

10

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A. E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

C. Changes in Circuit Requirements other  
Than Those Caused by Changes in Appa-  
ratus

C.1 Change test clip data, Conn. Grd., from 1L to 1U on Fig. 18  
Relays B&C code AJ14.

D. Description of Changes

D.1 Coil terminals 1U & 1L reversed on Relays B&C Fig. 18, on  
a no record basis, to agree with manufacturing information.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC  
WECO DEPT8411-RWH-WEA

9

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A. E. CO. 35E97  
LINE LOAD CONTROL CIRCUITCHANGESB. Changes in Apparatus

- |     |                    |                      |
|-----|--------------------|----------------------|
| B.1 | <u>SUPERSEDED</u>  | <u>SUPERSEDED BY</u> |
|     | B or C Relay U1178 | B or C Relay AJ14    |
| B.2 | <u>REMOVED</u>     | <u>REPLACED BY</u>   |
|     | CLB LAMP 2Y        | CLB LAMP M1          |
|     | CLC LAMP 2Y        | CLC LAMP M1          |
|     | B or C LAMP 2Y     | B or C LAMP M1       |

D. Description of Circuit Changes

- D.1 Fig. 17 is rated MFR. DISC., replaced by Fig. 18 for use in No. 1, 350, 360, 355 or 35E97 office.
- D.2 Fig. B, Fig. 7, Fig. 9 and Fig. 10 changed to show reference to Fig. 18.
- D.3 Circuit note 106 is revised to reflect the use of Fig. 18.
- D.4 Circuit note 108 is revised to show Fig. 17 rated MFR. DISC. and Fig. 18 rated Standard.
- D.5 Circuit note 110 is revised to show fusing of Fig. 18.
- D.6 Circuit note 110 (b) is revised to show reference to Fig. 18.
- D.7 B and C Relays of Fig. 18 are added to the circuit requirements.
- D.8 Figs. 10 and 16 are changed to show replacement of 2Y Lamps with M1 Lamps.
- D.9 Figs. 53, 67, 69 and 71 changed, 72 M.D. and 73 added.

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DEPT. 5245-ICB  
WECO DEPT. 5152-SJL/RAF-WEAF. Changes in CD Sections

- F.1 Under 4. CONNECTING CIRCUITS add:  
4.14 Group and Alarm Relay Circuit for Line and Trunk Finders - SD-32194-02.
- F.2 Under Section 5, Paragraph 2, Sentence 3, change:  
"Figure 2, 3, 8 and 17" to  
"Figure 2, 3, 8, 17 and 18".
- F.3 Under Section 5, Paragraph 3, Sentence 2, change:  
"Figure 2, 8 or 17" to  
"Figure 2, 8, 17, or 18".
- F.4 Under Section 5, Paragraph 3, Sentence 5, change:  
"Figures 2, 3, 8 and 17" to  
"Figures 2, 3, 8, 17 and 18".
- F.5 Under Section 5, Paragraph 6, change:  
"When Fig. 17" to  
"When Fig. 17 or 18".
- F.6 Under Section 7, Paragraph 1, Sentence 1, change:  
"Figures 2, 3, 8 or 17" to  
"Figures 2, 3, 8, 17 or 18".
- F.7 Under Section 7, Paragraph 2, Sentence 1, change:  
"Figures 2, 3, 8 or 17" to  
"Figures 2, 3, 8, 17 or 18".

CIRCUIT DESCRIPTION

CD-32069-01  
Issue 7-D  
Appendix 5-D  
Dwg. Issue 21-D

8

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A.E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Fig. 3 is changed to reduce the class A assignment for line load control to 10 per cent.
- D.2 The "Options Used" table and Note 108 are modified to show this change.
- D.3 Prior to Issue 21-D Note 113 did not make reference to Fig. 3, 2, and 8.
- D.4 Prior to Issue 21-D Option M was a part of the circuit not designated and Option K was not shown.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2363-MPC-FBB-VC

