

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A OR 35-E-97  
OUTGOING TRUNK CIRCUIT  
TO CROSSBAR TANDEM OFFICE  
FOR CAMA CALLS

CHANGES

B. Changes in Apparatus

B.1 Added

1 - 456B Diode (W) (A Opt) Fig. 1

D. Description of Changes

D.1 Option A is added to add Diode W and connecting information to the Totalizer and Traffic Usage Recorder Circuit.

D.2 Circuit Notes 103 and 108 are changed.

D.3 Changed CAD1 & added CAD 12 to reflect the above changes.  
Changed CADS 7, 8, 9 & 10 to reflect the use of a Traffic Register Cabinet in a 355A office.

F. Changes in CD Sections

F.1 Under 4. Connecting Circuits add:

4.9 Totalizer Circuit	SD-95965-01
4.10 Traffic Usage Recorder Circuit	SD-95738-01

BELL TELEPHONE LABORATORIES, INCORPORATED

Dept 5245 GFC  
WECO Dept 5152 RWH-WEA

6

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A OR 35-E-97  
OUTGOING TRUNK CIRCUIT  
TO CROSSBAR TANDEM OFFICE  
FOR CAMA CALLS

CHANGES

D. Description of Changes

D.1 Circuit Note 102 is changed to delete timed disconnect  
on partial dialed calls and add a reference to Note 110.

D.2 Circuit Note 110 is added.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245 -LCB  
WECO DEPT 5152-RWH-WEA

STEP BY STEP SYSTEMS  
NO. 1, 350A, 355A OR 35E97  
OUTGOING TRUNK CIRCUIT  
TO CROSSBAR TANDEM OFFICE  
FOR CAMA CALLS

CHANGES

D. Description of Changes

- D.1 Circuit Notes 102, 103, and 108 are revised for use of the "dial 1 for slumber" timing arrangement.
- D.2 Information Note 302 is added.

F. Changes in CD Sections

- F.1 In Section II, under 7.1, remove the first sentence above the paragraph; it is a printing error.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5643-CEH-MR

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A OR 35E97  
OUTGOING TRUNK CIRCUIT  
TO CROSSBAR TANDEM OFFICE  
FOR CAMA CALLS

CHANGES

B. Changes in Apparatus

B.1 Added

1 - 446F Diode (G OPT), Fig. 1

D. Description of Changes

- D.1 A 446F(B) diode, designated G option, is provided in Fig. 1, with added lead designated A, C, or EC.
- D.2 In Fig. 1 the BR lead is designated F option.
- D.3 The LB lead is added and designated B option.
- D.4 The ATB lead is added and designated E option and rated A&M Only.
- D.5 Information covering the above changes is added to Notes 102, 103, and 108 and Options Used Table. Information Note 301 is added.
- D.6 CAD 1 is revised and CADs 7, 8, 9, 10, and 11 are added to reflect these changes.

F. Changes in CD Sections

F.1 Under 4. CONNECTING CIRCUITS add:

4.8 Miscellaneous Alarm Circuit - Register Circuit - SD-31976-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5641-WCB-RMW

STEP BY STEP SYSTEMS  
NO. 1, 350A, 355A, OR 35-E-97  
OUTGOING TRUNK CIRCUIT  
TO CROSSBAR TANDEM OFFICE  
FOR CAMA CALLS

CHANGES

A. Changed and Added Functions

A.1 Provides for timed disconnect on partial dial calls.

B. Changes in Apparatus

B.1 ADDED

- 1 PU/PU AK16 Relay - Fig. 3
- 1 P2 KS-8512, 14A Resistor, 715Ω - Fig. 1
- 1 PU KS-8512, 14A Resistor, 1000Ω - Fig. 1
- 1 A 446F Diode - Fig. 1

D. Description of Changes

- D.1 Rate this circuit A&M Only for 350A offices.
- D.2 Provide for timed disconnect on partial dial calls. Fig. 3 is added to provide this feature. Option K is designated and rated Std. Options J and H are added and rated A&M Only.
- D.3 Fig. 3 and options K, J, and H are added to Circuit Note 103 and Options Used table.
- D.4 Circuit Note 109 and Equipment Note 201 are added.
- D.5 Fig. 3 and options J, H, and K are added to Note 108 Feature and Options table for A&M features only.
- D.6 Add reference to Notes 103, 104 and 105 regarding X and U options being rated Mfr Disc.

