STATION SYSTEMS
NO. 100 KEY EQUIPMENT - MULTIPLE LINE
LINE AND AUXILIARY SIGNAL CIRCUIT
FOR USE WITH CENTRAL OFFICE OR PBX
WITH OR WITHOUT ARRANGEMENT TO RETIRE
LINE SIGNAL WHEN LINE IS RELEASED AT
CENTRAL OFFICE OR PBX
ARRANGED FOR INTERCOMMUNICATING SERVICE

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
In Figs. 1 and 4 B2 Lamp (Option "W")	In Figs. 1 and 4 A3 Lamp (Option "V")

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The B2 lamp was replaced by the A3 lamp in order to reduce the frequency of burnt out lamps.

D.2 Options "W" and "V" were added to designate the B2 and A3 lamps respectively.

D.3 Limiting resistance values for the lamp leads were added to the working limits to avoid cases of poor illumination.

D.4 Note 116 was changed to cover the A3 lamp instead of the B3.

D.5 Note 117 was added.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

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

2. WORKING LIMITS

	Supervision	Signaling
Max. Cond. Loop Res.		
To Manual Cent. Off.	1645 ohm	1700 ohm
To Step-by-Step Cent. Off.	3100 "	1700 "
To Panel Cent. Off.	1715 "	1700 "
To 550C, 550SC, 551A or 551B PBX	110 "	1700 "
To 600C PBX	110 "	1700 "
To 605A, 701A or 711A PBX	465 "	1700 "
To 700C or 710C PBX	255 "	1700 "
To 740A or 740B PBX	10 "	1700 "
To 740C PBX	1200 "	1700 "

	Supervision	Signaling
Min. Insulation Resistance		
Manual or Panel Areas	20000 ohm	20000 ohm
Step-by-Step Areas	30000 "	30000 "

Max. Lamp Lead Resistance	
"L" and "B" lead	15 ohm
"A" and "B" ground lead	
For 3 line key boxes	15 "
For 6 line key boxes	75 "

3. FUNCTIONS

3.01 To light the line lamps on incoming calls.

3.02 To hold the line lamps lighted over silent intervals of machine ringing.

3.03 To hold the line lamps lighted for an appreciable interval after ringing ceases on manual ring.

3.04 To operate an audible signal as long as line lamp is lighted.

3.05 To extinguish the line lamps and to silence the audible signal when a call is answered.

3.06 If a call is unanswered, to extinguish the lighted line lamp and silence the audible signal a short time after ringing ceases.

3.07 To light the busy lamps when a call is answered or when a call is originated.

3.08 To hold the busy lamps lighted when a key is operated to the holding position if the receiver is off the hook.

3.09 If the telephone set is not connected to the line, to prevent the central office or PBX being signaled when a key is operated to the talking or holding position.

3.10 To hold the central office or PBX equipment when a key is operated to the holding position.

3.11 To release the holding equipment at the station if the line is opened at the central office or PBX.

3.12 To release the holding equipment and operate the line signal equipment if a rering is received while the line is being held.

3.13 To avoid extinguishing the busy lamps while a station is dialing on the associated line.

3.14 To prevent two lines being connected together when two talking keys are operated at one station.

3.15 To prevent the release of the central office or PBX equipment when transferring the key from the talking to the holding positions and from the holding to the talking positions.

3.16 Provides for intercommunicating service.

4. CONNECTING CIRCUITS

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

4.1 Standard common battery subscriber's sets.

4.2 Manual, panel or step-by-step central office subscriber's line circuits.

4.3 Standard PBX station line circuits.

4.4 Telephone and dialing circuit.

DESCRIPTION OF OPERATION

5. INCOMING RINGING

Relay (R) operates on ringing current from the central office or PBX, in turn operating relay (R1). Relay (R1) operates and locks, lighting the line lamps and operating the buzzer (AUX.). At the same time, relay (R) closes the timing circuit, the function of which is described later. At the end of the ringing period relay (R) releases and relay (R1) remains operated. The (R) relay is of the pendulum type which will not operate the (R1) relay on surges caused by releasing the connection.

6. TIMING CIRCUIT

The timing circuit is arranged to allow the (R1) relay to remain locked up keeping the line lamps lighted and the audible signal operated during the silent interval between the ringing periods of machine ringing or for an appreciable interval after manual ringing ceases, to enable the subscriber to ascertain on which circuit the call is coming in. It is arranged to release all the (R1) relays if more than one circuit is operated after the ringing has been discontinued on incoming calls when the calls are unanswered at the station.

