

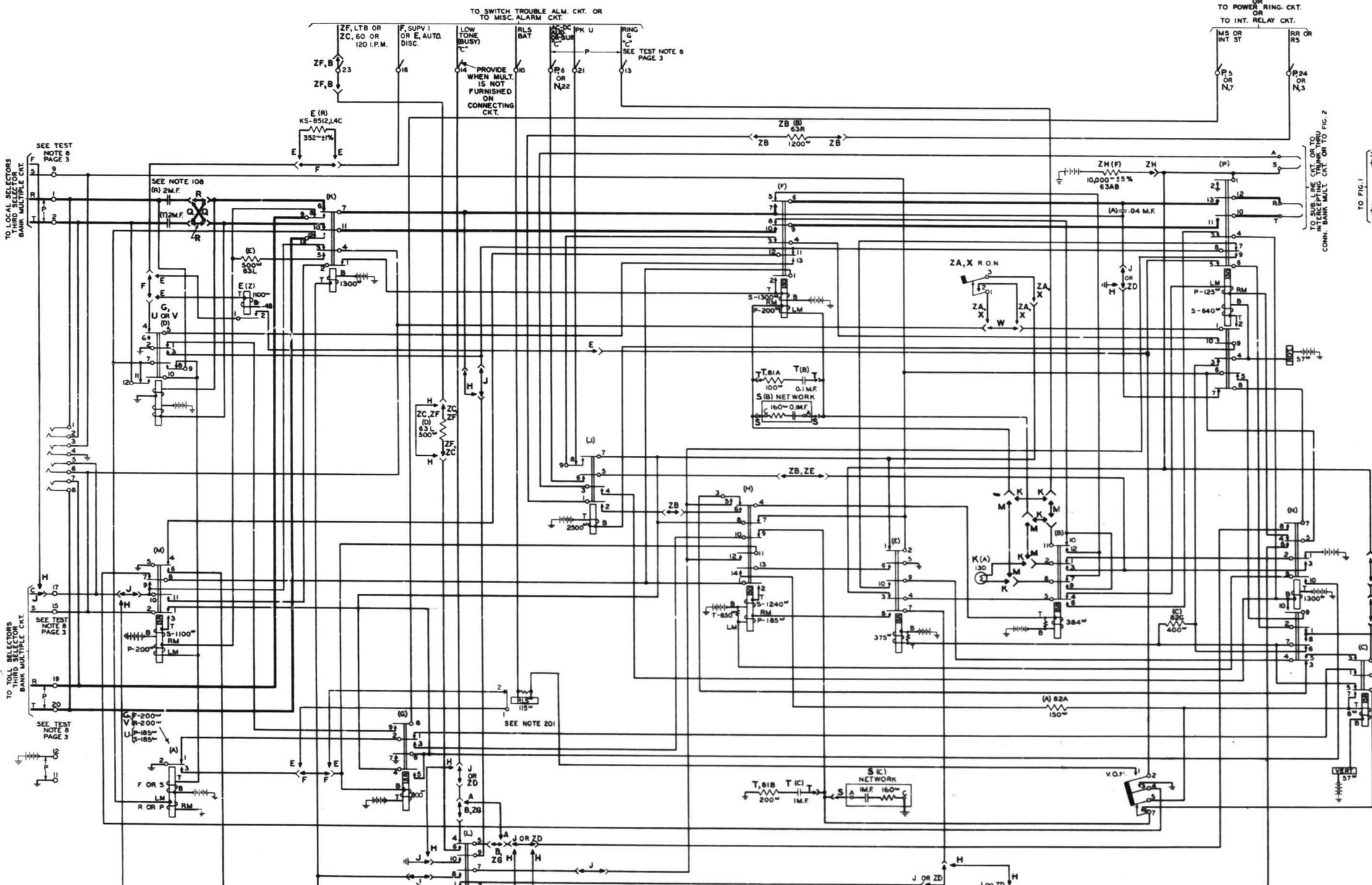
INFORMATION NOTES:
 301. WHERE CONNECTORS ARE PROVIDED WITH "M" OPTION, INTERCEPT CIRCUITS SHALL BE ARRANGED TO TRIP RINGING EITHER BY A COLD CATHODE TUBE OR BY MOMENTARY BATTERY ON ONE SIDE OF THE CIRCUIT. WHERE CONNECTORS ARE PROVIDED WITH "M" OPTION, INTERCEPT CIRCUITS SHALL BE ARRANGED TO TRIP RINGING EITHER BY A COLD CATHODE OR BY MOMENTARY GROUND ON ONE SIDE OF THE CIRCUIT.

