

This Method of Operation was prepared from Issue 8 of Drawing ST-512618.

METHOD OF OPERATION

LINE CIRCUIT

Holding - Arranged for Permanent Signal with Make Busy - Jack - Sender Monitor  
Operator - Trouble Desk - Panel System.

DEVELOPMENT

1. PURPOSE OF CIRCUIT

- 1.1 This circuit is used to provide a means of associating the howler cord, voltmeter cord or wire chief's test cord with a subscriber's line on which a permanent signal has been displayed and for applying tone to the subscriber's line for quickly identifying cable pairs affected by cable failure.

2. WORKING LIMITS

- 2.1 This circuit functions with howler cords having sleeves connected to 21-25 v. battery thru a maximum resistance of 241 ohms and with voltmeter and wire chief's test cords having sleeves connected to 45-50 v. battery thru a maximum resistance to 310 ohms.
- 2.2 The maximum external circuit loop is 2245 ohms. The minimum leak resistance is 27,150 ohms.

OPERATION

3. PRINCIPAL FUNCTIONS

- 3.1 This circuit is used at the sender monitor's position as a holding circuit thru which the line may be challenged, tested, and the howler tone applied when a permanent signal indicates its need, and for applying a tone for locating affected cable pairs. It functions in the following manner:
- 3.11 Selection of this circuit by a district or office selector, directed by a sender primed because of permanent signal.
- 3.12 Signals sender monitor by flashing lamp slowly when line is selected.



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- 3.13 Lamp changes from slow flashing to steady light as a busy signal when call is answered.
- 3.14 If receiver is replaced on the switchhook and the cord removed, the lamp flashes rapidly.
- 3.15 If the receiver is not replaced on the switchhook, the lamp burns steadily until the line is disconnected. The lamp then flashes rapidly until the disconnect key is operated or the make busy plug is withdrawn.
- 3.16 By operating the (PST) key, tone is applied for identifying cable pairs.

#### 4. CONNECTING CIRCUITS

This circuit functions with the following:

- 4.1 Any standard district or office selector at its originating end.
- 4.2 Any standard sender monitor howler cord circuit with sleeve connected to 21-25-V. battery thru a maximum resistance of 241 ohms.
- 4.3 Any standard sender monitor talking and voltmeter cord circuit with sleeve connected to 45-50 V. battery thru a maximum resistance of 300 ohms.
- 4.4 Any standard test line from local test desk to trouble desk with sleeve connected to 45-50V. battery thru a maximum resistance of 300 ohms.
- 4.5 Standard trouble desk auxiliary signal circuit.
- 4.6 Standard miscellaneous tone and interrupter circuit.

#### DESCRIPTION OF OPERATION

5. On a permanent signal when the sender is primed by the sender monitor inserting the plug in the "make busy" jack, or when it is primed automatically, the associated district selector circuit selects one of these holding lines, operating the (L) relay. The (L) relay operates in the circuit through the district and sender circuits to ground on the break



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contact of the (CO) relay. The direction of the current is such as to operate the polarized overflow relay in the sender. This causes the sender to advance the district to its cut-through position, in the same manner as it would in the case of office or incoming overflow, but it does not advance to its overflow position as the (L) relay in the district locks to ground on the sleeve which is connected to it by the operation of (L) relay in the holding line circuit. This relay, originally operated on sender trunk guard test, reoperates on closure of the repeat coil and then holds over the subscriber's loop. The (L) relay operated, closes the circuit from ground through the lamp, its make contact, break contact of the (MB) relay, to battery through the contacts of the slow interrupter, causing the lamp to flash and also closes a circuit from ground through the break contact of the (MB) relay, and make contact of the (L) relay to the auxiliary signal circuit. The ground connected to the sleeve terminal of the district or office selector by the operation of (L) relay prevents the district from advancing out of the "talking to operator" position, and makes the line test busy to other hunting selectors.

6. When the plug of the howler, voltmeter, or test cord is inserted in the answering jack, the (CO) relay operates. The (CO) relay operated, connects the tip and ring of the cord circuit through to the subscriber's line, closes a circuit from ground through its make contact, to hold the (L) relay operated and a circuit from ground through its make contact, to battery through the winding of the (MB) relay, which operates. The (MB) relay operated, (a) disconnects interrupted battery from the lamp and connects battery through the make contact of the (L) relay to the lamp, causing it to burn steadily, (b) disconnects ground from the auxiliary signal circuit; (c) connects ground to the sleeve of the district or office selector circuit, and (d) locks to ground through its make contacts under control of the disconnect key (fig. A) and the (L) relay. When the receiver is replaced on the switchhook at the subscriber's station, and the plug is withdrawn, the (L) and (CO) relays release. The (L) relay released, causes the lamp to flash rapidly from ground through the interrupter and the make contacts of the (MB) relay. The auxiliary signal circuit is also closed at this time. The operation of the disconnect key disconnects ground from the (MB) relay, which releases. The (MB) relay released, extinguishes the lamp and disconnects ground from the "S" lead, restoring the circuit to normal.
7. To identify cable pairs at the main distributing frame on lines affected by cable failures, the (PST) key is operated for applying tone to the ring conductors of all subscriber's lines routed to the holding lines. At the main distributing frames, a receiver, in series with a 1 or 2 mf condenser is connected, one side to ground and the other side



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to a lead used for making contact with the ring side of the protector springs of the cable affected. The (PST) key operated, closes tone circuit through the high winding of output transformer (PST). The tone path to the ring side of a subscriber's line is as follows: 48 volt battery, low windings of output transformer (PST), condenser (T), relay (CO) break contact to ring of district or office multiple.

## 8. WHEN FIGURE B

### 8.1 Plug in (Hold) Jack

When the receiver is replaced on the switchhook at the subscriber's station, and the plug is withdrawn from the (Ans.) Jack, the (L) and (CO) relays release. The (L) relay released, causes the lamp to flash rapidly from ground through the interrupter and the make contacts of the (MB) relay. The auxiliary circuit is also closed at this time. The removal of the make-busy plug from the (Hold) jack disconnects ground from the (MB) relay, which releases. The (MB) relay released, extinguishes the lamp and disconnects ground from the "S" lead.

### 8.2 Plug not in (Hold) Jack. When the receiver is replaced on switchhook at the subscriber's station and the trouble desk operator has withdrawn the plug from the (Ans.) Jack, the (L), (CO) and (MB) relays release restoring the circuit to normal.

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