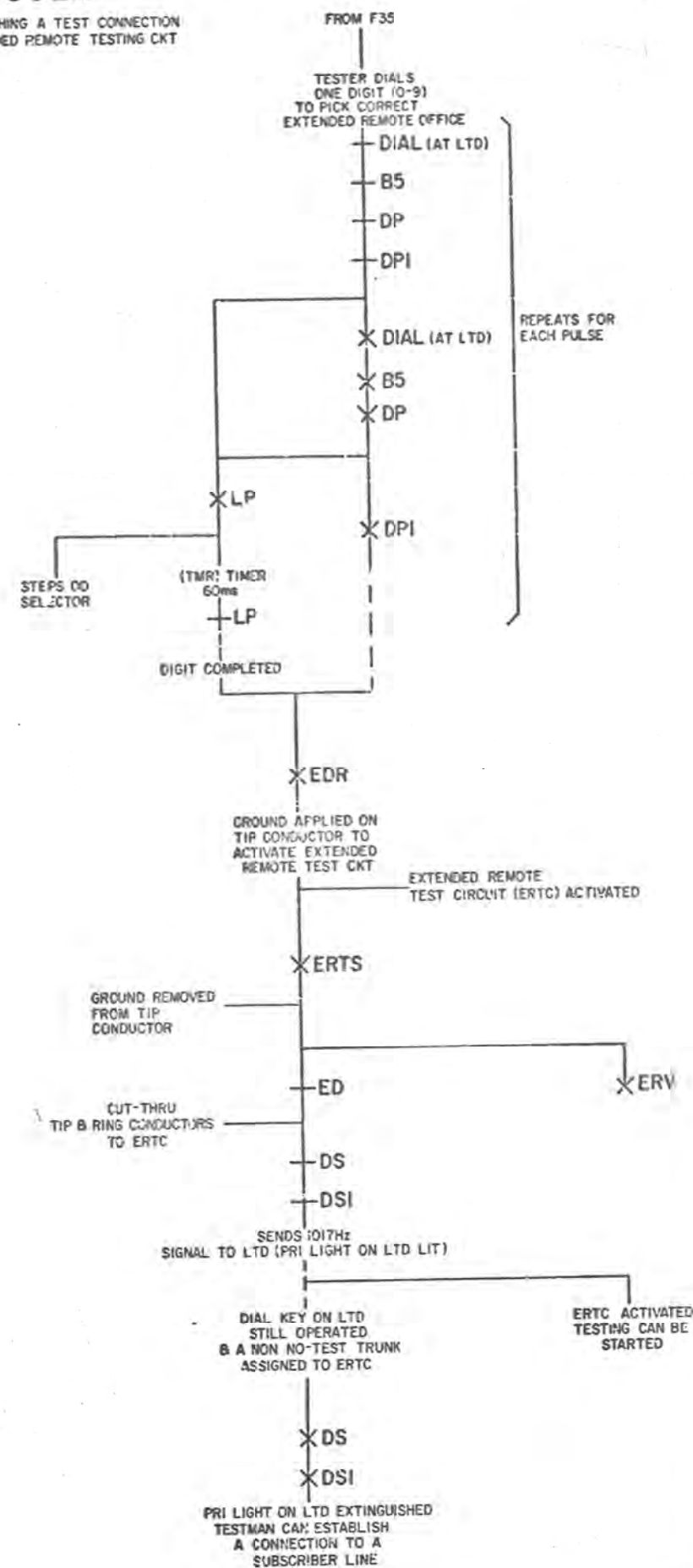
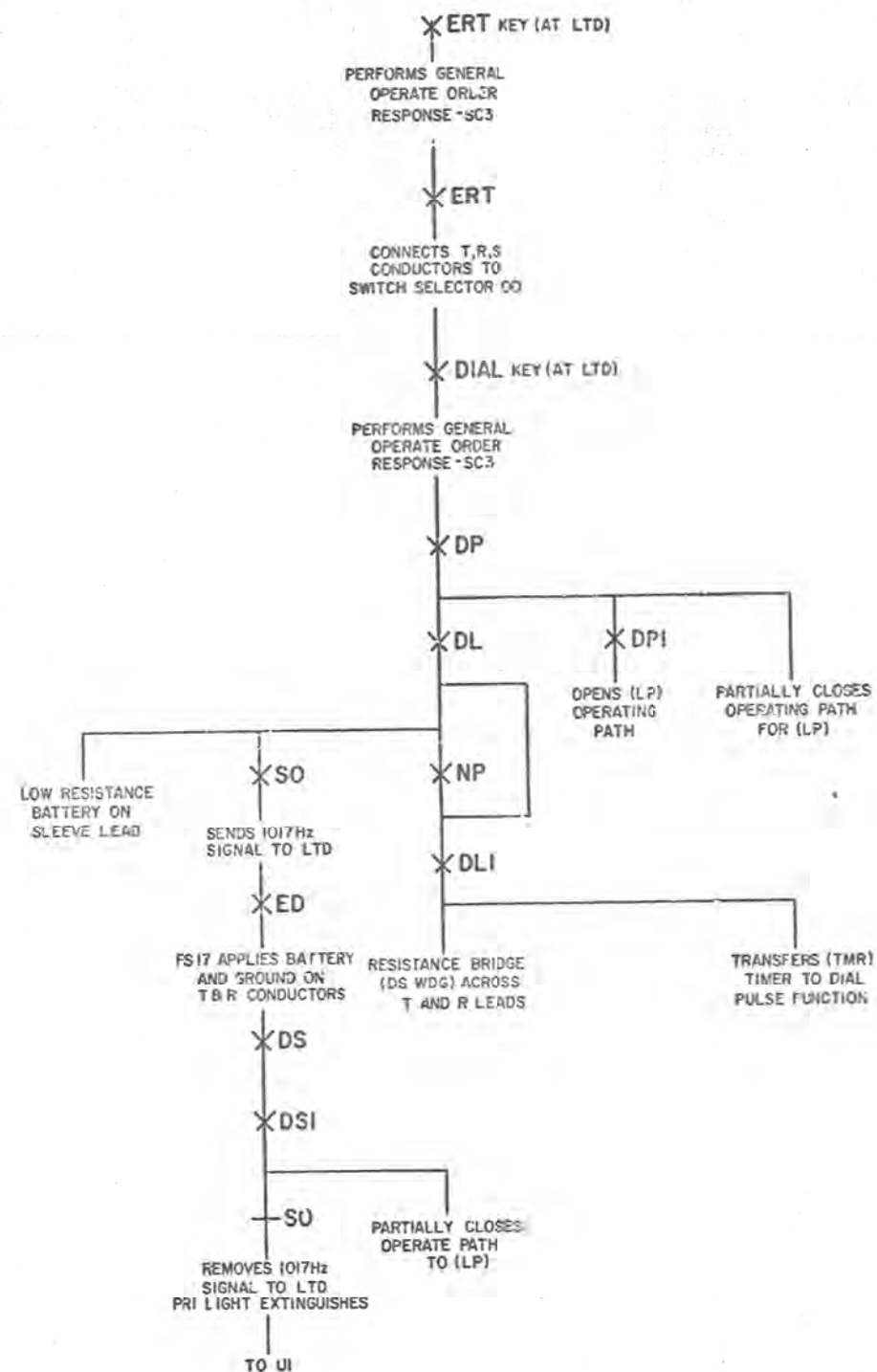
PART OF SC2

ESTABLISHING A TEST CONNECTION
TO A SUBSCRIBER LINE
(MF TERMINATING EQUIPMENT)



SC2A

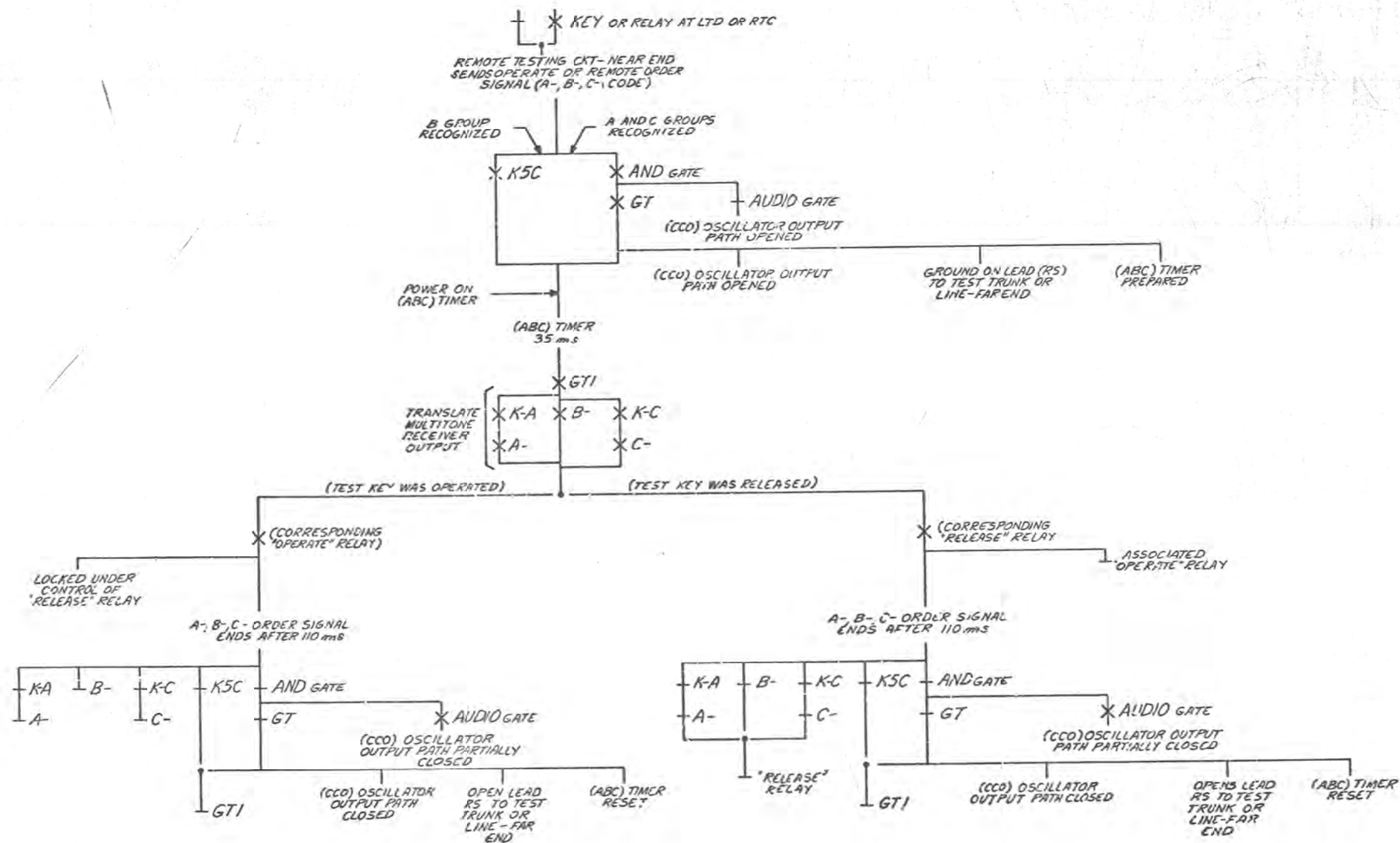
ESTABLISHING A TEST CONNECTION
TO EXTENDED REMOTE TESTING CKT



REMOTE TESTING CIRCUIT-FAR END		2	SD-9 3 01-E4C
BELL TELEPHONE LABORATORIES INCORPORATED		SS	

ISSUE
19AC

SC3 GENERAL OPERATE AND RESTORE ORDER RESPONSE



REMOTE TESTING CIRCUIT - FAR END

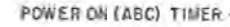
SD-99311-01-E5

BELL TELEPHONE LABORATORIES

6S

10

DISCONNECT



SD-99311-01		7 PAGES		CIRCUIT REQUIREMENTS																		DRAWING ISSUE	
APPARATUS				MECH REQ		CIRCUIT PREPARATION				TEST SET PREP				DIRECT CURRENT FLOW REQ				REMARKS		DRAWING ISSUE			
DESIG	CODE	OPT.	FIG.	BSP FIG	CONT PRES	ARM. TRVL	BLOCK OR INSULATE	TEST CLIP DATA	CONN BAT	CONN GRD	TEST SET PREP	SEE TEST NOTE	TEST WDG	TEST FOR	AFTER SOAK MA	TEST MA	READJ MA	REMARKS		DRAWING ISSUE			
MAGNET																				DRAWING ISSUE			
Q0	204CSEL		7					11(ERTS)	GRD		3	ROT	0			210	200	SEE BSP	DRAWING ISSUE				
								11(ERTS)	GRD					ROT	NO		150	160	DRAWING ISSUE				
								58(HR)	GRD		3	RLS	0			160	150	DRAWING ISSUE					
RELAY																				DRAWING ISSUE			
3W0	1/2AK22		3	216				1L(3W0)	GRD						0	27.5	26	MOUNTED WITH (3W0R)	DRAWING ISSUE				
3W0R	1/2AK22		3	216				1U(3W0R)	GRD						0	27.5	26	MOUNTED WITH (3W0)	DRAWING ISSUE				
60V	1/2AK22		3	216				1L(60V)	GRD						0	27.5	26	MOUNTED WITH (60VR)	DRAWING ISSUE				
60VR	1/2AK22		3	216				1U(60VR)	GRD						0	27.5	26	MOUNTED WITH (60V)	DRAWING ISSUE				
AI-5																				DRAWING ISSUE			
AI-5	AJ202		2	500				1U REL TST	GRD						0	42.5	40.5		DRAWING ISSUE				
ANS																				DRAWING ISSUE			
ANS	1/2 AK22	ZP	3	216			B (ANS)	1U(ANS)	GRD						0	28.6	26	MOUNTED WITH (+T)	DRAWING ISSUE				
B1																				DRAWING ISSUE			
B1	293E		2				(S)O	11(B1)					8/G	1.2		0	10		DRAWING ISSUE				
B2																				DRAWING ISSUE			
B2								21(B2)					8/G	1.2		0	10		DRAWING ISSUE				
B3																				DRAWING ISSUE			
B3								31(B3)					8/G	1.2		0	10		DRAWING ISSUE				
B4																				DRAWING ISSUE			
B4								41(B4)					8/G	1.2		0	10		DRAWING ISSUE				
B5																				DRAWING ISSUE			
B5								51(B5)					8/G	1.2		0	10		DRAWING ISSUE				
C1																				DRAWING ISSUE			
C1	1/2AK2		2	1				1U(C1)	GRD						0	12.1	11.5	MOUNTED WITH (C2)	DRAWING ISSUE				
C2																				DRAWING ISSUE			
C2	1/2AK2		2	1				1L(C2)	GRD						0	12.1	11.5	MOUNTED WITH (C1)	DRAWING ISSUE				
C3																				DRAWING ISSUE			
C3	1/2AK2		2	1				1U(C3)	GRD						0	12.1	11.5	MOUNTED WITH (C4)	DRAWING ISSUE				
C4																				DRAWING ISSUE			
C4	1/2AK2		2	1				1L(C4)	GRD						0	12.1	11.5	MOUNTED WITH (C3)	DRAWING ISSUE				
CC																				DRAWING ISSUE			
CC	1/2AK22		3	216				1L(CC)	GRD						0	27.5	26	MOUNTED WITH (CCR)	DRAWING ISSUE				
CCR																				DRAWING ISSUE			
CCR	1/2AK22		3	216				1U(CCR)	GRD						0	27.5	26	MOUNTED WITH (CC)	DRAWING ISSUE				
CN																				DRAWING ISSUE			
CN	AG34		3	3078				U(CN)	GRD						0	18	17		DRAWING ISSUE				
CR																				DRAWING ISSUE			
CR	1/2AK22		3	216				1L(CR)	GRD						0	27.5	26	MOUNTED WITH (CRR)	DRAWING ISSUE				
CRR																				DRAWING ISSUE			
CRR	1/2AK22		3	216				1U(CRR)	GRD						0	27.5	26	MOUNTED WITH (CR)	DRAWING ISSUE				
CT																				DRAWING ISSUE			
CT	1/2AK22 ZP		1	216			5(CT)	1L(CT)	GRD						0	28.6	26	MOUNTED WITH (CTR)	DRAWING ISSUE				
CTR																				DRAWING ISSUE			
CTR	1/2AK22 ZP		1	216				1U(CTR)	GRD						0	28.6	26	MOUNTED WITH (CT)	DRAWING ISSUE				
TEST NOTES:																				DRAWING ISSUE			
1. REMOVE ASSOCIATED LIMITER & DETECTOR CIRCUIT BOARD																				DRAWING ISSUE			
2. 3 THESE REQUIREMENTS SHALL BE MET IN ALL POSITIONS OF THE SWITCH.																				DRAWING ISSUE			
REL UNDER TEST																				DRAWING ISSUE			
TEST CLIP DATA																				DRAWING ISSUE			
CONN SLEEVE																				DRAWING ISSUE			
B1 15(B1)																				DRAWING ISSUE			
B2 25(B2)																				DRAWING ISSUE			
B3 35(B3)																				DRAWING ISSUE			
B4 45(B4)																				DRAWING ISSUE			
B5 55(B5)																				DRAWING ISSUE			
A. CONNECT (L2) TERM. OF TEST SET TO BAT. TERM. OF TEST SET.																				DRAWING ISSUE			
B. PLACE (L) KEY IN NEUTRAL POSITION.																				DRAWING ISSUE			
C. CONNECT SLEEVE OF (TBR) TEST JACK TO EACH LOAD CONTACT OF RELAY UNDER TEST AS INDICATED IN ABOVE TABLE.																				DRAWING ISSUE			
REMOTE TESTING CIRCUIT - FAR END																				DRAWING ISSUE			
SD-99311-01-F1																				DRAWING ISSUE			
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SD-99311-01		7 PAGES		CIRCUIT REQUIREMENTS																		DRAWING ISSUE	
APPARATUS				MECH REQ		CIRCUIT PREPARATION				TEST SET PREP				DIRECT CURRENT FLOW REQ				REMARKS		DRAWING ISSUE			
DESIG	CODE	OPT.	FIG.	ESP FIG	CONT PRES	ARM. TRVL	BLOCK OR INSULATE	TEST CLIP DATA	CONN BAT	CONN GRD	TEST SET PREP	SEE TEST NOTE	TEST WDG	TEST FOR	AFTER SOAK MA	TEST MA	READJ MA	REMARKS		DRAWING ISSUE			
D																				DRAWING ISSUE			
D	AJ15		3	249				U(D)	GRD						0		42.5	40.5	DRAWING ISSUE				
DIS																				DRAWING ISSUE			
DIS	1/2AK30		3	202			68(CT)	1U(DIS)	GRD						0		23	22	MOUNTED WITH (RCCIR)	DRAWING ISSUE			
DL																				DRAWING ISSUE			
DL	AG20		3	262				U(DL)	GRD						0	FS	10.7	10.2	DRAWING ISSUE				
DL1																				DRAWING ISSUE			
DL1	1/2AK6		3	2				1L(DL1)	GRD						0		29	27.5	MOUNTED WITH (LP)	DRAWING ISSUE			
DP																				DRAWING ISSUE			
DP	1/2AK8		3	204				1L(DP)	GRD						0		17	16	MOUNTED WITH (DP1)	DRAWING ISSUE			
DP1																				DRAWING ISSUE			
DP1	1/2AK3		3	204				1U(DP1)	GRD						0		9.2	8.7	MOUNTED WITH (DP)	DRAWING ISSUE			
DS																				DRAWING ISSUE			
DS	280AA	ZV	3	5											0	-40	0.0		DRAWING ISSUE				
DS1																				DRAWING ISSUE			
DS1	AG13		3	402				U(DS1)	GRD						0	FS	8.2	7.8	DRAWING ISSUE				
E																				DRAWING ISSUE			
E	AF144		3	258				U(E)	GRD						0		27.5	26	DRAWING ISSUE				
E1																				DRAWING ISSUE			
E1	AJ43		8	249			(ON)NO,98(DIS)	U(E1)	GRD						0		24.4	23	DRAWING ISSUE				
ED																				DRAWING ISSUE			
ED	1/2AK4		7	202				1U(ED)	GRD						0		11.9	11.3	MOUNTED WITH (EOR)	DRAWING ISSUE			
EDR																				DRAWING ISSUE			
EDR	1/2AK4		7	202			48(ERTR)	1L(EDR)	GRD						0		11.9	11.3	MOUNTED WITH (ED)	DRAWING ISSUE			
ELL																				DRAWING ISSUE			
ELL	1/2AK47		7	202			88(XN)	1L(ELL)	GRD						0		13.2	12.5	MOUNTED WITH (ETK)	DRAWING ISSUE			
ERT																				DRAWING ISSUE			
ERT	AJ15		7	249				U(ERT)	GRD						0		42.5	40.5	DRAWING ISSUE				
ERTR																				DRAWING ISSUE			
ERTR	AJ15		7	249				U(ERTR)	GRD						0		42.5	40.5	DRAWING ISSUE				
ERTS																				DRAWING ISSUE			
ERTS	1/2AK47		7	202			38(ERTR)	1U(ERTS)	GRD						0		13.2	12.5	MOUNTED WITH (HR)	DRAWING ISSUE			
ERV																				DRAWING ISSUE			
ERV	AJ83		7	249				U(ERV)	GRD						0		13.2	12.6	DRAWING ISSUE				
ETK																				DRAWING ISSUE			
ETK	1/2AK47		7	202				1U(ETK)	GRD						0		13.2	12.5	MOUNTED WITH (ELL)	DRAWING ISSUE			
F																				DRAWING ISSUE			
F	1/2AK22		3	216				1L(F)	GRD						0		27.5	26	MOUNTED WITH (FR)	DRAWING ISSUE			
FR																				DRAWING ISSUE			
FR	1/2AK22		3	216				1U(FR)	GRD						0		27.5	26	MOUNTED WITH (F)	DRAWING ISSUE			
G																				DRAWING ISSUE			
G	1/2AK22		3	216				1L(G)	GRD						0		27.5	26	MOUNTED WITH (GR)	DRAWING ISSUE			
GR																				DRAWING ISSUE			
GR	1/2AK22		3	216				1U(GR)	GRD						0		27.5	26	MOUNTED WITH (G)	DRAWING ISSUE			
GT																				DRAWING ISSUE			
GT	1/2AK13		1	203				1L(GT)	GRD						0		24.5	23	MOUNTED WITH (GT1)	DRAWING ISSUE			
GT1																				DRAWING ISSUE			
GT1	1/2AK13		1	203				1U(GT1)	GRD						0		24.5	23	MOUNTED WITH (GT)	DRAWING ISSUE			
TEST NOTES:																				DRAWING ISSUE			
1. WITH CORD IN (DS) JACK.																				DRAWING ISSUE			
2. ARMATURE BACK TENSION MIN 20 GRAM READJUST; 15 GRAM TEST.																				DRAWING ISSUE			
REMOTE TESTING CIRCUIT - FAR END																				DRAWING ISSUE			
SD-99311-01-F1																				DRAWING ISSUE			
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PRINTED IN U.S.A.																				DRAWING ISSUE			

DRAWING

APPARATUS				MECH REQ			CIRCUIT PREPARATION			TEST SET PREP	SEE TEST NOTE	DIRECT CURRENT FLOW REQ				REMARKS	
DESIG	CODE	OPT.	FIG.	BSP FIG.	CONT PRES	ARM. TRVL	BLOCK OR INSULATE	TEST CLIP DATA				TEST WDG	TEST FOR	AFTER SOAK MA	TEST MA		READJ MA
RELAYS																	
HR	1/2AK47		7	202			103(NP), 1B(3WO)	2L(HR)	1L(HR)	B/G	3		0		13.2	12.5	MOUNTED WITH (ERTS)
IN	1/2AK22		3	216					1L(IN)	GRD			0		27.5	26	MOUNTED WITH (INR)
INR	1/2AK22		3	216					1U(INR)	GRD			0		27.5	26	MOUNTED WITH (IN)
K1A	293E		2				(S)0	11(K1A)	13(K1A)	B/G	1,2		0		10		
K2A								21(K2A)	23(K2A)	B/G	1,2		0		10		
K3A								31(K3A)	33(K3A)	B/G	1,2		0		10		
K4A								41(K4A)	43(K4A)	B/G	1,2		0		10		
K5A								51(K4A)	53(K5A)	B/G	1,2		0		10		
K1C	293E		2				(S)0	11(K1C)	13(K1C)	B/G	1,2		0		10		
K2C								21(K2C)	23(K2C)	B/G	1,2		0		10		
K3C								31(K3C)	33(K3C)	B/G	1,2		0		10		
K4C								41(K5C)	43(K5C)	B/G	1,2		0		10		
K5C								51(K5C)	53(K5C)	B/G	1,2		0		10		
KP	AF20		3	205					1(KP)	GRD			0		36	34	
KP1	280J	ZV	3	8				(KP1)JK-T	(KP1)JA-2	B/G			0	-12		0.3	
													NO	-12		0.2	
													0	-12	3.2	3	
													NO	12	1.7	1.0	
													R	12	0.9	1	
KPI	316E	ZW	3	3				9-(KPI)	1+(KPI)	B/G			0	9	3		SOAK ONLY ON OPR TST
								9-(KPI)	1+(KPI)	B/G			R		0.8		
KPR	1/2AK5		3	4					1U(KPR)	GRD			0		15.8	15	MOUNTED WITH (MR)
LL	1/2AK44N,2S		3	222					1U(LL)	GRD			0		27.5	26	MOUNTED WITH (REXS)
LL1	1/2AK22 ZJ		3	216					1L(LL1)	JRD			0		27.5	26	MOUNTED WITH (REX1)
LP	1/2A.6		3	2					1U(LP)	GRD			0		29	27.5	MOUNTED WITH (DL1)
LRP	1/2AK22		3	216					1L(LRP)	GRD			0		27.5	26	MOUNTED WITH (LRPR)
LRPR	1/2AK22		3	216					1U(LRPR)	GRD			0		27.5	26	MOUNTED WITH (LRP)
LS	AJ516	YS	3	299			9(LS)		U(LS)	GRD			0		40.1	39	
LSR	1/2AK22	YS	3	216					1U(LSR)	GRD			0		27.5	26	MTD WITH SPARE

TEST NOTES:

1. REMOVE ASSOCIATED LIMITER & DETECTOR CIRCUIT BOARD. 3. ARMATURE BACK TENSION MIN 20 GRAM READJUST; 15 GRAM TEST.

- 2.

