Western Electric Co., Inc.,
Engineering Department,
New York.

Issue 1 - BT-470662
February 8, 1923.

METHOD OF OPERATION
LINE CIRCUIT

Arranged For Completing Calls - From C.I. Position and To Give Supervision - To "A" or Call Circuit "B" Position By Means of - A Second Multiple (Free Charge Trunks) - Relay Switchboard #1

THE ILLINOIS BELL TELEPHONE COMPANY

This Method of Operation was prepared from issue 2 of drawing T-470662

DEVELOPMENT

1. PURPOSE OF CIRCUIT - This circuit is used at the switchboard end of a subscriber's line circuit for use with call indicator trunks and to give supervision to "A" or call circuit "B" positions.

2. WORKING LIMITS - This circuit is used with #1 cords and trunks, whose sleeves are connected to battery through maximum resistance of 218 ohms, and with call indicator trunks whose sleeves are connected to battery through a maximum resistance of 119 ohms.

OPERATION

3. PRINCIPAL FUNCTIONS - This circuit functions as a standard subscriber's line circuit when used from the call circuit trunk and "A" multiple jacks. When used from the call indicator jack the principal functions of the circuit are as follows:

3.1 Automatic application of ringing current to the called subscriber's line.

3.2 Automatic tripping of ringing current.

3.3 Establishment of the talking connection.

3.4 Returning to normal.

4. CONNECTING CIRCUITS - This circuit functions with:

4.1 Any #1 standard "A" cord.

4.2 Any #1 standard call circuit trunk.

4.3 Any standard call indicator trunk.

DETAILED DESCRIPTION

5. CALL FROM A CALL INDICATOR POSITION TO A 500-C or 500-C PBX.

If this circuit is used as a one way trunk and the plug of a call indicator trunk is inserted in the call indicator multiple jack the SL

and SL-1 relays operate in series. The SL relay operated, causes the SL-2 relay to operate from ground over the tip and to lock under control of the SL relay. The SL-2 relay operated, operates the R-1 relay, which in turn disconnects the line from the trunk and applies ringing current to the line through the R-2 relay.

6. CALLED STATION ANSWERS - When the receiver is removed from the switchhook at the called station, the R-2 relay operates removing the short circuit from the R-3 relay. The R-3 relay operates in series with the R-1 relay and then locks short circuiting and releasing the R-1 relay, disconnecting ringing current from the line and connecting the line through to the trunk. The operation of the R-3 relay also connects battery and ground through the windings of the S-T retardation to the line thus getting the circuit ready for talking.

7. DISCONNECT - When the plug of the call indicator trunk is removed from the jack all operated relays release, restoring the circuit to normal.

8. CIRCUIT USED AS A TWO WAY TRUNK - If this circuit is used as a two way trunk to a 550-C or 600-C P.B.X. the SL-1 relay and 18-CN resistance (B) are not required as battery from the regular subscriber's line relay prevents the relays at the P.B.X. switchboard from vibrating.

9. CALL FROM EITHER "A" OR CALL CIRCUIT "B" POSITION - When this circuit is used from either the call circuit or "A" multiple jacks, it functions the sameas a standrad subscriber's line.

READJUST VALUES ARE FOR MAINTENANCE PURPOSES ONLY

FOR EXPLANATION OF FORM SEE SPECIFICATION X-70087 .

RELAYS CODE	DESIG.	MECHANICAL REQ. SPEC. NUMBER	SKETCH NUMBER	CONT. PRESS	ARM. TRVL	TEST WDG.	DIRECT CURRENT FLOW REQ. TEST FOR	AFTER SOAK	TEST AMPS.	READJ. AMPS.	S.S. POS.	CIRCUIT PREPARATION BLOCK	TEST CLIP DATA CONN.BAT.	CONN.GRD.	TEST SET PREP	SEE TEST NOTE	REMARKS
114-R	(R-2)	X-70054	FBX	-	-		0			.108						1/2	
							NO			.100						1/2	
							0		A.C.							1/3	A
							NO		A.C.							1/3	B
							0		A.C.							1/3	C
							NO		A.C.							1/3	D
198-A	(R-2)	X-70073	B	-	-		0			.060						2/4	
							NO			.054						2/4	
							0		A.C.							4/5	E
							NO		A.C.							4/5	F
B333	(SL)	X-70056	6	-	-		0		.054	.040			Rwdg(SL)		Bat.		H
							NO		.022	.026			Rwdg(SL)		Bat.		
E6024	(R-1)	X-70037	8/3	20	.020		0		.028	.026			RL(R-1)		Bat.		G
E6025	(R-3)	X-70037	11/3	20	.020		0		.026	.024		(R-2) 0	RL(R-3)		Bat.	6	
E6026	(SL-1)	X-70037	2	10	.015		0		.072	.037			RL(SL-1)		Bat.		
							H		.016	.015			RL(SL-1)		Bat.		
E6027	(SL-2)	X-70037	14/1	20	.035		0		.034	.032				RU(SL-2)	G		

TEST NOTES:

1. Special requirements for Illinois Bell Co., Chicago area, for use in offices having an A.C. ringing voltage of 110 to 125 volts and negative 110 volts for silent interval tripping battery.
2. The flutter spring shall be adjusted so that it will be approximately half way between the back contact and the armature when the armature is in the operated position. There should be a clearance of .034" between the back contact and the flutter spring when the flutter spring is pressed flat against the armature and the armature is in the operated position.

