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COMMON SYSTEMS
OUTPULSER CONNECTOR CIRCUIT
AUTOMATIC NUMBER IDENTIFICATION
TYPE B AND TYPE C
CROSSBAR NO. 1, PANEL OR
STEP-BY-STEP NO. 1, 350A, 355A OR
35E97 OFFICE

CHANGES

B. Changes In Apparatus

B.01 Added

TP Network 185A, App Fig. 3, Option G

D. Description of Changes

D.01 A contact protection network is added in App Fig. 3 per option G, on an after-date Standard basis to protect the 8M contacts of the TP- relays shown on FS 1, sheet 3. Note 115 is added and Note 104 is changed for this improvement.

D.02 Minor drafting corrections are made to Circuit Notes 102, 105, and to BD 2 on sheet 17.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 55413-DAJ

WE DEPT 45240-WCR-JTT-PG

COMMON SYSTEMS
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CHANGES

D. Description of Changes

D.1 The FS1,2,3 CADs 1,2,5,6, and 7 are revised and CADs 8 through 15 are added to indicate connections to a trunk connector circuit when automatic intercept and, or directory assistance trunk subgroups are added for ANI-C (option J). Where directory assistance trunk subgroups are added for ANI-B (option K), these can be added in a manner similar to the present arrangement as used for AIS in ANI-B except option H is used rather than option Q. Information Notes 302 and 303 with block diagrams BD1 and BD2 are added to explain the revised connecting circuit arrangements.

D.2 Minor corrections are made to clarify Circuit Note 109 and CADs 3 and 6. Cross-connect Note 401 is also revised and expanded to cover all trunk subgroup sizes.

D.3 The calling line identification (CLI) feature is rated as Mfr Disc., Circuit Note 114 is added, and Notes 102, 104, and 112 are revised for this or for the above listed items.

F. Changes in CD Sections:

F.1 Change SECTION I, 1.01 to read:

1.01 An ANI outgoing trunk circuit, . . . or a panel or SXS outgoing trunk circuit to an AIC, or a local directory assistance trunk circuit, gains access to the ANI output circuit . . . from 1 to 14 trunks in a subgroup.

F.2 Add under 1.05 and 1.09 following reference to option N, Mfr Disc.

F.3 Change SECTION II under 1.02 and 1.03 following reference to option N, also Mfr Disc.

F.4 In SECTION III under 2.01 change:

2.01 Leads to an ANI outgoing circuit, . . . outgoing trunk circuit to an AIC, local directory assistance trunk circuit, ANI permanent signal . . . are as follows:

<u>Designation</u>	<u>Meaning</u>
AB	Abandoned
.
.
INT	Intercept
A	Trunk Conn A Lead
B	Trunk Conn B Lead

F.5 Under FUNCTIONS, change 3.01 to:

3.01 Provides a means outgoing trunk circuits to an AIC, local directory assistance trunk circuits, or ANI permanent . . . to an outpulser.

F.6 Add under 3.12 after option N to CLI, Mfr Disc.

F.7 Add 3.13:

3.13 Provides a means for giving an automatic intercept or directory assistance trunk subgroup for ANI-C the lowest preference access to the outpulser circuit through a trunk connector circuit.

F.8 Under 4. CONNECTING CIRCUITS, add the following:

(p) Step-by-Step Systems - Trunk Connector Circuit for Automatic Intercept and Directory Assistance Trunks - SD-35043-01.

(q) Step-by-Step Systems - Local Directory Assistance Trunk Circuit for ANI Type B and C - SD-35029-01.

F.9 Under 5.02 change: ". . . all CP relays . . ." to read ". . . all OP relays . . .".

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC

WE DEPT 25830-WCR-GWC-JC

CIRCUIT DESCRIPTION

CD-95890-01
ISSUE 4D
APPENDIX 3D
DWG ISSUE 12D

COMMON SYSTEMS
OUTPULSER CONNECTOR CIRCUIT
AUTOMATIC NUMBER IDENTIFICATION
TYPE B AND TYPE C
CROSSBAR NO. 1, PANEL OR
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35E97 OFFICE

CHANGES

D. Description of Changes

- D.1 Circuit Note 113 is added to provide more information regarding the maximum trunk subgroup size for various trunk frames in the systems associated with this circuit, including trunk frames for the new step-by-step ANI combined noncoin trunk and the combined coin and noncoin trunk.
- D.2 Circuit Note 102 is changed to reflect the application of Circuit Note 113.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5223-VJA-COR

CIRCUIT DESCRIPTION

CD-95890-01
ISSUE 4D
APPENDIX 2B
DWG ISSUE 11B

COMMON SYSTEMS
OUTPULSER CONNECTOR CIRCUIT
AUTOMATIC NUMBER IDENTIFICATION
TYPE B AND TYPE C
CROSSBAR NO. 1, PANEL OR
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35E97 OFFICE

CHANGES

B. Changes in Apparatus

B.1 Superseded

Superseded By

OBA -- Resistor, 18AC,
option X

OBA -- Resistor, 18KE,
option M

D. Description of Changes

D.1 Option M is designated for the replacement of the OBA --
resistor.