REL UNDER TEST	TEST CLIP DATA	REL UNDER TEST	TEST CLIP DATA
	CONN SLEEVE		CONN SLEEVE
K1A	15(K1A)	K1C	15(K1C)
K2A	25(K2A)	K2C	25(K2C)
K3A	35(K3A)	K3C	35(K3C)
K4A	45(K4A)	K4C	45(K4C)
K5A	55(K5A)	K5C	55(K5C)

- A. CONNECT L2 TERM. OF TEST SET TO BAT. TERM. OF TEST SET.
- B. PLACE (L) KEY IN NEUTRAL POSITION.
- C. CONN SLEEVE OF (T & R) TEST JACK TO EACH LOAD CONTACT OF REL UNDER TEST AS INDICATED IN CONN SLEEVE COLUMN.

REMOTE TESTING CIRCUIT - FAR END

SD-99311-01-F2

BELL TELEPHONE LABORATORIES
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CREATING

APPARATUS				MECH REQ			CIRCUIT PREPARATION			TEST SET PREP	SEE TEST NOTE	DIRECT CURRENT FLOW REQ				REMARKS
DESIG	CODE	OPT.	FIG	BSP FIG.	CONT PRES	ARM FRVL	BLOCK OR INSULATE	TEST CLIP DATA				TEST WDG	TEST FLR	AFTER SCARS	TEST	
								CONN BAT.	CONN GRD			MA	MA	MA		
M	AJ516		3	299					U(M)	GRD		0	40.1	39		
MA	1/2AK22		3	216					1L(MA)	GRD		0	27.5	26	MOUNTED WITH (MAR)	
MAR	1/2AK22		3	216					1U(MAR)	GRD		0	27.5	26	MOUNTED WITH (MA)	
MDF	1/2AK22		3	216					1L(MDF)	GRD		0	27.5	26	MOUNTED WITH (MDFR)	
MDFR	1/2AK22		3	216					1U(MDFR)	GRD		0	27.5	26	MOUNTED WITH (MDF)	
MR	1/2AK5		3	4					1L(MR)	GRD		0	15.8	15	MOUNTED WITH (KPR)	
NC	AJ83		8	249			2B(TF2)		U(NC)	GRD		0	13.2	12.6		
NC1	1/2AK22		8	216					1U(NC1)	GRD		0	27.5	26	MOUNTED WITH (NC2)	
NC2	1/2AK22		8	216					1L(NC2)	GRD		0	27.5	26	MOUNTED WITH (NC1)	
NP	AJ19		3	405B					L(NP)	BAT.	1	0	21	20		
												H	2.0	1.8		
												R	1.0	1.3		
NT	1/2AK22		3	216					1L(NT)	GRD		0	27.5	26	MOUNTED WITH (NTR)	
NT1	1/2AK4		7	202					1L(NT1)	GRD		0	11.9	11.3	MOUNTED WITH (TS1)	
NT2	1/2AK22	YV	1	216					1U(NT2)	GRD		0	27.5	26	MOUNTED WITH (TS2)	
NTR	1/2AK22		3	216					1U(NTR)	GRD		0	27.5	26	MOUNTED WITH (INT)	
ON	AJ83		3	249					U(ON)	GRD		0	13.2	12.6		
ON1	AJ202		3	500					U(ON1)	GRD		0	42	40.5		
ON2	AJ202		3	500					U(ON2)	GRD		0	42	40.5		
P	AJ102		3	75			(RCC1) 0	1U(P)	2L(P)	M	2,3	P/S	0	14.7	14	
													R	5.8	6.1	
PR	1/2AK22		3	216					1L(PR)	GRD		0	27.5	26	MOUNTED WITH (PRR)	
PRR	1/2AK22		3	216					1U(PRR)	GRD		0	27.5	26	MOUNTED WITH (PR)	

TEST NOTES:

1. ARMATURE BACK TENSION MINIMUM 45 GRAMS READJUST, 40 GRAMS TEST.
2. CONTACT MAKE 5, NO MAKE 8.5. READJUST, MAKE 3.5, NO MAKE 10, TEST.
3. P/S PRIMARY AND SECONDARY IN SERIES AIDING.

REMOTE TESTING CIRCUIT - FOR IEND

SD-99311-01-F2

BELL TELEPHONE LABORATORIES
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65

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CIRCUIT REQUIREMENTS

APPARATUS				MECH REQ			CIRCUIT PREPARATION				TEST SET PREP		DIRECT CURRENT FLOW REQ				REMARKS
DESIG	CODE	OPT	FIG	BSP FIG	CONT PRES	ARM TRVL	BLOCK OR INSULATE	TEST CLIP DATA	CONN BAT	CONN GRD	TEST SET PREP	SEE TEST NOTE	TEST WDG	TEST FOR	AFTER SOAK MA	TEST READJ MA	
+R	1/2AK22		3	216						1L(+R)	GRD		0		27.5	26	MOUNTED WITH (+RR)
-R	1/2AK22		3	216						1L(-R)	GRD		0		27.5	26	MOUNTED WITH (-RR)
+RR	1/2AK22	B	3	216						1U(+RR)	GRD		0		27.5	26	MOUNTED WITH (+RR) OR (+RRM)
-RR	1/2AK22		3	216						1U(-RR)	GRD		0		27.5	26	MOUNTED WITH (-RR)
RC	1/2AK22		3	216						1U(RC)	GRD		0		27.5	26	MOUNTED WITH (TRG)
RCC1	AJ516		3	299						U(RCC1)	GRD		0		41	19	
RCC1R	1/2AK30		3	202						1L(RCC1R)	GRD		0		23.5	22	MOUNTED WITH (RCC1R)
RCC1R	1/2AK22		3	216						1U(RCC1R)	GRD		0		27.5	26	MOUNTED WITH (+RR)
REX	1/2AK22	N,ZS	3	216						1L(REX)	GRD		0		27.5	26	MOUNTED WITH (REX)
REX1	1/2AK22	ZJ	3	216						1U(REX1)	GRD		0		27.5	26	MOUNTED WITH (LL1)
REX1	1/2AK22	N,ZS	3	216						1U(REX1)	GRD		0		27.5	26	MOUNTED WITH (REX)
REXS	1/2AK44	N,ZO	3	222						1L(REXS)	GRD		0		27.5	26	MOUNTED WITH (LL)
RG	1/2AK22		3	216						1L(RG)	GRD		0		27.5	26	MOUNTED WITH (RGR)
RGR	1/2AK22		3	216						1U(RGR)	GRD		0		27.5	26	MOUNTED WITH (RG)
RL	B1040		3	6		50				2M(RL)	GRD		0		3.1	2.9	
															1.6	1.7	
ROH	1/2AK22		3	216						1L(ROH)	GRD		0		27.5	26	MOUNTED WITH (ROH1)
ROHD	1/2AK22		1	216						1U(ROHD)	GRD		0		27.5	26	MOUNTED WITH (SO)
ROH1	1/2AK4		3	202						1L(ROH1)	GRD		0		11.9	11.3	MOUNTED WITH (ROH2)
ROH2	1/2AK4		3	202						1U(ROH2)	GRD		0		11.9	11.3	MOUNTED WITH (ROH1)
ROHD	1/2AK22		1	216						1U(ROHD)	GRD		0		27.5	26	MOUNTED WITH (SO)
ROH	1/2AK22		3	216						1U(ROH)	GRD		0		27.5	26	MOUNTED WITH (ROH)
RT	1/2AK22	ZJ,XJ	3	216						1U(RT)	GRD		0		27.5	26	MTD WITH (-Y), SEE FIG. 3
RV	1/2AK22		3	216						1L(RV)	GRD		0		27.5	26	MOUNTED WITH (RVF)
RVM	1/2AK22		3	216						1L(RVM)	GRD		0		27.5	26	MOUNTED WITH (RVMR)
RVMR	1/2AK22		3	216						1U(RVMR)	GRD		0		27.5	26	MOUNTED WITH (RVM)
RVR	1/2AK22		3	216						1U(RVR)	GRD		0		27.5	26	MOUNTED WITH (RV)
S	AJ138	YA	3	56						1U(S)	2L(S)	M	1	P/S	12.6	12	
															5.2	5.5	
S	AJ26	ZZ	3	558						2L(S)	1U(S)	M		P/S	16.3	15.5	
															6.3	6.8	
SO	1/2AK22		1	216						1L(SO)			0		27.5	26	MOUNTED WITH ROHD
SL	B1056		3	3		30	(3W0)0			1M(SL)	2M(SL)	B/G	0	25	3.5	3.3	
															1.9	2.0	
SO	1/2AK22		1	216						1L(SO)	B/G		0		27.5	26	MOUNTED WITH (ROHD)
SRT	1/2AK22		3	216						1L(SRT)	GRD		0		27.5	26	MOUNTED WITH (SRT)
SRT	1/2AK22		3	216						1U(SRT)	GRD		0		27.5	26	MOUNTED WITH (SRT)

TEST NOTES:

1. P/S PRIMARY AND SECONDARY IN SERIES AIDING.

PAGE 5

SD-99311-01-F3

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CIRCUIT REQUIREMENTS

APPARATUS				MECH REQ			CIRCUIT PREPARATION				TEST SET PREP		DIRECT CURRENT FLOW REQ				REMARKS
DESIG	CODE	OPT	FIG	BSP FIG	CONT PRES	ARM TRVL	BLOCK OR INSULATE	TEST CLIP DATA	CONN BAT	CONN GRD	TEST SET PREP	SEE TEST NOTE	TEST WDG	TEST FOR	AFTER SOAK MA	TEST READJ MA	
ST	1/2AK22		3	216						1L(ST)	GRD		0		27.5	26	MOUNTED WITH (STR)
STA	AF9		3	213						U(STA)	GRD		0		8.6	8.2	
+STA	1/2AK22		3	216						1L(+STA)	GRD		0		27.5	26	MOUNTED WITH (+STAR)
-STA	1/2AK22		3	216						1L(-STA)	GRD		0		27.5	26	MOUNTED WITH (-STAR)
STR	1/2AK22		3	216						1U(STR)	GRD		0		27.5	26	MOUNTED WITH (ST)
+STAR	1/2AK22		3	216						1U(+STAR)	GRD		0		27.5	26	MOUNTED WITH (+STA)
-STAR	1/2AK22		3	216						1U(-STAR)	GRD		0		27.5	26	MOUNTED WITH (-STA)
+T	1/2AK22		3	216						1L(+T)	GRD		0		27.5	26	MTD WITH (+TR) OR (ANS)
-T	1/2AK22		3	216						1L(-T)	GRD		0		27.5	26	MTD WITH (-TR) OR (RT)
TB	AC24	N,ZS	3	198			(LL)0, 11(LL)			U(TB)	GRD		0		13.7	13	
															0.7	1	
+TR	1/2AK22	B	3	216						1U(+TR)	GRD		0		27.5	26	MOUNTED WITH (+T)
-TR	1/2AK22	B	3	216						1U(-TR)	GRD		0		27.5	26	MTD WITH (-T), SEE FIG. 3
TD	1/2AK22		3	216						1L(TD)	GRD		0		27.5	26	MOUNTED WITH (TDR)
TDR	1/2AK22		3	216						1U(TDR)	GRD		0		27.5	26	MOUNTED WITH (TD)
TF	1/2AK35		8	202			1B(NC)			1U(TF)	GRD	1			12.4	11.6	MOUNTED WITH (TFR)
TF1	1/2AK41		8	202			2(TFR)			2U(TF1)	1U(TF1)	B/G	1		31.5	30	MOUNTED WITH (TF2)
TF2	1/2AK41		8	202						1L(TF2)	GRD		0		48	44	MOUNTED WITH (TF1)
															4.4	4.2	
TFR	1/2AK35		8	202			1M(NC)			1L(TFR)	GRD	1			48	31.5	MOUNTED WITH (TF)
															4.4	4.2	
TK	1/2AK22		3	216						1L(TK)	GRD		0		27.5	26	MOUNTED WITH (TKR)
TKM	AJ15		3	249						U(TKM)	GRD		0		42.5	40.5	
TKR	1/2AK22		3	216						1U(TKR)	GRD		0		27.5	26	MOUNTED WITH (TK)
TP	AJ119	XI,XJ	3	53						L(TP)	BAT.		0		-50	19.5	18.5
															-50	15.5	16.5

TEST NOTES:

1. REMOVE TIMER (TF) CP D3 BEFORE MAKING TEST.

ISSUE
19AC

REMOTE TESTING CIRCUIT - FAR END (2)

SD-99311-01-F3

BELL TELEPHONE LABORATORIES
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6S

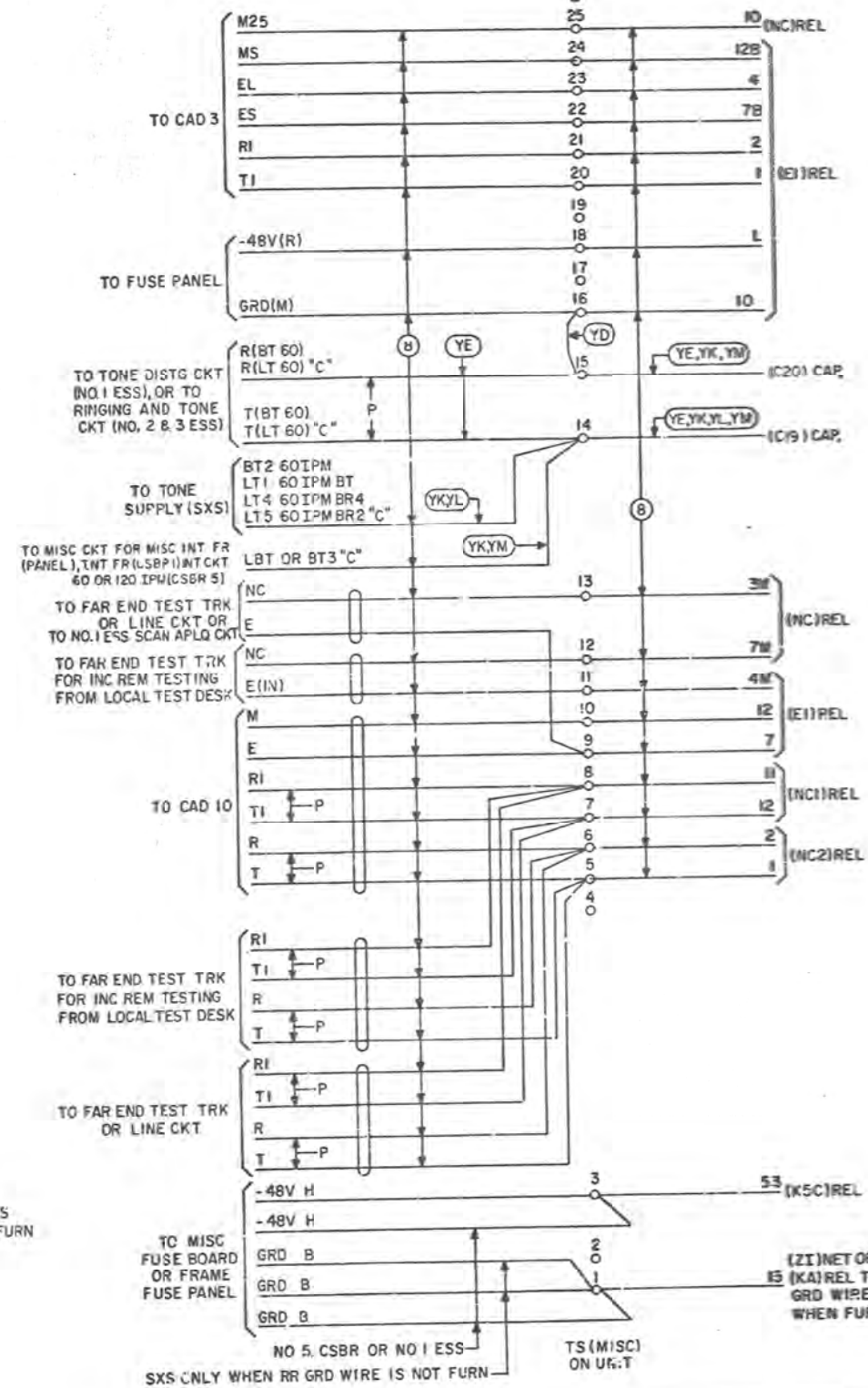
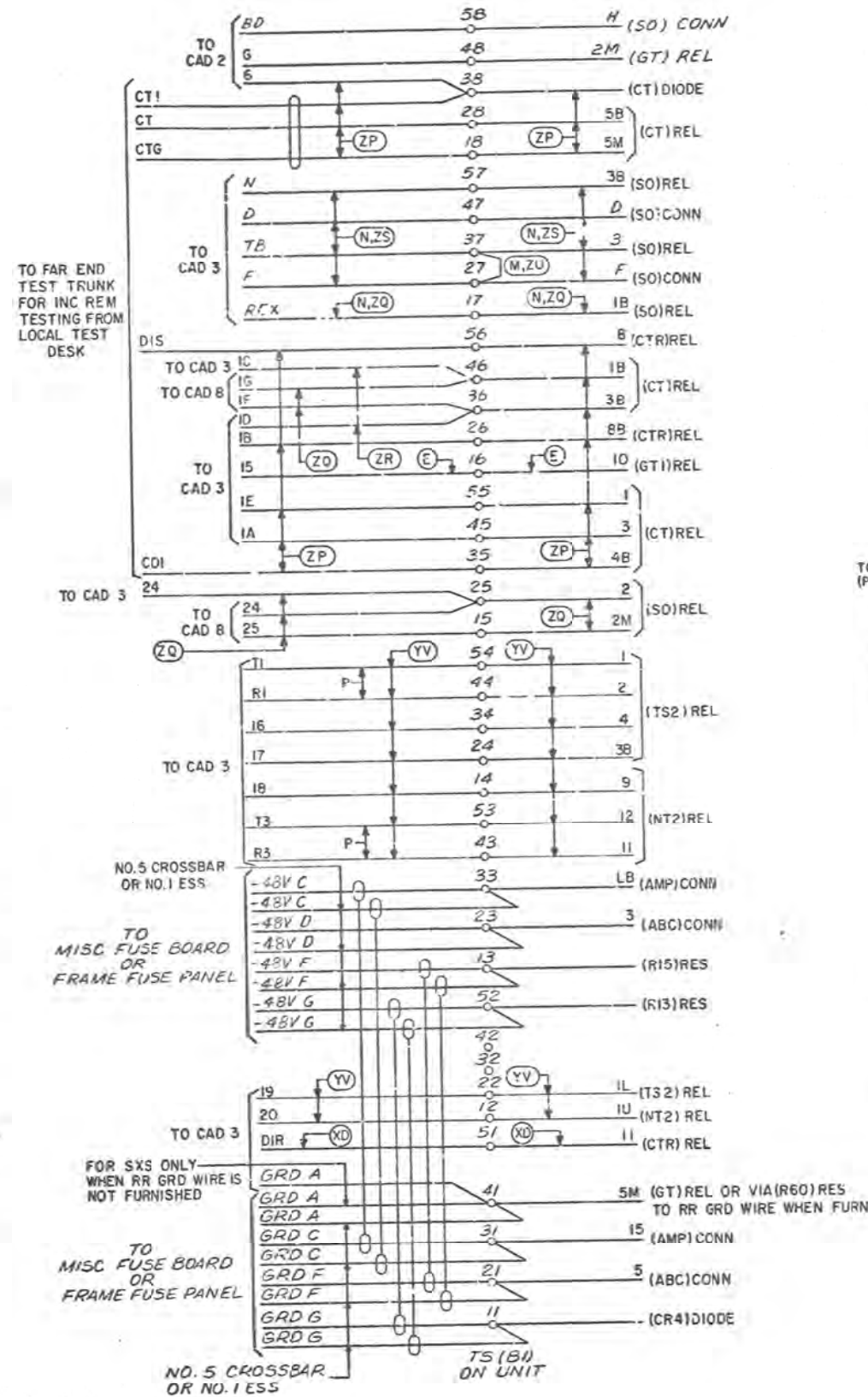
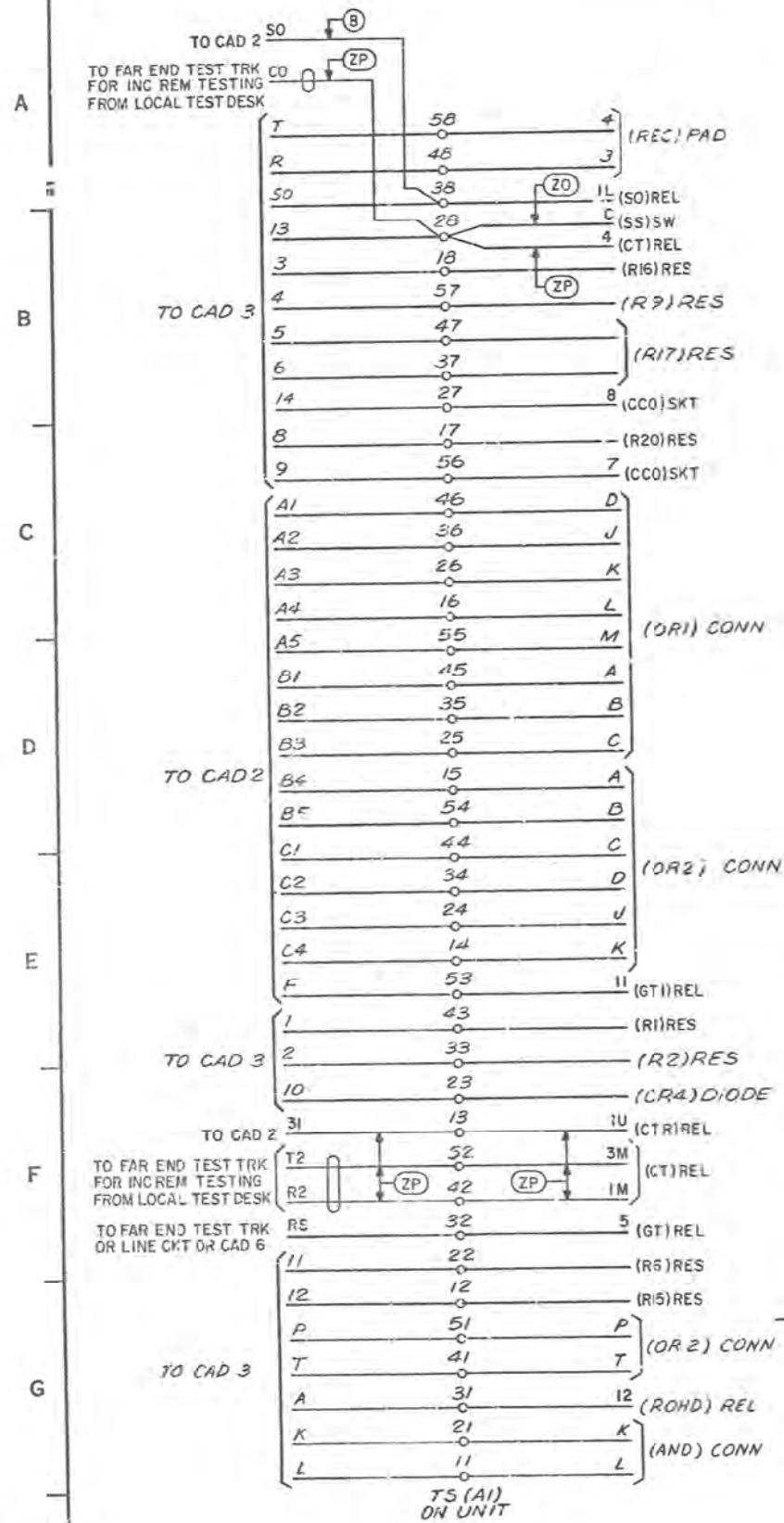
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CIRCUIT REQUIREMENTS																		
APPARATUS				MECH REQ			CIRCUIT PREPARATION				TEST SET PREP	SEE TEST NOTE	DIRECT CURRENT FLOW REQ					REMARKS
DESIG	CODE	OPT	FIG.	BSP FIG.	CONT PRES	ARM. TRVL	BLOCK OR INSULATE	TEST CLIP DATA		TEST WDG			TEST FOR	AFTER SOAK MA	TEST MA	READJ MA		
								CONN BAT.	CONN GRD									
TRG	1/2AK22		3	216					IL (TRG)	GRD		0		27.5	26	MOUNTED WITH (RC)		
TS	1/2AK22		3	216					IL (TS)	GRD		0		27.5	26	MOUNTED WITH (TSR)		
TS1	1/2AK4		7	202					IU (TS1)	GRD		0		11.9	11.3	MOUNTED WITH (NT1)		
TS2	1/2 AK22	YV	1	216					IL (TS2)	GRD		0		27.5	26	MOUNTED WITH (NT2)		
TSR	1/2AK22		3	216					IU (TSR)	GRD		0		27.5	26	MOUNTED WITH (TS)		
TT	1/2AK22		3	216					IL (TT)	GRD		0		27.5	26	MOUNTED WITH (TTR)		
TTR	1/2AK22		3	216					IU (TTR)	GRD		0		27.5	26	MOUNTED WITH (TT)		
VR	1/2AK22		3	216					IL (VR)	GRD		0		27.5	26	MOUNTED WITH (VRR)		
VRR	1/2AK22		3	216					IU (VRR)	GRD		0		27.5	26	MOUNTED WITH (VR)		
XN	AF32		3	208					U (XN)	GRD		0		32	30.5			
TIMING REQ																		
CIRCUIT PACK																		
ABC	D3		1				(DL) O					1,3						
TF	D3		8									1,5						
TMR	CF1		3									1						

