COIN SERVICE BOOKLET



Wisconsin Telephone

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THIS BOOKLET CONTAINS A COMPILATION OF SELECTED TEST METHODS, PRACTICE SECTIONS AND LETTERS FOR GENERAL USE IN COIN SERVICE MAINTENANCE.

DEVELOPED BY NEW YORK TELEPHONE.

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Part 1

NEW YORK TELEPHONE
METHODS ADMINISTRATION
COIN SERVICE BOOKLET

The purpose of this booklet is to familiarize personnel with the many intricate phases of coin service. This includes an overview of the total coin operation with emphasis on:

1. Station equipment
2. Central Office testing and circuit design requirements
3. Trouble analysis of station, loop and central office equipment.
4. "A" board and "TSPS" operation
5. Loop plant
6. Coin Improvement Items and DTF

To understand and effectively clear troubles on coin service, a basic knowledge of the above items is necessary.

Coin service in the New York Company today, consists of Dial Tone First (DTF), Pre-pay (coin first) and Post-pay type service. All utilize the single slot coin station and all place different demands upon central office and test desk equipment.

Prior to the development of the single slot coin telephone and the introduction to DTF service, coin operation was relatively simple. The coin station (multi-slot) placed very few demands upon the central office and test desk equipment. If the central office equipment could furnish a threshold capable to collect or refund a coin deposit, test for the presence of a coin, provide a minimum amount of talking battery and ring the station ringer, the station performed quite effectively.

Social changes, during the 1960s made the multi-slot coin station a prime target for; vandalism, strong arm robbery, fraud and theft of service. This brought about the introduction of the single slot coin station and a new environment for coin service.

Presently there are four types of single slot coin stations all having an identical outside appearance:

"A" Series – designed for all Pre-pay areas for use in coin first operation

"F" Spec – modified "A" series used for DTF service in Manhattan and Washington, D.C.

"C" Series – a convertible set that can be used in either a dial tone first mode or a coin first mode.

"E" Series – for Post-pay operation only.

Components for the single slot coin stations although appearing the same and physically fitting the same mountings are not compatible when intermixed. Station component compatibility charts will be found in Section II, Part 2.

The operational description of the single slot coin station is explained in Section II. The operational description must be understood by the central office and test desk force maintaining coin service. The station totalizer assembly as outlined in Section II afford a natural trouble indicator and trouble analyzer for loop plant, station and central office trouble conditions. The master test frame, district junctor test frame, J test boxes and coin supervisory test sets are good test facilities but lack the trouble detecting features that the coin station totalizer itself can uncover. Therefore, throughout the booklet reference will be made as to the state of the totalizer.

Part 1

"C" SERIES COIN STATION
DESCRIPTION AND OPERATION

The "C" Series Coin Telephone set is capable of providing coin service in either coin first (CF) or dial tone first (DTF) systems. The set can be converted in the field from one mode of operation to the other and is available with rotary or Touch-Tone dial. Identifying codes are assigned to the "C" Series coin stations that outline its functions.

IDENTIFYING CODES
CODE SIGNIFICANCE

CODE	FIRST NO.	LETTER	SECOND NO.
1C1	Box Type	CF or DTF Mode (Convertible)	Rotary Dial
1C2			Touch-Tone Dial
2C1	Panel Type		Rotary Dial
2C2			Touch-Tone Dial

THE FOLLOWING ABBREVIATIONS WILL BE USED THROUGHOUT THE DESCRIPTION:

CF	– Coin First	CR	–Coin Relay
DTF	– Dial Tone First	RE	–Reset Electromagnet
TT	– TOUCH-TONE Dial	CO	–Central Office
DP	– Dial Pulse	TSPS	–Traffic Service Position System
DON	–Dial Off Normal	SH	–Switchhook
HT	–Hopper Trigger	SCR	–Silicon Controlled Rectifier (voltage and current controlled electronic switching)

"C" SERIES COIN STATION
DESCRIPTION AND OPERATION

GENERAL

FUNCTIONS

Coin Chute

Nickel Operation-Valid Coin Accepted

Nickel Operation-Coin Rejected

Dime Operation-Valid Coin Accepted

Dime Operation-Coin Rejected

Quarter Operation-Valid Coin Accepted

Quarter Operation-Coin Rejected

Coin Release Mechanism Operation

Totalizer

A. DTF Mode

B. CF Mode

Coin Chassis

Dial and Housing Assembly

Coin Relay and Hopper Assembly

Other Component Circuits

THEORY OF OPERATION

DIAL-TONE-FIRST SERVICE

Originating A Call

Restoring Set to Standby

Call Abandoned

Partial Initial Rate Deposited

Initial Rate Deposited

Nickel Local Overtime

Coin Disposal Test

Toll Call

Incoming Call

COIN FIRST SERVICE

Originating A Call

Restoring Set to Standby

Call Abandoned

Partial Initial Rate Deposited

Initial Rate Deposited

Nickel Local Overtime

Coin Disposal Test

Toll Call

Coin First Station-Coin First Office

Coin First Station-Coin First/Dial Tone First Office

Incoming Call

SEQUENCE CHARTS

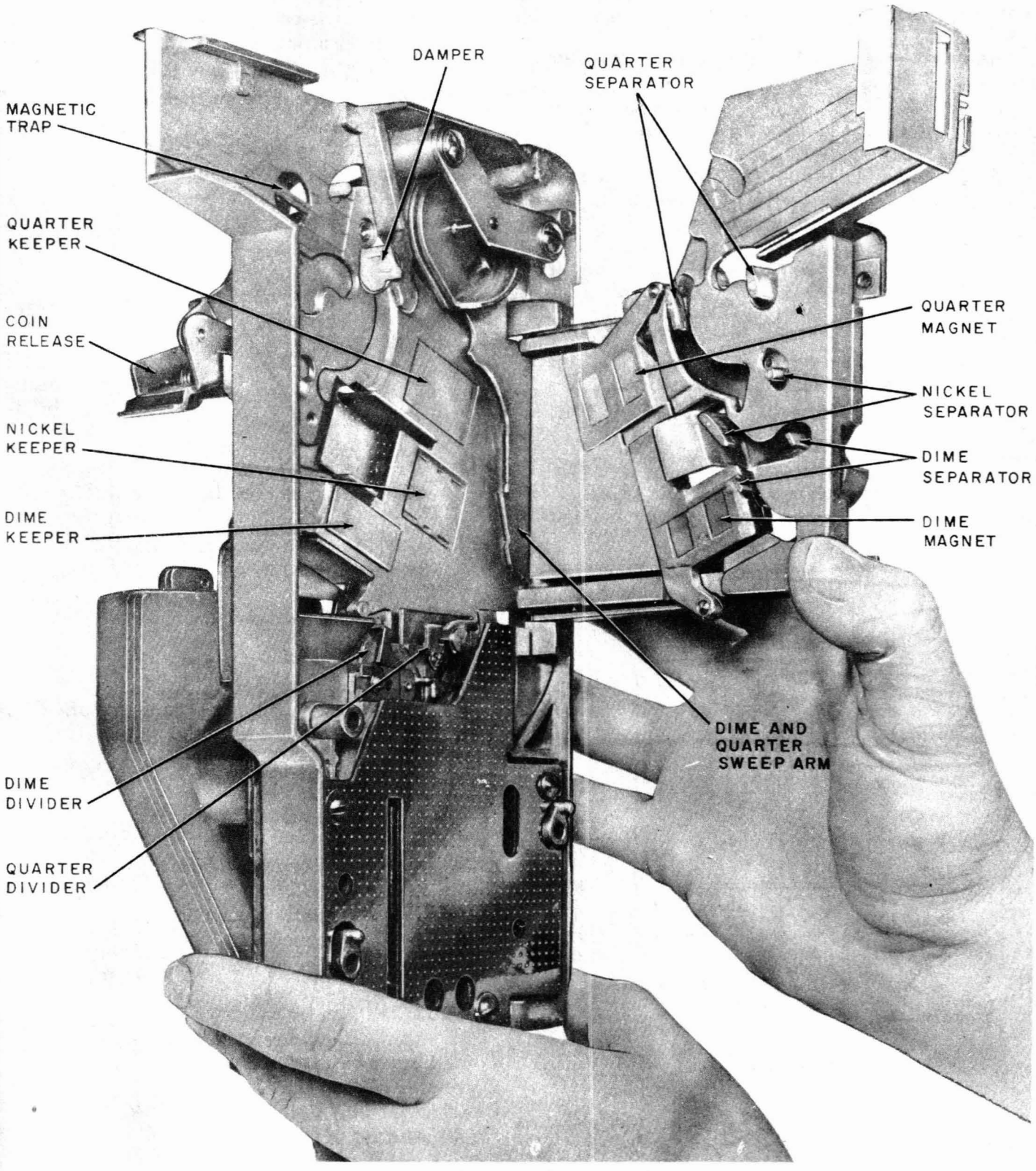


Fig. 1—Typical Coin Chute

FUNCTIONS:

Coin Chute (Fig. 1)

Nickel Operation – Valid Coin Accepted (Fig. 2):

1. Nickel is deposited in coin entrance, propelled by gravity and passes magnetic trap.
2. Continues by the damper removing the spin and is checked for size and weight as the nickel separator rotates.
3. Nickel is channeled into the nickel magnet area where eddy currents are set up retarding the speed of the coin.
4. Nickel continues on, falling toward the rear of the chute, strikes the nickel anvil, bounces over the nickel divider, and is accepted.

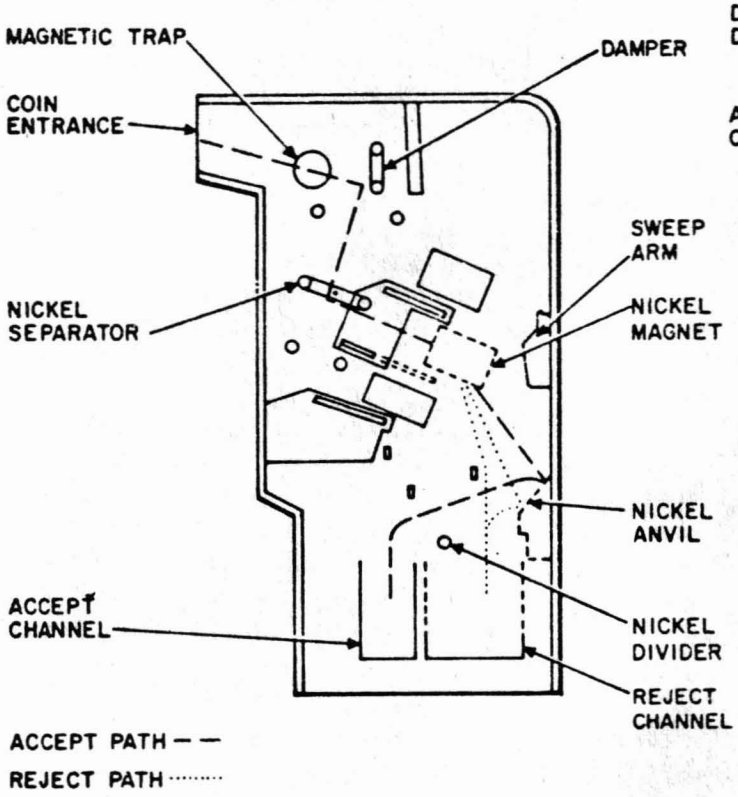


Fig. 2—Nickel Path in a Typical Coin Chute

Nickel Operation - Rejection of Slugs and Foreign Coins (Fig. 2):

1. Light weight magnetic coins will be stopped by the magnetic trap.
2. If size or weight is incorrect, it will be stopped at various locations in the chute and must be retrieved by operation of the coin release mechanism.

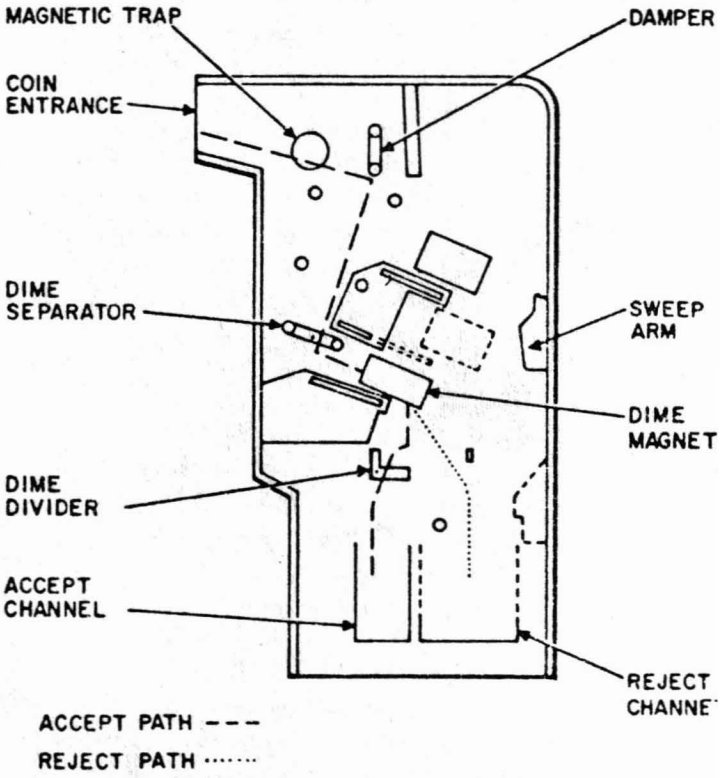


Fig. 3—Dime Path in a Typical Coin Chut

DIME OPERATION – VALID COIN ACCEPTED (FIG. 3):

1. Dime is deposited in coin entrance and passes magnetic trap, continues down chute, is checked for size and weight as the dime separator rotates.
2. Dime is channeled into the dime magnet area where eddy currents retard the movement down chute.
3. Dime drops through the dime divider and is accepted.

DIME OPERATION – SLUGS OR FOREIGN COINS REJECTED (FIG. 3):

Dime Operation-Coin Rejected (Fig. 3):

1. Lightweight magnetic coins will be stopped

by the magnetic trap. Heavier coins will be stopped by the dime magnet.

2. If the size or weight is incorrect, such as a penny used in coin phone tests, it will be stopped at various locations in the chute and must be retrieved by operation of the coin release mechanism.

3. If the eddy current characteristics are incorrect the dime magnet, with the aid of the divider, will reject the coin.

QUARTER OPERATION–VALID COIN ACCEPTED (FIG. 4):

1. Quarter is deposited in coin entrance and passed magnetic trap, continuing down chute and is checked for size and weight as the quarter separator rotates.

2. Quarter is channeled into the quarter magnet area where its speed is retarded by eddy currents.

3. Quarter strikes the right side of the quarter divider and is accepted.

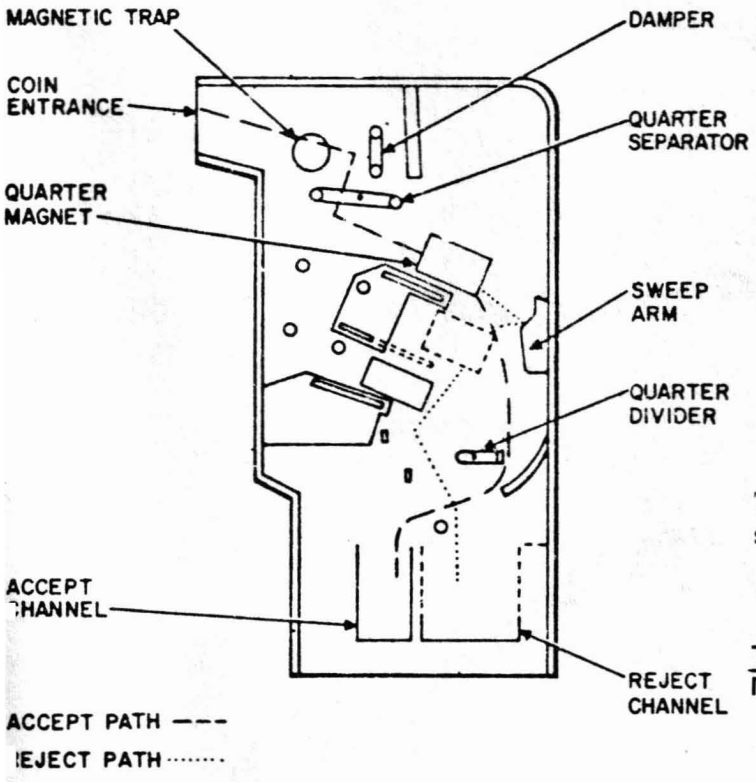


Fig. 4—Quarter Path in a Typical Coin Chute

QUARTER OPERATION – SLUGS OR FOREIGN COINS REJECTED (FIG. 4):

Lightweight magnetic coins will be stopped by the magnetic trap.

Heavier coins will be stopped by the quarter magnet.

If the size or weight is incorrect, it will be stopped at various locations in the chute and must be retrieved by operation of the coin release mechanism.

If the eddy current characteristics are incorrect, the bounce on the sweep arm will cause the coin to be rejected.

OPERATION:

1. The magnetic trap is withdrawn to release trapped magnetic material. The chute opens and the sweep arm clears material and directs material to reject channels.

TOTALIZER (FIG. 5):

The totalizer is an electromechanical device that has the ability to register initial rate deposits, prepare the set for calling, and signal coin denominations to the operator. Minimum loop current required to operate the totalizer reliably is 20 milliamps.

Accepted coins fall through the chute and strike totalizer arms, which project into the chute. Nickels and dimes strike the lower arm while quarters strike the upper arm. Arm deflection causes ratchet wheel to rotate and operate a cam. Each cog on the ratchet wheel represents a 5 per cent increment. The cam shaft is rotated 10 degrees by each nickel deposited, 20 degrees by each dime, and 50 degrees by each quarter.

The totalizer contains several Components as described below:

Totalizer Functions – When Wired in the (DTF) Mode

1. T1 (Initial Rate) Contacts:

   a. The make contacts, provide a path for the initial rate ground test.

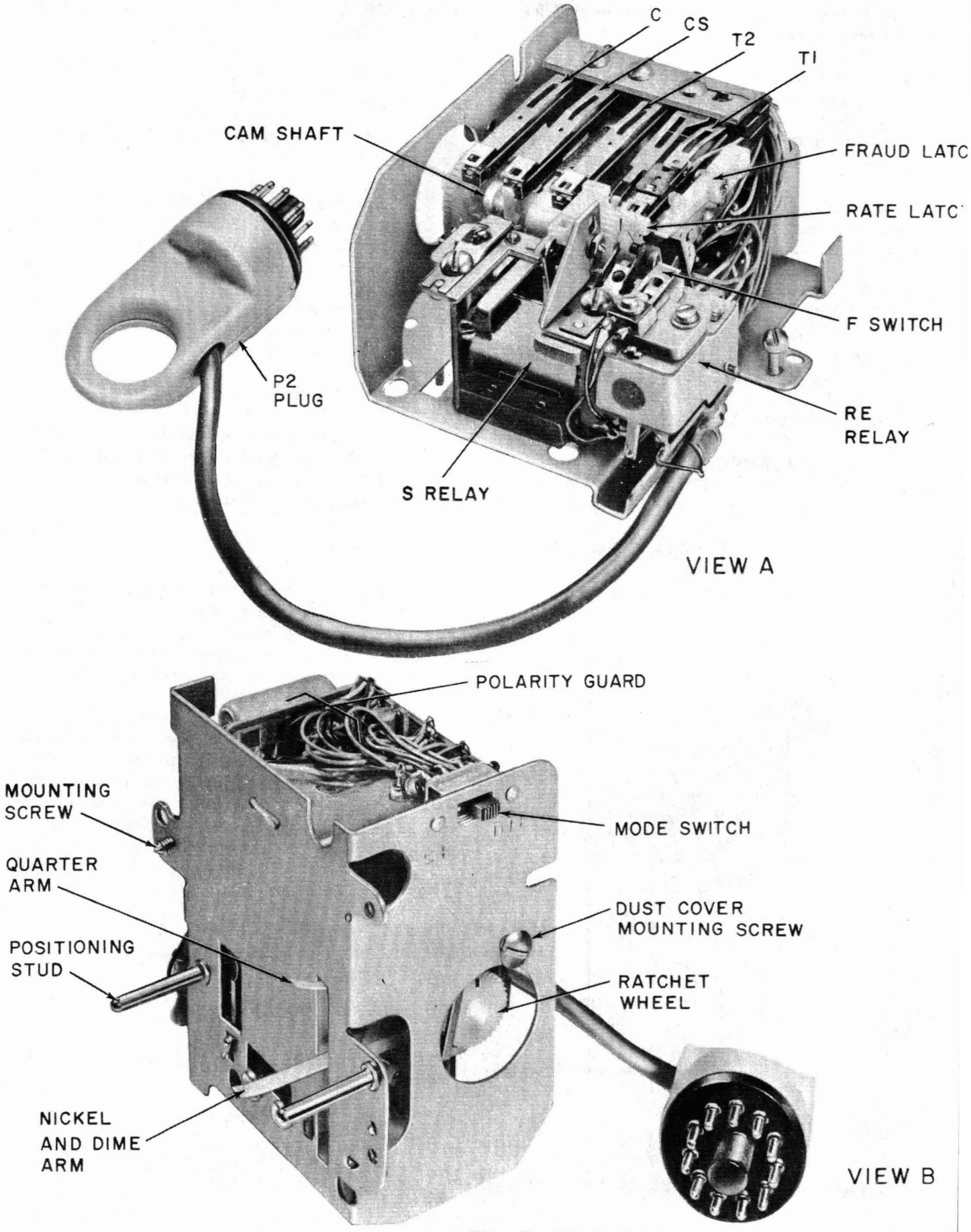


Fig. 5—1A Totalizer

b. The normally closed or break contacts allow totalizer to store deposits up to initial rate before reading out.

2. T2 (Totalizer Off Normal) Contacts:

   a. Operate (Transfer) when any coin is deposited.

   b. The break contacts short the totalizer during talking.

   c. The normally open contacts when operated provide a path through the speech network to allow totalizer to restore to normal on hangup.

3. S (Stepping) Relay and its S1 Contacts:

   a. The operating and releasing action of the S relay steps the totalizer back 10 degrees each time it operates.

   b. This action continues until T2 goes back to normal thus shorting the totalizer.

   c. Operation of S1 transfer contacts alternately applies power to the S relay and coin tone oscillator, thus stepping totalizer back to home position and generating coin signals.

   d. The dc resistance of the S relay coil is approximately 230 ohmns ±

4. C (Coin Arm Off-Normal) Contacts:

   a. On all coin deposits, the C contacts transfer to prevent the totalizer from stepping back while the coin arm is held down by a coin.

   b. The normally closed C contacts, when opened, remove the current path from the S relay while the normally open contacts, when closed, connect a click suppression circuit.

5. CS (Coin Signal Speed Changing) Contacts:

   a. The CS contacts operate only on quarter deposits.

   b. The break contacts open to allow more voltage across the S relay, thus providing a faster readout.

   c. The make contacts bypass the normally closed C contacts to allow the S relay coil to energize thereby allowing early totalizer response before the quarter arm returns to normal.

6. RE (Reset Electromagnet)

   a. The primary function of the RE relay is to reset the T1 contacts to normal on coin collect or refund pulses.

   b. When the initial rate is registered in the totalizer, the T1 contacts operate and the spring loaded rate latch engages holding T1 in its operated position.

   c. When the RE armature operates, it disengages the rate latch and T1 restores to normal.

   d. A second function of the RE relay is to control the F (fraud) switch.

7. Anti-fraud Provisions (F Switch Contacts and Fraud Latch)

   a. Operation of RE opens the F switch.

   b. The fraud latch drops each time the totalizer goes off home position.

   c. If RE relay operates while the fraud latch is down (totalizer off home position) the F switch will open and be held open by the fraud latch until the totalizer steps back to home position, thus preventing the possibility of fraudulently satisfying the initial rate ground check. This prevents calls from being made for less than initial rate.

8. Polarity Guard
   The polarity guard around the totalizer circuit allows it to operate on positive or negative battery.

TOTALIZER FUNCTIONS – WHEN WIRED IN THE (COIN FIRST) MODE:

1. T1 (Initial Rate) Contacts:

   a. The normally open contacts operate to close the ring lead and cause CO ground start when initial rate is deposited.

b. The normally closed contacts open to remove dial short when initial rate is deposited.

2. T2 (Totalizer Off-Normal) Contacts:

a. Operate (transfer) when any coin is deposited.

b. The normally closed contacts short the totalizer during talking.

c. The normally open contacts when operated provide a path through the speech network to allow totalizer to restore to normal on hangup.

3. S (Stepping) Relay and Its S1 Contacts:

a. The operating and releasing action of the S relay steps the totalizer back 10 degrees each time it operates.

b. This action continues until T2 goes back to normal thus shorting the totalizer.

c. Operation of S1 transfer contacts alternately applies power to the S relay and coin tone oscillator, thus stepping totalizer back to home position and generating coin signals.

d. The dc resistance of the S relay coil is 230 ohms ±5 per cent.

