

CIRCUIT DESCRIPTION

CD-32183-01
ISSUE 6AC
APPENDIX 3B
DWG ISSUE 16B
DISTN CODE 1D99
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8

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
DIGIT ABSORBING SELECTOR
3 OR 4 WIRE
LOCAL OR INCOMING SELECTOR
ARRANGED TO ABSORB ONE OR TWO DIGITS
TO RETURN BUSY TONE ON SPECIFIED
LEVELS, FOR PEG COUNT ON CUT THRU
AND FOR TIMED RELEASE ON
PERMANENT SIGNAL

CHANGES

D. Description of Changes

- D.1 Sleeve lead is extended to the Receiver off-hook Tone Connecting Circuit to allow Line Identification. Wiring Options ZF and ZG are added.
- D.2 Connecting information is added to LT1 Jack Punching 7, 16 - Fig. 1.
- D.3 CAD Fig. 51 is changed.

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DEPT 5245-GFC
WECO DEPT 2311-DFH-WEA

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CHANGESB. Changes in Apparatus

B.1	Superseded C Network, Fig. 1 Option ZB 178A Network	Superseded By C Network, Fig. 1 Option ZC, Consisting of 2 542D Capacitors & 1 KS13490 L2 Resistor 150 Ohms
	A Capacitor, Fig. 1 Option ZD 449C Capacitor	A Capacitor, Fig. 1 Option ZE 542L Capacitor

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

C.1 On Page 1 of the Circuit Requirements Table change the BSP Fig. for the 221A (A-Relay) from 11 to 726 and for the 221P (A-Relay) from 5A to 727. This change provides compatibility with the Bell Telephone Laboratories X-Spec. #75514.

D. Description of Changes

- D.1 Options ZB and ZD are designated and rated Mfr. Disc. and are superseded by Standard Options ZC and ZE to replace the present contact protection network and the (A) capacitor with ones that result in a cost reduction.
- D.2 Circuit Note 102 is changed and Note 106 is added to reflect the above modification.

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DEPT 5225-LCB
WECO DEPT 5152-FLS-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A OR 355A
DIGIT ABSORBING SELECTOR
3 OR 4 WIRE
LOCAL OR INCOMING SELECTOR
ARRANGED TO ABSORB ONE OR TWO DIGITS,
TO RETURN BUSY TONE ON SPECIFIED
LEVELS, FOR PEG COUNT ON CUT-THRU,
AND FOR TIMED RELEASE ON
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CHANGES

D. Description of Changes

- D.1 Option A is added and rated standard to allow the selector to rotary hunt to 11th step busy on a blocked digit level. This prevents other subscribers on the same selector shelf from hearing a reorder tone when they seize another selector. This option will provide a path for dial tone (option V) or ground (option W).
- D.2 Options B and D are rerated Mfr. Disc. Option ZA is designated and rated Mfr. Disc., allowing the removal of resistor (A), formerly used with option D. Options E and F are rated Mfr. Disc.
- D.3 Reference to options A and ZA are made in Note 102 and the OPTIONS USED table. Reference to options B and D is removed from Note 101. Notes 105 and 106 are added. Note 102 is revised to show "13AC" instead of "13D" in the "CHANGED ON ISSUE" column. Reference to Options E and F is removed from Note 101 & added to Note 106.

F. Changes in CD Section

- F.1 Replace sections 3.05 and 4.06 with the following:

If options A or B is provided, the switch will not block at rotary normal and will hunt to 11th rotary step to return all trunks busy tone (see 7.01).

- F.2 Replace section 11. RESISTANCE with the following:

11.01 Resistor A, option ZA, is used with option D to prevent the F relay from being operated from another circuit on the same shelf, and to provide a high impedance to ground for the busy tone.

