STEP BY STEP SYSTEMS
NO. 355A
TOLL SYSTEMS
INTERTOLL DIALING OFFICE
INTERRUPTER RELAY CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1	Superseded	Superseded by
	(SO) Relay U-431	(SO) Relay U-379

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Relay (SO) changed to prevent false ground from interfereing on "Code A" lead. Prior to Issue 21, Fig. A was part of Fig. 1.

D.2 Fig. 60 revised to reflect new (SO) relay per Fig. B.

D.3 Wording of title revised.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2315-RJS-RCD-NG

TOLL SYSTEMS
INTERTOLL DIALING
STEP BY STEP SYSTEMS
NO. 355A
INTERRUPTER RELAY CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Option "F" added to Figure 1 to prevent premature release of (SO) Relay when used with 806E & F Ringing Power Plant Interrupter.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2315-RJS-RCD-B4

TOLL SYSTEMS
INTERTOLL DIALING
STEP BY STEP SYSTEMS
NO. 355A
INTERRUPTER RELAY CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 63 connecting information of lead designated "BAT", is changed to read "TO FIG. 59".

D.2 Lead designated "BAT" and connected on terminal 16, is removed.

D.3 Lead designated "BAT" is added to terminal 9 of Fig. 59 and connecting information added to read "TO FIG. 63".

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2315-AS-RCD-B4

STEP-BY-STEP SYSTEMS
NO. 355A
INTERRUPTER RELAY CIRCUIT

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 Provides 30 I.P.M. grounded flash for 0.3 seconds duration.

A.2 Provides 30 I.P.M., low tone I, for 0.3 seconds duration.

B. CHANGES IN APPARATUS

B.1 Added

U384 relay - Fig. 14.

Superseded	Superseded By
Relays (W) & (W1)	
U1120	U519
Relay (Z)	
U766	U113

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 13 is rated "Mfr. Disc," and is replaced by Fig. 14 to provide 30 I.P.M. flash of 0.3 seconds grounded interval & 30 I.P.M., low tone I, is provided of 0.3 seconds duration.

D.2 Fig. 13 "Mfr. Disc." and added Fig.14 are added in Note 105.

D.3 Reference to Fig. 14 is added in Note 107.

D.4 Connecting circuits SD-32043-01 & SD-68505-01 are removed from the connecting information and "no circuit signal trunk" SD-56439-01 is added.

D.5 Circuit Note 111 is rated "Mfr. Disc."

D.6 In Fig. 63, the 4th, 5th and 6th 30 I.P.M.-BR3 leads are added, connection to Misc. Alm. Ckt. is deleted, replaced by connection to Intertoll Dialing No Ckt. Signal Trk. Ckt. or Intertoll Dialing Rotary Out Trk. Switch. For Fig. 14 in place of Fig. 13 is specified. "Lead LT1 30 I.P.M." previously read "LT1 3 I.P.M." in error. Indication at 30 I.P.M.-BR3 lead 1, 2 and 3 for frame Nos. is deleted. Local wiring connections are revised per Fig. 14.

D.7 In Figs. 59, 60, 61 and 63, GRD leads are indicated as connecting to Alm. bay fuse panels instead of to R.R. Grd., and the independent GRD leads in Figs. 60, 61 and 63 are indicated as 20 AM. Battery for Fig. 53 is indicated as a Mult. of the Bat. for Figs. 59, 60 and 61 since only one 1-1/3 amp. fuse is provided for all circuit Figs.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit showsthe necessary ringing supply and ringing code leads for 8 party semi-selective T.P.S. connector, and 3 code 10 party semi-selective T.P.S. connectors. It showsthe necessary ringing code leads for 10 party code ringing T.P.S. connectors if the code leads connect to more than 100 connector bank terminals. It also provides leads for 60 or 120 I.P.M. for toll selectors and connectors and other circuits if required, and leads for 30 I.P.M. flash & tone for intertoll thru selectors. It also provides means for operating the subscriber message register line circuit.

The relays furnishing the interruptions operate only when the motor start lead is grounded except in offices with intertoll selectors or in offices having circuits requiring interruptions from this circuit at a time when the motor start lead is not grounded, in which case they operate continuously.

