# STATION SYSTEMS
# UNATTENDED STATION CIRCUIT
# FOR TRANSMITTING EXTERNAL AUDIBLE SIGNALS
# BACK TO A CALLING PARTY

## 0. CHANGES

### 0.1 CHANGED AND ADDED FUNCTIONS

(a) Added C4A ringer as AT&TCo Standard and designated 8A ringer as Mfr Disc.

### 0.2 CHANGES IN APPARATUS

(a) Added C4A ringer.

### 0.3 CHANGES IN CIRCUIT REQUIREMENTS

(a) Added C4A ringer and Test Note 2.

### 0.4 DESCRIPTION OF CIRCUIT CHANGES

(a) The 8A ringer is designated "Q" option and is rated Mfr Disc. It is superseded by the C4A ringer designated "P" option and rated Standard.

(b) An addition was made to Note 105 to show the "P" option as Standard and the "Q" option as Mfr Disc.

(c) "P" and "Q" options were added to the option table.

(d) Added Test Note 2 to circuit requirement table describing the mechanical and electrical tests for the C4A ringer.

### 0.5 REASONS FOR REISSUE

(a) To convert SD to 8-1/2 by 11-inch handbook size.

(b) To raise CD issue to agree with SD issue. There are no intervening issues between 4A and 8D.

## 1. PURPOSE OF CIRCUIT

This circuit provides means to determine the height of a body of water such as a river by calling an unlisted telephone number and receiving tones over the telephone line, the time interval of which is an indication of the height of the body of the water. It is also used to indicate which of the two radio transmitters at an airport direction beam station is in operation, to calibrate seismographic instruments used in the field by oil prospecting companies, or to perform similar functions.

## 2. WORKING LIMITS

| Area | Max Capacitor Loop Resistance | Insulation Resistance |
|---|---|---|
| | ohms | |
| Manual | 650 | 10,000 |
| Panel | 670 | |
| Step by Step | 1,250 | 15,000 |

## 3. FUNCTIONS

This circuit:

(a) Responds to a ringing signal.

(b) Automatically trips the machine ringing.

(c) Provides for a time interval of approximately 5 seconds to transmit a tone identifying this station. The timing of this interval starts at the completion of the ringing period.

(d) By means of relay interrupters, operates the ringer by direct current pulses.

(e) Starts the lever indicator at the end of approximately 5 seconds.

(f) Allows the transmitter to pick up the tone generated by the ringer and the sounding device actuated by the level indicator.

(g) Provides means to hold open the release lead for approximately 5 seconds after the level indicator has been started.

(h) Provides means to release this circuit when the level indicator has completed its function.

(i) Provides means to disconnect the telephone equipment by opening the loop at the central office.

(j) Provides for originating telephone calls at station.

## 4. CONNECTING CIRCUITS

Standard line circuits in panel, manual, step by step, or crossbar offices are listed below:

(a) Standard central office subscriber line circuit.

(b) Level indicator circuit.

## 5. DESCRIPTION OF OPERATION

### 5.01 CALL ORIGINATED AT DISTANT STATION

When the subscriber wishes to obtain information on the water level, he calls in the regular way the unlisted telephone number assigned to the unattended station. When ringing current is applied to the line, the (R) relay operates, operating the (R1) relay. The (R1) relay opens the tripping bridge consisting of the 13 induction coil, the 626A transmitter, and the (D) relay. The (R1) relay also operates the (L) relay which locks to the back contact of the (AW1) relay. Upon completion of the ringing interval, the (R) relay releases, releasing the (R1) relay. The (R1) relay, upon its release, completes the loop to the central office, tripping machine ringing. The (R1) relay upon its release also closes a circuit to operate the (AW) and (B) relays in parallel. The (AW) relay requires approximately 5 seconds to operate. The (B) relay operates the (A) relay which closes the path to send a pulse of direct current through the ringer. The (A) relay also releases the (B) relay. The release of the (B) relay open-circuits the operating path of the ringer, and the clapper is restored by the biasing spring. In this manner the (A) and (B) relays interrupt each other in a cycle of approximately 1 second. On each cycle the ringer creates a ding-dong tone. The ringer is acoustically coupled to the transmitter which is energized by the line current received over the tip and ring to the central office. The purpose of the ding-dong tone is to identify this station to persons calling it and to operators that monitor on the line to determine that the called station has answered.

