13

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
SUBCRIBER LINE CIRCUIT

CHANGES

D. Description of Changes

D.01 The connecting information for the CDA 2-Way Auxiliary Line Circuit, SD-32563-01, is added to Fig. 9 to provide for the Feature Group A (FGA) billing for step-by-step.

D.02 CADs 58 and 59 are changed.

F. Changes in CD SECTION III

F.01 Under 4. CONNECTING CIRCUITS, add the following:

4.41 CDA 2-Way Auxiliary Line Circuit - SD-32563-01.

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DEPT 55212-NAR

WE DEPT 62810-RWH-JCR-LEV

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
SUBSCRIBER LINE CIRCUIT

CHANGES

A. Changed and Added Functions

A.1 New feature is added which allows connection of the ROH Tone to Selected Customer Lines only.

B. Changes in Apparatus

B.1 Added

ROH Diode, 533K, ZC Option, Fig.s 1, 2, 3, 9 **and** 10.

D. Description of Changes

D.1 Diode ROH is added to a sleeve lead to allow identification of the Line where ROH Tone should be reduced in level.

D.2 CAD 69 added.

F. Changes in CD Section

F.1 In Section III, add **paragraphs** 4.39 and 4.40:

4.39 Electronic Dial Tone Speed Register - SD-3B504-01.

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

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC
WECO DEPT 2311-DEH-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
SUBSCRIBER LINE CIRCUIT

CHANGES

D. Description of Changes

D.1 Rated Fig. 60 and 61 Mfr. Disc. and added Fig. 67 and 68.

D.2 Circuit note 109 is rated Mfr. Disc.

D.3 Circuit note 113 is added.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5245-LCB
WECO DEPT 5152-CAW-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97 SUBSCRIBER LINE CIRCUIT

CHANGES

D. Description of Changes

D.1 Circuit Note 112 is added: The combined series resistance of the MC1 and MC2 leads shall not exceed 14 ohms.

D.2 Reference to Note 112 is added to Fig. 4.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-LCB
WECO DEPT 5152-CAW-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
SUBSCRIBER LINE CIRCUIT

CHANGES

B. Changes in Apparatus

B.1 Added
458A Diode
Option ZA, Fig. 4

D. Description of Changes

D.1 Class A change is made to the overtime charging modifications to add a diode in the coil circuit of the message register in Figure 4. The diode eliminates a sneak holding path which holds the message register operated after the Multi-Contact Relay Control and Alarm Circuit operates to release the message register by opening its battery supply. The sneak holding path is to battery thru relays of other line circuits via the common connections of the message registers. The existing wiring is designated option ZB and rated Standard.

D.2 This change does not affect equipment in the field since ordering information has not yet been released by WECo.

F. -Changes in Description of Operation or Changes in CD Sections

F.1 Add Manufacturing Testing Requirements as follows:

MANUFACTURING TESTING REQUIREMENTS

This Line Circuit shall be capable of:

(a) Performing all the circuit functions specified in this circuit description

(b) Meeting all the requirements of the Circuit Requirements Table.

(c) Meeting all the working limits specified in this circuit description and in SD-32133-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5225-LCB
WECO DEPT 5152-NTM-WEA

STEP-BY-STEP SYSTEMS
NO. 1 , 350A, 355A, 360A OR 35-E-97
SUBSCRIBER LINE CIRCUIT

CHANGES

D. Description of Changes

D.1 Option ZA is added and rated standard to connect a make contact of the Multi-contact Relay Control and Alarm Circuit in series with the battery supply of those message registers which operate on positive booster battery and hold on exchange battery.

D.2 This change is made to add overtime charging to single-party, message-rate lines. The Multi-contact Relay Control and Alarm Circuit opens the battery supply to release the message register after each operation so that it can be reoperated to count overtime intervals.

D.3 Change Feature or Option Table, Note 102.

D.4 Change Record of Changes, Note 103.

