

SHEET INDEX (INITIATED ON ISSUE 21)

[illegible]

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT INFORMATION	ED-30382-01 J33021B-(-) J33021C-(-)
KEYSHEET DRAWINGS	
SXS NO. 1	SD-31359-01
SXS NO. 350A	SD-31364-01
EQPT DESIGN REQTS	J33021 BSP 814-620-1

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.

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

ISSUE
26A

SD-31141-01

1099

STEP BY STEP SYSTEMS

NO. 1 OR 350A
TEST CIRCUIT

FOR TESTING SUBSCRIBER STATION
RINGERS AND FOR CONNECTING TO
51 TYPE DIAL TESTER CIRCUIT
FOR OFFICES HAVING
SELECTIVE SUPERIMPOSED RINGING

BELL TELEPHONE LABORATORIES
INCORPORATED

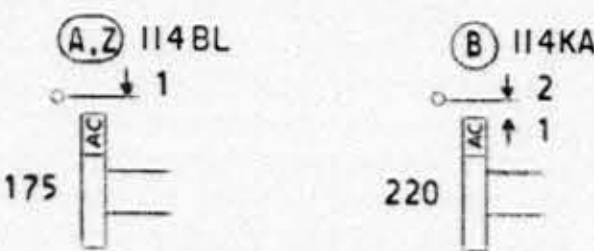
② SD-3141-01-1
10 SHEETS

EL RING)	10 SHEETS
DWG SIZE	
66	

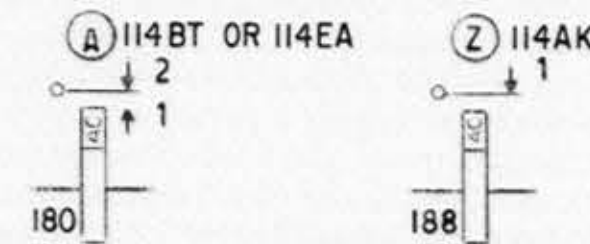
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CIRCUIT NOTES:

- SEE NOTE 135
101. PROVIDE ONE 1-1/3 AMP FUSE FROM 48V SIG BAT PER CIRCUIT.
102. BATTERY FOR THE (TA) AND (TL) MESSAGE REGISTERS SHALL BE TAKEN FROM THE FIRST RINGER TEST CIRCUIT.
103. PROVIDE ONE 1/2 AMP HV FUSE FROM EACH RINGING LEAD MR SUP-, MR SUP+, AND 105± FOR NOT MORE THAN 10 CIRCUITS.
104. LEADS DESIGNATED C SHALL BE RUN IN A SEPARATE CABLE.
105. PROVIDE ONE 1-1/3 AMP FUSE PER OFFICE FOR LT2 TONE SUPPLY LEAD.
106. CONNECTIONS TO THE DRY BAT. PER KS-6573 SHALL BE MADE SO THAT THE OPEN CKT VOLTAGE WILL NOT EXCEED 21V AND THE CLOSED CIRCUIT VOLTAGE AFTER 10 SECONDS DRAIN WITH 2000 OHMS RESISTANCE CONNECTED IN PARALLEL WITH THE VOLTMETER WILL NOT BE LESS THAN 19 VOLTS. THIS REGULATION IS BASED ON THE USE OF THE 0-60 VOLT SCALE OF A MODEL 280 WESTON VOLTMETER.
107. WHEN USED IN 4 PARTY SELECTIVE OFFICES USE X WIRING. WHEN USED IN 2 PARTY OFFICES OMIT BAT. PER KS-6573 AND USE L AND Y WIRING. CONNECTIONS TO MR SUP+ AND 105± RINGING LEADS ARE NOT REQUIRED IN 2 PARTY OFFICES.
108. THE MANUFACTURE OF V WIRING AND APPARATUS FOR USE IN THIS CIRCUIT HAS BEEN DISCONTINUED. V WIRING AND APPARATUS ARE SUPERSEDED BY W WIRING AND APPARATUS ON ISSUE 4D. PRIOR TO ISSUE 4D, W WIRING AND APPARATUS WERE NOT SHOWN AND V WIRING AND APPARATUS WERE PART OF THE MAIN DRAWING.
109. THE MANUFACTURE OF THE 200AG SELECTOR AND 10E BANK FOR USE IN THIS CIRCUIT HAS BEEN DISCONTINUED. THEY ARE SUPERSEDED BY THE 206AA SELECTOR AND 26D BANK ON ISSUE 4D. PRIOR TO ISSUE 4D THE 206AA SELECTOR AND 26D BANK WERE NOT SHOWN.
110. CONNECTION TO CEILING LAMP CKT IS A&M ONLY. C LEAD IS NOT USED IN THIS CONNECTION.
111. FIG. 2 IS FOR A&M ONLY AND IS SUPERSEDED BY FIG. 3 ON ISSUE 5D. PRIOR TO ISSUE 5D, FIG. 3 WAS NOT SHOWN.
112. THE USE OF 44G RESISTOR (H) IN THIS CKT IS FOR A&M ONLY. IT IS SUPERSEDED BY 59E RESISTOR ON ISSUE 5D. PRIOR TO ISSUE 5D, 59E RESISTOR WAS NOT SHOWN.
113. THE MANUFACTURE OF FIG. A FOR USE IN THIS CIRCUIT HAS BEEN DISCONTINUED. IT IS SUPERSEDED BY FIG. B ON ISSUE 6B. PRIOR TO ISSUE 6B FIG. B WAS NOT SHOWN AND FIG. A WAS PART OF FIG. 1.
114. THE MANUFACTURE OF H WIRING FOR USE IN THIS CIRCUIT HAS BEEN DISCONTINUED. H WIRING IS SUPERSEDED BY K WIRING ON ISSUE 7B. PRIOR TO ISSUE 7B, H WIRING WAS PART OF FIG. 1 AND K WIRING WAS NOT SHOWN.
115. E WIRING AND APPARATUS ARE FOR USE ONLY WHERE TWO PARTY SUBSCRIBER REGISTER TRUNK CIRCUITS PER SD-31431-01, SD-31174-01 OR SD-31132-01 ARE INSTALLED, OTHERWISE USE F WIRING. PRIOR TO ISSUE 8B E WIRING AND APPARATUS WERE NOT SHOWN AND F WIRING WAS NOT DESIGNATED AND WAS PART OF FIG. 1.
116. THE MANUFACTURE OF RELAY 114BT (TR1) FOR USE IN THIS CIRCUIT HAS BEEN DISCONTINUED. 114BT RELAY IS SUPERSEDED BY 114EA RELAY ON ISSUE 9D. PRIOR TO ISSUE 9D, 114EA RELAY WAS NOT SHOWN.
117. (a) WHERE ALL 4 PARTY LINES IN AN AREA ARE EQUIPPED WITH TUBE TYPE SUB SETS, USE B WIRING AND APPARATUS.
(b) WHERE ANY 4 PARTY LINES IN AN AREA ARE EQUIPPED WITH 42A, OR INVERTED TYPE RELAY SUB SETS, USE L WIRING, M WIRING AND APPARATUS AND "A" OR Z WIRING AND APPARATUS.
118. THE DIFFERENCE BETWEEN THE (CR1) RELAYS IS AS FOLLOWS:
119. PRIOR TO ISSUE 10D, B WIRING AND APPARATUS WERE NOT SHOWN, M WIRING AND APPARATUS WERE DESIGNATED X WIRING AND APPARATUS AND L WIRING AND "A" WIRING AND APPARATUS WERE NOT DESIGNATED.
120. THE MANUFACTURE OF 5 TYPE MESSAGE REGISTERS FOR USE IN THIS CKT HAS BEEN DISCONTINUED. THEY ARE SUPERSEDED BY 12 TYPE MESSAGE REGISTERS ON ISSUE 11D. PRIOR TO ISSUE 11D, 12 TYPE MESSAGE REGISTERS WERE NOT SHOWN.



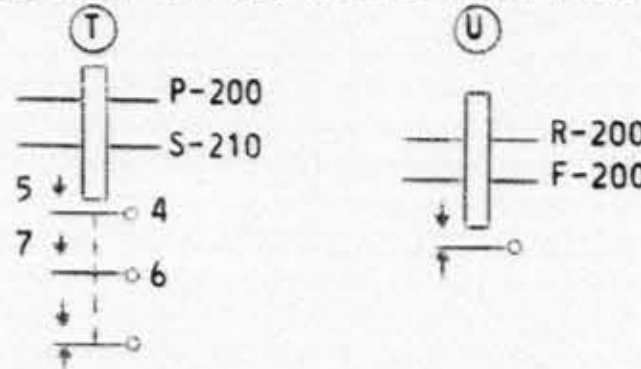
121. THE DIFFERENCE BETWEEN THE (TR1) RELAYS IS AS FOLLOWS:



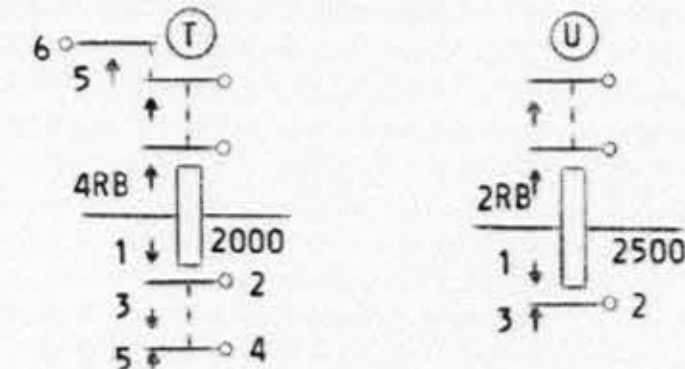
122. "A" WIRING AND APPARATUS ARE RATED A&M ONLY SUPERSEDED BY Z WIRING AND APPARATUS ON ISSUE 12D. PROVIDE Z WIRING AND APPARATUS FOR USE WITH 900 OHMS OR 1000 OHMS SUB LOOPS WHERE 42A OR INVERTED TYPE RELAY SUB SETS ARE USED. PRIOR TO ISSUE 12D Z WIRING AND APPARATUS WERE NOT SHOWN.