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DEPT 5225-LCB
WECO DEPT 5152-RAF-WEA

STEP BY STEP SYSTEMS
 NO. 1, 350A OR 355A
 DIGIT ABSORBING SELECTOR
 3 OR 4 WIRE
 LOCAL OR INCOMING SELECTOR
 ARRANGED TO ABSORB ONE OR TWO DIGITS,
 TO RETURN BUSY TONE ON SPECIFIED
 LEVELS, FOR PEG COUNT ON CUT-THRU,
 AND FOR TIMED RELEASE ON
 PERMANENT SIGNAL

TABLE OF CONTENTS	PAGE	
<u>SECTION I - GENERAL DESCRIPTION</u>	1	<u>12. MISCELLANEOUS MAINTENANCE FEATURES</u> .. 3
<u>1. PURPOSE OF CIRCUIT</u>	1	<u>13. TAKING EQUIPMENT OUT OF SERVICE</u> 4
<u>SECTION II - DETAILED DESCRIPTION</u>	1	<u>14. DESCRIPTION OF ALARM FEATURES</u> 4
<u>1. SEIZURE</u>	1	<u>SECTION III - REFERENCE DATA</u>
<u>2. VERTICAL STEPPING (FIRST DIGIT)</u>	2	<u>1. WORKING LIMITS</u>
<u>3. NORMAL POST SPRING OPERATION</u> <u>(FIRST DIGIT)</u>	2	<u>2. FUNCTIONAL DESIGNATIONS</u>
NO FRONT NORMAL POST SPRING OPERATED	2	<u>3. FUNCTIONS</u>
LEFT FRONT NORMAL POST SPRING OPERATED (OPTION D)	2	<u>4. CONNECTING CIRCUITS</u>
RIGHT FRONT NORMAL POST SPRING OPERATED	2	<u>5. MANUFACTURING TESTING REQUIREMENTS</u> ... 5
<u>4. NORMAL POST SPRING OPERATION</u> <u>(SECOND DIGIT)</u>	2	<u>SECTION IV - REASONS FOR REISSUE</u>
NO REAR NORMAL POST SPRING OPERATED	2	<u>SECTION I - GENERAL DESCRIPTION</u>
LEFT REAR NORMAL POST SPRING OPERATED (OPTION D)	2	<u>1. PURPOSE OF CIRCUIT</u>
RIGHT REAR NORMAL POST SPRING OPERATED	2	1.01 This circuit is for use as a 3- or 4-wire local or incoming local selector when digit absorbing or blocking is required. It is arranged to trunk hunt, absorb, or block, if required, on the first two digits, each digit being independent of the other, and to trunk hunt on the third digit. Provision is made for operation as a local selector without special features. It is also arranged for dial tone and all-trunks-busy tone, as well as for timed release on per- manent signals.
<u>5. TRUNK HUNTING</u>	3	<u>SECTION II - DETAILED DESCRIPTION</u>
<u>6. TRUNK SEIZED</u>	3	<u>1. SEIZURE</u>
<u>7. ALL TRUNKS BUSY</u>	3	1.01 When this circuit is seized, relay A operates over the line or trunk loop, and, in turn, operates relay B. Relay B connects ground to lead S to hold the preceding circuit operated.
<u>8. RELEASE AFTER CUT-THROUGH</u>	3	
<u>9. PERMANENT SIGNAL RELEASE</u>	3	
FIG. 2 AND N OPTION	3	
M OPTION	3	
<u>10. CONTACT PROTECTION</u>	3	
<u>11. RESISTANCE</u>	3	

2. VERTICAL STEPPING (FIRST DIGIT)

2.01 Relay A releases and reoperates under control of the incoming dial pulses. Relay B is slow in releasing and remains operated during pulsing. Each time relay A releases, ground from its back contact through a front contact of the B relay operates the vertical magnet in series with relay C, causing the switch to step vertically to the level dialed. Relay C operates on the first pulse and closes its front contact to maintain the pulsing path to itself and the vertical magnet after the vertical off-normal springs function. Relay C is slow in releasing and remains operated while the switch is stepping vertically. The operated C relay grounds lead P through a back contact of relay F.

