

STEP-BY-STEP SYSTEMS  
NO. 355A OR 35E97  
SUBSCRIBER LINE CIRCUIT  
ARRANGED FOR LOCKOUT

CHANGES

D. Description of Changes

- D.1 In Fig. 1, connecting information is added to the S lead (S option) for AIOD service.
- D.2 Note 302 is added to cover the use of the revised lead connecting information.
- D.3 In Fig. 1 connecting information is added for the MJ Mobile Radio Telephone System - Line Circuit, Link Circuit and Test Panel Circuit.
- D.4 In Note 102, connecting information for Fig. 1 Y and Z options is revised.

F. Changes in CD Sections

- F.1 Under 4. CONNECTING CIRCUITS add:
  - 4.15 Large MJ Mobile Radio Telephone System - Line Circuit - SD-2R002-01.
  - 4.16 Small MJ Mobile Radio Telephone System - Line Circuit - SD-2R049-01.
  - 4.17 Large MJ Mobile Radio Telephone System - Link Circuit - SD-2R054-01.
  - 4.18 Small Mobile Radio Telephone System - Line Circuit - SD-2R054-01.
  - 4.19 Small MJ Mobile Radio Telephone System - Test Panel Circuit - SD-2R055-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-WCB-RJJ

STEP-BY-STEP SYSTEMS  
NO. 355A OR 35E97  
SUBSCRIBER LINE CIRCUIT  
ARRANGED FOR LOCKOUT

## CHANGES

A. Changed and Added Functions

A.1 A function is added to permit message unit repetition to a PBX via a third wire.

B. Changes in ApparatusB.1 ADDED

14S message register, option Q, Fig. 5  
14R message register, option N, Fig. 2

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

C.1 Test NO current for MR Fig. 2, changed from 225 ma to 260 ma.

D. Description of Changes

D.1 Connecting information for ANI-type C added to Fig. 1.

D.2 Options Q and N are added, and Notes 102 and 106 are changed to include these added options.

D.3 Note 102 is changed to show that coin lines can be connected to the ANI num-

ber network.

D.4 Note 107 is changed to show that this note applies to post pay coin service.

F. Changes in CD Sections

F.1 Add 4.11, Number Network and Identifier Circuit - SD-32374-01.

F.2 Add 4.12, PBX Station Message Register Pulse Circuit - SD-66915-01.\*

F.3 Add 10.3 as follows.

## 10.3 Message Unit Repetition to PBX

When option N or Q is furnished, operation of the register connects battery via the register contacts to the M lead. The connecting circuit at the PEX causes the station message register to score at the same time.

F.4 Add 4.13. Two Way C.O. TRK. Ckt. - SD-66870-01.\*

F.5 Add 4.14. Message Register Resister Circuit - SD-99417-01

F.6 In 12. change the final sentence to read "In operation the ANI equipment imposes a 5800-cycle tone (ANI-type B) or a 340-volt positive dc pulse (ANI-type C) on the switch train sleeve which is translated into the directory number by an identifier at the number network circuit."

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-PRR-RJJ

STEP BY STEP SYSTEMS  
NO. 355A OR 35E97  
SUBSCRIBER LINE CIRCUIT  
ARRANGED FOR LOCK-OUT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Reference to pre-pay coin lines as well as pre-pay connecting circuits are removed.

1. PURPOSE OF CIRCUIT

1.1 This circuit provides means to cause a line finder to find the terminal associated with a calling line and to prevent starting a line finder on calls terminated to the line.

1.2 Means are also furnished, when required, by a fourth lead associated with the line, to provide for message registration or to furnish a succeeding trunk a direct or message register ground or a resistance ground as a type of line indication.

1.3 Means are also provided to lock out a permanent signal condition, and free the line finder and first selector.

2. WORKING LIMITS

45-52 volts.