D.2 Circuit Note 104 is changed.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5223-CEH-MR

COMMON SYSTEMS
OUTPULSER CONNECTOR CIRCUIT
AUTOMATIC NUMBER IDENTIFICATION TYPE B AND TYPE C
CROSSBAR NO. 1, PANEL OR
STEP-BY-STEP NO. 1, 350A, 355A or 35E97 OFFICE

CHANGES

B. Changes in Apparatus

B.1 Added:

TKN relay, AF34, option Q.

D. Description of Changes

D.1 The Q option TKN relay replaces the T option TKN relay for use with subgroups of trunks outgoing to an automatic intercept center. This permits a more economical apparatus arrangement for serving intercept trunks which are arranged in maximum three trunks per subgroup as opposed to the regular ANI trunks, which are arranged in maximum 13 trunks per subgroup.

D.2 Circuit Notes 102 and 104 are changed to cover Q option.

D.3 CAD 7 is added.

F. Changes in CD Sections

F.1 In 1.07, change (option T) to (option Q or T) and add:
"Option T is provided for regular ANI trunk subgroups.
Option Q is provided for subgroups of trunks outgoing to an automatic intercept center."

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5823-JLB-MR

COMMON SYSTEMS
 OUTPUTPULSER CONNECTOR CIRCUIT
 AUTOMATIC NUMBER IDENTIFICATION TYPE B AND TYPE C
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 STEP-BY-STEP NO. 1, 350A, 355A OR 35E97 OFFICE

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<u>1. GENERAL DESCRIPTION OF OPERATION.</u>	1	GENERAL FUNCTIONS
GENERAL FUNCTIONS	1	1.01 An ANI outgoing trunk circuit, line verification circuit, line verification and display circuit, permanent signal identification circuit, or auxiliary circuit for CLI, or a panel or SXS outgoing trunk circuit to an AIC, gains access to the ANI outputpulsers through the outputpulsers connector circuit. Each identifier group in the ANI system requires a separate outputpulsers connector circuit. The outputpulsers connector can be associated with a maximum of 10 outputpulsers and a maximum of 70 trunk subgroups with from 1 to 14 trunks in a subgroup.
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<u>1. OPERATION OF RELAYS TP--, LV, PS, AND N OPTION CLI - FS 1, FS 4, SC 1</u>	2	1.02 The outgoing trunk circuits associated with each subgroup are controlled in a lockout chain. The trunks within this chain are served one at a time and, when competing, are served according to their position in the chain. The ANI permanent signal identification circuit, the auxiliary circuit for CLI, and the line verification circuit or the line verification and display circuit, if provided, are treated in the same way as an individual ANI outgoing trunk circuit with the restriction that they appear in the first trunk subgroup.
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<u>5. TAKING EQUIPMENT OUT OF SERVICE</u>	4	1.03 Each trunk circuit is associated with a separate TP relay to which its start and work leads are permanently wired. These TP relays are arranged in their designated subgroups to provide two separate preference chains, as follows:
FIRST TRUNK SUBGROUP - RELAYS TP--, LV, PS, AND N OPTION CLI	4	(a) Operate preference to the highest numbered TP relay, with the preference going in descending order.
INTERMEDIATE AND LAST TRUNK SUBGROUP - TP-- RELAYS.	5	(b) Work leads contact preference to the lowest numbered TP relay, with the preference going in ascending order.
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<u>SECTION IV - REASONS FOR REISSUE</u>	5	1.04 The ANI permanent signal identification circuit and the line verification circuit or line verification and display circuit, if provided, as stated in 1.02, gain access through the first trunk subgroup. Their associated PS and LV relays are

arranged to provide first and second work leads contact preference and, consequently, last and next-to-last operate preference in the first trunk subgroup chain.

1.05 If N option is furnished, the auxiliary circuit ANI Type B for CLI also has an appearance in the trunk preference and lockout chain in the first trunk subgroup. Its associated CLI relay follows the PS relay in work leads contact preference and precedes the PS relay in operate preference in the first trunk subgroup chain.