F. Changes in CD Sections

F.1 Under 5 add as third sentence: B operated initiates a start timing in the connecting timing circuit.

F.2 Add as paragraph 8.3.

8.3 Timed Disconnect on Partial Dial Calls

Upon seizure of this trunk, after the B relay operates, a start timing condition is initiated in the connecting timing circuit by grounding the PU9 or ST lead. The receipt of this ground results in the return of a -48 volt battery signal over the same lead to operate the PU relay. If the calling customer fails to dial the proper number of digits (partial dial condition) before a timed interval of 3-7 or 4-8 minutes depending on the type of office, the timing circuit will ground the A9 or ET lead to operate the P2 relay. The P2 relay releases the B and C slow release relays. The B relay removes ground from the incoming S lead to release the preceding circuits as well as releasing the PU and W relays. When the circuits release, the holding path for the A relay is opened so A releases. The W relay in releasing recloses ground on the S lead to make this circuit appear busy and releases the P2 relay. The P2 relay releasing removes ground from the S lead and restores the trunk to normal.

F.3 Under 4. CONNECTING CIRCUITS add:

4.6 Auxiliary Timing Circuit-SD-32525-01.

4.7 Common Timing Circuit, SD-31310-01-SD-31558-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2363-NPS-RJJ

STEP-BY-STEP SYSTEMS  
NO. 1, 350A, 355A OR 35-E-97  
OUTGOING TRUNK CIRCUIT  
TO CROSSBAR TANDEM OFFICE  
FOR CAMA CALLS

## CHANGES

## D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Options "N" and "M" are added on an A&M Only basis to permit this circuit to function with a trunk that presents on-hook supervision during pulsing.
- D.2 Circuit Note 108 is added to cover Options "N" and "M".
- D.3 Options "M", "N", and "Q" are added to Circuit Note 103.
- D.4 Circuit Note 107 is revised to show the 177A network instead of the 179A.

All other headings under Changes, no change.

## 1. PURPOSE OF CIRCUIT

1.1 This circuit provides an outgoing trunk from a step-by-step office to a Crossbar Tandem office arranged to receive CAMA calls. It is arranged to test busy after the calling party disconnects until the CAMA equipment has recorded the charge for the call. It is also arranged to release the switch train when the called subscriber disconnects, in case the calling subscriber fails to disconnect.

## 2. WORKING LIMITS

2.1 For working limits, see drawing.

## 3. FUNCTIONS

- 3.1 To ground the sleeve lead to the preceding circuits when this circuit is seized.
- 3.2 To close the loop to the crossbar office when this circuit is seized.
- 3.3 To repeat pulses.
- 3.4 To release the switch train when the calling party disconnects first, and then test busy until the circuit at the crossbar office restores to normal.
- 3.5 To release the switch train when the called party disconnects first, in case the calling party fails to disconnect.
- 3.6 To test busy in case the battery supply to this circuit fails.

3.7 To test busy when battery and ground are reversed at the crossbar office.

## 4. CONNECTING CIRCUITS

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

- 4.1 Traffic Register Circuit-SD-30896-01.\*
- 4.2 Rotary Out Trunk Switch Circuit - SD-30868-01.
- 4.3 Selector Bank Multiple Circuit - SD-32123-01.
- 4.4 Incoming Trunk at Crossbar Tandem Office - SD-27010-01.
- 4.5 Local Selector, (35-E-97) - SD-30902-01.\*

\*Typical Circuit

## DESCRIPTION OF OPERATION

## 5. SEIZURE

When seized by a selector, relay A operates over the subscriber loop, operating B and in turn W. A closes the outgoing loop thru the winding of P to seize the circuit at the X-bar office, which reverses battery and ground operating P, P1 and in turn P2 which latter relay locks to B and W in parallel. B closes a circuit for later operation of C during pulsing, and grounds the incoming sleeve to hold the preceding circuits. B and P2 opens a lead to the Traffic Register Circuit. W opens the circuit to the secondary winding of P.

However, when "N" is furnished the X-bar office incoming trunk circuit presents an on-hook signal or the reversal of battery and ground upon the conclusion of dialing, thus, relays P, P1 and P2 do not operate upon seizure. With "N" option relays A, B and W operate as explained above.