### 5.02 STARTING THE TELECHRON MOTOR-DRIVEN RIVER LEVEL INDICATOR

Approximately 5 seconds after the (L) relay closes the circuit to the (AW) relay, the (AW) relay contacts close, operating the (AW1) relay. The (AW1) relay starts the level indicator over the leads designated "L" and locks to the back contact of the (RL) relay. The (AW1) relay also closes the loop through to the central office line in parallel with the closure provided by the (L) relay. Contacts 3B and 4B of the (AW1) relay close a ground from the (AW) relay to the 200-ohm noninductive resistor on the (W) relay. Contacts 1B and 2B which follow 3B and 4B also ground the inner end of the (W) relay. Thus the (W) relay cannot operate as ground is placed on both ends of its operating winding. The locking circuit for the (L) relay is opened by the operation of the (AW1) relay. The (L) relay upon its release opens the circuit to the (AW) and (B) relays stopping the ding-dong tone. The (AW) relay upon its release removes the short-circuit on the (W) relay permitting it to operate.

### 5.03 STARTING THE WEIGHT-DRIVEN RIVER LEVEL INDICATOR

When only a momentary closure is necessary to start the river level indicator, the operation of the circuit is similar to that described in the foregoing paragraph except that the closure to the start circuit is obtained over the leads designated "S" at the time the (W) relay operates.

### 5.04 HOLDING OPEN THE STOP CIRCUIT FROM THE LEVEL INDICATOR

When the (AW1) or (W) relay operated, it started the river level indicator. At the moment of this closure the level indicator may be at such a point that its contacts are closed as a stop indication; therefore, this circuit must provide sufficient time for the level indicator to move far enough to open the stop circuit before the (RL) relay circuit is completed. This feature is accomplished by re-using the (AW) relay for the second time to count in an additional 5 seconds.

The (W) relay operated closes a circuit to reoperate the (AW) relay and opens the circuit of the (B) relay. After approximately 5 seconds the (AW) relay operates the (Z) relay through a make contact on the (W) relay. The (Z) relay locks to the front contact of the (AW1) relay and releases the (W) relay. The (W) relay in releasing releases the (AW) relay. The (Z) relay in operating completed the circuit to the (RL) relay so that this circuit is in a position to receive a release signal from the level indicator stop circuit.

### 5.05 CIRCUIT RELEASED BY THE LEVEL INDICATOR

When the level indicator stop circuit is closed, the (RL) relay operates, releasing the (AW1) relay unless the (AW) has not had sufficient time to release, in which case, the (AW1) relay remains locked up under control of the (RL) and (AW) relays until the (AW) releases. The release of the(AW1) relay opens the loop to the central office and releases the (Z) relay which in turn releases the (RL) relay.

### 5.06 FAILURE OF LEVEL INDICATOR STOP CIRCUIT

In case the level indicator stop circuit fails to function, this circuit would remain locked up maintaining a permanent signal on the line. When a permanent signal occurs and the (D) relay fails to release on the transfer from cord circuit battery to line circuit battery, it will be necessary to open the line circuit at the central office by momentarily opening the heat coils or by some similar means. The release of the (D) relay provides a ground for operating the release relay (RL) causing this circuit to release as described in the preceding paragraph.

### 5.07 CHECKING THIS CIRCUIT FROM A CENTRAL OFFICE

The satisfactory operation of this circuit may be checked from the central office originating a call at that point. If the ding-dong tone is received satisfactorily and the disconnect signal is obtained from the station, either from the level indicator circuit or from the opening of the loop at the central office, a reasonable assurance is provided that the telephone equipment is functioning properly.

5.08 ONE CALL FOLLOWING CLOSE UPON ANOTHER

If one call follows close upon another, the level indicator may be returning to normal and may not be in a position to respond immediately to the start signal received from the (AW1) or (W) relay. In such case, this circuit responds to the ringing signal, provides the ding-dong tone, and waits for the level indicator to receive the start signal provided by the (AW1) or (W) relay. An observer on the line with this condition will wait until the level indicator has restored to normal from the preceding call.

5.09 STOP SIGNAL RECEIVED SHORTLY AFTER THE START SIGNAL IS TRANSMITTED

If the level indicator is in such a position that it transmits a stop signal during the 5-second interval immediately after the start signal is transmitted to the level indicator, this circuit is not in a position to receive the release signal. As previously described, this circuit times for approximately 5 seconds to permit the stop circuit to be opened. If the stop signal should occur within approximately 5 seconds after the starting signal, the start lead will remain closed causing the level indicator to complete its first cycle and start on its second cycle before the (RL) relay can operate.

5.10 BATTERY MAINTENANCE

The condition of the KS-6573 battery should be checked with a voltmeter at the +22.5 volt tap at regular intervals. Block the (RL) relay nonoperated, and operate and release the (R1) relay manually, reading the battery voltage 5 minutes after the start tone is received from the river level indicator. When the voltage is 19.5 or less, install fresh batteries. It is recommended that the batteries be replaced once per year at the start of the flood season even though they indicate greater than 19.5 volts on the test just described.

5.11 CALLS ORIGINATED AT STATION

A standard telephone may be bridged across the station line to be used for originating telephone calls.

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