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TOLL SYSTEMS  
TOLL SWITCHBOARD NO. 3C, 3CL OR 3CF  
TOLL TESTBOARD NO. 17B OR 18B  
POSITION DIAL CIRCUIT  
FOR REPEATED DIALING  
ARRANGED FOR REASSOCIATION OF DIAL CKT.  
AND FOR AUTOMATIC START OF RINGING

## CHANGES

## A. CHANGED AND ADDED FUNCTIONS

A.1 Provisions are added for using the dial of this circuit with a Signaling Test Circuit.

## D. DESCRIPTION OF CIRCUIT CHANGES

D.01 Connecting information in Fig. 1 is amended to permit the connection of this circuit to the Signaling Test Circuit, SD-56497-01.

D.02 Circuit Note 102 is modified to refer to the Signaling Test Circuit for the use of Fig. 3 with the toll testboard.

D.03 The word testboard in the title was formerly shown as two words.

D.04 Drawings J63516E and J63516N are added to the equipment information column.

D.05 Leads connecting 1T and 2B of relay A are designated Option B. This is made on a no record "D" change to agree with Western Electric Company manufacturing information. This will permit surface wiring of a more economical nature.

D.06 Connecting information is amended for inclusion of the Signaling Test Circuit on the dial leads in Fig. 1.

D.07 Fig. 55 is modified.

D.08 Fig. 58 is added.

D.09 Information Note 302 is modified.

D.10 Figs. L and 54 are rated A&M only.

D.11 Connecting information in Fig. 54 is modified.

## 4. CONNECTING INFORMATION

Add:

4.20 Signaling Test Circuit - SD-56497-01.

4.21 Cord Circuit - SD-56495-01.

## F. CHANGES IN DESCRIPTION OF OPERATION

F.1 Replace paragraph 12 with the following:

## 12. CONNECTION OF DIAL TO OTHER CIRCUITS

When the position circuit is arranged to associate the dial with other circuits the dial contacts, ("Y", "R", "B" and "GN" leads), are run through a series chain consisting of the associated circuits to the "Y1", "R1", "B1" and "GN1" leads of this circuit. Any circuit in the chain, when the dial is required, will function a transfer relay which transfers the dial contacts from the dial circuit to the particular circuit involved. The "W" lead of the dial is connected to the first circuit in the chain only when the Dialing and Supervisory Circuit is used regardless of the latter's position in the chain.

## 12.1 Dialing With Signaling Test Circuit

When a key in the signaling test circuit is operated it causes a transfer relay to operate and transfer the dial contacts to the signaling test circuit. Start and stop dialing indications will be observed on the signaling test circuit when the dial is in use.

## 12.2 Dialing Through Dialing and Supervisory Circuit

When the dial key associated with the dialing and supervisory circuit is operated the dialing and off-normal contacts of the

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dial are transferred from the position dial circuit to the dialing and supervisory relay equipment for dialing over intertoll trunks.

### 12.3 Signaling On Telephone Order Wire

When the SS1 Signaling Telephone Order Wire Circuit is used connection of a cord to

the jack associated with the SS1 Telephone Order Wire is made. The (DP) lamp will light as a start dialing signal when the SS1 Telephone Order Wire Circuit is ready for dialing. At that time the dial of this position dial circuit is transferred to the telephone order wire circuit for pulsing purposes. When the (DP) lamp is extinguished the dial is transferred back for use with this circuit.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2361-JFM-AAB-EP

TOLL SYSTEMS  
TOLL SWITCHBOARD NO. 3C, 3CL OR 3CF  
TOLL TEST BOARD NO. 17B OR 18B  
POSITION DIAL CIRCUIT  
FOR REPEATED DIALING  
ARRANGED FOR REASSOCIATION OF DIAL CKT.  
AND FOR AUTOMATIC START OF RINGING

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 This circuit is reissued to correct errors, which were inadvertently made when the tracings were redrawn for the previous issue.

D.11 In Fig. 1 the "b" symbol at 17 and 27 of the (RA) relay was omitted. This indicates these leads are to be looped when the (RA) relay is not furnished.

D.12 In Fig. 1 the leads connecting to Fig. 3 were "stubbed" together. This would nullify any reason for having Fig. 3 and would prevent proper operation with the SS1 Order Wire Circuit or the Supervisory Circuit.

