

## 1D/2D-TYPE COIN TELEPHONE SET DETAILED DESCRIPTION

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**1. GENERAL**

**1.01** The 1D/2D coin telephone set is used in conjunction with system standard dial-tone-first (DTF) central office arrangements to provide coin telephone service.

**1.02** The 1D/2D set consist of a ringer, polarity guard and surge protector, active speech network, handset, switchhook, and dial for residential like functions. Functions unique to coin service are handled by integrated circuits, A and B relays, 47A (MD) or 47A2 signal, coin return network, and coin relay.

**1.03** These sets are available with rotary or TOUCH-TONE® dial.

**1.04** Codes for the 1D- and 2D- type sets are described in Table A.

**TABLE A**

**CODE SIGNIFICANCE**

CODE	FIRST NO.	LETTER	SECOND NO.
1D1	Box Type	DTF Mode	Rotary Dial
1D2			TOUCH-TONE Dial
2D1	Panel Type		Rotary Dial
2D2			TOUCH-TONE Dial

**1.05** For detailed information on component and coding of these sets, refer to Section 506-410-401.

**1.06** Abbreviations used in this section are as follows:

- DTF—Dial-Tone-First
- CO—Central Office
- CDR—Customer Dial Receiver
- HT—Hopper Trigger
- SCT—Stuck Coin Test
- IRCPT—Initial Rate Coin Preset Test.

**1.07 Initial Rate Setting.**

- (1) Initial rate may be adjusted from 5¢ to \$3.15 in 5¢ increments. Since there is no totalizer, this set is less likely to be put out of service by improper CO sequences.
- (2) Initial rate setting is accomplished by inserting one or more leads into the **negative** field (-VCC) with remaining leads inserted in positive field (+VCC). Six leads, terminated on back side of chassis are color coded and individually plug ended. Each lead represents a specified amount (see Table B). These plug-ended leads are pressed on the pin connectors to establish an initial rate setting.

**TABLE B**  
**INITIAL RATE LEADS**

LEAD COLOR	LEAD MONETARY VALUE
BR	5 Cents
R	10 Cents
Y	20 Cents
S	40 Cents
W-BL	80 Cents
W-BR	1 Dollar — 60 Cents

**2. FUNCTIONS**

**2.01** Fig. 1 and 2 show block diagrams of rotary and TOUCH-TONE coin telephone sets, respectively. The 32A coin chassis includes an active network for speech equalization, the ringer, and a dual frequency coin tone oscillator. The front cover consists of a dial, switchhook, handset, and terminal board (TB2), which connects to the chassis via an 11-pin connector (J1). The 47A (MD) or 47A2 signal is attached to the side of the coin chute where coins are sensed as they leave the lower chute area. The 47A (MD) or 47A2 signal connects to the chassis via a 15-pin connector (J2).

**IDENTIFICATION AND DESCRIPTION OF COMPONENTS**

**2.02** Polarity Guard and Surge Protector—maintains proper set polarity and limits surge voltage behind station protector to prevent circuit damage.

**2.03** A-Relay (Ground Lifter)—operates on loop current to remove the coin relay ground path from the tip side of the line. This feature prevents the line unbalance that would be caused by a tip to ground path.

**2.04** B-Relay (Initial Rate)—is a latching relay which has two windings. One winding causes the relay to latch on initial rate deposit and the other unlatches the relay when the coin relay is actuated for coin collection or return.

**2.05** IC1 Integrated Circuit (Coin Logic)—is a hybrid integrated circuit (HIC) in a 40-pin dual in-line package. It acts as a controller of set functions during coin deposits, switchhook flashes, and dial operation.

**2.06** IC2 Integrated Circuit (Coin Tone Oscillator)—is a 14-pin HIC similar in construction to ICs used as TOUCH-TONE dial oscillators. It provides dual frequency coin deposit signals. It is switched on by the IC1 to provide a slow readout for 5¢ and 10¢ deposits and a fast readout for a 25¢ deposit.

**2.07** Speech Network—is a network which interconnects the loop, transmitter, and receiver. It provides ac and dc voltage equalization over the loop range and also TOUCH-TONE dial and coin tone equalization. During coin signaling, the speech portion is disabled so that the customer hears low level coin tones.

**2.08** Ringer—the C4B ringer is used. It is mounted on the 32A chassis frame and connected across the line.

**2.09** Dial—the TOUCH-TONE version uses a 70-type dial which operates on either normal or reverse CO battery to provide end-to-end signaling capabilities. The rotary version has the dial pulse contacts in the ring lead.