D.5 Fig. 66 is added for overtime charging.

F. Changes in Description of Operation or Change in CD Section

F.1 In Section II, MESSAGE REGISTER OPERATION, add the following sentence to paragraph 3.01:

For single-party, message-rate service with overtime charging the battery supply for the message register holding path is opened by the Multi-contact Relay Control and Alarm Circuit to permit reoperation of the message register to count overtime intervals.

F.2 In Section III, CONNECTING CIRCUITS, add the following circuit:

4.39 Multi-Contact Relay Control and Alarm Circuit - SD-35005-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5225-LCB
WECO DEPT 5152-NTM-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
SUBSCRIBER LINE CIRCUIT

CHANGES

D. Description of Changes

D.1 Connection information on Figure 9 is changed to include Dial Tone First coin box lines. Figure 9 will be ordered when new circuits are needed for Dial Tone First coin box lines.

D.2 Title of Figure 2 and Figure 10 are changed to include reference to Notes 110 and 111.

D.3 Note 102, feature and option table, is changed to include Figure 9 connection to Dial Tone First coin box lines. Also, options A & B of Figure 10 are removed.

D.4 Note 103, record of figures table, is changed to show Options A & B are rated A & M only. Reference to Note 111 is added.

D.5 Note 110 is rated A & M only. Reference to Figure 2 is removed.

D.6 Note 111 is added to explain that options A & B are intended for field modification of existing equipment.

D.7 Working limits table is revised to show the above changes on Figure 9. Also, several errors were corrected.

D.8 The maintenance BSP information is removed from the information column. They were listed in error.

D.9 These changes were done on a "D-No Record basis" per agreement with WECo.

F. Changes in Description of Operation or changes in CD Section

F.1 Change working limits to read:

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WORKING LIMITS

	45V. MIN.					
	0V	± 3V	± 10V	± 20V	-6V +10V	
	MAX. EXT. CKT. LOOP RES.					
FIGS. 1 AND 9						
2 PTY M.R. & 5¢ PREPAY COIN - ADJ. "A"	1260	___	1150	1030	___	
2 PTY M.R. ADJ. "B" SEE NOTE 302				1400		
2 PTY F.R. ARRANGED FOR AUTOMATIC TICKETING	1380	___	1315	1250	___	
OTHER LINES (HAVING NO D.C. PATH TO GROUND AT STATION	___	___	___	1400	___	
DIAL TONE FIRST COIN BOX LINES - ADJ "B" SEE NOTE 302	___	1400	___	___	___	
FIGS. 2 AND 10 ADJ "B" - SEE NOTE 302						
GROUND START (OPT "E")	___	___	___	___	1000	
LOOP START (OPTIONS A & E OR B)	___	1400	___	___	___	
	MAX. EXT. CKT. RES. TO GRD.					
PBX TRUNKS - ADJ "A"	1375	___	800	225	___	
FIG. 3						
MANUAL PREPAY COIN	___	___	___	1450	___	

	48V. MIN.					
	0V.	± 3V	± 10V.	± 20V.	-6V. +10V.	MIN. INS. RES.
	MAX. EXT. CKT. LOOP RES.					
FIGS. 1 AND 9						
2 PTY M.R. & 5¢ PREPAY COIN - ADJ. "A"	1375	___	1260	1150	___	15,000
2 PTY M.R. ADJ. "B" SEE NOTE 302				1500		15,000
2 PTY F.R. ARRANGED FOR AUTOMATIC TICKETING	1500	___	1450	1390	___	15,000
OTHER LINES (HAVING NO D.C. PATH TO GROUND AT STATION)	___	___	___	1500	___	15,000
DIAL TONE FIRST COIN BOX LINES - ADJ "B" SEE NOTE 302	___	1500	___	___	___	30,000
FIGS. 2 AND 10 ADJ "B" - SEE NOTE 302						
GROUND START (OPT "E")	___	1500	___	___	1100	15,000
LOOP START (OPTIONS A & E OR B)	___		___	___	___	30,000
	MAX. EXT. CKT. RES. TO GRD.					
PBX TRUNKS - ADJ "A"	1520	___	945	370	___	30,000
FIG. 3						
MANUAL PREPAY COIN	___	___	___	1700	___	20,000