D.13 Reference to Note 301 was inadvertently specified in the connecting information for the GN, R, B, and Y leads.

D.14 These changes agree with the Western Electric Co. Manufacturing information.

All other headings no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2321-JFM-AAB-JH

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TOLL SYSTEMS  
TOLL SWITCHBOARD NO. 3C, 3CL OR 3CF  
TOLL TEST BOARD NO. 17B OR 18B  
POSITION DIAL CIRCUIT  
FOR REPEATED DIALING  
ARRANGED FOR REASSOCIATION OF DIAL CRT.  
AND FOR AUTOMATIC START OF RINGING

## CHANGES

## A. CHANGED AND ADDED FUNCTIONS

A.1 Provisions are added for using the dial of this circuit, when signaling over the SS1 Telephone Order Wire Circuit.

## D. DESCRIPTION OF CIRCUIT CHANGES

D.01 Connecting information in Fig. 1 is amended to permit the connection of this circuit to the SS1 Signaling Telephone Order Wire Circuit, SD-96508-01.

D.011 When the dialing and supervisory circuit is also required with the SS1 Telephone Order Wire Circuit the dial leads (B, Y etc.) connect thru the order wire on thru the dialing and supervisory circuit and then back to this circuit over the auxiliary dial leads (Bl, Yl etc.).

D.012 When the dialing and supervisory circuit is not furnished but the SS1 Telephone Order Wire is furnished then the dial and dial auxiliary leads connect to the order wire circuit directly.

D.013 When neither SS1 Telephone Order Wire nor dialing and supervisory circuits are furnished then the straps per Fig. 3 are used.

D.014 When both order wire and dialing and supervisory circuits are furnished the "W" lead connects to the order wire circuit. If the order wire circuit is furnished alone the "W" lead is not connected to the SS1 Telephone Order Wire Circuit.

D.015 Information Note 301 is added to clarify the situation described in D.011, D.012 and D.013.

D.02 Fig. 3 is added. Note 108 is added to explain that Fig. 3 was part of Fig. 1.

D.03 Dial reassociated Option "A" is rated Mfr. Disc.

D.04 The wiring at 4 and 5 top of the (H) and (G) relays is designated "W" or "F" option to agree with Western Electric Co. manufacturing drawings. This will permit surface wiring of testboard units.

D.05 Provision is added for connecting to the Remote Control Connector Circuit, SD-95793-01 for service observing use.

D.06 The feature or option table circuit Note 102 is modernized.

D.07 CAD Figs. 56 and 57 are added.

D.08 CAD Figs. 54 and 55 are modified.

D.09 The following drawings are added to the "Equip Info" column:

J61528B  
ED-92115-01  
ED-92114-01  
ED-92106-01  
J61528C

D.10 Drawing ED-61601-01 is lined thru in the "Equip Info" column.

All other headings under Changes, no change.

## 1. PURPOSE OF CIRCUIT

1.1 The purpose of this circuit is to provide a means for dialing in offices arranged for repeated dialing only.

## 2. WORKING LIMITS

2.1 To operate relay (R1). Max. external resistance to ground on tip 140 $\Omega$ .

2.2 To nonoperate relay (R1). Min. external resistance to ground on tip 760 $\Omega$ .

## 3. FUNCTIONS

3.1 Provides means for operating on a repeated dialing basis.

3.2 Provides means for reassociation of the dial if the dial key is restored and reoperated.

3.3 Provides means for automatic start of ringing from inward positions for trunks requiring this feature. This feature can be disabled if necessary.

3.4 Provides for dial monitoring.

3.5 Provides a combined dial pilot and supervisory lamp.

- 3.6 Provides means for service observing on this circuit.
- 3.7 Provides means for signaling with this dial over the SS1 Telephone Order Wire Circuit.

