

9

COMMON SYSTEMS
PERMANENT SIGNAL
IDENTIFICATION CIRCUIT
AUTOMATIC NUMBER IDENTIFICATION TYPE B
CROSSBAR NO. 1, PANEL OR
STEP-BY-STEP NO. 1, 350A AND 355A OFFICES

CHANGES

A. Changed and Added Features

A.1 A feature is added which provides line insulation test (LIT) printout on the LIT teletypewriter or the trouble ticketer (ANI-B) by directory number with printout of line equipment number if permanent signal or ANI-B equipment is busy or provides no directory number.

B. Changes in ApparatusB.1 Added

L-0 - AF10 Relay - Fig. 5
L-1 - AF10 Relay - Fig. 6
L-2 - AF10 Relay - Fig. 7
L-C - AJ41 Relay - Fig. 5
TTK0 - $\frac{1}{2}$ AK33 Relay - Fig. 5
TTK1 - $\frac{1}{2}$ AK33 Relay - Fig. 6
TTK2 - $\frac{1}{2}$ AK33 Relay - Fig. 7
OB - AF63 Relay - Fig. 5
LC - 18AG Resistor - Fig. 5
LA0 - $\frac{1}{2}$ AK33 Relay - Fig. 5
LA1 - $\frac{1}{2}$ AK33 Relay - Fig. 6
LA2 - $\frac{1}{2}$ AK33 Relay - Fig. 7

D. Description of Changes

D.1 Four relays and one resistor are added to this circuit to provide directory number identification of LIT failures in No. 1 Crossbar ANI-B Offices.

Two additional relays are required for each additional LIT control circuit provided. Option S, a minor wiring change in App Fig. 5, 6, and 7 is required when the LIT frame serves two marker groups.

F. Changes in CD Sections

F.1 In SECTION III, 4. CONNECTING CIRCUITS, add:

- (g) Line Insulation Test Circuit - SD-25947-01
- (h) Line Insulation Test Teletypewriter Connector Circuit - SD-95558-01
- (i) Trouble Ticketer Circuit - SD-95816-01

F.2 In SECTION II, add:

13. DIRECTORY NUMBER ID OF LIT FAILURES

13.01 Apparatus Figure 5 provides a feature which furnishes line insulation test (LIT) printout on the (LIT) teletypewriter or the trouble ticketer (ANI-B) by directory number with printout of line equipment number if the permanent signal or ANI-B equipment is busy or provides no directory number.

13.02 Apparatus Figures 6 and 7 provide for a second and third LIT served by this circuit. Option 5 provides for LIT equipment which serve two marker groups.

F.3 In SECTION III, 3. FUNCTIONS, add:

3.11 This circuit provides line insulation test (LIT) printout on the LIT teletypewriter by directory number of LIT failures.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-HNS

WE DEPT 25830-DWW-EER-BT

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CHANGES

B. Changes in ApparatusB.1 Superseded

PS- Jack 239A -
FS1 - App Fig. 3

TNE- Jack 239A -
X, W Options -
FS1 - App Fig. 1

TNE- Jack 239A -
V Option - FS1 -
App Fig. 4

Superseded By

PS- Jack 239AM -
FS1 - App Fig. 3

TNE- Jack 239AM -
X, W Options -
FS1 - App Fig. 1

TNE- Jack 239AM -
V Option - FS1 -
App Fig. 4

D. Description of Changes

D.1 The SD-1C593-01 is added to Information Note 302 on sheet 1 to show the use of this circuit with AMARS identifiers.

