70946

CIRCUIT DESCRIPTION
SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

CD-20411-01
Issue 1
Appendix 1-D
Dwg. Issue 2-D

PANEL SYSTEM
REGISTER CIRCUIT
SUBSCRIBER'S LINE OVERFLOW
GROUND ON CUT-OFF RELAY OFFICES

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
B1033 relay	B1028 relay
E966 relay	E1883 relay
E6357 relay	E6436 relay
206FL relay, opt. "Z"	280DD relay, opt. "Y"
5AC M.R., opt. "X"	14LF M.R., opt. "W"
5M M. R., opt. "V"	14LP M.R., opt. "U"

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

C.1 Note 3 formerly referred to at relay 206FL is removed. It formerly read: "Negative sign (-) preceding a current value means that this current shall flow in the direction opposite to the direction of the operating current."

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of relays B1033, E966 and E6357 is rated "Mfr. Disc." to show realistic ratings for obsolescent apparatus.

D.2 The Mfr. Disc. 206FL relay, 5AC and 5M message registers are superseded by the 280DD relay and 14LF and 14LP message registers respectively.

D.3 Notes 105 and 106, and an options used table are added.

D.4 Equipment information on a job basis is added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2325-MAM-EWO-DL

PANEL SYSTEM
REGISTER CIRCUIT
SUBSCRIBER'S LINE OVERFLOW
GROUND ON CUT-OFF RELAY OFFICES

DEVELOPMENT

1. PURPOSE OF CIRCUIT

1.1 This circuit is designed for registering attempts to connect with a busy line or P.B.X. group on which it is desired to make observations.

Figure 1 is for use where the final terminals directly above the line under observation are vacant.

Figure 2 is for use where there are no vacant terminals directly above the line under observation.

2. WORKING LIMITS

2.1 Line circuit with rated sleeve resistance of 1100 ohms to ground, final with rated sleeve resistance of 220 ohms to battery and P.B.X. hunting condition of 1000 ohms to ground.

OPERATION

3. FUNCTIONS

3.1 FIGURE 1 - Final circuit is caused to stop on terminal immediately above busy line or P.B.X. group, operate message register, and return busy tone to calling subscriber.

FIGURE 2 - Final circuit causes operation of message register when it stops on a busy individual line terminal or a busy terminal of the last line of a P.B.X. group to which this circuit is connected.

4. CONNECTING CIRCUITS

4.1 Any standard line circuit in line finder office.

DETAILED DESCRIPTION

5. FIGURE 1 - This circuit connects to vacant terminals directly above the individual line or last line of a P.B.X. group on which it is desired to make observations. When so connected, the above line is wired the same as for an intermediate P.B.X. trunk, causing the final to hunt past the line if busy and stop on the terminal of this circuit. When the final stops on this circuit, battery thru the (BG) relay causes the final to return the busy back tone to the calling subscriber. Also the (BG) relay is operated, momentarily from ground from the final. The (BG) relay locks up thru its secondary winding in series with the message register and remains locked up until the message register is fully operated. As soon as the message register makes its front contact, it short-circuits and releases the (BG) relay, provided the final has restored and removed ground from the sleeve terminal. The release of the (BG) relay releases the message register.

6. FIGURE 2 - Relays (S) and (BG-1) are wired to the sleeve terminal of the line in multiple with the cut-off relay, and operate when the line is found either by a final or a line finder. The (BG-1) relay operated, operates the (R-1) relay. The operation of relay (S) causes relay (S-1) to operate and lock as soon as contact "B" of interrupter (LB) closes. About one second after relay (S-1) operates, contact "F" of interrupter (LB) closes, operating relay (S-2) which locks under control of relay (S) and connects relay (BG) to the circuit, the two non-inductive resistances (A) and (B) acting as two sides of a Wheatstone bridge, the other 2 sides being a resistance to battery in the final or district and the cut-off relay of the line circuit shunted by the (S) and (BG-1) relays in this circuit. Under this condition the bridge circuit is balanced and relay (BG) does not operate.

The purpose of the (LB) interrupter is to allow time for the final sequence switch to come to rest, due to possible variations in contact resistance of moving sequence switch causing false registration.

A final, testing the line while it is busy, momentarily connects a 1000 ohm ground to terminal "S", thereby unbalancing the bridge and cuasing relay (BG) to operate. The operation of the (BG) relay operates the (R) and (D) relays which lock to ground on the contacts of the (BG-1) relay. The operation of the (D) relay releases the (BG) relay, thereby removing the original operating circuit for the (R) relay, and also releases the (R-1) relay (slow release).

The release of (R-1) re-closes the (BG) relay circuit so that the (BG) relay may re-operate in case the final is slow in being satisfied that the line is busy, and also completes the circuit for operating the message register. The message register operates the (R-2) relay (slow operate) which in turn short circuits the locking winding of the (R) relay. If the final is still testing the line at this time, the (R) relay remains operated on its primary winding, otherwise it releases, releasing the (D) relay.

When the line becomes idle, the (BG) relay receives current momentarily in the operate direction during the time the (S) and (BG-1) relays are releasing. However, its operation under this condition will not cause registration since the circuit to the register is held open by the slow release (R-1) relay until the (BG-1) relay is released. If the circuit is disconnected from a subscriber's line while the line is busy, the (S) and (BG-1) relays receive sufficient current thru the (B) resistance to prevent their release since they are no longer shunted by the 1100 ohm cut-off relay in the line circuit. The path for holding these relays operated is traced through the (BG) relay which receives sufficient current in the proper direction to insure its operation. The operation of this relay operates the (R) and (D) relays which open the circuit thru the windings of the (S), (BG-1) and (BG) relays causing them to release and in turn release all other relays. This is effected without operating the register.

BELL TELEPHONE LABORATORIES, INC.

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