CIRCUIT NOTES (CONT.):

NO.	FEATURES OR OPTIONS	PROVIDE
112.	BUSY FLASH TO OPERATORS IN OFFICES WITHOUT TOLL TRAIN	B, H
	OFFICES WITH TOLL TRAIN EQUIPPED FOR RETURN OF BUSY FLASH TO TOLL OPERATOR AND BUSY TONE TO LOCAL OPERATOR	B, J, ZC

FIG. 1
CONNECTOR

FIG. 2
(MFR. DISC.)



W197DF SWITCH X197EC SWITCH ZA197HC SWITCH

NO.	REV. OR CHG.	DATE	APPROVED
1	1	3-3-39	W.C. O.A.F.
2-D	APR 2	6-15-39	W.C. O.A.F.
3-D	APR 2	11-2-39	W.C. O.A.F.
4-D	APR 2	7-1-40	W.C. O.A.F.
5-D	APR 2	8-21-40	W.C. O.A.F.
6-D	APR 2	6-3-41	W.C. O.A.F.
7-D	APR 2	7-21-41	W.C. O.A.F.
8-D	APR 2	8-7-41	W.C. O.A.F.
9-D	2-D	7-14-47	F.J.S.
10-D	3-D	5-3-48	F.J.S.
11-B	3-D	7-29-48	F.J.S.
12-D	3-D	7-30-48	F.J.S.
13-D	3-D	5-4-50	R.L.L.
14-D	3-D	5-23-51	W.C. O.A.F.
15-D	3-D	8-3-51	W.C. O.A.F.
16-B	3-D	5-22-52	W.C. O.A.F.
17-B	4-B	12-5-53	W.C. O.A.F.
18-D	4-B	12-15-53	W.C. O.A.F.
19-B	4-B	7-27-54	W.C. O.A.F.
20-B	4-B	8-7-55	W.C. O.A.F.
21-B	4-B	7-29-56	W.C. O.A.F.
22-D	5-D	4-24-64	W.C. O.A.F.
23-D	5-D	6-7-67	W.C. O.A.F.
24-C	5-D	2-24-68	W.C. O.A.F.
25-B	5-D	2-24-68	W.C. O.A.F.
26-B	5-D	5-2-67	W.C. O.A.F.

101. THERE SHALL BE ONE LEAD FROM 48V TALKING BATTERY EQUIPPED WITH A 1 1/2 AMR FUSE FOR EACH CIRCUIT.

102. CONNECT TO ONE OF THE CODE LEADS IN ACCORDANCE WITH THE RING CODE ASSIGNED FOR THE CALLED NUMBER CORRESPONDING TO THE BANK TERMINALS.

103. WHEN "2" AND "ZB" OPTIONS ARE PROVIDED THIS CIRCUIT SHALL NOT BE USED IN A LOCAL TRAIN FOR CALLS FROM INC. REPEATERS OR TRUNKS WHICH PLACE A HOLDING GRD. FORWARD ON THE SLEEVE AFTER THE CONNECTOR REMOVES ITS GRD. FROM THE INC. SLEEVE AT THE TIME OF RELEASE.

104. THIS CIRCUIT SHALL BE USED FOR REVERTING CALL SERVICE ONLY WHERE THERE IS A DIRECT LOCAL SLEEVE CIRCUIT FROM THE CONNECTOR THRU THE SWITCH TRAIN AND SUBSCRIBER LINE CIRCUIT TO THE CONNECTOR BANK.

