

PANEL SYSTEMS  
OUTGOING TRUNK CIRCUIT  
FROM DISTRICT OR 3-WIRE OFFICE MULTIPLE  
TO INFORMATION DESK NO. 3, 4, 6A OR 6B  
OR TO OFFICIAL PEK  
ARRANGED FOR COMMON BATTERY SIGNALING  
AND TO CONNECT TO  
CROSSBAR OFFICE SECONDARY MULTIPLE

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Circuit schematic is designated "Fig. 1 Trunk Circuit."
- D.2 Connecting information for T and R leads to incoming trunk circuit at central information desk did not include 6A or 6B desks.
- D.3 Cross-connections are revised.
- D.4 Cross-connection figures P and R are added.
- D.5 Equipment notes 202 and 203 are added.
- D.6 Fourth line of title did not include reference to 6A or 6B desks.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3340

LBS)  
FJS)MT



CIRCUIT DESCRIPTION  
SYSTEMS DEVELOPMENT DEPARTMENT  
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Appendix 3-D  
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PANEL SYSTEM  
OUTGOING TRUNK CIRCUITS  
FROM DISTRICT OR THREE-WIRE OFFICE MULTIPLE  
TO INFORMATION DESK NO. 3 OR NO. 4  
OR TO OFFICIAL P.B.X.  
ARRANGED FOR COMMON BATTERY SIGNALING  
AND TO CONNECT TO  
CROSSBAR OFFICE SECONDARY MULTIPLE

#### CHANGES

##### D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Leads "Crossbar secondary office multiple" are added.
- D.2 Cross-connection, Figure N, is added.
- D.3 "And to connect to crossbar office secondary multiple" is added to title.

All other headings, No Change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

LBS)  
FJS)RU



CIRCUIT DESCRIPTION  
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Appendix 2-D  
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PANEL SYSTEM  
OUTGOING TRUNK CIRCUIT  
FROM DISTRICT OR 3 WIRE OFFICE MULTIPLE  
TO INFORMATION DESK NO. 3 OR NO. 4  
OR TO OFFICIAL P.B.X.  
ARRANGED FOR COMMON BATTERY SIGNALLING

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO  
ADDED OR REMOVED APPARATUS

- C.1 The testing information for the (B) and (C) relays is changed to permit testing these relays while a busy condition is present on the "S" lead.
- C.2 The test set preparation for the (B) relay, "S" winding, and the (C) relay was shown as ground.
- C.3 The test clip connection to battery for the (B) relay, "S" winding and for the (C) relay was not shown.
- C.4 Test Note 3 is added.

All other headings, No Change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

WCJ)  
WLF) SP



CIRCUIT DESCRIPTION  
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PANEL SYSTEM  
OUTGOING TRUNK CIRCUIT  
FROM DISTRICT OR 3 WIRE OFFICE MULTIPLE  
TO INFORMATION DESK NO. 3 OR NO. 4  
OR TO OFFICIAL P.B.X.  
ARRANGED FOR COMMON BATTERY SIGNALLING

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Taps T, R and S added from district or office multiple and from cable pair to central information desk trunk to outgoing trunk test board, test and make busy jacks circuit.
- D.2 Circuit note 104 added, covering the addition of these taps.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

AR)  
WLF) KW





CIRCUIT DESCRIPTION  
AMERICAN TELEPHONE & TELEGRAPH CO.,  
DEPT. OF DEVELOPMENT & RESEARCH.  
BELL TELEPHONE LABORATORIES, INC.  
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PANEL SYSTEM  
OUTGOING TRUNK CIRCUIT  
FROM DISTRICT OR 3 WIRE OFFICE MULTIPLE  
TO INFORMATION DESK NO. 3 OR NO. 4  
OR TO OFFICIAL P.B.X.  
ARRANGED FOR COMMON BATTERY SIGNALLING

CHANGES

A. CHANGED AND ADDED FUNCTIONS

- A.1 The use of this circuit is extended to include calls to No. 4 Information Desk.

B. CHANGES IN APPARATUS

- B.1 No change.

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

- C.1 The title of the circuit requirements table formerly was "Outgoing Trunk Circuit to Information Desk No. 3 or to Official P.B.X. (OGT)".

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 The circuit title is changed to extend the application of the circuit to include calls routed from the panel office to No. 4 information desk and to limit application to P.B.X. trunks requiring common battery signaling.
- D.2 Reference to the No. 4 information desk is added in the connecting information at the right of the circuit diagram, and also in the cross connection diagram.
- D.3 Circuit note 101 changed to specify "SIG." battery.
- D.4 Relay winding designations are added.
- D.5 Under "Working Limits" reference to note 102 was not shown.

