

CIRCUIT DESCRIPTION  
SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

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TOLL SYSTEMS  
TOLL SWITCHBOARD NO. 3, 3C, 3CL OR 3CF  
TONE JACK CIRCUIT

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER  
THAN THOSE APPLYING TO ADDED, SUPER-  
SEDED OR REMOVED APPARATUS

C.1 "H" contact pressure is added for the  
R936 relay (S1).

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

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TOLL SYSTEMS  
TOLL SWITCHBOARD NO. 3, 3C, 3CL, OR 3CF  
TONE JACK CIRCUIT

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 Provides "no-circuit" tone for demonstration purposes.

B. CHANGES IN APPARATUS

B.1 Added

UA39 Relay (SL)  
U185 Relay (TN)  
103B Rep. Coil (TN)  
0.5 UF Capacitor (R)  
0.5 UF Capacitor (A) } Option "X", or  
0.25 UF Capacitor (B) }  
0.05 UF Capacitor } Option "H"  
0.025 UF Capacitor }  
2UF Capacitor (C) } Option "S"  
18T Resistor (C) }

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 Under test clip data for Fig. 9, (T) is changed to (TN).

D. DESCRIPTION OF CIRCUIT CHANGES

D.01 Note 108 is modified to add Figs. 12 and 13 to the 48 V. Sig. fuse; to add Fig. 13 to the LT1 and LT2 fuses; to delete reference to 1-1/3 amp. ringing fuses and to specify 1/2 amp. H.V. instead of 1/2 amp. ringing fuses.

D.02 Fig. 13 is added to provide "no-circuit" tone demonstration.

D.03 Notes 110, 111 and 112 are added to state conditions under which LT1 or LT2 tone supply, Option "S" apparatus options "X" or "H" and wiring options "V" and "T" are to be used.

D.04 The "Options Used" table is revised to add Fig. 13 and Options "S", "T", "V", "H" and "X".

D.05 Pairing designations are added in Figs. 2, 3, 4 and 4A.

D.06 In Figs. 3, 4 and 4A the designation "or Code 1 Gen." is added to the lead "To Machine Ringing."

D.07 In the circuit requirements table, the short title is changed from "Tone Jacks Circuit" to "Tone Jack Circuit".

D.08 Information Note 301 is added to waive wiring list records for Options "V" and "T".

D.09 The title of Fig. 12 is changed to add "For S-X-S Requiring Int. Start".

D.10 Cabling Fig. K is modified to show cross-connections for Fig. 13.

D.11 In the Equipment Inf. column, ED-55105-01 is added.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is for use at toll switchboard No. 3, 3C, 3CL or 3CF to give subscribers and operators characteristic machine switching tones, for demonstration purposes.

2. WORKING LIMITS

2.1 Relays (S), relay (SD) and relays (SL) operate in connection with a rated external sleeve resistance of 590 ohms.

3. FUNCTIONS

3.1 To provide dial busy, line busy, all trunks busy, dial ringing induction, vacant selector level, no-such-number, vacant code and no-circuit tones.

4. CONNECTING CIRCUITS

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

4.01 Toll Cords - Toll Swbd. No. 3C, 3CL and 3CF. SD-64737-01 Toll Swbd. No. 3 - SD-63556-01

4.02 Power Signaling Circuit - SXS - SD-80245-01

4.03 Signal Circuit - Vacant Level Tone. SD-31228-01

4.04 Power Ringing Circuit - Full Selective S-X-S, Panel and Crossbar, Manual SD-80594-03-04-05; - No. 5 Crossbar, - SD-80978-01

4.05 Power Ringing Circuit - Semi-Selective S-X-S, Panel & Crossbar Manual - SD-80594-03-04-05; No. 5 Crossbar, SD-80978-01

- 4.06 Signal Circuit - No-Such-Number Tone. SD-96357-01.
- 4.07 Miscellaneous Circuit for Miscellaneous Interrupter Frame in Panel Office. SD-21666-01.
- 4.08 Interrupter Frame Circuit in Crossbar Office. SD-25062-01.
- 4.09 Switchboard Jack Circuit. SD-64545-01.
- 4.10 Ringing Interrupter and Alarm Circuit - SXS - SD-31336-01.
- 4.11 Power Ringing Circuit No. 355 SXS - SD-80780-01; No. 350 SXS - SD-80885-01; No. 1 & 350 S-X-S, - SD-81169-01.
- 4.12 Interrupter Relay Circuit - No. 355a - Step-By-Step Office SD-31868-01.
- 4.13 Relay Interrupter Circuit, - SD-95036-01.
- 4.14 Signaling Circuit; 30, 60 & 120 IPM Int. - SD-80771-01.
- 4.15 30, 60 or 120 Interrupter Distributing Circuit. SD-95078-01.
- 4.16 No. 5 Crossbar - Ringing Circuit - SD-80978-01.
- 4.17 No. 5 Crossbar - Code Ringing Applique Circuit. SD-81069-01.
- 4.18 Toll Position Circuits - Toll Swbds. No. 3C, 3CL and 3CF - SD-64738-01 - Toll Swbd. No. 3 - SD-62032-02.