4. CONNECTING CIRCUITS

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

- 4.01 Toll Switchboard No. 3C Position Circuit - SD-64737-01.
- 4.02 Toll Switchboard No. 3C Cord Circuit - SD-64737-01.
- 4.03 Toll Test Board No. 17B Position Circuit - SD-64616-01.
- 4.04 Toll Test Board No. 17B Cord Circuit - SD-64613-01.
- 4.05 Toll Test Board No. 18B Secondary Cord Circuit - SD-55033-01.
- 4.06 Toll Test Board No. 18B Secondary Position Circuit - SD-55034-01.
- 4.07 Auxiliary Secondary Cord Circuit - SD-56212-01.
- 4.08 Monitoring and Observing Jacks Circuit - SD-90564-01.
- 4.09 Dial Monitoring Circuit - SD-90596-01.
- 4.10 Intertoll Dial Pulse Repeating Test Circuit - SD-64540-01.
- 4.11 Step-by-Step Pulsing Test Set Circuit - SD-31481-01.
- 4.12 Toll Test Board Nos. 4, 5 or 18B Dialing and Supervisory Circuit - SD-64595-01, SD-56064-01.
- 4.13 Peg Count Circuit - SD-62390-01.
- 4.14 Step-by-Step Traffic Register Circuit - SD-31109-01.
- 4.15 Crossbar No. 1 Traffic Register Circuit - SD-25317-01.
- 4.16 Toll Switchboard Nos. 3C or 3CL Traffic Register Circuit - SD-56233-01.
- 4.17 Cord Service Observing Circuit - SD-56295-01.
- 4.18 Remote Control Connector Circuit - For Use With Service Observing - SD-95793-01.
- 4.19 Telephone Order Wire Circuit - SS1 Signaling - SD-96508-01.

DESCRIPTION OF OPERATION

5. GENERAL

The following sections describe the operation of this circuit for front cord dialing. The operation is the same for rear cord dialing except that the (R) relay operates instead of the (F) relay.

6. PREPARATION FOR DIALING

6.1 Without Dial Reassociation

When the plug of the cord, over which it is desired to dial, is inserted into the jack of the out dial trunk and the (DIAL) key is operated to the "FRONT" position ground is connected over lead "DF1" thru relay contacts in the position circuit to lead "DF" causing the operation of relay (F). The operation of relay (F), (a) transfers the tip and ring leads of the front cord from the position circuit to the dialing equipment where battery is connected to the "R" lead, (b) provides ground over the "DH" lead for holding the cord connected to the dial circuit even if the cord circuit (TALK) key is released, (c) operates relay (A), (d) closes a locking circuit for itself under the control of relay (A) operated and the cord sleeve. Relay (A) needs only to be slow enough to insure that battery is not applied to the tip of the trunk before application to the ring. Relay (A) in operating (a) closes battery to the tip conductor to prepare the trunk for dialing and also closes a circuit to the dial pilot lamp under control of the trunk sleeve. A low trunk sleeve will cause the (DP) lamp to light as a start dialing indication. When this circuit is used with intertoll dialing trunks, this lamp will also serve to indicate the progress of the call during dialing. Thus when it goes out it will inform the operator to stop dialing and when it relights again it will be a "start dialing" indication. If the lamp flashes it will indicate a trunk or line busy has been encountered.

6.2 With Dial Reassociation, Option "A" (Mfr. Disc.)

In this case with the operation of the (DIAL) key to the front position, the (F) relay operates as previously described. In this case, however, relay (F) operates relay (RA) which in turn applies 48 volt battery to the ring conductor for an interval of time controlled by the operate time of relay (RA) and the release time of itself. The 48 volt battery connected to the ring is effective only when the associated dial trunk is arranged for reassociation of the dial circuit. On such trunks, if the (TALK) and (DIAL) keys have been released and the trunk has progressed into the talking condition, the reoperation of the (TALK) and (DIAL) key causes the 48 volt battery to be connected to the trunk for a sufficient

period to cause the trunk to revert to the dialing condition. Relay (RA1) in operating, locks under control of relay (F) and then operates relay (A) which performs the same functions as outlined in Paragraph 6.1.

### 6.3 SS1 Telephone Order Wire (see Section 12).

## 7. PULSING

7.1 When the dial is moved off normal, the off normal contacts of the dial provide ground for holding relay (A) operated. This supplements the hold ground furnished thru the (DIAL) key contacts and insures that even though the (DIAL) key is released while the dial is off normal, the (A) relay will not release until the dial is restored to normal.

As the dial returns to normal the pulsing contacts of the dial open and close, interrupting the battery connected to the ring of the trunk and causing the associated trunk relays and switches to function.