CIRCUIT DESCRIPTION

CD-32069-01  
Issue 7D  
Appendix 4D  
Dwg. Issue 20D

STEP BY STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A.E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Fig. 11 is rated A&M Only replaced  
Fig. 12 and 15 for use in a 355A  
office.
- D.2 Circuit Note 106 is revised to show  
the use of Figs. 12 and 15 in a No.1,  
350 or 355 office.
- D.3 Circuit Note 113 is changed to show  
the use of Fig. 11 in a 360 or 35E97  
office.
- D.4 Circuit Note 108 shows Fig. 11 rated  
A&M Only.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2335-MKD-FBB-KO

CIRCUIT DESCRIPTION

CD-32069-01  
Issue 7-D  
Appendix 3-D  
Dwg. Issue 19-D

STEP BY STEP SYSTEMS  
NO. 1, 350A, 355A, 360A or  
A.E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Rated Fig. 70 Mfr. Disc., revised Figs.  
67, 69 and 71, and added Fig. 72 to  
facilitate wiring to the terminal block.

D.2 Rated "W" and "N" options A&M Only.

All other headings, no change.

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DEPT. 2336-AH-RCD-ME

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Page 1  
1 Page

STEP BY STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A.E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

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

C.1 The Circuit Requirements table is  
changed for the (B), (C), and (LKA)  
relays to allow adjustment when Figure B is  
provided as well as when Figure A is  
provided.

4. CONNECTING CIRCUITS

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

4.02 No. 1 Audible and Visual Alarm Cir-  
cuit - SD-96188-01.

4.03 No. 1 Pilot Lamp Circuit -  
SD-31548-01.

4.04 No. 350A Pilot Lamp and Power Alarm  
Circuit - SD-31573-01.

4.05 Ceiling Lamp Panel Circuit -  
ES-360027.

4.06 Line Finder Circuits - SD-33012-01,  
SD-31530-01, SD-31922-01, H-35710.\*

4.07 Line Switch Circuit - SD-31644-01.

4.08 Line Circuit - SD-32133-01, SD-31777-01  
H-35710.\*

4.09 355A Aisle Pilot Circuit - SD-31970-01.

4.10 355A Alarm Control Circuit -  
SD-32192-01.\*

4.11 35-E-97 Power Supervisory Circuit -  
(H-61577).

4.12 Line Load Control Circuit Arranged  
for Remote Control - SD-32108-01.

4.13 Group and Alarm Relay Ckt. for Line  
and Trunk Finders - SD-32194-01.

\*Typical

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2315-RJS-RCD-CI

CIRCUIT DESCRIPTION  
SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

CD-32069-01  
Issue 7D  
Appendix 1D  
Dwg. Issue 17-D

STEP BY STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A.E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

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

C.1 The BSP Fig. No. is added for relay  
(LP) to correct an omission.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2325-JAF-EWO-DD

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Page 1  
1 Page

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A, 360A OR  
A. E. CO. 35E97  
LINE LOAD CONTROL CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Cross connection Fig. 71 is added and Figs. 67 and 70 are revised to include reference to Fig. 71.

D.2 Punchings 16 and 17 of TS(B) on L. FDR. Unit have been added to Fig. 70.

D.3 Information at multiple straps on punchings 23 and 13 in Fig. 70 was added.

D.4 Lead "O" to Pilot Lamp Ckt. in Fig. 1 was changed to "C" to agree with designation of lead of Pilot Lamp CKT.

D.5 In Fig. 70, leads to punchings 23, 13, 17 and 16 shown in same cable and leads to punchings 54 and 53 in another cable.

D.6 Titles are added for Figs. 1 and 13.

All other headings under Change, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit provides a means of controlling traffic from step-by-step lines so that during emergencies certain classes of lines can be prevented from originating calls. The purpose in this is to insure that the central office equipment will not be overloaded to such an extent that other lines such as those to police stations, fire stations, hospitals, etc. will not be able to obtain service.

2. WORKING LIMITS

2.1 None.

3. FUNCTIONS

3.01 To lock open the start or "G" leads of line circuits associated with certain line finder levels when a key is operated momentarily.

3.02 To lock open the "Open Main" leads of certain line switches when a key is operated momentarily.

3.03 To light a lamp on the line finder unit or in a line switch bay when lines are locked out of service.

3.04 To light a pilot lamp and a lamp at the cabinet corresponding to a particular line finder unit or line switch group when such a unit or group has lines locked out of service.