When any (R) relay connects ground to the timing circuit relay (ST) operates and locks. Relay (ST) operates relay (TL) which operates relay (T2) which in turn operates relay (T3). At the end of the ringing interval relay (ST) releases in turn releasing relay (T1). Relay (T1) releases relay (T2) which operates relay (W) and releases relay (T3). Relay (T3) operates relays (Z) and (T1). Relay (T1) operates relay (T2) which in turn operates relay (T3). Relays (T1), (T2) and (T3) now release. When relay (T2) releases, relay (W) releases and operates relay (W1) which connects ground to the "LK" lead. When relay (T3) releases, relay (Z) releases and operates relay (Z1). Relays (T1), (T2), and (T3) now operate and then release.

When relay (T2) releases, relay (W) operates. When relay (T3) releases, relays (Z) and (T1) operate. Relays (T2) and (T3) now operate and relays (T1), (T2) and (T3) release. The release of the (T2) relay releases the (W) which in turn releases the (W1) relay. The release of the (T3) relay removes ground from the "LK" lead to release all operated (R1) relays and release the (Z) relay which in turn releases the (Z1) relay.

The (T1) and (T2) relays are wired in series with a resistance so that they will be slow in operating. When they are operated, the resistances are short-circuited so that they will receive a soak and be slow in releasing.

If during the operation of the chain of relays described above, a second ring is received by an (R) relay, the (ST) relay operates, opening the circuit to the (W), (Z), (W1) and (Z1) relays. When the ringing ceases (ST) relay releases and starts the timing circuit functioning again.

If there is no rering during the functioning of the timing circuit, the line lamps are extinguished and the audible signal silenced when the corresponding (R1) relays release.

7. ANSWERING INCOMING CALLS

Incoming calls are answered by removing the receiver from the switchhook and operating a (TALK) key associated with a lighted line 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 in series with the (S) relay. The (S) relay operates in turn operating the (TA) and (B) relays. The (B) relay lights the busy lamps, prepares the circuit for the holding relays (H) and releases the (R1) relay. The (R1) relay extinguishes the line lamps.

8. HOLDING

Incoming and outgoing calls can be held after the (B) relay on the circuit to be held, is operated. When a key is moved from the (TALK) position into the (HOLD) position, before the receiver is replaced on the switchhook or before another talking key is operated, the (H) relay is connected across the line. The (H) relay operates and closes its locking contact. The (S), (TA) and (B) relays release since the (HOLD) key removes the telephone circuit from the line after it closes the holding circuit. Relay (H) keeps the busy lamps lighted.

9. RELEASE OF HOLDING CIRCUIT FROM THE CENTRAL OFFICE

The holding circuit can be released from the central office, by opening the line battery momentarily due to the fast release nature of relay (H) which is held operated on the central office battery.

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 or to the normal position. When the key is restored to the talking position, the telephone set is bridged across the line. The (H) relay releases and relays (S), (TA) and (B) operate and relight the busy lamps which may have been extinguished by relay (H) restoring before relay (B) operates. As the telephone set is bridged across the line before the holding bridge is removed, the central office line equipment is not released as there is no open period introduced in this operation.

If the key is restored to normal from the holding position, relay (H) releases, the busy signals are extinguished and the central office equipment is released.

11. DIALING

Outgoing calls are originated in the regular manner as at a subscriber's set. While the dial pulses are passing through the (S) relay it may vibrate following the pulses. The busy lamps remain lighted as the (TA) remains operated in turn holding the (B) relay operated.

12. LOCK-OUT

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.

13. GENERAL

The (Cut-off) switch may be equipped instead of the common timing circuit. When the switch contacts are open the locking circuits of the (R1) relays are opened so that the lamps will not remain lighted when the key cabinets are unattended.

14. INTERCOMMUNICATING SERVICE

Fig. 10 is used whenever intercommunicating service is required.

Fig. 11 is used when a key in the 100 key equipment box is unavailable. When the key is operated the telephone circuit is transferred from the key box to the intercommunicating line.

Fig. 12 and 13 are used for signaling between key equipments.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 3350-GTA-FS-CO

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Drawings for SD-69000-01 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.

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