3. NORMAL POST SPRING OPERATION (FIRST DIGIT)

NO FRONT NORMAL POST SPRING OPERATED

3.01 If the level reached at the end of the first digit does not operate either front normal post spring, the switch will trunk hunt as a regular selector.

3.02 The release of relay C at the end of pulsing connects ground from the vertical off-normal springs to operate relay E and start trunk hunting. The release of relay C also operates relay F, which locks under control of B, Z, and the release magnet.

LEFT FRONT NORMAL POST SPRING OPERATED (OPTION D)

3.03 If the level reached at the end of the digit operates the left front normal post spring, the switch will block and return busy tone.

3.04 The release of relay C at the end of pulsing operates relay F as above, and places ground through resistor A on the tone lead to operate a relay in the selector shelf alarm circuit. Since the VON springs are operated and relay C is released, no further pulsing can affect the switch. The operation of the shelf relay connects busy tone through contacts of the VON springs and the eleventh rotary step springs, and through capacitor A to the tip of the line.

3.05 If option B is provided, the switch will not block, no tone will be heard, and the switch will hunt as a regular selector.

RIGHT FRONT NORMAL POST SPRING OPERATED

3.06 If the level reached at the end of the digit operates the right front normal post spring, the switch releases and absorbs the digit.

3.07 The release of relay C operates relay F. The operation of relay F connects ground through the front contact of the right front normal post spring and the back contact of relay C to the release magnet. The release magnet operates and returns the switch to normal with the F relay operated.

4. NORMAL POST SPRING OPERATION (SECOND DIGIT)

4.01 If the first digit was absorbed, the second digit will operate relays A, C, and the vertical magnet as in 2.01. The operation of relay C and the VON springs operates relay Z which locks up under control of relay B.

NO REAR NORMAL POST SPRING OPERATED

4.02 If the level reached at the end of the digit does not operate either rear normal post spring, the switch will trunk hunt as a regular selector.

4.03 When relay C releases at the end of pulsing, ground is connected to relay E, which operates to start trunk hunting.

LEFT REAR NORMAL POST SPRINGS OPERATED (OPTION D)

4.04 If the level reached at the end of the digit operates the left rear normal post spring, the switch will block and return busy tone.

4.05 When relay C releases at the end of pulsing, ground through resistor A is connected to the busy tone lead to operate a relay in the switch trouble alarm circuit. The operation of the shelf relay connects busy tone through contacts of the VON springs and the eleventh rotary step springs and through capacitor A to the tip of the line. Since the VON springs are operated and relay C is released, no further pulsing can affect the switch.

4.06 If option B is provided, the switch will not block, no tone will be heard, and the switch will hunt as a regulator selector.

RIGHT REAR NORMAL POST SPRINGS OPERATED

4.07 If the level reached at the end of the digit operates the right rear normal post spring, the switch will release and absorb the digit.

4.08 When relay C releases at the end of pulsing, ground is connected to the release magnet which operates and restores the switch to normal. The operation of the release magnet opens the holding path of relay F, which releases.

5. TRUNK HUNTING

5.01 If the first and second digits were absorbed, the third digit will operate relays A, C, and the vertical magnet as in 2.01. When relay C releases at the end of pulsing, ground will be connected to relay E through a front contact of relay Z and a back contact of relay F. Relay E will operate to start trunk hunting.

5.02 The operation of relay E connects ground to the rotary magnet, which operates. Operation of the rotary magnet releases the E relay, which in turn releases the rotary magnet. This connects the sleeve wiper to a bank terminal of a trunk and operates the rotary off-normal spring (RON). If the trunk is busy, the bank terminal is grounded, and the release of the rotary magnet reoperates relay E, which in turn reoperates the rotary magnet. Stepping is continuous in this manner until an idle ungrounded terminal is reached or until the wipers step off the bank. During this interval relay D is shorted out and does not operate.

