

5

COMMON SYSTEMS
 TWO-WAY TRUNK CIRCUIT
 TO SUBSCRIBER LINE CIRCUIT
 INCOMING RINGDOWN OUTGOING AUTOMATIC
 OR 2-WAY RINGDOWN TO OTHER DESKS
 LOCAL TEST CABINET NO. 3-KEY CABINET NO. 20 OR 21
 LOCAL TEST DESK NO. 14 OR
 LOCAL TEST DESK NO. 16 OR LINE STATUS VERIFIER
 CTG TEST BOARD-MASTER TEST FRAME-ACD TEST FRAME
 CHIEF SWITCHMAN'S DESK-SENDER MAKE BUSY FRAME
 TEST SUPERVISOR'S PRIVATE DESK
 REPAIR SERVICE DESK NO. 2-CABLE TEST DESK NO. 3
 ESS NO. 1 MASTER CONTROL CENTER
 LOCAL TEST DESK NO. 15B

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit provides means for originating and receiving calls over a subscriber line circuit.

SECTION II - DETAILED DESCRIPTION

1. INCOMING CALL (Fig. 1 and A)

1.01 When ringing voltage is applied across the tip and ring the ac component of this voltage flows through the D capacitor and in a few cycles reduces the resistance of the 1A thermistor sufficiently to permit the R relay to operate on its secondary winding. Surges on the line are of short duration and do not sufficiently reduce the resistance of the thermistor to operate the R relay. The A varistor (option ZG) or A diode (option ZH) is poled in such a direction as to effectively shunt the R relay secondary winding when the voltage is of the polarity to oppose the primary winding ampere turns. When the polarity is such as to aid the primary winding the varistor is high resistance and the R relay operates on its secondary winding and locks on its primary winding. Since the varistor or diode permits only aiding current flow in the secondary winding the alternating current does not tend to release the relay differentially. The R relay operated causes the auxiliary signal circuit to indicate an incoming call and the lamp to light steady (M or Y option) or flashing (R, R, or X option).

1.02 When N option is provided, the incoming signal can be prevented from locking in when the office is unattended at night. Also, when incoming calls are transferred to another desk or switchboard by means of a key in the desk transfer circuit, the audible alarm circuit, the alarm transfer circuit, the alarm sending circuit or the interface and control circuit (No. 5 crossbar). The

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Pursuant to Judge Greene's Order of August 5, 1983, beginning on January 1, 1984, AT&T will cease to use "Bell" and the Bell symbol, with the exceptions as set forth in that Order. Pursuant thereto, any reference to "BELL" and/or the BELL symbol in this document is hereby deleted and "expunged".

key removes the locking ground for the primary winding of relay R and incoming signals will not lock in.

INCOMING CALL ANSWERED

1.03 When the associated key is operated, ground on the "K" lead operates the R relay and a low resistance bridge is placed across the tip and ring which will trip any machine ringing and will give off-hook supervision. The T and R resistors and W and Z options provide a minimum resistance to limit the acoustic disturbance to any calling subscriber during the tripping or ringing. The K relay operated releases the R relay, removes the bridge including the R relay secondary winding from across the tip and ring, and lights the lamp steady as a busy signal with T and X option. It also lights the lamp steady as a busy signal with J option except when the traffic is transferred. This option is used where the associated desk requires a busy signal but the location to which the traffic is transferred must not have a steady lamp as a busy signal.

1.04 Option A provides 48 volts and option ZA provides 24 volts for use with option J when the associated trunk transfer circuit is equipped with a "B" lead.

DISCONNECT

1.05 When the associated key is released, the R relay releases and the bridge is removed from across the tip and ring restoring the circuit to normal.

2. ORIGINATED CALL

2.01 When the associated key is operated a low bridge is placed across the tip and ring originating a call through the subscriber line circuit, the same as from a subscriber line, and ground is received over the "K" lead operating the R relay. The R relay operated removes the bridge through the R relay secondary winding from across the tip and ring and with J, T, or X option lights the lamp steady as a busy signal. On release of the key the bridge is removed from across the tip and ring, releasing the connection. The release of the key also releases the R relay restoring the circuit to normal.

3. ELECTRICAL HOLD (FIG. 4)

3.01 With the associated trunk TALK key operated, the position hold key in the connecting circuit is momentarily operated and then the associated trunk key is thrown back to normal, releasing relay K. The hold key in operating, shorts the S winding of the A relay and the A relay operates through its P winding. When the A relay operates the B relay operates in turn operating the C relay. This condition is electrically held until the associated key is operated to the talk position again. This will cause the R relay

to operate. When the K relay operates, ground is removed and the B relay releases. The A relay releases and then the C relay releases and the hold condition is released.