2. WORKING LIMITS

2.1 None.

3. FUNCTIONS

3.1 Provides a ground to the various ringing code leads, at definite intervals.

3.2 Provides superimposed ringing supply to 8 party semi-selective T.P.S. connectors. This supply is delayed for a period of time to permit relays in the associated connectors to operate.

3.3 Provides 60 I.P.M. interruptions for operating the subscribers message register line circuit.

3.4 Provides 60 and 120 I.P.M. interruptions where toll selectors and toll or combination connectors are provided. Provision is also made to superimpose busy tone on the 60 or 120 I.P.M. lead for toll or combination connectors.

3.5 Provides 60 I.P.M. to Pre-Postpay Coin Box Line Circuits or to Aux. Trk. Ckts. for Returning Initial Coin.

3.6 Provides 30 I.P.M. flash and tone for intertoll thru selectors and rotary out trunk switch.

4. CONNECTING CIRCUITS

When this circuit is shown on a Key Sheet, the connecting information thereon shall be followed.

4.01 Power ringing circuit. SD-80885-01

4.02 8 party semi-selective T.P.S. connectors. SD-31805-01

4.03 3 code 10 party semi-selective T.P.S. connectors. SD-31805-01

4.04 10 party code ringing T.P.S. connectors. SD-31811-01

4.05 Auxiliary line circuit for operating subscriber register.

4.06 Miscellaneous Alarm Circuit for Connectors. SD-32045-01

4.07 Miscellaneous Alarm Circuit, Alarm Control. SD-31980-01

4.08 Pre-Pose Payment Coin Line Circuit. SD-31873-01

4.09 Aux. Trunk for Returning Initial Coin. SD-32025-01

4.10 Connector test line. SD-31857-01

4.11 Other circuits requiring 30, 60 or 120 I.P.M. interrupter.

4.12 No Circuit Signal Trk. Ckt. SD-56439-01

4.13 Rotary Out Trunk Switch. SD-55945-01

DESCRIPTION OF OPERATION

5. CODE CIRCUIT FOR 8 PARTY S.S.-T.P.S. CONNECTORS (FIG. 1)

The (ST) relay operated either by ground on "MS1" lead or by being blocked operated, supplies battery to the (R1), (R2) and (SO) relays. (R1) operates once during each ringing cycles. When both (R1) and (R2) are operated (SO) operates. It is slow to operate to permit the ringing selection relays of the associated connector to operate, thus avoiding a false ring on the subscriber line. (SO) when operated connects the superimposed ringing supply to the line and locks operated until CODE A ground is removed from lead "D". (Option "N") or until both the (R1) and (R2) relays release ("C" option). If the connector terminal is for a party requiring superimposed positive ringing supply, the (A) terminal of the connector bank is connected to a 1+ or 2+ lead of Fig. 1 depending on whether 1 or 2 rings are required. If the connector terminal is for a party requiring superimposed negative ringing supply the (A) terminal of the connector bank is connected to a 1- or 2- lead of Fig. 10, which in turn connects to lead 1 or 2 of Fig. 1 depending on whether 1 or 2 rings are required.

6. CODE CIRCUIT FOR 3 CODE 10 PARTY S.S.-T.P.S. CONNECTORS (FIG. 6)

This circuit functions in a similar manner to that described in paragraph 5 except that an additional relay (R3) is required and that the (SO) relay does not operate until (R1), (R2) and (R3) relays are operated and remains operated until CODE A ground is removed from lead "D" ("N" option) or until (R1), (R2) and (R3) have all released ("C" option). This (R3) relay operates three times during each ringing cycle to provide 3 rings.

In case more code leads are required than can be supplied by Fig. 1 or Fig. 6, one or more Figs. 12 are provided. The relays of Fig. 12 operate from the contacts of the R1, R2, or R3 relays, as required. Each Fig. 12 furnishes 12 leads for connection to Fig. 10 or to 1 or 2 connector multiple leads. Since one lead from Fig. 1 or 6 is required for Fig. 12, the number of code leads is increased by 11 for each Fig. 12 added.