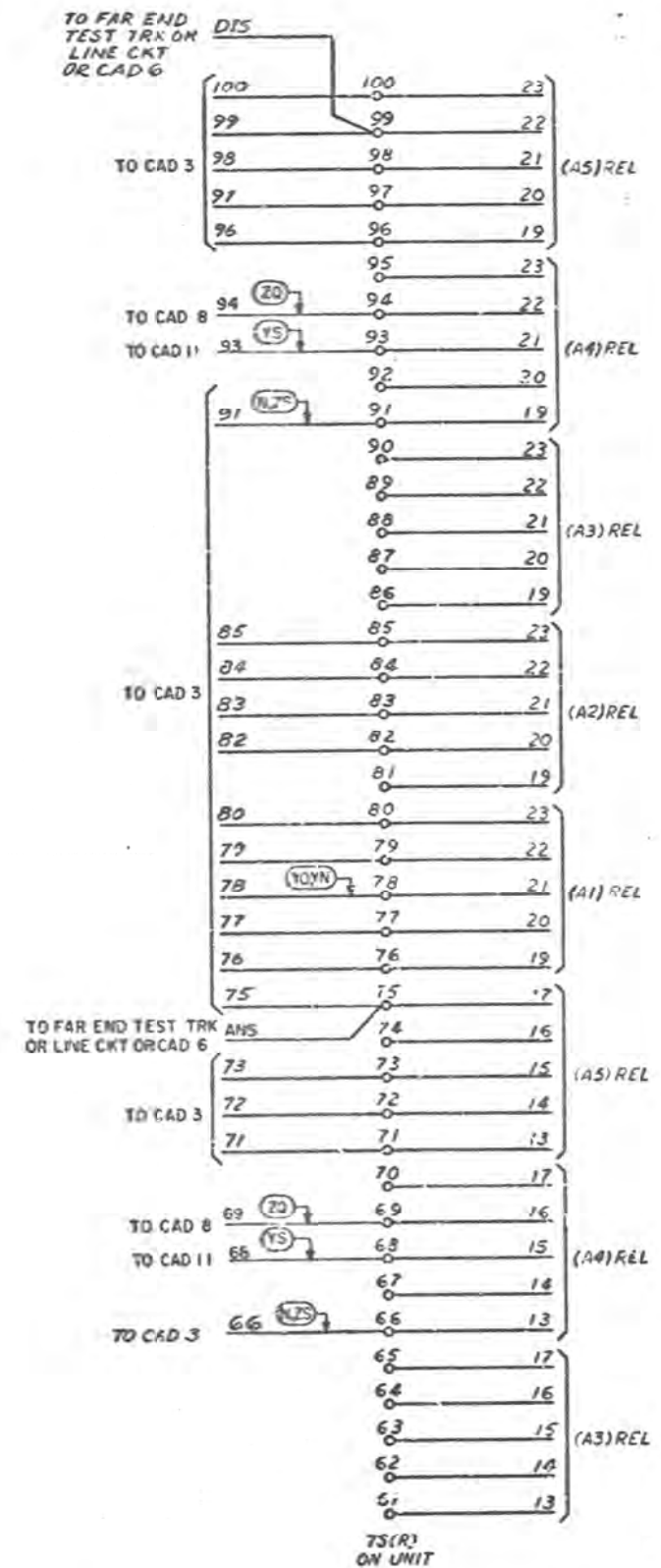
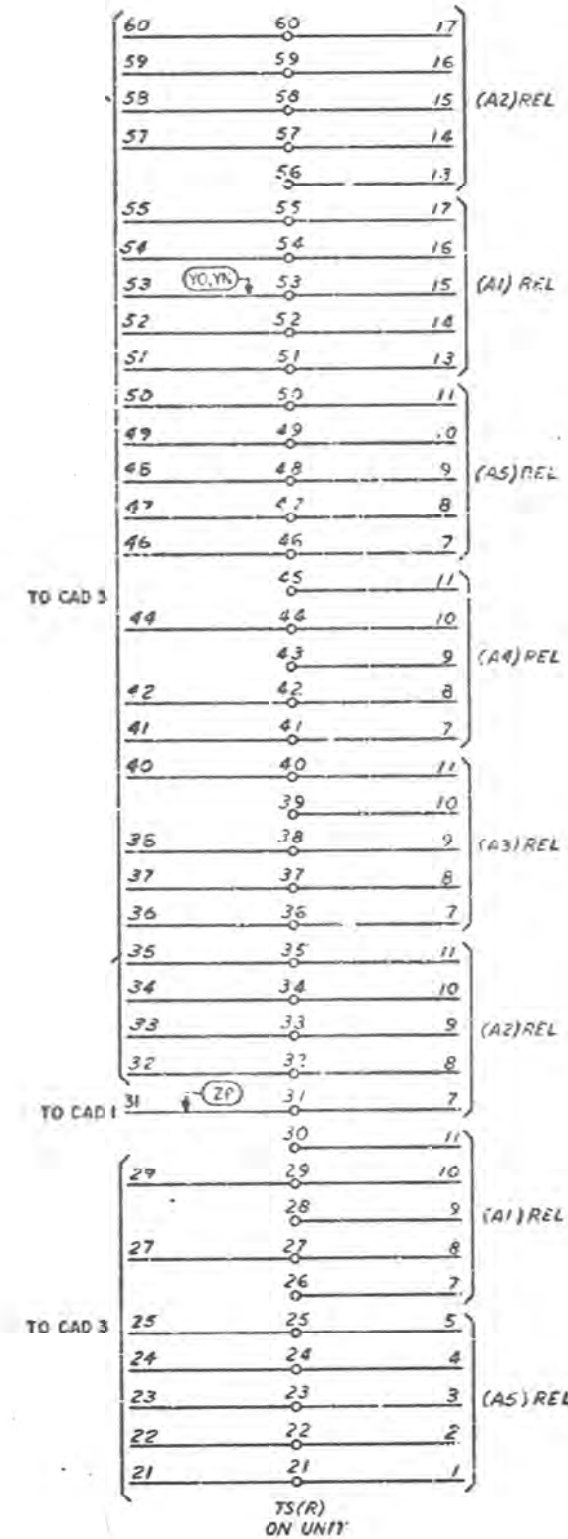
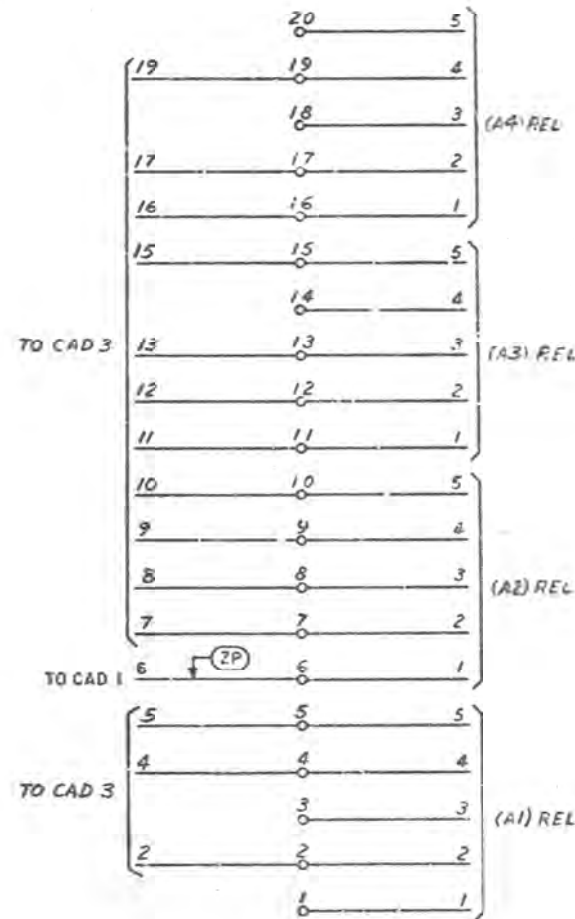
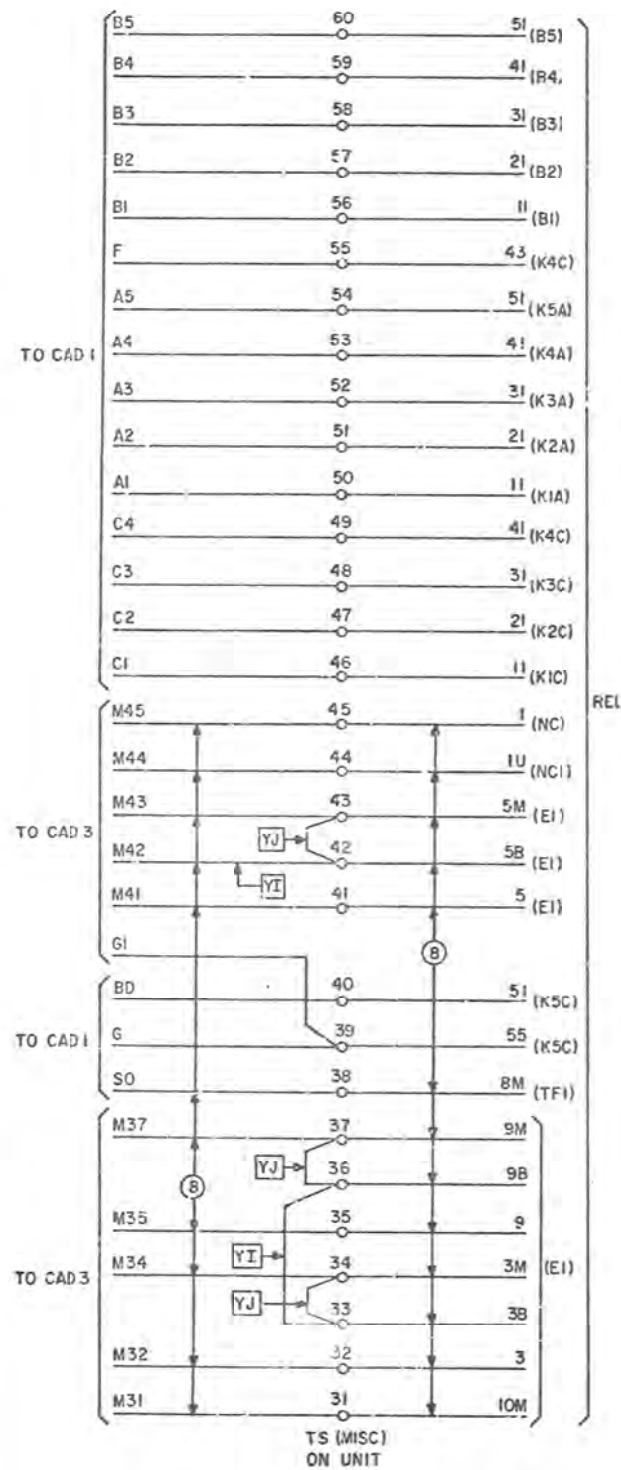
I. USE TEST SET FOR TIMING TESTS:

2. PUT OPEN PLUG IN (TJ) JACK. USING A CLIP CORD CONNECT FRAME GROUND TO 12B(LP) RELAY. CONNECT A 101G HANDSET E/W W2B CORD OR W2D CORD AND 624 TOOLS BETWEEN GROUND AND 5(R) TERM STRIP. HOLD (TST) KEY TO OPR POSITION AND IMMEDIATELY DIAL 0 (ZERG) WITH HAND SET. ADJUST (DTM) POTENTIOMETER UNTIL CORRECT TIMING IS OBTAINED. CALIBRATE TEST SET FOR 500 MS HALF SCALE MAKING FULL SCALE 1000MS.
3. BLOCK OPERATE (LL). CONNECT CONN W TO 5F(GT). TAKE READING 1. CONNECT CONN W TO 11F(GT). TAKE READING 2. READING 2 MINUS READING 1 SHOULD BE BETWEEN 40 AND 60 MS.
4. CALIBRATE TEST SET FOR 500 MS QUARTER SCALE MAKING FULL SCALE 2000 MS.
5. CONNECT CONN W TO 4M(TFR). TAKE READING 1. CONNECT CONN W TO 8M(TFI). TAKE READING 2. READING 2 MINUS READING 1 SHOULD BE BETWEEN 2500 AND 2700 MS.

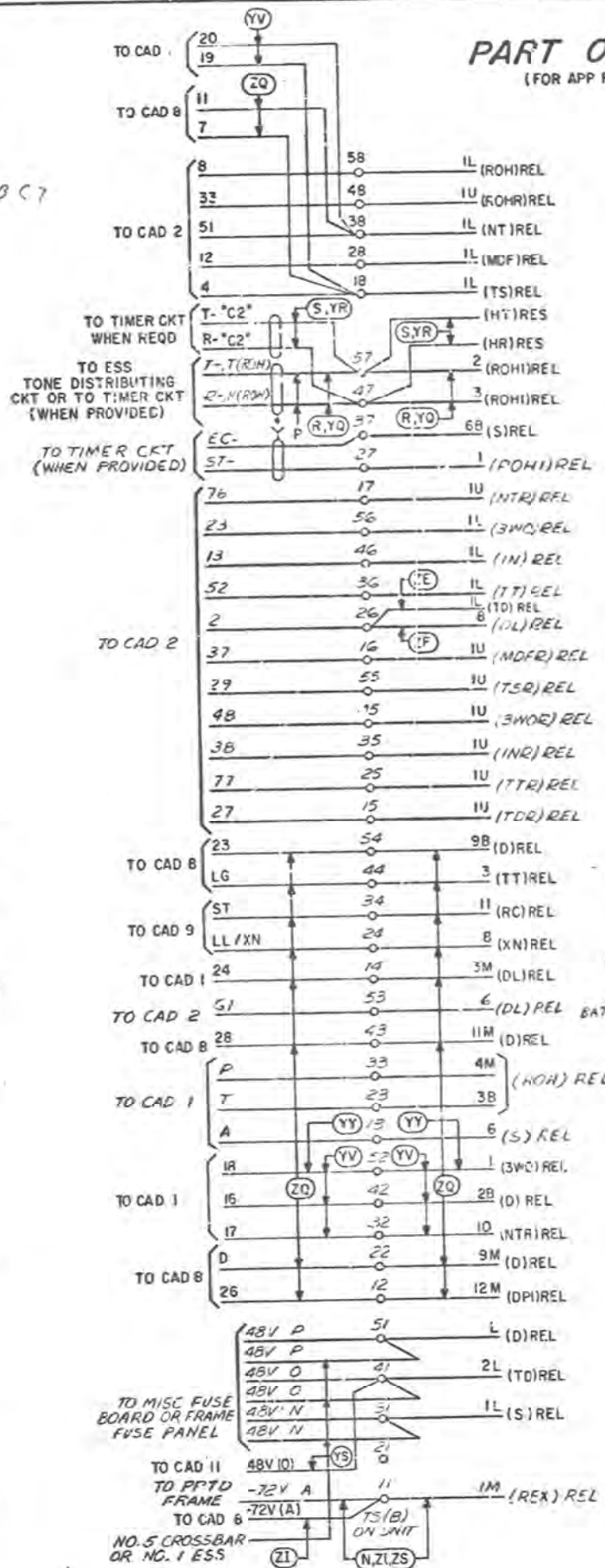
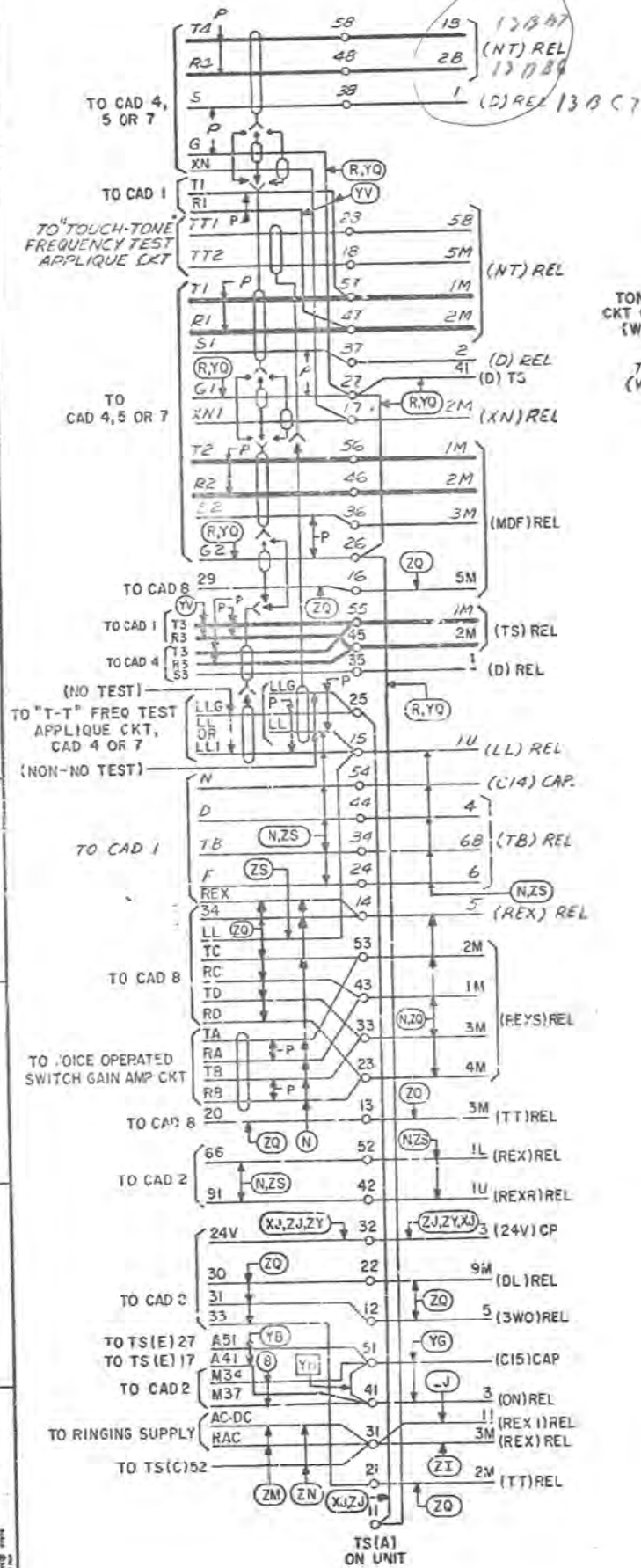


PART OF CAD 2

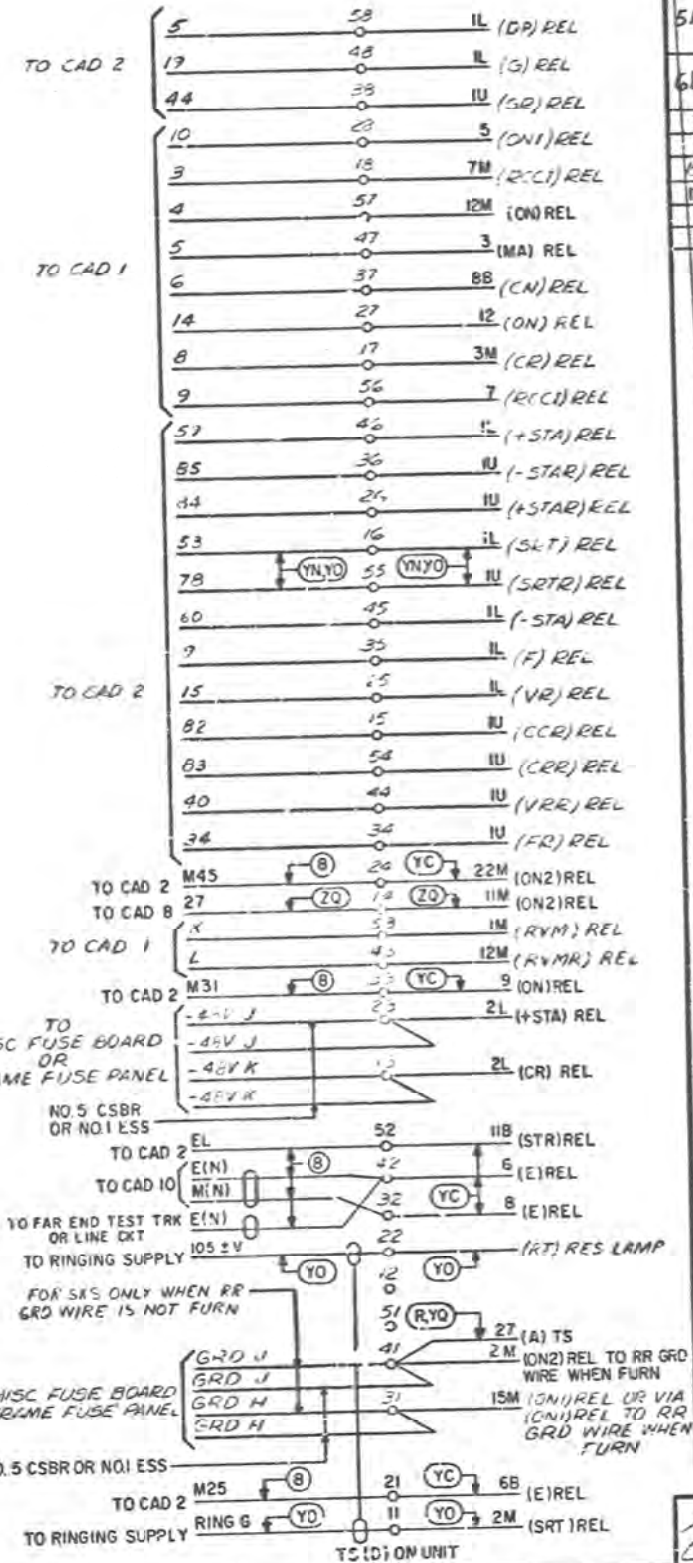
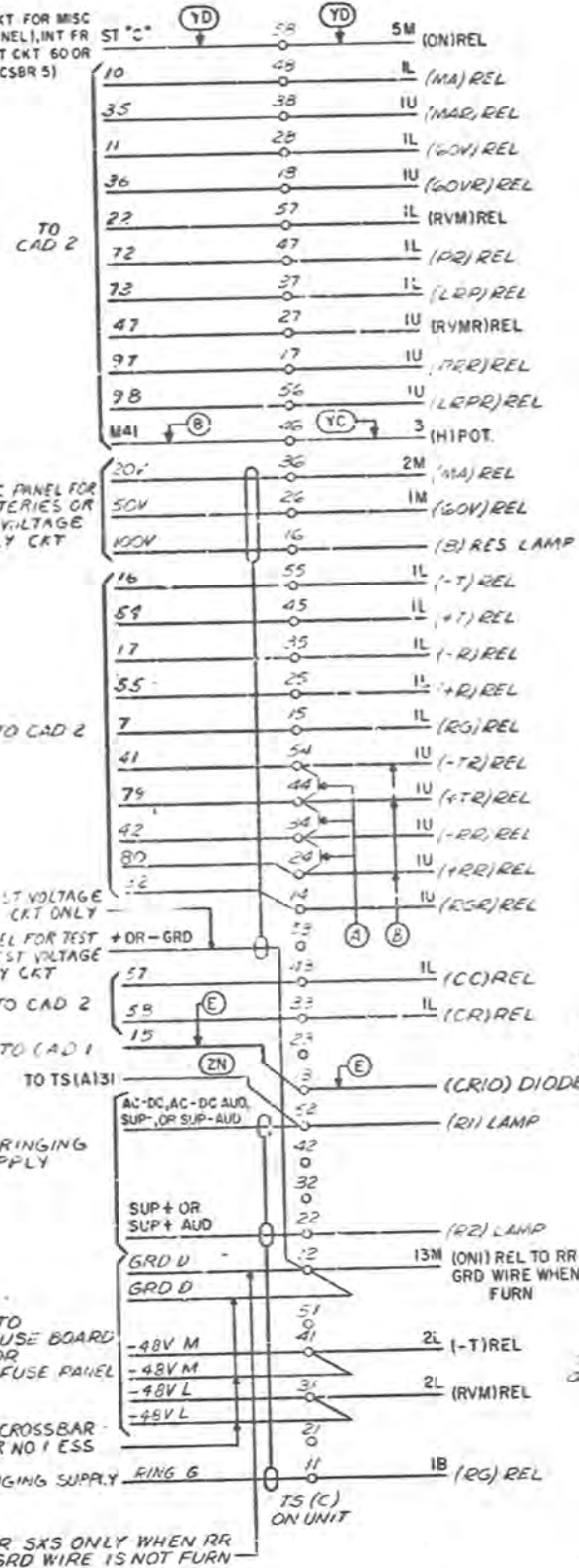
(FOR APP FIGS 28-8)



PART OF CAD 3
(FOR APP FIGS. 3 & 6)



TO MISC CKT FOR MISC
INT FR (PANEL), INT FR
(CSBR 1) INT CKT 60 OR
120IPM (CSBR 5)

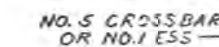
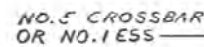


REMOTE TESTING CIRCUIT - FAR END

SD-9 1-01-63

(FOR APP FIGS 3 & 6)

TO FAR END TEST TRK
LINE CKT, FAR END TEST
TRK FOR INCREM TEST.
ING FROM LOCAL TEST
DESK, CAD 4 OR 13



CROSS CONN
TO INCOMING TRK
(NON NO TEST)
NO.1 CSER ONLY WITH
EXTRA NUMBER SERIES

CROSS CONNECT TO
FAR END TEST TRK
OR LINE CKT, OR
TRANSMISSION FACIL-
ITIES.
CROSS CONN TO FAR
END TEST TRK, LINE
CKT, OR SIGNALING
CKT

CROSS CONN
TO INCOMING TRK
(NON-NO TEST), TEST
DISTRIBUTOR CONTROL
TEST TRK FIRST
SELECTOR
(NON-NO TEST) OR
TOUCH-TONE
FREQUENCY TEST
APPLIQUE CKT
(SEE NOTE 1)

CROSS CONN
TO INCOMING TRK
(NO-TEST), TEST TRK
FIRST SELECTOR
(NO-TEST) OR
TOUCH-TONE
FREQUENCY TEST
APPLIQUE CKT
(SEE NOTE 1)