4. C (Coin Arm Off-Normal) Contacts:

a. On all coin deposits, the C contacts transfer to prevent the totalizer from stepping back while the coin arm is held down by a coin.

b. The normally closed C contacts, when opened, remove the current path from the S relay; while the normally open contacts, when closed, connect a click suppression circuit.

5. CS (Coin Signal Speed Changing) Contacts:

a. The CS contacts operate only on quarter deposits.

b. The normally closed CS contacts open to allow more voltage across the S relay, thus providing a faster readout.

c. The normally open CS contacts bypass the normally closed C contacts to allow the S relay coil to energize, thereby allowing early totalizer response before the quarter arm returns to normal.

6. RE (Reset Electromagnet):

a. The primary function of the RE relay is to reset the T1 contacts to normal on coin collect or refund pulses.

b. When the initial rate is registered in the totalizer, the T1 contacts operate and the spring loaded rate latch engages and holds T1 in its operated position.

c. When the RE armature operates, it disengages the rate latch and T1 restores to normal.

d. A second function of the RE relay is to control the F (fraud) switch.

7. Antifraud Provision (F Switch Contacts and Fraud Latch):

a. The F switch provides no essential function in the CF mode.

b. The fraud latch operates when the totalizer is off normal and RE is operated, thus preventing fraudulent ground start.

8. Polarity Guard:

The Polarity guard around the totalizer circuit allows it to operate on positive or negative battery.

Output characteristics of the totalizer are:

1. Tone Pulsing:

a. Fast readout (quarter only) – 5 beep tones, pulsing rate 12 – 17 PPS.

b. Slow readout (nickel and dime only) – nickel – 1 beep tone, dime – 2 beep tones, pulsing rate – 5 – 8.5 PPS.

Coin Chassis (Fig. 6)

The coin chassis is a framework for mounting electrical components as follows:

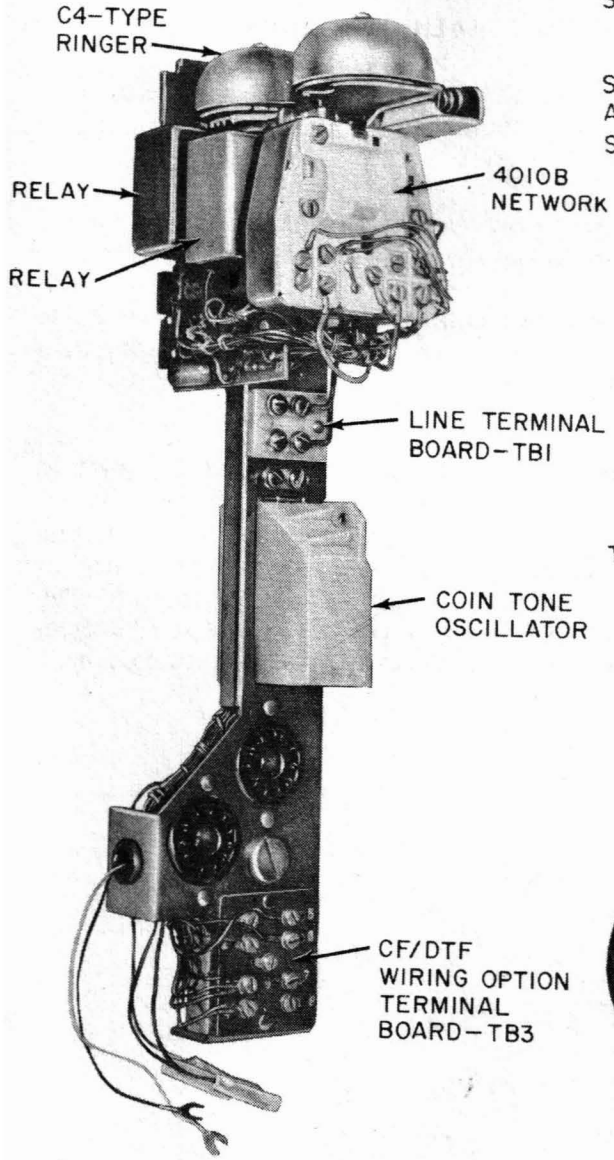


Fig. 6—1A Coin Chassis

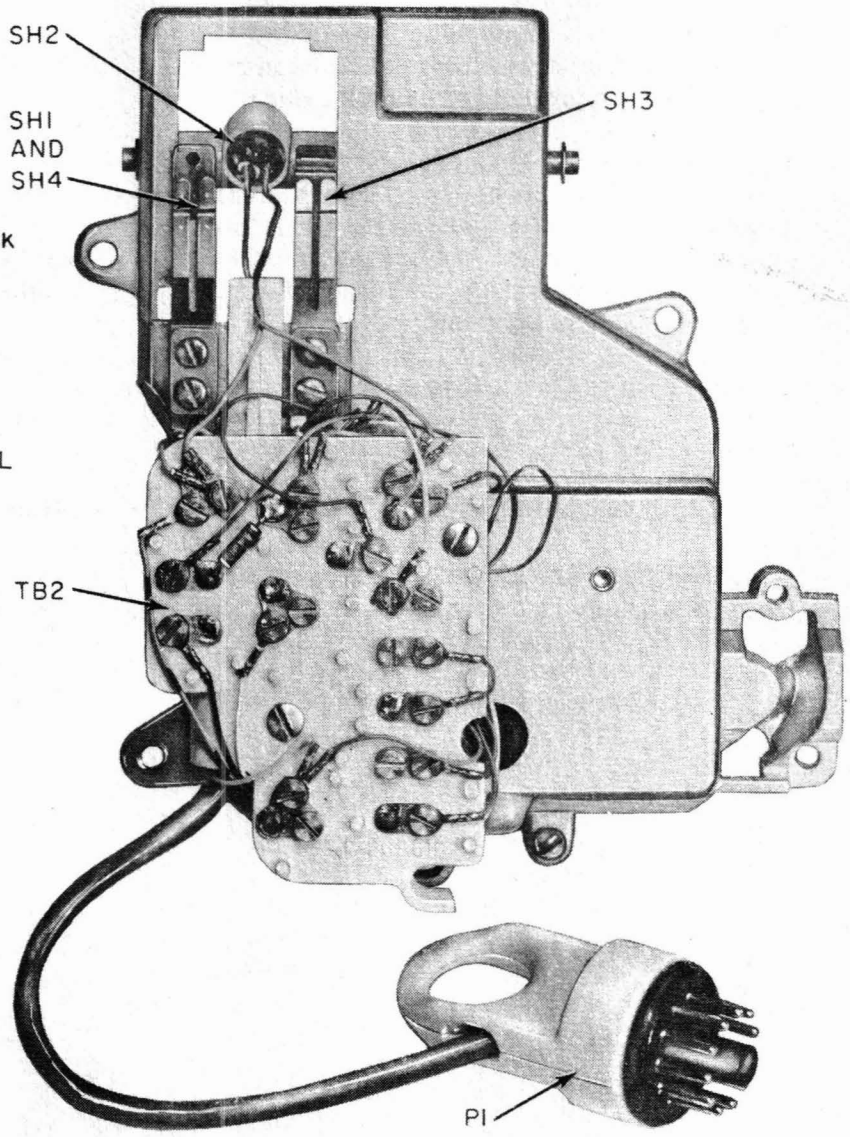


Fig. 7—Typical Dial Housing and Switchhook Assembly

1. B Relay – The B relay contacts close during totalizer readout and place a capacitor across the speech circuit to prevent the customer from hearing coin signals.

2. Coin Signal Oscilator – Generates 2200 Hz tone signal, controlled by totalizer readout indicating to the operator what value of coin has been deposited.

3. A Relay – Provides ground lifting in DTF mode and controls totalizer readout in CF mode.

Dial and Housing Assembly (Fig. 7)

The dial and housing assembly contains the switchhook contacts and rotary or TOUCH-TONE dial. The siwtchhook contacts are operated as the handset is lifted. Contacts SH1, SH2, and SH4 perform the same functions in both CF and DTF modes. SH3 differs as described in (3).

1. SH1 – When operated, SH1 connects the receiver in the speech circuit. The normally closed contacts (when handset is on hook) provide for insufficient deposit refund.

2. SH2 – A mercury switch, connected in parallel with SH4, to prevent switchhook dialing.

3. SH3 – In the DTF mode, its normally closed contacts, when operated, allow totalizer to store deposits up to initial rate before reading out. In CF mode (handset on hook), SH3 normally closed provides a short path to permit insufficient deposit refund.

4. SH4 – Closes ring lead when operated.

5. Rotary dial contacts:

   a. DP – Dial pulsing contacts

   b. DON 1 – Operates when dial is off normal. Shorts receiver to prevent acoustic shock.

   c. DON 2 – Used in DTF mode only. Prevents totalizer readout during dialing.

TOUCH-TONE DIAL COMMON SWITCH:

a. The break contact (y-z) places a resistor in series with the receiver to enable customer to hear low level TOUCH-TONE signals.

b. The transfer contacts (v-e and w-x) disconnect the transmitter and connect the dial oscillator.

c. The make contact (s-t) is used in DTF mode only. It prevents totalizer readout during dialing.

COIN RELAY AND HOPPER ASSEMBLY (FIG. 8)

The coin relay hopper assembly is an electro-mechanical unit which controls the coin collect or refund function. The resistance of the 1A relay winding is approximately 1020 ohms at 70 degrees fahrenheit and is affected by temperature changes.

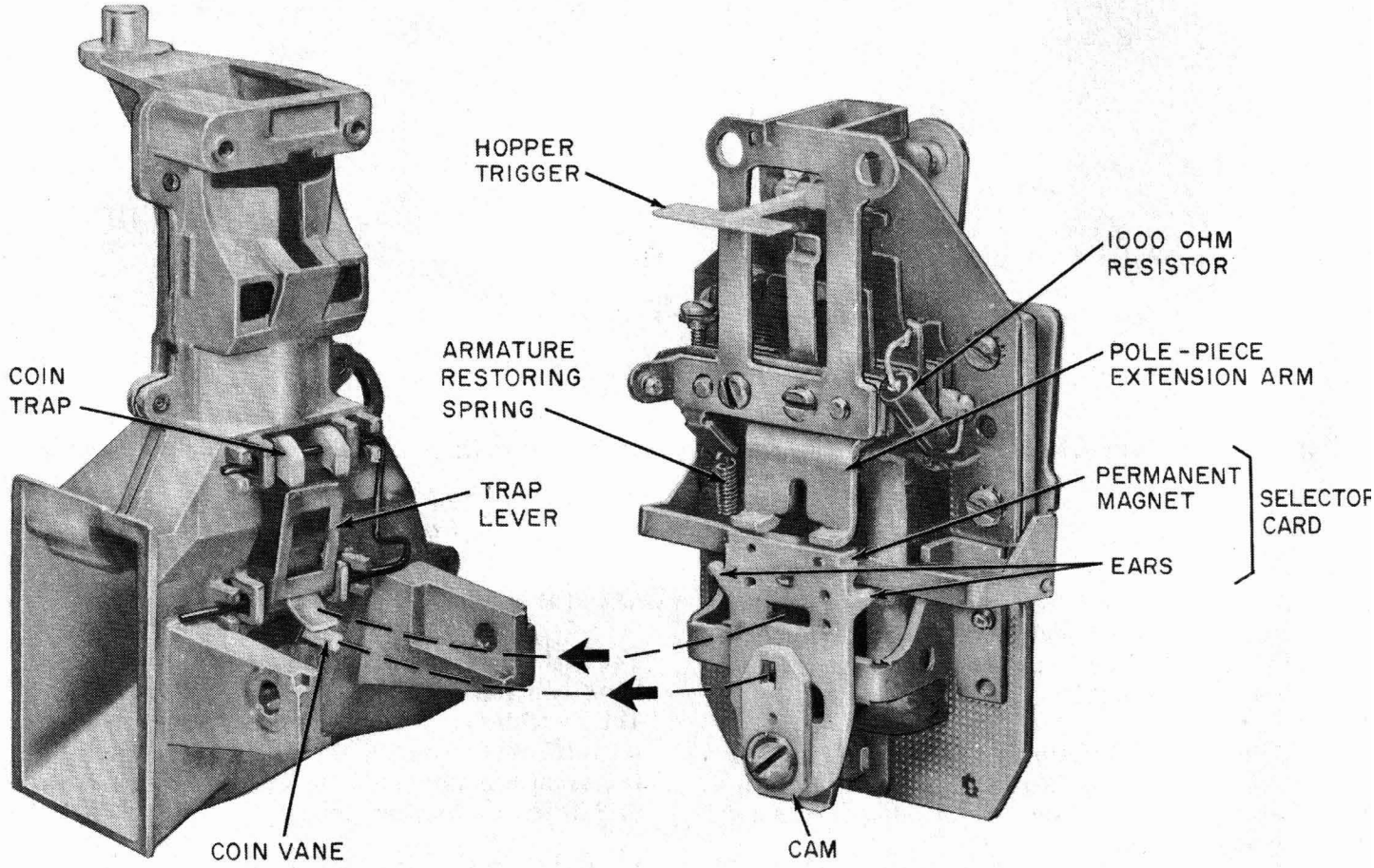


Fig. 8—1AA Coin Relay

Operating Values of Coin Relays are:

. Operate current – 41 milliamps

. Nonoperate current – 30 milliamps

. Operating time – 450 ±50 milliseconds

a. Hopper trigger contacts (HT) are closed by the first coin deposited. All coins deposited are temporarily stored in the hopper, on the coin trap, until dumped when the coin relay operates.

b. The selector card is polarized to move to the right or left, depending on the polarity of the central office voltage applied. This mechanically operates the cam which in turn operates the coin vane in hopper to collect or refund coins.

c. Upon completion of coin relay operating cycle, the HT and coin trap restore to normal.

GROUND LIFTING CIRCUIT (Used in DTF Only) (Fig. 9 and 10):

a. The ground lifting circuit is composed of the A relay, a polarity guard, and associated varistors, resistors, and capacitors. When loop current is flowing in the ring lead, the A relay operates to remove the ground connection at the station. Removal of ground at the station reduces noise unbalance.

b. Capacitors outside the polarity guard lower the ac impedance and prevent transients induced by collect or refund pulses.

COIN RETURN NETWORK (Used in DTF Only) Fig. 9 and 10):

a. The coin return network is composed of an SCR, a zener diode, and associated resistors, thermistor, and diode. The principle function of this circuit is to allow refund to occur if the T1 contact in the ground lead is open.

b. When the high negative voltage coin pulse is applied to the tip lead, the SCR switches and permits current to flow allowing coin relay and RE to operate.

c. When -48 volts is applied to the tip lead, during the initial rate ground test, current flows if T1 is operated. the -48 volts is insufficient to switch the SCR.

d. When the coin present test is made with +48 volts on the tip lead, the diode bypasses the network to allow successful completion of the test.

e. The zener diode controls the firing level (67 volts) of the SCR.

f. Resistors and thermistor are used to compensate for temperature variation.

TIP RELAY CIRCUIT (Used in CF only) (Fig. 11 and 12):

a. The A relay circuit is placed in the tip lead in the CF mode.

b. After initial rate deposit, and tip is grounded at the CO, the A relay operates and allows the totalizer to read out after each subsequent coin deposit.

THEORY OF OPERATION

DIAL-TONE-SERVICE (Fig. 9 and 10)

ORIGINATING A CALL

1. In DTF service, the central office line relay is wired for loop start (ring -48 volts; tip grounded.

   When the handset is lifted, switchhook contacts SH3 and SH4 and SH1 operate in that order and loop current flows from the ring lead to tip. This path is through the A relay winding, the normally closed T2 contact, the operated SH1 and SH4 contacts, through the speech network to tip. Current through this path operates the CO line relay and the A relay to remove station ground. Dial tone is received.

2. Dialing With No Deposit Made:

   a. If dialing a number with no deposit required, the number can be dialed immediately after dial tone is received and the call will be forwarded.

   b. If dialing a number which required a deposit, and no deposit is made, the initial

rate ground test is made. This test occurs at different times (during or after dialing) in various switching systems.

- During the initial rate ground test, the CO removes -48 volts from ring and connects it to tip, thus temporarily releasing the A relay.

- When no ground is detected (indicating HT or T1 open), the initial rate test has not been satisfied and a recording will instruct the customer to reinitiate his call with the proper deposit.

3. For a partial deposit of initial rate, T2 operates as well as HT and the dial and talking path is maintained. This path is from the ring terminal through the A relay winding, through normally closed T1, operated SH3 contacts, DP contacts (rotary dial only), operated SH2 and SH4 contacts, through the speech network, transmitter, normally closed v-e contacts (TOUCH-TONE dial only), back through the speech network to tip.

4. Upon additional deposit to initial rate, T1 operates, removing the short from totalizer and B relay winding. This allows B relay to operate and current flow to the totalizer and coin signal oscillator. A path now exists from the ring terminal through the A relay winding, B relay winding, S (stepping) relay winding, C and S1 totalizer contacts, through DP contacts (rotary dial only), operated SH2 and SH4 contacts, through the speech network and transmitter, normally closed v-e contacts (TOUCH-TONE dial only), back through the speech network to tip. As S1 transfers and the totalizer reads out, the coin tone oscillator is energized intermittently. The operated B relay shorts the speech circuit so the customer cannot hear the generated beep tones.

5. When the totalizer steps back to home, T2 restores, shorting the totalizer and B relay winding. The B relay releases, removing the AC short across the speech network. Even though the totalizer is returned to home position, T1 contact remains operated because it is mechanically latched in its transferred position.

6. A dialing and talking path now exists from the ring lead to tip. This path is through the A relay winding, normally closed T2 contacts, normally closed DP contacts (rotary dial only) operated SH2 and SH4, the speech network, transmitter, normally closed v-e contacts (TOUCH-TONE dial only) back through the speech network to tip.

7. With a rotary dial, the dial-off-normal contacts short out the receiver during dialing.

8. With a TOUCH-TONE dial, v-e contacts open while w-x contacts close during dialing, thus removing the transmitter from the speech network. Also the y-z contacts open, removing the shunt across the level limiting resistor to reduce oscillator sidetone in the receiver.

RESTORING SET TO STANDBY

1. Upon completion of call, customer hangs up handset, SH contacts restore, and the A relay releases. CO removes -48 volts from ring, ground from tip, and a collect (+115 to +135 volts) or refund (-115 to -135 volts) pulse is applied to tip, operating the coin relay and reset electromagnet (RE).

2. Operation of coin relay collects or refunds coin(s), and operation of RE unlatches totalizer contact T1.

3. The operated coin relay closes its make contact causing the current to bypass the relay and flow through the resistor which was previously shorted. The short across the relay winding causes the relay to be slow release. The resistor, having approximately the same resistance as the coin relay winding, is placed in the circuit to protect relay contacts in the CO and HT contacts in the set.

4. As the coin relay releases, the HT contacts open, placing the coin phone in its idle or standby condition.

CALL ABANDONED

Partial Initial Rate Deposited

a. Upon hanging up handset, SH contacts restore. When SH3 restores, the short around the totalizer is removed and current flows through the A relay winding, polarity guard, B relay winding, S relay winding, C and S1 contacts, operated T2, normally closed SH1, and the speech network to tip.

b. Operation and release action of the S relay

causes the totalizer to step back to its home position.

c. When the totalizer has been stepped to home, T2 contact restores, shorting the totalizer and opening the telephone circuit. Shorting the totalizer releases the B relay. Both relays restore to normal.

d. The CO, detecting the open circuit, applies -115 to -135 volts return battery to tip side of line to return the deposit. This causes the coin relay and RE to operate.

e. As the coin relay releases, HT opens, placing set in its idle or standby condition.

Initial Rate Deposited

a. Upon hanging up handset, SH contacts restore and A relay releases. CO removes -48 volts from ring, ground from tip, and a refund (-115 to -135 volts) pulse is applied to tip, operating the coin relay and RE, thus releasing T1.

b. As the coin relay releases, HT opens, placing set in its idle or standby condition.

NICKEL LOCAL OVERTIME

1. After the called party answers, the CO initiates timing.

2. When the initial talk period has ended, collect voltage is applied and the initial deposit is collected.

3. After approximately a 30 second interval, a coin supervisory control circuit is connected to the line.

4. If a nickel is deposited, T2 and HT in the coin station operate, the CO reverses battery on the line (applies +48 volts with tip grounded) for approximately 600 milliseconds and the totalizer reads out. When totalizer reads out, T2 reverts to normal.

5. With T2 in its normal position, CO applies +48 volts to tip, with ring open, to check for coin presence. If test is satisfied, conversation may continue.

6. If a nickel is not deposited, a recording or an operator is connected to the line and requests the overtime deposit.

COIN DISPOSAL TEST

1. Immediately after collect or return voltage is applied following customer disconnect, the CO makes a coin disposal test by applying +48 volts to the tip side of the line with ring open.

2. If no coin ground is detected, the HT contacts are open and the test is satisfied. If ground is detected, the HT contacts are still closed, indicating a failure to dispose of coin.

3. If ground was detected in 2, the CO again applies collect or return voltage and repeats tests. If this second test fails, an alarm condition is indicated at the CO for corrective action.

TOLL CALL

1. Originate a call to operator.

2. After the number is dialed, the CO automically applies return voltage and any previous coin deposit is returned.

3. The call is then connected to either a TSPS trunk or to a cord switchboard operator trunk.

4. If the call is connected to a TSPS:

   a. A TSPS operator is automatically connected to the calling party.

   b. The local office TSPS trunk applies +48 volt battery on the ring side of the line toward the station. This replaces the normal -48 volt talk battery on the line for the remainder of the call, which removes the short across the totalizer (positive battery blocked by CR4) and any station TOUCH-TONE dial is disabled.

   c. The TSPS operator requests the deposit required for initial talk period as displayed on the position, then monitors the coin tone signals for correct deposit and releases the position from that call.

   d. After the called party answers, the TSPS trunk times the call and at the end of the initial charge period causes the CO to collect the initial deposit and routes the call to an idle TSPS position. (This may not be the same operator as before.)

   e. The operator is connected to the call and

instructs the customer to signal when through. The position is released and the TSPS trunk continues to time the call automatically.

f. When the customer flashes the switchhook at the end of the call, an idle TSPS position is connected. The operator requests coin deposit in amount displayed at the position, monitors the coin tone signals for correct deposit, collects the deposit, and releases the position.

g. The customer hangs up handset. If the operator fails to collect the deposit it is automatically collected and a coin disposal test is made. The station is now idle and ready for another call.

If the call is connected to a cord switchboard operator:

1. +48 volt battery is applied to the ring side of the line toward the station.

2. The operator requests the deposit required for initial period, monitors the coin tone signals for correct deposit and completes the call.

3. The operator times the call, and at the end of the initial period, collects the deposit, and instructs the customer to signal when through.

4. When the customer flashes the switchhook at the end of the call, the operator determines the overtime charge, and requests a coin deposit in the amount of the overtime charge. The operator monitors the coin tone signals for the correct deposit, collects the deposit, then disconnects.

5. The customer hangs up handset and the station is now idle and ready for another call.

INCOMING CALL

The CO applies ringing over tip and ring to the station.

NOTE: Incoming collect calls cannot be received when the ring to tip talk battery is negative since the totalizer is shorted by SH3, T1, and CR4.

1. When the handset is lifted, ringing is shorted which trips a relay in the CO thus removing ring battery from the line. The shorting path is from ring, through the A relay winding, normally closed T2, DP contacts (rotary dial only), operated SH2 and SH4 contacts, through the speech network to tip.

   The CO now applies talk battery to ring and ground to tip.

COIN FIRST SERVICE (Fig. 11 and 12)

Originating A Call

In CF service, the central office is monitoring the ring to ground path (ring -48 volts, tip open).

1. When the handset is lifted, switchhook contacts SH3, SH2 and SH4, and SH1 operate in that order and a path exists from ring to the HT contacts. This path is through the normally closed T2 contacts, the DP contacts (rotary dial only), operated SH2 and SH4, through the speech network, transmitter, v-e contacts (TOUCH-TONE dial only), RE, coin relay winding to the normally open HT.

2. For a partial deposit of initial rate, T2 operates as well as HT.

3. Upon deposit of initial rate, T1 operates, thereby closing the normally open T1 contact, completing the ring to ground path. This path is from ring through the normally closed A relay contact, through operated T1 contacts, F contacts, operated SH3, DP contacts (rotary dial only), operated SH2 and SH4, through the speech network, transmitter, normally closed v-e contacts (TOUCH-TONE dial only), RE, coin relay, HT contacts, to ground.

4. The CO applies dial tone and grounds the tip side of the line.

5. Grounding the tip operates the A relay causing the A contacts to transfer. Opening the normally closed A contact removes the shorting path from the totalizer. A path now exists through the B relay winding, S (stepping) relay winding, C and S1 totalizer contacts, through operated T1, normally closed F contacts, operated SH3, DP contacts (rotary dial only), operated SH2 and SH4, through the speech network, transmitter, normally closed v-e contacts (TOUCH-TONE dial only), back through the speech network, through the A relay winding to tip. As S1 transfers and the totalizer reads out, the coin tone oscillator is energized inter-

mittently. The operated B relay shorts the speech circuit so the customer cannot hear the generated beep tones.