105. PROVIDE FEATURES AND OPTIONS AS FOLLOWS:

FEATURES OR OPTIONS	PROVIDE
REVERTING CALL	Y, ZB
NO REVERTING CALL	Y, ZB
OFFICES WITH TOLL TRAIN EQUIPPED FOR RETURN OF BUSY TONE TO TOLL AND LOCAL OPERATOR	J, ZF, ZG
AUTOMATIC DISCONNECT ON LOCAL NON-REVERTING CALLS	E
BUSY TONE TO OPERATORS IN OFFICES WITHOUT TOLL TRAIN	ZD, ZG

106. RECORD OF FIGURES, WIRING AND APPARATUS CHANGES

CHANGED ON ISS.	IF JOB SPECIFY	THIS WAS FURN.	NOTE	USE IN CIRCUIT	STANDARD	ALM.	M.D.	SPL.	WIRING	APPAR.
3-D	Y OR Z	Z	Z	Y	Y					
4-D	W OR X	W	X	W	W					
5-B	U OR V	V	U	V	V					
6-D	S OR T	T	S	T	T					
7-D	P OR R	R	P	R	R					
8-D										
9-D	FIG. 2	FIG. 2		FIG. 2						
10-D	K OR M	M	M	K	M					
13-D										
18-D	H OR J	J	J	H	H					
18-D	C	U OR V	U	V	V					
22-D	C OR F	F	F	C	F					
22-D	A, B, ZC	B, ZC	105	A, B, ZC						
22-D	ZA	W OR X	W	ZA	X					
22-D	ZB OR ZE	ZB	105	ZB						
22-D	ZD	J OR H	105	ZD	H					
24AC	ZF, ZG	A, B, ZC	105	ZF, ZG	A, B, ZC					
24AC		ZC	ZG		H					
26B	ZH	NONE	ZH							

OPTIONS USED

FIGS.	APP OR WIRING
1	Z, ZA
2	Y, ZB
	X, ZC
	W, ZD
	V, ZE
	U, ZF
	T, ZG
	S, ZH
	R, ZI
	Q, ZJ
	P, ZK
	O, ZL
	N, ZM
	M, ZN
	L, ZO
	K, ZP
	J, ZQ
	I, ZR
	H, ZS
	G, ZT
	F, ZU
	E, ZV
	D, ZW
	C, ZX
	B, ZY
	A, ZZ

107. THE DIFFERENCE BET. THE (D) REL IS AS FOLLOWS:
108. WHERE THE (T) & (R) CAPACITORS ARE PART OF A MULTI-UNIT CAPACITOR THEY SHALL BE BALANCED WITHIN 0.11 M.F.
109. "G" OPTION IS FOR USE WITH "R" OPTION AND TANDEM WOUND (A) AND (D) RELAYS WHEN IMPROVEMENT IN BALANCE AGAINST INDUCTIVE DISTURBANCES IS REQ.
- 110.
111. PROVIDE "M" OPTION WHERE 10-PARTY LINES ARE EQUIPPED WITH HIGH IMPEDANCE RINGERS. PROVIDE "K" OPTION IF ANY 10-PARTY LINE IS EQUIPPED WITH TUBE TYPE SUBSETS. SEE NOTE 301

TRANSMISSION TEST REQUIREMENTS (1000 CYCLE LOSS BETWEEN 600" LINES)

RELAY	TEST OPTION	MAX. ALLOWABLE CMT. LOSS (db)
(A)	(D)	0.9
(B)	(D)	0.7

ALLOWABLE INDIVIDUAL APPARATUS LOSSES (db)

APPARATUS	TEST CODE	MAX. LOSS	MIN. LOSS	REMARKS
CAPACITOR (T)	21M	1.6	1.4	SEE NOTE 1
RELAY	A	2.21A	0.3	"M" OPTION
RELAY	B	2.21B	0.3	"M" OPTION
RELAY	D	2.21D	0.3	"M" OPTION
RELAY	R	2.21R	0.3	"M" OPTION

NOTES:
 1. WHERE THE (T) & (R) CAPACITORS ARE PART OF A MULTI-UNIT CAPACITOR THE INDIVIDUAL LOSSES FOR THE (T) & (R) CAPACITORS SHALL BE WITHIN 0.5 db OF EACH OTHER.