F. Change in CD Section II

F.1 Change 4. CONNECTING CIRCUITS, 4.01 (c) to read:

(c) Identifier Circuit (No. 1 Crossbar, Panel, Step-by-Step) - SD-95810-01 or Identifier Circuit, ANI-B for use with No. 1 AMARC and Toll (Step-by-Step Offices) - SD-1C593-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-LCB

WE DEPT 367-WCR-EER-DM

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CHANGES

B. Changes in Apparatus

<u>B.1</u>	<u>Superseded</u>	<u>Superseded By</u>
	TOA Capacitor KS-13368,L3 - FS1 - App Fig. 1	TOA Capacitor KS-13367,L35 - FS1 - App Fig. 1
	TOB Capacitor KS-13368,L3 - FS1 - App Fig. 1	TOB Capacitor KS-13367,L35 - FS1 - App Fig. 1
	TO1 Resistor - 145C or 145B - FS1 - App Fig. 1 - 1.5 Meg	TO1 Resistor - KS-20810,L1A - FS1 - App Fig. 1 - 1.5 Meg
	TO2 Resistor KS-13490,L1 - FS1 - App Fig. 1 - 0.1 Meg	TO2 Resistor KS-19150,L1 - FS1 - App Fig. 1 - 0.1 Meg

D. Description of Changes

D.1 The D no-record drafting corrections are made in FS1 and in CAD 1 involving wiring reversals on terminals 2 and 4 of the TNE jacks and the spelling of TNE jack.

D.2 Circuit Note 102 is changed to include "Panel" in the identification of coin lines with coin charge troubles feature.

F. Changes in CD Section II

F.1 Change TNE Jacks, 1.04 to read:

1.04 To enable ANI identification of No. 1 crossbar or panel coin lines in trouble, the TNE jack is used in conjunction with the No. 1 crossbar CC and CN jacks or the panel SC and CN jacks provided in the miscellaneous circuit on the sender make-busy frame. On request, the PS plug is inserted in the TNE jack and the circuit operation is similar to the operation when using the PS-jack. The identification signal is fed back, through the coin supervisory circuit and the switching linkage to the identifier causing a ticket printout as in other line identity tests.

F.2 Change 6. COIN LINES, 6.01 to read:

6.01 If No. 1 crossbar or panel coin line sleeves are connected into the ANI number network, this circuit can be used to identify coin lines connected to PSH trunks. Coin lines connected to a stuck coin supervisory circuit can also be identified when the appropriate options are provided in the coin supervisory circuits. Existing restrictions preventing coin line access to CAMA must be maintained.

F.3 Under 4. CONNECTING CIRCUITS, change (f) to read:

(f) Miscellaneous Circuit Sender Make-Busy - SD-25076-01, the following circuits: SD-21236-01 and SD-21663-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-LCB

WE DEPT 367-WCR-EER-DM

6

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TABLE OF CONTENTS	PAGE	<u>SECTION I - GENERAL DESCRIPTION</u>
<u>SECTION I - GENERAL DESCRIPTION</u> . . .	1	<u>1. PURPOSE OF CIRCUIT</u>
<u>1. PURPOSE OF CIRCUIT</u>	1	1.01 This circuit is designed to eliminate manual tracing of single-party, 2-party, and coin lines when in a permanent signal (PS) condition. It also provides a means of identifying No. 1 crossbar coin lines with coin charge troubles. The PS plug is inserted into the proper jack to cause the automatic number identification (ANI) equipment to print a trouble ticket with the directory number of the line concerned. The coin line must be connected to the number network to accomplish this identification test.
<u>2. GENERAL DESCRIPTION OF OPERATION</u>	1	
<u>SECTION II - DETAILED DESCRIPTION</u> . .	2	<u>2. GENERAL DESCRIPTION OF OPERATION</u>
<u>1. JACK APPEARANCES</u>	2	2.01 Whenever a phone is off-hook and dialing has not begun for a period of time sufficient for the sender to time out, or when a trouble simulates the above, that line is in a permanent signal condition. The sender, on timing out, connects the line to a permanent signal holding (PSH) trunk.
PS JACKS	2	
TNE JACKS	2	
<u>2. IDENTIFIER GROUPS</u>	2	2.02 If a permanent signal has persisted through all removal attempts not requiring the identity of the particular line, it becomes necessary to identify the individual line concerned before additional action can be taken. An operator at a position or a maintenance employee at a sender make-busy frame notifies the ANI office maintenance employee of the number of the PS-jack associated with the permanent signal holding trunk to which the line is connected. The cord of the permanent signal identification (PSI) circuit is connected to the proper PS-jack, causing this circuit to seize an outpulser. The line is then identified in the same manner as an ANI service call, but the outpulser passes the identification along with a PS indication to the trouble ticketer. A PS record is printed with the directory number and a TPD lamp is lighted in this circuit.
<u>3. NORMAL IDENTIFICATION AND RELEASE - SCI AND SC2</u>	2	
<u>4. TWO-PARTY LINES</u>	3	
<u>5. MULTIPARTY LINES</u>	3	
<u>6. COIN LINES</u>	3	
<u>7. PBX LINES</u>	3	
<u>8. IDENTIFICATION FAILURE</u>	3	
<u>9. NO PERMANENT SIGNAL RECORD</u>	4	
<u>10. TIME-OUT AND RELEASE - SC3 AND SC4</u>	4	
<u>11. PERMANENT SIGNAL RECORD INTERPRETATION</u>	4	
<u>12. CIRCUIT LIMITATIONS</u>	4	
<u>SECTION III - REFERENCE DATA</u>	5	
<u>1. WORKING LIMITS</u>	5	
<u>2. FUNCTIONAL DESIGNATIONS</u>	5	
<u>3. FUNCTIONS</u>	5	
<u>4. CONNECTING CIRCUITS</u>	5	
<u>5. MANUFACTURING TESTING REQUIREMENTS</u>	6	2.03 This information allows tests and other actions to be taken to remove the permanent signal from the customer line.
<u>6. TAKING EQUIPMENT OUT OF SERVICE</u> .	6	
<u>SECTION IV - REASONS FOR REISSUE</u> . .	6	