## DEVELOPMENT

### 1. PURPOSE OF CIRCUIT

- 1.1 This circuit constitutes the outgoing end of a trunk leading from a panel office to a centralized information desk No. 3 or No. 4 or to an official P.B.X. The purpose of the circuit is to insure that the connection has reached its proper stage in the panel office before being extended to the distant end.

### 2. WORKING LIMITS

#### 2.1 For Relay (B)

The maximum external circuit loop for trunk supervision toward the outgoing end of the trunk is:

7135 $\omega$ , with 20-28 volts at distant end  
18000 $\omega$ , with 45-50 volts at distant end

- 2.12 Minimum insulation resistance, 30,000 $\omega$

- 2.13 Earth potential  $\pm$  20 volts. (Earth potential enters into consideration for relay (B) because of the possibility of "irregular" or sequence operation of the contacts on relay (C).)

#### 2.2 For Relay (A)

The external circuit loop resistance for relay (A) during sender "trunk guard" test shall be not less than 1666 ohms.

## OPERATION

### 3. FUNCTIONS

- 3.1 This circuit recognizes the sender "trunk guard" test condition, and withholds cut-thru for the time being so as to avoid the premature start of the incoming trunk at the distant end.
- 3.2 This circuit recognizes the district "trunk closure" condition, and then cuts through the connection from district or office multiple to the trunk, so that the call may be brought in before the distant operator.
- 3.3 This circuit withholds cut-thru entirely, if the polarity of the trunk has been unintentionally reversed, the purpose of this feature being to safeguard the subscriber against charges on a service call that is granted free of charge.
- 3.4 This circuit holds operated to ground on the sleeve until the district or office selector releases the connection.

#### 4. CONNECTING CIRCUITS

- 4.1 This circuit will function with the following circuits.
- 4.2 Standard, Panel, Line Finder and District Circuits.
- 4.3 Standard, Panel 3 Wire Office Selector Circuits.
- 4.4 Trunk Circuit, Incoming to Information Desk No. 3.
- 4.5 Trunk Circuit, Incoming to Information Desk No. 4.
- 4.6 Trunk Circuit, Incoming to Official P.B.X.

#### DETAILED DESCRIPTION

##### 5. SEIZURE

- 5.1 At the time this circuit is seized by the office or district selector for the purpose of reaching the distant P.B.X. or information desk, the sender is still attached to the connection. Immediately afterward the sender applies a bridge across tip and ring for the purpose of making "trunk guard" test, and in so doing it sets up a condition which would prematurely start the distant end of the trunk were it not for the presence of out-trunk equipment. This outgoing trunk applies ground to the ring and battery through relay (A) to the tip, thus presenting toward the district a polarity that is suited to the requirements of the sender, but not to the operation of the charging apparatus in the district.

Relay (A), being marginal, refuses to operate on the relatively high sender test loop, but it does operate when shortly afterward the sender is dismissed and the district sequence switch makes "trunk closure" through its 500 ohm supervisory relay and the winding of its repeating coil. With relay (A) operated, one winding of polarized relay (B) is bridged across the outer end of the trunk, where it finds ground and battery supplied from the distant end. Relay (B) now comes up and locks in series with relay (C) on ground supplied from the sleeve. Relay (C) next operates, locks to the sleeve, removes relay (A) from the tip and ground from the ring, and extends the tip and ring through to the trunk. Relay (A) falls back and detaches the bridged winding of relay (B) from the trunk, and relay (B) in turn releases because its locking winding is short circuited by relay (C).

The trunk is now in position for talking, without incumbrance from any condensers or supervisory bridges. The distant end of the trunk is started by the momentary loop through relay (B) and also by the district supervisory path.

6. HOLDING

- 6.1 It has already been noted that the operation of the trunk is partly dependent upon the presence of sleeve ground supplied from the district or office selector. Cut-thru relay (C) holds locked to this ground during conversation. At the end of the call, when the sleeve ground is removed, relay (C) falls back and restores the trunk to normal.

7. PROTECTION AGAINST FALSE CHARGING

- 7.1 Since connections routed over this trunk to information or to official P.B.X. are supposed to be given free, it is important to avoid conditions which might lead to charging. If the cross-connecting jumpers beyond the relay equipment should be unintentionally reversed, a charge would result following cut-thru were it not for the presence of polarized relay (B). This relay on each connection tests the polarity of the trunk and blocks the call if the polarity is in such direction as to cause charging.

AMERICAN TELEPHONE & TELEGRAPH CO.,  
DEPT. OF DEVELOPMENT & RESEARCH.  
BELL TELEPHONE LABORATORIES, INC.

DEPT. 332-A

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