	45V Min.				48V Min.				Min. Ins. Res.
	0	±10V	±20V	-6V +10V	0	±10V	±20V	-6V +10V	
Earth Potential	0	±10V	±20V	+10V	0	±10V	±20V	+10V	
"Z" Option	-	-	1400Ω	-	-	-	1500Ω	-	15,000Ω
"Y" Option	-	-	-	1000Ω	-	-	-	1100Ω	15,000Ω
PBX Trunks	1880Ω	1270Ω	565Ω	Max. Ext. Ckt. Resistance to Grd.	2150Ω	1450Ω	750Ω	-	30,000Ω

Maximum sleeve resistance through line finder and selector to holding ground or line circuit to connector multiple-ten ohms.

3. FUNCTIONS

- 3.01 To start a line finder when a line originates a call.
- 3.02 To mark the terminals of the calling line on the line finder banks.
- 3.03 To remove battery and ground through windings of line relay from the tip and ring when the line is found by the finder or seized by a connector.
- 3.04 To remove ground from the G lead when the line is found.
- 3.05 To allow the line finder and first selector to release after an interval, on a permanent signal condition.
- 3.06 To lock out a subscriber's line under control of a bridge across the line under a permanent signal condition. This is called "permanent signal lockout."
- 3.07 To prevent showering of line finders due to a high resistance bridge across the tip and ring or ring to ground.

- 3.08 To close a circuit to operate a permanent signal lockout alarm.
- 3.09 To charge completed calls on message rate lines.
- 3.10 To provide an indication on the "A" lead of the type of calling line.
- 3.11 To prevent false line finder starts, if this line is called and the calling party disconnects first.
- 3.12 To allow line directory number identification in office with automatic number identification equipment.

4. CONNECTING CIRCUITS

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

- 4.01 Subscriber's Lines, F.R.; M.R.; Individual or Multiparty Five-cent Coin or Ten-cent Coin.

- 4.02 Group and Alarm Relay Circuit - SD-32194-01.
- 4.03 Connector - SD-31737-01.\*
- 4.04 Dial Long Line Circuit - SD-96234-01 and SD-31376-01.\*
- 4.05 Line Finder 200 Pt. Three-wire - SD-33013-01.
- 4.06 Line Finder 200 Pt. Four-wire - SD-33015-01.
- 4.07 Auxiliary Line Circuits
  - Post-pay Coin Service - SD-31732-01
  - For Busying Line - SD-31883-01, 355A CDO
  - For Busying Line - SD-31652-01, No. 1 or 350A
  - Delayed Charge Reg. Opr. - SD-32082-01
  - With Automatic Cut-off for Individual Lines - SD-96468-01
- 4.08 Busy Line Cut-in Circuit - SD-31728-01.
- 4.09 PBX Trunk Circuit - SD-65657-01.\*
- 4.10 Number Network and Primary Bus Circuit - SD-95813-01.

\*Typical Circuits.

DESCRIPTION OF OPERATION

5. CALL ORIGINATED - STARTING LINE FINDER

5.1 "Z" Option

When the receiver is removed from the switchhook at a calling station, a bridge is placed across the tip and ring of this circuit either at the station or in an associated circuit, (L) operates. (L) operated, connects battery through the winding of (CO) to the sleeve terminal of the line finder bank, and it also connects ground through back contacts on (LO) to the "G" lead to operate the subgroup relay of the group and alarm relay circuit which in turn causes a line finder to hunt for this line.

5.2 "Y" Option

When a call is originated at a PBX, ground is connected to the ring conductor operating (L) with its windings in series aiding. (L) operated, causes the circuit to function as described in Par. 5.1.

6. LINE SEIZED BY LINE FINDER

6.1 When the line finder seizes this line, ground is connected to lead "S" operating (CO) which disconnects (L) from the line and locks through its own contacts to ground on the "S" lead, when (L) releases. (L) released also removes ground from the "G" lead to prevent other line finders from hunting for this line. (CO) operating, operates (LO) to prepare for the lockout feature of this circuit.