2.04 Should a No. 1 crossbar coin line develop a charge trouble, a lamp indication is displayed on the sender make-busy frame. This lamp is associated with a coin supervisory circuit jack. The identification procedure is similar to the permanent signal condition check except that the PS plug is inserted into the TNE jack determined by the cord connection at the sender make-busy frame.

SECTION II - DETAILED DESCRIPTION

1. JACK APPEARANCES

PS JACKS

1.01 A building may have over 500 PSH trunks, each requiring an appearance at a PS jack in the PSI circuit. Provision has been made for 600 PS jacks on the ANI trouble ticketer frame. Each jack connects to the sleeve lead of its associated holding trunk.

1.02 The PS jacks are required to enable ANI identification of customer lines connected to PSH trunks. In order to provide access to the sleeve in the PSH trunk, a direct ground is supplied from the PS jack for panel offices and step-by-step offices with ANI type B. In crossbar offices, no ground is supplied at the PS jack until the PS cord is inserted. With the PS cord inserted, direct ground is supplied but under control of relay contacts. These contacts provide for the removal of direct ground and the substitution of ground through an inductor in the oscillator circuit. The inductor has a low dc resistance to maintain the connection. The inductor also has an ac impedance which allows the effective connection of the 2.2-volt 5800-Hz tone on the sleeve. This tone is required for ANI identification.

1.03 When the PS cord is removed, the PS jack reconnects a direct ground over the sleeve lead to the PSH trunk for panel and step-by-step offices (option Y) so non-ANI functions may be performed. In crossbar offices, the ground is removed when the PS cord is withdrawn. The PS plug is a part of the PS cord which enables the connections of this circuit to a particular PS jack. Such a connection initiates the ANI permanent signal identification function as shown in SC1.

TNE JACKS

1.04 To enable ANI identification of No. 1 crossbar coin lines in trouble, the TNE jack is used in conjunction with the CC

and CN jacks provided in the miscellaneous circuit on the sender make-busy frame. On request, the PS plug is inserted in the TNE jack and the circuit operation is similar to the operation when using the PS-jack. The identification signal is fed back through the coin supervisory circuit and the switching linkage to the identifier causing a ticket printout as in other line identity tests.

2. IDENTIFIER GROUPS

2.01 For buildings having a single identifier group (a maximum of six panel and/or crossbar No. 1 central offices), GPO and associated PS-jacks are furnished but the intermediate or last GP-relays and associated jacks are not. A GP relay is assigned to each identifier group and when operated closes the ST and OSC leads to the outpulser connector and identifier of that group.