3.02 If the distant end disconnects while the hold condition exists, the hold condition will release and restore the circuit to normal.

4. GROUPING OF TRUNKS (FIG. 2 AND 3)

4.01 During periods of light traffic it may be required to group trunks. Operating the GRP key will cause relay G to operate, transferring an incoming call to a test supervisor's private desk or to the light load position at the local test desk.

5. OPERATION AT NO. 1 ELECTRONIC SWITCHING SYSTEM OFFICE (FIG. 1 AND B)

INCOMING CALL

5.01 When connection to a No. 1 ESS master control center is provided, an incoming call will cause relay R to operate on ringing as previously described in 1.

Relay R in operating will:

(a) Lock operated by leads "L" and "LU" if a key at the master control center has been operated, or just follow ringing if this key is released.

(b) Close leads "ST" to "LG" as a start signal to the key telephone system interrupter circuit.

(c) Close leads "RC" to "RN" to the line and trunk test circuit.

5.02 An interrupted battery will be applied to lead "LF" by the interrupter circuit causing the lamp associated with this trunk at the key telephone set to flash as an incoming call signal.

INCOMING CALL ANSWERED

5.03 When the key associated with the flashing lamp is operated and the handset is removed from the switchhook of the telephone set, a talking connection is established and ground from lead "A1" is closed to lead "A" causing relay K to operate. Relay K in operating will:

(a) Release relay R.

(b) Change the flashing lamp to a steady lamp condition over leads "L" and "LG" to the key telephone system interrupter circuit.

DISCONNECT

5.04 When the call is completed and the key at the key telephone set is released, relay K will release restoring the circuit to normal.

ORIGINATED CALL

5.05 The procedure for making an outgoing call is the same as for answering an incoming call, in that the pickup key associated with this trunk must be operated. This will operate relay K which will cause the associated lamp to light steady as a busy signal. Relay R will remain in a released condition while the call is in progress. Releasing the key at the completion of a call will cause a disconnect, as described in 5.04.

6. OPERATION FROM KEY TELEPHONE OR LINE STATUS VERIFIER (LSV) USING THE TALK TRUNK AND LINE CIRCUIT APPLIQUE

6.01 When this circuit is used in conjunction with the talk trunk and line circuit applique, the operation is the same as that described in Section 11, subparagraphs 1 and 2 except:

(a) The key telephone interrupter is started by leads ST and LG.

(b) A connection is established to the ringers in the No. 16 LTD and in the key equipment as determined by the optional multiple using leads RN and RC.

SECTION III - REFERENCE DATA1. WORKING LIMITS

1.01 Maximum Extension Loop Resistance - 1500 ohms.

1.02 Minimum Insulation Resistance - 10,000 ohms.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 Provides a talking connection through a subscriber line circuit.

3.02 Locks in the signal on incoming calls when ringing current is received.

3.03 Provides a flashing lamp on an incoming call (K or X option).

3.04 Provides a steady lamp on an incoming call (M or Y option).

3.05 Operates the auxiliary signal on an incoming call.

3.06 Prevents false incoming signals on line surges.

3.07 Extinguishes the line signal and releases the auxiliary signal circuit when the call is answered.

3.08 Lights the line lamp steady as a busy signal while the associated trunk key is operated. (J, T, S, or X option).

3.09 Prevents locking in the incoming signal when the desk traffic is transferred. (N option).

3.10 Prevents lighting the lamp steady as a busy signal when the desk traffic is transferred. (J option).

3.11 Provides for grouping the wire chief's central office lines to the supervisory and light load position of the local test desk.

3.12 Provides for controlling the locked-in signal when used with an audible alarm circuit, an alarm transfer circuit, alarm sending circuit, or an interface and control circuit (No. 5 crossbar). (N option).

3.13 Provides a means for holding a trunk electrically.

3.14 In ESS offices, provides loop closure on all control leads.

3.15 In ESS offices, causes key telephone system (interrupter circuit) to operate to supply interrupted battery for flashing a lamp on incoming calls.

3.16 In ESS offices, causes key telephone system (interrupter circuit) to supply battery for lighting a lamp as a busy signal on outgoing or answered calls.

4. CONNECTING CIRCUITS

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

(a) Key and Lamp of Telephone Circuit Repair Service Desk No. 2 - SD-90044-01 or SE-95717-01.

(b) Key and Lamp of Telephone Circuit - Test Supervisor's Private Desk - SD-90075-01 or SD-95722-01.