123. THE MANUFACTURE OF U OPTION FOR USE IN THIS CKT IS DISCONTINUED. IT IS SUPERSEDED BY T OPTION ON ISSUE 17D. PRIOR TO ISSUE 17D T OPTION WAS NOT SHOWN AND U OPTION WAS NOT DESIGNATED.

124. THE DIFFERENCE BETWEEN THE (L) RELAYS IS AS FOLLOWS:



125. THE DIFFERENCE BETWEEN THE (SS1) RELAYS IS AS FOLLOWS:



126. OPTIONS S, Q & N WERE ASSIGNED ON ISSUE 18D TO APPARATUS RATED A&M ONLY OR MFR DISC. ON PREVIOUS ISSUES AND OPTIONS R, P & J WERE ASSIGNED TO THE REPLACING APPARATUS.

127. PRIOR TO ISSUE 18D FIGS. 4, 5, & 6 WERE PART OF FIG. 1.

128. THE USE OF RELAYS R153, E545, R1267 AND E654 AND P OPTION IS RATED MFR DISC AND SUPERSEDED BY RELAYS R1851, E572, R1378 AND E199 AND ZA OPTION RESPECTIVELY ON ISSUE 19D. PRIOR TO ISSUE 19D, THE SUPERSEDING RELAYS AND ZA OPTION WERE NOT SHOWN.

129. THE USE OF J OPTION IS RATED MFR DISC AND SUPERSEDED BY G OPTION WHICH IS RATED A&M ONLY AND SUPERSEDED BY D OPTION ON ISSUE 19D. PRIOR TO ISSUE 19D, G AND D OPTIONS WERE NOT SHOWN.

130. THE USE OF THE 1-1/3 AMP RINGING FUSE IS RATED MFR DISC AND SUPERSEDED BY THE 1/2 AMP HV FUSE ON ISSUE 16D. PRIOR TO ISSUE 16D THE 1/2 AMP HV FUSE WAS NOT SHOWN.

131. THE USE OF ZB OPTION FOR USE IN THIS CIRCUIT HAS BEEN DISCONTINUED AND IS SUPERSEDED BY ZC OPTION ON ISSUE 20D. ZC OPTION PROVIDES FOR AN INCREASED VOLUME OF LT2 TONE. PRIOR TO ISSUE 20D, ZC OPTION WAS NOT SHOWN AND ZB OPTION WAS NOT DESIGNATED.

132. (a) WHERE AN AUXILIARY STATION RINGER TEST CIRCUIT, EQUIPPED WITH A PULSE REPEATER, IS FURNISHED, PROVIDE ZE AND ZG OPTIONS AND OMIT FIG. 6.
(b) WHERE AN AUXILIARY STATION RINGER TEST CIRCUIT, NOT EQUIPPED WITH A PULSE REPEATER, IS FURNISHED, PROVIDE ZE AND ZF OPTIONS AND OMIT FIG. 6.
(c) WHERE AN AUXILIARY STATION RINGER TEST CIRCUIT IS NOT FURNISHED PROVIDE ZC, ZD, AND ZF OPTIONS AND FIG. 6.

133. PRIOR TO ISSUE 20D, ZE AND ZG WIRING WERE NOT SHOWN, ZD AND ZF OPTIONS WERE NOT DESIGNATED AND FIG. 6 WAS ALWAYS PROVIDED.

134. ON ISSUE 20D, THE USE OF G OPTION IN FIG. 3 IS CHANGED FROM A&M ONLY TO MFR DISC.

135.

DESIG	FUSE AMP	POTENTIAL	ONE PER
A	1-1/3	-48 SIG	*FIG. 1 & C 3 5
B	1-1/3	-48 TALK	FIG. D
C	1-1/3	-48 SIG	FIG. D
	1-1/3	LT2	OFFICE
	1/2 HV	MR SUP-	10 CIRCUITS
	1/2 HV	MR SUP+	10 CIRCUITS
	1/2 HV	105V±	10 CIRCUITS
A		GRD	CKT
B		GRD	CKT

*SEE NOTE 102

BATTERY SYMBOL	VOLTAGE RANGE
-48	45-52
MR SUP-	SEE TRIPPING RANGE
MR SUP+	TABLE, SH 3
105V±	

136.

FEATURE OR OPTION		FIG.	APP OR WRG	QUANTITY	SEE NOTE
ALWAYS FURNISHED		1,5		1 PER CKT	
REGISTER CIRCUIT		3		1 PER GR	111,120, 126,128, 129,134
DIAL TONE SUPPLY CIRCUIT (REQD WITH ZD OPTION ONLY)		4	ZC, ZD	1 PER GR	131,132C, 133
RINGER TEST OF DIAL STATIONS ONLY REQD	WHERE AUXILIARY RINGER TEST CKT IS PROVIDED	C	F,ZE, ZG,ZI, ZK		132A,133
	WHERE AUXILIARY RINGER TEST CKT IS NOT PROVIDED AND	C	F,ZE, ZF,ZI, ZK		132B,133
	WHERE AUXILIARY RINGER TEST CKT IS NOT PROVIDED AND	C,6	E,ZD, ZF,ZI, ZJ		115, 132C, 133
	WHERE AUXILIARY RINGER TEST CKT IS NOT PROVIDED AND	C,6	F,ZD, ZF,ZI, ZJ	1 PER CKT	115, 132C, 133
RINGER TEST OF DIAL & "TOUCH TONE" STATIONS REQD	WHERE AUXILIARY RINGER TEST CKT IS PROVIDED	D	ZE, ZG,ZH		132A,138
	WHERE AUXILIARY RINGER TEST CKT IS NOT PROVIDED AND PRELIMINARY PULSE ABSORPTION IS NOT REQUIRED	D	ZE, ZF,ZH		132B,138
WHERE ALL 4 PARTY LINES IN AREA ARE EQUIPPED WITH TUBE TYPE SUB SETS		D,6,7	ZD, ZF,ZH		132C, 133, 139
WHERE ALL 4 PARTY LINES IN AREA ARE EQUIPPED WITH 42A OR INVERTED TYPE RELAY SUB SETS		B,X			107, 117, 118, 119
WHEN USED IN 4 PARTY SELECTIVE OFFICES		L,M AND AORZ			107, 116, 117, 118, 119, 121, 122
WHEN USED IN 2 PARTY OFFICES		B, L,Y			107, 117, 119, 141, 142

136. (CONT)

FEATURE OR OPTION	PROVIDE			SEE NOTE
	FIG.	APP OR WRG	QUANTITY	

137.

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES							
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT			
				STD	A & M	MD	
21D	ZH OR ZI	ZI	139	ZH,ZI			
21D	FIG. C OR D	FIG. C	139	FIG.C, FIG.D			
24AC	ZJ OR ZK	ZJ	136	ZJ,ZK			
26B	FIG. 7	NONE	136	FIG. 7			

138.

NETWORK VALUES			
NO.	NETWORK CODE	RESISTANCE IN OHMS	CAPACITANCE IN UF

139. PRIOR TO ISSUE 21D, FIG. C AND ZI OPTION WERE PART OF FIG. 1 AND FIG. D. ZH OPTION AND CIRCUIT NOTES 135, 136, 137, 138 AND 139 WERE NOT SHOWN.

140. PRIOR TO ISSUE 22AC, ZH OPTION WAS NOT SHOWN ON THE WIRING TO THE WINDING OF THE MAGNET AND THE (BF) ARC OF THE (P) SELECTOR SWITCH.
(CONT ON SHEET 10)

DRAWING ISSUE

ES 21D CHD GM

22AC JG JB

24AC AD GM

25AC WE JS

ISSUE 26B

TEST CIRCUIT

2

SD-31141-01-2

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6S

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(MFR DISC)

21

301. UNLESS OTHERWISE SPECIFIED:

302. PRIOR TO ISSUE 21D INFORMATION THAT WAS SHOWN ON DRAWINGS
-011 AND -012 IS NOW INCLUDED ON DRAWINGS -1 THRU -9.

A
B
C
D

WORKING LIMITS:

-	RINGING TEST
-	BELL ADJUSTING
+ +	RINGING CURRENT
+	

_____ PULSING
_____ SUBSCRIBE

WITH FIG. A _____ SUB LINE
WITH FIG. B _____

TRIPPING RANGES:

--	--

TEST CIRCUIT

ISSUE	HW
26B	

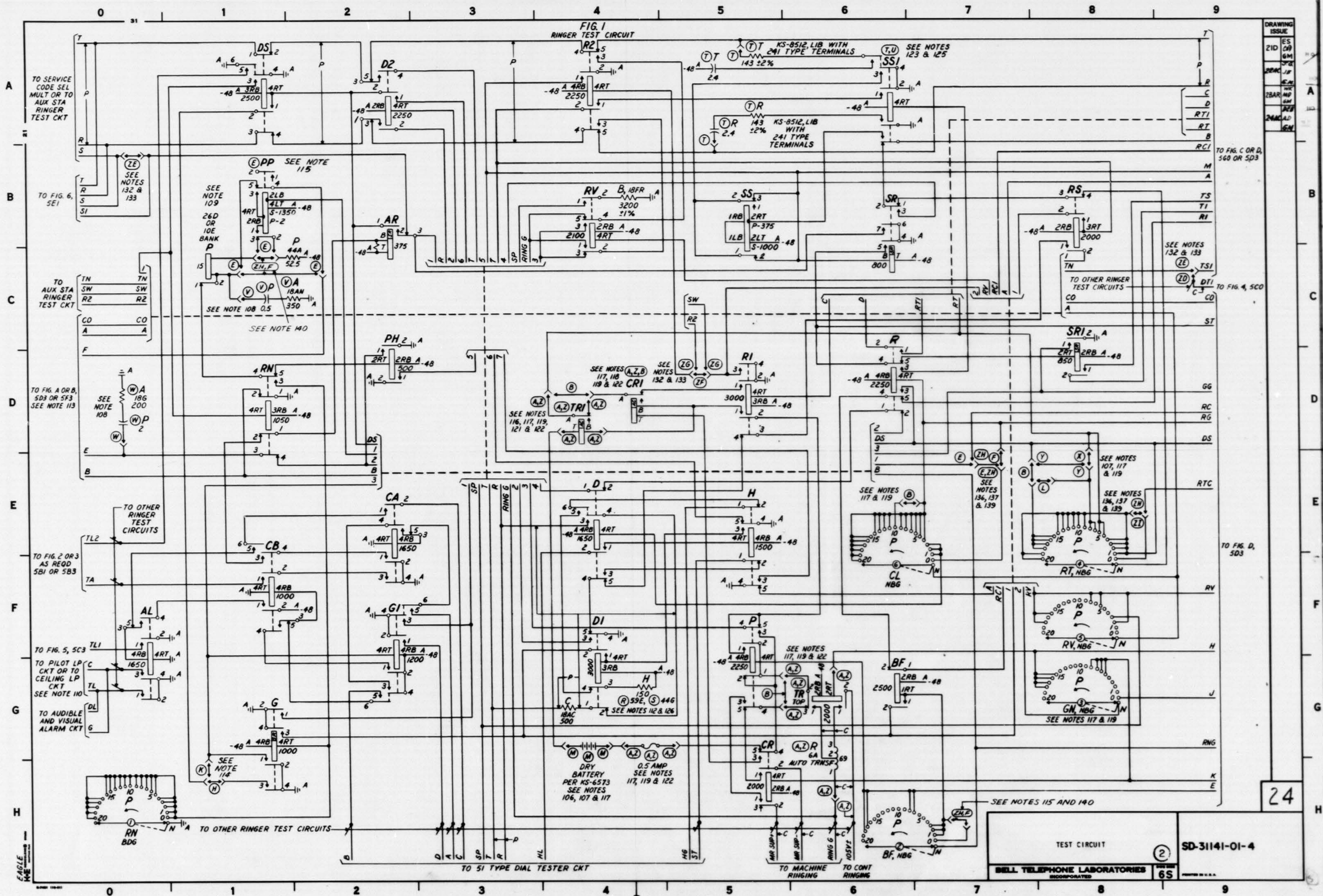


FIG. 2 (A&M ONLY)
REGISTER CIRCUIT COMMON TO GROUP OF
RINGER TEST CIRCUITS
SEE NOTES 111 & 128

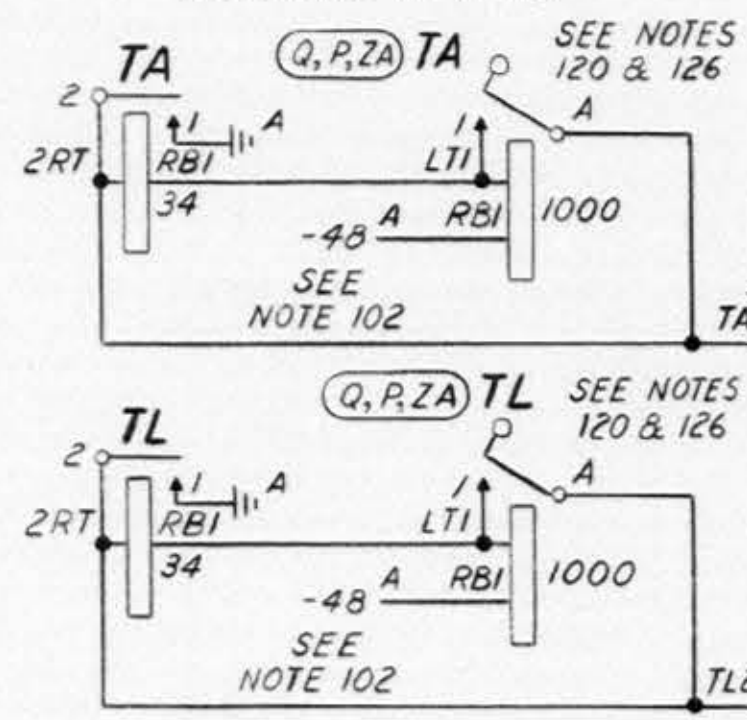


FIG. 3
REGISTER CIRCUIT COMMON TO GROUP OF
RINGER TEST CIRCUITS
SEE NOTES 111, 129 & 134

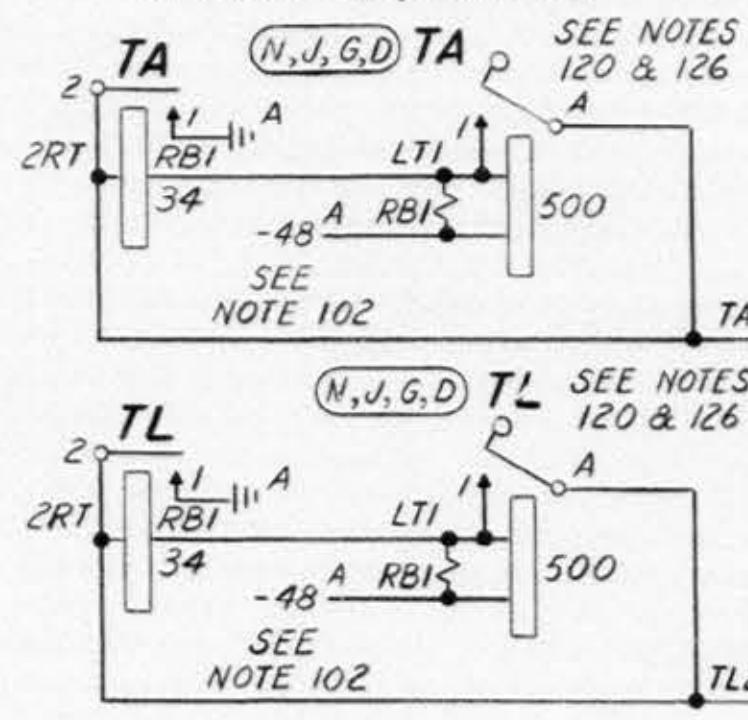


FIG. D
"TOUCH-TONE" CONNECTING CIRCUIT
SEE NOTES 136, 137 & 139

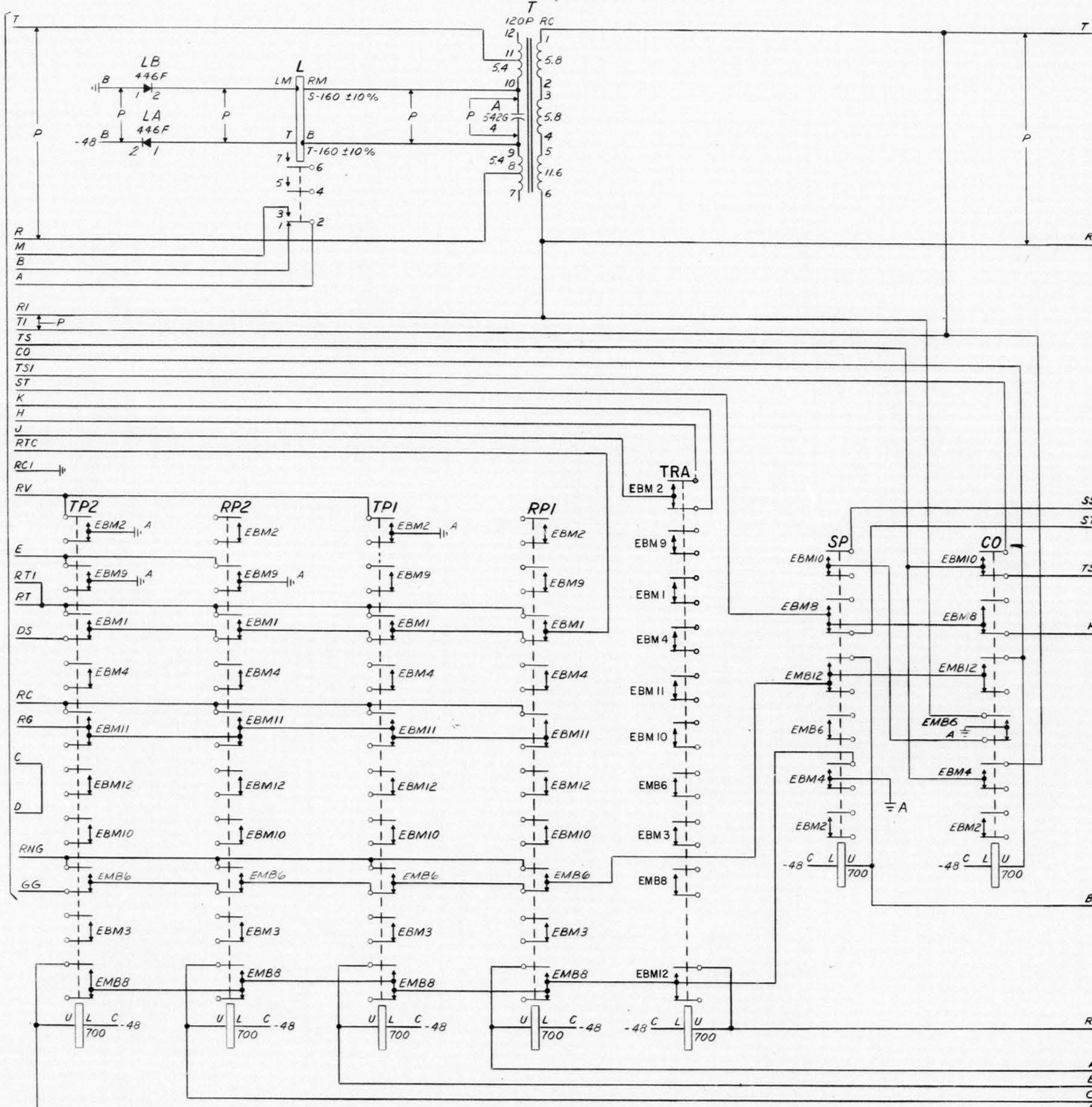


FIG. 4
LT2 OR TT2 DIAL TONE SUPPLY CIRCUIT
SEE NOTES 131 & 142

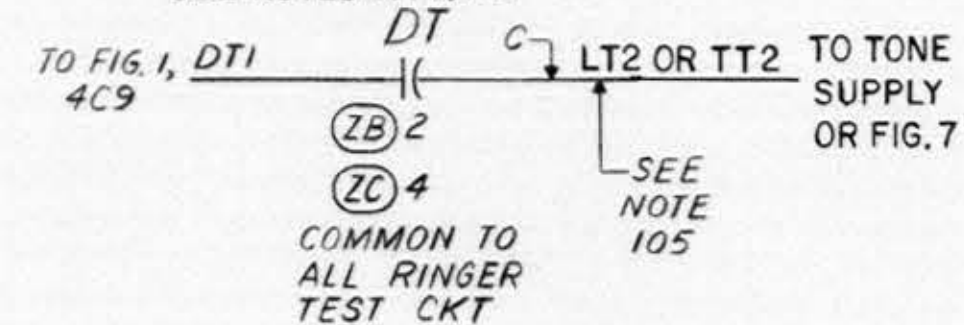


FIG. 5
TROUBLE LAMP CIRCUIT
TL
2Y
AT RELAY RACK

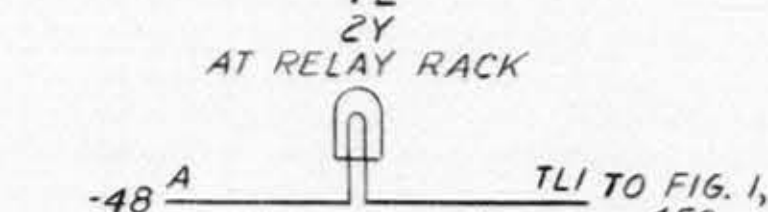