CROSS CONN
TO INCOMING TAX
(NO-TEST)
NO.1 CSBR ONLY WITH
EXTRA NUMBER SERIES

CROSS CONN
TO MDF TEST TR
CRT

CROSS CINK
TO TEST TRM
AND SEL CKT

AS SPECIFIED ^{DF}

SHEET NOTES:

1. WHEN ONLY NO-TEST TEST TRUNKS ARE PROVIDED, THEY MAY BE CONNECTED TO UPPER T. W. S. LEADS NORMALLY USED FOR WDN-NO TEST TRY S. THIS ELIMINATES THE NEED FOR OPERATION OF (NT) RELAY FOR EACH TEST TRUNK OPERATION.
2. PROVIDE ONLY WHEN TEST VOLTAGE IS OBTAINED FROM TEST VOLTAGE SUPPLY CKT

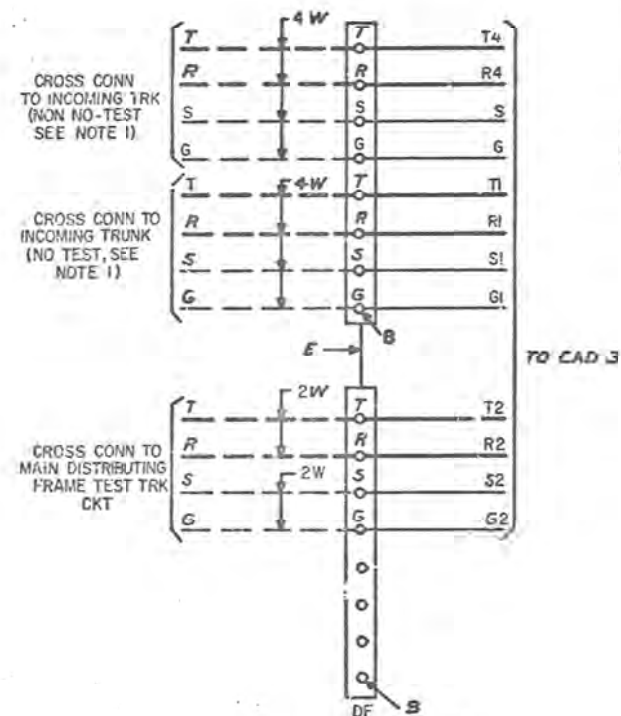
REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES
INCORPORATED

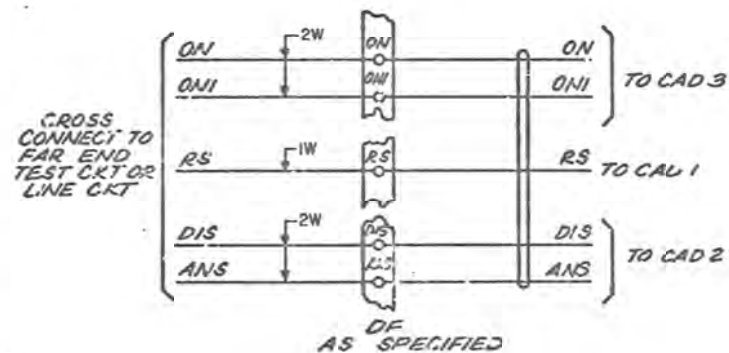
SD- 11-01-G4

65

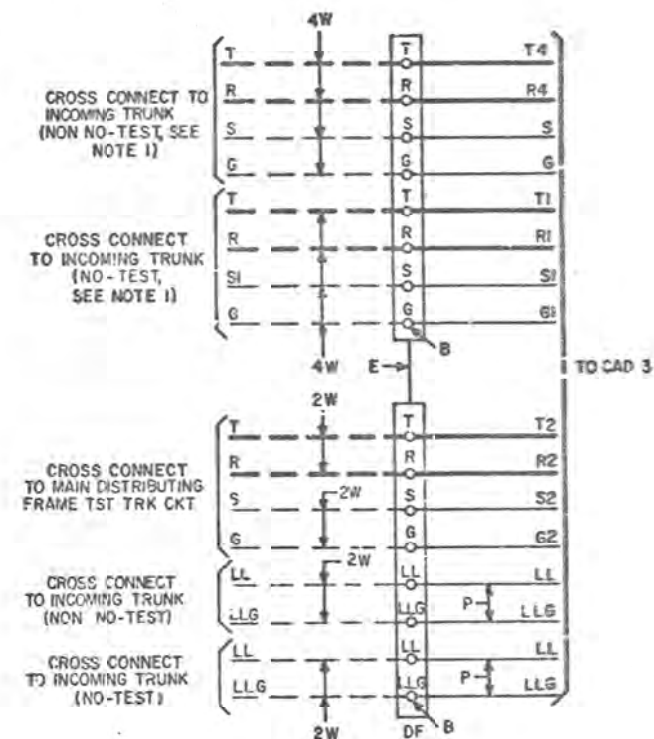
CAD 5 (FOR CAD 3) NO. 1 ESS, R OPTION



CAD 6



CAD 7 NO. 2 ESS



SHEET NOTES:

1. WHEN ONLY NO-TEST TRUNKS ARE PROVIDED, THEY MAY BE CONNECTED TO UPPER T, R, S, LL AND L'G LEADS NORMALLY USED FOR NON NO-TEST TRUNKS. THIS ELIMINATES THE NEED FOR OPERATION OF (NT) RELAY FOR EACH TEST TRUNK OPERATION.

SD-99311-01-65

REMOTE TESTING CIRCUIT-FAR END ②

SD-99311-01-65

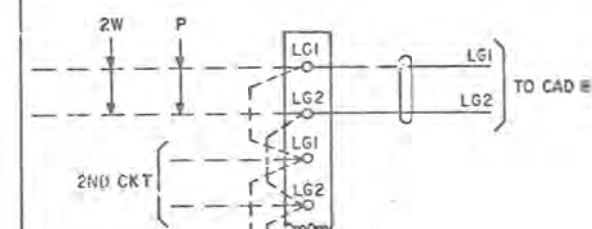
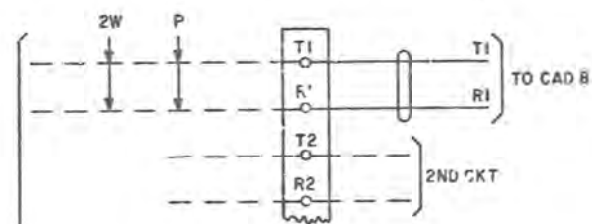
BELL TELEPHONE LABORATORIES
INCORPORATED

6S

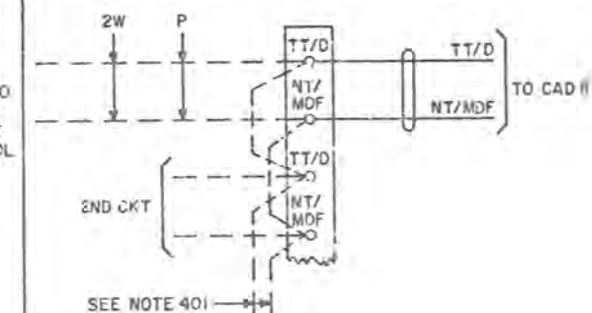
ISSUE
17B

CAD 9

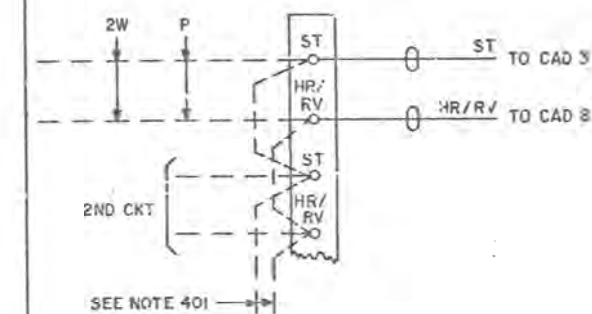
DISTG FRAME LEADS TO EXTENDED REMOTE TEST TRUNK CONTROL CIRCUIT



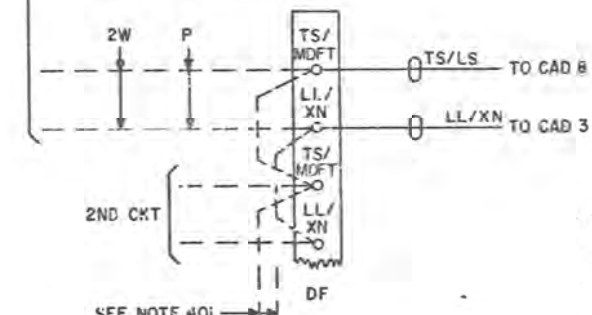
SEE NOTE 401



SEE NOTE 401



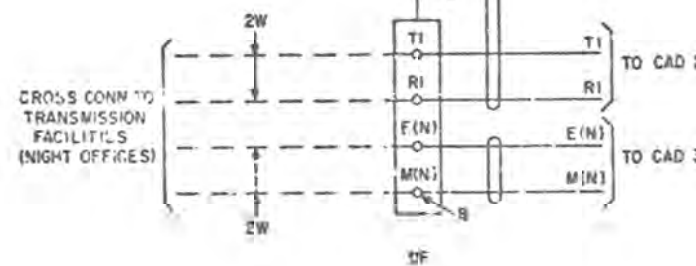
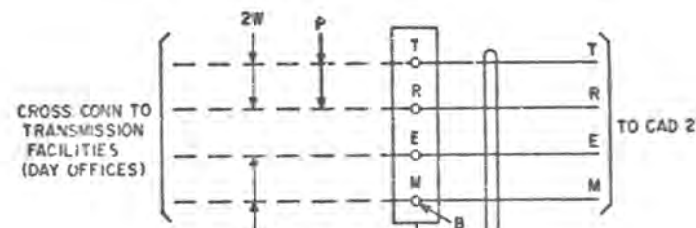
SEE NOTE 401



SEE NOTE 401

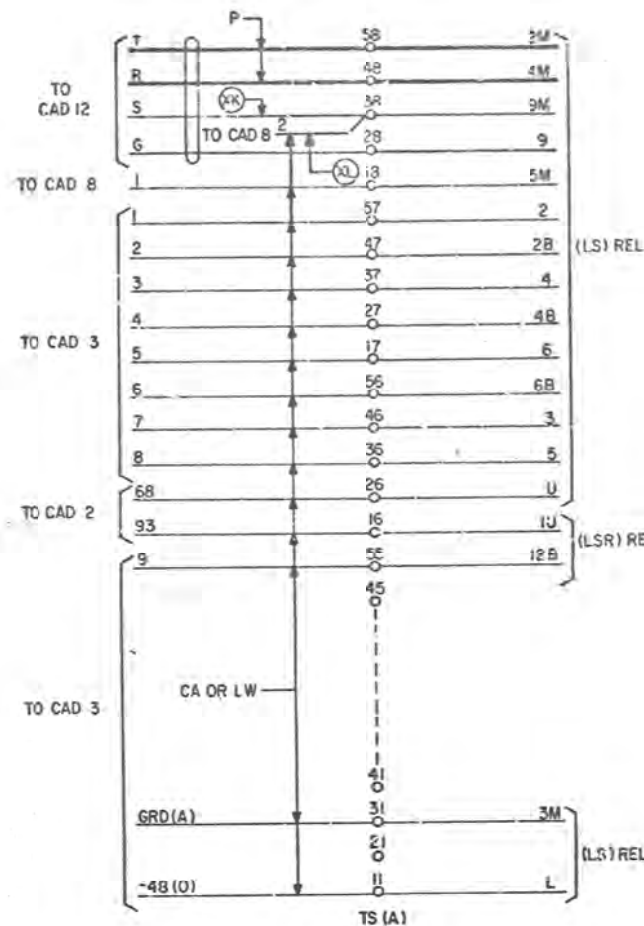
CAD 10

DISTG FRAME LEADS TO TRANSMISSION FACILITIES FOR NIGHT TEST COVERAGE



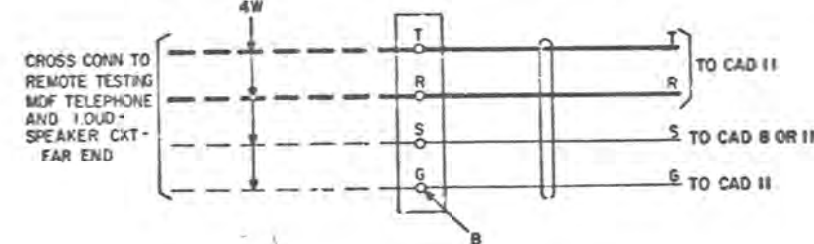
CAD 11

FOR APP FIG. 3



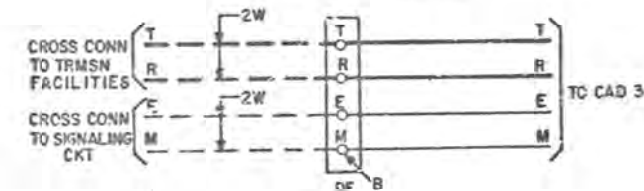
CAD 12

LEADS TO RMT TESTING MDF TELEPHONE AND LOUDSPEAKER CKT-FAR END



CAD 13

DISTG FR LEADS FOR NON-DEDICATED FACILITIES



REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES

SD-95 11-01-67

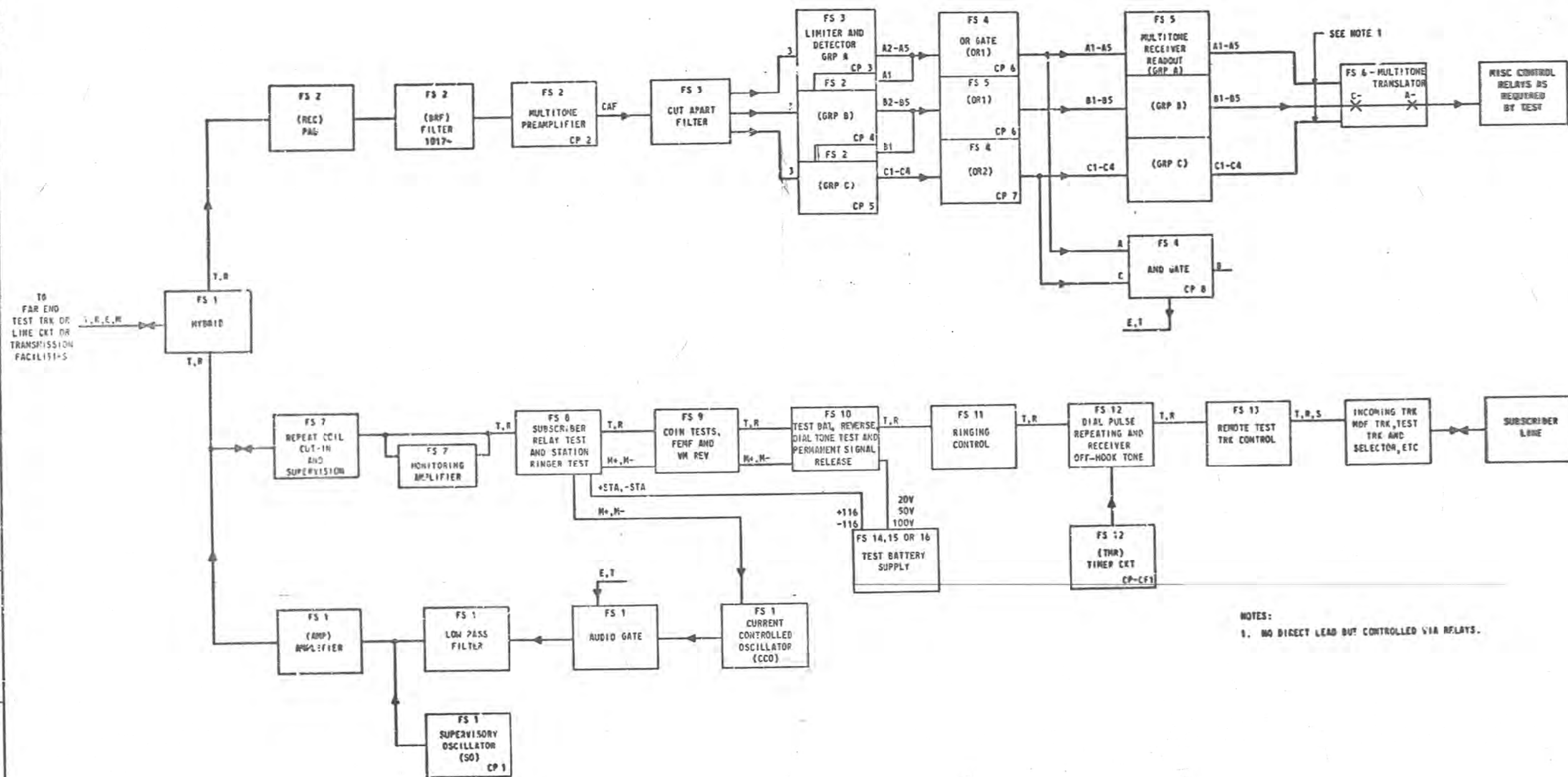
2

6S

PRINTED IN U.S.A.

19AC

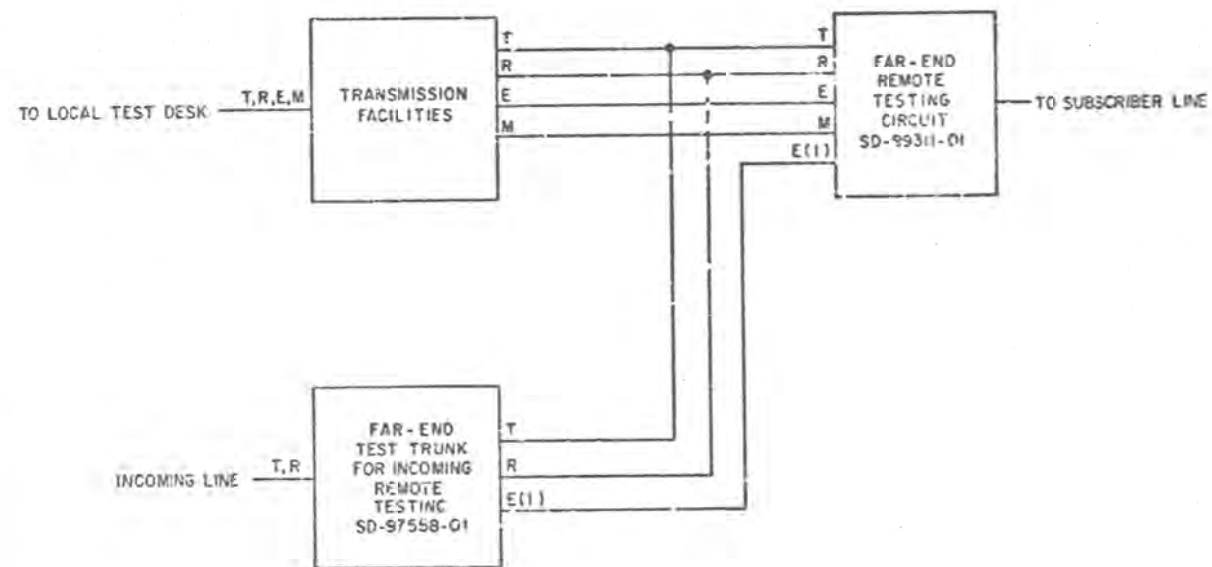
BD 1 FS BLOCK DIAGRAM



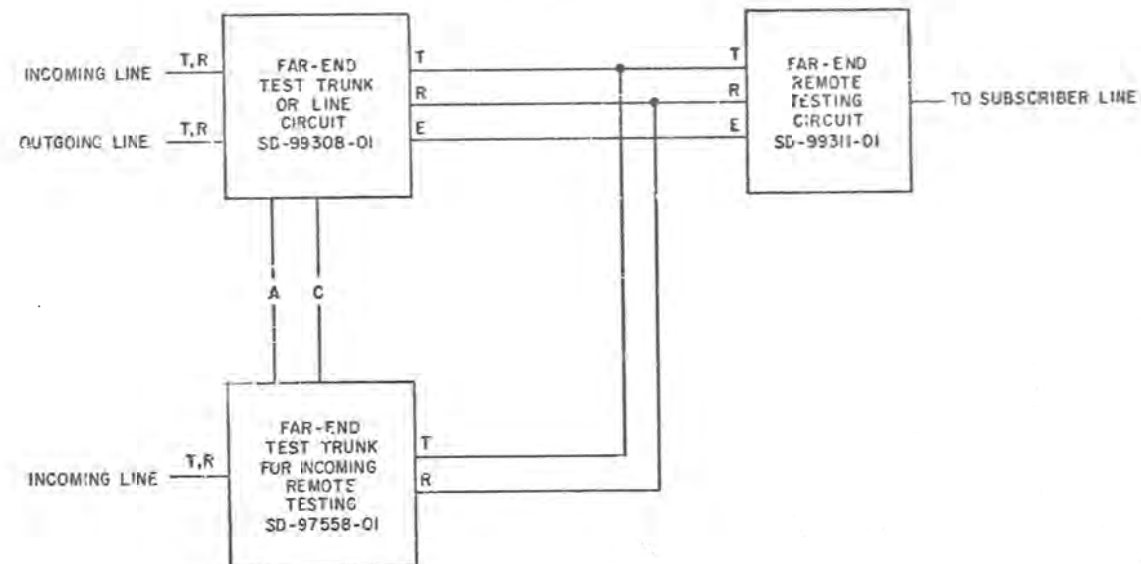
NOTES:
1. NO DIRECT LEAD BUT CONTROLLED VIA RELAYS.