**2.10** 47A (MD) or 47A2 Signal—attaches to the side of the chute the same as the 1A totalizer of the 1C coin telephone set. Sensor elements in the coin paths convert mechanical energy of the coin to a voltage signal which in turn signals the coin logic.

**2.11** 1A-Type Coin Relay—is located in the tip to ground path. It collects or refunds the contents of the hopper when the tip to ground current flow is a minimum of 41 milliamps.

### 3. THEORY OF OPERATION

**Note:** The CO battery requirements for system standard DTF service are defined as follows.

- (a) **Negative Battery:** -48 volt dc on ring with ground on tip.
- (b) **Positive Battery:** +48 volt dc on ring with ground on tip.
- (c) **Initial Rate Coin Present Test (IRCPT):** -48 volt dc on tip (20 ma dc maximum) with ring open in Section 105-250-100 this test is referred to as (-) coin present test.
- (d) **Stuck Coin Test (SCT):** +48 volt dc on tip (20 ma dc maximum) with ring open in Section 105-250-100 this test is referred to as (+) coin present test.
- (e) **Coin Collect:** +130 volt dc on tip (41 ma dc minimum) with ring open.
- (f) **Coin Refund:** -130 volt dc on tip (41 ma dc minimum) with ring open. Collect and refund may be followed by a SCT to assure the coins cleared the hopper. The SCT passes if no current flows, which indicates that the HT contacts have been restored.

#### ORIGINATING A LOCAL CALL

**3.01** In DTF service, the customer is instructed to:

- listen for tone
- deposit coins
- dial.

With the contention that upon hearing dial tone a customer will know he has accessed a working system. This is in contrast to coin first operation, where the customer must invest initial rate to get dial tone.

#### IDLE STATE

**3.02** In the on-hook condition the CO has -48 volt dc on R and ground on T. No loop current flows because switchhook contacts are open.

#### LOCAL CHARGE CALL, ANSWERED

**3.03** When the customer picks up the handset, the switchhook closes and loop current flows. The A-relay operates and the network and TOUCH-TONE dial are enabled. A reset pulse initializes the logic and the set is ready for coin deposits. The CO recognizes a bid for service and supplies dial tone. The customer hears dial tone and deposits the first coin. The coin strikes the respective sensor element in the signal, the value is registered, and the coin continues on to operate the hopper trigger (HT) contacts. As soon as the coin is registered in the logic, the coin oscillator generates coin tones. Immediately after the coin tone which makes initial rate, the B-relay is operated. After each deposit is signaled, the network and dial are reenabled. Loop battery is removed when the initial rate coin present test (IRCPT) is made, causing the A relay to release momentarily. This provides a path from tip-to-ground. The CO reapplies negative battery causing A relay to reoperate and removes ground from tip of line. When the customer hangs up, the switchhook opens, the A relay releases, coins are collected by collect battery from the CO and the B relay is released. As the coin relay armature releases, the hopper trigger (HT) restores and a stuck coin test (SCT) is applied. If the coin has cleared the hopper, HT is open and the test passes. The set is now ready for the next call.

#### LOCAL CHARGE CALL, NOT ANSWERED

**3.04** This call proceeds, as in paragraph 3.03, until busy signal is heard or there is no answer to ringing. Upon hanging up, the CO recognizes the disconnect and coin return battery is applied. The coin relay refunds the initial deposit, a SCT is performed, and the set is ready for the next call.

#### CALL TO A NONCHARGE NUMBER

**3.05** When the customer picks up the handset, the switchhook closes, loop current flows, and the set initializes as in paragraph 3.03. On receipt of dial tone, the customer dials a noncharge number. Call is completed in normal manner. The CO provides a refund cycle to return any coins that may have been deposited by mistake.

**ABANDONED CALL**

**3.06** This is a situation whereby the customer terminates prior to dialing, during dialing, or before receiving a busy or audible ringing signal. When the switchhook opens at termination the CO recognizes the disconnect and applies a refund. If coins have been deposited, they are returned as in 3.04. If no money has been deposited, no current will flow through coin relay because HT is open.

**CHARGEABLE CALL WITH INSUFFICIENT OR NO DEPOSIT**

**3.07** This call proceeds, as in paragraph 3.03, until the IRCPT is made. The call is routed to an announcement trunk and the customer is advised how to properly make the call. If partial funds were deposited, a refund is made, and the set is ready for the next call.