7.2 When dialing over the SS1 Telephone Order Wire Circuit, the dialing is not done over the connecting cord but through the SS1 Telephone Order Wire Circuit as described in Section 12.

## 8. COMPLETION OF DIALING

### 8.1 Automatic Start of Ringing Not Required

With the release of the (DIAL) key and when the dial has restored to normal, relay (A) releases. Relay (A) released, removes battery from the tip conductor, opens the circuit to the dial supervisory lamp and opens the holding circuit for relay (F). Relay (F) is sufficiently slow in releasing to maintain battery on the ring for an interval long enough to permit the trunk to pass from the dialing to the talking condition. The release of relay (F) restores the circuit to normal.

### 8.2 Automatic Start of Ringing Required

In this case, the operation of relay (A) applies battery to the tip conductor of the trunk thru the P winding of relay (R1) instead of resistor (B). Relay (R1) is marginal, operating on those circuits not requiring automatic start of ringing, these circuits being identified by a low resistance ground on the tip. Relay (R1) in operating, locks up under control of relay (F) and prevents the operation of the timing relays (R2) and (R3).

The automatic start of ringing may be disabled by operating the (NR) key which prevents the operation of relays (R2) and (R3).

Those trunk circuits requiring automatic ringing will present a high resistance to ground on the tip conductor. This will prevent the operation of relay (R1). The operation of relay (A) in this case has operated relays (R2) and (R3).

With the release of the (DIAL) key relay (A) releases, opening up the tip conductor to permit the trunk to get out of the dialing condition. Relay (A) released, opens the circuit to relay (R2) which is slow in releasing. It provides enough time (0.230 sec.) to insure getting the trunk and associated switches out of the dialing condition prior to sending out 48 volt battery on the tip for ringing. With the release of relay (R2), the circuit to relay (R3) is opened and 48 volt battery is applied to the tip conductor. The (R3) relay is also slow in releasing to insure application of 48 volt ringing battery to the trunk for a sufficient interval of time (0.3 sec. min.). Meanwhile relay (R3) has been providing an auxiliary holding path for relay (F). With the release of relay (R3), relay (F) is released and the circuit restored to normal.

## 9. TROUBLE RELEASE

To correct an error previous to the completion of dialing, the cord is pulled down. The pulling down of the cord opens the operating and locking circuits for the (F) relay. The operator may then restore the (DIAL) key and proceed as for a new call.

## 10. DIAL MONITORING

The circuit is connected to the dial monitoring circuit by the operation of relay (SO). This relay is operated from the monitoring and observing jack circuit. Ground is applied to the "D" lead as long as the dial circuit is in use. This will cause the monitoring circuit to register the period the dial circuit is in use. Differences in potential across leads "B" and "C" cause the registration of dial pulses.

## 11. INTERTOLL DIALING PULSING TESTS - TOLL TEST BOARD NO. 17B OR 18B

When it is desired to make tests of the pulse repeating relays of intertoll dialing trunks from the toll test board, using continuous pulses instead of the position dial, the (PLS) jack is provided which affords means for connecting the intertoll dialing pulse repeating test set to the position dial circuit.

To set up the pulsing test condition, the trunk is dialed up in the regular way. The (LP OUT) jack of the pulse repeating test set is then patched to the (PLS) jack, which connects the pulsing interrupter in

series with the pulsing contacts of the dial and removes the (A) resistor and (A) capacitor from across the dial pulsing contacts and (A) inductor coil. A second pulse repeating test set provides the per cent break meter for reading the output of the relay under test.

To avoid releasing a dialed connection, one end of the patching cord should be plugged first into the pulsing source and the other end plugged into the (PLS) jack and the plug fully seated without hesitation.

The battery and ground jack (48V) of Fig. 2 is provided for use with the Intertoll

Dialing Pulse Repeating Test Set and Step-by-Step Pulsing Test Set.

## 12. SIGNALING ON TELEPHONE ORDER WIRE

When the SS1 Signaling Telephone Order Wire Circuit is used connection of a cord to the jack associated with the Telephone Order Wire is made. The (DP) lamp will light as a start dialing signal when the SS1 Telephone Order Wire Circuit is ready for dialing. At that time the dial of this position circuit is transferred to the telephone order wire circuit for pulsing purposes. When the (DP) lamp is extinguished the dial is transferred back for use with this circuit.

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