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COMMON SYSTEMS
DIAL LONG LINE CIRCUIT
COMPOSITE SIGNALING TYPE B
TYPE B TB SUPPLY
FOR PBX STATION LINES
OR SUBSCRIBER LINES IN CROSSBAR,
PANEL OR STEP BY STEP OFFICE
WITH OR WITHOUT TELEPHONE REPEATER

CHANGES

D. Description of Changes

D.1 This circuit is changed to overcome a difficulty in the application of ZF and ZG options as introduced on issue 22B. This change is made on a no-record basis in agreement with WECO and consists of the following:

- (a) CAD Fig. 55 and 56 are restored to previous SD issue 21AC.
- (b) CAD Fig. 56 is rated Mfr Disc. and is replaced by CAD Fig. 60. CAD Fig. 60 utilizes installer strapping for H or J options to permit increased circuit flexibility.
- (c) CAD Fig. 55 is modified to show application of ZF and ZG options per SD issue 22B.
- (d) CAD Fig. 59 is introduced to permit application of ZF option per SD issue 22B.

D.2 This circuit is compatible for use with T1 carrier equipment. Circuit Note 102 is changed and Information Note 303 is added to reflect this usage.

D.3 This circuit is changed to distinguish non-record options from record options. This is in accord with the standardization of equipment common languages codes as requested by the AT&TCo. The changes are as follows:

- (a) Non-record options are now identified on the drawing by a square symbol instead of a circle. The options affected are G,H,J,M,N,ZC, and ZD.
- (b) Non-record options are now identified on the Feature and Option table and Record of Changes table by an asterisk adjacent to each non-record option. The note * non-record option appears below each table.
- (c) On Record of Changes table an entry is shown only in the use column for non-record options.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5333-WFH-RDW

**COMMON SYSTEMS
DIAL LONG LINE CIRCUIT
COMPOSITE SIGNALING TYPE B
TYPE B TB SUPPLY
FOR PEX STATION LINES
OR SUBSCRIBER LINES IN CROSSBAR,
PANEL OR STEP BY STEP OFFICE
WITH OR WITHOUT TELEPHONE REPEATER**

CHANGES

D. Description of Changes

D.1 The T and R lead MDF connecting information to the Auxiliary Long Line Circuit in CAD Fig. 58 is modified on a no-record basis.

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DEPT 5333-WFH-RDW

COMMON SYSTEMS
DIAL LONG LINE CIRCUIT
COMPOSITE SIGNALING TYPE B
TYPE B TB SUPPLY
FOR PBX STATION LINES
OR SUBSCRIBER LINES IN CROSSBAR,
PANEL OR STEP BY STEP OFFICE
WITH OR WITHOUT TELEPHONE REPEATER

CHANGES

B. Changes in ApparatusB.1 ADDED

C Diode 446F Fig. D, E
ZF Option

B.2 SUPERSEDED

B Resistor 18FS
E Option, Fig. 1
C Resistor 18KF
E Option, Fig. 1

SUPERSEDED BY

E Resistor 145A
ZE Option, Fig. 1

C. Changes in Circuit Requirements Other Than Those Caused by Changes in Apparatus

C.1 The after soak current flow requirement for relay A is changed from 190 ma to 100 ma to show the correct value.

D. Description of Changes

D.1 The following changes are made to arrange this circuit for use in a loop start signaling circuit employing E3B/E1L SF units to provide improved foreign exchange service:

Fig. D and E

(a) The C diode is added at 3T(R) relay.

Fig. A

(b) Cross-connections to the 4-wire terminating circuit are added per

ZF option for the T1, R1 leads from Fig. 1.

(c) Circuit Note 111 is added.

D.2 T and R leads from 2T, 2B(R) relay, Fig. C, D, E, and F, are added to provide connections to the Auxiliary Long Line Circuit, SD-1E043-01, when TOUCH-TONE to dial pulse conversion is required.