A
B
C
D
E
F
G
H

BD 2 DEDICATED SERVICE

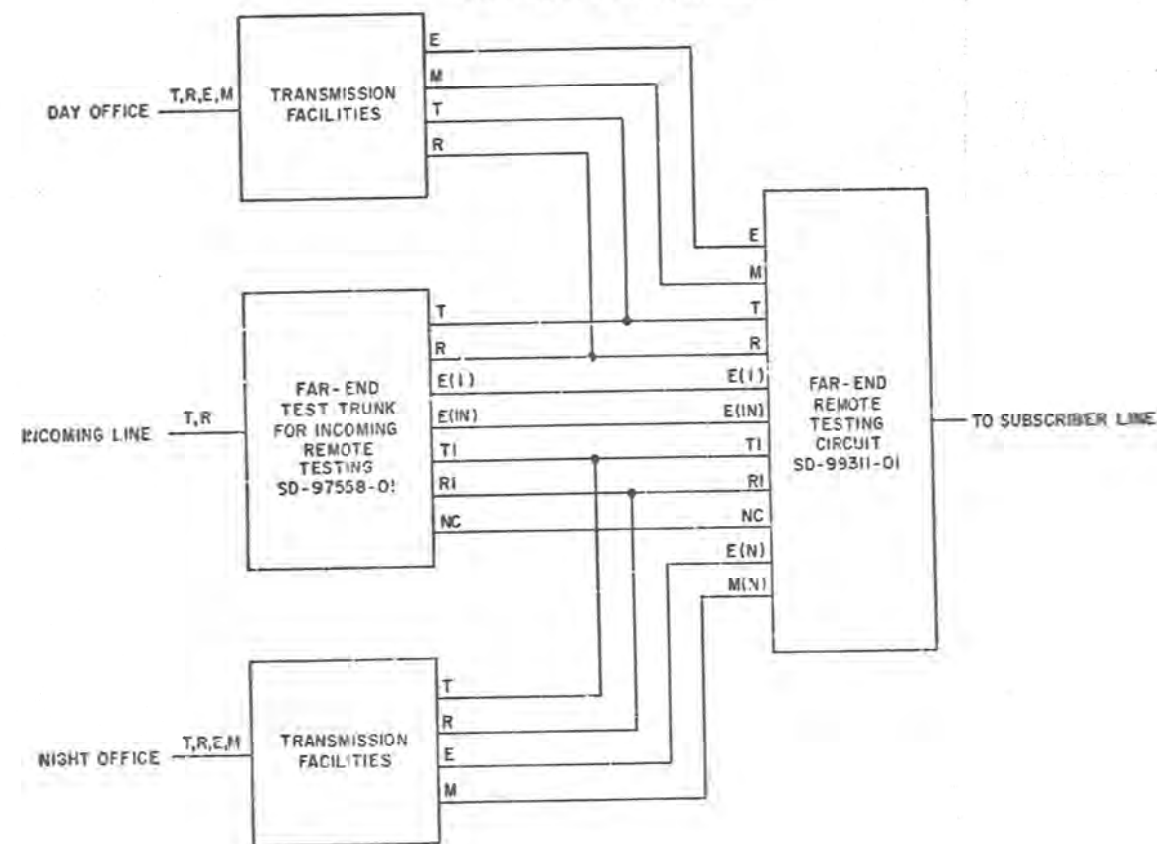


BD 3 NON-DEDICATED SERVICE



BD 4

NIGHT TEST COVERAGE
DAY & NIGHT OFFICES DEDICATED
WITH INCOMING REMOTE TESTING



SD-99311-01-H2

ISSUE
19AC

REMOTE TESTING CIRCUIT-FAR END

②

SD 311-01-H2

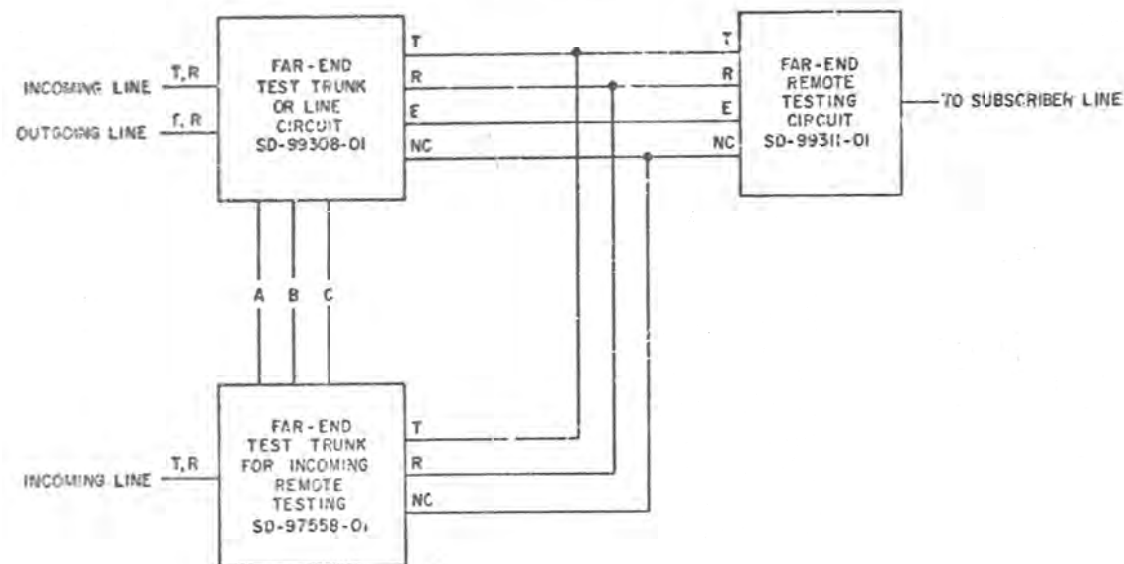
BELL TELEPHONE LABORATORIES
INCORPORATED

6S

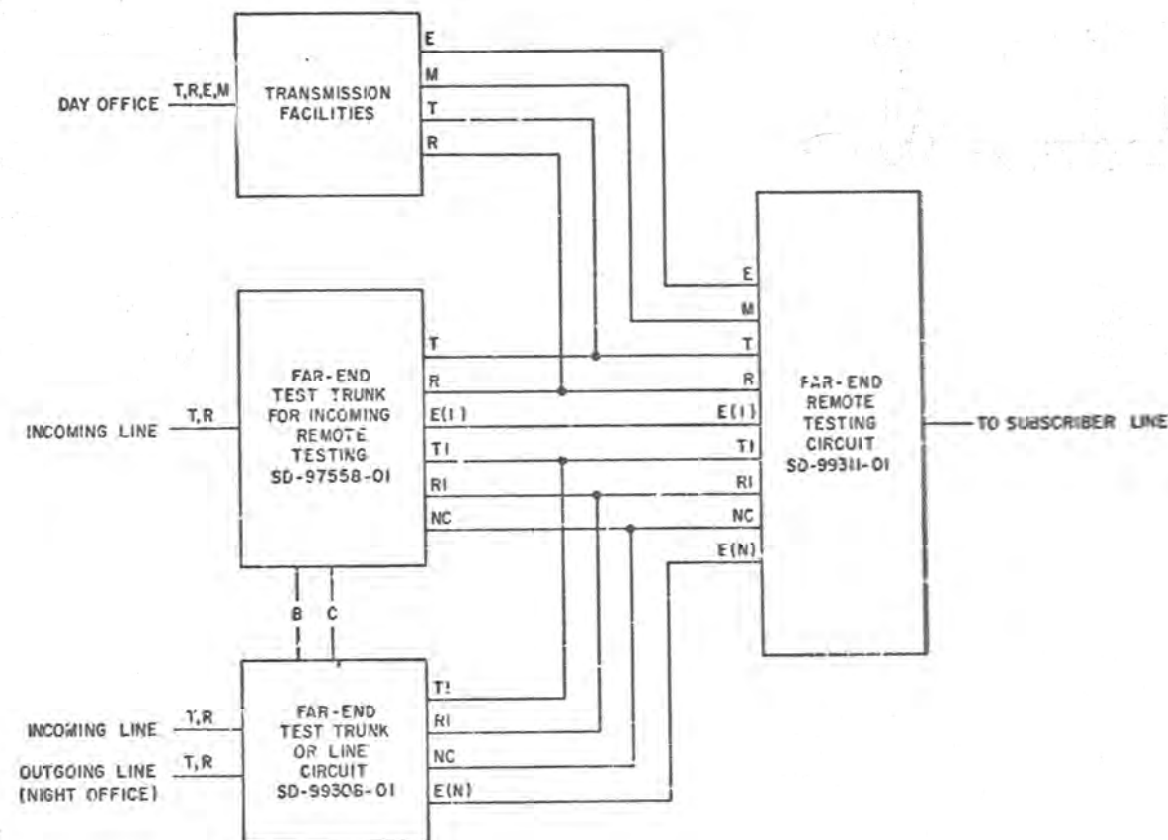
PRINTED IN U.S.A.

0 1 2 3 4 5 6 7 8 9

BD 5 NIGHT TEST COVERAGE DAY & NIGHT OFFICES NON-DEDICATED WITH INCOMING REMOTE TESTING



BD 6 NIGHT TEST COVERAGE DAY OFFICE DEDICATED & NIGHT OFFICE NON-DEDICATED WITH INCOMING REMOTE TESTING



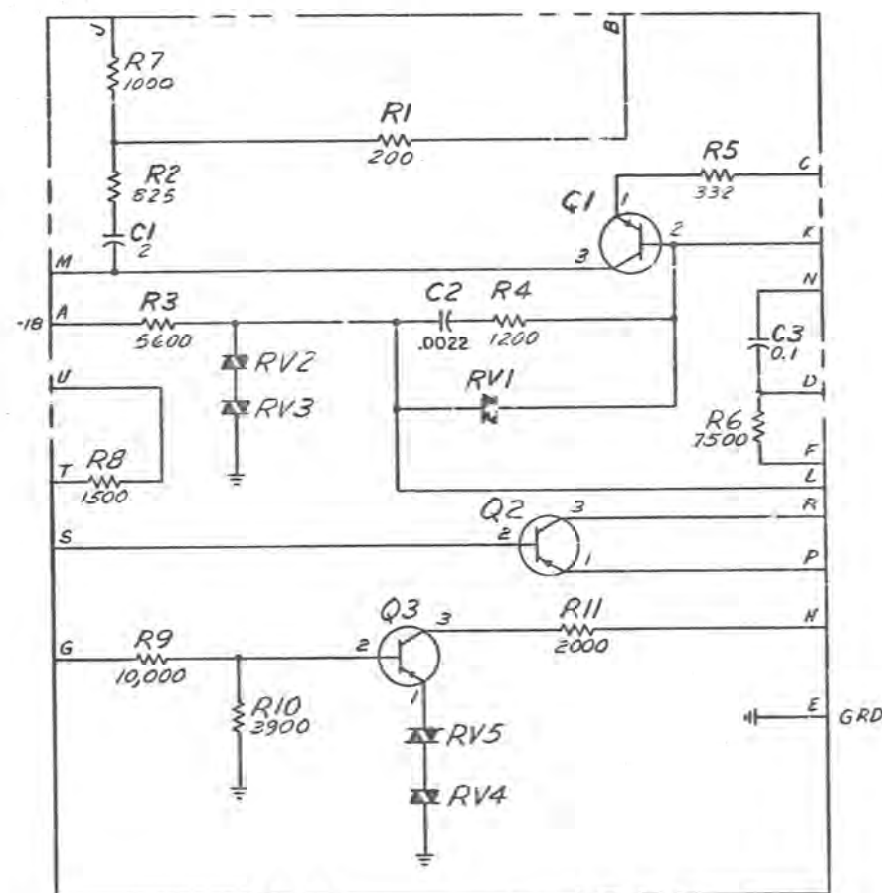
SD-99311-01-H3

ISSUE
19AC

0 1 2 3 4 5 6 7 8 9

0 1 2 3 4 5 6 7 8 9

CPS I SUPERVISORY OSCILLATOR & BIAS AMP



COMPONENT LIST

CAPACITOR

DESIG	CODE
C1	542F
C2	KS-1604BL1
C3	570A

RESISTOR

DESIG	CODE
R1	221A, 200
R2	221A, 825
R3	KS-1349CL1, 5600
R4	KS-1349CL1, 1200
R5	221A, 332
R6	KS-1349 L1, 7500
R7	KS-1349 L1, 1000
R8	KS-1349 L1, 1500
R9	KS-1349 L1, 10,000
R10	KS-1349 L1, 3900
R11	KS-1349 L1, 2000

TRANSISTOR

DESIG	CODE
Q1	122
Q2	12M
Q3	12M

VARIATOR

DESIG	CODE
RV1	100A
RV2	
RV3	
RV4	
RV5	

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	ED-99435-()
ASSEMBLY DRAWING	ED-99435-()
MANUFACTURING TEST REQUIREMENTS	
CONNECTOR OR FRAME	KS-19331L1

SYMBOL

NONE

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

DRAWING	ISSUE
2A	1
3A	2
4D	3
7A	4
12B	5

A
HW

B

C

D

E

F

G

H

12

REMOTE TESTING CIRCUIT - FAR END

2

SD-99311-01-J1

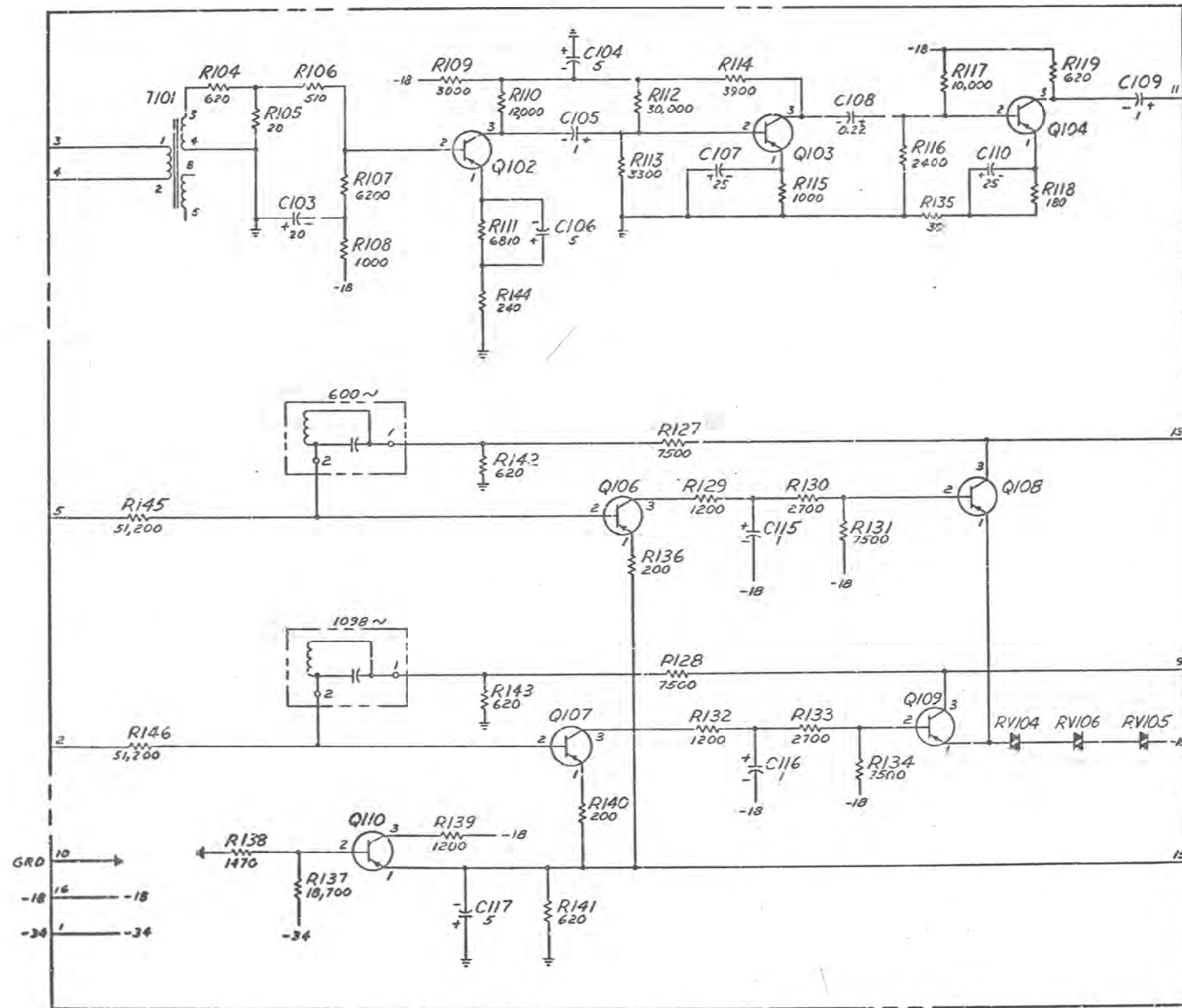
BELL TELEPHONE LABORATORIES

6S

PRINTED IN U.S.A.

SD-99311-01-J1

PART OF CPS 2 MULTITONE PREAMPLIFIER



PART OF CPS 2 MULTITONE PREAMPLIFIER

DRAWING
ISSUE
7A

COMPONENT LIST

CAPACITOR

DESIG	CODE
C103	602C
C104	601A
C105	600A
C106	601A
C107	601C
C108	KS-19107, L2, 0.22, 90V
C109	600A
C110	601C
C115	600A
C116	600A
C117	601A

NETWORK

DESIG	CODE
600~	4017T
1098~	4017U

RESISTOR

DESIG	CODE
R104	KS-13490, L1, 400
R105	20
R106	510
R107	6200
R108	1000
R109	3000
R110	KS-13490, L1, 12,000
R111	221, 6810
R112	KS-13490, L1, 30,000
R113	3300
R114	3900
R115	1000
R116	2400
R117	10,000
R118	160
R119	620
R127	7500
R128	7500
R129	1200
R130	2700
R131	7500
R132	1200
R133	2700
R134	7500
R135	30
R136	KS-13490, L1, 200
R137	221A, 18,700
R138	221A, 1470
R139	KS-13490, L1, 1200
R140	200
R141	620
R142	620
R143	620
R144	KS-13490, L1, 240
R145	221A, 51,200
R146	221A, 51,200

COMPONENT LIST (CONT)

TRANSFORMER

DESIG	CODE
T101	256CH

TRANSISTOR

DESIG	CODE
Q102	12G
Q103	12G
Q104	12G
Q106	12G
Q107	12G
Q108	16A
Q109	16A
Q110	12G

VARIATOR

DESIG	CODE
RV104	100A
RV105	100A
RV106	100A

CIRCUIT DESCRIPTION

THIS CPS PROVIDES AN AMPLIFIER, AND TWO DETECTORS.

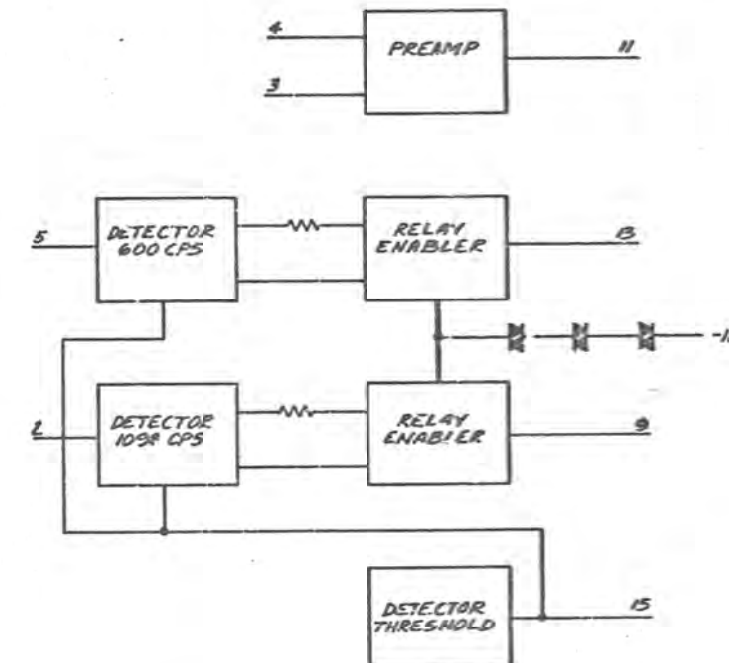
Q106, Q107, Q108, Q109 ARE DETECTORS AND RELAY ENABLERS. THEY DETECT THE PRESENCE, IN A DATA SIGNAL, OF EITHER A 600 OR 1098 CPS COMPONENT AND ALLOW A RELAY TO OPERATE IF EITHER OF THESE FREQUENCIES ARE PRESENT.

Q110 PROVIDES A BIAS THRESHOLD VOLTAGE FOR THE DETECTORS.

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	AA5
CONNECTOR ON FRAME	KS-16425, L2

SYMBOL



NOTES:

- UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS;
CAPACITANCE VALUES ARE IN MICROFARADS;
VALUES PRECEDED BY + (PLUS) OR - (MINUS)
ARE IN VOLTS.

SD-9311-01-J2B

ISSUE
150

REMOTE TESTING CIRCUIT-FAR END

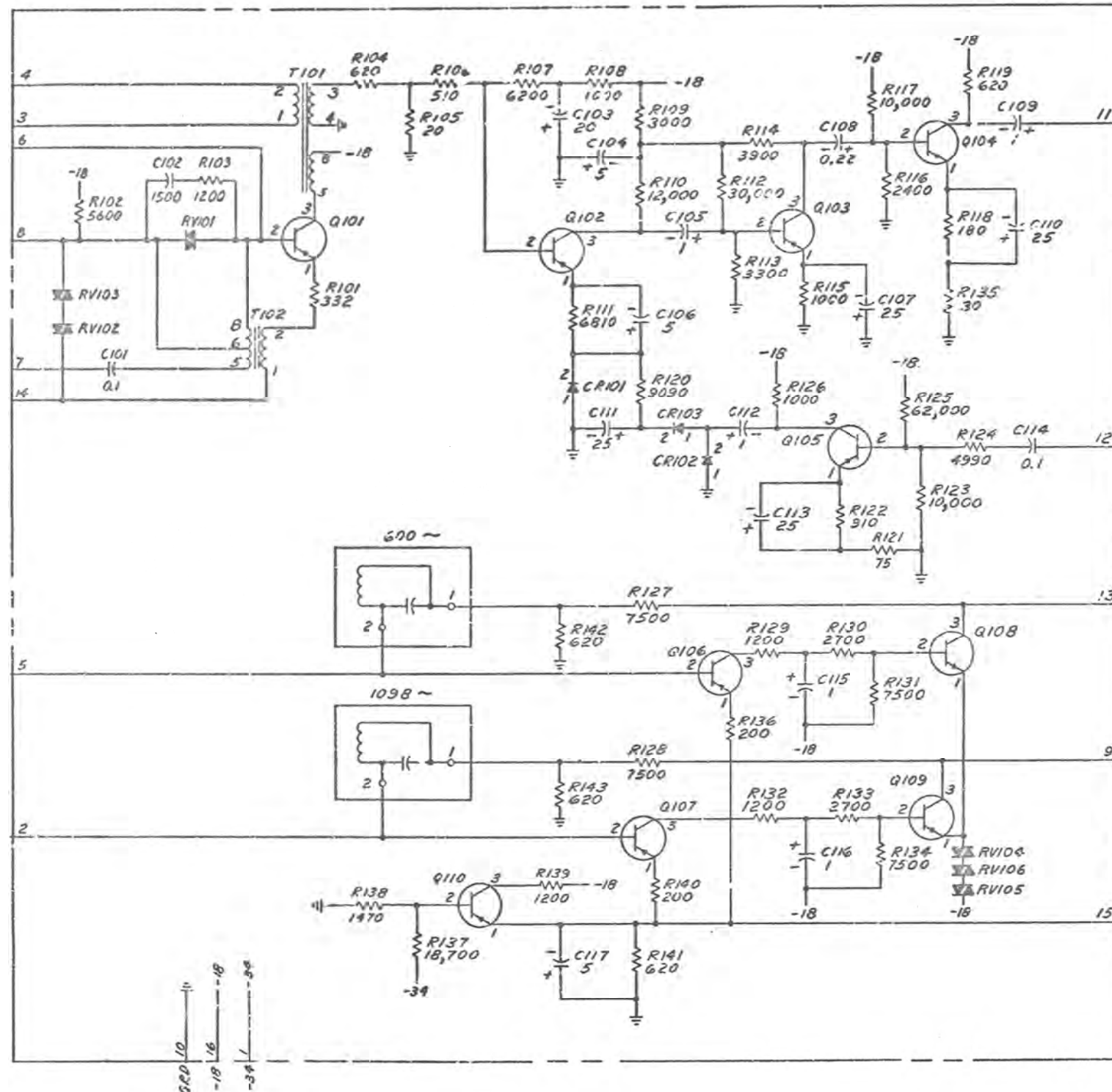
SD-9311-01-J2B

BELL TELEPHONE LABORATORIES
INCORPORATED

2
65

PART OF CPS 2

MULTITONE PREAMPLIFIER
(SEE NOTE 1)



COMPONENT LIST

CAPACITOR

DESIG

C101
C102
C103
C104
C105
C106
C107
C108

CODE

5708H
KS-19057,L1
602C
601A
600A
601A
601C
KS-19107,L2, 0.22, 50V

C109
C110
C111
C112

CODE

600A
601C
601C
600A

C113
C114
C115
C116
C117

CODE

601C
KS-19107,L4, 0.1, 50V
600A
600A
601A

DIODE

DESIG

CR101
CR102
CR103

CODE

KS-16986,L1
KS-16986,L2
KS-16986,L3

NETWORK

DESIG

600-
1098-

CODE

4017T
4017U

RESISTOR

DESIG

R101
R102
R103
R104
R105
R106
R107
R108
R109
R110
R111
R112
R113
R114
R115
R116
R117
R118
R119
R120

CODE

221A, 332
KS-13490,L1, 5600
KS-13490,L1, 1200
KS-13490,L1, 620
KS-13490,L1, 20
KS-13490,L1, 510
KS-13490,L1, 6200
KS-13490,L1, 1000
KS-13490,L1, 3000
KS-13490,L1, 12,000
221A, 4810
KS-13490,L1, 30,000
KS-13490,L1, 3300
KS-13490,L1, 3900
KS-13490,L1, 1000
KS-13490,L1, 2400
KS-13490,L1, 10,000
KS-13490,L1, 180
KS-13490,L1, 620
KS-13490,L1, 75
KS-13490,L1, 910
KS-13490,L1, 10,000
221A, 4990

R121
R122
R123
R124

CODE

KS-13490,L1, 62,000
KS-13490,L1, 1000
KS-13490,L1, 7500

R125
R126
R127
R128

CODE

KS-13490,L1, 7500

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE AND ASSEMBLY DRAWING	ED-99669-30 (MFR DISC)
CONNECTOR ON FRAME	KS-16425,L2

SYMBOL

SEE SHEET J2B

RESISTOR (CONT)

DESIG

R129
R130
R131
R132
R133
R134
R135
R136

CODE

KS-13490,L1, 1200
2700
7500
1200
2700
7500
30
KS-13490,L1, 200

CODE

R137
R138
R139
R140

CODE

221A, 18,700
221A, 1470
KS-13490,L1, 1200
200

CODE

R141
R142
R143

CODE

620
620
KS-13490,L1, 620

TRANSFORMER

DESIG

T101
T102

CODE

2564H
2574G

TRANSISTOR

DESIG

Q101-Q107
Q108
Q109
Q110

CODE

12G
16A
16A
12G

VARIABLE

DESIG

RV101-RV106

CODE

100A

NOTES:

1. IF ED-99669-30 FAILS AND NO ED-99669-30 ARE AVAILABLE CPS2 AS WELL AS CPS3, CPS4 AND CPS5 MUST ALL BE REPLACED BY CAS, AAB, AAB7, AND AAB, RESPECTIVELY.