TRIPPING RANGES

TYPE OF RINGING AND DISTRICT	RINGING 20 CYCLES			D.C. VOLTAGE	SILENT INTERVAL VOLTAGE	RATING	MAX. EXT. CKT. LOOP
	NO. 1	NO. 350A	NO. 355A				
AC-DC	84-88 80-88	72-88 84-88	75-110	45-52	45-52	STD	1030-1400
SUR. TUBE 25 V. E. R	72-80	72-88	65-90	42-46	37-40	STD	1030-1400
	84-88	64-88	65-90	37-40	37-40	STD	1115-1500

*72-80V A.C. AND 80-88 V.A.C. ARE A & M

WORKING LIMITS
 LIMITS ARE FOR SINGLE OFFICE AREAS. FOR MULTI-OFFICE AREAS AND FOR OPERATOR PULSING, SEE NET SHEETS.
 45V. MIN. 48V. MIN.

TYPE OF DIAL OR ADJ.	PULSING FROM SUB.			CALLED STA. SLEWS			PULSING FROM SUB.			CALLED STA. SLEWS		
	ADJ. A	ADJ. B	ADJ. C	ADJ. A	ADJ. B	ADJ. C	ADJ. A	ADJ. B	ADJ. C	ADJ. A	ADJ. B	ADJ. C
MAX. EXT. CKT. LOOP	750	1200	1100	1000	1400	1400	850	1500	1400	1115	1500	1500
MAX. EXT. CKT. LOOP	850	1400	1300	1200	1600	1600	1000	1500	1400	1115	1500	1500
MIN. INS. RES.	1000	1400	1400	1000	1400	1400	1115	1500	1500	1115	1500	1500

* WHEN USING 1000" LOOP - LEAK B IN PULSING TEST SET
 ** WHEN USING 1200" LOOP - LEAK A IN PULSING TEST SET
 *** WHEN USING 1400" LOOP - LEAK A IN PULSING TEST SET

LOCAL FEATURES REPLACED BY SD-3181-01, EXCEPT FOR ADDITIONS

SD-3181-01

STEP-BY-STEP SYSTEMS
 NO. 1, 350A OR 355A
 COMBINATION CONNECTOR CIRCUIT
 5 CODE FOR
 10 PARTY TERMINAL PER STATION
 ARRANGED FOR OPERATOR'S CALLS
 AND FOR CALLING PARTY CONTROL
 (COMB CONN 5 CODE TFS)

BELL TELEPHONE LABORATORIES, INC.

