STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU
TO ABSORB DIGITS
ONCE ONLY AND/OR REPEATEDLY
AND TO RETURN OVERFLOW
SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED 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 all Line Identification. Wiring Options ZY and ZX are added.

D.2 Circuit Notes 101, 102, and 107 are changed.

D.3 Equipment Notes 211 and 212 are removed, and 213 added.

D.4 CAD Fig. 58 is changed.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC
WECO DEPT 2311-DFH-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU
TO ABSORB DIGITS
ONCE ONLY AND/OR REPEATEDLY
AND TO RETURN OVERFLOW
SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
ARRANGED FOR USE AS FIRST SELECTOR
FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED FOR TIMED RELEASE ON
PERMANENT SIGNAL

CHANGES

B. Changes in Apparatus

B.1 Superseded	Superseded By
C Network, Fig. 3 ZU Option 178A Network	C Network, Fig. 3 ZV Option 840073431 Network
F Network, Fig. 3 ZN Option 179A Network	F Network, Fig. 3 ZW Option 840073423 Network

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

C.1 On 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 Option ZN is rated Mfr. Disc. and Option ZU is designated and rated Mfr. Disc. These options are superseded by Std. Options ZW and ZV which replace the present contact protection networks with networks that result in a cost reduction.

D.2 Circuit Note 102 is changed and Notes 107, 211 and 212 are added to reflect the above modification.

D.3 To correct drafting errors: Reference to Sheet 4 and Test Note 15 is added to Figs. 1, 3 and 4.

STEP-BY-STEP SYSTEMS NO. 1, 350A, 355A, 356A OR 360A 3 OR 4 WIRE SELECTOR ARRANGED FOR PEG COUNT ON CUT THRU TO ABSORB DIGITS ONCE ONLY AND/OR REPEATEDLY AND TO RETURN OVERFLOW SIGNAL ON SPECIFIED LEVELS NO. 1 OR 350A ARRANGED FOR USE AS FIRST SELECTOR FOR 2 PARTY MESSAGE RATE SERVICE NO. 355A OR 356A ARRANGED FOR TIMED RELEASE ON PERMANENT SIGNAL

CHANGES

B. Changes in Apparatus

B.1 Added
185 Network (Option ZR)

B.2 Superseded	Superseded By
197EU Switch	197JU Switch
Option ZS	Option ZT

D. Description of Changes

D.1 Contact Protection (ZR Option) is added to contacts 2 and 3 of the A relay to reduce the possibility of contact welding due to inductive load of the B relay winding.

D.2 Option ZT (197JU Switch) is added and rated Standard. Option ZS (197EU Switch) is designated and rated Manufacture Discontinued. The 197JU Switch is the same as the 197EU Switch except that the seven-spring rotary step spring assembly is replaced by the five-spring rotary step spring assembly, due to a cost reduction case.

D.3 Options ZR, ZS and ZT are add to Note 102.

D.4 To correct drafting errors: reference to Fig. 4 is added to the 360A office section of Note 105, designation "C" is added to the "A or F" lead in Fig. 3 and reference to "355A or 356A" office is added to the RLS lead in Fig. 3.

D.5 Added Maintenance BSP's to Supporting Information Table.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT.5225-LCB
WECo-DEPT.5152-FLS-WEA

STEP-BY-STEP SYSTEMS
NO. 1,350A, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU TO ABSORB DIGITS ONCE ONLY AND/OR REPEATEDLY AND TO RETURN OVERFLOW SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
ARRANGED FOR USE AS FIRST SELECTOR FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED FOR TIMED RELEASE ON PERMANENT SIGNAL

CHANGES

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

C.1 When the left normal post cam, in addition to the right, is operated on the first level, a minimum of 20 grams contact pressure shall be maintained on each side.

D. Description of Changes

D.1 Note 105 is revised to add ZP option to apply to 3W and 4W selector circuits respectively, for No. 356A and 360A offices.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5823-MEB-MR

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU
TO ABSORB DIGITS
ONCE ONLY AND/OR REPEATEDLY
AND TO RETURN OVERFLOW
SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
ARRANGED FOR USE AS FIRST SELECTOR
FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED FOR TIMED RELEASE ON
PERMANENT SIGNAL

CHANGES

D. Description of Changes

D.1 Option ZQ is added to show connection to the Receiver Off-Hook Tone Connecting Circuit, SD-33034-01.