**AUTOMATIC LOCAL OVERTIME**

**3.08** Areas which have initial and overtime charging on local calls serve the customer as follows. One-half minute before the end of the initial period, the initial deposit is collected. A local coin overtime test is made at the end of the initial period. It will indicate the presence of a coin, if the customer had deposited 5¢ (HT closed), and the call is allowed to continue until 30 seconds from the end of the first overtime when the routine is repeated. If the customer did not deposit 5¢ (or another coin to close HT), the local coin overtime test will not indicate the presence of a coin and the call is connected to an announcement which prompts the customer to deposit 5¢. After 30 seconds another local coin overtime test is made and if coin is not detected the call is disconnected.

**LOCAL CALL—SIMULTANEOUSLY DEPOSITING COINS AND DIALING**

**3.09** If a customer deposits a coin which is registered in the logic during dial operation, coin signaling is deferred until the dial is released. If the dial is operated during a coin tone, that tone is completed and the remaining coin tones are delayed until the dial is released. If the dial is operated during a silent interval, the sequence halts immediately, and resumes on dial release. Thus the dial has priority over the coin logic for local calls. This prevents simultaneous coin and dial signaling which would cause misregistered digits.

**ORIGINATING A TOLL CALL**

**3.10 Toll Call Through a Cord Switchboard.**

(a) The customer picks up the handset, receives dial tone and dials "O" (no deposit needed). When the operator connects, the trunk supplies refund in the event money had been deposited. Normal battery is replaced by positive battery for the remainder of the call. The customer announces the called number and the operator specifies the initial charge. The customer deposits coins which are read out as they are deposited. The operator starts timing the call and at the end of the initial period, collects the initial deposit and announces "***your initial period is up, please signal when finished.***" The customer either flashes the switchhook or hangs up when through. If he flashes, he is advised of overtime charges. If he hangs up, the operator uses the ring back key. The operator listens to the coin signals, collects the money, and terminates. The customer hangs up and the set is ready for the next call initiation. The TOUCH-TONE dial is active during normal and reversed battery to provide end-to-end signaling.

**3.11 Toll Call Through a TSPS.**

(a) Operator assisted (0 + NPA + 7 digits) or operator dialed ("O"-) calls progress as in paragraph 3.10 except the operator is located at a TSPS console. The customer may also begin by dialing the toll number or 1 + the toll number depending upon local practice. A position is seized and refund is applied. Positive battery is supplied. Initial charge is announced, and coin signals are heard by the position attendant. Overtime charges may be handled by another position in the group. The set functions as before by signaling each coin as deposited.

**4. FEATURES**

**4.01** The following is a list of features applicable to the 1D/2D coin telephone set.

- (1) Stable and reliable operation from -30° to +140°F
- (2) Assures consistent coin signaling in all environments

- (3) Coin misregistration greatly reduced over previous coded sets which was caused by totalizer malfunction.
- (4) Circuit presents a constant DC resistance to the CO for all signaling and switching functions.
- (5) The network uses low transmitter current and ac amplification.
- (6) Set resistance is almost constant at approximately 300 ohms.