7. INCOMING CALLS FROM CONNECTOR

7.1 When a connector seizes this circuit, ground is connected to the lead "S" operating (CO) which disconnects the line relay (L) from the line to prevent interference when ringing current is applied or when the called subscriber answers. (CO) operating, also operates (LO) to prepare the circuit for lockout.

8. DISCONNECT

8.1 Call Originated Through This Line Circuit

When the calling party disconnects, ground is removed from the sleeve lead "S" releasing (CO). (CO) releasing, releases slow-to-release relay (LO) and connects (L) to the tip and ring, "Z" option, or battery through both windings of (L) to the ring, "Y" option. If the line is clear, that is, not bridged or grounded, (L) does not operate and when (LO) releases the circuit restores to normal.

8.11 Call Completed to This Line Circuit

8.111 If the called party disconnects first, then the calling party, ground is removed from the "S" lead releasing (CO) and in turn (LO) and the circuit is restored to normal.

8.112 If the calling party disconnects first, ground is removed from the "S" lead releasing (CO). (CO) releasing, opens the circuit to slow-to-release (LO) and connects (L) to the tip and ring. (L) operates and remains operated until the called party releases the connection. (LO) is slow in releasing to allow (L) to operate. (L) operated, locks (LO) on its "S" winding to battery on the "PS" lead. After a predetermined time, ground through make contacts on the (L) and "S" winding (LO) to the "PS" lead operates the permanent signal alarm. (LO) operated, applies busy ground to the connector sleeve and prevents ground application to the "G" lead which prevents false starts of the line finder.

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## 9. PERMANENT SIGNAL LOCKOUT

If a leak is present from ring to ground ("Y" or "Z" option) or from tip to ring ("Z" option) or if the subscriber removes his receiver from the switchhook and fails to dial, (L) operates connecting (CO) to the sleeve and ground to the "G" lead directing a finder to this line as described in Par. 5. The tip and ring are extended through to the first selector. After a predetermined time, if no digit is dialed, the selector removes ground from the "S" lead releasing the (CO). Then (L) operates before (LO) releases. Locking (LO) operated which energizes the permanent signal alarm circuit as described in Par. 8.112.

If the leak resistance is such that there is sufficient current to operate (L) but not sufficient current to operate the line relay of the succeeding circuit, (L) operates causing the line finder to seize this line and extend the tip and ring to the next circuit whose line relay fails to operate and connect holding ground to the "S" lead. When the line finder cuts through and removes the ground from the "S" lead, (CO) releases and (L) operates, locking (LO) operated and locking out the line as described above.

## 10. MESSAGE REGISTER OPERATION

## 10.1 Figure 5

The message register will not operate on the 48-volt exchange battery but does operate when a positive battery is connected to the "M" lead. The register will hold operated on the 48-volt exchange battery.

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DEPT. 2335-AH-FBB-AE

## 10.2 Figure 2

When an office is not equipped with positive battery, Figure 2 and a four wire finder is used, lead "A" is extended through the finder to the message rate trunk which applies a low resistance battery to the "A" lead operating the register.

## 11. SUBSCRIBER LINE INDICATION, FIGURES 3 AND 4

In offices arranged for class of service indications, four-wire line finders are provided which connect the "A" lead, individual to the subscriber's line circuit, through the line finder and selector to a trunk to provide an indication of the type of calling line. Three classes of service are provided. "A" lead, open, high resistance, and low resistance to ground. The register in Fig. 2 may also be used as a low resistance class of service indication.

## 12. AUTOMATIC NUMBER IDENTIFICATION

Lead "S", Option "S" connecting to the Number Network and Primary Bus Circuit provides a path for line identification tone to permit identification of the line directory number. This feature is required in offices with ANI equipment.

In operation the ANI equipment superimposes 5800 cycle tone on the switch train sleeve which is translated into directory number by an identifier at the number network circuit.