D.2 ZP and ZQ options were added to Notes 101 and 102 and the Options Used Table.

F. Changes in Description of Operation

F.1 Under 4. CONNECTING CIRCUITS, add:

4.25 Receiver Off-Hook Tone Connecting Circuit - SD-33034-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-ALF-RJJ,Jr.

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU
TO ABSORB DIGITS
ONCE ONLY AND/OR REPEATEDLY
AND TO RETURN OVERFLOW
SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
ARRANGED FOR USE AS FIRST SELECTOR
FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED FOR TIMED RELEASE ON
PERMANENT SIGNAL

CHANGES

B. Changes in Apparatus

B.1 ADDED

179A Network F

D. Description of Changes

D.1 Contact protection, ZN option, is added to reduce the surge effect of the F relay winding upon contacts 4 and 5 of the B relay.

D.2 Rating of 350A equipment was formerly AT&TCo Std.

D.3 ZN was added to Note 102 and the Options Used table.

D.4 Reference to K option in Circuit Note 105 for 356A office was removed.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-FM-RJJ,Jr

Printed in U.S.A.

STEP-BY-STEP SYSTEMS
NO. 1, 350, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU TO ABSORB DIGITS ONCE ONLY AND/OR REPEATEDLY AND TO RETURN OVERFLOW SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
ARRANGED FOR USE AS FIRST SELECTOR FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED FOR TIMED RELEASE ON PERMANENT SIGNAL

CHANGES

D. DESCRIPTION OF CHANGES

D.1 The busy-flash feature option K is rated Mfr Disc. and reference to it is removed from Notes 102 and 105.

D.2 Circuit Note 106 is added.

F. CHANGES IN DESCRIPTION OF OPERATION

F.1 Under 4., CONNECTING CIRCUITS, add:

4.23 Converter Trunk TOUCH-TONE Calling - SD-32326-01.

4.24 Register Trunk and Link - SD-32353-01 - (Trunk Portion).

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-GO-RJJ, Jr.

Printed in U.S.A.

STEP BY STEP SYSTEMS
NO. 1 350A, 355A, 356A OR 360A
3 OR 4 WIRE SELECTOR
ARRANGED FOR PEG COUNT ON CUT THRU
TO ABSORB DIGITS
ONCE ONLY AND/OR REPEATEDLY
AND TO RETURN OVERFLOW
SIGNAL ON SPECIFIED LEVELS
NO. 1 OR 350A
ARRANGED FOR USE AS FIRST SELECTOR
FOR 2 PARTY MESSAGE RATE SERVICE
NO. 355A OR 356A
ARRANGED FOR TIMED RELEASE ON
PERMANENT SIGNAL

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 2 is rated A&M Only.

D.2 "ZL option" is introduced and rated A&M Only.

D.3 "ZM option" is rated AT&TCo. Std. replacing Fig. 2 and "ZL."

D.4 Notes 101 and 102 are revised to reflect these changes.

D.5 Use of Fig. 2 and "ZL option" is shown in Note 105.

D.6 Use of this circuit in 356A offices is rated A&M Only.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is for use as a 3 or 4-wire local selector when digit absorbing or rotation to all trunks busy on specified levels is required. It is arranged to absorb digits repeatedly on some specified levels, to absorb digits once only on some other specified levels, and to rotate to all trunks busy on other specified levels. It is arranged to operate as a local selector without special features on unspecified levels or any succeeding digit after a "Once-only" digit absorbing level is reached. It is arranged for dial tone, all trunks busy tone or busy flashing and for timed release on permanent signal. It is also arranged to return a ground impulse to the preceding trunk when used as a first selector for 2 party message rate service, in No. 1 or 350A offices, or as following a post pay coin trunk for use with coin and noncoin stations on the same line in No. 350A or 355A offices.

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 or Adj.	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 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.

3.04 To absorb the initial digit only on specified levels.

3.05 To absorb digits repeatedly on specified levels unless the previous digit dialed on this switch reached a level which absorbs the initial digit only.

3.06 To rotate to all trunks busy on specified levels unless the previous digit dialed on this switch reached a level which absorbs the initial digit only.

3.07 To cut in and trunk hunt on the remaining levels and on specified levels in accordance with paragraphs 3.05 and 3.06.

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

3.09 To return a ground impulse to the preceding trunk circuit during pulsing of each digit which causes this switch to step vertically.