7. CODE BROADCAST CIRCUIT FOR 10 PARTY CODE RINGING T.P.S. CONNECTORS (FIG. 2)

This circuit is provided when more than 100 - 5 code connector bank terminals are connected to a code lead, and is the means to provide additional code leads. The (ST) relay operated either by ground on the "MS1" lead or by being blocked operated connects battery to the windings of the (C1), (C2), (C3), (C4) and (C5) relays is provided. These relays operate in accordance with the ground codes supplied by the ringing machine and ground the code leads of the 10 party T.P.S. connector circuits.

The grounding of any of the code 1 grd. - code 5 grd. leads operate the ringing interrupter relay of the connector which closes through the ringing supply to the subscriber line.

8. 60 I.P.M. FOR AUXILIARY LINE CIRCUIT FOR M.R. LINES (FIG. 4 & 5)

When an auxiliary line circuit arranged for a delayed charge interval for operating subscriber registers is furnished in an office, Figs. 3 and 4 are required. This auxiliary line circuit functions when the message rate subscriber is to be charged for a call. At that time battery through a relay in that circuit is connected to lead (A) to Fig. 4 of this circuit, operating the (MS) relay (Fig. 5). The (MS) relay operated, operates certain relays in the miscellaneous alarm circuit, which in turn grounds the motor start lead, starting the ringing machine, if not in operation at that time, and operating the (ST) relay (Fig. 1), if it is not operated. (ST) operated, connects battery to (SB) (Fig. 4), permitting this relay to follow 60 I.P.M. interruptions. (SB) operated grounds lead "A" to the auxiliary line circuit and short circuits the (MS) relay (Fig. 5) which releases. (MS) reoperates when (SB) releases and causes the miscellaneous alarm circuit to keep the ringing machine running. The grounding of lead "A" permits relays in the auxiliary line circuit to function, thereby operating the message register associated with the auxiliary line circuit. After the registration, the lead "A" is opened at the auxiliary line circuit allowing the release of (MS).

9. 60 OR 120 I.P.M. (FIGS. 4, 7 AND 11)

The (ST) relay operated either from ground on the "MS1" lead or by being permanently operated, connects battery to (SB) and (FB) permitting these relays to follow 60 and 120 I.P.M. respectively. These relays furnish 60 and 120 I.P.M. to the toll selectors and connectors. Extra contacts are provided on (SB) or (FB) to furnish 60 or 120 I.P.M. interruption to other circuits as required.

10. FILTER CIRCUIT (FIG. 8-9)

Filter circuits are required for toll selectors and toll or combination connectors to reduce clicks from busy flashes. "X" wiring is provided in Fig. 8 when a busy tone is to be superimposed on the busy flash. The (A) retardation coil retards the build up of current through the repeating coil of the toll transmission selector, and together with the (F) condenser and (F) resistance (Fig. 9) reduces the surge when the ground is removed from the interrupter lead by the (SB) or (FB) relay.

11. 30 I.P.M. INTERRUPTER FOR INTERTOLL THRU SELECTORS (FIG. 14)

When an intertoll thru selector requires 30 I.P.M. leads A and B are connected, and lead D is grounded in the no circuit signal trunk ckt. or rotary out trunk switch. On the first 120 I.P.M. closure W1 operates and locks to lead D. Z1 is short circuited. On the open interval the short circuit on Z1 is removed, and Z1 operates. The next closure short circuits W1, which releases, (Z1 holds). The next open releases Z1. The above is repeated as long as the connections of leads A, B, and D remain unchanged. Z1 operated causes W and Z to function in the same manner as W1 and Z1. Thus relay (T) will operate while any of relays W, Z, or W1 are operated, i.e. for 1-3/4 seconds out of each 2 seconds period. The 30 I.P.M. leads are grounded whenever relay (T) is released, i.e. for 1/4 seconds. Similarly 30 I.P.M. tone is applied whenever relay(T) is released. When 30 I.P.M. is no longer required, the connection of leads A, B, and D are opened and any operated relays will release.

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