

STATION SYSTEMS  
KEY AND TELEPHONE CIRCUIT  
ARRANGED FOR TOUCH-TONE  
CALLING ON 2- AND 4-WIRE  
COMMON BATTERY LINES  
568HT SET

1. PURPOSE OF CIRCUIT

This circuit provides station talking and touch-tone calling (pushbutton dialing) circuits together with pickup keys for connection to a maximum of five lines. Lines may be 2- or 4-wire common battery central office or PBX lines arranged for touch-tone calling, or nondial private lines. It also provides for holding one or more lines, signal lamps which illuminate the pickup buttons, a ringer which may be associated with one of the lines or which may be used as a common signal, a common signal key to signal private or intercommunicating lines; and an exclusion key.

2. WORKING LIMITS

- (a) Maximum connector cable resistance per conductor:
  - lamp "L" leads - 25 ohms.
  - 4-wire relay "FW" lead - 50 ohms.

3. FUNCTIONS

This circuit provides for:

- (a) A handset and anti-sidetone transmission circuit for connection to 2-wire common battery lines.
- (b) A relay to switch the transmission circuit to permit connection through an external circuit to a 4-wire common battery line.
- (c) Picking up a maximum of five lines.
- (d) Operation of holding circuits.
- (e) An audible signal device which may be connected to any one line or to an external circuit.
- (f) Touch-tone calling (pushbutton dialing).
- (g) A common signal key to signal two or three private lines.
- (h) Keys that may be converted in the field from pickup (locking) to signaling (nonlocking).
- (i) Lamps to indicate visual signals.
- (j) A mounting cord terminating in a plug.

(k) An exclusion key, which may be operated when the handset is off the mounting, to disconnect one or more extension stations from a given line. The exclusion key will be restored to normal when the handset is replaced on the mounting.

(l) Signaling keys arranged to operate local circuits.

(m) Facilities for a lamp in the first key position.

4. CONNECTING CIRCUITS

When this circuit is listed on a key sheet, the connecting information thereon is to be followed. The following are typical connecting circuits:

- (a) 4-Wire Subscriber Line Circuits Arranged for Common Battery Operation - SD-69414-01.
- (b) Auxiliary Service Transfer Circuit for 4-Wire Lines - SD-69422-01.
- (c) Key Telephone System No. 1A1 - Visual and Audible Signal Circuit - SD-69294-01.
- (d) Key Telephone System No. 1A1 - CO or PBX Line Circuit - SD-69270-01.
- (e) Key Telephone System No. 1A1 - Line and Signaling Circuit - SD-69203-01.
- (f) Station Connector Cables and Associated Components - SD-69368-01.
- (g) 4-Wire Key Telephone System Arranged to Terminate 2- and 4-Wire No. 5 Crossbar Central Office Lines - Block Diagram - SD-69424-01.

5. DESCRIPTION OF OPERATION

5.1 TRANSMITTING AND RECEIVING

5.1.1 On 2-Wire Lines

The handset and network circuit function in the usual manner as a common battery subscriber station circuit.

### 5.1.2 On 4-Wire Lines

Operation of the 4-wire (FW) relay of Fig. 1 disconnects the receiver from the network and connects the receiver to the "RT" and "RR" leads. The transmitter and network function in the usual manner as a common battery transmitter circuit. The receiver leads are externally switched to impedance-matching repeating coils in the associated line circuits.

## 5.2 LINE SELECTION

### 5.2.1 General

The pickup keys, which are locking type and are arranged to release other pickup keys when operated, have three make contacts on each key and are mechanically interlinked so that an operated pickup key is forced by the operation of another pickup key to break its contacts before the second key makes its contacts.

### 5.2.2 2-Wire Lines

When a pickup key is operated, the common circuits are connected to the line associated with that key, and a call may be answered or originated in the usual manner.