2.02 The PSH trunks cannot serve two or more identifier groups in common. Each PSH trunk must serve offices of the same identifier group as the one to which it is assigned. Failure to observe this rule can cause permanent signal identification failures and also other conditions on service calls including false charging. Permanent signal identification failures can be due to no signal; that is, the identifiers of a particular identifier group have access only to the number networks for the central offices associated with that group. Service call false charging could occur should two 5800-Hz tones be connected to the same number network at the same time, one for the service call and the other (due to incorrect PSH trunk assignment) for the permanent signal identification.

3. NORMAL IDENTIFICATION AND RELEASE - SC1 AND SC2

3.01 The seizure of the PSI circuit is accomplished by the insertion of the PS plug into the PS jack associated with the PSH trunk that has a line to be identified. In the case of a coin line, the PS plug is inserted into the TNE jack. The PS cord causes relay GPA to operate. Relay GPA operates relay GP- and the latter operates relay ST. Relay ST now closes a battery start lead through the operated GP-relay to the outpulser connector to seize an outpulser. The outpulser will, in turn, control the identification of the line plugged up and force a permanent signal record.

3.02 The timing circuit will function in 2 to 3.6 seconds if an outpulser is not connected within that interval. Once an outpulser is connected it grounds the SP lead to operate relay SP, which cancels timing. The outpulser then applies battery to the SP lead to operate relay OPH, which holds this circuit. Relay SP is locked to ground supplied by relay ST. The outpulser connects to an identifier and then grounds lead R to operate relay ID. Relay ID connects the sleeve lead from the PSH trunk to the oscillator circuit, which applies the identification signal tone to be detected by the identifier. When identification is completed, the outpulser releases relay ID by opening lead R. The identity of the line is transferred to the trouble ticketer by the outpulser in order to print a permanent signal or a coin line coin trouble record. Then the outpulser grounds the AB lead to operate relay TPD, which lights the TPD lamp to indicate a record will be printed. The outpulser then releases, releasing relay OPH.

3.03 The removal of the PS cord releases the GPA, GP-, and ST relays as shown in SC2. Relay ST releases relays SP and TPD. The release of relay TPD extinguishes the TPD lamp. The circuit is now idle.

Caution: When identifying a series of permanent signals do not withdraw the PS cord from one PS- jack and insert it into another too rapidly. The trouble ticketer requires about 5 seconds to print each PS record. Outpulser attempts to seize a busy trouble ticketer will not light a TPD lamp or print a PS record. The attempt to identify the line must be repeated when the trouble ticketer is idle.

4. TWO-PARTY LINES

4.01 The PSI circuit gives a ring party indication to the outpulser on every call. Should the identifier fail to find a ring party, the outpulser thereupon instructs the identifier to search for the tip party. For ring or tip party, upon a good identification, a permanent signal record is printed and the TPD lamp is lighted.

5. MULTIPARTY LINES

5.01 The multiparty line is recognized but not identified by the identifier. It notifies the outpulser that the line is multiparty and releases. The outpulser has a PS record printed minus the office and numerals but showing a multiparty indication. The TPD lamp is lighted and the circuit releases normally when the PS cord is removed.

6. COIN LINES

6.01 If No. 1 crossbar coin line sleeves are connected into the ANI number network this circuit can be used to identify coin lines connected to PSH trunks. Coin lines connected to a stuck coin supervisory circuit can also be identified when the appropriate options are provided in the coin supervisory circuits. Existing restrictions preventing coin line access to CAMA must be maintained.

7. PBX LINES

7.01 The PBX groups are connected into the ANI number network so that the directory number of one line is used for charging, that is, calls originated on all of these lines are charged to the single charging directory number. The PSI circuit handles the PBX line similar to any regular permanent signal, but the PS record gives the charging number only. The charging number can be the number of the station responsible for the permanent signal, but usually is not.

