

49476

COMMON SYSTEMS
PLUGGING UP LINE CIRCUIT
WITH AUTOMATIC CUT THRU FEATURE
FOR PLUGGING UP FRAME
IN CROSSBAR, STEP BY STEP OR PANEL OFFICE
SERVED BY
CENTRAL "A" SWITCHBOARD

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Fig. E (4W11A Cord) is added for use with 300 type connectors or 121 type protectors.
- D.11 Information is added to note 102 to show that when the line protection consists of 121 type protectors Fig. A and Option "X" are required and that when 300 type connectors are used Fig. E and Option "X" are required.
- D.12 Fig. E is shown as "AT&TCo Std" in Note 103.
- D.13 Fig. E is added to the list of options used.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2311-DEW-MFF-DB

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CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 Provision for immediate cut-through, when a trouble condition is corrected, is added.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Fig. 4 is added to provide for immediate cut-through when a trouble condition is corrected.

D.2 Reference to Fig. 4 is added to notes 102 and 103, Options Used table and connecting information for the A and B leads of Fig. 1.

D.3 Cross connection Fig. 51 is revised to make provision for added Fig. 4.

D.4 "To all other ckts. (for timing ckt. only)" is added to the multiple strap on the A and B leads of Fig. 1.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to connect a subscriber's line, which is out of order, to a plugging-up circuit panel for test purposes. The connector or final selector terminals corresponding to the subscriber's line are connected to an intercepting trunk. This circuit is also used to automatically restore the connection between the subscriber's line and the line finders and connectors if the trouble is cleared.

2. WORKING LIMITS

2.1 Working Limits	Non-Coin	Coin	
Max. Ext. Ckt. Loop	4630 ohms	No E.P.	-20V. E.P.
Max. Ext. Ckt. Resistance		4630 ohms	2495 ohms
Min. Ins. Resistance	15000 ohms	15000 ohms	15000 ohms

3. FUNCTIONS

3.1 A connection is provided between the connector or final selector terminals and an intercepting trunk.

3.2 The subscriber's line is connected to a jack at the plugging-up circuit panel and may be connected to a test trunk to a test desk, to a local test cabinet or to a telephone circuit by means of a patching cord.

3.3 A green busy lamp (B) lights while the circuit is connected to a subscriber's line.

3.4 A red line lamp (L) lights and a common audible signal operates when the trouble on the subscriber's line is corrected.

3.5 The apparatus is protected against crosses with high potential wires which might not operate the heat coils but

which would cause overheating of the sensitive apparatus used in subscriber's line circuits.

3.6 If the trouble on the subscriber's line is cleared for the time interval provided by the associated timing circuit, the connection between the subscriber's line and the line circuit is reestablished, the intercepting trunk or battery and ground is disconnected, the tip and ring of the line remain connected to the jack for monitoring, and the red lamp lights as an indication that the connection is reestablished.

3.7 When Fig. 4 is provided and the trouble on the subscriber's line is cleared the connection between the subscriber's line and the line circuit is immediately reestablished.

3.8 In step-by-step offices this circuit may be selected by a test

connector. Means are provided to test the subscriber's line over this path.

3.9 In a crossbar office, if Fig. 2 is used, the terminating marker attempting to complete a call to the plugged up line is caused to reroute the call to a trouble intercepting trunk.

4. CONNECTING CIRCUITS

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

- 4.01 Subscriber's Line Circuit in Crossbar Office - SD-25553-01.
- 4.02 Subscriber's Line Circuit in Step-by-Step Office - SD-31259-01.
- 4.03 Subscriber's Line Circuit in Panel Office - SD-21712-01.
- 4.04 Telephone Circuit at the plugging-up circuit panel - SD-90588-01.
- 4.05 Test trunk to a test desk - SD-90589-01.
- 4.06 Local test cabinet - SD-96181-01.
- 4.07 Auxiliary Signal Circuit at the plugging-up circuit panel - SD-90594-01.
- 4.08 Timing Circuit at the plugging-up circuit panel - SD-96085-01.
- 4.09 Panel Intercepting Trunk Circuit - SD-21558-01.
- 4.10 Step-by-Step Intercepting Trunk Circuit - SD-31339-01.
- 4.11 Test Connector Circuit - SD-30243-01.
- 4.12 Number Group Circuit in Crossbar Office No. 1 - SD-25276-01.
- 4.13 Connector Circuit in Step-by-Step Office - SD-30206-01.
- 4.14 Final circuit in Panel Office - SD-21200-01.

DESCRIPTION OF OPERATION

5. CONNECTION TO SUBSCRIBER'S LINE

To connect to a subscriber's line with Fig. A the heat coils at the distributing frame are removed and the 252 type plugs are inserted in their place. With Fig. B when the protector is not used the plug is connected to a jack which opens the subscriber's line. The 289 type plug is then inserted in the (A) and (B) jacks. This lights the (B) lamp,

connects the tip and ring of the "connector banks" or the "final multiple banks" or crossbar No. 1 line link to the intercepting trunk, in step-by-step, panel or crossbar offices or to battery and ground in crossbar offices only if Fig. 2 is furnished, and connects the tip and ring of the subscriber's line to the (L) jack and the (L) relay. If the line is open, the (L) relay will not operate. If the line is short-circuited or the ring is grounded, the (L) relay will operate, operating the (L1) relay. With the contacts of the (A) jack closed and relays (L) and (L1) normal, relay (L2) operates which causes the (L) lamp to light and the common audible signal to operate. The operation of the (TR) key transfers the circuit of the (L2) relay to the front contact of the (L1) relay, thus releasing the (L2) relay which in turn extinguishes the (L) lamp and silences the common audible signal. If the (L) relay operates when the connection is made to the subscriber's line, it will not be necessary to operate the (TR) key.