6. When the totalizer steps back to home position, T2 restores, shorting the totalizer and B relay winding. The B relay releases, removing the AC short across the speech network. Even though the totalizer is returned to home position, T1 contact remains operated because it is mechanically latched in its transferred position.

7. A dialing and talking path now exists from the ring lead to tip. This path is through the normally closed T2 contacts, normally closed DP contacts (rotary dial only) operated SH2 and SH4, the speech network, transmitter, normally closed v-e contacts (TOUCH-TONE dial only) back through the speech network, through the A relay to tip.

8. When dialing with a rotary dial, the dial-off-normal contacts short out the receiver.

9. When dialing with a TOUCH-TONE dial, v-e contacts open while w-x contacts close, thus removing the transmitter from the speech network. Also, the y-z contacts open, removing the shunt across the level limiting resistor to reduce oscillator sidetone in the receiver.

NOTE: If the call is a local noncharge call, the deposit will be returned upon completion of call.

RESTORING SET TO STANDBY

10. Upon completion of call, customer hangs up handset, SH contacts restore, and the A relay releases. CO removes -48 volts from ring, ground from tip, and a collect (+100 to +135 volts) or refund (-100 to -135 volts) pulse is applied to tip, operating the coin relay and reset electromagnet (RE).

11. Operation of coin relay collects or refunds coin(s), and operation of RE unlatches totalizer contact T1.

12. The operated coin relay closes its make contact causing the current to bypass the relay and flow through the resistor which was previously shorted. The short across the relay winding causes the relay to be slow release. The resistor, having approximately the same resistance as the coin relay winding, is placed in the circuit to protect relay contacts in the CO and HT contacts in the set.

13. As the coin relay releases, the HT contacts open, placing the coin phone in its idle or standby condition.

CALL ABANDONED

Partial Initial Rate Deposited

a. Upon hanging up handset, SH contacts restore and current flows from ring to station ground through the normally closed A contact, normally closed SH3, operated T2, normally closed SH1, the transmitter v-e contacts (TOUCH-TONE dial only) RE, coin relay and HT.

b. The CO recognizing the ground, applies ground to tip which operates the A relay and removes the short ground around the totalizer.

c. Current now flows through the polarity guard, B relay winding, S relay winding. C and S1 contacts operated T2, normally closed SH1, the speech network, and the A relay winding to tip.

d. Operation and release action of the S relay causes the totalizer to operate and step back to home.

e. When the totalizer has been stepped back to home, T2 contact restores, shorting the totalizer and opening the telephone circuit. Shorting the totalizer and opening the telephone circuit. Shorting the totalizer releases the B relay. Opening the circuit releases the A relay. Both relays restore to normal.

f. The CO, detecting the open circuit, applies -100 to -135 volts return battery to tip side of line to return the deposit. This causes the coin relay and RE to operate.

g. As the coin relay releases, HT opens, placing set in idle or standby condition.

Initial Rate Deposited

a. Upon hanging up handset, SH contacts restore and A relay releases. CO removes -48 volts from ring, ground from tip, and a refund (-100 to -135 volts) pulse is applied to tip, operating the coin relay and reset electromagnet (RE).

b. As the coin relay releases, HT opens, placing set in idle or standby condition.

NICKEL LOCAL OVERTIME

1. After the called party answers, the CO initiates timing.

2. When the initial talk period has ended, collect voltage is applied and the initial deposit is collected.

3. After an approximate 30 second interval, a coin supervisory control circuit is connected to the line.

4. If a nickel is deposited, T2 and HT in the coin station operate, the CO reverses battery on the line (applies +48 volts with tip grounded for approximately 600 milliseconds and the totalizer reads out. When totalizer reads out, T2 reverts to normal.

5. With T2 in its normal position, CO applies -48 volts to tip, with ring open, to check for coin presence. If test is satisfied, conversation continues.

6. If a nickel is not deposited, a recording or an operator is connected to the line to request an overtime deposit.

COIN DISPOSAL TEST

1. Immediately after collect or return voltage is applied following customer disconnect, the CO makes a coin disposal test by applying +48 volts to the tip side of the line with ring open.

2. If no coin ground is detected, the HT contacts are open and the test is satisfied. If ground is detected, the HT contacts are still closed, indicating a failure to dispose of coin.

3. If ground was detected in the CO again applies collect or return voltage and repeats test. If this second test fails, an alarm condition is indicated at the CO for corrective action.

TOLL CALL

Coin First Station – Coin First Office

1. Originate a call through operator.

2. After the number is dialed, the CO automatically applies return voltage and the deposit is returned.

3. The call is then connected to either a TSPS trunk or to a cord switchboard operator trunk.

4. If the call is connected to a TSPS:

   a. A TSPS operator is automatically connected to the calling party.

   b. The TSPS operator requests the deposit required for initial talk period as displayed at the position, then monitors the coin tone signals for correct deposit and releases the position from that call.

   c. After the called party answers, the TSPS trunk times the call and at the end of the initial charge period causes the CO to collect the initial deposit and routes the call to an idle TSPS position. (This may not be the same operator as before.)

   d. The operator is connected to the call and instructs the customer to signal when through. The position is released and the TSPS trunk continues to time the call automatically.

   e. When the customer flashes the switchhook at the end of the call, an idle TSPS position is connected. The operator requests a deposit in the amount displayed at the position, monitors the coin tone signals for correct deposit, collects the deposit, and releases the position.

   f. The customer hangs up handset. If the operator fails to collect the deposit, it is automatically collected and a coin disposal test is made. The station is now idle and ready for another call.

If the call is connected to a cord switchboard operator:

   a. The operator requests the deposit required for initial period, monitors the coin tone, signals for correct deposit and completes the call.

   b. The operator times the call, and at the end of the initial period collects the deposit, and instructs the customer to signal when through.

c. When the customer flashes the switchhook at the end of the call, the operator determines the overtime charge required, and requests a coin deposit in the amount of the overtime charge. The operator monitors the coin tone signals for correct deposit, collects the deposit, then disconnects.

d. The customer hangs up handset and the station is restored to the idle state and ready for another call.

COIN FIRST STATION – COIN FIRST/DIAL TONE FIRST OFFICE

1. Originate a call through TSPS or A board.

2. After the number is dialed, the CO automatically applies return voltage and any previous deposit is returned.

3. The call is then connected to either a TSPS trunk or to a cord switchboard operator trunk.

4. If the call is connected to a TSPS:

   a. A TSPS operator is automatically connected to the calling party.

   b. The local office TSPS trunk applies +48 volt battery on the ring side of the line toward the station. This replaces the normal -48 volt talk battery on the line for the remainder of the call.

      NOTE: The +48 volts has no effect in the operation of a coin first station, but in a combination office (CF/DTF), this feature is necessary to operate a DTF station which has a diode (CR4) around the totalizer.

   c. The TSPS operator requests the deposit required for initial talk period as displayed at the position, then monitors the coin tone signals for correct deposit and releases the position from that call.

   d. After the called party answers, the TSPS trunk times the call and at the end of the initial charge period causes the CO to collect the initial deposit and routes the call to an idle TSPS position. (This may not be the same operator as before).

   e. The operator is connected to the call and instructs the customer to signal when through. The position is released and the TSPS trunk continues to time the call automatically.

   f. When the customer flashes the switchhook at the end of the call, an idle TSPS position is connected. The operator requests coin deposit in amount displayed at the position, monitors the coin tone signals for correct deposit, collects the deposit, and releases the position.

   g. The customer hangs up handset. If the operator fails to collect the deposit it is automatically collected and a coin disposal test is made. The station is now idle and ready for another call.

5. If the call is connected to a cord switchboard operator:

   a. +48 volt battery is applied to the ring side of the line toward the station.

      NOTE: Refer to note following (4) (b).

   b. The operator requests the deposit required for initial period, monitors the coin tone signals for correct deposit and completes the call.

   c. The operator times the call, and at the end of the initial period, collects the deposit, and instructs the customer to signal when through.

   d. When the customer flashes the switchhook at the end of the call, the operator determines the overtime charge, and requests a coin deposit in the amount of overtime charge. The operator monitors the coin tone signals for correct deposit, collects the deposit, then disconnects.

   e. The customer hangs up handset. If the operator fails to collect the deposit it is automatically collected and a coin disposal test is made. The station is now idle and ready for another call.

INCOMING CALL

1. The CO applies ringing over tip and ring to the station.

2. When the handset is lifted, ringing is shorted which trips a relay in the CO thus removing ring battery from the line. The shorting path is from ring, through the normally closed T2 contacts. DP contacts (rotary dial only), operated SH2 and SH4 contacts, through the speech network, through the A relay winding, to tip.

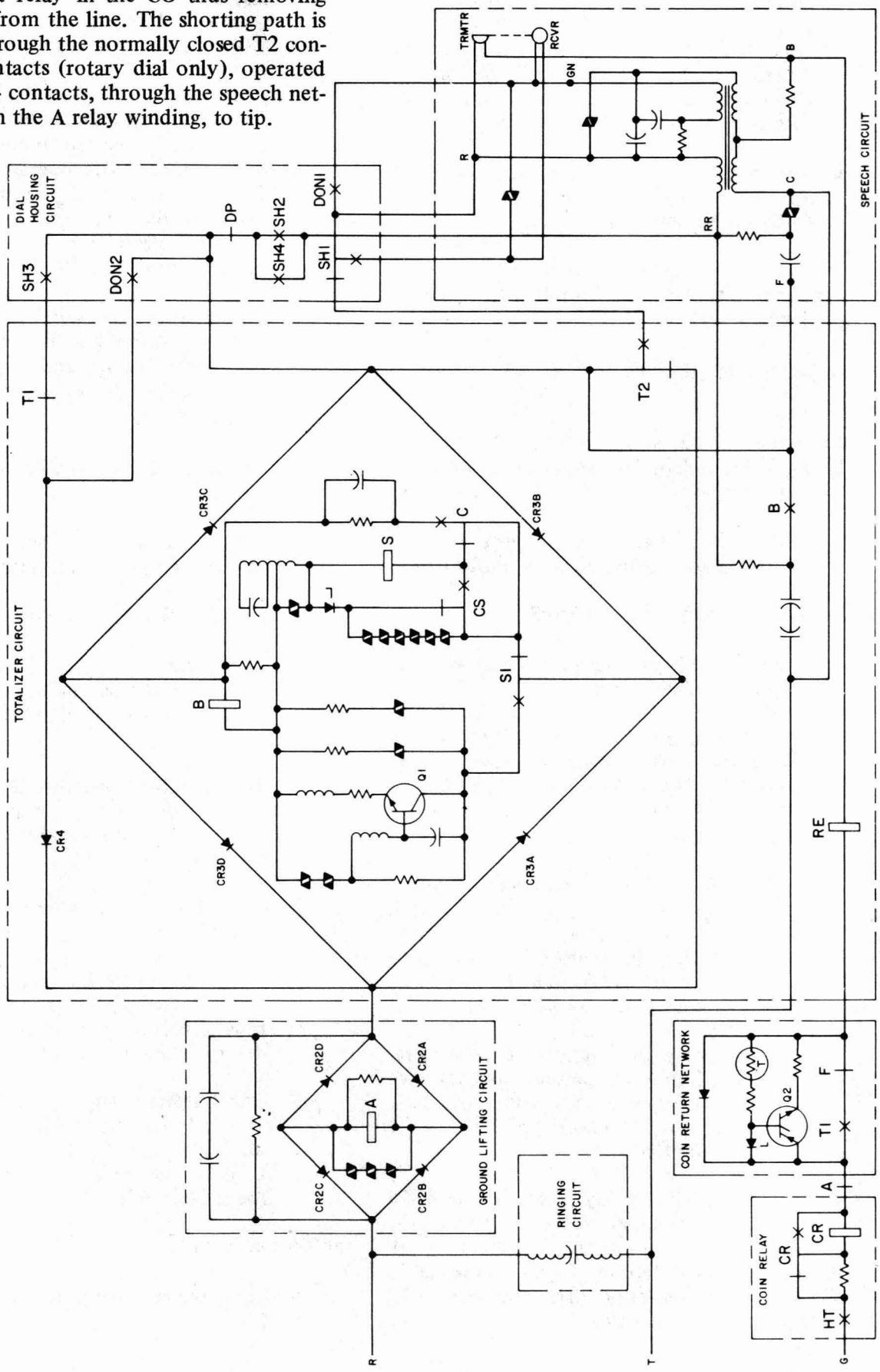


Fig 9—1C1/2C1 Coin Telephone Set—Schematic (DTE Mod)

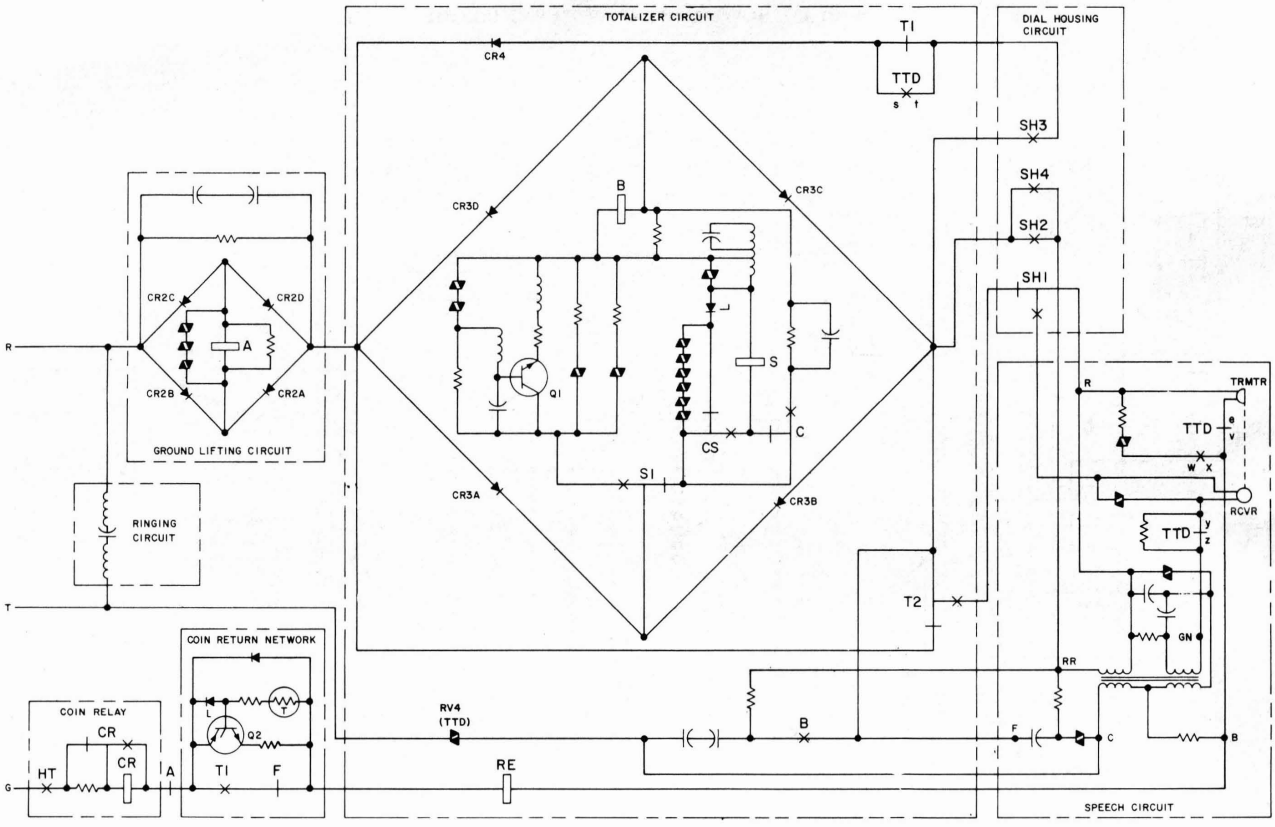


Fig. 10—1C2/2C2 Coin Telephone Set—Schematic (DTF Mode)

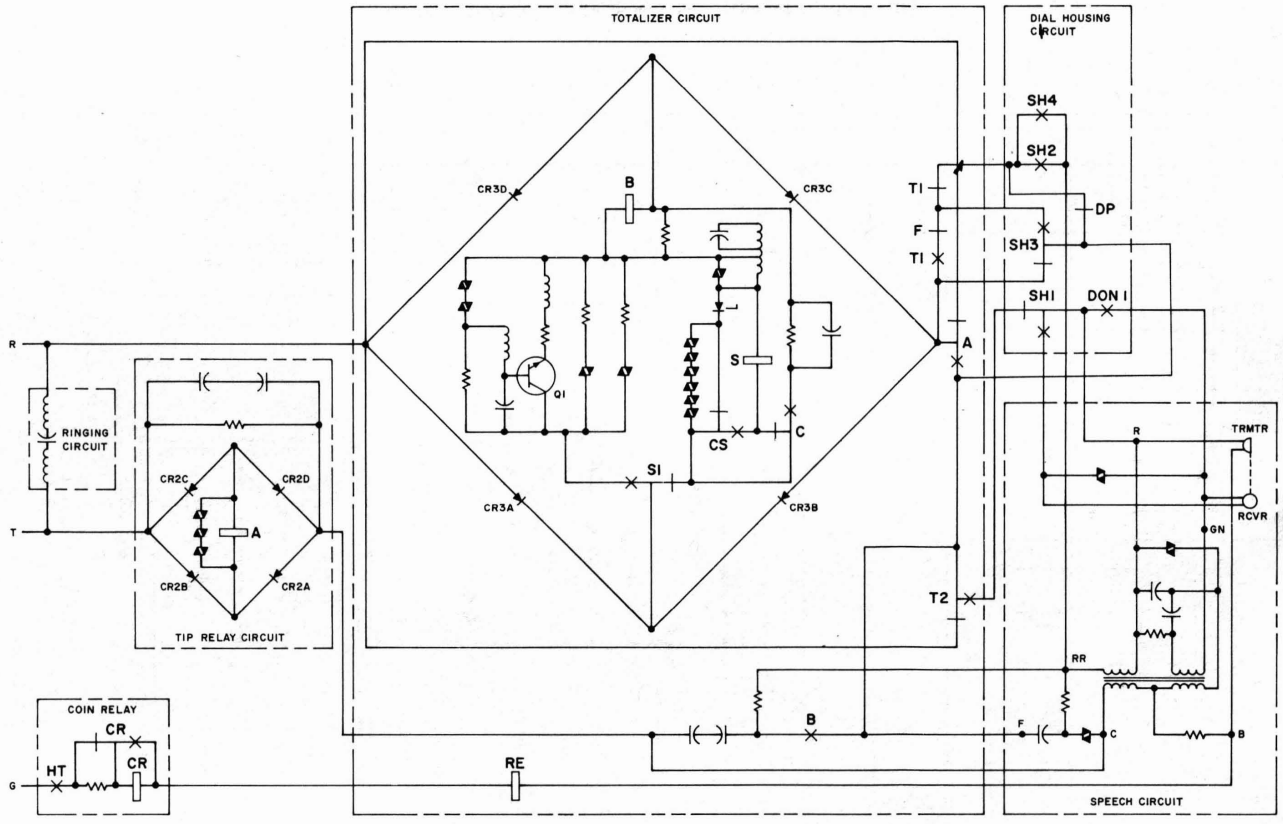


Fig. 11—1C1/2C1 Coin Telephone Set—Schematic (CF Mode)

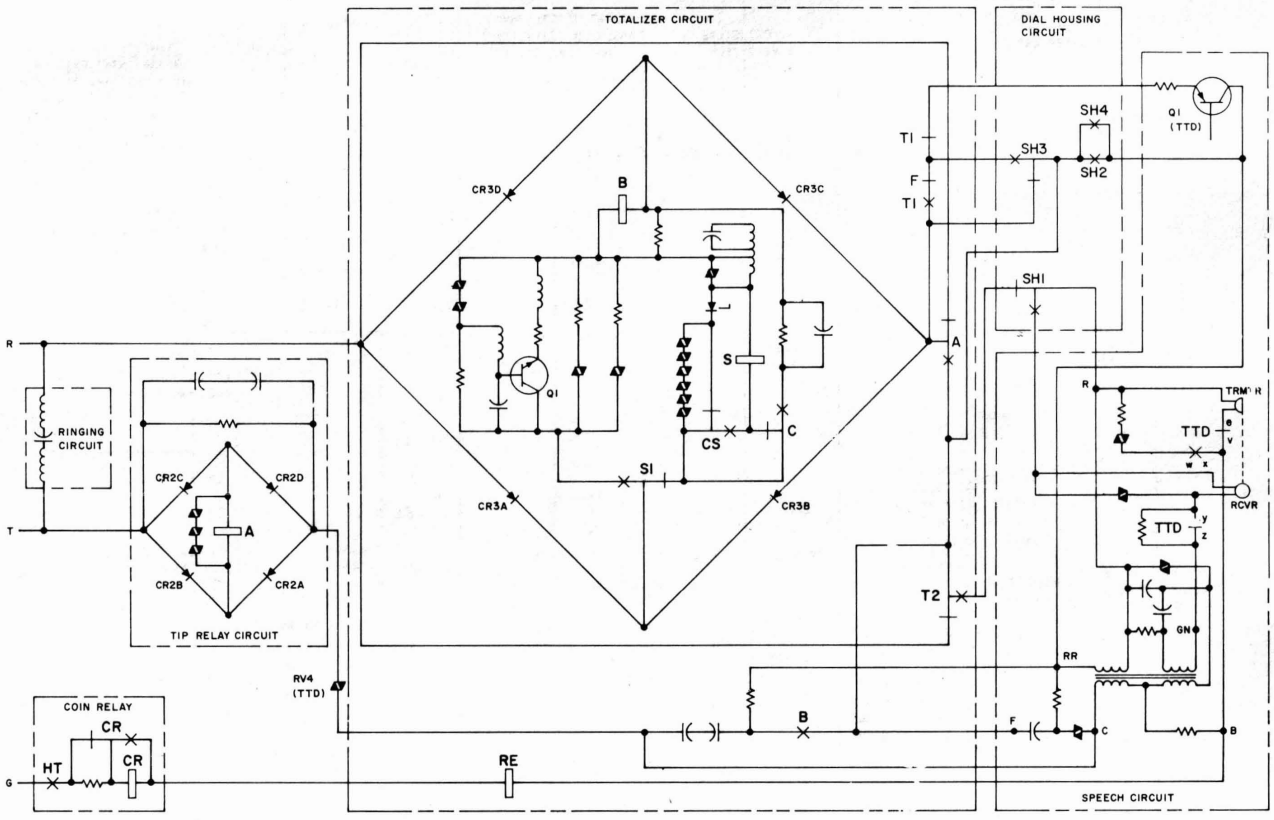
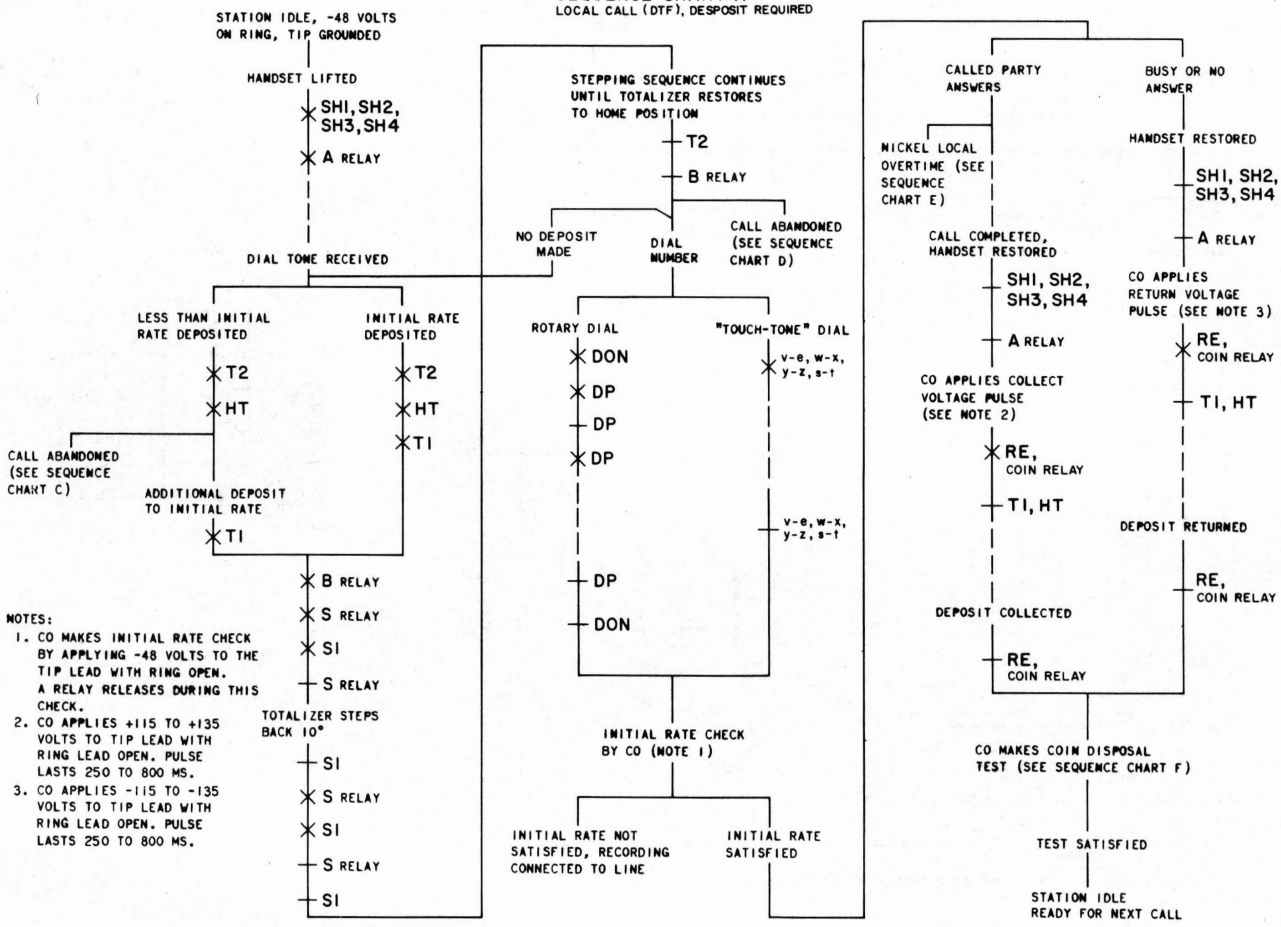