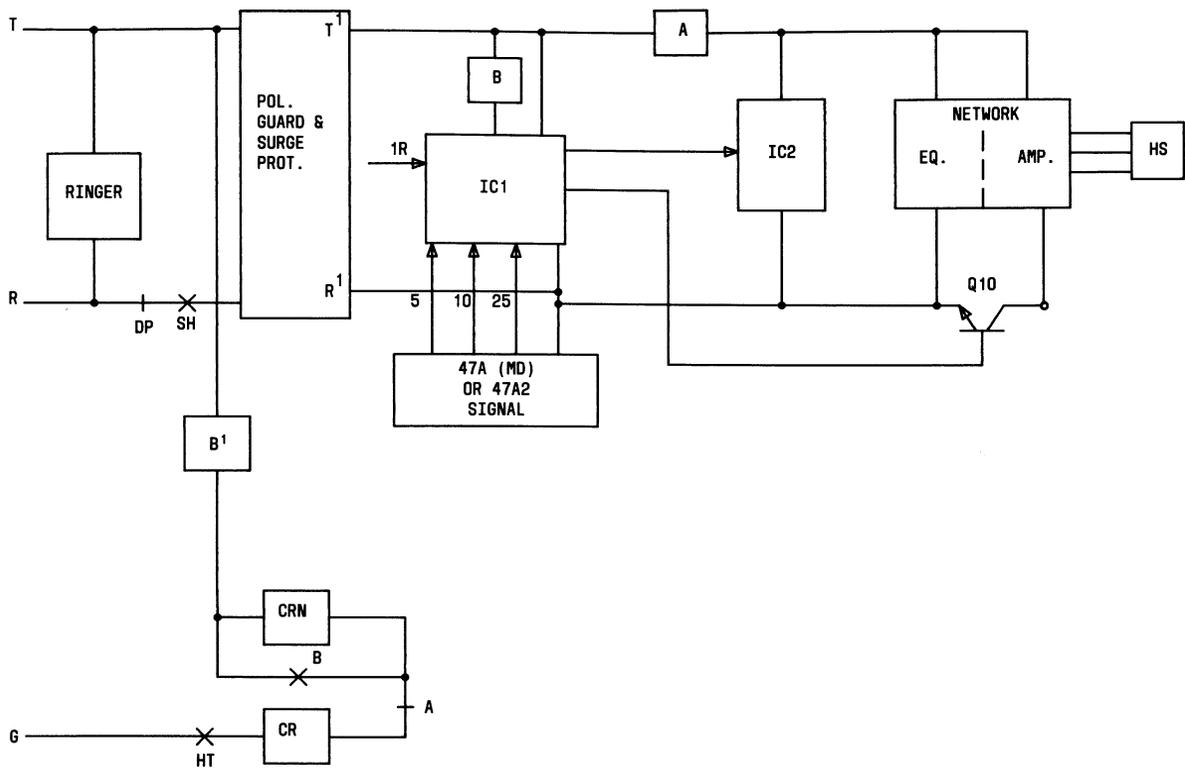


Fig. 1—1D1/2D1 Coin Telephone Set, Schematic

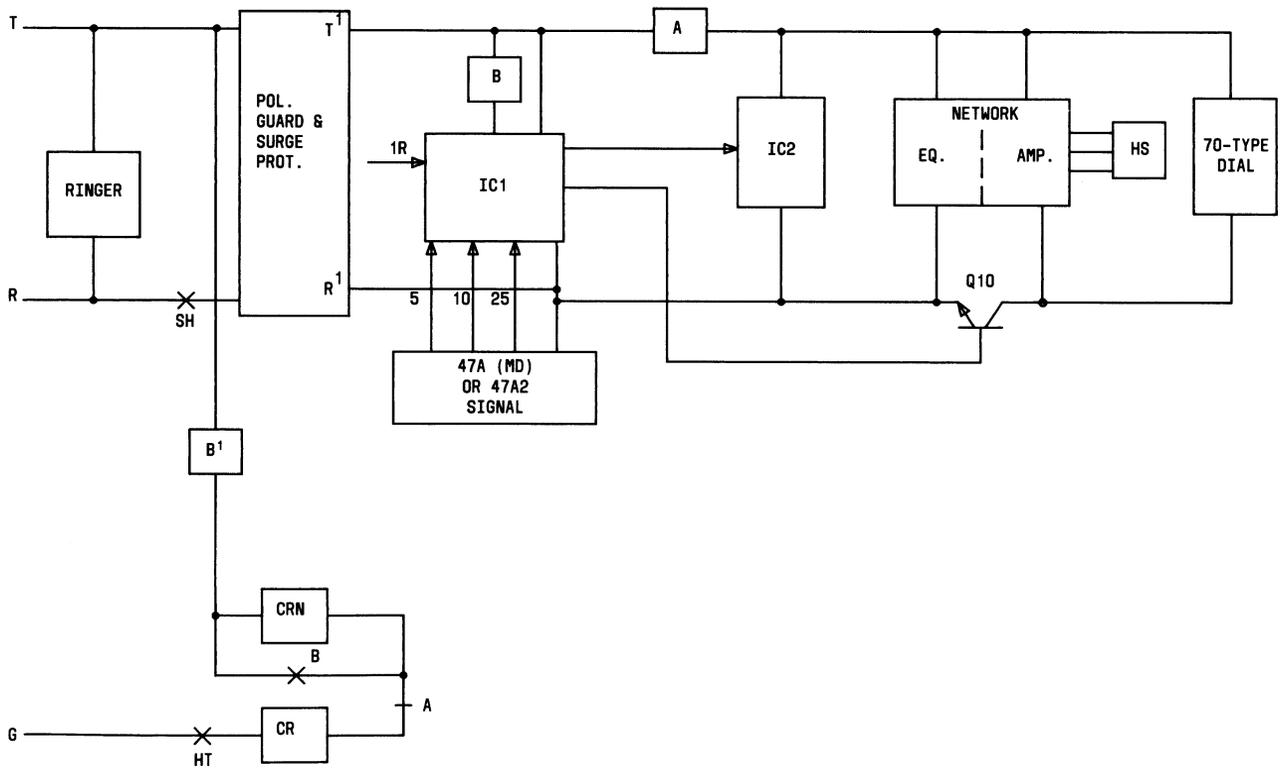


Fig. 2—1D2/2D2 Coin Telephone Set, Schematic