REMOTE TESTING CIRCUIT-FAR END

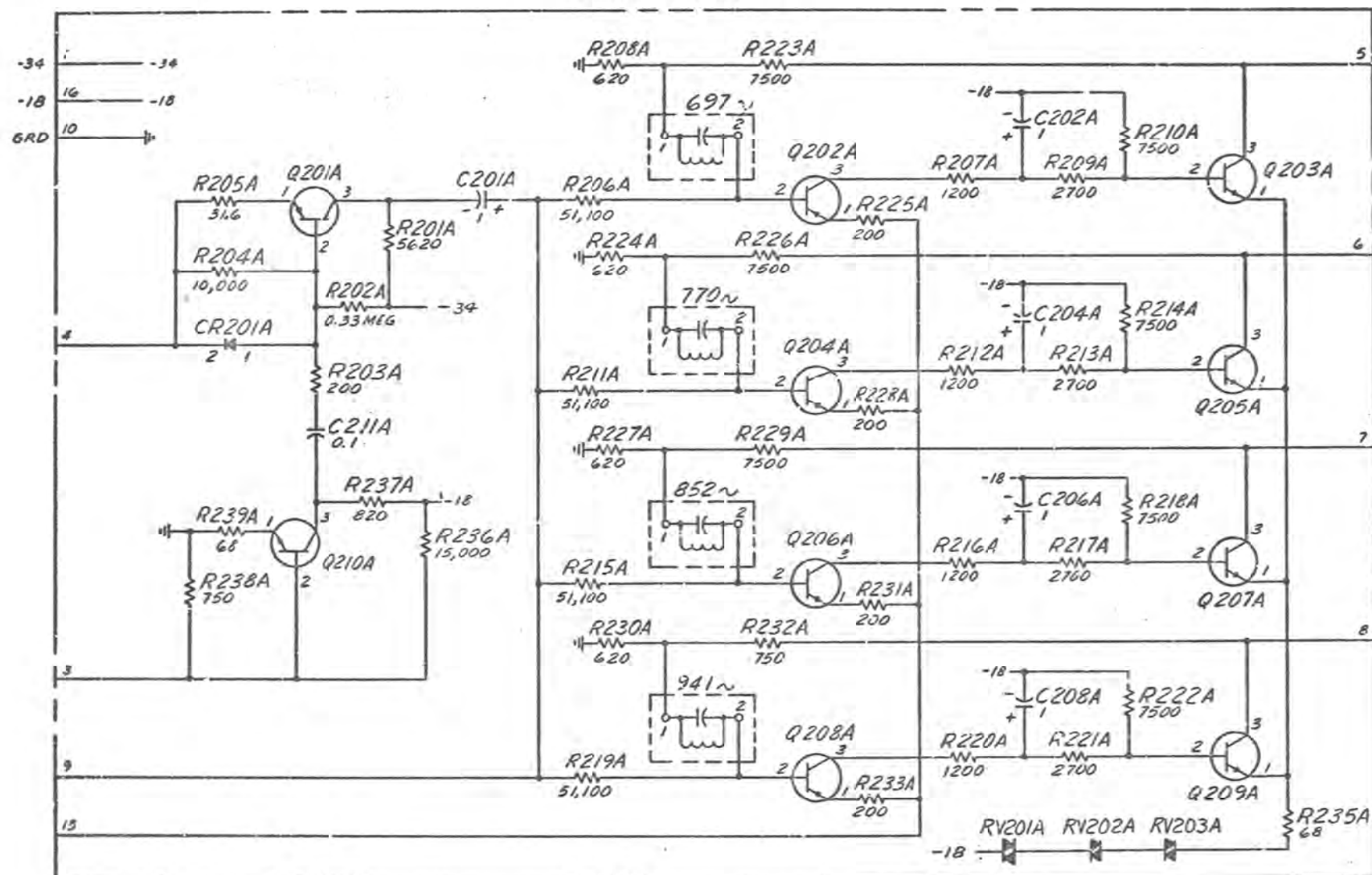
2

S. 3311-01-J2C

BELL TELEPHONE LABORATORIES

65

PART OF CPS 3 LIMITER & DETECTOR



DRAWING
ISSUE
7A

7

REMOTE TESTING CIRCUIT - FAR END

(2)

SD-99311-01-J3A

BELL TELEPHONE LABORATORIES

55

NOTED 3-1-54

PART OF CPS 3 **LIMITER & DETECTOR**

COMPONENT LIST

CAPACITORS

DESIG	CODE
C201A	600A
C202A	
C204A	
C206A	
C208A	600A
C211A	KS-19107, L2, 0.1, 50V

DIODE

DESIG	CODE
CR201A	KS-16995, L2

NETWORK

DESIG	CODE
697~	4017A
770~	4017B
852~	4017C
941~	4017D

RESISTOR

DESIG	CODE
R201A	KS-20810 L1A, 238A, 5620
R202A	KS-13490, L1, 0.33 MEG
R203A	KS-13490, L1, 200
R204A	KS-13490, L1, 10,000
R205A	221A, 31.8
R206A	221A, 51,100
R207A	KS-13490, L1, 1200
R208A	KS-13490, L1, 620
R209A	KS-13490, L1, 2700
R210A	KS-13490, L1, 7500
R211A	221A, 51,100
R212A	KS-13490, L1, 1200
R213A	KS-13490, L1, 2700
R214A	KS-13490, L1, 7500
R215A	221A, 51,100
R216A	KS-13490, L2, 1200
R217A	KS-13490, L1, 2700
R218A	KS-13490, L1, 7500
R219A	221A, 51,100
R220A	KS-13490, L1, 1200
R221A	KS-13490, L1, 2700
R222A	KS-13490, L1, 7500
R223A	KS-13490, L1, 7500
R224A	KS-13490, L1, 620
R225A	KS-13490, L1, 200
R226A	KS-13490, L1, 7500
R227A	KS-13490, L1, 620
R228A	KS-16645, L1, 200
R229A	KS-13490, L1, 7500
R230A	KS-13490, L1, 620
R231A	KS-13490, L1, 200
R232A	KS-13490, L1, 7500
R233A	KS-13490, L1, 200
R234A	KS-13490, L1, 620
R235A	KS-16645, L1, 15,000
R237A	KS-16645, L1, 820
R238A	KS-16645, L1, 750
R239A	KS-16645, L1, 68

COMPONENT LIST (CONT)

TRANSISTOR

DESIG	CODE
Q201A	12D
Q202A	12G
Q203A	16A
Q204A	12G
Q205A	16A
Q206A	12G
Q207A	16A
Q208A	12G
Q209A	16A
Q210A	12G

VARIABLE

DESIG	CODE
RV201A	100A
RV202A	100A
RV203A	100A

CIRCUIT DESCRIPTION

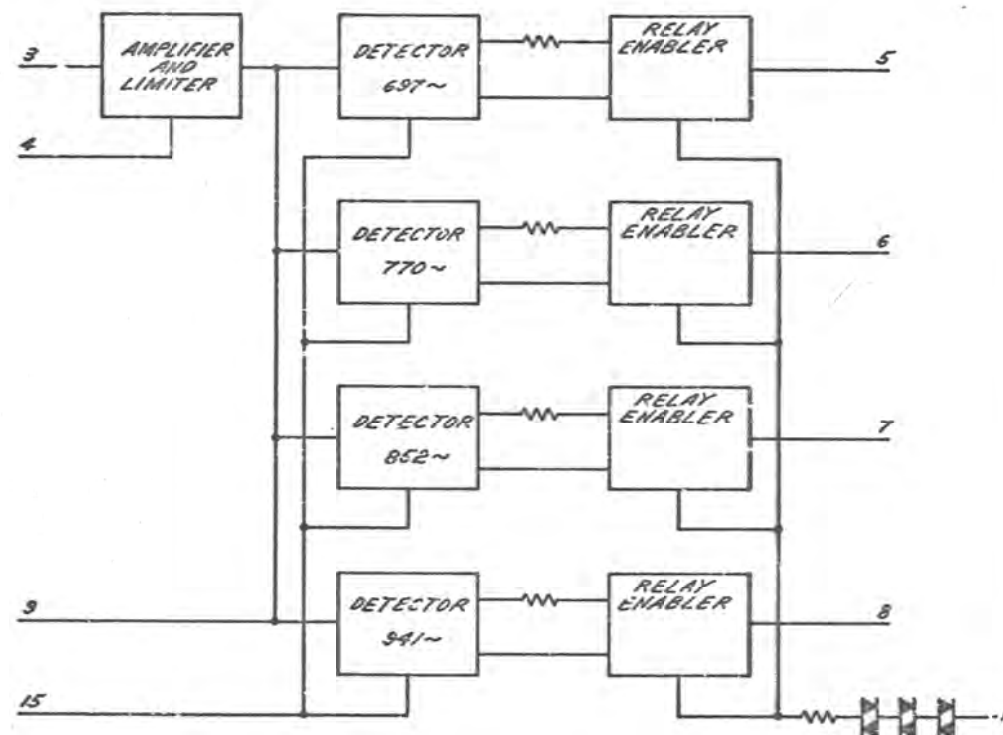
THIS CPS CONTAINS AN AMPLIFIER, A LIMITER AND FOUR DETECTORS FOR INITIAL USE IN THE REMOTE TESTING CKT-FAR END. APPLICATION IS DESCRIBED IN CD-99311-01.

Q210A IS AN AMPLIFIER AND Q201A IS A LIMITER. THE AMPLIFIER AND LIMITER SHAPE THE INCOMING DATA SIGNAL INTO A FORM SUITABLE FOR DETECTION. Q202A, Q204A, Q206A, Q208A ARE DETECTORS AND Q203A, Q205A, Q207A, Q209A ARE RELAY ENABLERS. THE DETECTORS AND RELAY ENABLERS DETECT THE PRESENCE, IN A DATA SIGNAL, OF FREQUENCIES OF 697, 770, 852 OR 941 CP. AND ALLOW EXTERNAL RELAYS TO OPERATE IF ANY OF THESE FREQUENCIES IS PRESENT.

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	AA6
CONNECTOR ON FRAME	KS-16425, L2

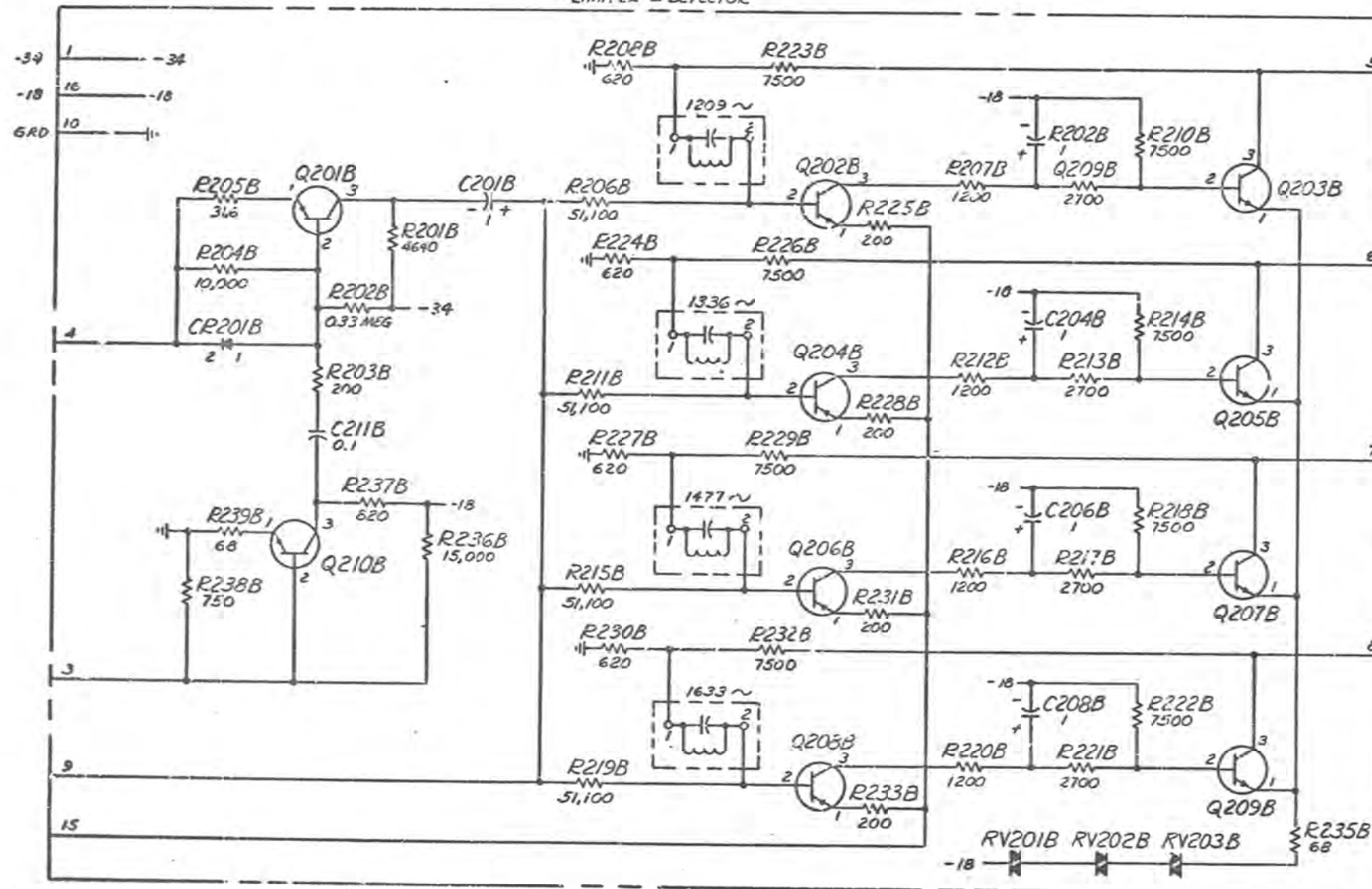
SYMBOL



NOTES:

- UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS;
CAPACITANCE VALUES ARE IN MICROFARADS;
VALUES PRECEDED BY + (PLUS) OR - (MINUS)
ARE IN VOLTS.

PART OF CPS 4 LIMITER & DETECTOR



DRAWING
ISSUE
7A

PART OF CPS 4 LIMITER & DETECTOR

COMPONENT LIST

CAPACITORS

DESIG	CODE
C2010	600A
C2028	
C2048	
C2068	
C2088	600A
C2118	KS-19107, L2, 0.1, 50V

DIODE

DESIG	CODE
CR2018	KS-16986, L2

NETWORK

DESIG	CODE
1209~	4017E
1336~	4017F
1477~	4017G
1633~	4017H

RESISTOR

DESIG	CODE
R2018	KS-201810, L1A, 238A, 4640
R2028	KS-13490, L1, 0.33 MEG
R2038	KS-13490, L1, 200
R2048	KS-13490, L1, 10,000
R2058	221A, 51.6
R2068	221A, 51,100
R2078	KS-13490, L1, 1200
R2088	KS-13490, L1, 620
R2098	KS-13490, L1, 2700
R2108	KS-13490, L1, 7500
R2118	221A, 51,100
R2128	KS-13490, L1, 1200
R2138	KS-13490, L1, 2700
R2148	KS-13490, L1, 7500
R2158	221A, 51,100
R2168	KS-13490, L1, 1200
R2178	KS-13490, L1, 2700
R2188	KS-13490, L1, 7500
R2198	221A, 51,100
R2208	KS-13490, L1, 1200
R2218	KS-13490, L1, 2700
R2228	KS-13490, L1, 7500
R2238	KS-13490, L1, 7500
R2248	KS-13490, L1, 620
R2258	KS-13490, L1, 200
R2268	KS-13490, L1, 7500
R2278	KS-13490, L1, 620
R2288	KS-16645, L1, 200
R2298	KS-13490, L1, 7500
R2308	KS-13490, L1, 620
R2318	KS-13490, L1, 200
R2328	KS-13490, L1, 7500
R2338	KS-13490, L1, 200
R2358	KS-13490, L1, 48
R2368	KS-16645, L1, 15,000
R2378	KS-16645, L1, 820
R2388	KS-16645, L1, 750
R2398	KS-16645, L1, 68

COMPONENT LIST (CONT)

TRANSISTOR

DESIG	CODE
Q2018	120
Q2028	126
Q2038	16A
Q2048	126
Q2058	16A
Q2068	176
Q2078	16A
Q2088	126
Q2098	16A
Q2108	126

VARIABLE

DESIG	CODE
RV2018	100A
RV2028	100A
RV2038	100A

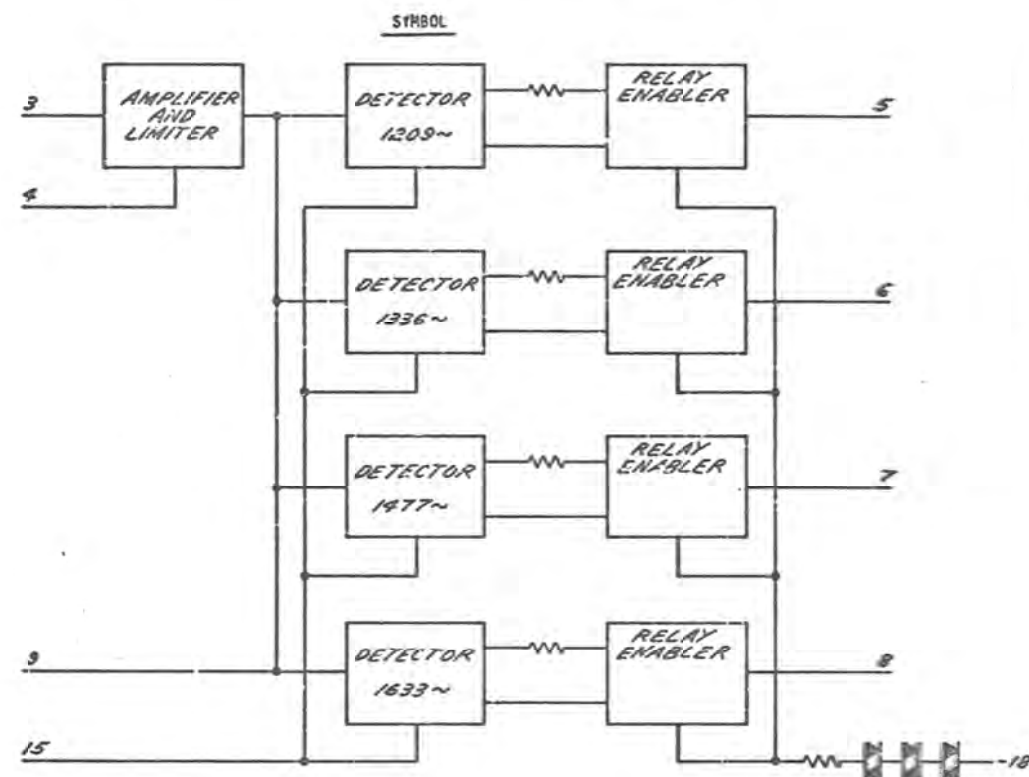
CIRCUIT DESCRIPTION

THIS CPS CONTAINS AN AMPLIFIER, A LIMITER AND FOUR DETECTORS FOR USE IN THE REMOTE TESTING CRT FAR-END. APPLICATION IS DESCRIBED IN CO-99311-01.

Q2108 IS AN AMPLIFIER AND Q2018 IS A LIMITER. THE AMPLIFIER AND LIMITER SHAPE THE INCOMING DATA SIGNAL INTO A FORM SUITABLE FOR DETECTION. Q2028, Q2048, Q2068, Q2088 ARE DETECTORS AND Q2038, Q2058, Q2078, Q2098 ARE RELAY ENABLERS. THE DETECTORS AND RELAY ENABLERS DETECT THE PRESENCE, IN A DATA SIGNAL, OF FREQUENCIES OF 1209, 1336, 1477 OR 1633 CPS AND ALLOW EXTERNAL RELAYS TO OPERATE IF ANY OF THESE FREQUENCIES IS PRESENT.

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	3A7
CONNECTOR ON FRAME	KS-18425, L2



NOTES:

- UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS;
CAPACITANCE VALUES ARE IN MICROFARADS;
VALUES PRECEDED BY + (PLUS) OR - (MINUS)
ARE IN VOLTS.

REMOTE TESTING CIRCUIT-FAR END

②

SD-99311-01-J48

BELL TELEPHONE LABORATORIES
INCORPORATED

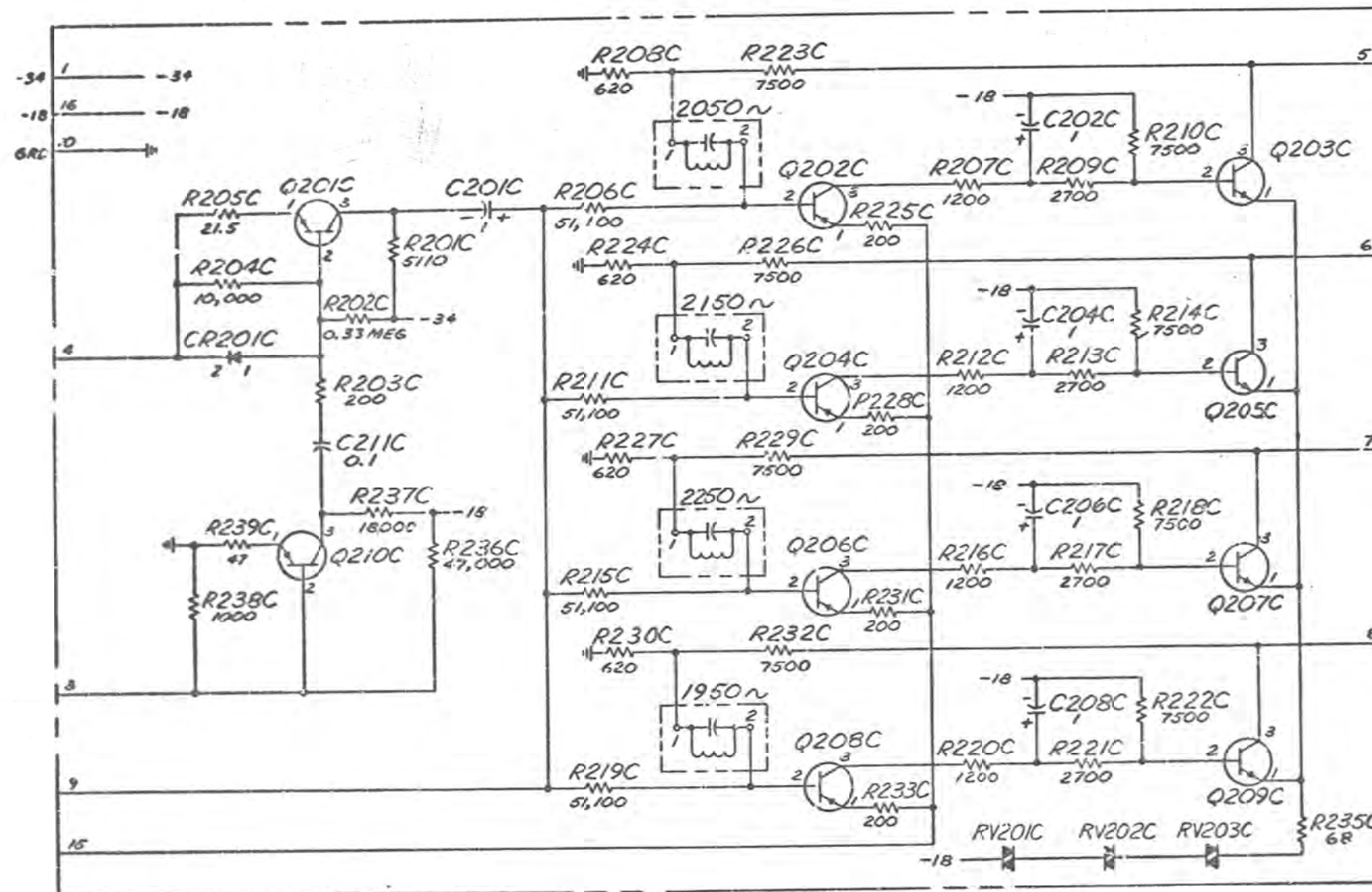
6S

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ISSUE
17B

SD-99311-01-J48

PART OF CPS 5 LIMITER & DETECTOR



PART OF CPS 5 LIMITER & DETECTOR

COMPONENT LIST

CAPACITORS

DESIG	CODE
C201C	600A
C202C	
C204C	
C206C	
C208C	600A
C211C	KS-19107, L2, 0.1, 50V

DIODE

DESIG	CODE
CR201C	KS-16986, L2

NETWORK

DESIG	CODE
1950~	4017W
2050~	4017J
2150~	4017K
2250~	4017L

RESISTOR

DESIG	CODE
R201C	KS-20810, L1A, 23, 4, 510
R202C	KS-13490, L1, 0.33 MEG
R203C	KS-13490, L1, 200
R204C	KS-13490, L1, 10,000
R205C	221A, 21.5
R206C	221A, 51, 100
R207C	KS-13490, L1, 1200
R208C	KS-13490, L1, 620
R209C	KS-13490, L1, 2700
R210C	KS-13490, L1, 7500
R211C	221A, 51, 100
R212C	KS-13490, L1, 1200
R213C	KS-13490, L1, 2700
R214C	KS-13490, L1, 7500
R215C	221A, 51, 100
R216C	KS-13490, L1, 1200
R217C	KS-13490, L1, 2700
R218C	KS-13490, L1, 7500
R219C	221A, 51, 100
R220C	KS-13490, L1, 1200
R221C	KS-13490, L1, 2700
R222C	KS-13490, L1, 7500
R223C	KS-13490, L1, 7500
R224C	KS-13490, L1, 620
R225C	KS-13490, L1, 200
R226C	KS-13490, L1, 7500
R227C	KS-13490, L1, 620
R228C	KS-16645, L1, 200
R229C	KS-13490, L1, 7500
R230C	KS-13490, L1, 620
R231C	KS-13490, L1, 200
R232C	KS-13490, L1, 7500
R233C	KS-13490, L1, 200
R234C	KS-13499, L1, 68
R235C	KS-16645, L1, 47,000
R237C	KS-16645, L1, 1800
R238C	KS-16645, L1, 1000
R239C	KS-16645, L1, 47

COMPONENT LIST (CONT)

TRANSISTOR

DESIG	CODE
Q201C	123
Q202C	123
Q203C	16A
Q204C	121
Q205C	16A
Q206C	123
Q207C	16A
Q208C	123
Q209C	16A
Q210C	123

VARIATOR

DESIG	CODE
RV201C	100A
RV202C	100A
RV203C	100A

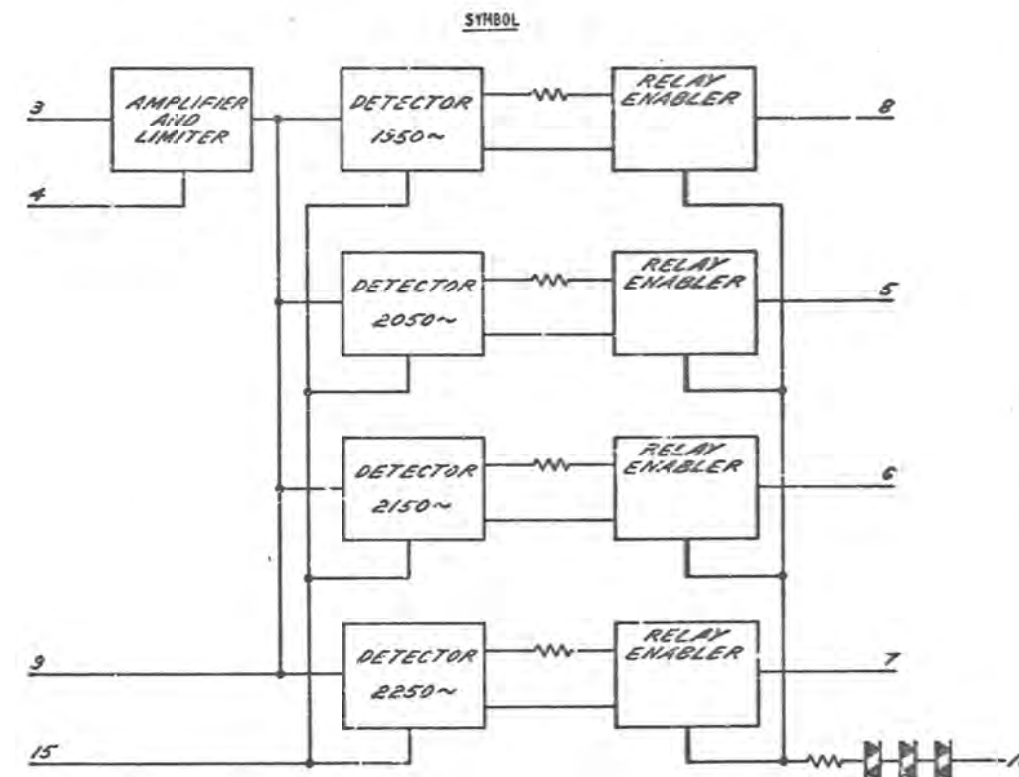
CIRCUIT DESCRIPTION

THIS CPS CONTAINS AN AMPLIFIER, A LIMITER AND FOUR DETECTORS FOR USE IN REMOTE TESTING CKT FAR-END. APPLICATION DESCRIBED IN CO-99311-01.