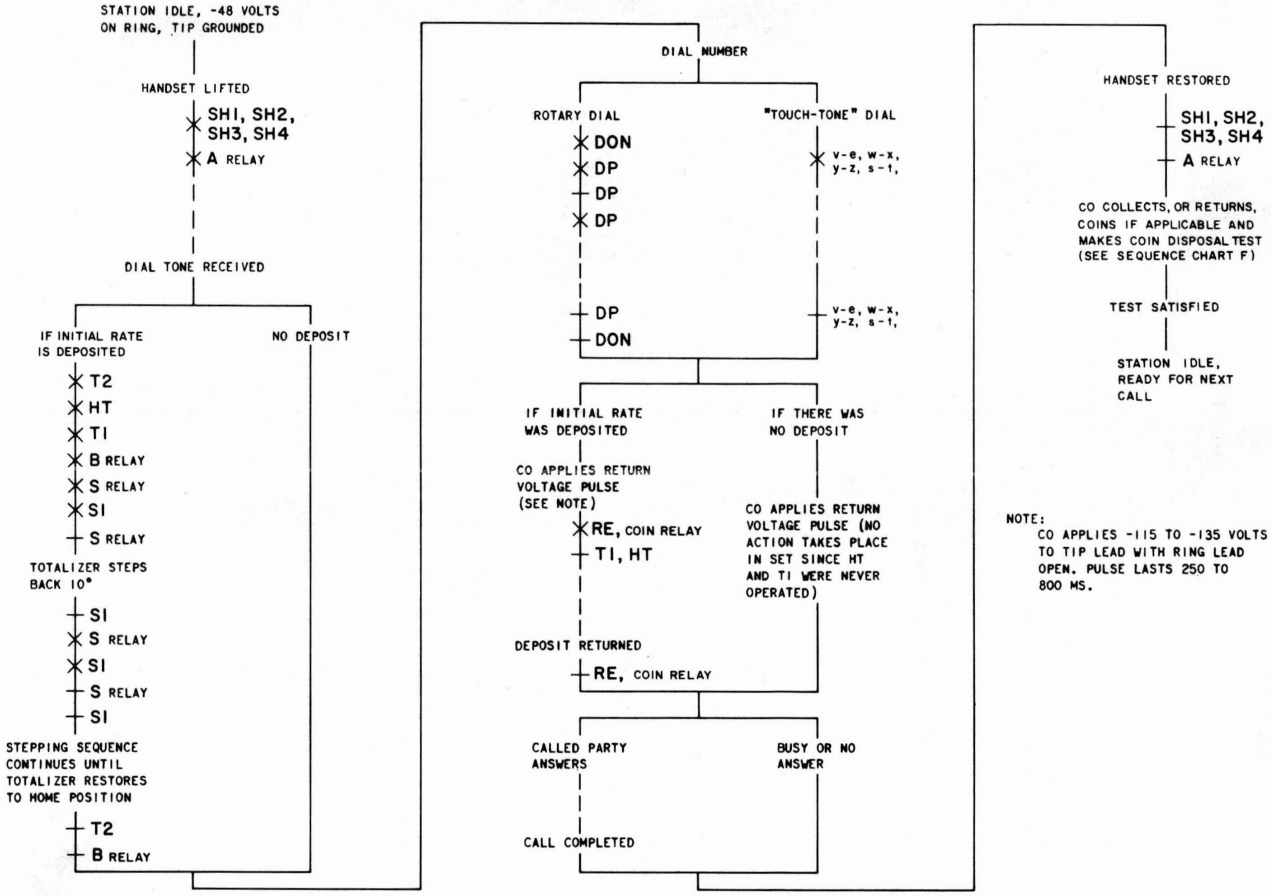
Fig. 12—1C2/2C2 Coin Telephone Set—Schematic (CF Mode)

SEQUENCE CHART A
LOCAL CALL (DTF), DESPOSIT REQUIRED



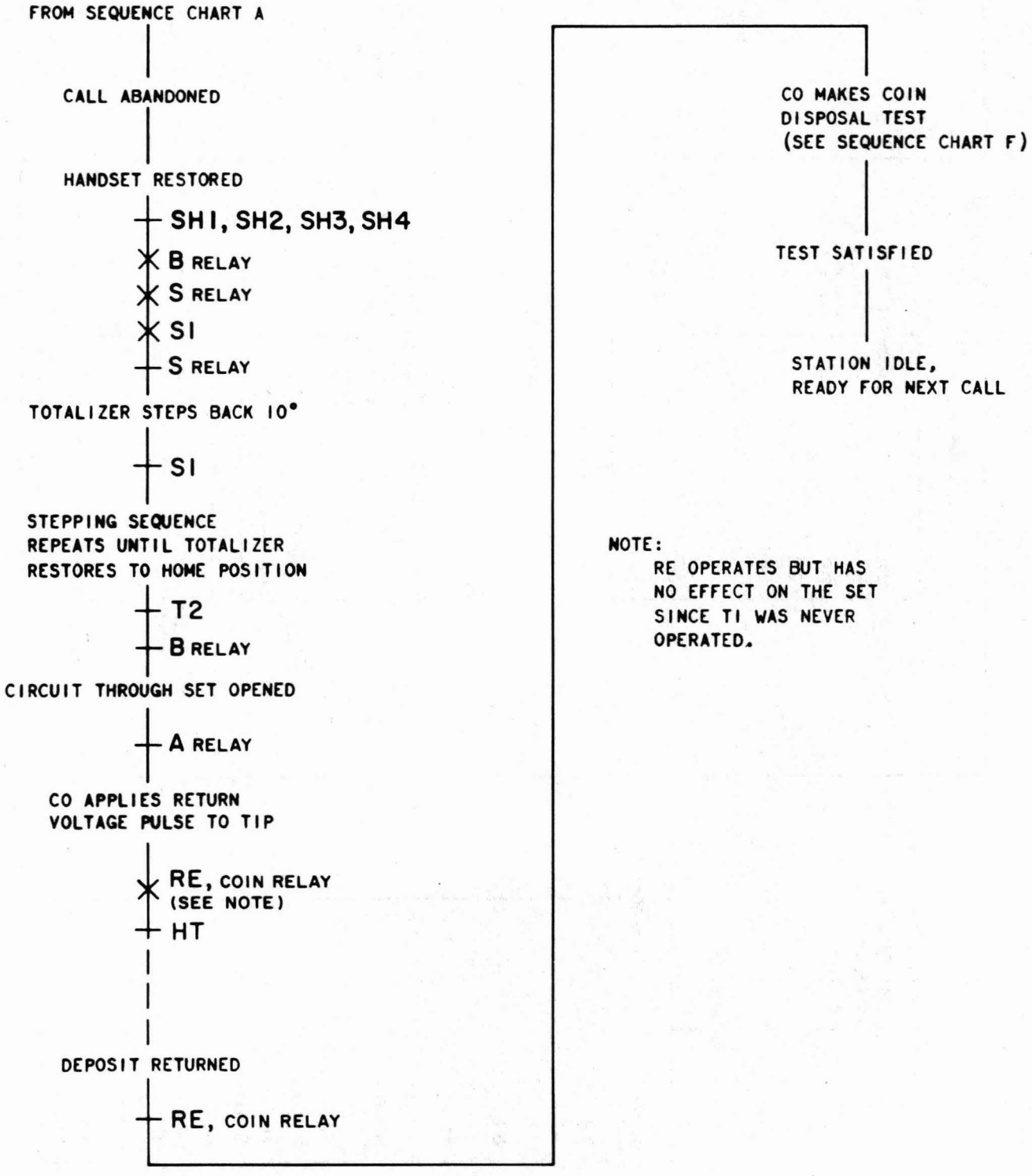
SEQUENCE CHART B

LOCAL CALL (DTF), NO DEPOSIT REQUIRED



SEQUENCE CHART C

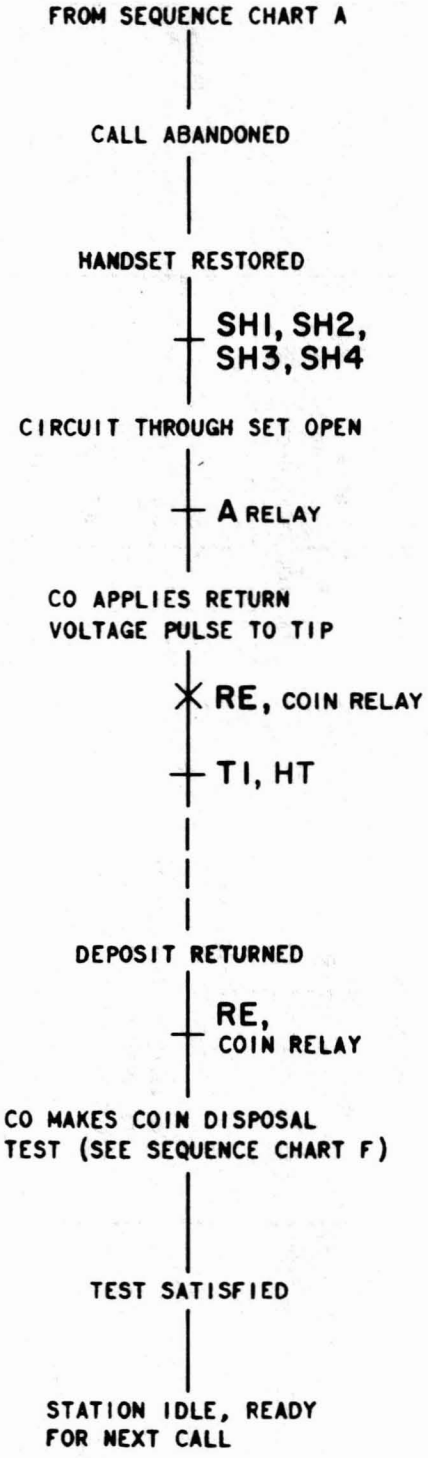
CALL ABANDONED,
INSUFFICIENT DEPOSIT REFUND (DTF)



NOTE:
RE OPERATES BUT HAS NO EFFECT ON THE SET SINCE TI WAS NEVER OPERATED.

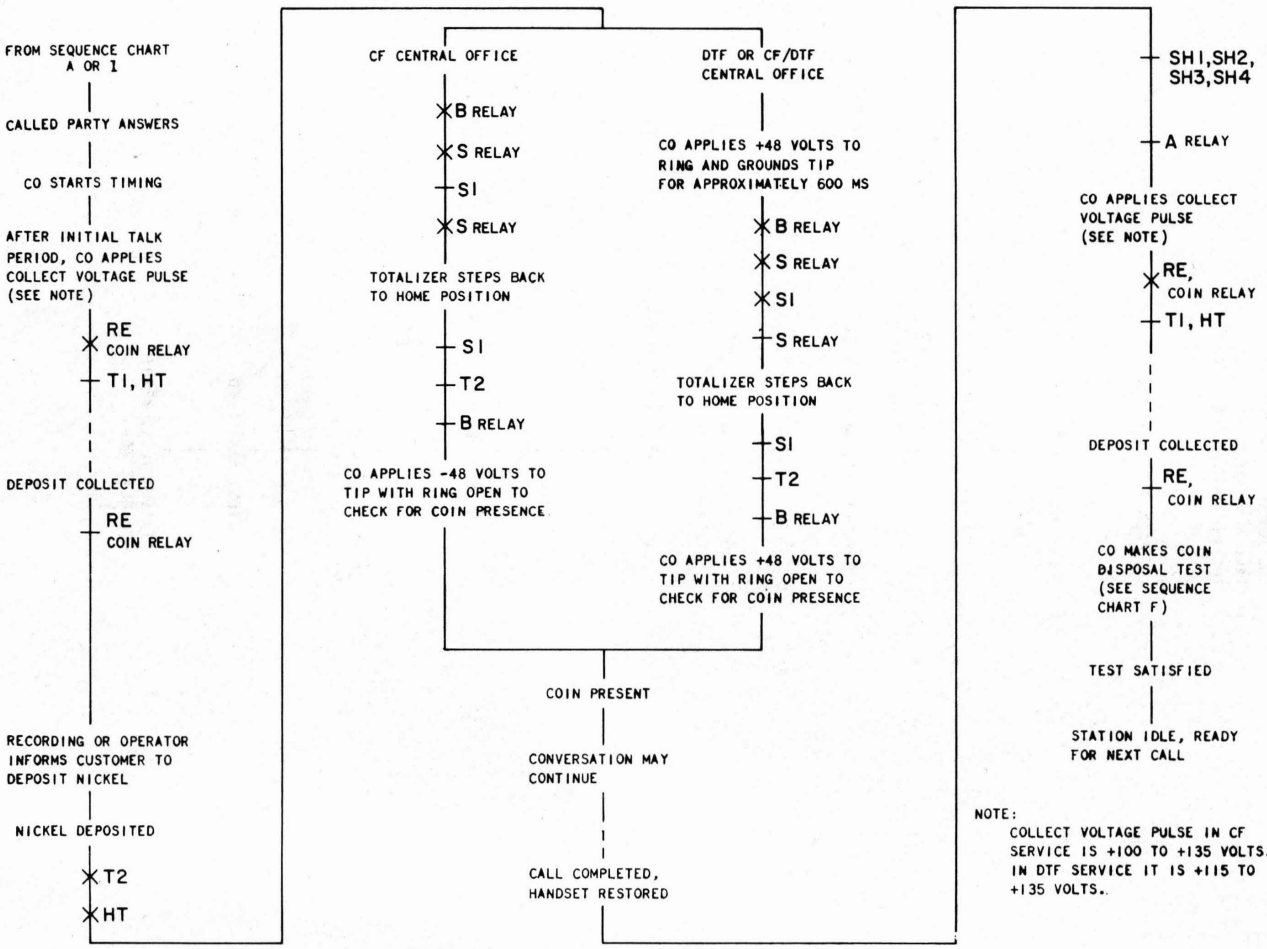
SEQUENCE CHART D

CALL ABANDONED,
INITIAL RATE DEPOSITED (DTF)



SEQUENCE CHART E

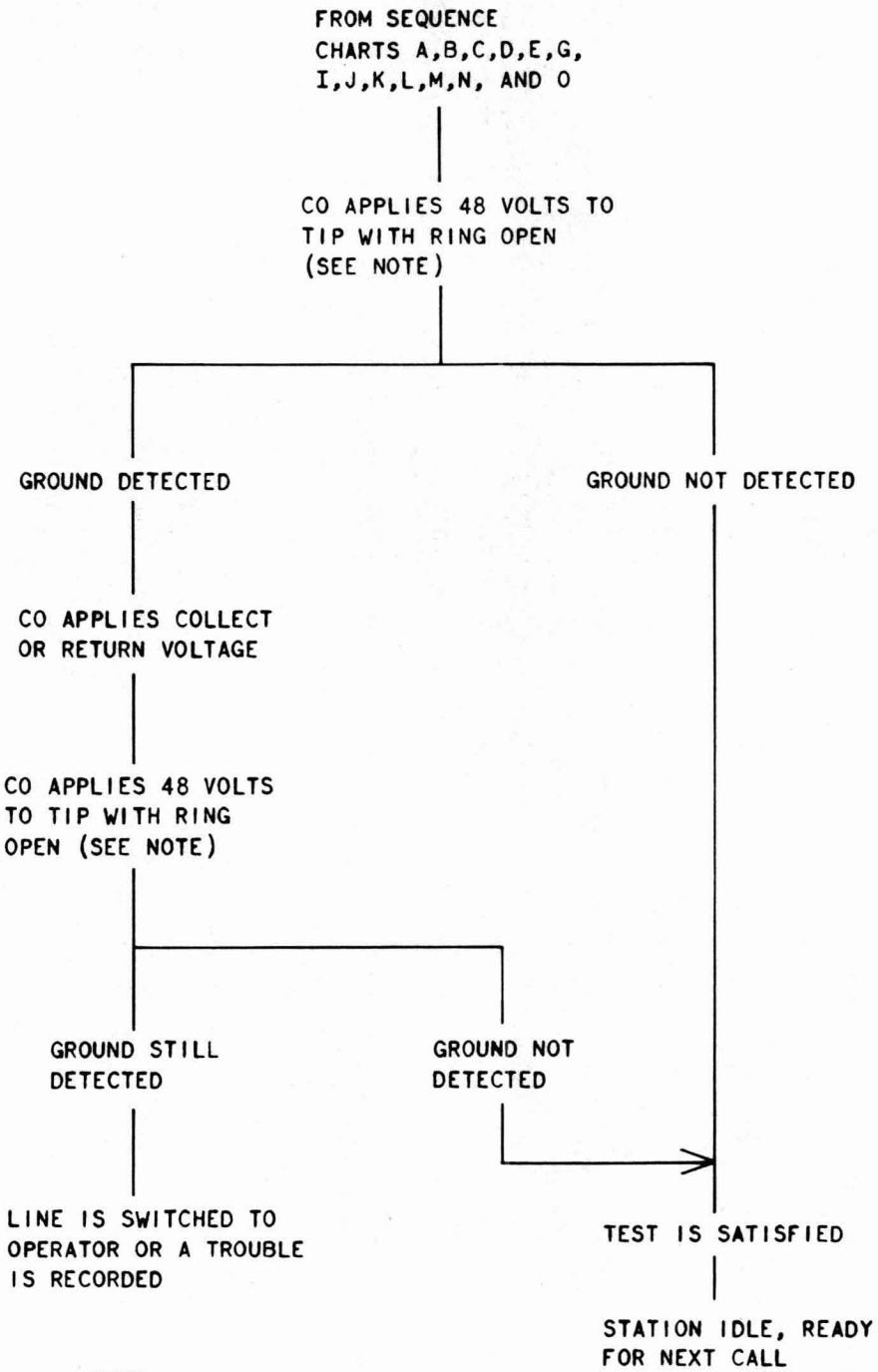
NICKEL LOCAL OVERTIME (CF AND DTF)



NOTE:
COLLECT VOLTAGE PULSE IN CF SERVICE IS +100 TO +135 VOLTS. IN DTF SERVICE IT IS +115 TO +135 VOLTS..

SEQUENCE CHART F

COIN DISPOSAL TEST (CF AND DTF)

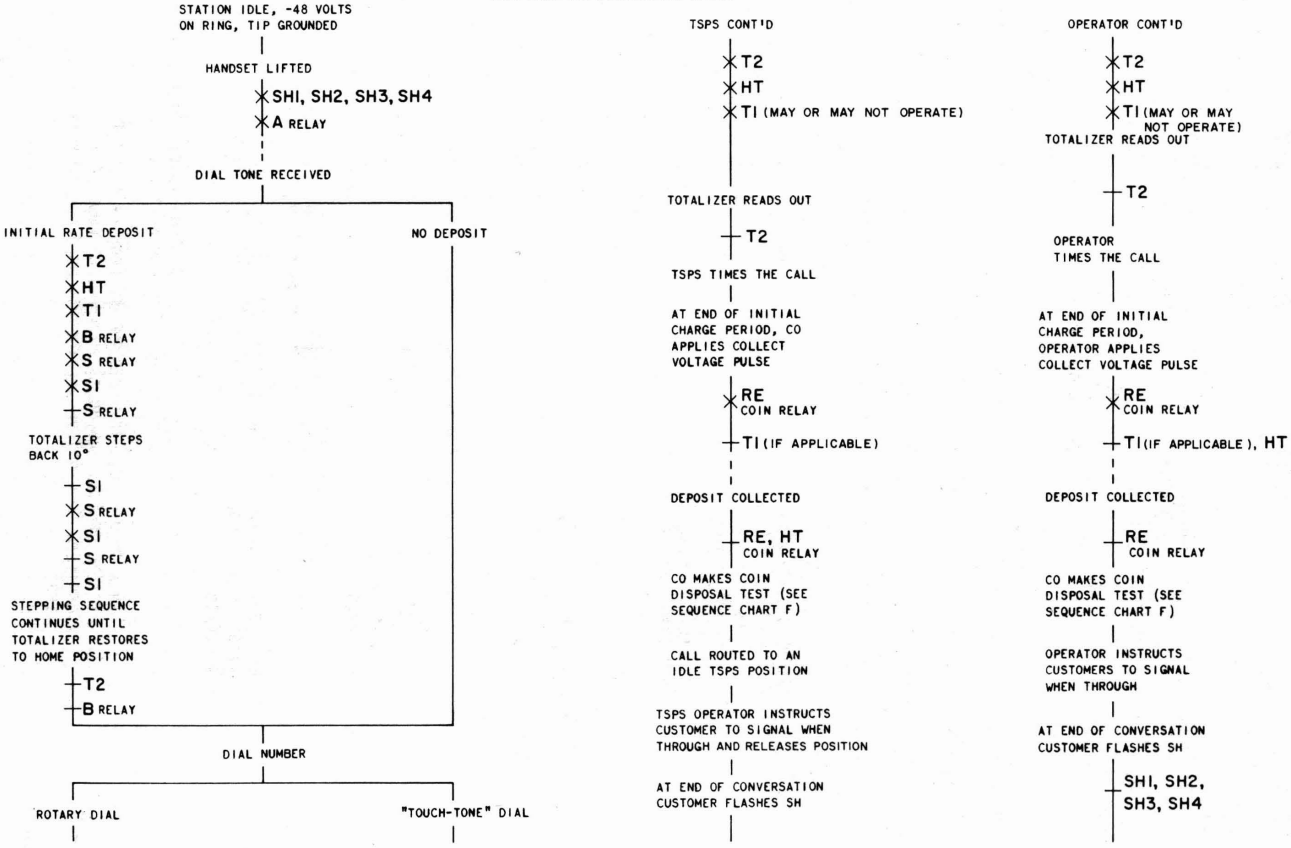


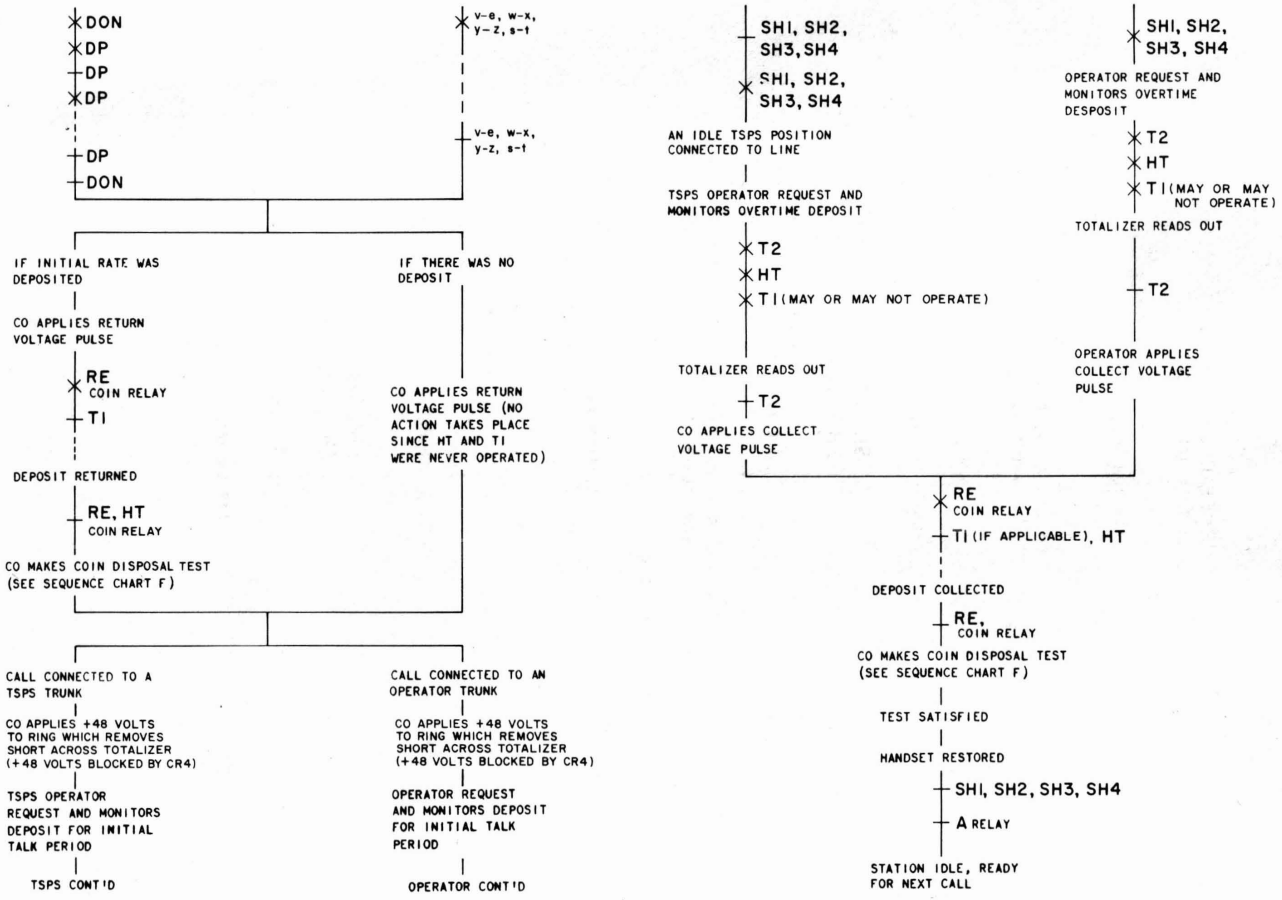
NOTE:

IN A CF OFFICE, -48 VOLTS IS APPLIED; IN A DTF OR CF/DTF OFFICE, +48 VOLTS IS APPLIED; HOWEVER IN SOME OFFICES, COIN RETURN VOLTAGE MAY BE USED FOR THIS TEST.