FIG. A (MFR DISC.)
SEE NOTE 113

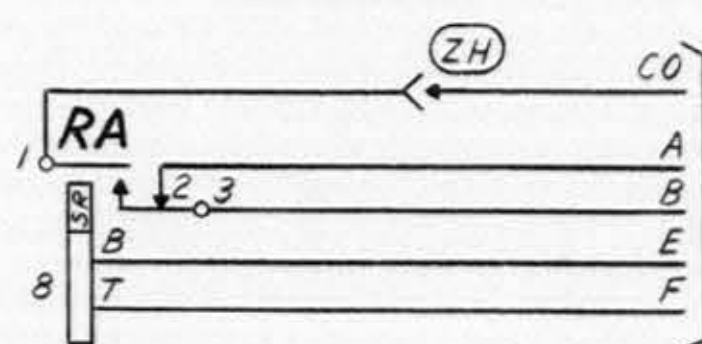


FIG. 6
TEST AND MAKE BUSY JACK CIRCUIT

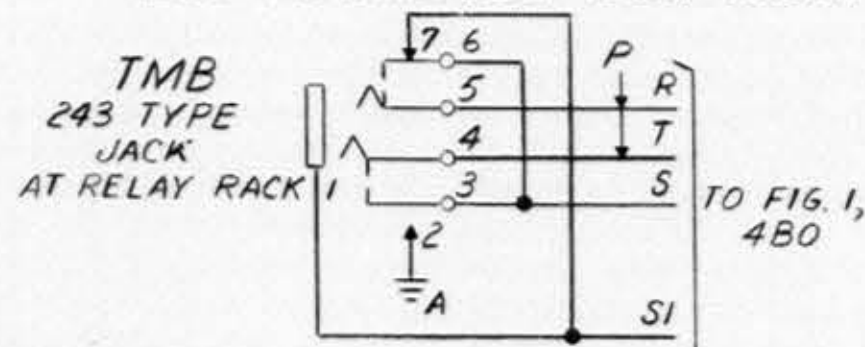


FIG. C
DIAL STATION ONLY
DIAL TONE CIRCUIT
SEE NOTES 136, 137 & 139

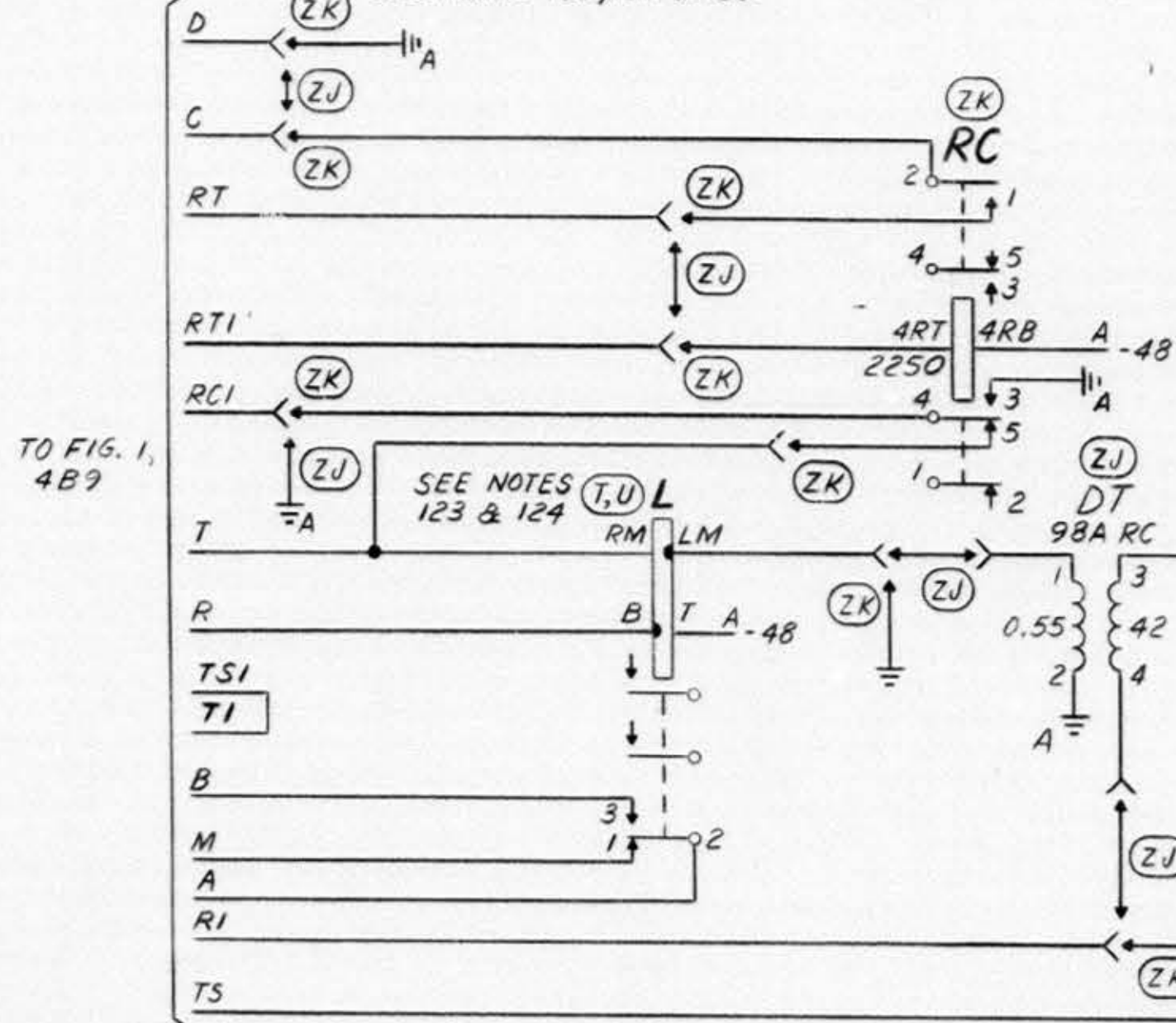
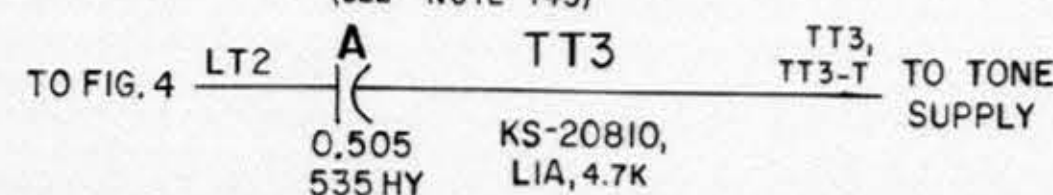


FIG. 7
"TOUCH-TONE" DIAL TONE
(SEE NOTE 143)



DRAWING
ISSUE
21D
23AR
24AC

ES
GM
GM
GM

A

B

C

D

E

F

G

H

ISSUE
26B

HW

H

TEST CIRCUIT

SD-31141-01-5

BELL TELEPHONE LABORATORIES
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2
6S

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SD-31141-01-5

EAGLE
K&E
ELECTRONIC

6-7481 (10-61)