8. IDENTIFICATION FAILURE

8.01 Should the identifier be unable to identify the line, a trouble ticket is printed (if the trouble ticketer is available) and the TPD lamp does not light. The removal of the PS cord allows the circuit to release as in SC2 (see 3.01) except for the TPD relay and TPD lamp that have not been energized.

8.02 The PSI circuit may receive an identification failure indication under the following conditions.

- (a) Permanent signal is removed before the identifier is seized, releasing the PSH trunks and opening the oscillator identification signal path. (This assumes that the connection is not being held from an operator position or sender make-busy frame.)
- (b) Attempting to identify a coin line not connected to the number network.
- (c) Attempting to identify a step-by-step line as in 12.01.
- (d) Assigning offices from different identifier groups to the same PSH trunk. (See 2.01.)
- (e) Connection and quick removal of the PS cord in and out of the PS jack such that relay GP- (option Z, or App Fig. 4) is locked operated. With relay

GP- operated seizure of the outpulser connector will occur and if an outpulser is connected there will be an identification failure if the PS cord is removed when the oscillator identification is connected. In order for this condition to happen there must be a slight delay in connecting to an outpulser; that is, an available outpulser can connect an available identifier quickly enough to finish identification before the PS cord can be removed.

(f) A variation of (e) above (assuming a delay in connecting to an outpulser) is the immediate connection of the PS cord into a second PS- jack. If this second PS- jack is associated with a different identifier group, then identification failure will occur. If, on the other hand, the second PS- jack is associated with the same identifier group, a good PS record could result.

9. NO PERMANENT SIGNAL RECORD

9.01 Failure to take a PS record may be due to the conditions described in 8.02. However, a good identification may result in no PS record if the trouble ticketer is busy or the outpulser is in trouble.

9.02 Should the trouble ticketer be busy, the maintenance employee will have to repeat the attempt to identify the PS when it is idle. If the outpulser is in trouble, a trouble ticket may or may not be printed. If a trouble ticket is printed, it should show a PS mark.

10. TIME-OUT AND RELEASE - SC3 AND SC4

10.01 Failure of the PSI circuit to connect to an outpulser within 2 to 3.6 seconds results in the operation of the TO tube which operates relay TO. Relay TO operates relay SP which opens the SP lead to the outpulser link and lights the TO lamp to indicate that a time-out has occurred.

10.02 After a time-out the PS cord is removed, releasing the circuit as in a normal release, except for the TPD relay and TPD lamp. In their place, relay ST releases relay TO which extinguishes the TO lamp.

10.03 When a time-out occurs, the maintenance employee must remove the PS cord and reinsert it in the same PS jack to make another attempt to identify the line.

11. PERMANENT SIGNAL RECORD INTERPRETATION

11.01 The PS or coin trouble record is printed by the trouble ticketer on a 35-position ticket instead of the 40-position used for trouble tickets. Thus, PS or coin record tickets are shorter than trouble tickets and may be readily separated from a stack of tickets.

11.02 The following positions indicate the most important information. For complete analysis, consult the trouble ticketer, CD-95816-01.

- (a) Position 3 with a 9 indicates a PS or coin trouble record.
- (b) Position 11 gives the office number.
- (c) Positions 12, 13, 14, and 15 give the thousands, hundreds, tens, and units of the directory number.
- (d) Position 16 gives a multi- or nonmultiparty indication.
- (e) Positions 30, 31, 32, and 33 give the time of day.

11.03 The office number is an arbitrarily assigned numeral standing for a particular office code where physical and theoretical offices are not used.

11.04 When physical-theoretical offices are used, the actual office code must be obtained from a translation of the office number and the numerical thousands digit, or from a translation of the office number, numerical thousands, and the numerical hundreds digit.

11.05 If a PS or coin trouble record shows dashes (-) or asterisks (*) in any position where a number is ordinarily printed, or if it is abnormal in any way, this indicates a trouble in the trouble ticketer circuit. Such a condition will have a lighted TPD lamp because the outpulser has been satisfied.