6. TRUNK SEIZED

6.01 When an idle terminal is reached, as described in 5.02, relay D operates in series with relay E when the rotary magnet releases, since it is not shunted by a ground on the sleeve wiper. Relay E does not operate because of the resistance of the D relay winding. The operated D relay disconnects the T and R leads from the A relay winding and extends the T, R, S, and A or C leads to the succeeding circuit. The operation of relay D releases relays A and B. If relay F is operated and relay Z is released, F remains locked to the sleeve. If Z is operated, it remains locked to the sleeve and allows F to release. Relay D is held operated by ground returned on the S lead from the succeeding circuit. During the releasing time of relay B, ground is connected to the M lead to operate the peg count register.

7. ALL TRUNKS BUSY

7.01 If the switch has stepped to the eleventh rotary step, the eleventh rotary step springs operate to connect all-trunks-busy tone to the calling party through capacitor A and open the circuit to relay D, thus causing this circuit to remain held under control of the A relay. Further dialing will not affect the switch. When the calling party disconnects, relay A releases, releasing relay B, which operates the release magnet to restore the switch to normal. The release of relay B will release relays F and Z if those relays are operated. The operation of the release magnet may have a tendency to cause relay F to buzz momentarily. The switch will release in this manner at any time prior to the seizure of an idle trunk.

8. RELEASE AFTER CUT-THROUGH

8.01 As described in 6.01, relay D is held by the succeeding circuit after the idle trunk is seized. When the calling party disconnects under this condition, and when ground is removed from the S lead by the circuit beyond, relay F or Z will release and relay D will release and close the circuit to operate the release magnet through the VON springs. When the switch restores to normal, the release magnet circuit is opened by the VON springs.

9. PERMANENT SIGNAL RELEASE

9.01 This circuit is arranged to release under control of the miscellaneous alarm and permanent signal timing circuit if dialing does not occur within a predetermined time interval.

FIG 2 AND N OPTION

9.02 When the selector circuit is seized and the A relay has operated, the primary winding of the PS relay is connected to the permanent signal timing circuit over the PA lead. Ground over this lead operates the PS relay which locks under control of the B relay. The operation of the PS relay transfers control of the sleeve lead from the selector to the permanent signal timing circuit over the PB lead. After a predetermined time interval, ground is removed from the PB lead which causes the line finder to release and release the selector.

M OPTION

9.03 When this circuit is seized and the A relay has operated, ground is connected to the LO lead to operate the PS relay on the line finder unit. If dialing does not occur within a predetermined time interval, the holding ground to the line finder is removed so that the finder and then the selector are released.

10. CONTACT PROTECTION

10.01 Network C is used to protect the relay contacts which control the vertical and rotary magnets.

11. RESISTANCE

11.01 Resistor A is used to prevent the F relay from being operated from another circuit on the same shelf, and to provide a high impedance to ground for the busy tone.

12. MISCELLANEOUS MAINTENANCE FEATURES

12.01 A test jack provides ready access to the incoming tip and ring conductors for

making operation tests of the switch. A test plug inserted in the test jack grounds the sleeve to make this switch busy, and closes auxiliary contacts 5 and 6 of the test jack to short circuit contacts 3-4 of the VON springs so that relay C may be reoperated during a rotary speed test.

12.02 When making a leak pulsing test or operational test in this switch, test jack springs 5 and 6 must be insulated.

13. TAKING EQUIPMENT OUT OF SERVICE

13.01 When this circuit is used as other than an incoming selector, it may be taken out of service by inserting a 375-A tool between the sleeve spring (3) and ground spring (4) of the test jack. In a line switch office, after a first selector is made busy, the secondary line switch division having access to the selector must be observed to make sure that no plungers are engaging the trunk involved, and that no plungers are directed toward the trunk.

13.02 When this circuit is used as an incoming selector, the associated trunk at the originating office must be made busy to take this circuit out of service.