SD-31141-01		3 PAGES		CIRCUIT REQUIREMENTS																		DRAWING ISSUE	
RINGER TEST CKT (RING TST SEL RING)																							
APPARATUS				MECH REQ				CIRCUIT PREPARATION				TEST SET				DIRECT CURRENT FLOW REQ				REMARKS			
DESIG	CODE	OPT.	FIG.	LOC	BSP FIG.	CONT PRES	ARM. TRVL	RESID	WGT ON INSULATE	TEST CLIP DATA		TEST SET PREP	SEE TEST NOTE	TEST WDG	TEST FOR	AFTER SOAK MA	TEST MA	READJ MA					
MAGNETS																							
P	200AG OR 206AA SEL		1	4C1	SEE BSP				(G)&(DS)NO	2(P)MAG		G/V						SEE BSP	REQT FOR STEPPING INSULATE 5T & 2T (RN)				
									(G)&(DS)NO	1(P)MAG		G/V						SEE BSP	REQT FOR RUNNING INSULATE 5T & 2T (RN)				
RELAYS																							
AL	R153, R1851		1	4F0	9/11	H	35			RB(AL)		BAT.			0		24	14					
AR	221DW		1	4B2	24		15	0		1B(RN)		GRD			0	110	15.5	14.7					
										1B(RN)		GRD			NO	110	10.6	11.2					
BF	R1209		1	4G6	2/1	H	15			RT(BF)		GRD			0		6.6	6.2					
CA	R153, R1851		1	4E2	9/11	H	35			RB(CA)		BAT.			0		24	14					
CB	E1757		1	4E1	23/9	H	35			RB(CB)		BAT.			0		40	27					
CO	AF32		D	5D9	208					U(CO)		GRD			0		32.5	30.5					
CR	E545, E572		1	4G5	8/3	H	20			RT(CR)		GRD			0		19	16					
CR1	114BL	A, Z	1	4D4			15			3T(CR)	1B(R1)	B/G			0		50	47.5	REQT WHERE INVERTED OR TUBE TYPE SUB SETS ARE USED				
										3T(CR)	1B(R1)	B/G			NO		41	43					
										3T(CR)	1B(R1)	B/G			0		55	52	REQT WHERE 42A REL SUB SETS ARE USED				
										3T(CR)	1B(R1)	B/G			NO		46.5	49					
CR1	114KA	B	1	4D4			20			3T(CR)	1B(R1)	B/G	2		0	-50	26	25	REQT WHERE TUBE TYPE SUB SETS ONLY ARE USED				
										3T(CR)	1B(R1)	B/G	2		NO	-50	22	23					
D	R997		1	4E4	26/8	H	30		(H)O	RT(D)		GRD			0		24	16					
D1	R339		1	4F4	8/15	H	20			RT(D1)		GRD			0		13	11					
D2	R511		1	4A2	9/14	H	35			RT(D2)		GRD			0		18	15					
DS	R460		1	4A1	26/10	H	30			RT(DS)		GRD			0		16	13	FOR K OPTION INSULATE 1B(DS)				
G	E1947		1	4G1	11/11	H	15			RT(G)		GRD			0		24.5	23					
G1	R1267, R1378		1	4F2	23/23	H	30			RT(G1)		GRD			0		31	27.5					
H	E1593		1	4E5	7/7	H	20			RT(H)		GRD			0		23	20					
L	221A	U	C	5G1	11		8	7-11	(RN)O	5T(R2)	5B(R2)	M	3/5	F/R	0	100	15.1	14.8	TEST WITH WINDINGS F & R SERIES AIDING				
									(RN)O	5T(R2)	5B(R2)	M	3/5	F/R	NO	100	13.9	14.4					
L	221FAC	T	C	5G1	366		8	4-8	(RN)O	5T(R2)	5B(R2)	M	3/4	P/S	0	FS	14.1	13.4					
									(RN)O	5T(R2)	5B(R2)	M	3/4	P/S	NO	FS	11.7	12.4					
TEST NOTES:																							
1. TEST CLIP DATA ASSUMES THAT CIRCUIT HAS BEEN MADE BUSY BY INSERTING A PLUG IN (TMB) JACK.																							
2. PRIOR TO ISSUE 180 THE CURRENT FLOW VALUES WERE AS FOLLOWS AND THE CORRESPONDING TRIPPING RANGE WAS 1000 OHMS.																							
TEST READJ																							
0 33 MA 31.5 MA																							
NO 28 MA 29.5 MA																							
3. ARMATURE NEED NOT TOUCH CORE ON OPERATE CURRENT.																							
4. TEST CONTACT SEPARATION MIN 3 CONTACT FOLLOW 2-3, 4-5 AND 6-7 MIN 8 TEST AND READJUST.																							
5. TEST CONTACT SEPARATION MIN 3 CONTACT FOLLOW MIN 8.																							
TEST CIRCUIT										SD-31141-01-6													
BELL TELEPHONE LABORATORIES INCORPORATED										PRINTED IN U. S. A.													

CIRCUIT REQUIREMENTS																						DRAWING ISSUE	
APPARATUS				MECH REQ				CIRCUIT PREPARATION				TEST SET		DIRECT CURRENT FLOW REQ				REMARKS					
DESIG	CODE	OPT.	FIG.	LOC	BSP FIG.	CONT PRES	ARM. TRVL	RESID	WGT OR INSULATE	TEST CLIP DATA		TEST SET PREP	SEE TEST NOTE	TEST WDG	TEST FOR	AFTER SOAK	TEST MA			TEST MA	TEST MA		
L	221FAE		D	5A5	728		8	7-11	(RN)O	5T(R2)	5B(R2)	M	2/3/4/5	S/T	0	FS	14.3	14		PULSE REPEATING REQ ARE NOT REQUIRED			
									(RN)O	5T(R2)	5B(R2)	M	2/3/4/5	S/T	0	FS	12.5	12.8					
									(RN)O	5T(R2)	5B(R2)	M	2/3/4/5	S/T	0	FS	15			PULSE REPEATING REQ ARE REQUIRED			
									(RN)O	5T(R2)	5B(R2)	M		S/T	NO	FS	12.5						
P	R450		1	4F5	8/7	H	20				RT(P)	GRD			0		17	13.2					
PH	E6133		1	4C2	31/31	H	15		(RN)O		RT(PH)	GRD	7		0		11.1	10.5					
									(RN)O		RT(PH)	GRD			NO		6	6.4					
PP	R347	E	1	4B1	8/3	H	20				RT(PP)	GRD		P	0		685			CONN DIR BAT. TO RB(PP)			
											LB(PP)	GRD		S	0		18	17					
											LB(PP)	GRD		S	NO		10	10.5					
R	R450		1	4C6	8/7	H	20		(BF)O		RT(R)	GRD			0		17	13.2					
R1	R338		1	4D5	11/10	H	15		(R2)NO		RT(R1)	GRD			0		13	10.6					
R2	R322		1	4A4	8/8	H	20		(SR)NO		RT(R2)	GRD			0		18	15					
RA	221CD	A	5D2	901			15	5-4			1T(PH)	GRD	8/9		0	500	90	85		CONTACT PRES SPRINGS 2&3 MIN 10 GRAMS			
											1T(PH)	GRD	8/9		NO	500	65	69					
RA	1498R	B	5F2	C							1T(PH)	GRD	9/10		0		100	95					
											1T(PH)	GRD	9/10		NO		40.5	43					
RC	R450	ZK	C	5F2	8/7	H	20				RT(RC)	GRD			0		17	13.2					
RN	R1054		1	4D1	7/15	H	20				RT(RN)	GRD			0		38	15					
RP1	AJ9		D	5D6	234						U(RP1)	GRD			0		40	38					
RP2	AJ9		D	5D4	234						U(RP2)	GRD			0		40	38					
RS	E1528		1	4B8	10/1	H	15				RT(RS)	GRD			0		20	13					
RV	R1221		1	4B4	8/3	H	20				RT(RV)	GRD			0		19	10.6					
SP	AF32		D	5D8	208				(RN)O		U(SP)	GRD			0		32.5	30.5					
SR	221CS		1	4B6	13		12	0	(RN)O		3(L)	GRD			0	50	8.3	7.9					
									(RN)O		3(L)	GRD			NO	50	6.9	7.3					
SR1	E1485		1	4C8	1/1	H	15				RT(SR1)	GRD			0		25.5	24					
SS	E6407		1	4B5	3/2	H	20				RT(SS)	GRD			P/S	0	29.5	27					
											RT(SS)	GRD			P/S	NO	17	18					
SS1	R163	T	1	4A6	23/8	H	30		(SS)O		RT(SS1)	GRD			0		19.5	18.5					
SS1	R273	U	1	4A6	11/3	H	20		(SS)O		RT(SS1)	GRD			0		16	10					
TA	5Y MR	Q	2	5A0							RB1(TA)	GRD	11		0		30	28					
	12E MR	P									RB1(TA)	GRD	11		NO		21	23					
	14LH MR	ZA																					
TA	E654, E199		2	5A0	1	H	15		1(TA)		RT(TA)	GRD	12		0		35	33					
TA	5AF MR	N	3	5A2							RB1(TA)	GRD	11		0		62	59					
	12C MR	J									RB1(TA)	GRD	11		NO		40	43					
	14LL MR	G																					
	14K MR	D																					
TEST NOTES:																						DRAWING ISSUE 21D GM M 24C 20 6M	
1. TEST CLIP DATA ASSUMES THAT CIRCUIT HAS BEEN MADE BUSY BY INSERTING A PLUG IN (TMB) JACK.																							
2. ARMATURE NEED NOT TOUCH CORE ON OPERATE CURRENT.																							
3. TEST CONTACT SEPARATION MIN 3 CONTACT FOLLOW 2-3, 4-5 AND 6-7 MIN 8 TEST AND READJUST.																							
4. DIODES MUST BE SHORT CIRCUITED FOR CURRENT FLOW ADJUSTMENTS ONLY.																							
5. CONTACT 2-3 AND 4-5 SHALL MAKE BEFORE 6-7.																							
6. APPLY PULSE REPEATING REQUIREMENT A1 WITH 46-78 PER CENT BREAK (A492.708).																							
7. THE FRONT CONTACTS SHALL MAKE BUT THE ARMATURE NEED NOT TOUCH THE CORE ON OPERATING CURRENT.																							
8. CONTACTS 2 AND 3 SHALL NOT BREAK WHEN THE RELAY IS ELECTRICALLY ENERGIZED AGAINST A GAUGE WHICH IS .001 INCH SMALLER THAN THE GAUGE ON WHICH CONTACTS 1 AND 3 ACTUALLY MAKE. PRIOR TO ISSUE 40 NOTE 1 WAS NOT SHOWN.																							
9. CONNECT DIRECT BATTERY TO 4T(RN).																							
10. MAX. ARM TRVL 30 RELAY SHALL NOT BREAK CONTACT ON TEST 65MA; READJ 70MA THE MIN NORMALLY CLOSED CONTACT PRESSURE SHALL BE 20 GRAMS.																							
11. TEST CLIP DATA REFERS TO RELAY.																							
12. CONNECT (M) RESISTOR IN PARALLEL WITH REGISTER BY PATCHING 3B(D1) AND RB(TA).																							
TEST CIRCUIT																		2		SD-31141-01-6			
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CIRCUIT REQUIREMENTS																	DRAWING ISSUE		
APPARATUS				LOC	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	RESID	BLOCK OR INSULATE	TEST CLIP DATA		TEST WDG			TEST FOR	AFTER SOAK MA	TEST MA	READJ MA	
									CONN BAT.	CONN GRD									
TA	E654 E199		3	5A1	1	H	15		1(TA)	RT(TA)	GRD			0	35	33			
TL	5Y MR	Q	2	5B0						RB1(TL)	GRD	2		0	30	28			
	12E MR	P								RB1(TL)	GRD	2		NO	21	23			
	14LH MR	ZA																	
TL	E654, E199		2	5B0	1	H	15		1(TL)	RT(TL)	GRD	3		0	35	33			
TL	5AF MR	N	3	5B2						RB1(TL)	GRD	2		0	62	59			
	12C MR	J								RB1(TL)	GRD	2		NO	40	43			
	14LL MR	G																	
	14K MR	D																	
TL	E654, E199		3	5B1	1		15		1(TL)	RT(TL)	GRD			0	35	33			
TP1	AJ9		D	5D5	234					U(TP1)	GRD			0	40	38			
TP2	AJ9		D	5D4	234					U(TP2)	GRD			0	40	38			
TR	E672		1	4G6	3/1	H	20			RT(TR)	GRD			0	19	12			
TR1	114 BT, 114 EA	A	1	4D4			20		T(TR1) T(TR1)	B(TR1) B(TR1)	B/G B/G			0 NO	37 31	35 33			
TR1	114 AK	Z	1	4D4			34		(TR)0			4							
TRA	AJ9		D	5E7	234					U(TRA)	GRD			0	40	38			
DIODES																			
LA	446F		D	5B4								5,6				REMOVE B BAT CONNECTION			
LB	446F		D	5A4								5,7				REMOVE B GRD CONNECTION			
TEST NOTES:																			
1. TEST CLIP DATA ASSUMES THAT CIRCUIT HAS BEEN MADE BUSY BY INSERTING A PLUG IN (TMB) JACK.																			
2. TEST CLIP DATA REFERS TO RELAY.																			
3. CONNECT (H) RESISTOR IN PARALLEL WITH REGISTER BY PATCHING 3B(D1) AND RB(TL).																			
4. THE 114AK REL SHALL BE TESTED AND READJUSTED BY CONNECTING IN SERIES THE FOLLOWING RES BETWEEN "B" TERM. OF REL UNDER TEST AND GRD.																			
(A) FOR STANDARD 42A RING. WITH 900Ω SUB LOOPS OPERATE 900Ω ±1% NON-OPERATE 1035Ω ±1%																			
(B) FOR INVERTED 42A RING. WITH 1000Ω SUB LOOPS OPERATE 1000Ω ±1% NON-OPERATE 1150Ω ±1%																			
5. USE VOLTMETER WITH 20,000 OHMS/VOLT OR HIGHER SENSITIVITY. DOTTED LINES INDICATE TEMPORARY TEST LEADS. IN TEST FIG. 1 VOLTAGE ACROSS DIODE SHOULD NOT EXCEED 2 VOLTS. IN TEST FIG. 2 VOLTAGE ACROSS 0.1 MEG RESISTOR SHOULD NOT EXCEED 2 VOLTS.																			
7. BLOCK OR INSULATE TO ISOLATE TERM NO. 2 OF (LB) DIODE SUPPLY GROUND TO TERM NO. 1 AND MAKE FORWARD TEST AS SHOWN IN NOTE 5, TEST FIG. 1. REMOVE GRD AND SUPPLY BAT. TO TERM. NO. 1 AND MAKE REVERSE TEST AS SHOWN IN NOTE 5, TEST FIG. 2.																			
FIG. 1 FORWARD TEST FIG. 2 REVERSE TEST																			
TEST CIRCUIT																			
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[illegible]