RELAYS		MECHANICAL REQ.				DIRECT CURRENT FLOW REQ.				CIRCUIT PREPARATION			TEST SET	
CODE	DESIG.	SPEC. NUMBER	SKETCH NUMBER	CONT. ARM. PRESS	TEST TRVL	TEST WDG. FOR	AFTER SOAK	TEST READJ. AMPS.	S.S. AMPS.	POS.	TEST BLOCK	CLIP DATA CONN.BAT.	CONN.GRD.	PREP NOTE	REMARKS

TEST NOTES:

3. Test with testing circuit where furnished or by connecting the non-inductive resistance specified under remarks in series with the relay during the ringing period. If the relay fails to meet its test requirements, it shall be readjusted to its readjust requirements. If, after having been readjusted, the relay still fails to meet its test requirements, its adjustment shall be modified until it does meet the test requirements.
4. Special requirements for Illinois Bell Co., Chicago Area.
5. Test with testing circuit where furnished or by connecting the non-inductive resistance specified under remarks in series with the relay during the ringing period.
6. Connect direct ground to RU winding lug of R-3 relay.

REMARKS:

A. - 640 ohms ± 1% ringing test for 1100 to 1200 R.P.M.
B. - 1180 ohms ± 1% - ringing test for 1100 to 1200 R.P.M.
C. - 680 ohms ± 1% - ringing test for 950 to 1050 R.P.M.
D. - 1220 ohms ± 1% - ringing test for 950 to 1050 R.P.M.
E. - 700 ohms ± 1% - ringing test.
F. - 1300 ohms ± 1% - ringing test.
G. - Req. to insure slow release.
H. - Req. to meet hold circuit condition.

ENG: RF-CX CHK'D - FAB-WHL APPROVED: J.L. DOW - G.M.L.

Western Electric Co., Incorporated,
Equipment Engineering Branch, Hawthorne.

Issue 1 BT 470662
Appendix 1
March 12, 1927.

This Appendix was prepared from Issue 5 of Drawing T-470662.

METHOD OF OPERATION
LINE CIRCUIT

Arranged for Completing Calls - From C.I. Position and to Give Supervision - To "A" or Call Circuit "B" Position by Means of A Second Multiple (Free Charge Trunks) - Relay Switchboard No. 1.

Cancel circuit requirements on pages 3 and 4.

Circuit requirements have been added on T-470662.

CIRCUIT REQUIREMENTS

READJUST VALUES ARE FOR MAINTENANCE PURPOSES ONLY

FOR EXPLANATION OF FORM SEE SPECIFICATION X-70087.

RELAYS CODE	DESIG.	MECHANICAL REQ. SKETCH NUMBER	CONT. ARM. PRESS	TRVL	TEST WDG.	DIRECT CURRENT FLOW REQ. TEST FOR	TEST AFTER SOAK	READJ. AMPS.	S.S. POS.	CIRCUIT PREPARATION BLOCK	TEST CLIP DATA CONN.	BAT.	CONN.	GRD.	TEST SET PREP	SEE TEST NOTE	REMARKS
114-AK	(R-2)	BX				See Note 7										4	
114-R	(R-2)	FBX	-	-		0		.108			U-Wdg(R-2)		L-Wdg(R-2)		NBG	1	
						NO		.100			U-Wdg(R-2)		L-Wdg(R-2)		NBG	1	
						0	A.C.									1/3	A
						NO	A.C.									1/3	B
						0	A.C.									1/3	C
						NO	A.C.									1/3	D
198-A	(R-2)	B	-	-		See Note 8										5	
B-333	(SL)	6	-	.030		0	.052	.040			2-Wdg(SL)				BAT		E
						NO	.022	.024			2-Wdg(SL)				BAT		
E-6024	(R-1)	8/3	H	.020		0	.051	.026			RL(R-1)				BAT		G
E-6025	(R-3)	11/3	H	.020		0	.026	.024		(R-2) 0	RL(R-3)		RU(R-3)		B/G		
E-6026	(SL-1)	2	L	.015		0	.071	.037			RL(SL-1)				BAT		F
						H	.025	.015			RL(SL-1)				BAT		H
E-6027	(SL-2)	14/1	H	.035		0	.034	.032					RU(SL-2)		G		

TEST NOTES:

1. Special requirements for Illinois Bell Co., Chicago area, for use in offices having an A.C. ringing voltage of 110 to 125 volts and negative 110 volts for silent interval tripping battery.

CIRCUIT REQUIREMENTS

READJUST VALUES ARE FOR
MAINTENANCE PURPOSES ONLY

TEST NOTES:

2. The flutter spring shall be adjusted so that it will be approximately half way between the back contact and the armature when the armature is in the operated position. There should be a clearance of .034" between the back contact and the flutter spring when the flutter spring is pressed flat against the armature and the armature is in the operated position.
3. Test with testing circuit where furnished or by connecting the non-inductive resistance specified under remarks in series with the relay during the ringing period. If the relay fails to meet its test requirements, it shall be readjusted to its readjust requirements. If, after having been readjusted, the relay still fails to meet its test requirements, its adjustment shall be modified until it does meet the test requirements.
4. The #114-AK relay (R-2) shall be tested and readjusted in accordance with X specification.
5. This relay shall be tested and readjusted in accordance with X specification.

REMARKS:

A. - 640 ohms ± 1% ringing test for 1100 to 1200 R.P.M.
B. - 1180 ohms ± 1% ringing test for 1100 to 1200 R.P.M.
C. - 680 ohms + 1% ringing test for 950 to 1050 R.P.M.
D. - 1220 ohms ± 1% ringing test for 950 to 1050 R.P.M.
E. - Ext. res. - series 218W - shunting 107W.
F. - Ext. res. max. 218 ohms to battery.
G. - Req. to insure slow release.
H. - Ext. res. max. 218 ohms to battery - min. 18 ohms to ground.

ENG: W.S.E.
March 12, 1927.
BMS

CHK'D. BY: G.E.H.

APP'D. BY: E. R. COOKE
S.C.E.