OUTPULSER SEIZURE - PREFERENCE AND LOCKOUT - OUTPULSER MAKE BUSY

1.06 For any connector circuit, the associated trunk subgroups gain access to the associated outpulsers through a set, or sets, of OP and OB relays. These sets of relays are arranged as units in vertical and horizontal circuit patterns. The horizontal pattern corresponds to a trunk subgroup, and the vertical pattern corresponds to an outpulser. The OP relays provide for cutting through the start and work leads to an outpulser directly or through back contacts of other OP relays. Relays OB and BY provide the busy and lockout features.

TRUNK NUMBER IDENTIFICATION

1.07 For trouble recording purposes in the ANI type B system, the outpulser can cause the trunk number of the trunk circuit connected to it to be passed to the trouble ticketer circuit. A TKN (option T) relay is provided in each trunk subgroup to perform this function.

REGULAR OR TEST CALL - LINE VERIFICATION AND PERMANENT SIGNAL IDENTIFICATION

1.08 On every ANI trunk service or test call the connector circuit closes the same leads through to the outpulser circuit. On calls from an outgoing trunk to an AIC, option R is provided grounding lead INT to the outpulser to indicate an intercept call. On line verifications or permanent signal identifications, the connector closes through one additional lead, PS, to the outpulser. The outpulser determines which type circuit is requesting service and whether trunk seizure is for service or test by the condition of two of the leads cut through to it. These are the TST and PS leads. The conditions on the leads and the meaning to the outpulser follow:

Lead	TST	PS
Trunk Service	No signal	No signal
Trunk Test	Ground	No signal
Line Verification	Ground	Ground
Permanent Signal	No signal	Ground

OPERATION WITH CALLING LINE IDENTIFICATION EQUIPMENT - N OPTION

1.09 On operation with calling line identification equipment the same leads are closed through to the outpulser circuit as on a permanent signal identification. However, -48 volts instead of ground is connected to the PS lead by the ANI auxiliary circuit.

SECTION II - DETAILED DESCRIPTION

1. OPERATION OF RELAYS TP--, LV, PS, AND N OPTION CLI - FS 1, FS 4, SC 1

1.01 When an outgoing trunk circuit, ANI type B line verification circuit, ANI type B line verification connector and display circuit, or ANI type B permanent signal identification circuit requires the services of an outpulser it applies battery to its ST lead toward the connector. As stated in 1.04 of Section I, relays LV and PS are, effectively, the lowest and next-to-lowest numbered relays in the TP relay chain for the first trunk subgroup; and they each function in the same way as a TP-- relay.

1.02 If N option is furnished and the auxiliary circuit ANI Type B for calling line identification requires the services of an outpulser, it applies battery to its ST lead toward the connector preparatory to operating the CLI relay. The CLI relay precedes the PS relay in operate preference and functions in the same manner as a TP-- relay.

1.03 Battery on lead ST will operate the associated TP--, LV, PS, or N option CLI relay if a higher-numbered relay is not already operated. If a lower-numbered relay is operated, the higher-numbered relay will operate but will not be served until the lower-numbered relay releases. The operated TP--, LV, PS, or CLI relay in control closes the work and control leads toward the horizontal circuit pattern of relays OP and OB associated with the subgroup.

2. OPERATION OF RELAYS OP AND OB - FS 1, SC 1

2.01 The operated TP--, LV, PS, or N option CLI relay in control of the trunk subgroup closes battery from resistance lamp OP to lead OP to the associated horizontal circuit pattern of relays OP and OB. This OP lead is cross-connected from the A punching of the subgroup to a B punching which establishes outpulser preference in the horizontal chain circuit controlled by the OB relays associated with the subgroup bidding for an outpulser. As shown in FS 1, battery on lead OP enters the chain at the B punching and is passed through normal contacts of relay OB to the winding of its associated OP relay for the preferred outpulser. If the preferred outpulser is busy,

the associated OB relay will be operated and will pass the OP lead battery to contacts of the next OB relay in the horizontal chain. If this relay is normal, the battery is passed to its associated OP relay winding. If this relay is operated, the battery is passed to the next OB relay in the chain. If all OB relays in the chain are operated, the bidding subgroup waits (a) until an outpulser is available or (b) for the removal of battery on lead OP by a timeout in the circuit controlling the subgroup.