FIG. 51
(FOR FIG. 1, B & C)
FOR TESTING RINGERS WHERE
DIAL STATIONS ONLY ARE PROVIDED

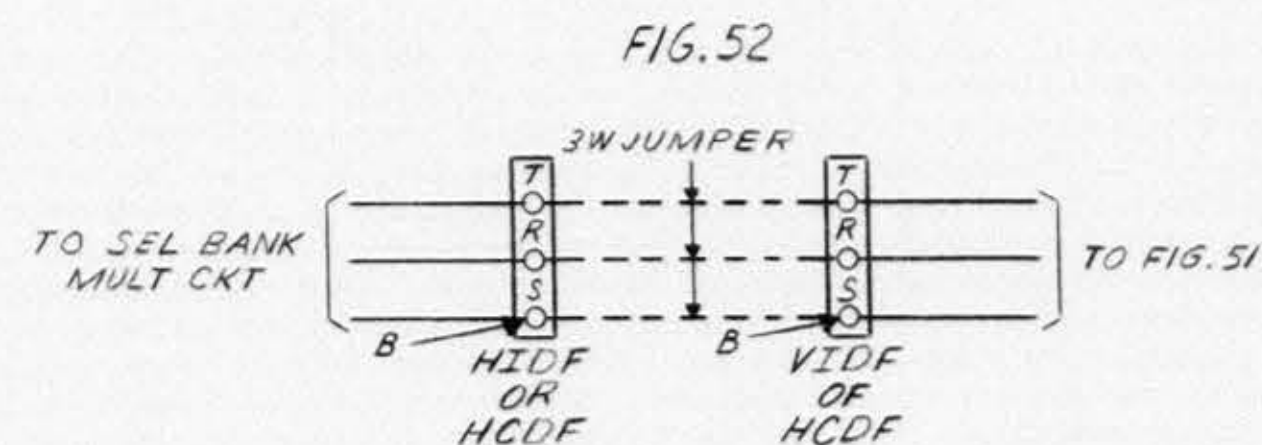
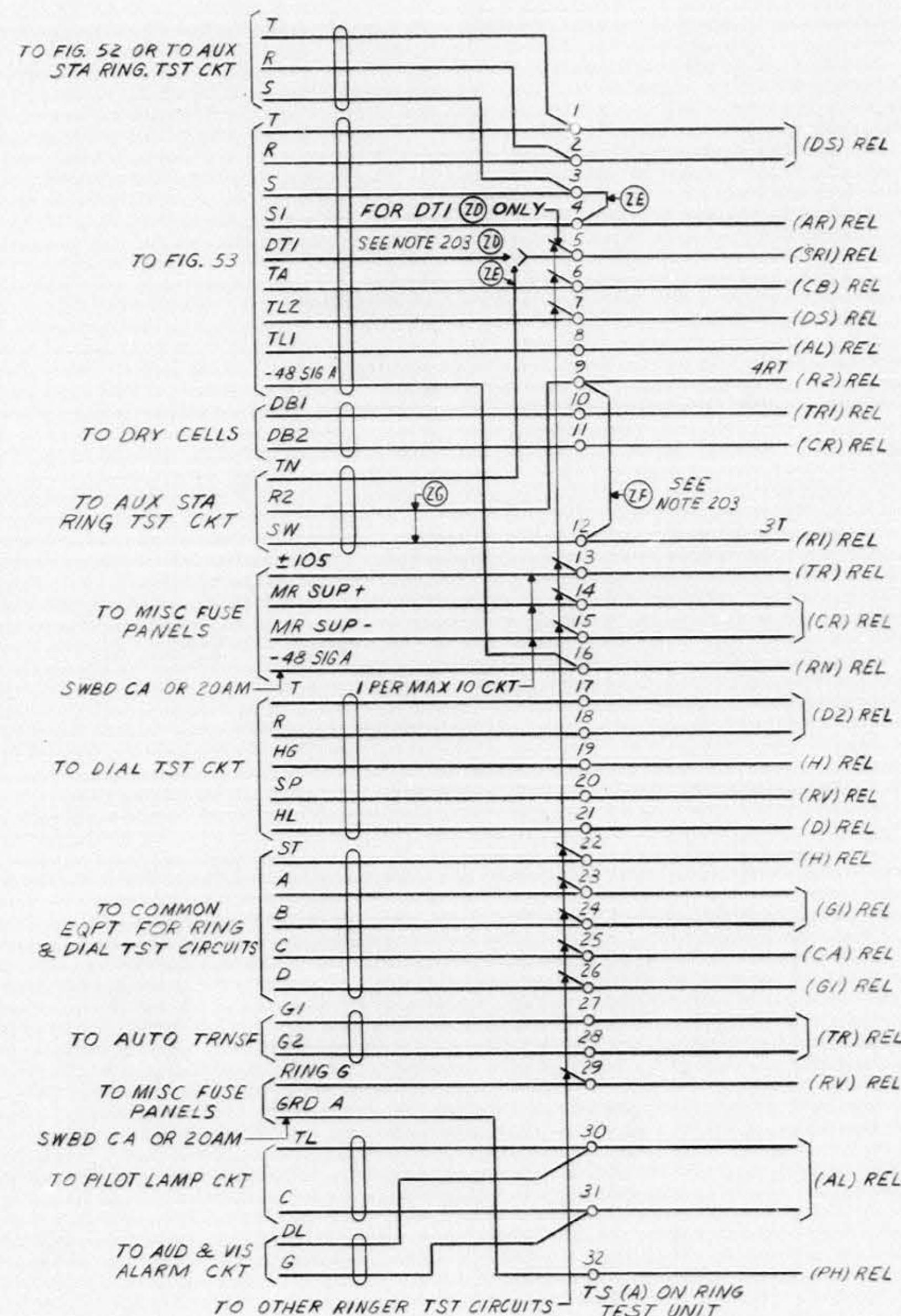


FIG. 53
(FOR FIG. 3, 4, 5, 6 & 7)