3.05 To restore locked out lines to service when a nonlocking toggle switch or key is operated.

3.06 To provide means by which, after a cabinet key is operated, lines can be locked out of originating service in particular line finder units or line switch groups when a load control relay mounted near the equipment is operated manually.

3.07 To provide an alarm and light a pilot lamp if any of the line load control relays mounted on the line finder frames or in the line switch bays operate falsely.

3.08 To provide an alarm and light a pilot lamp if the locking lead for the line load control relays on the frames or bays gets battery connected to it.

3.09 To provide an alarm and light a pilot lamp when the key is operated to take a class of lines out of service.

3.10 To provide an alarm and light a pilot lamp when the key which provides means of locking manually operated relays is operated or released.

3.11 To provide means for retiring alarms.

3.12 To function with remote control circuit.

4. CONNECTING CIRCUITS

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

4.02 No. 1 Audible and Visual Alarm Circuit - SD-96188-01.

4.03 No. 1 Pilot Lamp Circuit - SD-31548-01.

- 4.04 No. 350A Pilot Lamp and Power Alarm Circuit - SD-31573-01.
- 4.05 Ceiling Lamp Panel Circuit - ES-360027
- 4.06 Line Finder Circuits - SD-31530-01 (1, 350, 360), SD-31922-01 (355), H-35710 (35-E-97).
- 4.07 Line Switch Circuit - SD-31644-01
- 4.08 Line Circuit - SD-31531-01 (1, 350, 360), SD-31777-01 (355), H-35710 (35-E-97).
- 4.09 355A Aisle Pilot Circuit - SD-31970-01.
- 4.10 355A Alarm Control Circuit - SD-31980-01.
- 4.11 35-E-97 Power Supervisory Circuit - (H-61577).
- 4.12 Line Load Control Circuit arranged for remote control - SD-32108-01.
- 4.13 Group and Alarm Relay ckt. for line and Trunk Finders - SD-32194-01.

DESCRIPTION OF OPERATION

5. CLASS OF LINES REMOVED FROM SERVICE

Ordinarily, the lines which are to be denied originating service temporarily, are divided into two groups, designated "Class B" and Class C". Class B lines are associated with one Figure 1 and Class C lines with another Figure 1.

To remove a class of lines from service the (Class B) or (Class C) key is operated to the (REM LINES FROM SERV) position momentarily, or the CLB OR CLC key in the shelter area (Figure 16 is operated momentarily. If the (MASTER) key is provided it also must be held operated. While they are operated, relays (A1), (A2), and (G), when provided operate, operating all the (B) or (C) relays of Figure 2, 3, 8 and 17. The (B) or (C) relays of Figure 3 also operate the (B1) or (C1) relays. With Figure B, (G) will lock to (AL) after that relay operates.

In Figure A, (G) is slow release so that (A1) and (A2) will break the current to the B or C relay primary winding. The (B) or (C) relays of Figure 2, 8 or 17 or the (B1) or (C1) relays of Figure 3 close circuits to the (LP) relay of Figure 1 through the lamps of Figure 7. This lights the (B) or (C) lamps of Figure 7 and operates the (LP) relay. The (LP) relay operates the (AL) relay which lights the (B), (C) or (LOAD CONT) pilot lamp, causes an audible and visual alarm or sends an alarm via an extension alarm circuit or an alarm

circuit or an alarm sender and operates the (LK) relay which locks in order to remain operated after relay (A1) releases. Relay (LK) furnishes locking ground to the (B) or (C) relays of Figures 2, 3, 8 and 17 and lights the CLB or CLC lamp of Figure 16 when provided.

Relay (LP), (AL) and (LK) and the (B) or (C) relays (and with Figure 3, the B1 or C1 relays) remain operated after the keys are restored. With Figure B, (G) also remains operated. Alarms may be retired by the momentary operation of the (RA) key which operates and locks relay (ALO).

When the (B) or (C) relay of Figure 2 operated it opened the "Open Main" leads of the primary line switches in Class B or C in a maximum of three bays thus blocking originating service.

When Fig. 17 is used in connection with the line finders, the B or C relay operated opens the circuit to the line finders group relays circuit to prevent originating service to the lines.