Q210C IS AN AMPLIFIER AND Q201C IS A LIMITER. THE AMPLIFIER AND LIMITER SHAPE THE INCOMING DATA SIGNAL INTO A FORM SUITABLE FOR DETECTION. Q202C, Q204C, Q206C, Q208C ARE DETECTORS AND Q203C, Q205C, Q207C, Q209C ARE RELAY ENABLERS. THE DETECTORS AND RELAY ENABLERS DETECT THE PRESENCE IN A DATA SIGNAL, OF FREQUENCIES OF 1950, 2050, 2150 OR 2250 CPS AND ALLOW EXTERNAL RELAYS TO OPERATE IF ANY OF THESE FREQUENCIES IS PRESENT.

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	AAB
CONNECTOR ON FRAME	KS-16425, L2



NOTES:

- UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS;
CAPACITANCE VALUES ARE IN MICROFARADS;
VALUES PRECEDED BY + (PLUS) OR - (MINUS)
ARE IN VOLTS.

REMOTE TESTING CIRCUIT-FAR END

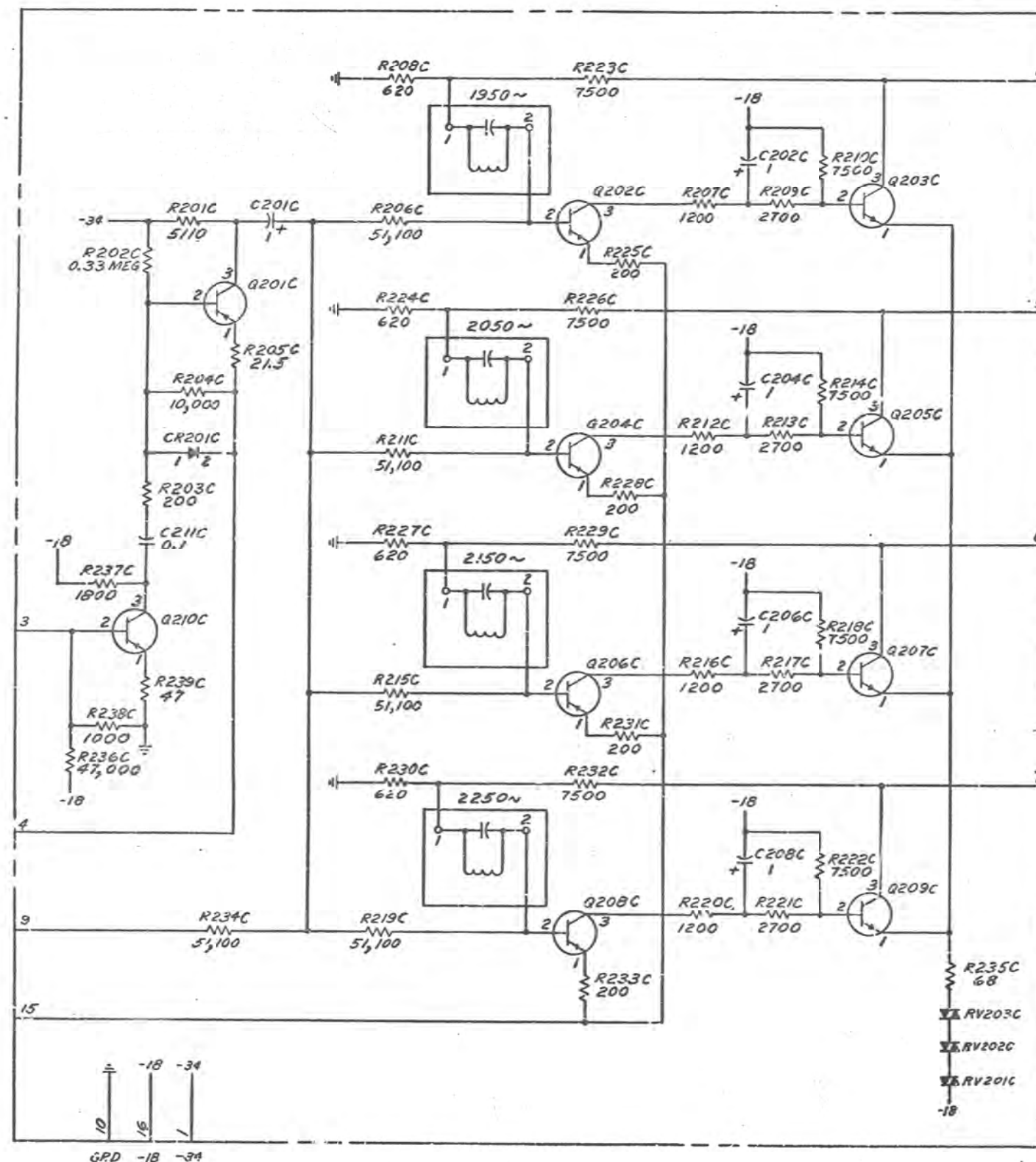
SD-99311-01-J5B

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

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PART OF CPS 5 LIMITER AND DETECTOR CIRCUIT (1950, 2050, 2150, 2250 CPS) (SEE NOTE 1)



COMPONENT LIST

CAPACITORS

DESIG

C201C
C202C
C204C
C206C
C208C
C211C

CODE

600A
600A
KS-19107, L2, 0.1, 50V

DIODE

DES G

CR201C

CODE

KS-16986, L2

NETWORK

DESIG

1950~
2050~
2150~
2250~

CODE

4017H
4017J
4017K
4017L

RESISTOR

DESIG

R201C
R202C
R203C
R204C
R205C
R206C
R207C
R208C

CODE

236A, 5110
KS-13490, L1, 0.33 MEG
KS-13490, L1, 200
KS-13490, L1, 10,000
221A, 21.5
221A, 51,100
KS-13490, L1, 1200
KS-13490, L1, 620

R209C
R210C
R211C
R212C

KS-13490, L1, 2700
KS-13490, L1, 7500
221A, 51,100
KS-13490, L1, 1200

R213C
R214C
R215C
R216C

KS-13490, L1, 2700
KS-13490, L1, 7500
221A, 51,100
KS-13490, L1, 1200

R217C
R218C
R219C
R220C

KS-13490, L1, 2700
KS-13490, L1, 7500
221A, 51,100
KS-13490, L1, 1200

R221C
R222C
R223C
R224C

KS-13490, L1, 2700
KS-13490, L1, 7500
KS-13490, L1, 7500
KS-13490, L1, 620

R225C
R226C
R227C
R228C

KS-13490, L1, 200
KS-13490, L1, 7500
KS-13490, L1, 620
KS-16645, L1, 200

R229C
R230C
R231C
R232C

KS-13490, L1, 7500
KS-13490, L1, 620
KS-13490, L1, 200
KS-13490, L1, 7500

R233C
R234C
R235C
R236C

KS-13490, L1, 200
221A, 51,100
KS-13490, L1, 68
KS-16645, L1, 47,000

R237C
R238C
R239C

KS-16645, L1 1800
KS-16645, L1 1000
KS-16645, L1, 47

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE AND ASSEMBLY DRAWING	ED-99672-30 (NFR DISC)
CONNECTOR ON FRAME	KS-16425, L2

SYMBOL SEE SHEET J58

TRANSISTOR

DESIG	CODE
Q201	120
Q202	126
Q203	16A
Q204	126
Q205	16A
Q206	126
Q207	16A
Q208	126
Q209	16A
Q210	126

VARISTOR

DESIG	CODE
RV201	100A
RV202	100A
RV203	100A

NOTES:

- IF ED-99672-30 FAILS AND NO ED-99672-30 ARE AVAILABLE CPS5 AS WELL AS CPS2, CPS3, AND CPS4 MUST ALL BE REPLACED BY AAB, AAS, AAG AND AA7, RESPECTIVELY.

REMOTE TESTING CIRCUIT-YAR END

2

SD-99311-01-J5C

BELL TELEPHONE LABORATORIES
INCORPORATED

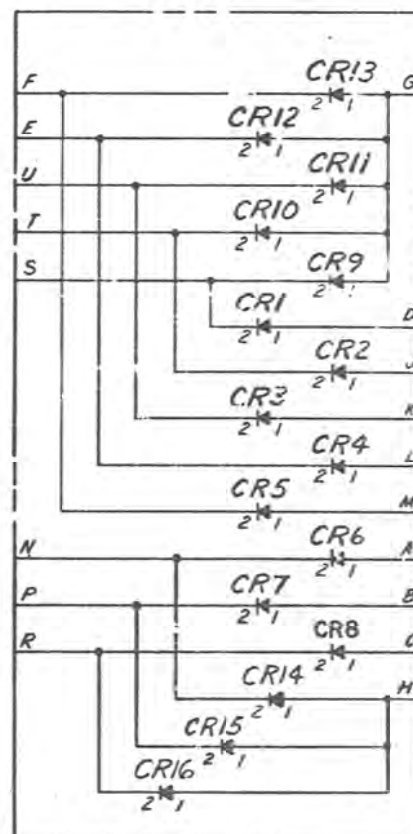
65

0 1 2 3 4 5 6 7 8 9

COMPONENT LIST

DESIG	CODE
CR1	
CR2	
CR3	
CR4	
CR5	
CR6	
CR7	
CR8	446A
CR9	
CR10	
CR11	
CR12	
CR13	
CR14	
CR15	458A
CR16	

CPS 5 OR GATE



MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	ED-99436-()
ASSEMBLY DRAWING	ED-99436-()
MANUFACTURING TEST REQUIREMENTS	
CONNECTOR ON FRAME	KS-1953111

SYMBOL

NONE

NOTES:

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

DRAWING ISSUE
2A
3A
4D
7A
12B

12

REMOTE TESTING CIRCUIT - FAR END

BELL TELEPHONE LABORATORIES

SD-99311-01-J6

65

A
B
C
D
E
F
G
H

COMPONENT LIST

DIODE

DESIG	CODE
CR1	446A
CR2	
CR3	
CR4	
CR5	
CR6	
CR7	
CR8	
CR9	
CR10	446A
CR11	426P
CR12	458A

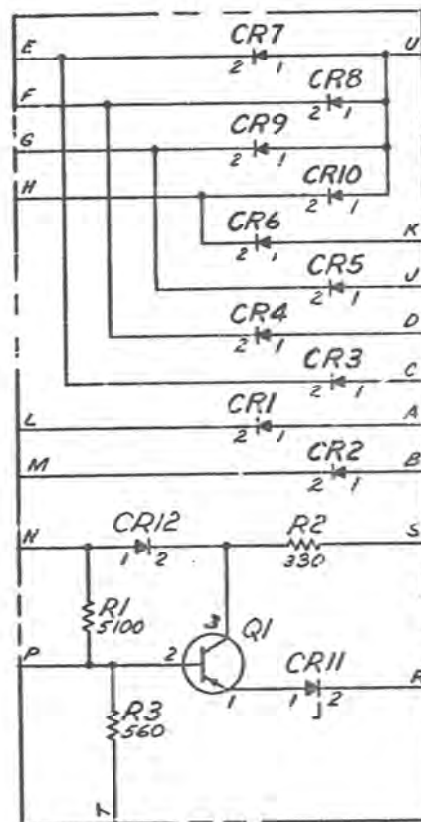
RESISTOR

DESIG	CODE
R1	RS-13490 L1, 5100
R2	RS-13491 L1, 330
R3	RS-13490 L1, 560

TRANSISTOR

DESIG	CODE
Q1	12H

CPS7 OR GATE



MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	ED-99437-()
ASSEMBLY DRAWING	ED-99437-()
MANUFACTURING TEST REQUIREMENTS	
CONNECTOR ON FRAME	RS-99331L1

SYMBOL

NONE

NOTES:

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

COMPONENT LIST

DIODE

DESIG	CODE
CR1	444R
CR2	444R
CR3	444R
CR4	455A
CR5	455A
CR6	455A
CR7	455A

RESISTOR

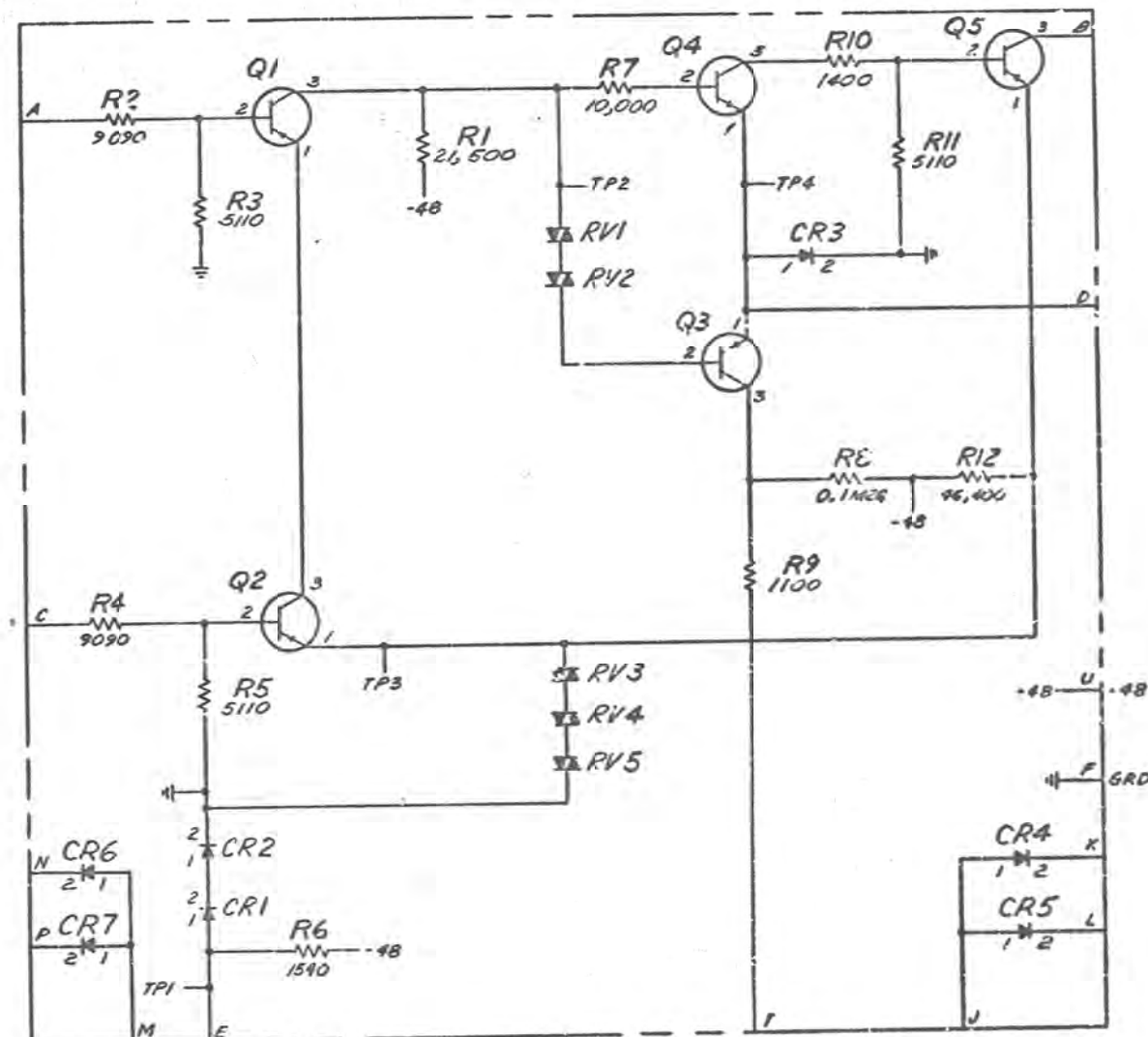
DESIG	CODE
R1	221A, 21,500
R2	9,090
R3	5110
R4	9,090
R5	221A, 5110
R6	KS-16244, 30, 1540
R7	221A, 10,000
R8	0.1 MEG
R9	1100
R10	1400
R11	5110
R12	221A, 46,400

TRANSISTOR

DESIG	CODE
Q1	12H
Q2	12H
Q3	12H
Q4	21C
Q5	12H

VARISTOR

DESIG	CODE
RV1	1000
RV2	1000
RV3	1000
RV4	1000
RV5	1000

CPS 8
AND GATE

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE	ED-99438-()
ASSEMBLY DRAWING	ED-99438-()
MANUFACTURING TEST REQUIREMENTS	
CONNECTOR ON FRAME	KS-19331L1

SYMBOL

NONE

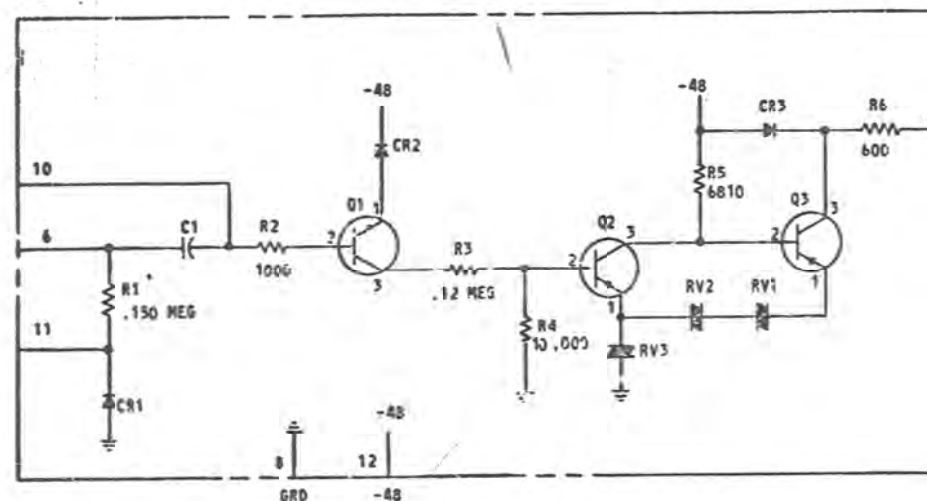
NOTES:

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

CPS CFI

TIMING CIRCUIT



INPUT/OUTPUT INFORMATION

INPUT:

-48 VOLTS IS APPLIED TO TERM. 6.

OUTPUT:

600 OHM GROUND AT TERMINAL 2.

CIRCUIT DESCRIPTION

TERM. 8 CONNECTS TO GROUND. TERM. 12 CONNECTS TO -48 VOLT BATTERY. TERM. 2 CONNECTS TO AN EXTERNAL RELAY TO BE TIMED. TERMINAL 10 CONNECTS TO AN EXTERNAL PRECISION RESISTOR WHICH, WITH (C1), DETERMINES THE TIMING INTERVAL. NORMALLY TERM. 6 IS OPEN AND GROUND THROUGH THE EXTERNAL RESISTOR AT TERM. 10 ALLOWS CURRENT TO FLOW TO THE BASE OF (Q1), HOLDING (Q1) ON. THE EMITTER OF (Q1) IS CONNECTED TO -48 VOLTS THROUGH (CR2) AND, SINCE VERY LITTLE VOLTAGE IS LOST ACROSS (CR2) OR THE BASE-EMITTER JUNCTION OF (Q1), THE BASE OF (Q1) IS ALSO AT ABOUT -48 VOLTS. THUS (C1) HAS A CHARGE OF NEARLY -48 VOLTS SINCE ITS OTHER SIDE IS CONNECTED TO GROUND THRU RESET RESISTOR (R1) AND (CR1). (Q1) ON HOLDS (Q2) ON BY SUPPLYING CURRENT TO THE BASE OF (Q2) THRU (R3). WITH (Q2) ON THE BASE OF (Q3) IS CLAMPED TO THE EMITTER OF (Q3) THRU VARISTORS (RV1) AND (RV2), HOLDING (Q3) OFF. (RV1) AND (RV2) PROVIDE REVERSE BIAS TO HOLD (Q3) OFF, (RV3) AND (R4) PROVIDE REVERSE BIAS TO EVENTUALLY HOLD (Q2) OFF. WHEN TERM. 6 IS CONNECTED TO -48 VOLTS BY ACTION OF EXTERNAL CIRCUITS THE -48 VOLT CHARGE ON (C1) DRIVES THE BASE OF (Q1) TO -96 VOLTS, REVERSE BIASING IT AND TURNING IT OFF. (Q1) OFF TURNS (Q2) OFF SO THAT CURRENT THRU (R5), WHICH FORMERLY FLOWED THROUGH (Q2), NOW FLOWS THRU THE BASE OF (Q3) TURNING (Q3) ON. THIS OPERATES AN EXTERNAL RELAY CONNECTED TO TERM. 2. THE RELAY WILL REMAIN OPERATED AS LONG AS (Q1) AND (Q2) REMAIN OFF, ALLOWING (Q3) TO REMAIN ON. AS CHARGE LEAKS OFF (C1) THRU THE EXTERNAL RESISTOR AT TERM. 10 THE BASE VOLTAGE OF (Q1) SLOWLY RETURNS TO -48 VOLTS. WHEN IT REACHES ABOUT -48 VOLTS (Q1) WILL TURN BACK ON, TURNING (Q2) ON, (Q3) OFF, AND RELEASING THE EXTERNAL RELAY. (R6) AND (R2) LIMIT CURRENT THRU THE TRANSISTORS IN CASE DIRECT BATTERY IS INADVERTENTLY CONNECTED TO TERMINAL 2 OR 10. (CR3) PROTECTS (Q3) FROM SURGE VOLTAGES WHEN THE EXTERNAL RELAY RELEASES. (CR1) PREVENTS FALSE OPERATION DUE TO ANY SMALL FLUCTUATIONS IN THE -48 VOLT SUPPLY. THE TIME INTERVAL FROM THE START SIGNAL TO THE START OF RELEASE OF THE OUTPUT RELAY IS $t = 0.715 RC \pm 5\%$ WHEN $\pm 1\%$ COMPONENTS ARE USED FOR R AND C.

MANUFACTURING REFERENCES

CATEGORY	NO.
CIRCUIT PACK CODE	CF1
CONTROLLING DRAWING	SD-32571-01
MANUFACTURING TEST REQUIREMENTS	
CONNECTOR ON FRAME	KS-19437, L1

NOTES:

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

REMOTE TESTING CIRCUIT - FAR END

2

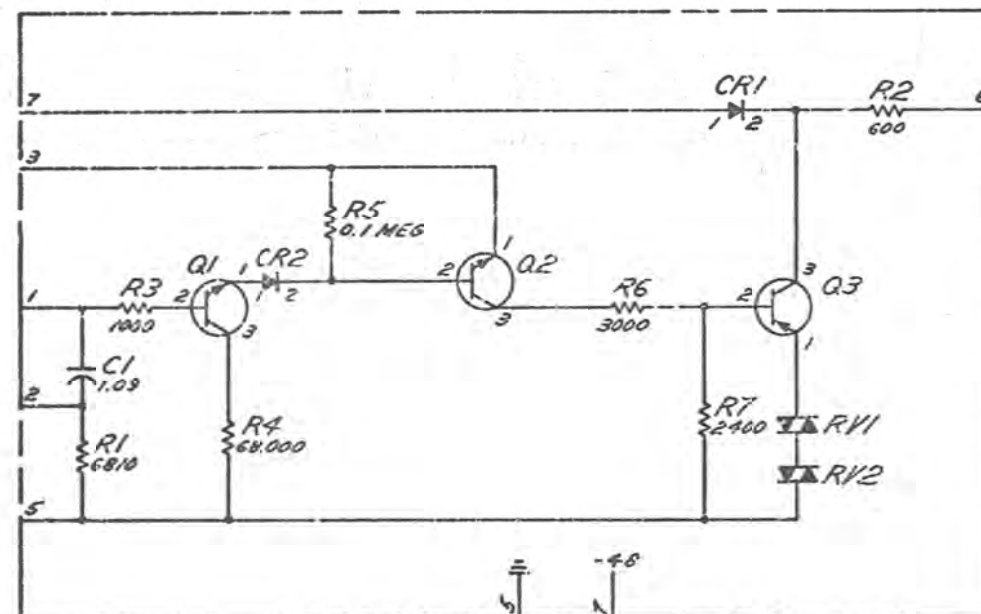
SD-99311-01-J9

BELL TELEPHONE LABORATORIES
INCORPORATED

65

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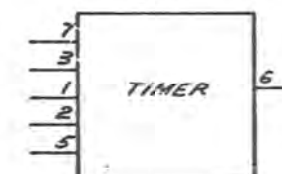
CPS D3 TIMER



MANUFACTURING REFERENCES

CATEGORY	NUMBER
CONTROLLING DRAWING	SD-32371-01
CIRCUIT PACK CODE	D3
CONNECTOR ON FRAME	910A

SYMBOL



NOTES:

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

INPUT/OUTPUT INFORMATION

THIS INFORMATION IS INCLUDED IN THE CIRCUIT DESCRIPTION.

CIRCUIT DESCRIPTION

THIS CIRCUIT IN CONJUNCTION WITH A START CONTACT, AN EXTERNAL RESISTOR AND AN OUTPUT RELAY PROVIDES A VARIABLE TIME INTERVAL BETWEEN INPUT AND OUTPUT.

THE CIRCUIT PACK EXTERNAL CONNECTIONS ARE AS FOLLOWS: TERM. 1 CONNECTS THRU TIMING RESISTANCE (R1) TO GROUND; TERM. 2 CONNECTS TO -48V BATTERY THRU THE START (MAKE) CONTACT; TERM. 2 ALSO CONNECTS TO ONE TERMINAL OF THE OUTPUT RELAY WHOSE OTHER TERMINAL CONNECTS TO TERM. 6 OF THIS CIRCUIT; TERM. 3 & 7 CONNECT TO -48V; TERM. 5 IS GROUNDED.