F.2 Change title above 1.06 to read:

Loop Start - Field Modification of Existing Equiptment for Dial Tone First (Option A and E or B)

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5225-LCB
WECo DEPT 5152-RAP-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A OR 35-E-97
SUBSCRIBER LINE CIRCUIT

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit causes the line finder to seize the tip, ring, and sleeve when a call is originated.

SECTION II - DETAILED DESCRIPTION

1. ORIGINATING CALL

A. Figures 1 and 9

1.01 When the receiver is removed from the switchhook at the calling station, the loop start condition is satisfied. This operates line relay L.

1.02 Relay L operated:

(a) Connects battery to the sleeve toward the line finder.

(b) Connects ground to the "G" lead.

1.03 Ground on the "G" lead operates the sub-group relay of the line finder thereby causing the line finder to hunt for this line.

B. Figures 2 and 10

Ground Start (option E)

1.04 When a call is originated at the PBX or when the proper coins have been deposited at the 10¢ coin box station, ground is connected to the ring conductor to operate relay L thru its winding in series aiding.

1.05 Relay L operated causes circuit to operate as described in paragraphs 1.02 and 1.03.

Loop Start - Coin Service Improvement Program (option A and or B)

1.06 When the receiver is taken off-hook at the "dial tone first" coin box line relay L operates under unbalanced (option A and E) or balanced (option B) loop start operation.

1.07 Relay L operated causes circuit to operate as described in paragraphs 1.02 and 1.03.

C. Figure 3

1.08 When a coin is deposited at a manual prepayment coin box station, ground thru the coin magnet at the coin box station is connected to the tip side of the line operating relay L.

1.09 Relay L operated causes the circuit to operate as described in paragraphs 1.02 and 1.03.

2. LINE SEIZED BY LINE FINDER

A. Figures 1, 2, 3, 9, and 10

2.01 When the line finder seizes this line, ground is connected to the sleeve operating relay CO.

2.02 Relay CO operated:

(a) Locks to ground on the sleeve thru its own contact.

(b) Disconnects the L relay.

2.03 Relay L released removes ground from lead "G" to prevent other line finders from hunting for this line.

3. MESSAGE REGISTER OPERATION

A. Figures 4 and 6

3.01 The message register operates only when a 65 volt positive battery is connected to either the "M" or "TR" lead. It won't operate on the 48 volt exchange battery, however, it will hold operated on the exchange battery.

B. Figure 5

3.02 The message register operates when the 48 volt exchange battery is connected thru a low resistance to the "TR" lead.

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4. DISCONNECT

A. Figures 1, 2, 3, 9 and 10

Originating End Disconnects Before Seizure

4.01 Relay L will release:

(a) Disconnects relay CO from the sleeve of the line finder thereby restoring circuit to normal.

(b) Disconnects ground from lead "G".

4.02 Ground disconnected from lead "G" releases the sub-group relay of the line finder.

4.03 Sub-group relay released:

(a) Prevents further line finder hunting.

(b) Restores line finder to normal.

Originating End Disconnects After Seizure

4.04 Ground is disconnected from the sleeve releasing relay CO and thereby restoring the circuit to normal.

5. INCOMING CALL FROM CONNECTORS

A. Figures 1, 2, 3, 9 and 10

5.01 When a connector seizes this circuit, ground is connected to the sleeve which operates relay CO.

5.02 Relay CO operated disconnects relay L from the line to prevent it from operating when the called party answers.

5.03 When the calling party disconnects, ground is disconnected from the sleeve to release CO (if called party has not disconnected at this time the L relay will operate and a line finder will be started).