### 5.2.3 4-Wire Lines

When a pickup key is operated, the transmitting portion of the circuit is connected to the line associated with that key. The "A" lead ground operates an external pickup relay associated with the line, which in turn supplies battery to operate the (FW) relay of Fig. 1 and also connects the receiving leads "RT" and "RR" to the associated line circuit.

## 5.3 SIGNALING

### 5.3.1 Visual Signals

Signal lamps are provided to illuminate the pickup key buttons and are operated by the associated line circuits which provide different signals by lighting the lamps steadily or with various interruptions.

### 5.3.2 Audible Signals

#### 5.3.2.1 Ringer

A ringer and capacitor are provided in the set and may be used as either a line ringer or a common ringer. If the ringer and capacitor are used as a line ringer, they will operate on all incoming calls on the line with which the ringer is associated when ringing current is applied to the line at the central office or the PBX. If they are used as a common ringer, they will operate when ringing current is applied to any line with which the common ringer is associated. Ringer connections to provide a line ringer on a 2-wire line are available within the set. When providing a line ringer on a 4-wire line or when providing a common ringer, the "R or R1" and "B or B1" leads are used to connect the ringer externally.

### 5.3.2.2 Buzzer

The ringer of the 568HT set may be replaced by a 7-type buzzer mounted on a 44B bracket. The buzzer may be used as a common signal or as an intercommunicating signal, if desired.

### 5.3.3 Convertible Keys

The three farthest right keys provided can be converted from pickup to signaling or vice versa. Line transfer and auxiliary transfer functions may also be assigned to these keys when the Auxiliary Service Transfer Circuit for 4-Wire Lines is furnished. The keys are converted from locking to nonlocking by removing a screw detail from the plunger. The circuit is converted for signaling by moving a flexible lead to a ground supply terminal. The key contact and cord conductor, which in the pickup condition connect to the "A" lead, are used for the signaling lead.

### 5.3.4 Common Signaling Key

The set can be arranged for signaling on 2-wire private or intercommunicating lines by means of a common signaling key. With these lines the auxiliary control lead is not required and is used as a signaling lead by operating a signaling key while the pickup key is operated.

### 5.3.5 Dial (Touch-Tone Caller)

A pushbutton-type dial is provided in the set to operate the associated central office equipment. This dial includes a transistor oscillator capable of generating two frequencies simultaneously. The oscillator is powered by line current from the common battery source. With no buttons depressed, the tip side of the 2-wire line (or the transmitting tip of a 4-wire line) is connected through the dial to the network, effectively introducing only a small resistance in series with the line. The ring side of the line connects directly to the network, thus providing a satisfactory transmission path from the line to the network and transmitter. When a button is depressed, two tuned circuits are selected corresponding to the two frequencies required and the dial circuit is closed to the ring side of the line over the "C" lead. The two frequencies generated by the oscillator are transmitted over the line to the central office receiving equipment which registers the corresponding digit. In addition to the usual ten digits available on rotary dials, the touch-tone caller is arranged for two extra signals designated "Priority" and "Special Grade." These two signals may be used on 4-wire lines as preliminary codes to indicate a request for special handling of the call on a priority basis or special transmission consideration for data-type messages. The latter requires a simultaneous dc signal for the station equipment which is provided by a set of contacts operated by the (SG) button, and results in a closure of the "SP" and "P3" leads.

### 5.3.6 Set Switch

The set switch is provided with three sets of contacts. The continuity transfer contact is used for the auxiliary control lead. The closure contact

completes the ring side of the line or the ring side of the transmitting pair. The normally closed contact shunts the receiver when the handset is replaced on the cradle.

5.4 HOLDING

A hold key is provided for use with line circuits providing the holding feature. Operation of

the hold key opens the "A" lead, which permits a hold relay in the line circuit to operate in series with the transmitter circuit and to lock operated. Release of the hold key restores the pickup key through mechanical linkage. When the line is again picked up, the "A" lead is closed causing the hold relay to be short circuited and to restore, thereby releasing the holding bridge.

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