2.02 An operated OP relay closes ground to lead ST to the outpulser and places a shunt on the resistance battery for the associated OB relay primary winding. The operation of relay ST in the outpulser to ground on its ST lead causes the operation of all OB relays in the vertical circuit pattern associated with the outpulser, except relay OB whose primary winding is shunted by the operated OP relay. As shown in FS 1, the outpulser is now busy to all other subgroups until it releases. The operated OP relay also closes all work leads from the controlling trunk subgroup to the outpulser seized and opens the CH leads for outpulser timing. The operated OP relay transfers the holding circuit of the TP--, LV, PS, or CLI relay in the subgroup to lead TPL from the outpulser. The subgroup is now under the control of the outpulser and cannot release until the outpulser releases.

2.03 An OB-- relay, operated by an outpulser, has a holding circuit on its secondary winding controlled by its associated subgroup. Thus, a subgroup establishing connection to an available outpulser places ground on its OBL lead to hold, on its secondary windings, all OB relays of the associated horizontal OB relay chain which are operated or operate during the course of the subgroup connection. The purpose of this locking circuit is to prevent unwanted interruption of the battery on lead OP of the subgroup once connection to an outpulser is established.

2.04 At a point just prior to outpulser release, all the associated OB relays will be operated. A chain circuit through make contacts of all the operated OB relays will, at this time, close ground to lead OBT to the outpulser. If the outpulser identifier test circuit is attempting to seize the outpulser, this ground signal informs the outpulser identifier test circuit that the outpulser is busy to all trunk subgroups.

3. OPERATION OF RELAY BY-- - FS 1

3.01 An idle outpulser seized by a trunk subgroup places ground on its OPB lead to the connector. Ground on lead OPB causes the operation of all the connector BY-- relays associated with the outpulser. The operated BY-- relays place operating grounds on the primary windings of all OB relays

associated with the outpulser. (One OB-- relay is short-circuited.)

4. OPERATION OF RELAY TKN - FS 3

4.01 An ANI type B outpulser circuit which has failed to complete its functions and has seized the trouble ticketer circuit will place a ground on its TKN lead to the connector. Ground on lead TKN is passed to the winding of relay TKN of the connected subgroup through operated contacts of the associated OP relay, either directly or through back contacts of other OP relays associated with the outpulser. Relay TKN, operated by the ground from relay OP-, will close grounds on certain of the SG-- and TK-- leads to the miscellaneous circuit for the trouble ticketer. The particular leads grounded will identify the trunk subgroup and trunk number in the subgroup involved in the unsuccessful functioning of the outpulser.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

None.

2. FUNCTIONAL DESIGNATIONS

2.01 Leads to an ANI outgoing trunk circuit, line verification circuit, line verification and display circuit, outgoing trunk circuit to an AIC, ANI permanent signal identification circuit, or auxiliary circuit ANI Type B for calling line identification and outpulser circuit are as follows:

<u>Designation</u>	<u>Meaning</u>
AB	Abandoned
CH1	Chain 1 for OP Relays
CH2	Chain 2 for OP Relays
OBG	Outpulser Busy Ground
OBT	Outpulser Busy Test
OPB	Outpulser Busy
PS	Permanent Signal
R	Ring
SP	Split
ST	Start Outpulser
ST or ST00-13	Start Trunk Subgroup Relay
T	Tip
TKN	Trunk Number
TPL	TP Relay Lock
TPT	Tip Party Test
TST	Trunk Test
INT	Intercept

2.02 Leads to the miscellaneous circuit for the trouble ticketer circuit are as follows:

<u>Designation</u>	<u>Meaning</u>
TK00-13	Trunk Number
SGT-	Subgroup Tens
SGU-	Subgroup Units

3. FUNCTIONS

3.01 Provides a means for connecting an ANI outgoing trunk circuit, line verification circuit, line verification and display circuit, outgoing trunk circuit to an AIC, or ANI permanent signal identification circuit to an outpulser.

3.02 Serves outgoing trunk circuits in any subgroup one at a time, but serves subgroups simultaneously if outpulsers are available.

3.03 Serves the line verification circuit, the line verification and display circuit, and the ANI permanent signal identification circuit in the same way as an ANI outgoing trunk circuit.

3.04 Serves outgoing trunk circuits in any subgroup one at a time, with operate preference in a descending order. However, when more than one TP relay in the subgroup is operated, service preference follows an ascending order.

3.05 Attempts to seize a preferred outpulser in accordance with established cross-connections.

3.06 Supplies the trunk number and subgroup number to the trouble ticketer for trouble recording purposes.

3.07 Informs the outpulser whether the call in progress is an ANI outgoing trunk test or service call, a line verification, an automatic intercept call, or an ANI permanent signal identification.