6. LINE IDENTIFICATION

A. Figures 1, 2, 6, 9 and 10

6.01 Lead "C" provides a connection from the subscriber line to the thousands number circuit when the line is to be identified for automatic ticketing or A.M.A.

B. Figures 1, 2, 6, 9 and 10 (option H provided)

6.02 Lead "S" provides a connection from the subscriber line to the number network and primary bus circuit to permit line identification on calls which route through ANI to a CAMA office. Note: Coin box lines are not equipped with this lead.

7. CLASS OF SERVICE INDICATION

A. Figures 7 and 8

7.01 These figures provide means for connecting direct or high resistance ground to the "A" bank terminals of 4 wire line finders.

7.02 When an open appears on the "A" lead 3 class of service indications are given to the associated trunk depending upon the calling line.

B. Figure 5

7.03 For individual message rate lines, this figure's low resistance message register provides the same class of service indication as a direct ground on the "A" lead.

8. OFFICIAL LINE CLASS IDENTIFICATION

A. Figures 1, 2, 9 and 10

8.01 When these figures are used as official lines in an AMA office, lead "A" is connected to the common number and class circuit.

8.02 Tone on lead "A" identifies, to the identifier, the calling line as an official subscriber.

SECTION III - REFERENCE DATA

1. WORKING LIMITS*

Earth Potential	Max. Ext. Ckt. Loop Resistance 45V Min. 0V±	±3V	±10V	+20V	-6V +10V	48V Min. 0V±3V±10V	+20V	-6V +10V	Min. Ins. Resistance
Fig. 1 and 9									
2 Pty. M.R. & 5¢ Prepay Coin Adj. "A"	1260		1150-1030		-	1375-1260	1150	-	15,000
2 Pty. M.R. Adj. "B" See Note 302	-	-	-	1400	-	- - -	1500	-	15,000
2 Pty. F.R. Arranged for Auto. Tkt.	1380	-	1315-1250		-	1500-1450	1390		15,000
Other lines (No DC path to ground at station)	-	-		1400	-	- - -	1500		15,000
Fig. 2 and 10									
ADJ "B" Ground Start (opt. "E")	-	-	-	-	1000	- - -	-	1100	30,000
Loop Start (opt. "A&E or B"	-	1400	-	-	-	- -1500	-	-	30,000
	Max. Ext. Ckt. Res. To Ord.								
PBX Trunks - Adj. "A"	1375	-	800- 225		-	1520 -945	370	-	30,000
Fig. 3									
Manual Prepay Coin	-	-	-	1450	-	- - -	1700	-	20,000

* Resistances are in ohms

2. FUNCTIONAL DESIGNATIONS

DESIGNATIONS	MEANINGS
Relays	
CO	Cutoff
L	Line
Message Registers	
MR	Message Register
TR	Tip Party Register