D.3 The B and C resistors in Fig. 1 are replaced by the E resistor. This cost reduction item is covered by the ZE option.

D.4 To eliminate a possible cause of ringing induction pickup, when this circuit is equipped for ringing trip, the number 2 lead between CAD Fig. 56 and 57 is labeled critical and is shown in a separate cable.

D.5 The B, B1, G, and G1 leads, shown with a ZG option in Fig. E, are added to provide connections to the Patching Package Application Schematic, SD-99405-01. This change will permit the restoration of service on failed private line service components at the private line testboard No. 22A.

F. Changes in CD Sections

F.1 Under Connecting Circuits, add:

4.13 Auxiliary Long Line Circuit - SD-1E043-01.

4.14 Patching Package Application Schematic - SD-99405-01.

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DEPT 5332-WFH-HHA

COMMON SYSTEMS
DIAL LONG LINE CIRCUIT
COMPOSITE SIGNALING TYPE B
TYPE B TB SUPPLY
FOR PBX STATION LINES
OR SUBSCRIBER LINES IN CROSSBAR,
PANEL OR STEP BY STEP OFFICE
WITH OR WITHOUT TELEPHONE REPEATER

CHANGES

D. Description of Changes

- D.1 The following changes are made to correct the ringing trip feature which is inoperative for N1 or 0 carrier operation:
- (a) Fig. E - ZC and ZD option wiring is added at 7T(R) relay.
 - (b) Fig. D - ZC and ZD option wiring is added at 7TF(R) relay.
 - (c) Fig. G - ZC and ZD option wiring is added at 7,7B(TP) relay.
- D.2 Circuit Note 110 is added.

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DEPT 5332-WFH-HHA

COMMON SYSTEMS
DIAL LONG LINE CIRCUIT
COMPOSITE SIGNALING TYPE B
TYPE B TALK BAT. SUPPLY
FOR PBX STATION LINES
OR SUBSCRIBER LINES IN CROSSBAR,
PANEL OR STEP BY STEP OFFICE
WITH OR WITHOUT TELEPHONE REPEATER

CHANGES

B. CHANGES IN APPARATUS

B.1	Removed	Replaced By
	TP-AJ49 Relay	TP-AG-58 Relay

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DEPT. 5336-BAF-EVDL-EB

**COMMON SYSTEMS
DIAL LONG LINE CIRCUIT
COMPOSITE SIGNALING TYPE B
TYPE B T.B. SUPPLY
FOR PBX STATION LINES
OR SUBSCRIBER LINES IN CROSSBAR
PANEL OR STEP BY STEP OFFICE
WITH OR WITHOUT TELEPHONE REPEATER**

CHANGES**A. CHANGED AND ADDED FUNCTIONS**

- A.1 A motor start lead is added.
A.2 A tripping relay is added.

B. CHANGES IN APPARATUS

- B.1 Added
491 (TP) relay Fig. G
- B.2 Added
KS-15724, L2 Diode Figs. C, D, E or F (Option B)
- | | |
|--|--|
| B.3 Superseded | Superseded by |
| Resistors B & C
18RE & 19RT
Option F | Resistors B & C
18FS & 18KF
Option E |

DESCRIPTION OF CIRCUIT CHANGES

- D.1 In Fig. 1, resistor B and C are changed to reduce cost.
- D.2 Fig. G is added to provide a tripping relay.
- D.3 In Figs. C, D, E or F Option B is added. Option B is to provide a motor start lead.
- D.4 Circuit Note 102 is revised to repeat Issue 19D and to remove reference to Option M under line and balancing repeating coil coil and compromise network circuit.

1. PURPOSE OF CIRCUIT

- 1.1 This circuit is for use as a dial long line circuit for subscriber's line circuit, PBX trunk or PBX station circuit at the office near the subscriber. Dial pulsing and supervision is over a composite signaling circuit to the crossbar, panel or step-by-step central office.

