

STATION SYSTEMS
KEY TELEPHONE SYSTEM NO. 1A2
OFF PREMISES LINE
CIRCUITSECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 This circuit exchanges lamp, hold release, and ring trip signals between key telephone stations bridged on the same line but separated by a distance greater than lamp range. A signaling pair is required between locations.

SECTION II - DETAILED DESCRIPTION1. APPLICATION OF CIRCUIT

1.01 A 400-type line circuit and off-premises (OP) line circuit are required at each key telephone system location. The OP line circuit is installed in any 1A2 connector wired for 400-type line circuit use. The 400-type line circuits at each location are operated in parallel on the associated central office (CO) line. Leads A and L of the off-premises line circuit are bridged to leads A and L of the line circuit at the cross-connect field. The signaling pair between locations is connected to the CO tip and ring terminals of the OP line circuit at the cross-connect field appearance.

2. RINGING SIGNAL

2.01 Incoming ringing is detected by the 400-type line circuit at each location in the normal manner as described in CD-69513-01 and CD-69651-01. When an incoming call is answered at either location, local audible signaling is discontinued and a signal is sent to the OP station over the BY signaling lead, causing the OP line circuit to go to the busy state and discontinuing audible signaling at that location.

3. BUSY STATE

3.01 When an idle station becomes busy, lead A is grounded, operating relay K4 of the OP line circuit via the bridged A lead connection to the line circuit and the normally closed contact of relay K1. The contacts of relay K4 disconnect local signaling circuit input and send ground to the distant station on lead BY. The incoming ground at the distant location biases transistor A1C on, operating relay K1. Relay K1 contacts at the distant end disconnect relay K4 and ground lead A, putting the distant line circuit in the busy state and providing a steady lamp indication.

4. HOLD STATE

4.01 When a station engages the line circuit in hold, the near-end OP line circuit

receives a unique combination of an ungrounded A lead and wink (or optional steady) on the lamp lead. The only similar condition is incoming ringing when lead A is ungrounded and the lamp is in the flash mode. The hold detector circuit (transistors Q1, Q2, Q3, A1B, and A1A) discriminates between hold and ringing. Negative half-cycles of the lamp voltage (± 10 Vac) turn on transistor Q1 and discharge capacitor C3, which is charged to the supply voltage through resistor R8 when the lamp is off. Transistor Q1 renders the circuit insensitive to variations in lamp supply voltage. Transistor Q2 is cut off at this time, allowing capacitor C4 to discharge through resistor R14 at a slow rate, eventually turning on transistor A1A (after about two wink cycles), which turns on Q3, and operating relay K3.

4.02 This sequence operates only when lead A is ungrounded (A1B is cut off). If the station is busy, the grounded A lead forward biases A1B, charging capacitor C4 to near-power supply voltage, inhibiting the operation of relay K3. When relay K3 (at the station in hold) operates, the contacts ground the outgoing H lead and disconnect the input to transistor IC1C. When the far-end station receives the hold signal (incoming ground on lead H) A1E is biased on, operating relay K2 and triac Q4. Relay K2 contacts at the far-end station connect the station lamp lead to the lamp wink signal, disconnecting the input to the far-end hold detector, and Q4 starts the interrupter.

5. COMPONENT FUNCTIONS

5.01 Diode CR12 provides a threshold of 8.2 volts to protect against leakage in the cable pair and differences in ground potential between station locations. R3/C4 and R5/C2 filter unwanted induced longitudinal voltages (60 cycles and harmonics) and lightning surges. Diodes CR1 and CR2 prevent operation of near-end circuits in the event of far-end power failure. Diode CR9 guards against supply polarity reversal.

SECTION III - REFERENCE DATA1. WORKING LIMITS (477A OFF-PREMISES LINE CIRCUIT)

1.01 Signaling pair requirements consist of:

- (a) Loop Resistance: 5000 ohms (2500 ohms per conductor) maximum

(b) Leakage Resistance: 10,000 ohms
minimum

(c) Longitudinal Induction (60 cycle and harmonics): 38 Vrms maximum

1.02 The power supply must be between -20 to -26 Vdc.

1.03 Ground potential difference between the two locations cannot exceed ± 3 Vdc maximum.

2. FUNCTIONAL DESIGNATIONS

2.01 Leads

| <u>Designation</u> | <u>Meaning</u> |
|--------------------|----------------|
| BY | Busy Signaling |
| H | Hold Signaling |

3. FUNCTIONS

3.01 Exchanges lamp, hold release, and ring trip signals between key telephone stations bridged on the same line but separated by a distance greater than lamp range.

4. CONNECTING CIRCUITS

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

(a) CO or PBX Line Circuit - CD-69513-01, CD-69651-01.

5. MANUFACTURING TESTING REQUIREMENTS (477A OFF-PREMISES LINE CIRCUIT)

5.01 These requirements are set forth in X-18229.

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