(c) Key and Lamp of Telephone Circuit - Local Test Desk No. 14 - SD-90050-01 or SE-95754-01.

(d) Key and Lamp of Telephone Circuit - Cable Test Desk No. 3 - SD-90271-01 or SE-95783-01.

(e) Key and Lamp of Telephone Circuit - Key Cabinet No. 20 - SD-95404-01.

(f) Key and Lamp of Telephone Circuit - Sender Make Busy Frame - SD-21702-01.

(g) Key and Lamp of Telephone Circuit - Chief Switchman's Desk - SD-95404-01.

(h) Key and Lamp of Telephone Circuit - Outgoing Trunk Test Board - SD-25107-01.

(i) Master Test Frame Telephone Key, Lamp and Jack Circuit - SD-25744-01.

(j) Key and Lamp of Telephone Circuit - SxS Manual Outgoing Trunk Test Frame - SD-32349-01.

(k) Master Test Frame - Jack, Lamp and Key Circuit SD-25762-01.

(l) Miscellaneous Circuit for Miscellaneous Interrupter Frame (Panel Office) - SD-21666-01 or SD-21667-01J.

(m) Interrupter Frame Circuit (Crossbar Office) SD-25062-01.

(n) Flashing Circuit - SD-90084-01 or SD-95725-01.

(o) Transfer and Auxiliary Circuit - SD-95407-01.

(p) Transfer and Make Busy Key Circuit - SD-90620-01 or SD-95736-01.

(q) Auxiliary Signal Circuit - SD-90628-01 or SD-95735-01.

(r) Subscriber Line Circuit (typical) - SD-25548-01.

(s) Repair Service Desk No. 2 Transfer Circuit SD-90041-01, SD-95050-01, SD-95726-01 or SD-95729-01.

(t) Audible Alarm Circuit - SD-31551-01.

(u) Alarm Transfer Circuit Crossbar No. 1 SD-25885-01.

(v) Alarm Transfer Circuit E.C.C. Panel - SD-20733-01.

(w) Alarm Transfer Circuit G.C.C. Panel - SD-20736-01.

(x) Alarm Sending Circuit Crossbar No. 5 - SD-95417-01.

(y) Auxiliary Signal, Flash and Transfer Key Circuit - SD-96230-01.

(z) Service Observing Circuit - SD-90266-01.

(aa) Key Telephone System 1A2 (Interrupter Circuit) SD-69476-01.

(ab) ESS No. 1 - Office Alarm Circuit - SD-1A158-01.

(ac) ESS No. 1 - Line and Trunk Test Ckt - SD-1A132-01.

(ad) Toll Subscriber Line Circuit - SD-56389-01.

(ae) Key Telephone System 1A2 Key and Telephone Circuit SD-69495-01.

(af) Key and Lamp Circuit Local Test Cabinet No. 3 SD-96182-01.

(ag) Key Telephone System No. 1A2 - 503A1 Key Service Unit - SD-69518-01 (typical).

(ah) No. 16 Local Test Desk Telephone Circuit SD-1C361-01.

(ai) No. 16 Local Test Desk Flashing Circuit SD-1C401-01.

(aj) No. 16 Local Test Desk Pri-Sec Test Circuit SD-1C379-01.

(ak) No. 15E Local Test Desk - Control and Access Circuit - SD-1C461-01.

(al) Jack, Lamp, and Key Circuit for ACD - SD-27999-01.

(am) Talk Trunk Circuit, Line Status Verifier SD-97551-01.

(an) Interface and Control Circuit for No. 5 Crossbar - SD-28075-01.

(ao) LSV Flashing, Fusing and Alarm Circuit SD-97554-01.

(ap) LSV Miscellaneous and Alarm Circuit - SD-97568-01.

5. MANUFACTURING TEST REQUIREMENTS

None

SECTION IV - REASONS FOR REISSUE

I. Description of Changes

D.1 The following changes have been made to change references to the interface and control circuit (No. 5 crossbar) to agree with the latest circuit title ("For CSACS" deleted), and to add the interface and control circuit (No. 5 crossbar) in Note 102 to insure that option N is designated when line lamp lock in is transferred to or controlled by the interface and control circuit (No. 5 crossbar).

(a) Interface and control circuit (No. 5 CSBR) added to Note 102 for N option.

(b) In Figure 1, 51, 54, and 55, "FOR CSACS" deleted.

Note: This reissue also covers information authorized by the following appendixes to Issue 7D of this CD:

APPX 1D - DWG ISS 17D
APPX 2B - DWG ISS 18B
APPX 3B - DWG ISS 19B
APPX 4B - DWG ISS 20B
APPX 5B - DWG ISS 21B

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