3.08 Provides a signal to the outpulser which indicates the instant the outpulser is busy to all trunk subgroups.

3.09 Prevents the call from reverting to a more preferred outpulser which becomes available after the call in the outpulser connector has been assigned to a less preferred outpulser.

3.10 Provides means for advancing outpulser preference in an outpulser connector when the preferred outpulser is seized by some other trunk subgroup.

3.11 Prevents more than one trunk subgroup from being connected to an outpulser at one time.

3.12 Provides a means for connecting an ANI auxiliary circuit for calling line identification to an outpulser and serving it in the same manner as an ANI permanent signal identification circuit when N option is provided.

4. CONNECTING CIRCUITS

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

- (a) Common Systems, ANI Type B Outpulser - SD-95811-01.
- (b) Panel System, MF Outgoing Trunk - SD-21972-01 (typical).
- (c) Panel System, PCI Outgoing Trunk - SD-21974-01.
- (d) No. 1 Crossbar System, MF Outgoing Trunk - SD-26209-01 (typical).
- (e) No. 1 Crossbar System, PCI Outgoing Trunk - SD-26210-01.
- (f) Common Systems, Miscellaneous Circuit for the Trouble Ticketer - SD-95823-01.
- (g) Common Systems, Line Verification Connector and Display Circuit - SD-95820-01.
- (h) Step-by-Step System, Line Verification Circuit - SD-32246-01.
- (i) Common Systems, ANI Permanent Signal Identification Circuit - SD-95817-01.
- (j) Step-by-Step System, ANI Outgoing Trunks (E&M Lead) - SD-32244-01 (typical).
- (k) Step-by-Step System, ANI Outgoing Trunk (Loop) - SD-32245-01 (typical).
- (l) Step-by-Step System, Outpulser Circuit, ANI Type C - SD-32375-01.
- (m) Panel System, Trunk Finder and Outgoing Trunk Circuit - SD-21560-01.
- (n) Step-by-Step System, Outgoing Intercept Trunk Circuit - SD-32532-01.
- (o) Common Systems Auxiliary Circuit ANI Type B for Calling Line Identification - SD-10208-01

5. TAKING EQUIPMENT OUT OF SERVICE

FIRST TRUNK SUBGROUP - RELAYS TP--, LV, PS AND N OPTION CLI

5.01 Relays LV, PS, and N option CLI are located in the first trunk subgroup with from 0 to 13 TP relays. To take the LV, PS, CLI, or any TP-- relay in this subgroup out of service, make busy the circuits associated with all the relays in the subgroup in accordance with make-busy information in the respective CD.

This action makes the trunk subgroup busy. In addition, block nonoperated all OP relays associated with this subgroup.

INTERMEDIATE AND LAST TRUNK SUBGROUP - TP-- RELAYS

5.02 Make busy all trunk circuits associated with the subgroup containing relay TP-- in accordance with the make-busy information in the CD for trunk circuits. This action makes the trunk subgroup busy. In addition, block nonoperated all CP relays associated with this subgroup.

RELAY OP--

5.03 Make busy the associated outpulser circuit in accordance with make-busy information in the outpulser CD. Block both CH relays operated in the outpulser. When working on relay OP, avoid crossing contacts or accidental application of battery or ground to work lead contacts.

RELAY OB--

5.04 Make busy the associated outpulser circuit and trunk subgroup as directed in 5.01, 5.02, and 5.03. Insulate the contacts of relay BY-- associated with the primary winding of relay OB--.

RELAY BY--

5.05 Block operated all OB relay associated with BY-- relays.

SECTION IV - REASONS FOR REISSUE

A. Changed and Added Functions

A.1 This circuit is reissued to provide for operation with the calling line

identification equipment. The auxiliary circuit ANI Type B for calling line identification which associates this equipment with the regular ANI facilities bids for connection to an outpulser when a signal for calling line identification is received from the distant end.

B. Changes in Apparatus

B.1 Added

Relay CLI, AJ503, N option.

D. Description of Changes

D.1 Relay CLI is added as N option in the preference chain of TP-- relays for the first trunk subgroup which also includes the LV and PS relays. It has third lowest operate preference and third highest preference in the work leads contact preference chain.

D.2 Contacts of the N option CLI relay are added in the same work leads which are cut through to an outpulser by the PS relay. These are leads AB, PS, R, SP, ST, and T.

D.3 Circuit Note 102 is changed to include reference to the calling line identification feature. Reference to N option is added in Circuit Note 104.

D.4 Connecting information is added in CAD 2.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5641-JLB-MR