SEQUENCE CHART G

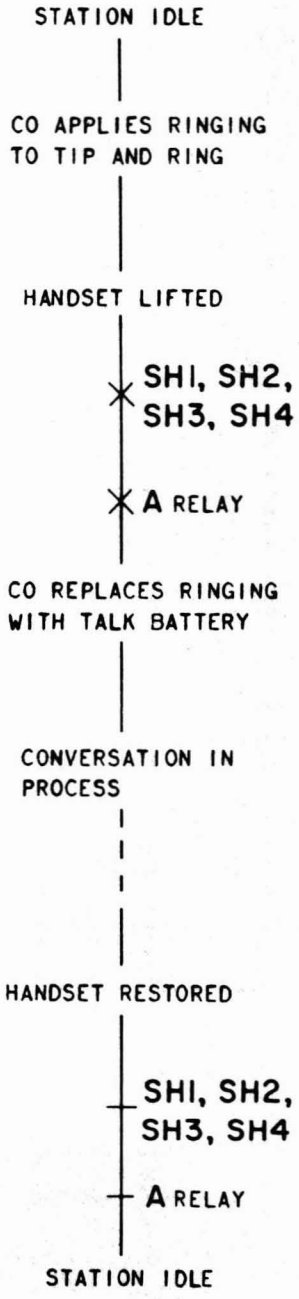
TOLL CALL-DTF STATION, DTF OFFICE



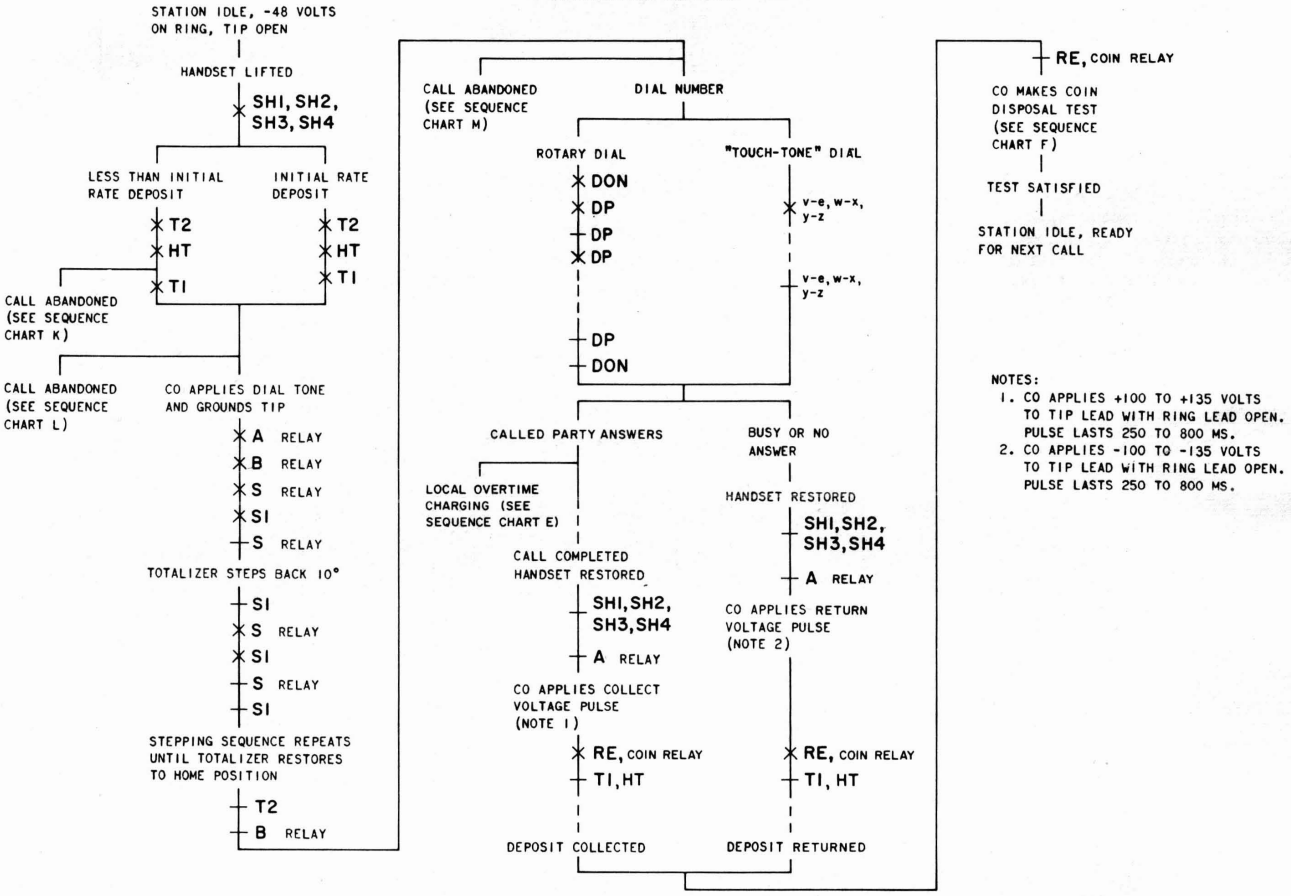

DON
DP
DP
DP
DP
DON
v-e, w-x, y-z, s-t
v-e, w-x, y-z, s-t
IF INITIAL RATE WAS DEPOSITED
CO APPLIES RETURN VOLTAGE PULSE
RE COIN RELAY
TI
DEPOSIT RETURNED
RE, HT COIN RELAY
CO MAKES COIN DISPOSAL TEST (SEE SEQUENCE CHART F)
IF THERE WAS NO DEPOSIT
CO APPLIES RETURN VOLTAGE PULSE (NO ACTION TAKES PLACE SINCE HT AND TI WERE NEVER OPERATED)
CALL CONNECTED TO A TSPS TRUNK
CO APPLIES +48 VOLTS TO RING WHICH REMOVES SHORT ACROSS TOTALIZER (+48 VOLTS BLOCKED BY CR4)
TSPS OPERATOR REQUEST AND MONITORS DEPOSIT FOR INITIAL TALK PERIOD
TSPS CONT'D
CALL CONNECTED TO AN OPERATOR TRUNK
CO APPLIES +48 VOLTS TO RING WHICH REMOVES SHORT ACROSS TOTALIZER (+48 VOLTS BLOCKED BY CR4)
OPERATOR REQUEST AND MONITORS DEPOSIT FOR INITIAL TALK PERIOD
OPERATOR CONT'D
SHI, SH2, SH3, SH4
SHI, SH2, SH3, SH4
AN IDLE TSPS POSITION CONNECTED TO LINE
TSPS OPERATOR REQUEST AND MONITORS OVERTIME DEPOSIT
T2
HT
TI (MAY OR MAY NOT OPERATE)
TOTALIZER READS OUT
T2
CO APPLIES COLLECT VOLTAGE PULSE
SHI, SH2, SH3, SH4
OPERATOR REQUEST AND MONITORS OVERTIME DESPOSIT
T2
HT
TI (MAY OR MAY NOT OPERATE)
TOTALIZER READS OUT
T2
OPERATOR APPLIES COLLECT VOLTAGE PULSE
RE COIN RELAY
TI (IF APPLICABLE), HT
DEPOSIT COLLECTED
RE, COIN RELAY
CO MAKES COIN DISPOSAL TEST (SEE SEQUENCE CHART F)
TEST SATISFIED
HANDSET RESTORED
SHI, SH2, SH3, SH4
A RELAY
STATION IDLE, READY FOR NEXT CALL

SEQUENCE CHART H

INCOMING CALL (CF OR DTF)



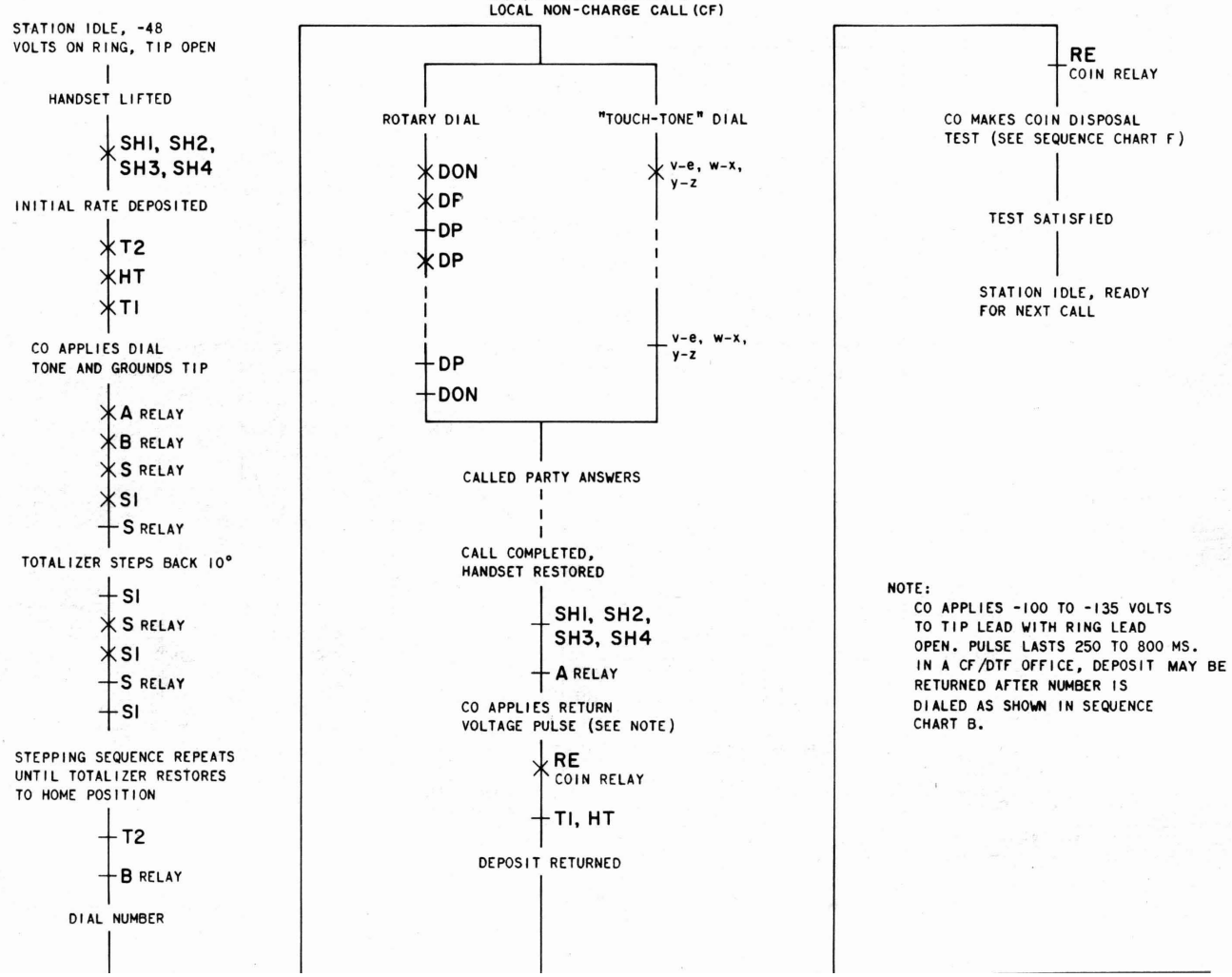
SEQUENCE CHART I
LOCAL CHARGE CALL (CF)



NOTES:

1. CO APPLIES +100 TO +135 VOLTS TO TIP LEAD WITH RING LEAD OPEN. PULSE LASTS 250 TO 800 MS.
2. CO APPLIES -100 TO -135 VOLTS TO TIP LEAD WITH RING LEAD OPEN. PULSE LASTS 250 TO 800 MS.

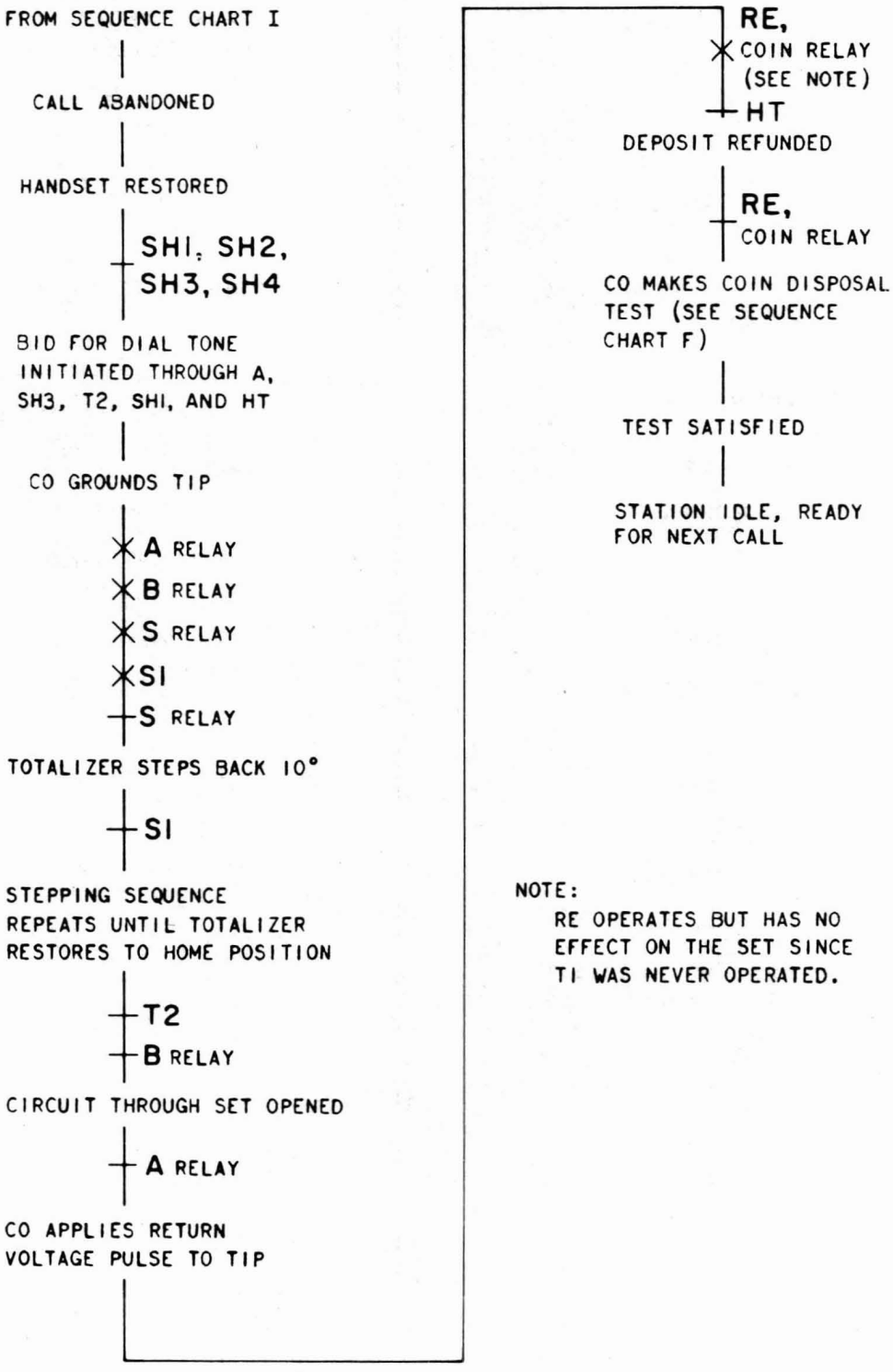
SEQUENCE CHART J
LOCAL NON-CHARGE CALL (CF)



NOTE:
CO APPLIES -100 TO -135 VOLTS TO TIP LEAD WITH RING LEAD OPEN. PULSE LASTS 250 TO 800 MS. IN A CF/DTF OFFICE, DEPOSIT MAY BE RETURNED AFTER NUMBER IS DIALED AS SHOWN IN SEQUENCE CHART B.

SEQUENCE CHART K

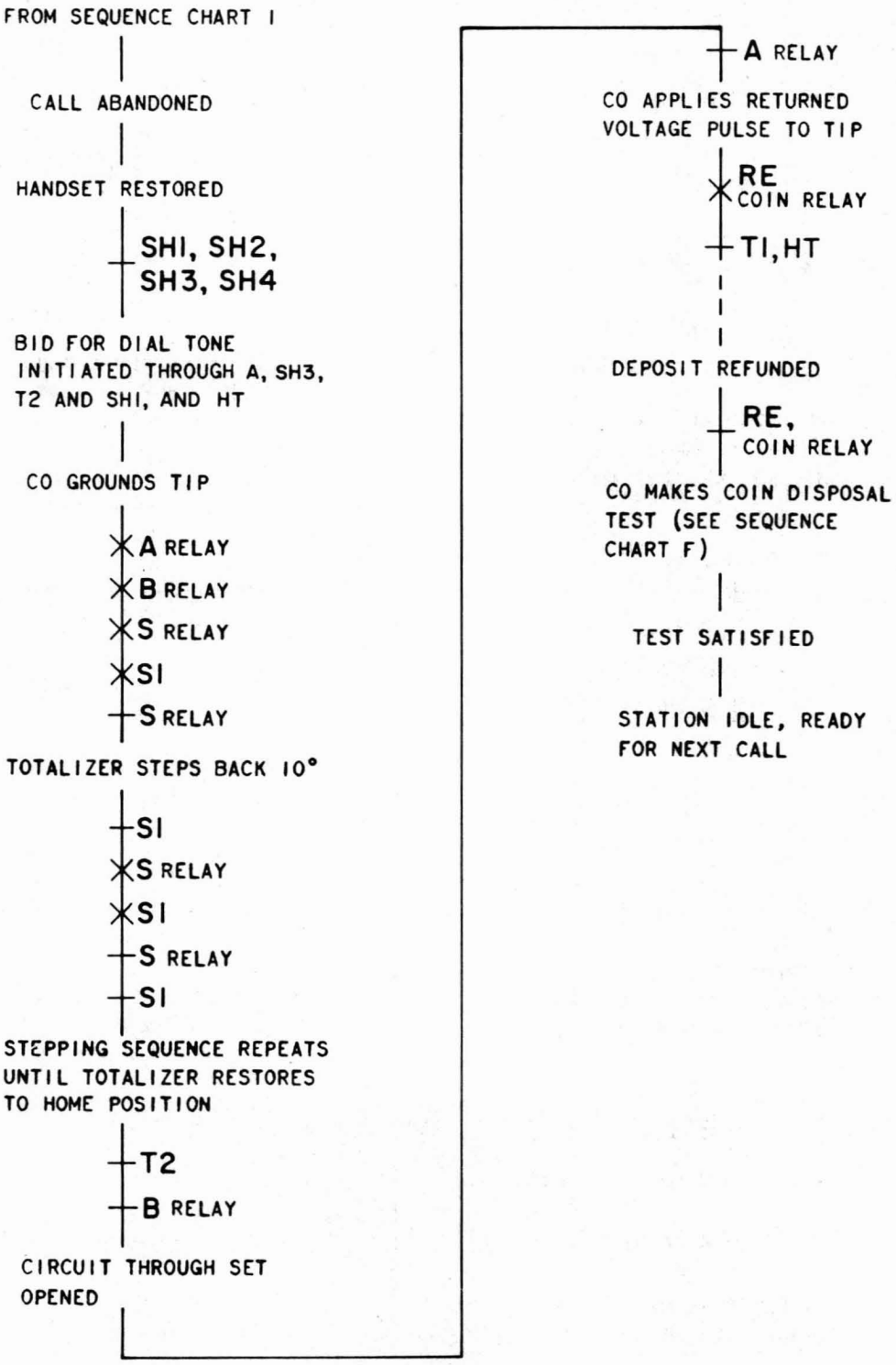
CALL ABANDONED, INSUFFICIENT DEPOSIT REFUND (CF)



NOTE:
RE OPERATES BUT HAS NO EFFECT ON THE SET SINCE T1 WAS NEVER OPERATED.