2. WORKING LIMITS

- 2.1 Maximum external conductor loop resistance for dialing - 3,000 ohms.

- 2.2 Maximum external circuit loop resistance for supervision - 3,100 ohms.
- 2.3 Maximum subset capacity 1.35 MF.
- 2.4 Minimum insulation resistance - 15,000 ohms.
- 2.5 Dial speed 8-11 P.P.S.

3. FUNCTIONS

- 3.1 Provides for repeating dial pulses and supervisory signals from the subscribers line over a signaling circuit to the dial long line circuit in the distant office.
- 3.2 Provides for applying local ringing current to the line or trunk under control of signals over the signaling circuit.
- 3.3 Provides transmitter battery supply to the station.
- 3.4 Provides for tripping local ringing current during the silent interval.
- 3.5 Provides means for protecting the resistance lamp against high voltage induced on the line.
- 3.6 Provides for testing the polar relay.
- 3.7 Provides for controlling a voice repeater in the same office.
- 3.8 Provide a motor start lead.
- 3.9 Provides a tripping relay to trip during the ringing period.

4. CONNECTING CIRCUITS

When this circuit is listed on a key-sheet the connecting information thereon is to be followed.

- 4.01 Dial Subscribers Set.
- 4.02 Loop Signaling PBX Trunk Circuit - SD-66013-01.*
- 4.03 Repeating Coil Circuit - SD-60782-02.*

*Typical Circuits

- 4.04 Simplex Signaling Circuit - SD-95051-01.*
- 4.05 Composite Signaling Circuit - SD-95028-01.*
- 4.06 Composite Set and Repeating Coil Circuit - SD-95004-01.
- 4.07 Repeating Coil and Compromise Net. Circuit - SD-95015-01.
- 4.08 V3 Rept. Applic. Schem - SD-95144-01.
- 4.09 M1 Carrier Applic. Schem. - SD-95121-01.
- 4.10 Patching Jack Ckt. - SD-59329-01.*
- 4.11 4-Wire Terminating Set - SD-96463-01.
- 4.12 Line and Balancing Repeating Coil Ckt. - SD-96452-01.

*Typical Circuits

DESCRIPTION OF OPERATION

5. CALL FROM SUBSCRIBER

When the subscribers receiver is removed from the switchhook or the PBX attendant inserts the plug of a cord in the PBX trunk jack associated with this circuit the loop is closed operating relay (P). Relay (P) operated, removes ground and connects battery through resistance lamp "B" to lead "M" toward the signaling circuit. Battery on lead "M" signals the long line circuit at the distant end of the signaling circuit and the dial office circuit is prepared for receiving pulses. When dial tone is heard the subscriber or PBX attendant dials in the usual manner and relay (P) follows the dial pulses alternately connecting battery and ground to lead "M" to operate the circuit at the dial central office. When the subscriber disconnects, relay (P) releases the connection at the distant end and restore the circuit to normal.

6. CALL FROM CENTRAL OFFICE

When the subscriber connected to this circuit is called from the central office the long line circuit at the distant end functions to operate the signaling circuit in step with ringing current.

Figs. C (Mfr. Disc.) or F

Ground on lead "E" from the signaling circuit in step with the ringing current from the distant end operates relay (R) to (1) apply local ringing current to the subscribers line and (2) with Option B starts the ringing machine

Fig. B

Removal of ground from lead "E" in step with the ringing current release relay (R) to apply local ringing.

Figs. D (Mfr. Disc.) or E

Removal of ground lead "E" in step with the ringing current from the distant end releases relay (E) which (1) operates relay (R) to apply local ringing and (2) with Option B starts the ringing machine.

7. CALL ANSWERED

7.1 When the subscriber answers, the loop is closed and during the silent interval the circuit is closed for operating relay (P). Relay (P) operated, removes ground and connects battery through resistance lamp "B" to lead "M" to signal the distant end and trip ringing. When the subscriber disconnects relay (P) releases connecting ground to lead "M" and restoring the circuit to normal. Ground on lead "M" returns a disconnect signal over the signaling circuit to the calling operator.