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, and to give a flashing signal to the operator.

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 the 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 provide for timed permanent signal release.

4. CONNECTING CIRCUITS

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

4.01 Line Finder - SD-33013-01*

4.02 Selector (Local) - SD-30200-01*, SD-33003-01*

4.03 2 Party Message Rate Trunk - SD-31506-01*

4.04 Prepay Coin Trunk - SD-31592-02*
Post Pay Coin Trunk - SD-31895-01

4.05 Traffic Register Circuit - SD-30896-01

4.06 Misc. Alarm Circuit (Registers) - SD-31976-01

4.07 Selector B and Multiple Circuit - SD-32123-01

4.08 Misc. Tone & Tone Alarm Circuit - SD-31521-01

4.09 Local Connector - SD-31737-01*, SD-30979-01

4.10 Intercepting Trunk from Selector Levels - SD-31767-01*

4.11 Outgoing Repeater - SD-31779-01

4.12 Switch Trouble Alarm Circuit for Selectors - SD-32043-01*

4.13 Incoming Repeater - SD-30974-01*

4.14 Power Ringing Circuit - SD-81131-01*

4.15 Two-way Interlocal Trk. - SD-31842-01*, SD-31674-01*, SD-32190-01

4.16 Permanent Sig. Timing Ckt. - SD-31844-01

4.17 Misc. Alm. Ckt. Selector Shelves - SD-32043-01

4.18 Alarm Circuit, No. 356A - SD-32145-01

4.19 Connector Alternating Relay Circuit - SD-32063-01

4.20 Verification Distributor Ckt. - SD-30980-01

4.21 Miscellaneous Alarm Circuit - SD-31209-01

4.22 Miscellaneous Alarm & Permanent Signal Timing Circuit.- SD-32192-01

*Typical Circuit

DESCRIPTION OF OPERATION

5. SEIZURE

5.1 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 preceding circuits operated and operate relay (F) through back contacts of relays (Z), (C) and the vertical off-normal springs.

6. VERTICAL STEPPING

6.1 Relay (A) releases and reoperates under control of the incoming dial pulses. (B) is slow in releasing and remains operated during pulsing. Each time (A) releases ground from its back contact through a front contact of the (B) operates the vertical magnet in series with relay (C) causing the switch to step vertically to the level dialed. (C) operates on the first pulse but is slow releasing and remains operated while the switch is stepping vertically. (C) operated, operates (E) which locks to (D) through the rotary interrupter and also maintains a locking circuit to keep relay (F) operated. With Fig. 3, ("A" Option) (C) also returns ground to the preceding trunk circuit as a signal to test for a ground on the tip of the calling subscriber line.

7. NORMAL POST SPRING OPERATION AND TRUNK HUNTING

7.1 No Normal Post Springs Operated

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

The release of (C) connects ground through contacts of (B) and (Z), the left normal post springs and relay (E) to operate the rotary magnet. Operation of the rotary magnet releases (E) which in turn releases the rotary magnet. This connects the sleeve wiper to a bank terminal of a trunk. If the trunk is busy the bank terminal is grounded, and release of the rotary magnet reoperates (E) which in turn reoperates the rotary magnet. Stepping is continued 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.

7.2 Right Normal Post Spring Only Operated

If the level reached at the end of the digit actuates only the right normal post spring the switch will rotate to all trunks busy unless "once only" absorption has previously occurred.

Relay (F) is kept operated after the release of (C) by the ground through a back contact of (Z). Ground from (B) through the right normal post springs and the make contact of (F) is connected to the operating path of (E). The selector wipers will hunt across the bank as covered in paragraph 7.1. and operate the 11th rotary step springs because the superimposed ground causes all trunks to appear busy. Operation of the 11th rotary step spring opens the operating path for (E) and prevents its reoperation.

7.3 Left Normal Post Springs Only Operated

When the level reached actuates the left normal post spring only, the switch releases and absorbs digits repeatedly as often as it reaches a level which operates the left normal post springs only unless "once only" absorption has previously occurred.

At the end of the digit relay (C) releases but the locking path of (F) is maintained by the right normal post spring. Release of (C) connects ground through a back contact of (Z) the left normal post spring and a front contact of (F) to operate (Z) which locks through its make first contact to (C). Operation of (Z) operates the release magnet which returns the switch to normal. Relay (F) is kept operated by the closure of contacts on the release magnet while the switch is returning to normal and by the right normal post spring when the release magnet releases. At the beginning of the next digit (C) operates, releasing (Z) returning the circuit to the same condition as before the first digit. This allows the switch to operate as in Par. 7.1 or 7.2 for the next digit or repeat Par. 7.3.

