

STEP BY STEP SYSTEM  
NO. 1, 350A, 355A, OR 360A  
BUSY LINE CUT-IN CIRCUIT  
FOR COMPLETING EMERGENCY CALLS

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded                      Superseded By  
      (A) 221ER relay            (A) 221KN relay

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The (A) 221ER relay is rated "Mfr.  
Disc." and is superseded by the  
221KN relay. This is part of a general pro-  
gram to reduce the number of standard pieces  
of apparatus.

D.2 Circuit Note 103 is added.

D.3 Prior to issue 3-D, the maximum op-  
erating voltage was shown as 50 volts.

D.4 Prior to issue 3-D, the rating of  
this circuit was "AT&T Co. Std.".

D.5 Fig. 53 is revised to indicate  
and cover application for use on  
relay rack mounted shelf units only.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3030-VJA-RLL-H1

CIRCUIT DESCRIPTION  
SYSTEMS DEVELOPMENT DEPARTMENT  
PRINTED IN U.S.A.

CD-31728-01  
Issue 1  
Appendix 1-D  
(1 page) Page 1

STEP BY STEP SYSTEM  
NO. 1, 350A, 355A OR 360A  
BUSY LINE CUT-IN CIRCUIT  
FOR COMPLETING EMERGENCY CALLS

CHANGES

B. CHANGES IN APPARATUS

B.1	Replaced	Replaced By
	242A Plug	242C Plug
	344 Jack	346 Jack

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Provision has been made for more than one circuit per unit. Formerly the jacks lettered A to F were numbered as indicated in Note 102 for the first circuit.
- D.2 Circuit Note 102 is added.
- D.3 Circuit Note 101 has been changed. It formerly read "Provide one 1-1/3 ampere fuse from 48V. Sig. Bat. per two circuits".
- D.4 Cross-connection Figures 51, 52 and 53 have been changed.

E. CHANGES IN TRANSMISSION REQUIREMENTS

- E.1 The transmission test requirements have been added.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

GNQ) FN  
WLF)

STEP-BY-STEP SYSTEM  
BUSY LINE CUT-IN CIRCUIT  
FOR COMPLETING EMERGENCY CALLS

1. PURPOSE OF CIRCUIT

- 1.1 This circuit is designed to provide means for cutting in on a busy line in case of emergency when the subscriber must be reached immediately in offices not equipped with verification circuits. It cannot be used with lines equipped with line switches.

2. WORKING LIMITS

- 2.1 None.

3. FUNCTIONS

- 3.1 To trip the ringing in the calling connector circuit when the called line is busy.
- 3.2 To establish a talking connection through series condensers when the called line is busy after the ringing is tripped in the connector circuit.
- 3.3 To cut out the condensers when the line is busy initially from an incoming call through a connector circuit with calling party control if the party that originated that call disconnects.
- 3.4 To cut through and supply ringing current and talking battery from the associated connector to the called line if it is idle.
- 3.5 To delay closing through the tip and ring for a short interval to insure that the (CO) relay of the called line is operated.

4. CONNECTING CIRCUITS

- 4.1 Connector Circuit.
- 4.2 Line Circuit.

## DESCRIPTION OF OPERATION

## 5. GENERAL

An unlisted connector terminal number not equipped with a line circuit is required for each line provided with emergency service in addition to the regular connector terminal assigned to that line. When the unlisted number is dialed, a talking connection is established with the associated line on which emergency service is provided regardless of whether or not the listed terminal is busy. When the line is busy, the ringing is tripped before the talking circuit is established through series condensers in the tip and ring. When the line is idle, the circuit is cut through and the connector will supply ringing current and talking battery to the line in the regular manner.

## 6. CALL TO A BUSY LINE

When the line is called through the unlisted number while the line is busy through its regularly assigned terminal, the cut through relay of the connector operates in series with the (D) resistance. When the connector supplies ringing current, the (C) relay operates, in turn operating the (A) relay which locks to the sleeve lead. The (A) relay operated, grounds the sleeve of the line circuit associated with the listed number in series with the primary winding of relay (D) and connects ground to the winding of relay (B). Relay (B) operates and locks to the sleeve of the line circuit. Since the sleeve of the line circuit is grounded, relay (D) primary winding is short circuited and the (D) relay does not operate. The operation of relay (B) closes a bridge through 700 ohms resistance (A) to trip machine ringing in the calling connector. The operation of relay (B) also operates relay (D) on its secondary winding. Relay (D) operated, releases relay (A). Relay (A) is slow to release to maintain the tripping circuit for a sufficient length of time to insure the completion of the tripping function in the connector circuit. Relay (A) released, removes the 700 ohm bridge and establishes the talking circuit through the (T) and (R) condensers. If the line had been busy from an inward call through a calling party control connector and the calling party disconnects before the conversation over the unlisted terminal is completed, the connector used for establishing the first connection will release, removing ground from the sleeve of the line circuit, thus releasing relay (B). Relay (B) released, removes the (T) and (R) condensers from the talking circuit. The talking battery for the called line will then be supplied from the connector through the unlisted terminal.

7. CALL TO AN IDLE LINE

When the unlisted number is dialed and the regularly assigned terminal is idle, relays (A) and (C) operate the same as described above. Since there is no ground on the sleeve of the line circuit, relay (D) operates immediately when the (A) relay operates - relay (B) being slow to operate. The operation of relay (D) grounds the sleeve of the line circuit and allows relay (A) to release. The (A) relay released, closes the tip and ring through to the line circuit and ringing current and talking battery is then supplied to the called line from the connector as on any regular dial connection.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

MCG)  
RSW)EJ