In order to restore the lines to service the (B) or (C) toggle switch or key in the line switch bay must be operated momentarily. This releases the (B) or (C) relay, extinguishing the lamp in the bay and at the cabinet. Since the toggle switch or key is non-locking it recloses the locking lead when released. The (B) or (C) relay will lock if operated manually at this time providing there is at least one other (B) or (C) relay operated.

With all the (B) or (C) relays of Figure 2 released, the (LP), (AL), (ALO) and (LK) relays release and the pilot lamp is extinguished.

When Figure 3 is used the operation is similar except the (B) and (B1) or (C) and (C1) relays open the circuit to the line finder group relays to deny originating service to the lines.

Two relays are used in Figure 3 in order to obtain double contacts in the group relay circuits so as to reduce the possibility of blocking lines from service without an alarm because of dirty contacts.

When Figure 8 is used, the "ST" leads associated with the line circuits on each level with denied service are opened between the line circuits and the start relay in the line finder control circuit. In the 35-E-97 these leads are designated by numbers.

6. REMOVING SMALL NUMBER OF LINES FROM SERVICE

If there is occasion to remove only a few lines from service, the (LOCK MAN OPER

REL) key is operated. This operates the (LK) and (AL) relays whereupon any (B) or (C) relays which are operated manually will lock and operate the (LP) relay. The (AL) relay operates alarms which may be retired by operating the (RA) key momentarily which locks relay (ALO).

The (B) and (C) relays must be released by operating the (B) or (C) toggle switches at the equipment since releasing the (LOCK MAN OPER REL) keys will not release these relays. This feature prevents the sudden restoral of service to large groups of lines without the maintenance man being near the equipment so as to be able to observe the effect of such restoral and take any action necessary.

If the (LOCK MAN OPER REL) key is released during the time that any (B) or (C) relays are still operated the audible and visual alarms will again be brought in because the (ALO) relay releases on flux reversal. The alarm may be retired as before.

#### 7. GENERAL

A double alarm path to indicate falsely operated (B) or (C) relays in Figures 2, 3, 8 or 17 is provided over the "LK" and "L" leads. If an alarm lamp is burned out there is still a path through the "LK" lead for indicating the falsely operated relay. In Figure 3 if the (B1) or (C1) relay is falsely operated but the lamp is burned out, the circuit to the group relays will still be maintained through back contacts of the (B) or (C) relays.

The (B) or (C) relays of Figure 2, 3, 8 or 17 will not lock in series with the (LKA) relay if operated. However, if the (B) or (C) relay is held operated the (LKA) relay will operate, operating the (AL) relay and causing an alarm.

The (MASTER) key reduces the possibility of taking a class of lines out of service accidentally since it is necessary

to hold two nonlocking keys operated to lock a class of lines out of service. The (MASTER) key is replaced by the 10A guard which also prevents accidental operation.

A lighted pilot lamp (B), (C) or (LOAD CONT) indicates that there is at least one (B) or (C) relay operated.

(E1) lamp in series with a resistance are used in the cabinet to prevent overheating of the lamp strips.

The (ADJ) key "R" option provides a means of removing ground from the springs of the (A1) and (A2) so that these relays may be adjusted without operating the line load control relays. Operation of this key causes an alarm which may be retired by the (RA) key, and lights the (B), (C) or (LOAD CONT) pilot lamp.

The (G) relay "Q" option supplies ground to the contacts of relays (A1) and (A2) when these relays are operated, and is slow-to-release when relays (A1) and (A2) release in order to insure that the contacts of (A1) and (A2) open the circuit to the (B) or (C) relays.

#### 8. OPERATION WITH REMOTE CONTROL

When lines are to be removed from service the remote control circuit grounds the "B" or "C" lead which performs the same function as the operation of the (REM LINES FROM SERV) key. Relay (LK) grounds the "RB" or "RC" lead to indicate to the remote control circuit what group of lines has been removed from service.

Alarms are retired, the same as if the (RA) key were operated, by the remote control circuit which grounds the "RAB" or "RAC" lead. With "S" wiring the ground for controlling the (LK) relay is fed from the remote control circuit. When lines are to be restored to service the remote control circuit removes ground from the "GB" or "GC" lead.

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DEPT. 2325-FHP-EWO-DJ