#### DESCRIPTION OF OPERATION

#### 5. FIGURES 1 TO 4-A

When a toll cord is inserted into the tone jack, the sleeve relay operates, closing the particular tone circuit corresponding to the jack in use, through to the cord. Upon removal of the cord from the jack the sleeve relay releases, restoring the circuit to normal.

#### 6. FIGURE 5 (A & M Only)

When a toll cord is inserted into the tone jack, relay (S) operates and operates relay (S1).

Relay (S1) operated

- (a) connects ground thru condenser (T) to the tip of the jack.
- (b) connects vacant level tone to the ring of the jack.

- (c) connects ground to lead "A" of the vacant level tone signal circuit which operates a relay in that circuit.

When the toll cord is removed from the jack relays (S) and (S1) release.

The release of relay (S1)

- (a) disconnects vacant level tone from the ring of the jack.
- (b) disconnects ground thru condenser (T) from the tip of the jack.
- (c) disconnects ground from lead "A".

This restores the circuit to normal.

#### 7. FIGURE 6 (MFR. DISC.)

When the toll cord is inserted into the tone jack, relay (S) operates and operates relay (S1).

Relay (S1) operated

- (a) connects leads "C" and "D" of the No-Such-Number signal circuit of the tip and ring respectively of the jack.
- (b) connects ground to lead "A" of the No-Such-Number signal circuit which operates a relay in that circuit. This relay supplies a continuous undulating tone to the tip and ring of the jack.

Relay (S) operated also completes a circuit from the 60 IPM interrupter to lead "B" of the No-Such-Number signal circuit which operates and releases a relay in that circuit. This causes the tone to be varied at the 60 IPM rate.

When the toll cord is removed from the tone jack, relays (S) and (S1) release and restore this circuit to normal.

#### 8. FIGURE 7

When the toll cord is inserted into the tone jack, relay (SD) operates and closes the tone supply to the primary winding of coil (DT). This supplies tone over the tip and ring conductors to the connected toll cord.

When the toll cord is disconnected from the tone jack, relay (SD) releases, disconnects the tone supply and restores this circuit to normal.

#### 9. FIGURE 8

When a toll cord is inserted into the tone jack, relay (S) operates and connects the winding of relay (T) to ground

on the interrupter causing relay (T) to operate and release in unison.

Relay (T) in following the interrupted ground, causes the steady tone from the tone supply to be interrupted and line busy tone to be provided to the connected toll cord.

When the toll cord is disconnected from the tone jack, relays (S) and (T) release, restoring this circuit to normal.

#### 10. FIGURE 9

When a toll cord is inserted into the tone jack relay (SL) operates.

Relay (SL) operated

- (a) connects the tone supply to the primary winding of coil (TN).
- (b) connects the winding of relay (TN) to ground on the interrupter causing relay (TN) to operate and release in unison.

Relay (TN) in following the interrupted ground causes the steady tone in the secondary circuit of coil (TN) to be interrupted and busy tone to be provided to the connected Toll Cord.

When the toll cord is disconnected from the tone jack, relays (SL) and (TN) release and restore this circuit to normal.

#### 11. FIGURE 10

When a toll cord is inserted into the tone jack, relay (S) operates and operates relay (Sl).

Relay (Sl) operated

- (a) connects lead "C" and "D" of the No-Such-Number signal circuit to the tip and ring respectively of the jack.
- (b) connects ground to lead "A" of the No-Such-Number signal circuit which operates a relay in that circuit. This relay causes a continuous undulating tone to the tip and ring of the jack via leads "C" and "D".

When the toll cord is disconnected from the tone jack relays (S) and (Sl) release and the circuit is restored to normal.

#### 12. FIGURE 11

When a toll cord is inserted into the tone jack, relay (SL) operates and connects ground to the primary winding of coil (T). This causes a galloping low tone (every third spurt of 60 IPM tone removed) to be applied to the tip and ring of the tone jack.

When the toll cord is disconnected from the tone jack, relay (SL) releases and restores this circuit to normal.

#### 13. FIGURE 12

When a toll cord is inserted into the tone jack, relay (S) operates.

Relay (S) operated

- (a) connects the winding of relay (R) to lead 2+ of the connected interrupter circuit.

- (b) connects ground to lead "ST" of the ringing interrupter and alarm circuit (where the relay interrupter is used the "ST" lead is not required since the interrupter runs continuously).

Relay (R) follows the interrupter connected to lead 2+ and provides audible ringing per MR-R2 to the tip and ring of the jack.

When the toll cord is disconnected from the jack, relays (S) and (R) release and restore this circuit to normal.

#### 14. FIGURE 13

When a toll cord is plugged into the tone jack, relay (SL) operates, connecting interrupted ground (30 IPM) to the winding of relay (TN) and tone to the primary of coil (TN). Ground is connected to lead "ST" or "MS" for 30 IPM supply circuits which require a start signal.

Relay (TN) follows the 30 IPM ground pulses and closes the tip and ring 30 times per minute to the secondary of coil (TN) thereby furnishing "No-Circuit" tone to the connected toll cord.

When the toll cord is disconnected from the tone jack, relay (SL) releases, opens the circuits to relay (TN) and coil (TN) and restores this circuit to normal.

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