6. LINE TROUBLE CORRECTED

If the short-circuit or ground on the subscriber's line is removed, the (L) and (L1) relays are released and the (L2) relay operates. If the break in the line is repaired and the subscriber attempts to call, the (L) and (L1) relays operate, operating the (L2) relay. In either case the operation of the (L2) relay lights the (L) lamp and causes the common audible signal to operate.

7. ANSWERING SUBSCRIBERS' SIGNALS

In order to answer subscribers' signals on the plugging-up line, the maintenance man connects the (L) jack to the telephone circuit. This disconnects the (L) relay from the line and releases the (L2) relay, which extinguishes the (L) lamp and silences the common audible signal. If the plug is removed from the (L) jack, this circuit returns to its former condition.

8. AUTOMATIC CUT-THROUGH

In order to provide service to a line on which the trouble is corrected during the absence of the maintenance force, this circuit will when a timing circuit is furnished reestablish the connection between the subscriber's line and his line circuit, in step-by-step offices if the trouble is corrected for 18 to 48 seconds, in a panel office if the trouble is corrected for 24 to 29 seconds, and in a crossbar office if the trouble is corrected for 28 to 58 seconds. When Fig. 4 is furnished the above connections will be made immediately after the trouble is corrected. This feature is made operative by operating the (CT) key. When a timing circuit is provided and the trouble is corrected, the (B) lead is connected to the battery, the (L2) relay is operated from

a contact of the (L1) relay as described above. The battery is then disconnected from the (B) lead by the timing circuit but the (L2) relay remains locked under control of the (L1) relay. If the line remains clear until the "A" lead closes, the (CT) relay operates. The (CT) relay operated, locks under control of the (CT) key, disconnects the leads to the intercepting trunk, in step-by-step, panel or crossbar offices if Fig. 2 is provided, connects the subscriber's line to the line circuit, and operates the (CT1) relay. The (CT1) relay operated disconnects the (L) relay from the line and releases the (L2) relay. The release of the (L2) relay lights the (L) lamp as an indication that the service has been reestablished. If the trouble should reappear between the time that the battery is removed from the "B" lead in the timing circuit and the time that the "A" lead is closed, the (L2) relay will be released and the (CT) relay cannot be operated. The (D) resistance is provided to prevent excessive current flow through the contacts of the (L2) relay when it releases, since the "B" lead is connected to ground when the battery is removed.

When Fig. 4 is provided and the trouble is corrected, battery and ground are connected directly to the B and A leads respectively. Except for the time limits, service is reestablished as described above for Step-by Step, Panel and Crossbar Offices.

The (L) lamps will indicate to the maintenance man which plugging-up lines have been cut through. The (CT) keys associated with the (L) lamps which are not lit may be restored at any time. However, if the lamp is lit, the maintenance man should monitor on the line by connecting the telephone circuit to the (L) jack before the (CT) key is restored. Restoring the (CT) key, releases the (CT) and (CT1) relays and extinguishes the line lamp. If the trouble has not reappeared, the (L2) relay will operate thru the (L1) relay contacts and relight the (L) lamp, and operate the common audible signal.

9. CONNECTION TO TEST CIRCUIT BY MEANS OF (L) JACK

In order to test the subscriber's line, the (L) jack is connected to a local test cabinet or to a test trunk to a test desk. This removed (L) relay from the line and extends the tip and ring to the test circuit.

Ground is furnished through the sleeve to signal the test desk. If the plug is removed from the (L) jack, this circuit returns, to its former condition.

10. SELECTION BY A TEST CONNECTOR WHEN USED IN STEP-BY-STEP OFFICE

When the test connector stops on the terminals corresponding to this circuit, the (CT1) relay is operate over the sleeve lead, and the tip and ring of the subscriber's line are extended to the test desk. The operation of the (CT1) relay disconnects battery and ground from the subscriber's line and opens the circuit thru the (L1) relay contacts to the (L2) relay. When the test connector returns to normal the (CT1) relay releases, restoring this circuit to its former condition. If the test connector stops on the terminals corresponding to this circuit when the (CT1) relay is operated by a contact of the (CT) relay, a busy signal will be returned to the test desk, and the test man must call the desired subscriber's number in order to test the line.

11. INCOMING CALLS TO LINE, CROSSBAR OFFICE

11.1 When Fig. 2 Is Provided

With the (CT) relay normal should a terminating marker attempt to complete a call to a line that is plugged up, direct ground and battery thru the (A) resistance will be connected to the tip and ring of the marker causing it to reroute the call to a trouble intercepting trunk.

11.2 When Fig. 3 Is Provided

When panel and crossbar offices use this circuit in common and a terminating marker attempts to complete a call to a line that is plugged up, it will complete to the trouble intercepting trunk which connects to Fig. 1 as described in paragraphs 5 and 8.

12. DISCONNECTION OF THE PLUGGING-UP CIRCUIT FROM THE SUBSCRIBER'S LINE

In order to restore a subscriber's line to its normal condition, the 252 type plugs are removed from the protector mounting and the heat coils replaced, Fig. A, or the 301 type plug removed from the jack, Fig. B, and the plug is then removed from the (A) and (B) jacks. This releases all of the operated relays and extinguishes the (B) lamp.

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