SD-3181-01
 2 SHEETS

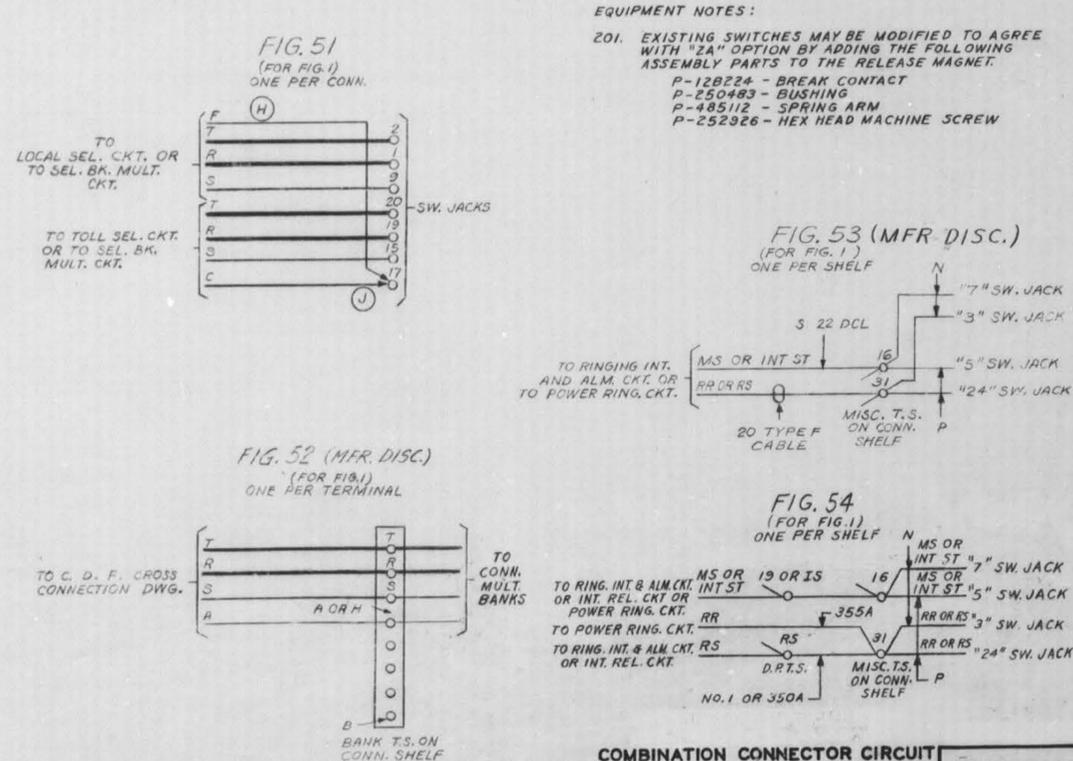
APPARATUS		MECH. REQ.		CIRCUIT PREPARATION		DIRECT CURRENT FLOW REQ.		TIME REQ.		REMARKS	DWG. ISS.				
DESIG.	CODE	OPTION	RESID.	BSP. FIG.	CONT. PRES.	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA	TEST SET PREP.			TEST WDG.	TEST FOR	AFTER SOAK	TEST
TEST NOTES:															
1. TEST - CONT. FOLLOW ON MAKE MIN. 8 CONT. SEPARATION ON ALL CONTS. MIN. 3.															
2. CONTS. 1-2 & 3-4 MAY BREAK.															
3. CONTS. 1-2 & 4-5 MAY BREAK.															
4. ARM. NEED NOT TOUCH CORE.															
5. CONT. PRESS. SPGS. 8-9 & 11-12 MIN 35 GRAMS.															
6. FOR USE WHEN TIMING REQ. ARE NOT APPLIED.															
7. FOR USE WHEN TIMING REQ. ARE APPLIED.															
8. TST HOLD-USE LEAK A IN PULSING TST. SET.															
9. CONNECT DIRECT GRD. TO SLEEVE WIPER.															
10. ADJ. "A"															
11. ADJ. "B"															
12. ADJ. "A" IS SUPERSEDED BY ADJ. "B" ON ISS. 14D.															

APPARATUS		MECH. REQ.		CIRCUIT PREPARATION		DIRECT CURRENT FLOW REQ.		TIME REQ.		REMARKS	DWG. ISS.				
DESIG.	CODE	OPTION	RESID.	BSP. FIG.	CONT. PRES.	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA	TEST SET PREP.			TEST WDG.	TEST FOR	AFTER SOAK	TEST
TEST NOTES:															
1. CONTS. 11-2T & 1B-2B MAY MAKE AND 3B-4B MAY BREAK AND IS PERMITTED BY SEQ. ANY TWO OTHER BREAK CONTS. MAY BREAK.															
2. CONTS. 1B-2B SHALL MAKE BEFORE SPG. 18 STRIKES THE BUSHING ON SPG. 4B AND IT STRIKES THE BUSHING ON SPG. 4T.															
3. TST. CONTS. 1B, 2B SHALL MAKE BEFORE 1T-2T MAKE CONTS. 1T-2T SHALL MAKE BEFORE 3T-4T & 5B-6B BREAK. CONTS. 3B-4B SHALL BREAK BEFORE 3T-4T & 5B-6B BREAK.															
4. 1T-2T MAY MAKE ONLY 1B-2B, 3B-4B REQ TO ORR.															
5. (RLS) SPRINGS 1-2 SHALL BREAK WITH A SEPARATION OF .008 IN READJ.; .006 IN TEST.															
6. (RLS) SPRINGS 1-2 SHALL NOT BREAK.															