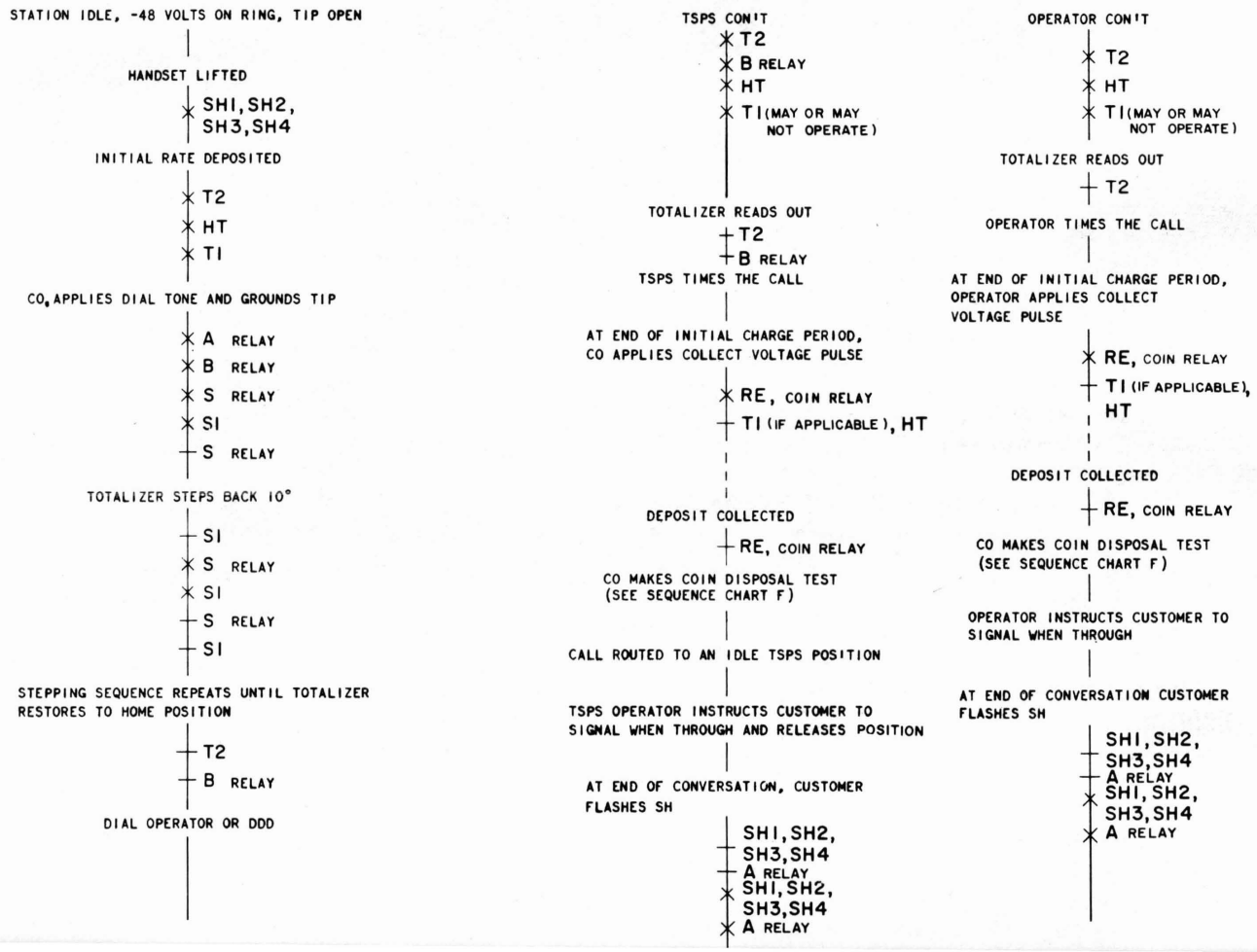
SEQUENCE CHART L

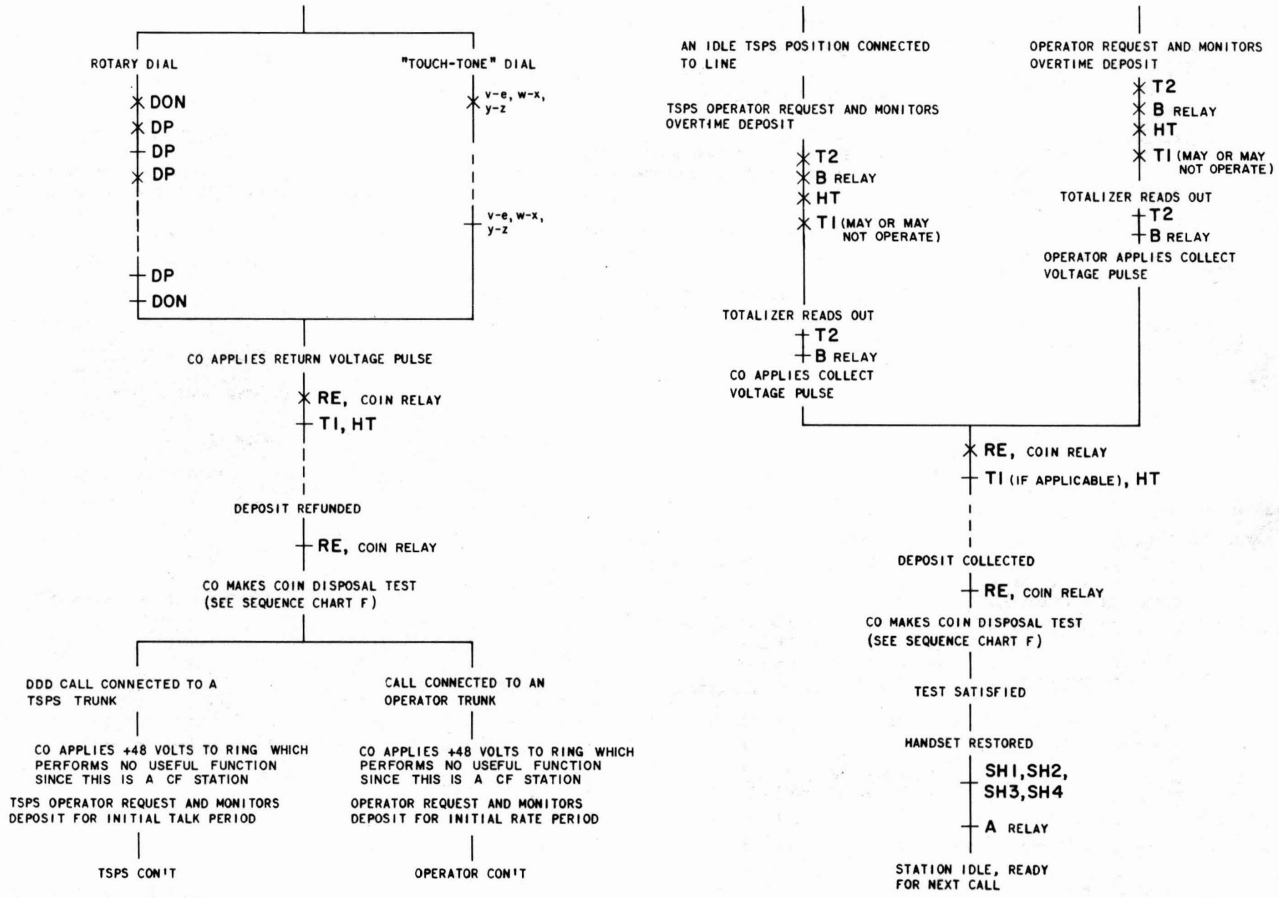
CALL ABANDONED, INITIAL RATE
DEPOSITED, NO DIAL TONE (CF)



EQU[illegible] CHART N

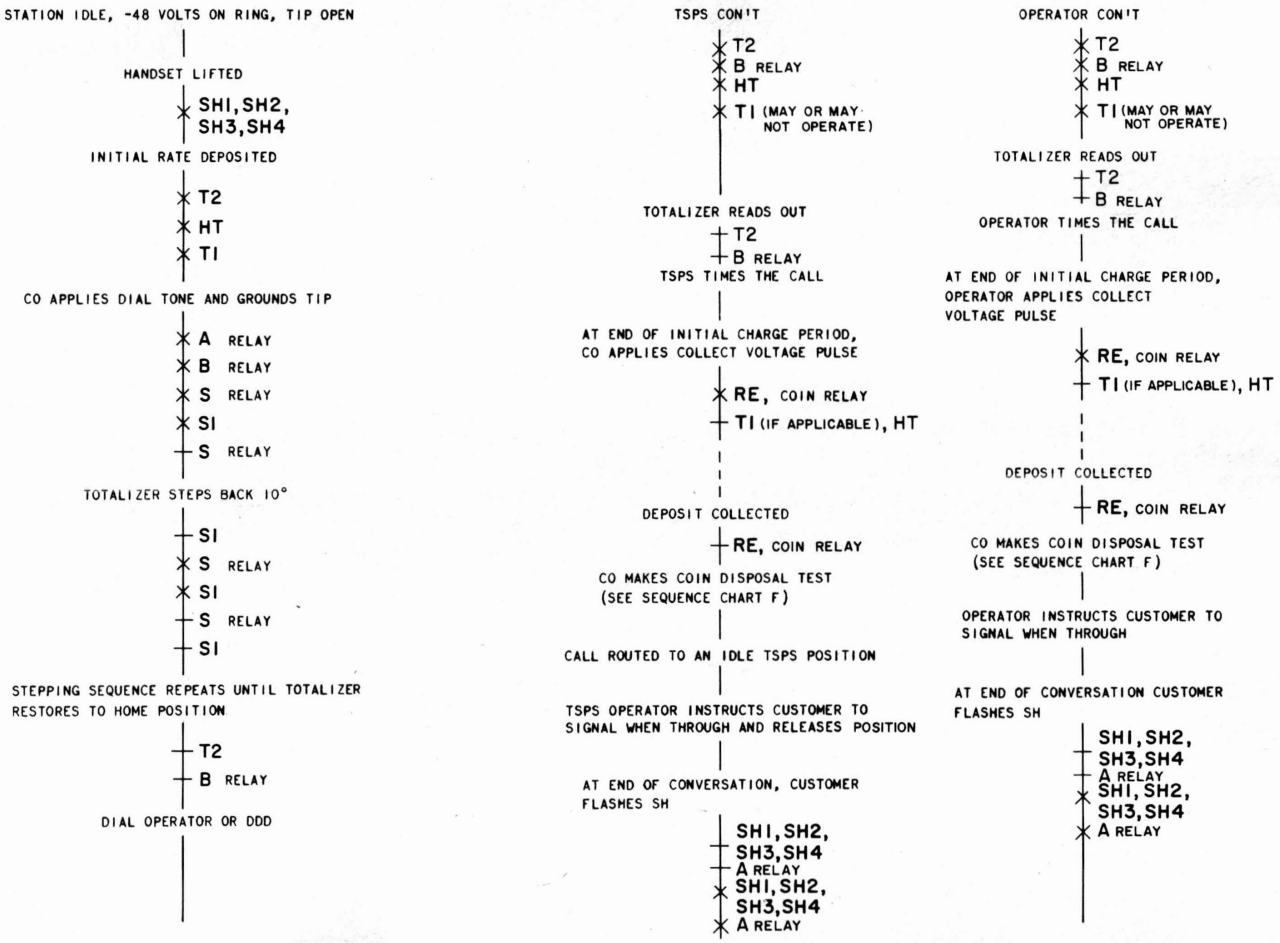
TOLL CALL-CF STATION, CF OFFICE




ROTARY DIAL
"TOUCH-TONE" DIAL
DON
DP
DP
DP
DP
DON
v-e, w-x, y-z
v-e, w-x, y-z
CO APPLIES RETURN VOLTAGE PULSE
RE, COIN RELAY
TI, HT
DEPOSIT REFUNDED
RE, COIN RELAY
CO MAKES COIN DISPOSAL TEST (SEE SEQUENCE CHART F)
DDD CALL CONNECTED TO A TSPS TRUNK
CALL CONNECTED TO AN OPERATOR TRUNK
CO APPLIES +48 VOLTS TO RING WHICH PERFORMS NO USEFUL FUNCTION SINCE THIS IS A CF STATION
CO APPLIES +48 VOLTS TO RING WHICH PERFORMS NO USEFUL FUNCTION SINCE THIS IS A CF STATION
TSPS OPERATOR REQUEST AND MONITORS DEPOSIT FOR INITIAL TALK PERIOD
OPERATOR REQUEST AND MONITORS DEPOSIT FOR INITIAL RATE PERIOD
TSPS CON'T
OPERATOR CON'T
AN IDLE TSPS POSITION CONNECTED TO LINE
TSPS OPERATOR REQUEST AND MONITORS OVERTIME DEPOSIT
T2
B RELAY
HT
TI (MAY OR MAY NOT OPERATE)
TOTALIZER READS OUT
T2
B RELAY
CO APPLIES COLLECT VOLTAGE PULSE
OPERATOR REQUEST AND MONITORS OVERTIME DEPOSIT
T2
B RELAY
HT
TI (MAY OR MAY NOT OPERATE)
TOTALIZER READS OUT
T2
B RELAY
OPERATOR APPLIES COLLECT VOLTAGE PULSE
RE, COIN RELAY
TI (IF APPLICABLE), HT
DEPOSIT COLLECTED
RE, COIN RELAY
CO MAKES COIN DISPOSAL TEST (SEE SEQUENCE CHART F)
TEST SATISFIED
HANDSET RESTORED
SH1, SH2, SH3, SH4
A RELAY
STATION IDLE, READY FOR NEXT CALL

SEQUENCE CHART O

TOLL CALL-CF STATION, CF/DTF OFFICE



Part 2

"A" SERIES COIN STATION

The operational description for the "A" series coin station is similar to that of the 'C' series station wired in the coin first mode. The difference being – the "A" series coin station requires that negative talking battery always be applied to the ring side of the line with ground on the tip side. The "A" series station therefore, is critical to linkage reversals and especially critical in SXS type central offices using reversals for supervision. In central offices providing both DTF and CF type service it becomes necessary to provide dedicated trunk groups by class of service when "A" series stations are used for CF service. In most cases it is more advantageous and more economical to modify the "A" series stations to 'C'.

With closing of "A" boards and implementation of TSPS, Design personnel must be aware of the pitfalls in using the "A" series coin station.

EXAMPLES:

1. The 'TSPS' provides +48v talking battery on the ring side of the line when serving DTF service. This is for nickel identification and also utilized to prevent TT fraud.

2. Toll diversion option on #5 X-Bar trunks to TSPS reverses the talking battery.

The above examples will render the "A" series coin station out of service.

COMPONENT PARTS
"A" and "C" Series
COIN STATIONS

ITEM NO.	COMPONENTS	PART NO. "A" Series	PART NO. "C" Series
1	Chassis Assembly	P15E437	*1A or 31A
2	Coin Chute Only	P24E34Z	1A
3	Totalizer Only	P15E579	*1A
4	Coin Chute or Totalizer Assemb.	P15E428	1AA
5	Hand Set	G3P-52	G3P-52
6	Dial & Housing Assembly	P83B752 or P90DZ74	P90D274
7	Coin Chassis		1A
8	Coin Relay	P15E687	1A

TABLE G

REQUIREMENTS FOR DIAL LONG LINE CIRCUITS ON COIN LINES (FOR LIMITATIONS OTHER THAN COIN CONTROL) (ASSUMES 300-OHM STATION SET RESISTANCE)

TYPE OF CENTRAL OFFICE	REQUIREMENTS
Step-by-Step	DLL CKT Required on Loops Over 1050 ohms
Panel	DLL CKT Required on Loops Over 885 ohms
No. 1 Crossbar	DLL CKT Required on Loops Over 1200 ohms
No. 5 Crossbar	DLL CKT Required on Loops Over 1300 ohms
No. 1 ESS	DLL CKT Required on Loops Over 1300 ohms
No. 2 ESS	DLL CKT Required on Loops Over 1300 ohms

TABLE H

MAXIMUM ALLOWABLE LOOP RANGES FOR CENTRAL OFFICE COIN SUPPLY VOLTAGES — COLLECT AND RETURN ONLY (MAXIMUM GROUND RESISTANCE 50 OHMS; MAXIMUM DC EARTH POTENTIAL ±3 VOLTS)

TYPE OF CENTRAL OFFICE	MINIMUM COIN VOLTAGE	LOOP RANGE
SXS, Panel, No. 1 XBar	100 volts (100-120V)	1900 ohms
SXS, Panel, No. 1 XBar	115 volts (115-120V)	2700 ohms
No. 5 XBar, No. 1 ESS, No. 2 ESS	125 volts (125-135V)	3100 ohms

Note: Loop Range = Conductor Loop Resistance (excluding coin telephone set resistance).

TABLE I

OPERATE VALUES OF COIN RELAYS

MARKING ON RELAY	OPERATING TIME	OPERATE CURRENT	NON-OPERATE CURRENT
1A*	450 ±50 milliseconds (Note 2)	41 milliamps	30 milliamps
1A (Note 1)			

Notes:

1. Coin relays marked 1A without the asterisk symbol have bifurcated rather than solid contact springs.
2. The timing interval of 450 milliseconds may be compared with the time it takes for a rotary dial to return to normal after dialing digit 4.

(THE TOTALIZER)
A TROUBLE INDICATOR FOR REPAIR AND CENTRAL OFFICE

COIN FIRST

Observing the state of the totalizer can afford valuable trouble locating information. It can generally isolate the trouble to the central office equipment, station or loop plant. It can be used to great advantage by the C.O. Switchman to detect the exact piece of C.O. equipment causing a trouble condition and also indicate to the Switchman what the cause is.

Some of the more important observations that should be made of the totalizer by the Repairman or Switchman are:

1. **Totalizer in fraud.** This condition usually indicates that the totalizer encountered a central office trouble condition that rendered the station out of service.

OBSERVATION: TOTALIZER IN FRAUD

1. Totalizer off normal
2. Rate latch down
3. Fraud latch set

This condition is generally caused by the failure of the C.O. equipment to apply 48v battery on the loop prior to applying coin control (100 to 130v) battery.

VERIFICATION TEST FROM R.S.B.:

1. Tester will observe short circuit.
2. Operate RCCI and T key. Monitor Oscillator Tones of totalizer homing.
3. Tones stop indicating totalizer has reached home position.
4. Test for short circuit – short circuit now removed.
5. Release test circuit.
6. Station now back in service.

II. OBSERVATION: TOTALIZER OFF NORMAL NOT IN FRAUD

1. Totalizer off normal beyond 10 degrees
2. Rate latch up
3. Fraud latch normal

This condition is generally caused by an open both side or ring side open for both the "A" and "C" series stations. A reversal will also cause this condition with an "A" series station.

VERIFICATION TEST FROM R.S.B.:

1. Tester will observe ground both side.
2. Operate RCCI and T key.
3. Monitor oscillator tone as totalizer homes.
4. Tone stops.
5. Tester will now observe ground tip side.
6. Operate CC key and release.
7. Tester will now observe "O.K." circuit.
8. Release test ckt.
9. Station now back in service.

NOTE: If totalizer fails to home when operating RCCI and T key. Operate the Rev. key with them. If oscillator tone is heard and stops, it is an indication that the station loop is reversed. ('A' Series Station)

CENTRAL OFFICE

CHECK LIST FOR SINGLE SLOT COIN STATIONS

COIN FIRST SERVICE

This introduction is to be used as a quick check method to determine if Central Office equipment has been modified and installed properly.

Test Equipment:

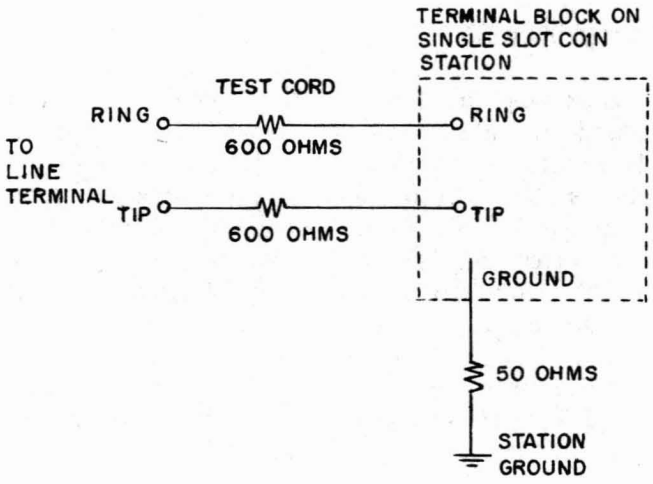
1. P11C Connecting cord.
2. "A" or "C" Series Single Slot Coin Station, resistance padded to reflect the maximum customer loop and ground resistance of the Central Office being tested.

   EXAMPLE. If customer loop design is 1200 ohms.

Each circuit pertaining to this listed method should be tested at least once initially and thereafter as required. The purpose of these tests and the use of a single slot coin station in performing them is to uncover trouble conditions that only the station set can detect.

NOTE: I #5XB – The coin test station can be used at the Line Link Frame or can be used at the Master Test Frame for selection of Central Office equipment by:

1. Connecting a spare jack in the vacinity of the MTF to punchings O2, 12 and Grd. at the B Term. strip on the R Controller Bay to the T, R and Sleeve of the jack. Then connect a plug ended cord from the jack to the T, R and Station Ground punching on the coin test station. This in turn will connect the coin station to the originating test line.



2. The equipment under test can now be selected in the usual M.T.F. manner at the test frame and the coin station will be activated by the operation of the start key. Use the coin station to perform the test after activation of the start key. In this manner, the coin station will detect Central Office trouble conditions that the MTF, when used alone, cannot detect.

NOTE: **II #1XB** – The coin station should be used at the Line Link in performing these tests.

NOTE: **III SXS** – Tests should be performed at the L.F. Bay and Local Coin Box Trk Ckts.

I – ABANDON CALL

PROCEDURE	ACTION
Deposit 5¢ with receiver on hook.	Coin should be automatically refunded.

II – PARTIAL DIAL

PROCEDURE	ACTION
Lift receiver off hook and deposit 10¢.	Dial tone heard.
Dial digit other than one or zero.	Dial tone removed.
Hang up.	Coin refunded.

III – LOCAL CHARGE

PROCEDURE	ACTION
Lift receiver off hook and deposit 10¢.	Dial tone heard.
Dial charge number.	Ringing heard.
Call answered.	ringing tripped.
Hang up receiver.	Coin collected.

NOTE: In #5XBar Operation of St. Ky represents initial deposit.

IV – STUCK COIN AND RECYCLE FEATURE

NOTE: If #5XB Office is not equipped with recycle, only one application of coin control will be furnished.

PROCEDURE	ACTION
Block the coin relay armature non-operated, but allow some travel.	
Connect volt-meter to the coin test station.	
Connect one lead to the tip side and one lead to the station ground, both located at TB1 terminal strip on the chassis assembly. Volt-meter should be adjusted to read on the 150v negative scale for return and 150v positive scale for collect.	
Lift receiver off hook and deposit 10¢.	Dial tone heard.
Hang up.	Coin relay attempts to operate and release. Volt-meter should register from 100v- to 130v-.

NOTE In #5XB Office equipped with recycle, coin relay should make two attempts.

In SxS Offices, coin relay should make continued attempts and activate the Coin Release Audible alarm.

PROCEDURE	ACTION
Clear blocking tool from coin relay.	Alarm stops and coin relay refunds coin.
(#5XB) (#1XB)	
Lift receiver off hook.	"A" Board Operator gets steady lamp. Operator answers.
Clear blocking tool from coin relay.	
Request Operator to refund coin.	Coin refunded.
Hang up.	Circuit released.
Now repeat the same test, calling a charge number. Reverse voltmeter leads to read + current.	

NOTE: **XBar** – When call routes to A Board on a charge condition, Operator gets a flashing lamp.

V – DIAL "O"

PROCEDURE	ACTION
Lift receiver off hook, deposit 10¢ and dial "0".	Coin automatically refunded, when Operator answers.
Request Operator to identify coins	
Deposit a nickel, dime and quarter.	Operator can identify coin deposits.
Request Operator to refund.	Coin refunded.
Deposit coin and request Operator to collect.	Coin collected.

NOTE: When Operator collects or refunds coin, request her to observe coin pilot lamp for coin present indication if call is served from 'A' Board.

PROCEDURE	ACTION
Request Operator to ring back.	
Hang up.	Operator rings back.
Lift receiver off hook.	Ringing trips.
Hang up.	Circuit released.

NOTE: Test each trunk circuit.

VI – INCOMING TOLL

PROCEDURE	ACTION
From another phone request Operator to establish a call to the coin test station using a Toll Switching Trunk.	
Operator establishes call.	Coin test station rings.
Lift receiver off hook.	Ringing trips.
Request Operator to identify coin deposit.	
Deposit coin.	Operator identifies coin.
Request Operator to return coin.	Coin return.
Request Operator to collect coin.	
Deposit coin.	Coin collected.
Hang up.	Circuit disconnected.

NOTE: Always have Operator observe coin pilot lamp when collecting or refunding coin from 'A' board location.

NOTE: Check each Incoming Coin Toll Switch Trunk.

TEST DESK CHECK LIST FOR SINGLE SLOT COIN STATIONS

The single slot coin station is critical to sequential testing. Tests performed out of sequence can render the coin station out of service.

The "A" series coin station is polar. Therefore, a reversal in 48v battery will fail to home the station totalizer from off normal.

The "C" series coin station totalizer will home on 48v battery applied to either the tip or ring of the line.

Note I

Test Step I should be performed when testing repeated reports. It will detect a foreign current on the line that could hinder the totalizer operation. The station totalizer is designed to home on 20MA of current at 48 volts.

Prior to dialing line up on test:

TEST STEP I

1. Operate FEMF key
2. Dial line up on test
3. Observe test meter for reading
4. Operate reverse key
5. Observe test meter for reading
6. Restore FEMF key and Rev key

Part 2

TOTALIZER OFF NORMAL – NOT IN FRAUD

TEST STEP II

1. Observe meter for ground ring side (full deflection)
2. Operate REV key
3. Observe meter for ground tip side (full deflection)
4. Restore REV key
5. Operate G key
6. Observe meter for short circuit

NOTE: A ground both side condition generally indicates that the station totalizer is off normal and the coin ground still present.

To verify this condition, perform the following test:

NOTE: 1. When performing tests from the MTF use the Talk Key in lieu of the RCCI key as used at the RSB test positions.

2. The tester should never apply coin control battery without having first restored the totalizer to its home position.

1. Operate RCCI and T key, listen for totalizer readout (2200 Cycle Tone). If readout is heard and tone stops, proceed.
2. Restore RCCI and T key.
3. Observe test meter, if no reading.
4. Operate REV key, observe test meter (ground tip full scale).
5. Operate CC key.
6. Restore CC key.
7. Observe test meter (no reading) ground removed.
8. Restore all keys to normal.

The trouble encountered by the station was an open ring side or open both sides.

Have Central Office force check for open condition.

TOTALIZER OFF NORMAL – IN FRAUD

When performing a line test, if a short circuit is observed and no ground present, a totalizer could be off normal and in a fraud condition. To check this condition:

1. Operate the RCCI and T key Monitor for totalizer readout (2200 Cycle Tone).

   If readout is heard and stops.

2. Operate G key.
3. Observe test meter (test clear).

The trouble that was encountered was most likely an open tip side or a reversal, if testing an "A" series station. This is verified because the station ground had been previously removed and the totalizer readout was heard.

TROUBLE: Probably open tip side – refer to Central Office.