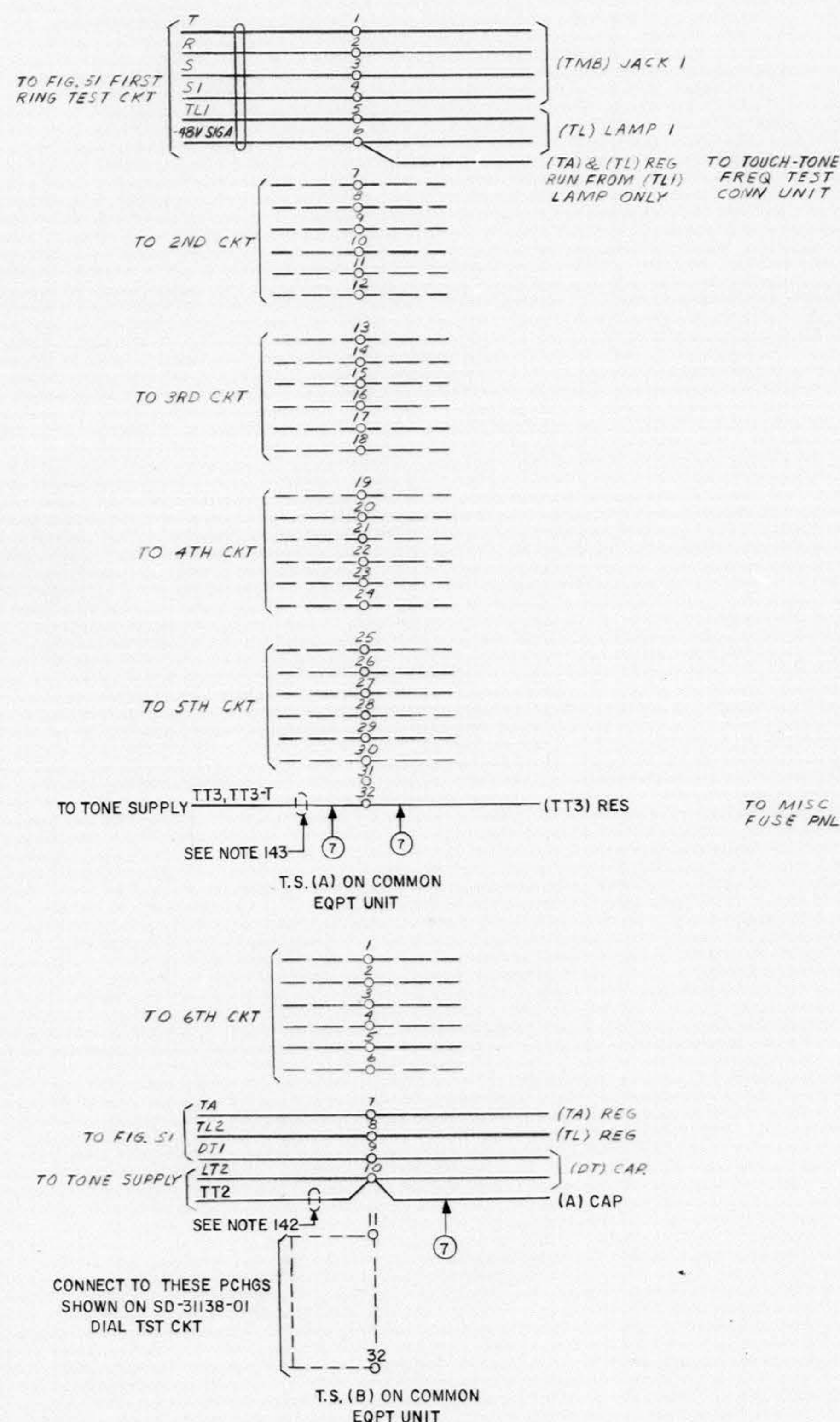
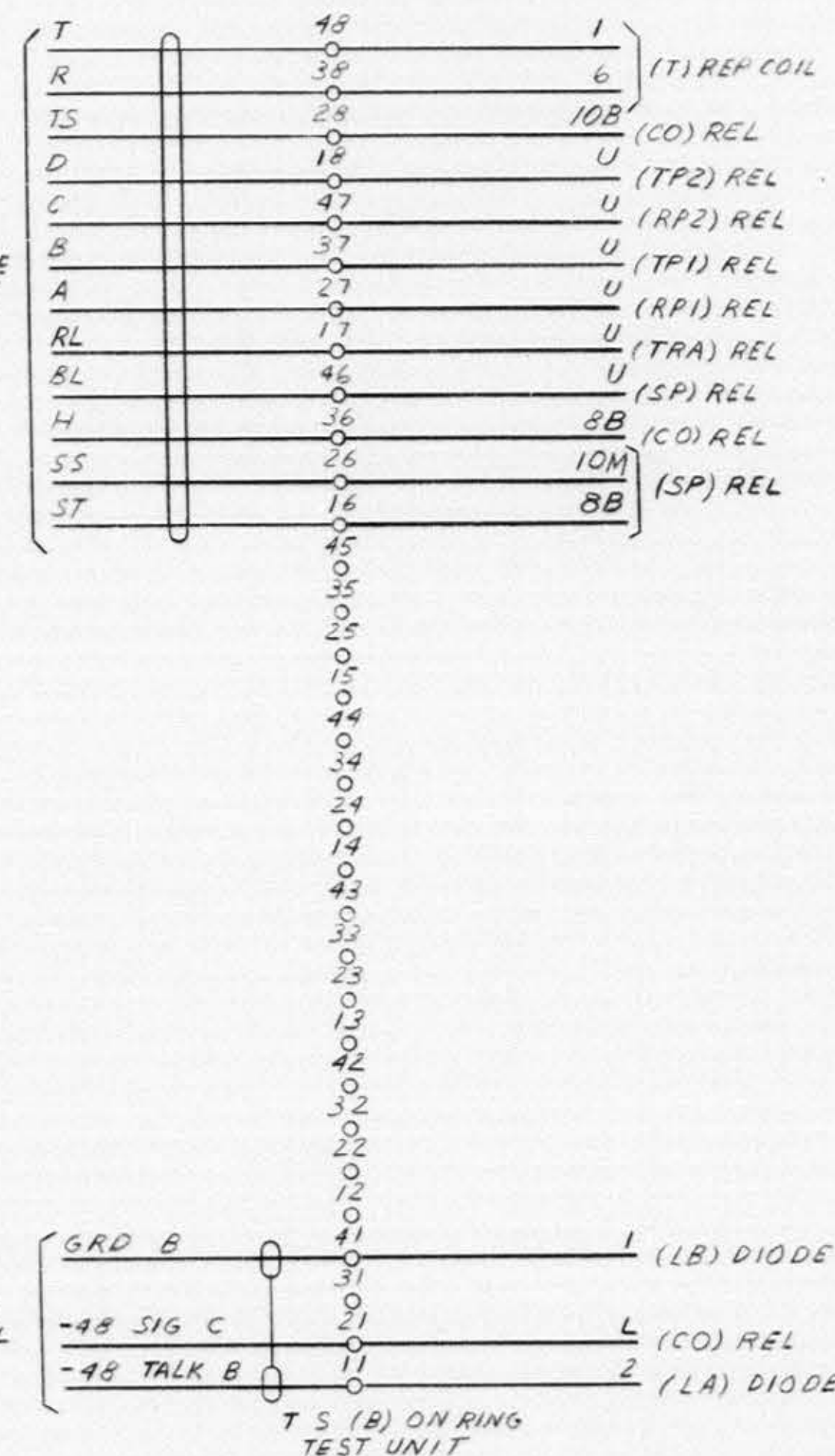