WITH START CONTACT NORMAL (OPEN), TRANSISTORS (Q1), (Q2) AND (Q3) ARE FORWARD BIASED AND ARE IN THE "ON" STATE. EVEN THOUGH (Q3) IS "ON" THE OUTPUT RELAY CANNOT OPERATE BECAUSE THE START CONTACT IS OPEN, KEEPING OPERATING BATTERY OFF ITS WINDING.

WHEN START CONTACT CLOSSES, TERMINAL 2 SIDE OF CAP.(C1) WHICH WAS AT GROUND POTENTIAL CHANGES TO -48V, CAUSING IN TURN THE POTENTIAL OF SIDE 1 TO CHANGE FROM ABOUT -46V TO ABOUT -94V. THIS REVERSE BIASES TRANSISTOR (Q1) WHICH TURNS "OFF", IN TURN CAUSING TRANSISTORS (Q2) AND (Q3) TO TURN OFF.

CAPACITOR (C1) STARTS DISCHARGING TOWARDS GROUND THRU EXTERNAL TIMING RESISTOR (R1). WHEN TERMINAL 1 REACHES ABOUT -46V, TRANSISTORS (Q1) AND (Q2) AND DIODE (CR2) ARE FORWARD BIASED ENOUGH TO TURN "ON". THIS CAUSES TRANSISTOR (Q3) TO CONDUCT AND OPERATE THE OUTPUT RELAY.

WHEN THE START CONTACT IS OPENED THE OUTPUT RELAY IS RELEASED AND CAPACITOR (C1) RECHARGES THRU TRANSISTORS (Q1) AND (Q2) AND RESISTORS (R1) AND (R3) UNTIL TERMINAL 1 IS ABOUT -46V. THE CIRCUIT IS NOW RECYCLED AND READY FOR ANOTHER START SIGNAL. THE TIME INTERVAL BETWEEN THE START SIGNAL AND THE TIME WHEN THE OUTPUT RELAY STARTS TO OPERATE IS $t = 0.715 RC \pm 5\%$ WHEN $\pm 1\%$ COMPONENTS ARE USED FOR (R) AND (C). MAXIMUM VALUE FOR (R) IS 4.33 MEG.

REMOTE TESTING CIRCUIT-FAR END

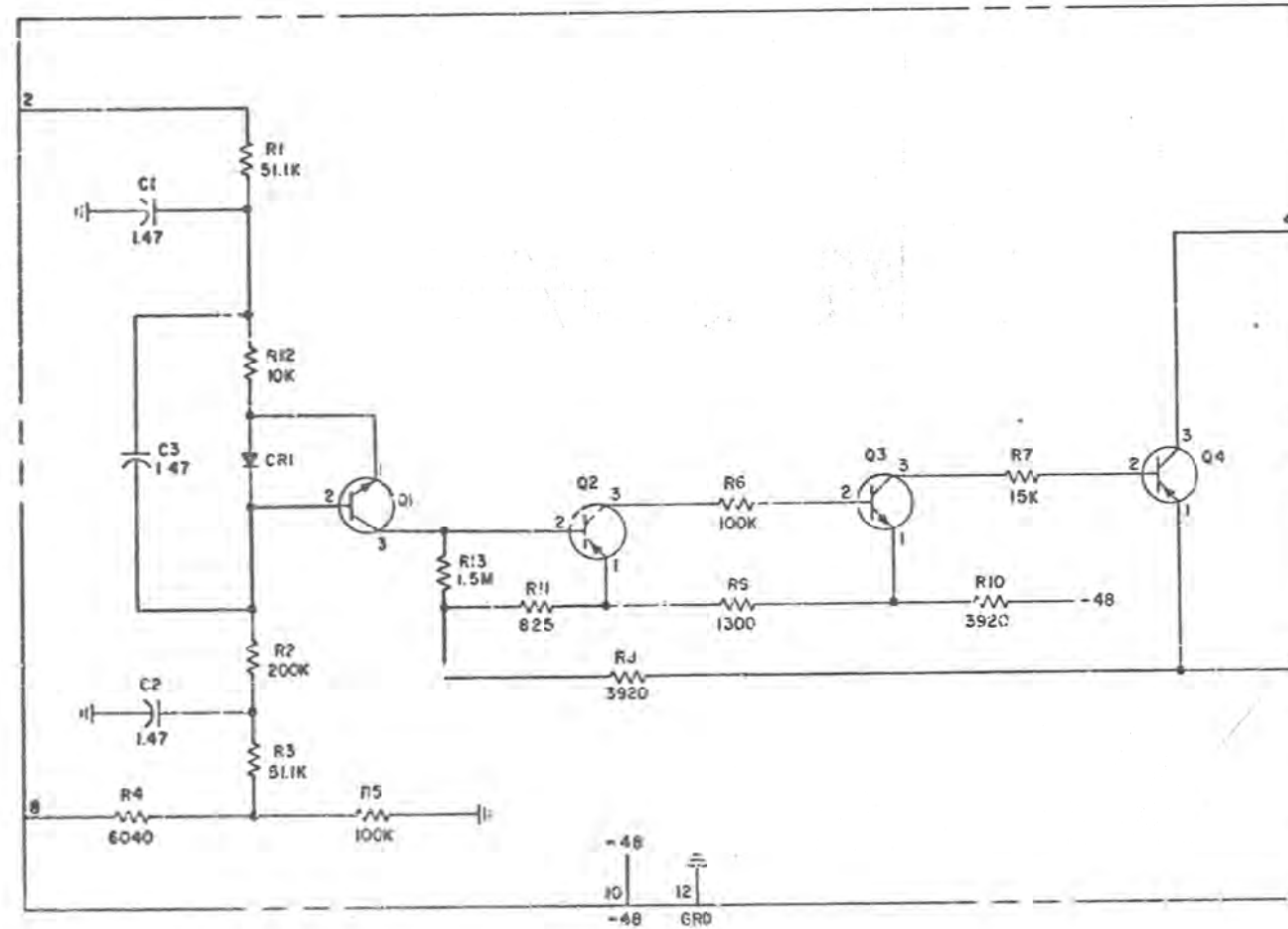
2

SD-99311-01-J10

BELL TELEPHONE LABORATORIES
INCORPORATED

65

② CPS 9 RING TRIP



INPUT/OUTPUT INFORMATION

-48V IS CONNECTED TO TERMINAL 10 AND GROUND TO TERMINAL 12. TERMINAL 4 CONNECTS TO A RELAY WINDING HAVING -48V ON THE WINDING. A GROUND IS APPLIED TO TERMINAL 6, TO ACTIVATE THE CIRCUIT. A DC VOLTAGE FROM THE RINGING SUPPLY IS APPLIED TO TERMINALS 2 AND 8 ACROSS A 200 OHM RESISTOR.

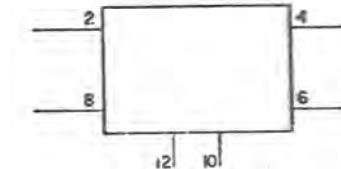
CIRCUIT DESCRIPTION

THIS CIRCUIT IS USED TO DETECT WHEN A TELEPHONE BEING RUNG IS ANSWERED. DURING RINGING THE DC COMPONENT OF THE RINGING SIGNAL HOLDS THE COMMON POINT OF R3, R4 AND R5 POSITIVE WITH RESPECT TO TERMINAL 2. THIS TURNS ON ALL TRANSISTORS AND HOLDS THE RELAY ON TERMINAL 4 OPERATED. WHEN THE TELEPHONE GOES TO OFF-HOOK THE POLARITY, APPLIED FROM TERMINAL 2 TO THE COMMON POINT OF R3, R4 AND R5, REVERSES. THIS BIASES Q1 OFF WHICH SHUTS OFF Q2, Q3 AND Q4, RELEASING THE OUTPUT RELAY.

MANUFACTURING REFERENCES

CATEGORY	NO.
CONTROLLING DRAWING	SD-24116-01
CIRCUIT PACK CODE	ED-24053-(1) GROUP 3
CONNECTOR ON FRAME	NONE

SYMBOL



NOTES:

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

REMOTE TESTING CIRCUIT-FAR END

②

SD-24116-01-J11A

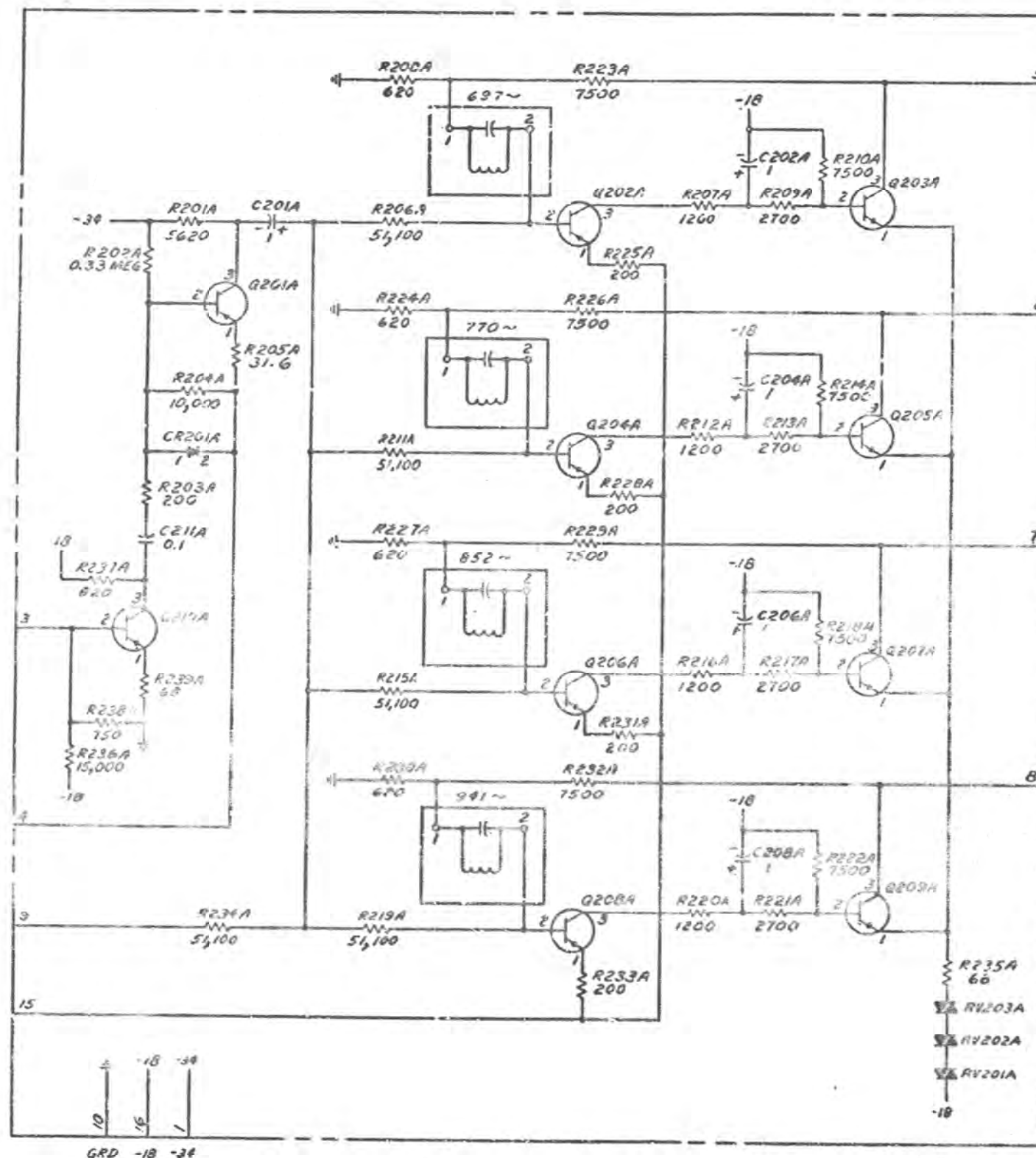
BELL TELEPHONE LABORATORIES
INCORPORATED

65

ISSUE
1940

SD-99311-01-J11A

PART OF CPS 3 LIMITER AND DETECTOR CIRCUIT (657, 770, 852, 941 CPS) (SEE NOTE 1)



COMPONENT LIST

CAPACITORS

DESIG
C201A
C202A
C204A
C206A
C208A
C211A

CODE
400A
400A
KS-19107, L2, 0.1, 50V

DIODE

DESIG
CR201A

CODE
KS-14700, L2

NETWORK

DESIG
697~
770~
852~
941~

CODE
4017A
4017L
4017C
4017D

RESISTOR

DESIG
R201A
R202A
R205A
R204A
R205A
R206A
R207A
R208A
R209A
R210A
R211A
R212A
R213A
R214A
R215A
R216A
R217A
R218A
R219A
R220A
R221A
R222A
R223A
R224A
R225A
R226A
R227A
R228A
R229A
R230A
R231A
R232A
R233A
R234A
R235A
R236A

CODE
238A, 5620
KS-13490, L1, 0.33 MEG
KS-13490, L1, 200
KS-13490, L1, 10,000
221A, 51.6
221A, 51,100
KS-13490, L1, 1200
KS-13490, L1, 2700
KS-13490, L1, 7500
221A, 51,500
KS-13490, L1, 1200
KS-13490, L1, 2700
KS-13490, L1, 7500
221A, 51,100
KS-13490, L1, 1200
KS-13490, L1, 2700
KS-13490, L1, 7500
221A, 51,100
KS-13490, L1, 1200
KS-13490, L1, 2700
KS-13490, L1, 7500
KS-13490, L1, 620
KS-13490, L1, 200
KS-13490, L1, 7500
KS-13490, L1, 620
KS-16645, L1, 200
KS-13490, L1, 7500
KS-13490, L1, 620
KS-13490, L1, 200
KS-13490, L1, 15,000
221A, 51,100
KS-13490, L1, 68
KS-16645, L1, 15,000
KS-16645, L1, 820
KS-16645, L1, 750
KS-16645, L1, 68

MANUFACTURING REFERENCES

CATEGORY	NUMBER
CIRCUIT PACK CODE AND ASSEMBLY DRAWING	ED-99670-30 (XFR DISC)
CONNECTOR ON FRAME	KS-10425, L2

SYMBOL

SEE SHEET J38

TRANSISTOR

DESIG	CODE
Q201A	120
Q202A	135
Q203A	16A
Q204A	125
Q205A	16A
Q206A	125
Q207A	16A
Q208A	125
Q209A	16A
Q210A	125

VARIABLE

DESIG	CODE
RV201A	100A
RV202A	100A
RV203A	100A

NOTES:

1. IF ED-99670-30 FAILS AND NO ED-99670-30 ARE AVAILABLE CPS3 AS WELL AS CPS2, CPS4 AND CPS5 MUST ALL BE REPLACED BY RAB, RAS, RAS7, AND RAB, RESPECTIVELY.

REMOTE TESTING CIRCUIT-FAR END

50-39311-01-J3C

BELL TELEPHONE LABORATORIES

65

ISSUE
15D

Ⓢ CPS 9 RING TRIP

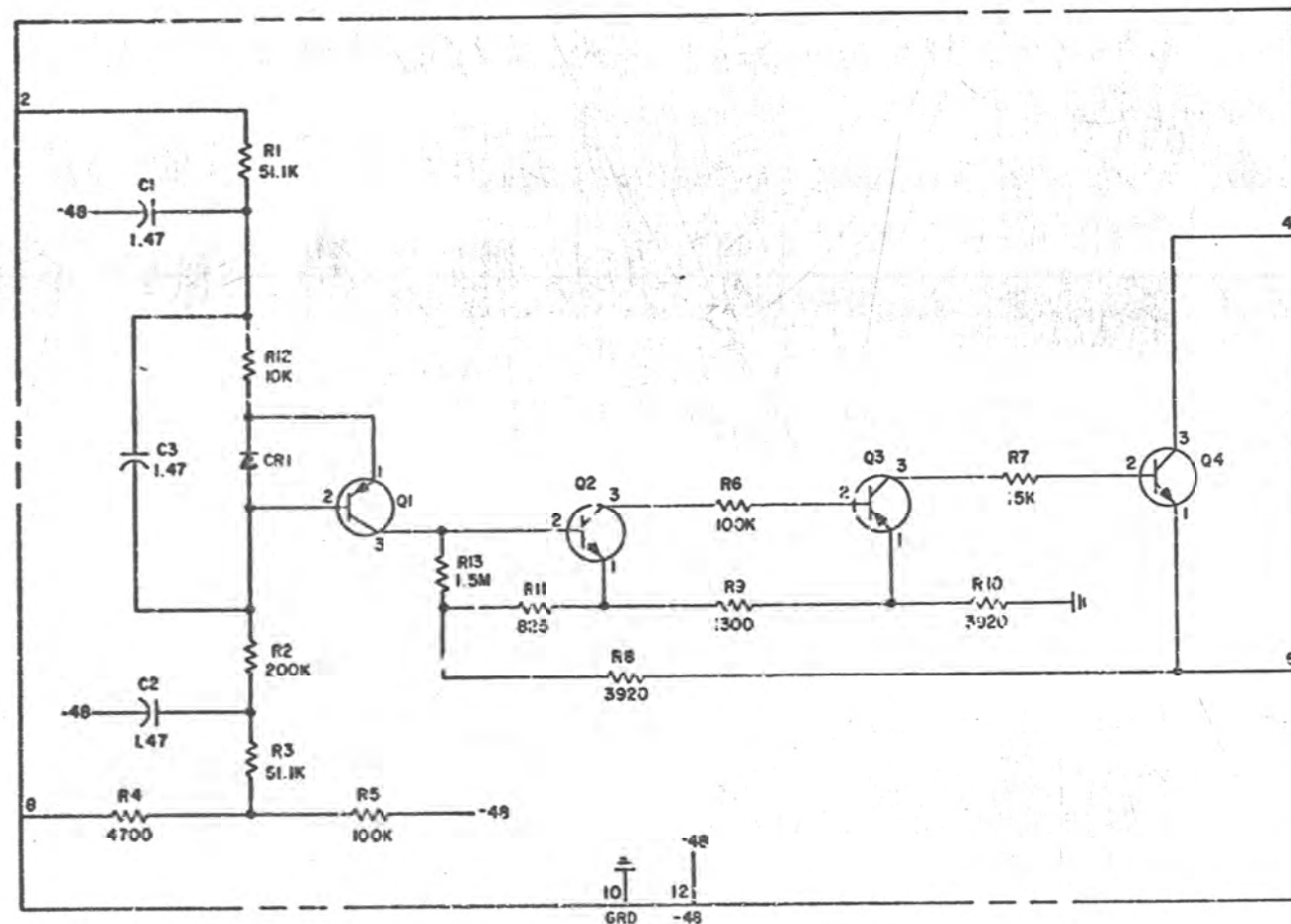
INPUT/OUTPUT INFORMATION

TERMINAL CONNECTIONS

TERMINAL	
10	GROUND
12	-48
6	-48
4	A 640 OHM RELAY WINDING TO THE MIDPOINT OF A VOLTAGE DIVIDER (464Ω, 1670Ω, -48, GRD) WITH A 446 TYPE DIODE CONNECTED IN A BACK DIRECTION ACROSS THE RELAY WINDING
3	GROUND OR 200Ω GROUND
2	200Ω GROUND OR GROUND

CIRCUIT DESCRIPTION

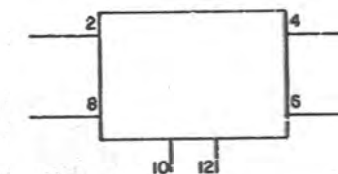
THIS CIRCUIT PACK IS INTENDED TO BE USED FOR TRIPPING RINGING TO CUSTOMER LOOPS EXTENDING TO 3000 OHMS. IT IS INSENSITIVE TO 20HZ OR RINGING CURRENT BUT SENSITIVE TO CUSTOMER D.C. TRIPPING CURRENT. WITH CONNECTIONS MADE AS STATED IN INPUT/OUTPUT INFORMATION, THE RELAY CONNECTED TO TERMINAL 4 IS HELD OPERATED. IT WILL REMAIN OPERATED WHILE RINGING THE CUSTOMER TELEPHONE. WHEN A CUSTOMER GOES OFF-HOOK, THE D.C. CURRENT THAT FLOWS THROUGH A 200 OHM RESISTOR BRIDGED ACROSS TERMINALS 2 AND 6 IS DETECTED AND CAUSES THE RELAY CONNECTED TO TERMINAL 4 TO RELEASE. THE RELAY RELEASED CAUSES THE RINGING TO BE TRIPPED.



MANUFACTURING REFERENCES

CATEGORY	NO.
CONTROLLING DRAWING	SD-2HI26-02
CIRCUIT PACK CODE	ED-2HI14-(1,51
CONNECTOR ON FRAME	

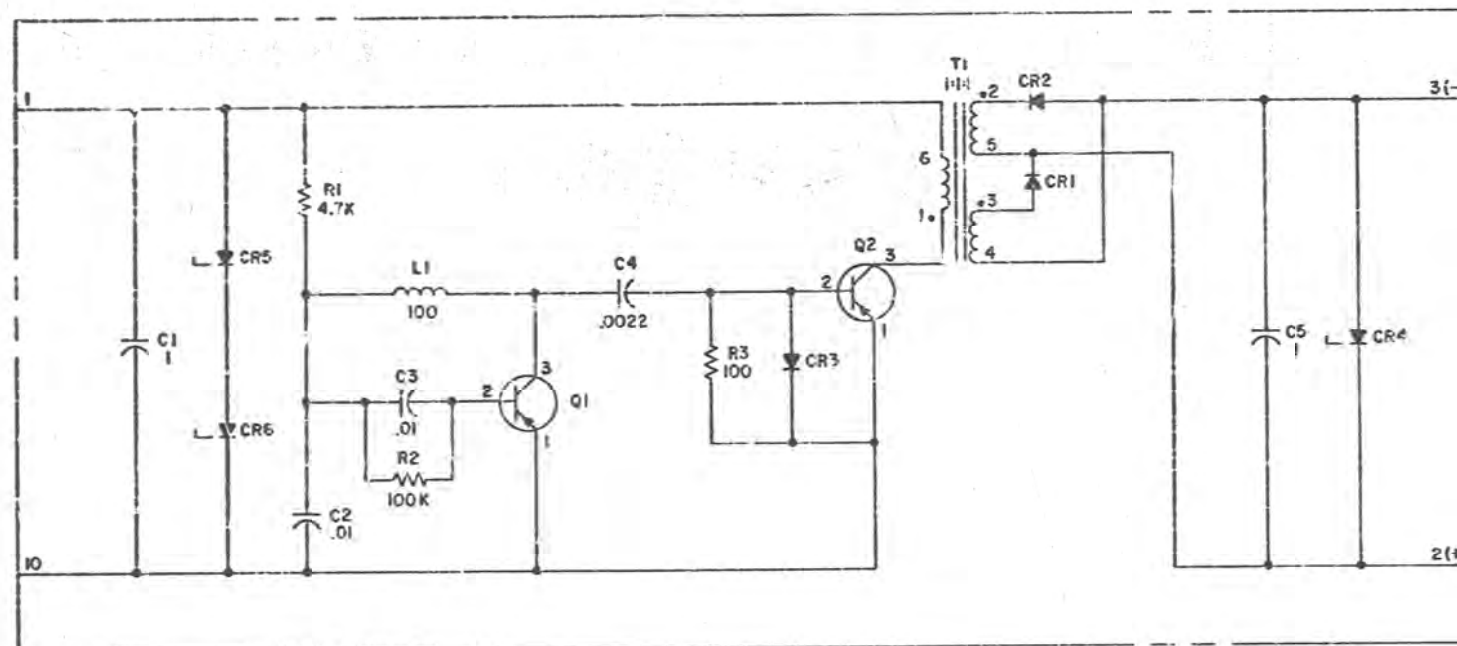
SYMBOL



NOTES:

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

CPS 10 DC TO DC CONVERTER



INPUT/OUTPUT INFORMATION

INPUT IS GROUND ON TERMINAL 10 AND -48V THRU AN EXTERNAL 216 OHMS RESISTOR TO TERMINAL 1. OUTPUT IS FLOATING 24V ON TERMINALS 2(+) AND 3(-).

CIRCUIT DESCRIPTION

THE 48V SUPPLY IS REDUCED AND REGULATED AT 27V BY THE EXTERNAL RESISTOR AND INTERNAL ZENER DIODES CR5 AND CR6. C1 IS PART OF AN OSCILLATOR WHOSE FREQUENCY IS DETERMINED BY THE TUNED CIRCUIT L1, C2 AND C3 (ABOUT 300 KHz). THE BASE AND EMITTER OF Q2 IS IN THE TUNED CIRCUIT SO Q2 IS TURNED ON AND OFF BY THE OSCILLATOR. Q2 ACTS AS A SWITCH FOR CURRENT IN THE PRIMARY WINDING OF T1. VOLTAGE INDUCED IN THE SECONDARY WINDINGS IS RECTIFIED BY CR1 AND CR2 AND FILTERED BY C4. DIODE CR4 LIMITS THE OUTPUT VOLTAGE UNDER NO LOAD AND KEEPS THE TRANSFORMER VOLTAGE FROM RISING TO DAMAGING VALUES. ALSO CR4 PROTECTS THE CIRCUIT FROM TRANSIENTS ON THE LOAD, SUCH AS FROM LIGHTNING ON A SUBSCRIBER LINE.

MANUFACTURING REFERENCES

CATEGORY	NO.
CONTROLLING DRAWING	SD-2H114-01
CIRCUIT PACK CODE	ED-2H052-1
CONNECTOR ON FRAME	NOTE

SYMBOL



NOTES:

- UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN MICROFARADS.
VALUES PRECEDED BY '+' SYMBOL + (PLUS)
OR - (MINUS) ARE IN VOLTS.