STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A OR 360A
3 OR 4 WIRE SELECTOR
FOR USE AS LOCAL OR INCOMING SELECTOR
REPEATED DIALING TOLL PRECEDING SELECTOR
OR 2 PARTY MESSAGE RATE SELECTOR
ABSORBS DIGITS ONCE OR REPEATEDLY
RESTRICTS SERVICE OVER SPECIFIED LEVELS
PROVIDES TIMED RELEASE ON PERMANENT SIGNAL
OR BUSY FLASH ON CALLS FROM OPERATOR

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 1, the "DT" lead was formerly connected to "Switch Tbl. Alm. Ckt., or to Misc. Alm. Ckt. (Selector Shelf)". The designation "DT or LT2" was formerly "DT".

D.2 In Fig. 1, the lead designation "LT1-120 IPM TB, LT1-60 IPM TB or Low Tone 1 (Busy)" was formerly "Low Tone 1 (Busy)".

D.3 In Fig. 1, the lead designation "120 IPM or 120 IPM BR3" was formerly "120 IPM".

D.4 In Note 102, Option "ZF" is added for "Used with prepay coin lines."

D.5 In Note 103, record for issue 7-D, "ZT" was formerly shown in the MD column where "ZR" is now shown.

D.6 In Note 103, record for issue 7-D, "ZT" was formerly shown in the "If Jobs Records Do Not Specify" column where "ZI" is now shown.

D.7 Cross connection Fig. 58 and equipment Note 201 are added.

D.8 Connecting information in Fig. 1, "From Sel. Bank Mult. Ckt. or From Line Finder, Sel. Rep., Trk., or Trk. Ckt." formerly read, "From Sel. Bank Mult. Ckt. or From Line Finder Sel., Rep., Trk. or Trk. Ckt."

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2353-HLHD-EWO-CL

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A OR 360A
3 OR 4 WIRE SELECTOR
FOR USE AS LOCAL OR INCOMING SELECTOR
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CHANGES

A. CHANGED OR ADDED FUNCTIONS

A.1 Provides for use as a 2 party message rate selector.

A.2 Provides for use as a repeated dialing toll preceding selector.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 ZC option is rated Mfr. Disc. superseded by ZF option in the switch and by ZH option in the shelf wiring. ZG option was formerly part of ZF. This change is made without record to reduce the number of options in switch manufacture, since ZF option added on Issue 6-D, has not been incorporated in the manufacturing drawings.

D.2 Note 102 is revised to open the busy tone lead when this switch is used as a repeated dialing toll preceding selector. This is done by omitting ZE option.

D.3 ZM and ZL options provide for use of this circuit in a 360A office.

D.4 Fig. 3 is reinstated for No. 360A offices, and Z1, ZJ, ZK, and ZN to ZQ options provide for the use of clinched and soldered mechanized banks. ZS and ZR options were formerly part of U and T options respectively.

D.5 Notes 102 and 103 are revised and Notes 104, 105 and 106 added for record of the above changes.

D.6 The replacement note was "Replacing SD-31836-01 and SD-31933-01 for No. 1 and 350A" and the rating was "AT&TCo Standard" without exception.

D.7 Connecting lead information for 360A office circuits was added.

D.8 The title formerly read:

STEP-BY-STEP SYSTEMS
NO. 1, 350A or 355A
SELECTOR CIRCUIT
LOCAL OR INCOMING 3 OR 4 CONDUCTOR
ARRANGED TO ABSORB DIGITS
ONCE OR REPEATEDLY, TO RESTRICT
SERVICE OVER ANY SPECIFIED LEVELS
AND FOR EITHER TIMED RELEASE ON PERMANENT
SIGNAL OR BUSY FLASH ON CALLS FROM OPERATOR

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is for use as a 3 or 4 conductor local or incoming selector where digit absorbing is required on specified levels once or repeatedly. It is also arranged for restricted service on all or specified levels and/or timed release on permanent signals.

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2. WORKING LIMITS

2.1 Limits are for single office areas. For multioffice areas, and for operator pulsing, see key sheets.

	45V. Min. Pulsing From Sub.			48V. Min. Pulsing From Sub.		
Type of Dial	2.4 or 5	6	7	2.4 or 5	6	7
Max. Ext. Ckt. Loop*	750ω	1200ω	1100ω	850ω	1500ω	1400ω
Max. Ext. Ckt. Loop**	850ω	1400ω	1300ω	1000ω	1500ω	1500ω
Max. Ext. Ckt. Loop***	1000ω	1400ω	1400ω	1115ω	1500ω	1500ω
Min. Ins. Res.		15000ω			15000ω	

*When using 1000ω loop - Leak B in pulsing test set
**When using 1200ω loop - Leak A in pulsing test set
***When using 1400ω loop - Leak A in pulsing test set

3. FUNCTIONS

3.01 To ground the sleeve lead to the preceding circuit when the selector is seized.

3.02 To supply dial tone to the calling party when required.

3.03 To step the switch vertically under control of the dial pulses.

3.04 To release from any level arranged for absorbing on the initial digit or to release from any level arranged to absorb repeatedly each time the level is dialed.