14. DESCRIPTION OF ALARM FEATURES

14.01 The permanent signal and release magnet alarms controlled by this circuit are described in the circuit description for the switch trouble alarm circuit listed under Section III, 4.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The limits in Table A are for single office areas. For multioffice areas, and for operator pulsing, see keysheets.

2. FUNCTIONAL DESIGNATIONS

None.

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 dial pulses.

TABLE A

Type of Dial	45 Volt Minimum		
	Pulsing From Subscriber		
	Ohms		
	2, 4, or 5	6	7
Maximum External Circuit Loop*	750	1200	1100
Maximum External Circuit Loop**	850	1400	1300
Maximum External Circuit Loop***	1000	1400	1400
Minimum Insulation Resistance	15,000		
Type of Dial	48 Volt Minimum		
	Pulsing From Subscriber		
	Ohms		
	2, 4, or 5	6	7
Maximum External Circuit Loop*	850	1500	1400
Maximum External Circuit Loop**	1000	1500	1500
Maximum External Circuit Loop***	1115	1500	1500
Minimum Insulation Resistance	15,000		

* When using 1000-ohm loop; leak B in pulsing test set.
 ** When using 1200-ohm loop; leak A in pulsing test set.
 *** When using 1400-ohm loop; leak A in pulsing test set.

3.04 To absorb the first digit on specified levels.

3.05 To absorb the second digit on specified levels if the first digit was absorbed.

3.06 To block and return busy tone on specified levels on either the first or second digit, if required.

3.07 To cut in and trunk hunt on the first or second digit on unspecified levels.

3.08 To cut in and trunk hunt on the third digit if both the first and second digits were absorbed.

3.09 To remove dial tone from the calling line after the first digit is dialed.

3.10 To select an idle trunk automatically.

3.11 To connect all-trunks-busy tone to the calling party when all the trunks in the group dialed are busy.

3.12 To extend the T, R, S, and A leads to the idle trunk selected.

3.13 To restore to normal if the calling party disconnects before the idle trunk is selected.

3.14 To be held under control of ground on the S lead after an idle trunk is selected.

3.15 To operate a peg count register whenever an idle trunk is seized.

3.16 To provide for use as a 3- or 4-wire selector.

3.17 To ground a lead to the message rate trunk during the first digit to allow the trunk to make a party identification test.

3.18 To provide a timed, permanent signal release in 355A offices.

4. CONNECTING CIRCUITS

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

- (a) Line Finder - SD-33013-01 (typical).
- (b) Local Selector - SD-30200-01 (typical).

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- (c) Prepay Coin Trunk - SD-31592-02 (typical).
- (d) Traffic Register Circuit - SD-30896-01.
- (e) Selector Bank Multiple Circuit - SD-32123-01.
- (f) Local Connector - SD-30201-01 (typical).
- (g) Intercepting Trunk From Selector Levels - SD-31767-01 (typical).
- (h) Outgoing Repeater - SD-31779-01 (typical).
- (i) Switch Trouble Alarm Circuit for Selectors - SD-32043-01.
- (j) Incoming Repeater - SD-31648-01 (typical).
- (k) Two-Way Interlocal Trunk - SD-31658-01 (typical).
- (l) Two-Party Message Rate Trunk - SD-31506-01 (typical).
- (m) Miscellaneous Alarm Permanent Signal Timing Circuit - SD-32192-01.
- (n) Converter Trunk - TOUCH-TONE[®] Calling - SD-32326-01.
- (o) Register Trunk and Link - SD-32353-01 (Trunk Portion).
- (p) Receiver Off-Hook Tone Connecting Circuit - SD-33034-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 The manufacturing testing requirements are specified in the X-67142 specification.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

- D.1 Options B and D are added in Fig. 1.
- D.2 Reference to options B and D is added in Notes 101 and 102 and the Options Used table.
- D.3 Reference to "no-such-number tone" was removed from the circuit and the CD on a no-record basis since rating is Mfr Disc.