12. CIRCUIT LIMITATIONS

12.01 The PSI circuit will not properly identify:

- (a) PBX lines.
- (b) Multiparty lines.

- (c) Coin lines not connected to the number network and primary bus circuit.
- (d) Permanent signals on trunks incoming from a step-by-step office which connect to a step-by-step district junctor in a No. 1 crossbar office used as a tandem office. Identification cannot occur for two reasons: these trunks will not be connected into the ANI system, and there will be a direct ground on the sleeve at the time identification is attempted.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

<u>Desig</u>	<u>Meaning</u>	<u>Main Function</u>
GPA	Group Auxiliary	Provides for PS cord control.
GPO	Identifier Group Zero	In buildings with more than one identifier group, to provide for identification in group 0.
GP-	Identifier Group	In buildings with more than one identifier group, to provide for identifications in groups other than 0.
ID	Identification	Connects identifying signal to sleeve lead.
OPH	Outpulser Hold	Provides for outpulser control during its connection to this circuit.
SP	Split	Provides for operation with outpulser connector and outpulser.
ST	Start	Starts seizure of outpulser.
TO	Time-Out	Operates TO lamp to indicate time-out.
TPD	Ticket Printed	Operates TPD lamp to indicate PS record will be printed.

3. FUNCTIONS

- 3.01 Provides a jack for each individual permanent signal holding trunk to enable access by this circuit.
- 3.02 Provides a jack to enable identification of coin lines with coin trouble.
- 3.03 Provides a plug seating relay to assure proper plug connection before seizure of this circuit.
- 3.04 Provides for operation with more than one identifier group.
- 3.05 Provides a timing limitation for connecting an outpulser to this circuit.
- 3.06 When under control of an outpulser this circuit:
 - (a) De-energizes the timing circuit.
 - (b) Opens the ST lead to outpulser connector.
 - (c) Connects an identifying signal to sleeve lead.
 - (d) Lights the TPD lamp.
- 3.07 Provides for restoring the circuit to normal when the PS cord is withdrawn.
- 3.08 Provides for lighting the TO lamp when time-out occurs.
- 3.09 Provides for release after time-out when the PS cord is withdrawn to restore the circuit to normal.
- 3.10 This circuit is controlled as follows: after seizure and until outpulser connection, the timing feature is in control; during its connection, the outpulser is in control; after outpulser release, the PS cord has control.

4. CONNECTING CIRCUITS

- 4.01 When this circuit is listed on a key-sheet, the connecting information shown thereon is to be followed.
 - (a) Outpulser Connector Circuit - SD-95890-01.
 - (b) Oscillator Circuit - SD-95827-01.

- (c) Identifier Circuit - SD-95810-01.
- (d) No. 1 Crossbar and Panel Permanent Signal Holding Trunks, such as, SD-95554-01 and SD-55870-01.
- (e) Step-by-Step No. 1, 350A, 355A Permanent Signal Holding Trunk Circuit - SD-32370-01.
- (f) Miscellaneous Circuit Sender Make-Busy - SD-25076-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall perform all service functions specified in this Circuit Description and shall meet all the standards of the Circuit Requirements Table. It also shall be able to function under the test conditions listed below.

5.02 All tests shall be made with the test voltage between -45 to -50 volts.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 As long as the PS cord is not inserted in a PS-jack or TNE jack the circuit remains out of service.

SECTION IV - REASONS FOR REISSUE

A. Changed and Added Functions

A.1 A jack is added, per GP-relay, for use when a No. 1 crossbar coin line with coin charge trouble needs to be identified. By use of a series of patching cords, tone is transmitted back through the switching linkage, identified, and a coin charge trouble record is printed similar to a PS record.

B. Changes in Apparatus (Components)

B.1 Added

TNE - 239A Jack - Fig. 1, X Option

TNE - 239A Jack - Fig. 1, W Option

TNE - 239A Jack - Fig. 4, V Option

D. Description of Changes

D.1 The TNE jack is added to provide a means of transmitting a tone signal to a No. 1 crossbar coin line in order to identify the particular line.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-WCB-LCB-PKM