APPARATUS		MECH. REQ.		CIRCUIT PREPARATION		DIRECT CURRENT FLOW REQ.		TIME REQ.		REMARKS	DWG. ISS.				
DESIG.	CODE	OPTION	RESID.	BSP. FIG.	CONT. PRES.	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA	TEST SET PREP.			TEST WDG.	TEST FOR	AFTER SOAK	TEST
TEST NOTES:															
1. REQ. FOR SPGS. 1-2 ONLY.															
2. CONTS. 1-2 MAY MAKE AND 3-4 & 5-6 MAY BREAK.															
3. FOR USE WHEN TIMING REQ. ARE NOT APPLIED.															
4. FOR USE WHEN TIMING REQ. ARE APPLIED.															
5. TST. HOLD-USE 100% LOOP IN PULSING TST. SET.															
6. CONNECT DIRECT GROUND TO SLEEVE WIPER.															
7. TST. HOLD-USE LEAK A IN PULSING TST. SET.															
8. CONTS. 1-2 SHALL MAKE BEFORE SPG. 1 STRIKES THE BUSHING ON SPG. 4.															
9. ADJ. "A" & "B" ARE SUPERSEDED BY ADJ. "C" & "D" RESPECTIVELY ON ISS. 14D.															
10. ADJ. "A"															
11. ADJ. "B"															
12. ADJ. "C"															
13. ADJ. "D"															
14. WITH "K" OPTION															
15. WITH "M" OPTION															
16. ADJ. "F"															
17. ADJ. "E"															
18. ADJ. "C" & "D" ARE SUPERSEDED BY ADJ. "E" & "F" RESPECTIVELY ON ISSUE 17B.															

APPARATUS		MECH. REQ.		CIRCUIT PREPARATION		DIRECT CURRENT FLOW REQ.		TIME REQ.		REMARKS	DWG. ISS.				
DESIG.	CODE	OPTION	RESID.	BSP. FIG.	CONT. PRES.	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA	TEST SET PREP.			TEST WDG.	TEST FOR	AFTER SOAK	TEST
TEST NOTES:															
201. EXISTING SWITCHES MAY BE MODIFIED TO AGREE WITH "2A" OPTION BY ADDING THE FOLLOWING ASSEMBLY PARTS TO THE RELEASE MAGNET:															
P-12B224 - BREAK CONTACT															
P-250483 - BUSHING															
P-485112 - SPRING ARM															
P-252926 - HEX HEAD MACHINE SCREW															

APPARATUS		MECH. REQ.		CIRCUIT PREPARATION		DIRECT CURRENT FLOW REQ.		TIME REQ.		REMARKS	DWG. ISS.				
DESIG.	CODE	OPTION	RESID.	BSP. FIG.	CONT. PRES.	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA	TEST SET PREP.			TEST WDG.	TEST FOR	AFTER SOAK	TEST
TEST NOTES:															
1. CONTS. 1-2 & 3-5 MAY MAKE AND 3-4 & 7-8 MAY BREAK.															
2. BLOCK RGN. SPGS. OPERATED.															
3. TST. CONTS. 1-2 SHALL MAKE BEFORE SPG. 1 STRIKES THE BUSHING ON SPG. 4 CONT. PRESSURE SPGS. 3-5 (ARM. OPR.) MIN. 15 GRAMS.															
4. CONTS. 1T-2T & 1B-2B MAY BREAK.															
5. TST. CONT. SEPARATION SPGS. 2T-3T MIN 13.															
6. CONTS. 1-2 & 3-4 MAY BREAK.															
7. CONTS. 1-2 & 4-5 MAY BREAK.															
8. JK SPGS. 9&11 AND 13&15 SHALL MAKE CONT. WHEN THE SW IS REMOVED.															
9. TEST CLIP DATA: CONN. GRD. TO 6(M) FOR "J" OPTION, TO 8T(N) FOR "H" OPTION.															



S-10-1181E-02

COMBINATION CONNECTOR CIRCUIT SD-31811-01-2
 BELL TELEPHONE LABORATORIES, INC. R
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DWG. ISS. 14D, 15D, 16B, 17B, 18D, 19B, 20B, 21B, 22D, 23D, 24AC, 25B, 26B