7.2 (Trip during ringing interval)

When the subscriber answers relay TP operates on its primary winding. Relay TP operated (1) releases relay R and (2) locks operated to lead E. Relay R released, connects the loop to operate relay P. Relay P operated changes the condition on lead M from ground to battery to signal the distant end to trip ringing. Relay TP will release when the distant end removes ground from lead E. When the subscriber disconnects relay P releases connecting ground to lead M and restoring the circuit to normal.

B. CIRCUIT EQUIPPED WITH TELEPHONE REPEATERS (OPTION Y)

When Option "Y" is furnished, relay (B) keeps a short circuit on the repeater line and network leads to prevent repeater singing while the circuit is normal. When the loop is closed, relay (A) operates in series with relay (P) in turn operating relay (B). Relay (B) operated removes the short circuit from the repeater to permit transmission. When the PBX operator or subscriber dials, relay (A) follows the dial pulses and operates relay (C) through contacts of relay (B) operated. Relays (B) and (C) being slow releasing remain operated during pulsing and relay (C) operated re-closes the short circuit on the repeater to prevent possible singing during dialing. After dialing and while the loop is closed, relay (A) remains operated to hold relay

(B) operated and relay (C) releases. When the subscriber disconnects, relay (A) releases in turn releasing relay (B) to re-apply the short circuit on the repeater.

9. TESTING

Resistance lamp (A) is provided when a vacuum tube base and straps as shown are included in the base. When the lamp is removed from the socket, points are provided for connecting the test set for testing and adjusting relay (P).

When lamp (A) is removed from the circuit, varistor (A) of Fig. 2, when furnished, remains connected to the "P1" winding of relay (P), but its resistance under the test condition is high enough so its effect may be neglected when testing the "P1" winding. The "B" and "C" resistances remain connected to the "S" wiring of relay (P) and their effect is compensated for in the test current flow requirements.

10. MISCELLANEOUS

Fig. 2 or 4 is furnished when required to protect the filaments of resistance lamp (A) and the windings of relay (P) on lines which may be exposed to electrical disturbances and high voltages which would cause the filaments to burn out. Fig. 2 provides shunts around the lamp filaments and relay windings to prevent the voltage rising above the capability of the lamp and relay. Normally the varistor resistance is so high that it has no effect upon the circuit operation but when the voltage rises above 50 volts the resistance drops quite low and holds the voltage drop across the lamp and relay to a value below that which would cause the filaments to burn out or relay to breakdown.

Fig. 3 is furnished when the associated composite signaling circuit is equipped with 209 type relays, or when this circuit is used with N1 or O carrier connected on a 2-wire basis. Repeating coil (A) serves as the battery feed coil for the subscriber line and prevents current changes and line surges from affecting the signaling circuit relays and giving false signals.

Figs. C, D (Mfr. Disc.) E or F

Condenser (B) in series with the secondary winding of relay (R) or resistance (D) is used to prevent the false operation of relay (P) during ringing when relay (R) releases during the silent interval. When relay (R) is operated, condenser (B) is charged from ground through contacts of relay (R) and the secondary winding or resistance (D) to battery through one filament of lamp (A). When relay (R) releases during the silent interval the voltage built up on the subscribers line is discharged into the operate windings of relay (P) in the direction tending to operate it. Under this condition condenser (B) is charged in the opposite direction through the "S" winding of relay (P) and in parallel with the biasing resistance. This charging current in the "S" winding opposes the rise of current in the operate windings and prevents the false operation of relay (P).

Fig. B

Condenser (B) in series with resistance (D) operates as above except that the operate and release conditions of relay (R) are reversed.

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DEPT. 5332-WVS-HFH-MD