3. FUNCTIONS

3.01 To operate the line relay when a bridge is closed across the tip and ring. (Figures 1, 2, 9 and 10).

3.02 To operate the line relay when ground is connected to the ring (figs. 2 and 10).

3.03 To operate the line relay when ground is connected to the tip (fig. 3).

3.04 To start a line finder hunting for the line when the line relay operates.

3.05 To cause the line finder to stop on the line finder terminals of this line.

3.06 To operate the cut-off relay and disconnect line relay from the line when the line finder seizes the line.

3.07 To operate the cut-off relay and disconnect line relay fron the line on calls from the connector

3.08 To operate a message register in multiple with the (CO) relay.

3.09 To operate a message register over the "TR" lead.

3.10 To provide means for number checking.

3.11 To provide means for line identification in connection with automatic ticketing, AMA, or ANI.

3.12 To provide class of service indications by individual sub. line when used with 4-wire line finders.

3.13 To provide means for official line class identification in AMA offices.

4. CONNECTING CIRCUITS

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

4.01 Subscriber Line, 5¢ Coin Box Line, or 10¢ Coin Box Line.

4.02 Dial Long Line Ckt. SD-96234-01 (Typical).

4.03 Dial Long Line for Prepay Coin - SD-32053-01.

4.04 Aux. Line for Busy Line to Incoming Calls - SD-31652-01.

4.05 Toll Swbd. No. 3 Business Office Line Ckt. - SD-64497-01.

4.06 Business Off. Line Ckt. -SD-31608-01 (Typical).

4.07 Chief Opr. Line - SD-96262-01 (Typical).

4.08 Toll Test Bd. Nos. 4, 5, 8, 16 and Telegraph Test Bd. No. 9 2-Way Trk. - SD-63877-01.

4.09 Busy Line Cut-In Ckt. - SD-31728-01.

4.10 Call Thru Test Ckt. - SD-96063-01.

4.11 Common Jack Panel - SD-96068-01.

4.12 Connector Test Line - SD-31636-01 (Typical).

4.13 Aux. Line with Auto. Cutoff for Ind. Lines - SD-96240-01.

4.14 Toll Test Bd. No. 16, 17B or 18B and Test and Control Bd. No. 8 2-way Trk. Ckt. - SD-64232-01 (Typical).

4.15 Local Sta. Line Local Test Desk No. 14 or Repair Service Desk No. 2 - SD-90561 (Typical).

4.16 Local Connector - SD-30201-01 (Typical).

4.17 PBX Trunk Ckt. - SD-31757-01.

4.18 Line Finder - 100 Pt. 3 or 4 Wire- SD-31781-01.

4.19 Line Finder - 200 Pt. 3 Wire - SD-31530-01.

4.20 Line Finder - 200 Pt. 4 Wire - SD-31908-01.

4.21 Line Finder - 22 Pt. 4 Wire - SD-31793-01.

4.22 Toll Rate Quoting Desk No. 42 & 43 - SD-62028-01.

4.23 Auxiliary Line Circuit for 10¢ Coin Box Service - SD-95494-01.

4.24 Auxiliary Line Circuit for Mess. Reg. Operation - SD-32082-01.

4.25 Common Number and Class Circuit - SD-31961-01.

4.26 Number Network and Primary Bus Circuit - SD-95813-01.

4.27 Line Concentrator Control Circuit - SD-96536-01.

4.28 Number Network and Identifier Circuit - SD-32374-01.

4.29 PBX Station Message Register Pulse Circuit - SD-66915-01 (Typical).

4.30 Two-way C.O. Trunk Circuit - SD-66870-01 (Typical).

4.31 Message Register Resistor Circuit - SD-99417-01.

4.32 Large MJ Mobile Radio Telephone System Line Circuit - SD-2R002-01.

4.33 Small MJ Mobile Radio Telephone System Line Circuit - SD-2R049-01.

4.34 Large MJ Mobile Radio Telephone System Link Circuit - SD-2R008-01.

4.35 Small MJ Mobile Raido Telephone System Link Circuit - SD-2R054-01.

4.36 Small MJ Mobile Radio Telephone System Test Panel Circuit - SD-2R055-01.

4.37 AIOD Number Network and Primary Bus Circuit - SD-95813-01.

4.38 Dial Tone Speed Register Circuit - SD-96403-01.

SECTION IV - REASONS FOR REISSUE

A. Changed and Added Functions

A.1 Figures 2 and 10 of this circuit were changed to include loop start for the Coin Service Improvement Program.

D. Description of Changes

D.1 Figures 2 and 10 were changed to include a simple wiring option (option A) used in conjunction with the existing circuitry (option E) to provide for unbalanced loop start operation. In areas where longitudinal noise is a problem the double coil line relay can be rewired (option B) to provide for balanced loop start operation.

D.2 Notes 102 and 103 were changed to include the options.

D.3 Note 110 was added to clarify the purpose of the options.

D.4 The "Working Limits" Table and the Circuit Requirements Table were changed to include the options.

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