7.4 Left and Right Normal Post Springs Operated

When the level reached operates both the right and left normal post springs the switch shall release and absorb the digit. For any subsequent digit, however, the switch will operate as an ordinary local selector regardless of normal post spring action.

On release of the (C) relay at the end of the digit relay (F) is kept operated by a back contact of relay (Z). The left normal post spring actuated operates (Z) opening the operating path of (F) which releases quickly. (Z) operated locks to (C) and also operates the release magnet which closes the release magnet springs. (F) released, cannot be reoperated through its own contacts by the release spring. The switch returns to normal with (Z) operated until the next digit keeping the operating path for (F) open. On the next digit (C) operates preventing (F) from reoperating. (F) and (Z) remain released so that regardless of the position of the normal post springs the switch will hunt for an idle trunk in the regular manner.

8. TRUNK SEIZED

8.1 When an idle terminal is reached as described in paragraph 7.1 (D) operates in series with (E) when the rotary magnet releases, since it is not shunted by a ground on the sleeve wiper. (E) does not operate because of the resistance of the (D) relay winding. (D) operated disconnects the "T" and "R" leads from the (A) relay winding and extends the "T", "R", "S", and "A" leads to the succeeding circuit. (A) releases, releasing (B). (B) released, releases (F) if operated. (D) is held operated by ground returned on the "S" lead from the succeeding circuit. During the releasing time of (B) ground is provided to operate the peg count register.

9. ALL TRUNKS BUSY

9.1 Busy Tone

When the switch has been stepped to the 11th step, the 11th rotary step springs operate which connect all trunks busy tone to the calling end and open the circuit to (D), thus causing this circuit to remain held under control of (A). When the calling end disconnects, (A) releases, releasing (B) which operates the release magnet to restore the switch to normal. The switch will release in this manner on a disconnection at any time prior to the seizure of an idle trunk. If the switch is released with (F) operated (B) released releases the (F) relay.

9.2 All Trunks Busy Flash - "W" Option Fig. 1 or "K" Option, Fig. 3

When the 11th rotary step springs are operated 120 IPM ground is connected to lead "F". This causes a relay in the incoming or two-way trunk to return paths busy flashes to the calling operator. Release is the same as in 9.1. All trunks busy flash is used only on operators incoming selectors, and subsequent second selectors, if any, in No. 355A or 356A offices.

10. RELEASE AFTER CUT THROUGH

10.1 As described in paragraph 9.1 (D) is held by the succeeding trunk after the idle trunk is seized. When the calling station disconnects under this condition and when ground is removed from the "S" lead by the circuit beyond, (D) will release and close the circuit to operate the release magnet through the V. O. M. springs. When the shaft restores to normal, the release magnet circuit is opened by the V. O. M. springs.

11. PERMANENT SIGNAL RELEASE

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

11.1 Fig. 2 and "ZL" Option

When this circuit is seized and the (A) and (B) relays have operated, the primary winding of the (PS) relay is connected to the permanent signal timing circuit over the "PA" lead. When ground is placed on "PA", the (PS) relay operates and locks under control of the (B) relay. (PS) transfers control of the "S" lead to the finder from the selector to the timing circuit over the "PB" lead. After a predetermined interval ground is momentarily removed from "PB" and the line finder releases. The selector is released by the finder and the lockout relay in the line circuit operates.

11.2 "ZM" Option

When this circuit is seized and the (A) relay has operated, ground is placed on the "LO" lead to the permanent signal relay on the line finder unit. If dialing does not occur within a predetermined interval, the associated line finder is released, releases this circuit and operates the lockout relay in the line circuit.

11.3 Permanent signal lockout is used only on subscribers first selectors in No. 355A or 356A offices. Since as stated in paragraph 9.2, busy flash is not used on these selectors, jack 7 is used in both circuit arrangements, since otherwise a total of 17 jack springs would be required. With this exception, all circuit options are obtainable by changes in the jack wiring to the switch.

12. TEST JACK

12.1 A test jack provides means for making this switch busy and for making operation tests of the switch.

13. CONTACT PROTECTION

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