TEST NOTES:

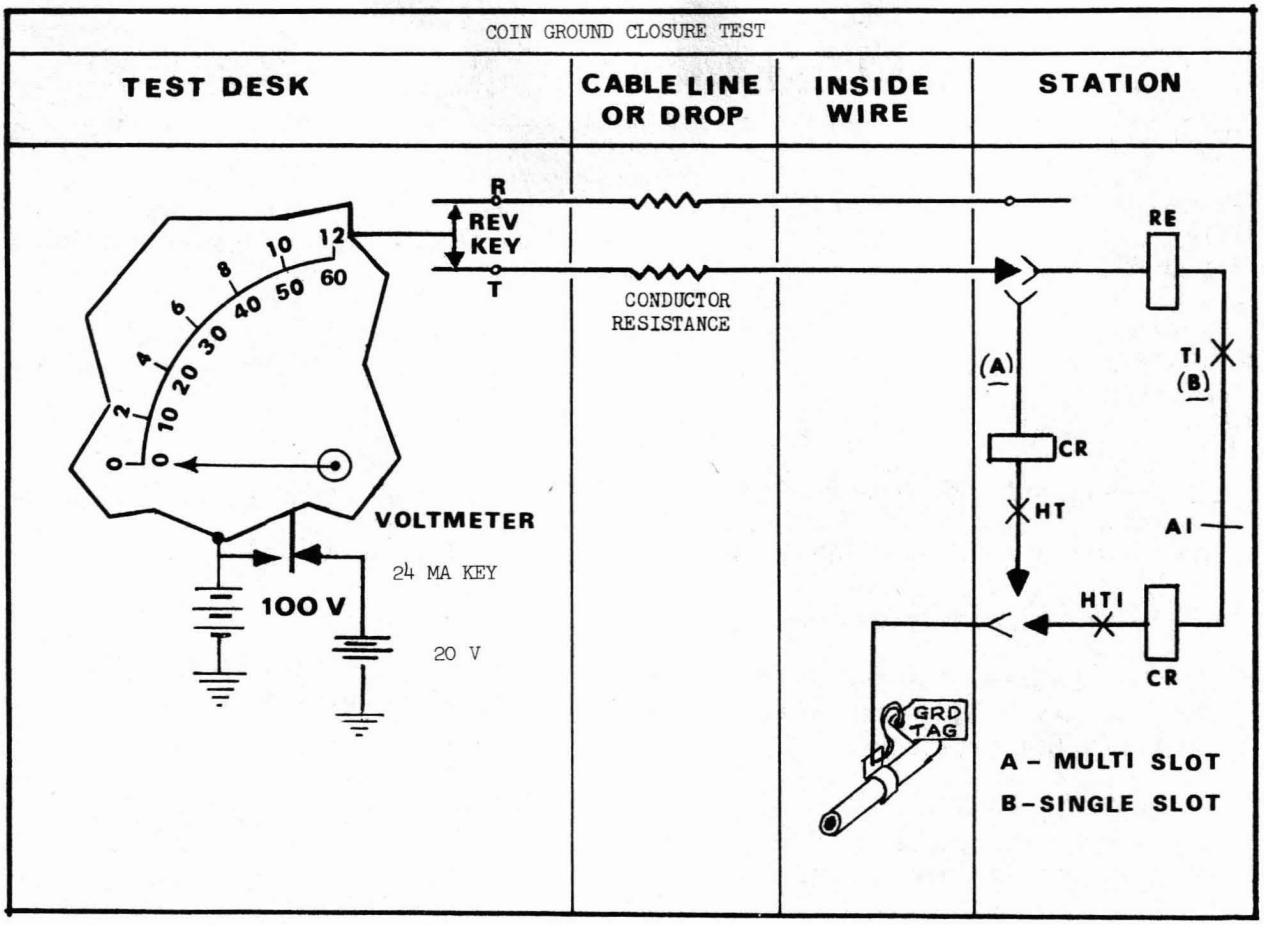
Readout tones from the station oscilator indicate individual type trouble conditions.

1. A steady tone cannot be removed indicates a jammed chute and totalizer.

2. A continuous beep tone indicates an open T2 totalizer contact or defective totalizer.

3. When having the repairman adjust the coin relay, the adjustment speed should be set at 450MS.

NOTE: A totalizer off normal in fraud with an R.O.H. at the station will test as an O.K. station. Under this condition the tester will be unable to reset the station totalizer from the test desk until the switchhook is in the onhook position.



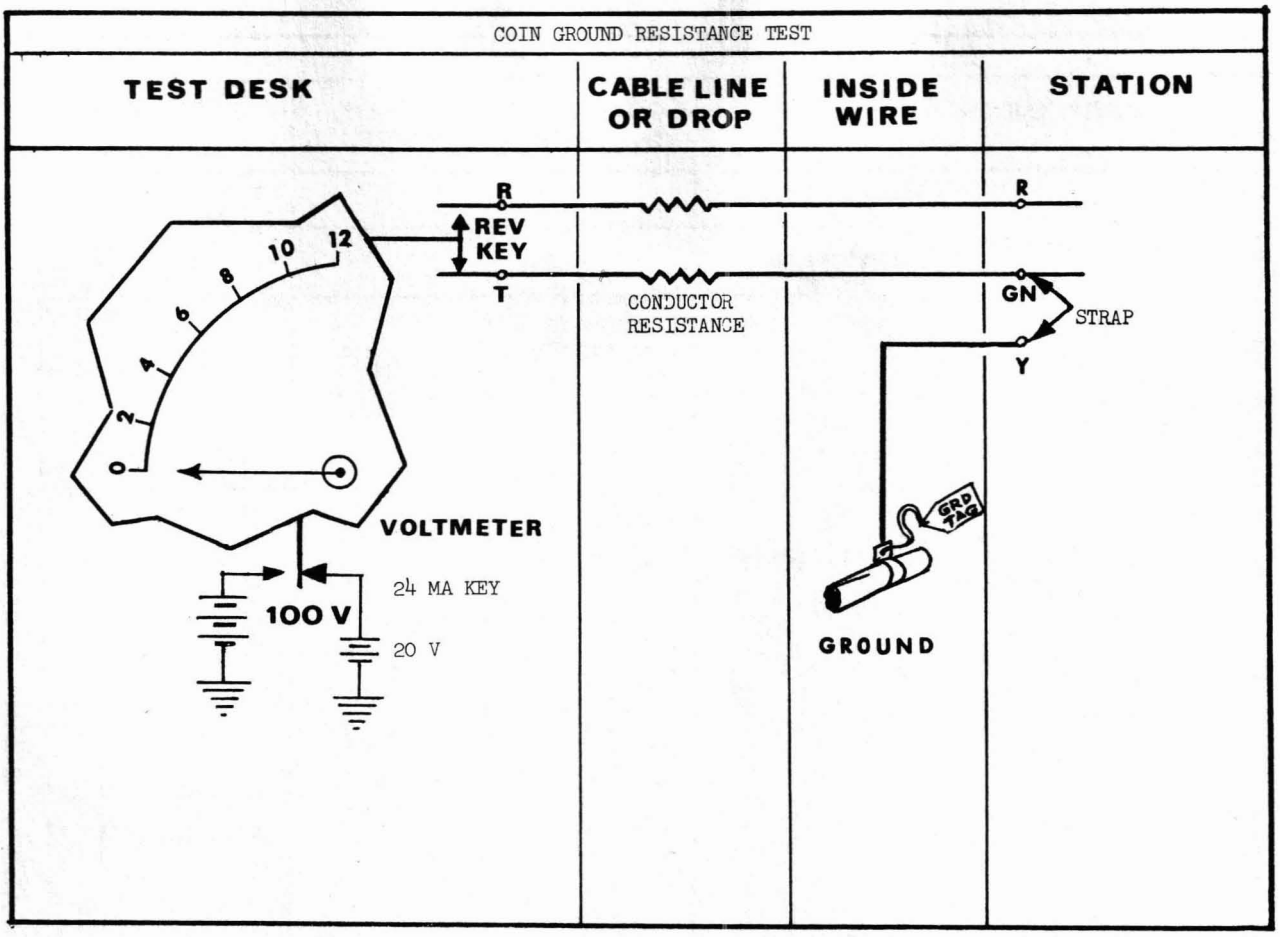
COIN GROUND CLOSURE TEST

FOR ALL SINGLE AND MULTI-SLOT TYPES

To determine that a deposited coin operates a coin ground contact on the coin relay, proceed as follows:

1. Connect to the line to be tested. Line should test clear of crosses.
2. Signal station. Operate T and RCCI keys and request deposit of 10¢.
3. After deposit of coin, restore all keys and operate REV key.
4. Voltmeter should deflect to nearly full scale, indicating operation of coin hopper trigger by deposited coin.
5. Operate 24 MA key. Meter should deflect between 7.0 and 9.5 volts on the 0-24 volt scale.
6. Restore REV key and operate CR key to refund coin.
7. Release all test connections and restore all keys to normal.

REF: BSP 662-300-500 or BSP 662-400-500



COIN GROUND RESISTANCE TEST

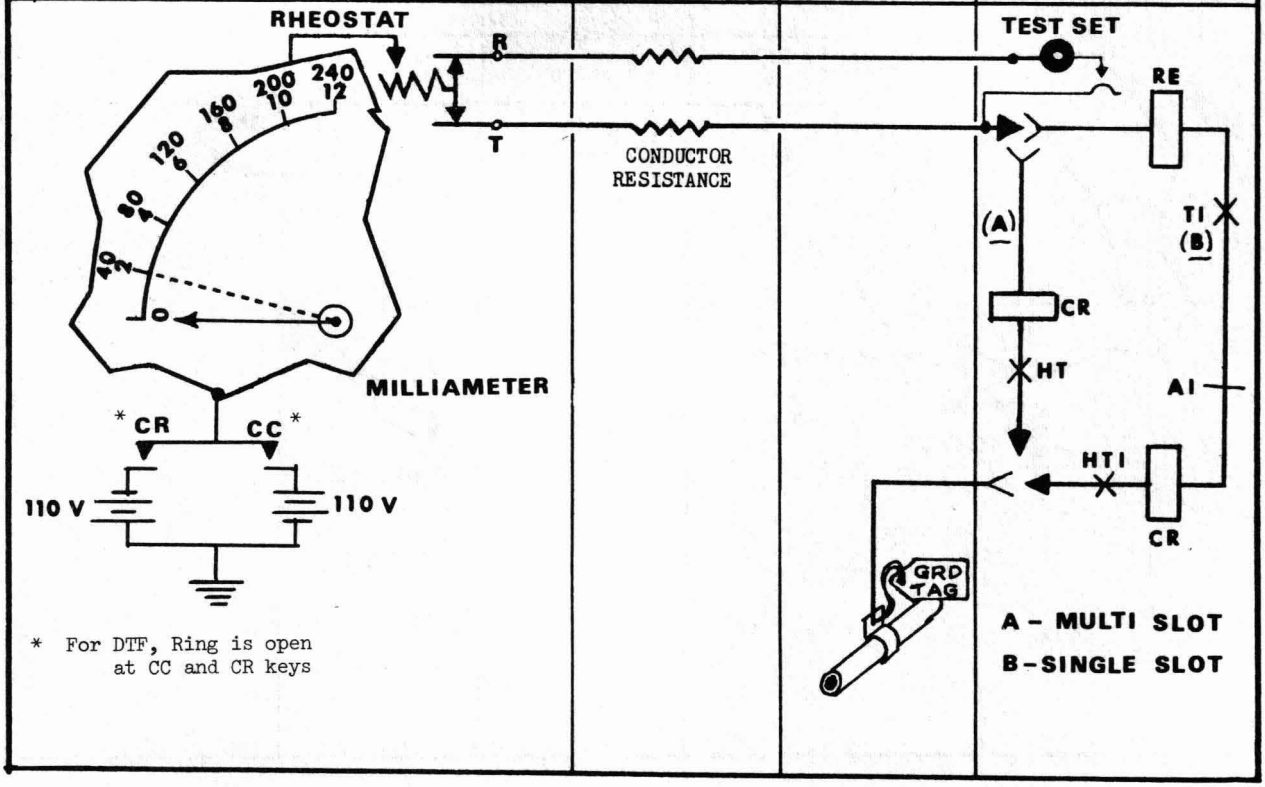
To measure the DC resistance of a ground connection, proceed as follows:

1. Connect to the line to be tested. Line should test clear of crosses.
2. Instruct the craftsman to strap the tip side of the line to the ground terminal at the station.
3. Operate REV key and the meter should indicate a tip ground.
4. Operate 24 MA (or 1000) key to connect 1000 ohm voltmeter to the test circuit.
5. Measure resistance to ground on tip side by obtaining voltmeter reading on 0-24 volt scale.
6. Resistance values may be obtained by referring to Table 4 in BSP 662-300-500 or BSP 662-400-500, 1000 ohm WINDING 24 VOLT SCALE using the voltage reading obtained in (5).
7. Resistance of the coin ground is the difference between the resistance value found in (6), and one half the loop resistance measurement.
8. Maximum ground resistance should be 50 ohms.
9. Release all test connections and restore all keys to normal

REF: BSP 662-300-500
or BSP 662-400-500

Note: To be able to measure only the ground connection at the station, it will first require a loop resistance measurement of the tip and ring conductors.

COIN RELAY CURRENT FLOW TEST - 50 VOLT RELAY



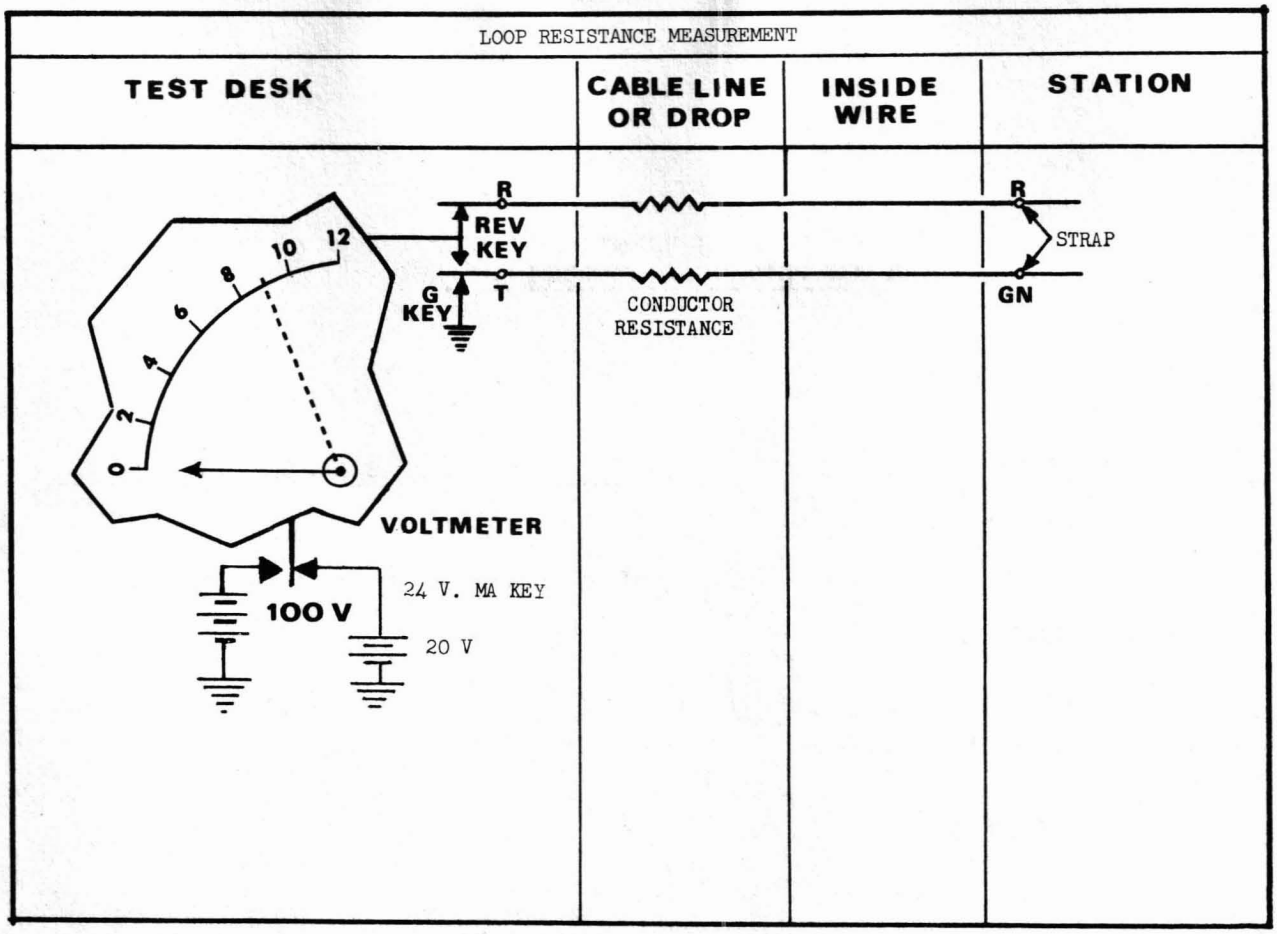
COIN RELAY CURRENT FLOW TEST - 50 VOLT RELAY

For all single and multi-slot telephone sets, connect upper and lower housings with a test cord, keep handset off hook and trip Coin Hopper Trigger. Trigger must be tripped each time coin relay operates.

To determine if the 50 volt coin relay operates within specified limits, proceed as follows:

REFUND – NON-OPERATE	1. Adjust Rheostat to place maximum resistance in circuit. 2. Hold CR key operated while adjusting Rheostat until Milliameter reads 30 MA. 3. Release and reop rate CR key at least 5 times while observing meter. Meter should indicate 30 MA each time.
COLLECT – NON-OPERATE	Same as REFUND-NON OPERATE except use CC key.
REFUND – OPERATE	1. Hold CR key operated and adjust Rheostat until meter reads 30 MA. 2. Gradually adjust Rheostat to increase the current flowing in the coin relay and observe meter reading. 3. Meter returns to zero when coin relay operates. This should occur before current flow reaches 41 MA.
COLLECT – OPERATE	Same as REFUND – OPERATE except use CC key.

REF: BSP 662-300-500 or BSP 662-400-500



LOOP RESISTANCE MEASUREMENT

To measure the DC loop resistance of a subscriber's line, proceed as follows:

1. Connect to the line to be tested. Line should test clear of crosses.
2. Instruct the craftsman to strap the tip and ring at the station.
3. Operate G key. Meter should deflect to indicate the short circuit.
4. Operate 24 MA (or 1000) key to connect 1000 ohm voltmeter to the test circuit.
5. Obtain voltage reading on 0-24 volt scale.
6. Loop resistance value may be obtained by referring to Table 4 in BSP 662-400-500 or BSP 662-300-500, 1000 ohm WINDING - 24 VOLT SCALE, using the voltage reading obtained in (5).
7. When measurement is complete request craftsman to remove strap.
8. Release all test connections and restore all keys to normal.

REF: BSP 662-300-500 and BSP 662-400-500

TOTALIZER CURRENT FLOW TEST
USING TEST DESK OR TEST CABINET

PROCEDURE

TEST DESK	STATION
1. Put line up on test	
2.	Remove receiver from switch-hook
3. Operate RCCI key " T " " RHE "	
4. Adjust rheostat until test meter reads 20ma.	
5. Restore RCCI key " T "	
6.	Step totalizer off normal backward two steps by operating S relay armature
7. Operate RCCI key " T "	Totalizer steps Home

NOTE: 1. Failure of totalizer to step home indicates a defective totalizer.

2. If totalizer steps home under control of test desk current flow test - Totalizer relay O.K.

   If totalizer fails to step home under central office control when Test Desk current flow test checked O.K. - Loop resistance too high.

   Check customer loop plant design.

COIN SERVICE IMPROVEMENT AND DIAL TONE FIRST ITEMS

The implentation of Dial Tone First service and the Coin Service Improvement program highlighted new changes and new objectives.

BASIC OBJECTIVES:

1. To enable customers to dial certain calls without an initial coin deposit, such as calls to the operator for assistance, NPA Directory Assistance calls, station-to-station toll calls, person-to-person calls, collect calls, credit card calls, and three digit service code calls including the 911 emergency code.

2. To give the customer greater assurance that the coin telephone instrument is working before a coin deposit is made. Coincidentally, the customer would be able to report a trouble condition without depositing a coin.

3. To permit DTF service operation in all types of central office – except panel – with all types of traffic switchboards and systems.

4. To improve transmission characteristics and reduce noise by removing the unbalancing ground at the station during conversation. An improvement of 12 to 34 db in 180 Hz balance can be expected when ground isolation is employed. Ground isolation also substantially reduces corrosion caused by ground currents.

5. To prevent fraudulent simulation of coin signals by manipulating TOUCH-TONE dial buttons.

6. To eliminate customer irritations at multi-slot coin stations caused by blocked switchhook, dial off normal and electrical subset tampering.

FUNCTIONAL CHANGES:

DTF requires new screening of dialed digits by the central office to determine whether a coin is required to complete the call.

With present-day methods of coin station operation and with the need to handle both 10-cent initial deposit and 5-cent subsequent deposits, it is necessary for the central office to generate and send to the station a signal which conditions the station to accept 5-cent deposits. Application of loop current now serves this signal function. But with Dial Tone First, loop current is applied before a coin is deposited. Thus, to condition the station for 5-cent deposits, a new signal or "threshold change condition" must be provided. This new signal is a reversal of talking battery, specifically, *positive 48-volts* on the ring conductor and ground on the tip conductor.

To effect ground removal during conversation, changes in the central office coin control and coin testing arrangements as well as at the station are necessary.

To deter TOUCH-TONE fraud, the T-T dial is disabled electrically at appropriate times upon signal from the central office. This accomplished by the same reversal of talking battery that permits subsequent 5-cent coin deposits. On operator involved calls this is permissible since the acceptance of 5-cent deposits and the disabling of the coin station TOUCH-TONE dial are required only when an operator is connected to the coin line call.

Also, positive battery is fed to the coin station on calls placed through the TSP(s) operator. The present plan accomplishes this by a change in signaling procedure from TSPS equipment to the local office (which applies a reversal when an operator is connected). A less elaborate arrangement is used with cord switchboards, in which local office trunks to a cord switchboard are arranged to supply positive battery to the coin station as long as the station is connected to the trunk.

SPECIFIC CHANGES:

1. Central Office Line Circuit

   All systems require the modification of the coin line circuit from ground start to loop start operation when converting to DTF operation.

2. Coin Presence Tests

   Several methods are used to test for the presence of coins at the station. With DTF service *all* systems have to be modified to apply the following tests toward the coin telephone:

	Tip	Ring
Initial Deposit (current limited to 20 ma)	–48v.	Open
5¢ Automatic Local Overtime Deposit (current limited to 20 ma)	GND then +48v	+48v then Open

Part 1

Operator recognition of a coin deposit is by audible 2200Hz beep tones from the station totalizer returning to its home position from the +48v talking battery on the ring side of the line and ground on the tip side.

3. Code Screening

   Calls are screened to determine whether they shall or shall not be completed without requiring an initial coin deposit. The amount of screening and where it is accomplished is a function of the type of local switching equipment used, as shown in Table A.

4. Refund of initial deposit on Operator Calls

   While automatic coin return before reaching an operator is an optional arrangement currently available for cord switchboards, it must be provided in all instances in DTF systems. And since the same capability is also required for traffic service positions, this (in some instances) requires reinstatement of previously rated "M.D." operations to provide for automatic coin return.

5. Use of positive Battery on Trunks to or From an Operator

   Positive 48-volt talking battery will be applied on a temporary or permanent basis by all switchboard trunks, "permanent" meaning for the duration of the trunk connection. This supply is not normally provided in local central offices, so when DTF service is to be introduced it will be necessary to add sufficient positive 48-volt power plant capacity to handle the required number of trunks.

6. Coin Deposit and Coin Presence Tests

   Coin collect and return potentials as well as coin presence tests are applied only on the tip conductor of a DTF coin line. This is because the ground isolator located at the station.

7. Coin Dial Long Line Circuit

   Coin lines that exceed the central office loop limit require use of a long line circuit or loop extender. Existing long line circuits will not work with the polarity changes and coin presence tests that are unique to DTF operation. A new long line circuit for use in all types of central offices and with single slot type coin telephone sets is now available.

8. Increased Range for Step-by-Step

   Development of a new coin trunk for step-by-step system use is now available. The range of this new trunk is at least 1300 ohms conductor loop resistance.

LOCAL CENTRAL OFFICE SCREENING AND HANDLING OF DTF CALLS

Common-Control Office(1)
Initial Deposit

Type Call	Dialing Procedure	Required	Ret. Pot. Applied During Set-up	Ret. Pot. Applied On Disc.	TSP Oper. Called in To Supervise Initial Dep.	See Note
Local	7D	Yes	No			2
Zone or Toll	7D or 10D	No	Yes		Yes	4
INWATS	10D	No	Yes		No	3
Service Code	3D	No	No	Yes	No	6
Toll INF	10D	No	No		No	
Assistance	"0"	No	Yes		Yes	5
"0" Prefix	1 + 7 or 1 + 10	No	Yes		Yes	
			Non-Common Control Offices			
Local	7D	Yes	No			2
Zone or Toll	"1" + 7D or 10D	No	Yes		Yes	4
INWATS	"1" + 10D	No	Yes		No	3
Service Code	3D	No	No	Yes	No	7
Assistance	"0"	No	Yes		Yes	5

NOTES:

1. In common control areas the "1" prefix may or may not be required according to dialing procedures. This dialing procedure in itself does not cause calls from coin stations to be treated differently from those originated from non-coin stations; i.e., treatment accorded coin stations with respect to an initial deposit is determined by translation of the code information.