3.05 To return a busy tone and block further operation on any specified level or levels over which service is restricted.

3.06 To cut in and trunk hunt on the first digit on any level not arranged for absorbing or restricting service.

3.07 When required, to cut in and trunk hunt on all levels when the second digit is dialed.

3.08 To remove dial tone if provided when the switch cuts through or when the first digit is absorbed.

3.09 To select an idle trunk automatically.

3.10 To connect an "all trunks busy" tone to the calling party when all the trunks in the group dialed are busy, except when used as a repeated dialing toll train selector.

3.11 When used as a repeated dialing toll train selector, to open the ground from the tip winding of the (A) relay, thus releasing the switch, when all trunks in the group dialed are busy.

3.12 To extend the tip, ring and sleeve lead, and "A, C or F" lead when furnished, to the idle trunk selected.

3.13 To restore to normal upon disconnection by the calling party.

3.14 To operate a peg count register whenever an idle trunk is selected.

3.15 To provide a timed permanent signal release.

3.16 When required, to restrict service on specified levels on any digit.

3.17 When required, to restrict service (prevent cut-through) on all levels until a digit has been absorbed.

3.18 To provide a service code selector in offices with branch office selector repeaters when completion of some "11X" code calls are required through the main office.

3.19 At the end of the first digit, to give a signal to the preceding trunk, causing that circuit to make a test to determine what station is calling.

4. CONNECTING CIRCUITS

When this circuit is listed on a keysheet, the connecting information thereon is to be followed.

4.01 Line Finder SD-32000-01.*

4.02 Incoming Repeater - SD-32008-01.*

4.03 Selector - SD-31735-01.*

4.04 2 Way Interlocal Trunk - SD-31658-01.*

4.05 Post Pay Coin Trunk - SD-31895-01.*

4.06 Selector Bank Multiple Circuit - SD-32123-01.

4.07 Connector Circuit - SD-31737-01.*

4.08 Permanent Signal Timing Circuit - SD-32192-01.

4.09 Outgoing Repeater - SD-31779-01.*

4.10 Switch Trouble Alarm Circuit or Misc. Alarm Circuit for Selector Shelves - SD-32043-01.*

4.11 Misc. Alarm Circuit - Registers SD-31976-01.

4.12 Misc. Alarm Circuit - 360A SD-31209-01.

4.13 2 Party Message Rate Trunk SD-31506-01*

4.14 Traffic Register Ckt. - SD-31109-01 & SD-30896-01.

4.15 Repeated Dialing - Toll Train Relay Equipment ES-241981.*

*Typical Circuit

DESCRIPTION OF OPERATION

5. SEIZURE

When this circuit is seized (A) operates over the line or trunk loop operating (B). (B) connects ground to lead

"S" to hold the preceding circuits, closes a path for operating (C) and the VERT magnet and prepares a circuit for operating (F) and the traffic register.

6. VERTICAL STEPPING

(A) will release and reoperate in unison with the dial pulses but the slow releasing (B) will remain operated. Each time (A) releases, ground from its back contact through the front contact of (B) operates the VERT magnet in series with (C) causing the switch to step in a vertical direction to the level dialed. (C) operates (E) through the V.O.N. springs which operate as soon as the switch takes the first vertical step. (C) being slow to release remains operated during dialing.

7. DIGIT ABSORBING

7.1 Levels on which it is required to absorb a digit shall have the "L" normal post spring operated.

7.11 Absorbing First Digit Only - "M" Option.

When the switch reaches the level dialed and (C) releases, ground from the RLS magnet contact is connected by (C) through a make of (E) and a break of (F), through the "L" normal post springs and V.O.N. springs to the RLS magnet. The RLS magnet operates, locks through its own and V.O.N. contacts. The operation of the RLS magnet restores the switch shaft to normal and the RLS magnet contact springs open the ROT magnet operating circuit and close a circuit which operates (F). When the switch shaft has restored to normal the V.O.N. springs open and release the RLS magnet and (E). (F) operated, locks to (B) substitutes ground for dial tone, makes the "L" normal post springs ineffective and also with "J" option, the right also, and prepares the operating circuit for the ROT magnet. When the next digit is dialed the switch steps vertically as previously described. When the level dialed is reached the switch cuts in and trunk hunts since the rotary circuit is completed through contacts on (F) when (C) releases, regardless of the position of the "L" normal post springs.