## 6. PULSING

A follows the subscriber pulsing operating C on the first open. C holds over pulsing, opening the repeating coil windings, and connecting battery to the ring and ground to the tip, to meet ground and battery, respectively at the distant office.

C also holds P1 operated with "Q" option. A opens and closes the loop for pulsing. C releases shortly after the last pulse.

With Option "N", after dialing is completed the X-bar office incoming trunk circuit reverses the battery and ground, thus operating relays P, P1 and in turn P2 which opens the C operate path. C is prevented from operating should the subscriber dial an extra digit or flash after the reversal has taken effect.

7. CALL ABANDONED

7.1 With "Q" Option

If the call is abandoned after dialing is completed, or before dialing A releases ----- from the sleeve.

If the call is abandoned after dialing is completed, or before dialing, A releases, releasing P and opening the circuit to the X-bar office. A also operated C, and releases B, which is slow to release. C holds P1. When B releases, it removes ground from the sleeve, and releases C and W, but usually W releases before C. W released again connects ground to the sleeve. With B and W released, P reoperates over the loop, unless the X-bar circuit has reversed battery and ground. P holds or reoperates P1. (P2 will not release if P1 should release momentarily in those cases where C might release before W). When the X-bar circuit restores to normal it reverses battery and ground, releasing P, and in turn P1 and P2. P2 removes ground from the sleeve.

7.2 With "N" Option

If the call is abandoned before dialing is completed. A releases, and opens the circuit to the X-bar office. A also operates C, and releases the slow release B. When B releases, it removes ground from the sleeve, and releases C and W. W released, connects the secondary winding of P to the loop. If three or less digits were dialed before abandonment this circuit and the X-bar circuit will release. However, if more than three digits were dialed before the abandonment, a reversal from the X-bar circuit will operate P when W released, and in turn operating P1 and P2. With W released and P2 operated the sleeve is re-grounded to guard the X-bar circuit from false reseizure. When the X-bar circuit restores to normal it reverses battery and ground, releasing P, and in turn P1 and P2. P2 removes ground from the sleeve.

If the call is abandoned after dialing is completed, A releases, releasing P and opening the circuit to the X-bar office. P releases the slow release P1, and A releases the slow release B. When B releases, it removes ground from the sleeve and

releases W. W released again connects ground to the sleeve, starts the release of the slow release P2, and connects the secondary winding of P to the loop. P reoperates over the loop from a reversal effected by the X-bar circuit. P reoperates P1, and it holds or reoperates P2, which regrounds the sleeve. The circuit now remains under control of the X-bar circuit, and will release when the X-bar circuit reverses the battery and ground.

8. DISCONNECT

8.1 Calling Subscriber Disconnects First

The action is as described for an abandoned call, except that reversal from the X-bar office is delayed until the equipment in the X-bar office has completed charging for the call.

8.2 X-bar Subscriber Disconnects First

If the calling subscriber disconnects before charging is completed, the action is as in 8.1. If charging is completed before the calling subscriber disconnects, battery and ground from the X-bar office are reversed, releasing P, and in turn P1, but P2 remains locked to B and W in parallel. P1 released releases B which opens the sleeve, releasing the switch train, and also releasing slow to release relay W.

W and B released, unlock P2, restoring this circuit to normal, thus this action described prevents a calling subscriber from holding this circuit out of service after the called subscriber disconnects.

9. FUSE FAILURE MADE BUSY RELAY

When Fig. 2 is provided failure of the battery supply to this circuit releases relay MB, grounding the sleeve, thus making the circuit busy, and removing ground from lead "BR" to the all trunks busy traffic register.

10. TAKING EQUIPMENT OUT OF SERVICE

This circuit may be made busy (a) by inserting a plug in jack T, or (b) from the X-bar office, by reversing battery and ground thus operating P, and in turn P1 and P2. P2 operated grounds the sleeve.

11. TEST JACKS

Test Jack T, provides for making operating tests of this circuit with a hand test set or the trunk test circuit. When a plug is inserted in this jack, lead "BR" to the all trunks busy register circuit is opened.

Jack TT provides for testing relay P, and for opening the circuit to the X-bar office to prevent calling in an operator when testing or readjusting the A relay.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2335-WF-FBB-DR