FIG. 54
(FOR FIG. D)
FOR TESTING RINGERS WHERE DIAL &
TOUCH-TONE STATIONS ARE PROVIDED



DRAWING
ISSUE
21D
NRC
23AR
GM
NO
GM

ISSUE
26B

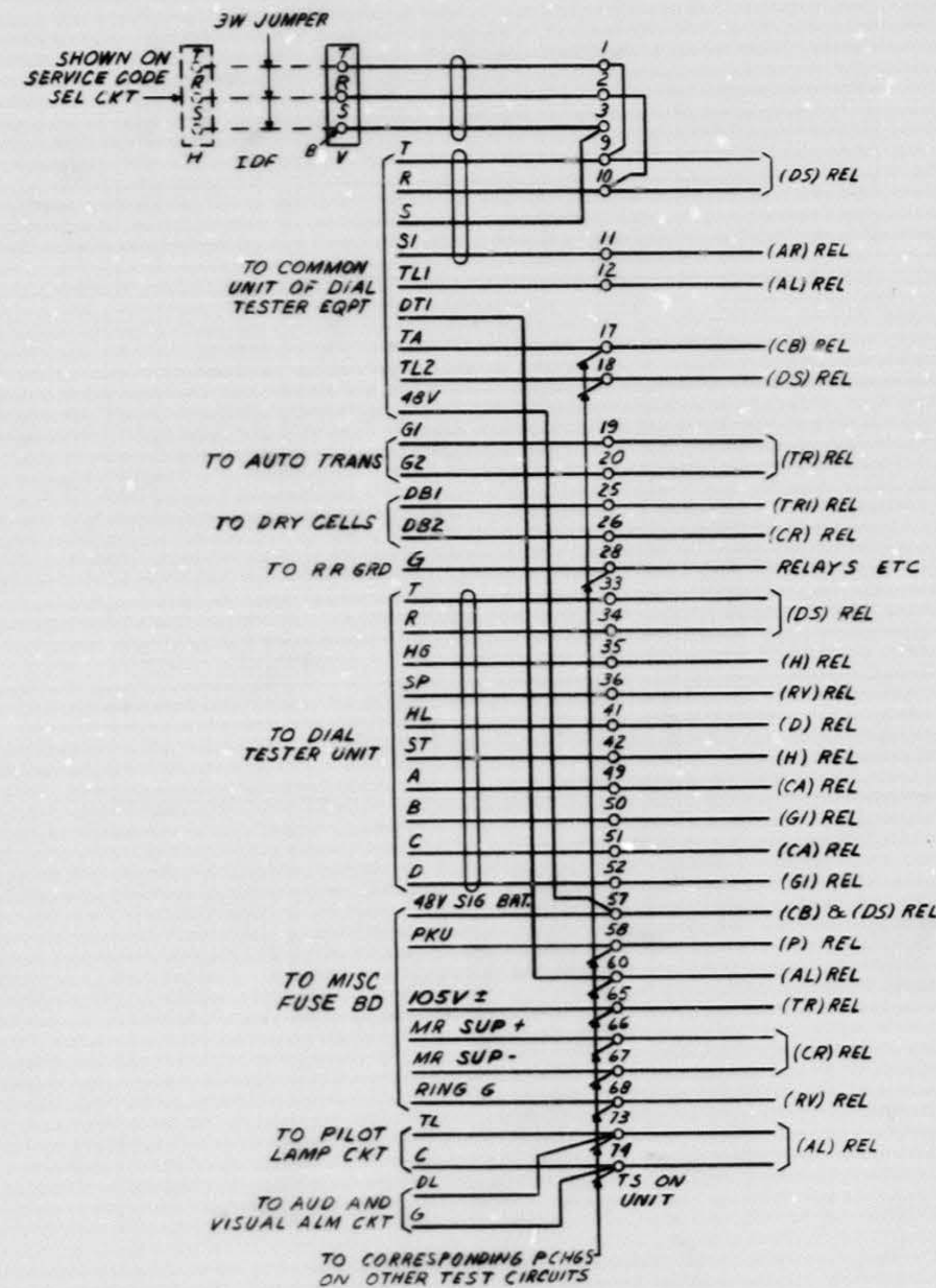
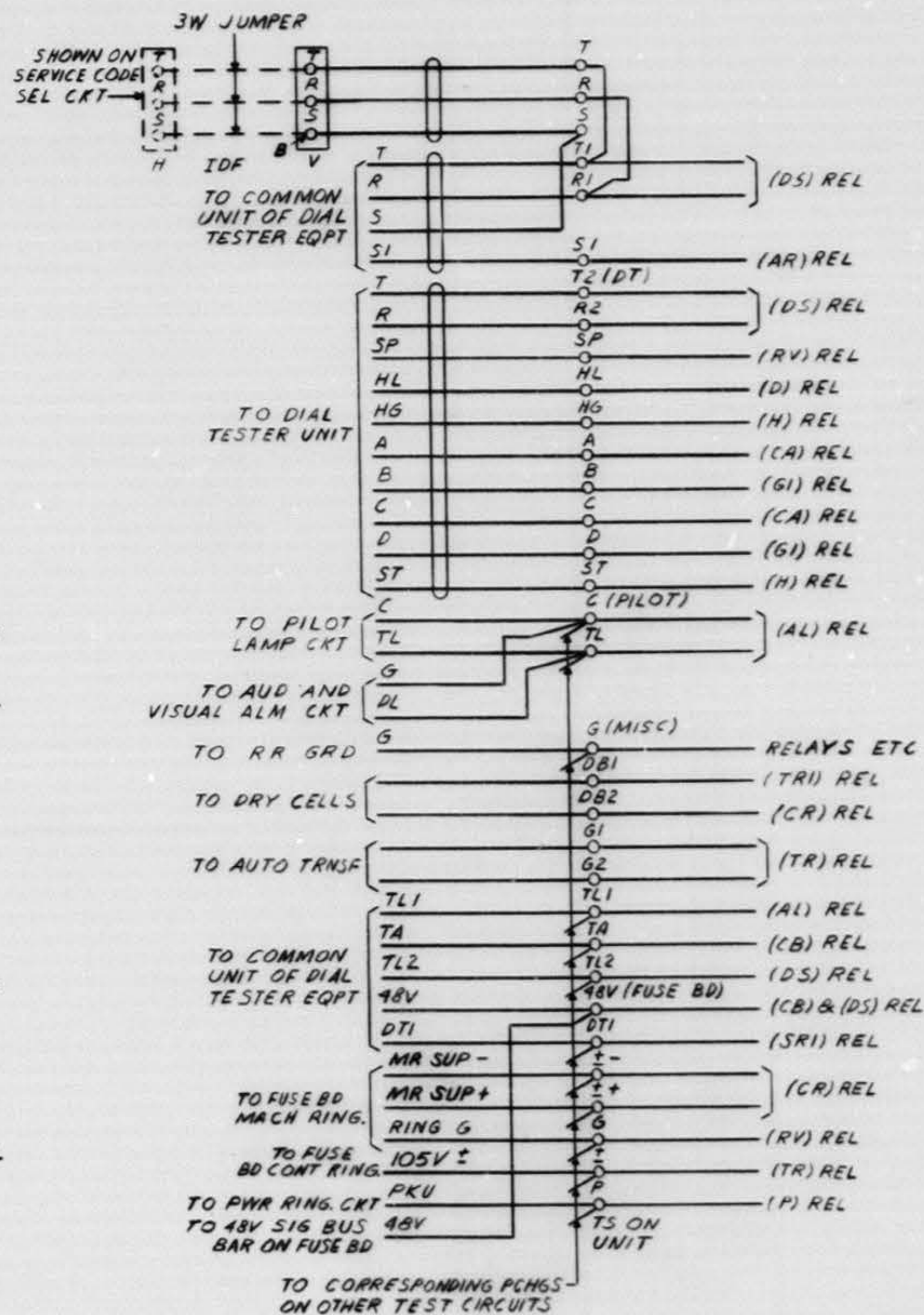
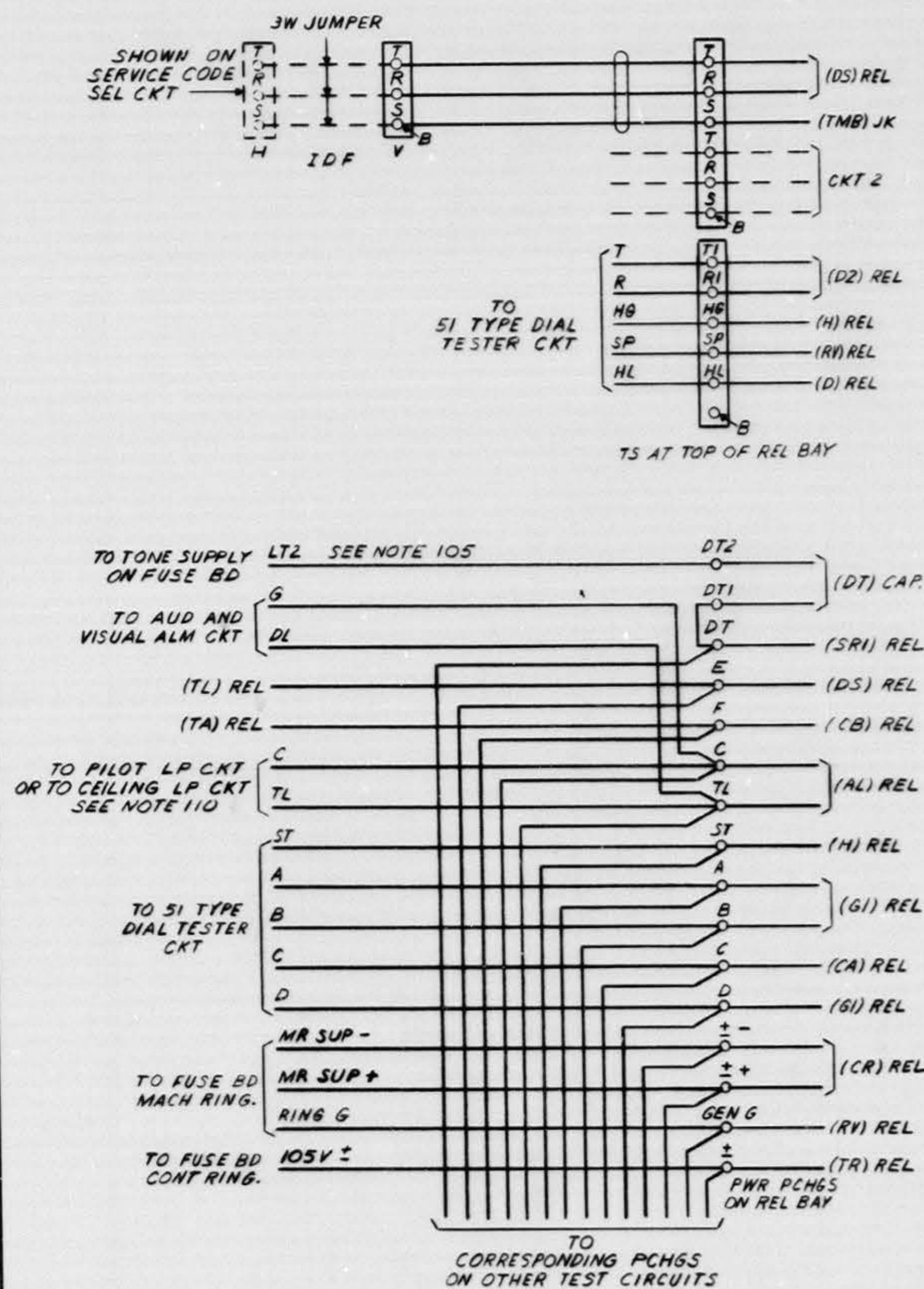
TEST CIRCUIT
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FIG. K (MFR DISC.)
SEE NOTE 201

FIG. L (MFR DISC.)
SEE NOTE 201

FIG. M (MFR DISC.)
SEE NOTE 202



CIRCUIT NOTES: (CONT)

141. PRIOR TO ISSUE 25AC, B WIRING AND APPARATUS WAS NOT SPECIFIED FOR USE IN 2 PARTY OFFICES.
142. IN OFFICES EQUIPPED WITH A PRECISE TONE PLANT, THE TT2 LEAD OF FIG. 4 SHALL BE 16 GA BK SHIELDED WIRE. THE TT2 LEAD DOES NOT REQUIRE FUSING AT THE MISC FUSE PANEL. BOTH ENDS OF THE SHIELD SHALL BE GROUNDED USING CRIMPED CONNECTIONS PER BSP SECTION 800-612-164. THE LENGTH OF THE TT2 LEAD SHALL NOT EXCEED 100 FEET. IF THIS LIMITATION CANNOT BE MET, REFER TO THE RINGING AND TONE PLANT DRAWINGS FOR ALTERNATE ARRANGEMENTS.
143. THE TT3 LEADS FROM SUPPLY CIRCUIT SHALL BE 22 GA SHIELDED WIRE. THE SHIELD SHALL BE GROUNDED AT BOTH ENDS. GROUND CONNECTIONS SHALL BE CRIMPED CONNECTIONS PER BSP SECTION 800-612-164. THE LENGTH OF THE TT3 LEADS SHALL NOT EXCEED 600 FEET.

ISSUE
26B

TEST CIRCUIT	②	SD-31141-01-10
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