7.12 Absorbing Repeatedly - "N" Option

When the switch reaches the level dialed, (C) releases and connects ground through make on (E) and (F) to operate the RLS magnet which locks under control of the V.O.N. springs. The RLS magnet also opens the ROT magnet operating circuit and operates (F) which locks to (B). (F) operates substituting direct ground for dial tone where the latter is provided. When the switch shaft has restored to normal, the V.O.N. springs open and unlock the RLS magnet. (F) remains locked to (B). If the subsequent digits dialed are to be absorbed, "N" option is furnished. When (C) releases it will connect ground through (E) and (F) operated to operate the RLS magnet and restore the switch to normal as previously described.

8. TRUNK HUNTING WHEN FIRST DIGIT IS DIALED

8.1 On levels requiring trunk hunting on the first digit the normal post springs shall not be operated. When (C) releases the ROT magnet is operated from the circuit through the "L" normal post springs and steps the wipers to the first bank terminals. The operation of the ROT magnet allows (E) to release which in turn allows the release of the ROT magnet. The "S" wiper is now in contact with the first multiple bank terminal and if this is grounded because of a busy condition, (E) reoperates causing the ROT magnet to operate and step the wipers to the next terminal. This automatic stepping or trunk hunting will continue until an idle or nongrounded terminal is found.

9. TRUNK HUNTING ON SECOND DIGIT WHEN FIRST DIGIT HAS BEEN ABSORBED ("M" OPTION)

9.1 When (C) releases at the termination of the second digit the trunk hunting operation is the same as that described under paragraph 8 except that the ROT magnet circuit is completed through the contacts of (F). The switch will trunk hunt on all levels regardless of the adjustment of the "L" normal post springs.

10. SEIZING THE IDLE TRUNK

10.1 When an idle terminal is found (D) operates in series with (E) when the ROT magnet releases, since it is no longer short circuited by the ground through the "S" wiper. (E) does not operate due to the high resistance of the (D) in series with it. (D) disconnects the tip and ring leads from (A), cuts the tip, ring and sleeve and "A, C or F" lead if provided, through to the trunk beyond, opens the RLS magnet circuit and grounds the "R" lead to operate a peg count register. The release of (A) allows (B) to release. (B) on releasing removes the ground from the "R" lead, prepares the RLS magnet circuit and allows (F) to release if operated. (D) is held by ground from the succeeding circuit.

11. RESTRICTED SERVICE

11.1 This circuit is arranged to restrict service by line finder group or line finder level of the calling line on specified levels. The "R" normal post springs shall be operated on all restricted service levels.

11.11 Line Finder Group - "Y" and "K" Options

Line Finder Level of Calling Line - "Z" and "K" Options

When (C) releases after the first digit is dialed the ROT magnet is energized the same as described in paragraph 8.1. On the release of the ROT magnet (E) is again operated by ground over "Y" or "Z" option through the "R" normal post springs thus stepping the shaft around until the 11th rotary step is reached. The operation of the 11th rotary step springs opens the operating circuit for (E) and thereby prevents any further operation of the ROT magnet. The operation of the 11th rotary springs also transfers from dial tone or ground to busy tone and prevents the operation of (D).

11.12 Specified Level Restricted on First Digit Only - "Y" or "Z" and "J" Options

All Levels Restricted on First Digit - "Y" or "Z", "Q" and "J" Options

The switch can be prevented from cutting through on a particular level until a digit has been absorbed, that is, until (F) has operated and opened the operating circuit of (E) from ground through "Y" or "Z" option. If all levels are to be restricted until a digit is absorbed, "Q" option is provided which obviates operating the normal post springs for this traffic feature.

11.13 Specified Levels Restricted on Any Digit - "Y" or "Z" and "K" Options

Specified levels may be restricted on any digit by providing "K" option in addition to "Y" or "Z" options. This prevents opening the operating circuit of (E) when (F) operates for digit absorbing and if a restricted level is dialed after a digit is absorbed ground over "Y" or "Z" options through the operated "R" normal post springs will operate (E) and cause the switch to rotate to the 11th rotary step and return all trunks busy tone.

