

STATION SYSTEMS
NO. 100 KEY EQUIPMENT
MULTIPLE LINE
TIE LINE AND AUXILIARY SIGNAL CIRCUIT

Drawings for SD-69001-01 have been converted from 4- by 7-inch handbook size to 8-1/2 by 11-inch handbook size. This CD will no longer be printed in 4- by 7-inch handbook size.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5113-WFBW-LHA

STATION SYSTEMS
NO. 100 KEY EQUIPMENT
MULTIPLE LINE
TIE LINE AND AUXILIARY SIGNAL CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded Superseded By
 B348 (H) B551 (H)

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Fig. 3 "Z" wiring and apparatus were added.

D.2 Fig. 3 was rated "Mfr Disc"

D.3 Note 116 was added.

All other headings under "Changes", no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used so that any one of a number of subsets can be connected to any one of a number of tie lines.

2. WORKING LIMITS

2.1 Max. Ext. Ckt. Loop Res.

For Fig. 3 Outgoing Calls	1620 Ohms
For Fig. 3 Incoming Calls	1785 Ohms
For Fig. 5 Max. Cond. Loop	2000 Ohms
For Figs. 3 and 5 Min.	
Ins. Res.	20000 Ohms

3. FUNCTIONS

- 3.01 To light the lamps on incoming calls.
- 3.02 To operate an audible signal as long as a line lamp is lighted.
- 3.03 To extinguish the line lamp and to silence the audible signal when the call is answered.
- 3.04 To light the busy lamps when a call is answered or when a call is originated.
- 3.05 To hold the busy lamps lighted when a key is operated to the holding position.
- 3.06 To hold the circuit when a key is operated to the holding position under control of the distant end.
- 3.07 To release the holding equipment when the connection is released at the distant end (Fig. 3 only).
- 3.08 To release the holding equipment and operate the line signal equipment if a new call

is received while the line is being held (Fig. 3 only).

3.09 To prevent two lines being connected together when two talking keys are operated on one station.

3.10 To extinguish the busy lamps and light the line lamps if a new call is received while the hold key is operated (Fig. 5).

4. CONNECTING CIRCUITS

- 4.1 Standard common battery subscribers sets.
- 4.2 Similar tie line at distant end. Fig. 5.
- 4.3 Telephone and dialing circuit.
- 4.4 Continuous ringing supply.

DESCRIPTION OF OPERATION

5. FIGURE 3

5.1 Incoming Call

When a call is originated at the distant end, battery and ground are sent out over the line operating the (LI) relay. The (LI) relay in turn operates the (I) relay which prepares a holding circuit for the (CO) relay, operates the common and individual buzzers, prepares a locking circuit for itself to the (TB) relay and lights the line lamps.

5.2 Answering Incoming Call

An incoming call is answered by removing the receiver from the switchhook and operating the (TALK) key associated with a lighted lamp. The (TALK) key bridges the subscriber's telephone set across the tip and ring of the line (provided no other (TALK) key between the (TALK) key on the line being answered and the telephone set is operated). The (TB) relay operates, in turn operating the (CO) relay and short-circuiting the 12000-ohm winding of the (LI) relay to give a signal to the distant end. The (CO) relay locks itself to the (I) relay, silences the buzzers, extinguishes the line lamps, lights the busy lamps and prepares the circuit for the holding relay (H). The circuit is now in the talking condition.

5.3 Disconnection on Incoming Call

If the distant end disconnects first the (LI) relay releases. When the local end disconnects, the (TB) relay releases, in turn releasing the (I) and (CO) relays and restoring the circuit to normal.

If the local end disconnects first the (TB) relay releases. When the distant end disconnects, the (LI) relay releases, in turn releasing the (I) and (CO) relays and restoring the circuit to normal.

5.4 Outgoing Call

An outgoing call is originated by removing the receiver from the switchhook and operating the (TALK) key. This operates the (TB) relay which in turn operates the (CO) and (O) relays. The (CO) relay lights the busy lamps, and prepares the holding circuit. The (O) relay connects battery and ground through the (LO) relay to the line to signal the distant end.

5.5 Distant End Answers

When the distant end answers the (LO) relay operates and closes a locking circuit for the (CO) relay. The circuit is now in the talking condition.

5.6 Disconnection of Outgoing Call

If the distant end disconnects first, the (LO) relay releases. When the local end disconnects, the (TB) relay releases, in turn releasing the (CO) and (O) relays and restoring the circuit to normal.