12. ALL TRUNKS BUSY CONDITION AND RELEASE PRIOR TO CUT THROUGH

12.1 When all of the trunks in a group are busy the switch wipers will pass off the bank terminals and operate the 11th rotary step springs.

12.11 Where Busy Flash to Operator is not Required on Calls Over Local Train - "F" Option

When the 11th rotary step springs operate they connect "all trunks busy" tone to the calling station and prevent the operation of (D) thus causing this circuit to remain held under control of (A). When the calling station disconnects (A) releases, releasing (B) and in turn energizing the RLS magnet and restoring the switch to normal, and provides ground to the "RLS" lead to release the line finder. The switch will release the line finder. The switch will release in this manner on a disconnection at any time prior to the seizure of an idle trunk.

12.12 Where Busy Flash to Operator is Required on Calls Over Local Train - "E" Option

When the 11th Rotary Step Springs operate, the circuit to relay D is opened and 120 IPM ground is connected to lead F, causing a relay in the incoming or 2 way trunk to return path busy flashes to the calling operator.

The switch is held under control of relay (A) until the operator disconnects, which releases (A) and, in turn (B), operating the release magnet and restoring the switch to normal.

12.13 Where Both Busy Tone and Busy Flash to Operator are Required on Calls Over Local Train - "F" and ZC or "ZH" Options

When the 11th rotary step springs operate, the circuit to relay (B) is opened, 120 IPM ground is connected to lead "F" and 120 IPM tone is connected to the ring. The 120 IPM ground causes a relay in the trunk circuit to return path busy flashes to the operator, while the busy tone is transmitted to any subscribers who may have access to this circuit.

The switch is held under control of relay (A) until the calling party or operator disconnects, (A) then releases,

in turn releasing (B), operating the release magnet, and restoring the switch to normal.

12.14 As a Repeated Dialing Toll Preceding Selector - "ZE" Option Omitted

The 11th rotary step springs remove ground from the (A) relay winding, releasing A, and in turn B restoring the switch to normal. The trunk at the toll office recognizes this as an all trunks busy condition, opens the tip and ring towards this circuit to prevent reseizure, and connects busy flash signals to the toll operator.

13. RELEASE AFTER CUT THROUGH

13.1 As mentioned in paragraph 10, (D) is held from the succeeding trunk after an idle trunk is seized. When the calling station disconnects under this condition ground is removed from the (D) relay winding by the trunk beyond, allowing this relay to release. The release of (D) energizes the release magnet, restores the switch to normal and provides ground to the "RLS" lead to release the line finder.

14. TEST JACK

14.1 By means of the test jack this switch can be made busy for test purposes or in case it is out of order. By plugging a test set into jack springs 1 and 2 the switch can be operated locally in the manner described above.

15. CONTACT PROTECTION

15.1 Network (C) is used to protect relay contacts against inductive discharges from the windings of the vertical and rotary magnets.

16. PERMANENT SIGNAL RELEASE

The circuit is arranged to release under control of the permanent signal timing circuit if a subscriber originates a call and then fails to dial before the end of a predetermined time interval. When the circuit is selected and (A) and (B) have operated, the primary winding of (Z) is connected through to the permanent signal timing circuit "PA" lead. That circuit places a ground on the "PA" lead operating (Z) which locks under control of (B) and transfers the line finder (S) lead from ground on (B) contacts to ground on the "PB" lead. After an interval ground is momentarily removed from the "PB" lead which causes a relay in the line finder to release, opening the tip and ring, and causing a lock-out relay in the line circuit to operate. The line finder relay in releasing opens the circuit to (A) thus releasing (B) and (Z) and the circuit is restored to normal.

If the line circuit is not equipped with a lock-out relay the timing circuit will open the "PB" lead long enough to release the switch train before reclosing ground.

17. STATION IDENTIFICATION CONTROL

When the preceding trunk requires an indication of the termination of a digit the "P" lead is furnished which connects ground from (B) through a make on (C) to the "P" lead during the digit. At the termination of the digit, (C) releases and removes ground from the "P" lead.

18. CIRCUIT USED AS SERVICE CODE SELECTOR IN OFFICES WITH SELECTOR REPEATERS - "ZG" OPTION

When this circuit is used as a service code selector in offices with branch office selector repeaters, and service code calls (11X), such as information, are completed through the main office, "ZG" option is furnished. When all trunks from the selector level are busy, an originating call will cause the 11th rotary step springs to operate. This connects ground to the A lead which operates a relay in the selector repeater circuit to supply the busy tone signal.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3030-OCH-RLL-P1