If the local end disconnects first, the (TB) relay releases, in turn releasing the (O) relay. The (O) relay releases the (LO) relay which in turn releases the (CO) relay and restores the circuit to normal.

5.7 Holding

Calls can be held after the (CO) relay on the circuit to be held is operated. When a key is removed from the (TALK) position into the (HOLD) position before the receiver is replaced on the switchhook and before another talking key is operated, the (H) relay is connected in series with the (TB) relay. The (H) relay operates and closes a hold circuit for the (O) relay on outgoing calls and shorts the 12,000 ohm winding of the (L) relay on incoming calls. The (TB) relay releases since the (HOLD) key removes the telephone circuit from the line after it closes the holding circuit and the (TB) relay will not hold in series with the high resistance (H) relay.

5.8 Incoming Call - Release of Holding Circuit from the Distant End

The holding circuit will be released when the distant end disconnects. Under this condition battery and ground are removed from the line, releasing the (LI) relay which in turn releases the (I) relay. The (I) relay releases the (CO) relay and restores the circuit to normal.

5.9 Outgoing Call - Release of Holding Circuit from the Distant End

The holding circuit will be released when the distant end disconnects. Under this condition the (LO) relay will release, in turn releasing the (CO) relay. The (CO) relay will release the (H) relay

which will release the (O) relay, thus restoring the circuit to normal.

5.10 Release of Holding Circuit by Release of Holding Key

The holding circuit is released when the operated key is moved from the holding to the talking position. When the key is restored to the talking position, the telephone set is bridged across the line. The (H) relay releases and relay (TB) operates.

6. FIGURE 5

6.1 Incoming Call

When a call is originated at the distant end of the battery and ground coming in over the line will operate the (L) relay lighting the line lamps. The operation of the (L) relay will also operate the (CR) relay if Fig. 6 is provided and the individual buzzers. The operation of the (CR) relay will operate the common buzzers. If individual buzzers are not required, Fig. 6 is not provided, and the operation of the (L) relay operates the common buzzer.

6.2 Answering Incoming Calls

An incoming call is answered by removing the receiver from the switchhook and operating a (TALK) key associated with the lighted lamp. The (TALK) key bridges the subscriber's telephone set across the tip and ring of the line (provided no other (TALK) key between the (TALK) key on the line being answered and the telephone set is operated). This operates the (TB) relay, which operates the (CO) relay. The operation of the (CO) relay extinguishes the line lamps, lights the busy lamps, releases the (CR) relay if provided, and silences the buzzers.

6.3 Disconnection on Incoming Calls

If the distant end disconnects first, the (L) relay will not release as it is held operated from battery and ground on the contacts of the (TB) relay. When the local attendant disconnects the (TB) relay releases, releasing the (CO) and (L) relays and removing battery and ground from the tip and ring of the line, respectively. The (CO) relay released, extinguishes the busy lamp, restoring the circuit to normal.

If the local attendant disconnects first, the (TB) relay will release, removing battery and ground from the line, and opens the operating path for the (CO) relay. When the attendant at the distant end disconnects, the (L) relay releases, which releases the (CO) relay. The release of the (CO) relay extinguishes the busy lamp, restoring the circuit to normal.

6.4 Outgoing Call

An outgoing call is originated by removing the receiver from the switchhook and operating the (TALK) key. This operates the (TB) relay which in turn operates the (CO) and (L) relays. The (CO)

relay lights the busy lamps. The (L) relay closes the holding circuit for the (CO) relay. The (TB) relay also connects battery and ground to the ring and tip of the line, respectively, which signals the attendant at the distant end. When the distant end answers, no change takes place in this circuit.

6.5 Disconnection on Outgoing Calls

Disconnections on outgoing calls are the same as for incoming calls as covered in paragraph 6.3.

6.6 Holding

Incoming or outgoing calls are held by the operation of the (TALK) key into the (HOLD) position. This causes the (TB) relay to release, which removes battery and ground from the line

and opens the operating path for the (CO) relay. If the attendant at the distant end disconnects while the (HOLD) key is operated, the (L) and (CO) relays will release and the busy lamp will be extinguished. If another call comes in while the hold key is still operated, the operation of the circuit will be the same as for an incoming call, as covered in paragraphs 6.1 and 6.2.

7. LOCKOUT

The talking keys are connected in series to prevent two or more lines being connected together in case two or more talking keys are operated at the same time. The key electrically nearest to the telephone set connects its line to the telephone circuit and cuts off all the other keys.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-WMB-WLF