2. With the exception that when the number 555-1212 is dialed the call shall be completed with a coin deposit.

3. INWATS calls are blocked if zero prefix is used.

4. The TSP operator will not be connected on calls to an NPA Assistance Bureau.

5. Or may be a cord board operator.

6. Includes all N11 service codes.

7. N11 and 11N service codes will be completed without an initial deposit.

CONVERSION PROCEDURES, COIN FIRST TO DTF:

The conversion to Dial Tone First service can be done in a progressive manner over a period of time.

Introduction of the new coin present test can be done initially in the Originating Registers, Subscriber Senders, Markers and on Coin Supervisory Circuits. Modification of trunks and coin supervisory circuits to provide for removal of simplex arrangements can be done concurrently or follow thereafter.

Screening for the initial deposit can then be introduced since with coin first operation, all calls will have an initial deposit. However, the provision of positive talking battery on switchboard trunks can be done only after all "A" Series type single slot coin stations have been converted to "C" Series type coin stations.

Table B provides a suggested step outline transition procedure to be used for No. 1 and No. 5 Crossbar DTF conversions.

TABLE B

No. 1 or No. 5 Crossbar DTF
Transition Procedure

Central Office Equipment	Steps 1 through 4 1	2	3	4
Common Control Equipment	1*			
Toll Trunk Circuits			3	
Line Circuits				4a
Station Equipment				
1A/2A-type Coin Telephone Sets		2		4c
200 type Coin Collectors (Single coil coin relay)				4b

***Complete before Step 4**

Step 1 –
Modify common control equipment to make ground test.

Step 2 –
Modify or substitute sets to "convertible" equivalents. Leave in prepay mode for positive battery operation.

Step 3 –
Modify coin toll trunks for positive battery operation.

Step 4a –
Convert line circuit to loop start.

Step 4b –
Substitute diode, disconnect dial shorting contacts (also substitute chute electromagnet if in automatic 5¢ overtime area) and test operation in DTF mode.

Step 4c –
Rearrange wiring and test operation in DTF mode.

NOTE: Steps 4a and 4b or 4a and 4c must be coordinated.

Arrangement of the TSP, TSPS or cord type switchboard local office trunk circuit to return the initial deposit must be done before cutover of the station – but can be done at any time during the precutover period. The only stipulation being that all offices

served by a switchboard should be changed at one time so that the operator and/or the coin rater will know how each call is to be handled.

The final step in the cutover procedure is the conversion of the line circuit from ground start to loop start function coincident with the coin station modification to DTF operation. DTF-oriented telephone instruction cards and other related customer assistance information are provided at the time of station conversion and test out of DTF service features.

Central Office Modifications:

The following circuits have been modified or provided new to reflect Coin Improvement items including DTF.

Title	Circuit	Iss. Date After 10/69
Sender (U&Y)	SD-25012	
Sender (WS)	SD-27810	
Marker	SD-25016	
Marker Conn.	SD-25035	
Inc. Trk.	SD-25026	
Inc. Trk.	ES-25723	
Inc. Trk.	SD-25876	
Inc. Trk.	SD-25937	
Inc. Trk.	SD-25263	
Inc. Trk.	SD-25303	
Inc. Trk.	SD-25308	
Inc. Trk.	SD-25322	
Inc. Trk.	SD-25024	
Inc. Trk.	SD-25306	
Inc. Trk.	SD-25353	
Inc. Trk.	SD-25302	
Inc. Trk.	SD-25307	
Inc. Trk.	SD-25314	
Inc. Trk.	SD-25883	
Inc. Trk.	SD-25294	
Inc. Trk.	ES-25725	
Opr. Trk.	SD-25218	
Opr. Trk.	SD-18067	
Opr. Trk.	SD-55183	
Opr. Trk.	SD-55946	
Opr. Trk.	SD-96210	
Opr. Trk.	SD-20465	
Opr. Trk.	SD-21130	
TSP O.G. Trk.	SD-27555	
TSP O.G. Trk.	SD-27577	
TSP O.G. Trk.	SD-27814	
TSPS O.G. Trk.	SD-27816	
Coin Zone Ckt.	SD-96366	
Coin Serv. Appl.	SD-27886	
Coin Zone Trk.	SD-96518	
Coin Cont. Ckt.	SD-21548	
Coin Cont. Ckt.	SD-21549	
Coin Cont. Ckt.	SD-21705	
VAC. Code. Trk.	SD-25125	
VAC. Code. Trk.	SD-25134	
Sub Line Line Lk. Cont.	SD-2503	
	SD-2553	
Sub Sdr Lk and Cont.	SD-25004	
	SD-25554	
VAC. Code. Trk.	SD-25467	
P.S. Hold Trk.	SD-25418	
P.S. Hold Trk.	SD-95554	
P.S. Hold Trk.	SD-25126	
P.S. Hold Trk.	SD-25425	
Coin Sup. Ckt.	SD-25061-01	
Coin Sup. Ckt.	SD-25061-02	
Coin Sup. Ckt.	SD-2544	
Coin Sup. Cont.	SD-27153	
Coin Sup. Monitor Trk.	SD-56000	
Talk Battery Filter	New Dwg.	
Orig. Sdr. Test	SD-25221	
Orig. Trbl. Ind.	SD-25018	
Dist. Jetr. Test	SD-25158	
ANI Trk. Test	SD-95889	
LAMA Trk. Test	SD-27587	
Opr. Trk. Test	SD-90470	
Panel OST Test	SD-20015	
Panel OST Test	SD-21610	
STA Ringer Test	SD-96218	
OGTT	SD-25177	
AMA Trk. Test	SD-27587	
ANI Trk. Test	SD-95889	
Coin Zone Test	SD-96372	
OG Trk. Test +MB	SD-96376	
TSPS O.G. Trk.	SD-27816	
Coin Zone Ckt.	SD-96366	
Coin Serv. Appl.	SD-27886	
#5 Crossbar		
Incoming Trunk	SD-25911-01	12D
	SD-26083-01	8D
	SD-26123-01	4D
	SD-26149-01	3D
Outgoing Trunk or Junctor	SD-26078-01	12D
Outgoing Trunk to TSP (Loop)	SD-27547-01	7D
Outgoing Trunk to TSP (E&M)	SD-27551-01	4D
2-Way Operator Office Trunk	SD-27593-01	7D
Recording Completing Trunk	SD-25923-01	10D
	SD-25923-02	8D

	SD-25923-03	12D
	SD-25923-04	12D
	SD-26091-01	11D
	SD-26093-01	7D
	SD-26099-01	7D
Toll Switching Trunk	SD-25712-01	12D
	SD-26081-01	8D
	SD-26082-01	6D
	SD-25854-01	13D
Coin Supervisory Concentrating	SD-25736-01	26D
Circuit for Permanent Signal Holding Trunks	SD-2576-01	21D
Toll Swbd. No. 3C or 3C1 Manual Subscriber Line	SD-56317-01	6D
Toll Swbd. No. 1 Manual Subscriber Line	SD-56318-01	4D
Completing Marker	SD-25550-01	58D
Originating Register	SD-26040-01	38D
Originating Register	SD-25551-01	55D
MTF Automatic Monitor Register & Sender Test	SD-25680-01	79D
MTF Voltmeter Test	SD-25792-01	13D
Trunk Test	SD-25918-01	50D
Automatic Progression Trunk Test	SD-25938-01	42D
Office Test Frame Test	SD-27633-01	17D
Office Test Frame Trouble Indicator & Connector	SD-27634-01	14D

CIRCUIT MODIFICATIONS

COIN SERVICE IMPROVEMENT

Listed are new and modified drawings issued by the Engineering Staff Design Group for Panel, #1 and #5 Crossbar Systems.

I. The features provided for all three systems include:

1. Cancellation of the "Coin Present" test when coin current is applied on collect calls. This eliminates the unproductive routing of calls to the operator and consequent delay in returning the coinbox to service.

2. A second application of coin current if the first application is unsuccessful in clearing the coin ground (the coin recycle feature). Tests have shown that a major reduction in coin supervisory failures can be attained by the use of this feature.

II. For Panel and #1 Crossbar, three optional methods are available for disposting of a call if the coin ground is not cleared after the second application of coin current, as follows:

1. The call is routed to the operator, as at present.

2. The call is automatically primed without calling the operator.

3. The calling line is identified by the ANI equipment, a trouble ticket is printed and the call is automatically primed. The office must be equipped for ANI identification of coin lines to permit the use of this option.

For #5 Crossbar, two options are available after the second coin failure – routing to the operator or automatic priming without identification.

III. #5 Crossbar is also modified for connection to a recorded announcement, instead of the operator, for requesting an overtime deposit. If the customer fails to deposit a coin, as requested, the call is routed to the operator for Handling. This feature is already available for #1 Crossbar and Panel on a variety of standard and local arrangements.

The details of the new features are described in the following drawings and related information, rated New York Telephone Company Standard, which have been distributed to the Engineering Area File Bureaus.

Panel Line Finder-District and Coin Control Circuit

Schematic	NY-S-21078-02	Issue 1
Equipment	NY-E-21078-02	Issue 1
Wiring	NY-T-21078-02	Issue 1
Circuit Description	NY-CD-21078-02	Issue 1
Test Specification	NY-X-21078-02	Issue 1

The modifications shown on these drawings apply to the following panel district circuits:

SD-21078-02

SD-21031-02

SD-21350-02

#1 Crossbar Coin Supervisory Circuit

Schematic	NY-S-25061-02	Issue 1
Equipment	NY-E-25061-02	Issue 1
Wiring	NY-T-25061-02	Issue 1
Circuit Description	NY-CD-25061-02	Issue 1
Test Specification	NY-X-25061-02	Issue 1

#5 Crossbar Coin Supervisory Circuit

Schematic	NY-S-25736-01	Issue 1
Equipment	NY-E-25736-01	Issue 1
Wiring	NY-T-25736-01	Issue 1
Circuit Description	NY-CD-25736-01	Issue 1

#5 Crossbar Applique Circuit for NY-S-25736-01

Schematic	NY-S-26N18-01	Issue 1
Equipment	NY-E-26N18-01	Issue 1
Wiring	NY-T-26N18-01	Issue 1
Circuit Description	NY-CD-26N18-01	Issue 1
Test Specification	NY-X-26N18-01	Issue 1

The following circuits are required if automatic number idenfication of stuck coin and permanent signal lines is to be provided in panel and #1 Crossbar offices.

ANI Monitoring Circuit For Coin Control, Coin Supervisory and PSHT Circuits - Common Systems

Schematic	NY-S-90N34-01	Issue 1
Equipment	NY-E-90N34-01	Issue 1
Wiring	NY-T-90N34-01	Issue 1
Circuit Description	NY-CD-90N34-01	Issue 1
Test Specification	NY-X-90N34-01	Issue 1

Trouble Ticketer Circuit – Common Systems

Schematic	NY-S-95816-01	Issue 1
Equipment	NY-E-95816-01	Issue 1
Wiring	NY-T-95816-01	Issue 1
Circuit Description	NY-CD-95816-01	Issue 1

Permanent Signal Identification Circuit – Common Systems

Schematic	NY-S-95817-01	Issue 1
Wiring	NY-T-95817-01	Issue 1
Circuit Description	NY-CD-93817-01	Issue 1

Miscellaneous Circuit – Trouble Ticketer Frame

Schematic	NY-S-95823-01	Issue 1
Equipment	NY-E-95823-01	Issue 1
Wiring	NY-T-95823-01	Issue 1
Circuit Description	NY-CD-95823-01	Issue 1

#1 Crossbar Coin District Junctor Circuit

The district junctor circuit must be equipped with Figure I and Options F, N, R of SD-25210-01 to apply this modification.

Schematic	NY-S-25210-01	Issue 2
Equipment	NY-E-25210-01	Issue 2
Wiring	NY-T-25210-01	Issue 4
Circuit Description	NY-CD-25210-01	Issue 1 App. 1

Central Office Threshold

For DTF Service

1. Coin Present Test for initial deposit: -48v battery on the tip side with the ring side open.

2. Coin Present Test for 5c overtime or subsequent deposit less than initial rate: +48v battery on the tip side with the ring side open.

3. Totalizer homing: -48v or +48v battery on the ring side of line to ground on the tip side for initial or above deposits.

4. Totalizer homing for a deposit less than initial rate or after coin control has been applied: +48v battery on the ring side of the line to ground on the tip.

5. The removal of coin control battery (+130v or -130v) from the ring side of the line. This is to prevent false operation of the station "A" relay.

6. Provision of +48v talking battery on all operator trunks. This is required to home station totalizers on 5c deposits and to disable the TT dial.

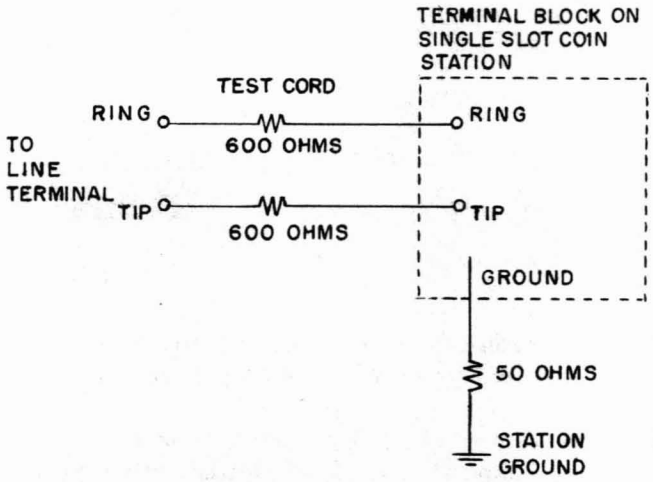
NEW YORK TELEPHONE
METHODS ADMINISTRATION

DIAL TONE FIRST

This information is to be used as a quick check method in order to determine if Central Office equipment has been modified and installed properly.

Test Equipment:

1. P 11 C connecting cord.
2. "C" Series Single Slot Coin Station, resistance padded to reflect the maximum customer loop and ground resistance of the Central Office being tested.



1. PERMANENT SIGNAL RELEASE
   NY-S-25003-01
   NY-S-2553-01

   Method: connect the single slot coin test station to the line equipment under test.

   Connect station ground.

PROCEDURE	ACTION
Lift receiver off hook.	Dial tone heard.
Deposit 5c and leave receiver off hook	18 to 22 seconds linkage releases and dial tone removed.
Hang up, then remove receiver from switchhook.	*Dial tone should be heard.
Hang up.	Coin refunded.

*NOTE:
If test station cannot activate linkage after routing tp permanent signal release, momentarily open and close line. If dial tone is not heard, PS circuit is not modified for PS relay 23108 or circuit modification.

See drawing on Attachment No. 1

2. RECYCLE

1 X-Bar – NY-S-25061-02 SD-25061-02
NY-S-25444-01
NY-S-25736-01

5 X-Bar – NY-S-26N18-01 SD-25736-01

Method:

Connect single slot coin test station to DTF line equipment. Remove upper housing from single slot coin test station and connect upper housing to the chassis using the P11C connecting cord.

Leave upper housing off as a visual inspection of the coin control relay will be necessary.

PROCEDURE	ACTION
Block armature of coin relay in the test station so that it will not operate fully.	
Lift receiver off hook, deposit 10c	Dial Tone heard.
Dial a charge number	Allow call to complete.
Hang up.	Coin relay should attempt to operate twice. (Observe) Failure to remove coin ground should route a call to the sender monitor position or send the stuck coin indication to a TTY or Tb1. Ticketer.
After second attempt of coin relay operation lift receiver off hook.	
When Sender Monitor "A" board option is used.	Operator answers.
Request operator to identify a coin deposit. Then deposit 5c.	Operator should be able to identify 5c deposit.
Unblock coin relay and ask operator to return coin.	Operator should be able to return coin.

NOTE:

(A) If coin supervisory circuits are modified properly two attempts will be made to dispose coin in a stuck coin condition prior to routing the call to sender monitor, TTY or tb1. Ticketer.

(B) If interface circuit to Sender Monitor position is modified properly, operator will be able to identify 5c deposit and return coin.

IMPORTANT:

1. In all cases on all types of calls or attempts, after the deposit of a coin, the Central Office equipment must furnish 48v bat. to the station in order to reset the station totalizer.

2. At NO time should the Central Office equipment furnish coin control voltage prior to application of the 48v bat. required to reset the station totalizer. If this results, the station will be put into a fraud condition and the station put out of service.

3. LOCAL OVERTIME ANNOUNCEMENT

PROCEDURE	ACTION
Establish a call to any local charge number.	Call in progress.
At the end of 4½ minutes.	Initial deposit collected.
Between 4½ and 5 minutes.	Recorded announcement requests 5c deposit for additional 5 minutes.
Deposit 5c while the announcement is in progress.	If cut off, the Announcement Trunk does not supply 48v pos. battery. Check circuit modification for single slot operation.
Repeat the above steps with the exception of depositing the 5c overtime. Allow announcement to complete.	30 seconds after recorded announcement the call will be routed to the coin overtime operator.
	Operator should challenge for the O.T. deposit.
Deposit 5c. If not cut off, request operator to refund deposit.	If operator is unable to refund deposit, O.T. circuit not modified to apply coin control on tip side only.

IMPORTANT:

1. All circuits controlling coins in D.T.F. must be modified to send coin control over the tip side only. (This is because of a ground lifter device in the C series coin stations.)

2. Identification of a 5c deposit or any deposit less than the initial rate in D.T.F. is accomplished by application of 48v pos. battery over the ring side of the line to the station. This battery is required to reset the totalizer when less than rate has been deposited.

4. AUTOMATIC REFUND

NUC 4157 Modified per NUC4157W Fig. 2 & 2A

NOTE:

(A) Modification of this circuit consists of applying 48v battery on a timed basis and then applying coin potential. Coin potential will be sent out over the tip side only for Dial Tone First.

(B) Sketch (A) covers the 48v polarity that will be required at the time that this circuit is turned up.

TEST PROCEDURE

based on BSP 216-209-901 NY and attachment 2 CD-MS-25024 (copies attached).

(1.) **GENERAL**

(1.01) This section describes a method of making an operation test of the automatic coin return equipment in No. 1 crossbar offices.

(1.02) This test *should be made during a period of very light traffic* to avoid possible interference with regular traffic

(1.03) The line controller delay and coin refund peg count register readings should be taken before and after the test.

(2.) **APPARATUS**

(2.01) Portable coin station, C series type.

(2.02) Relay blocking tools.

(2.03) Make busy plugs.

(2.04) Coins.

(3.) **PREPARATION**

(3.01) Connect the portable coin test set to a spare line equipment in the line link primary switch to be tested.

(4.) **METHOD**

(4.01) Make the district junctors busy at the district junctor frames for those junctors that are associated with the line link secondary switch to which the call is to be directed.

(4.02) Make all the line link secondary switches busy on the frame to be tested except the one to which the refund call will be directed.

(4.03) Deposit 10c into the coin test set and observe that dial tone is not received in the test set receiver. Coin should be refunded and *totalizer should home.*

(4.04) Release several district junctors and make a charge test call to verify that LLF and Coin Supervisory circuits work properly. (Use other coin set wired to spare line and directory number as a test termination).

(4.05) Repeat steps (4.01) through (4.04) with coin sets that are in the field at the time of the test and all deposit combinations of 5c – 25c, covering all switches.

CAUTION:

If service calls are observed waiting, stop the test and release several LLF SEC switches.s,

5. ABANDON CALL

SUBSCRIBER SENDER OR ORIGINATING REGISTER

PROCEDURE	ACTION
Deposit nickel and lift receiver off hook.	Dial Tone heard.
Dial digit.	Lose dial tone.
Hang up.	Coin refunded.

6. ANNOUNCEMENT CIRCUIT FOR LESS THAN INITIAL RATE DEPOSITED

PROCEDURE	ACTION
Deposit nickel and lift receiver off hook.	Dial tone heard.
Dial your own number.	Announcement should indicate that a ten cent deposit is required.
Hang up.	Coin is refunded.
Repeat Step 1 & 2 and wait for 2 announcement cycles.	*Ann. Trk. disconnects after 2 cycles releases channel and returns D.T.

*With 7A system limit switch should be adjusted for one announcement per cycle.

7. DIAL "0" Or "211" (USE TOUCH-TONE 1C DTF SET)

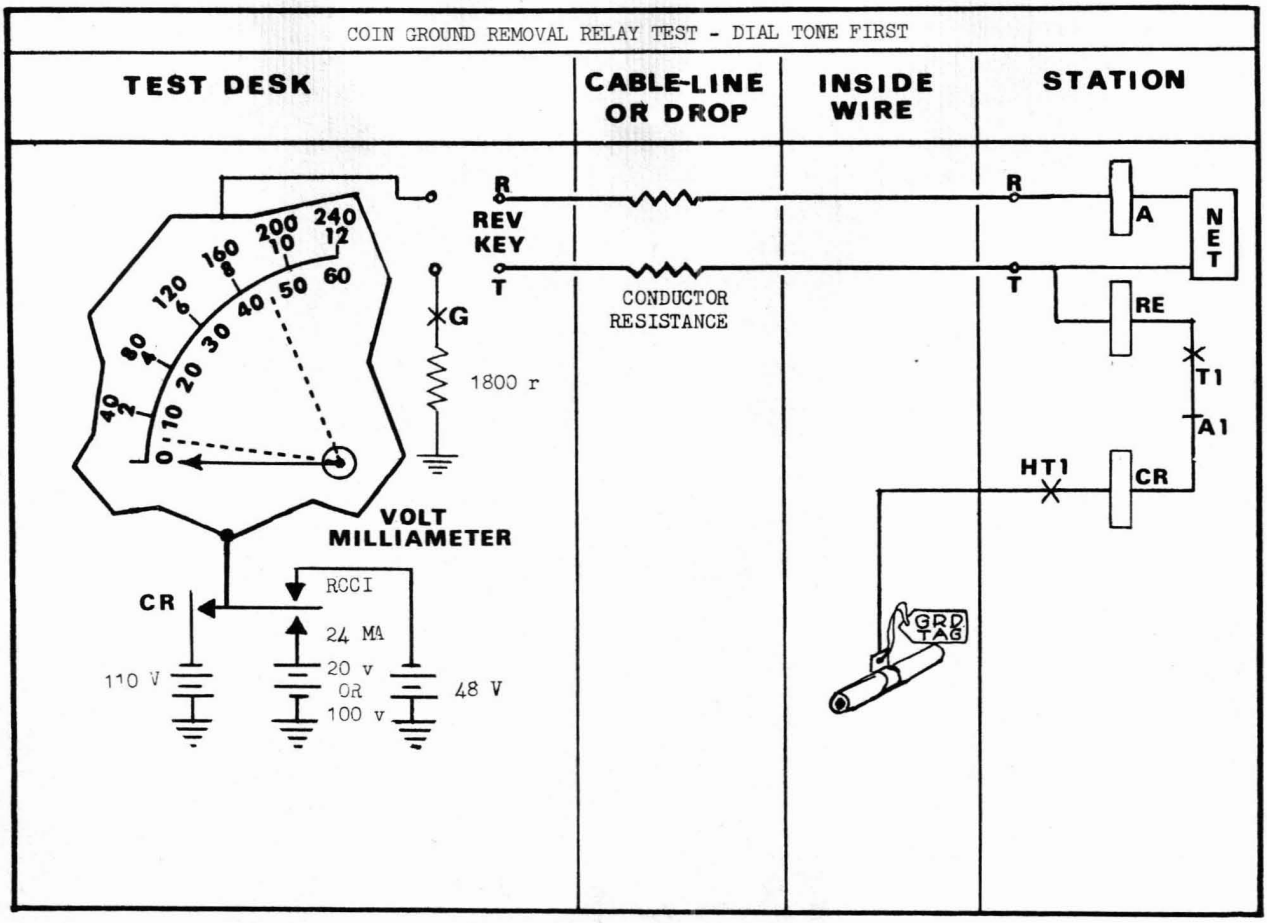
PROCEDURE	ACTION
Deposit nickel.	Dial tone heard.
Dial 0 or 211.	Operator answers, coin is refunded.
Attempt to assimilate coin signals by depressing any button.	48v + polarity on trunk should disable touch-tone dial.
Request operator to identify coin and deposit nickel.	Operator can identify coin and is not cut off.
Request operator to refund coin.	Coin is refunded.
Deposit coin and have operator collect coin.	Coin is collected.
Request operator to ring you back when you hang up. Then hang up.	Phone rings.

These tests verify that the circuit is modified properly. The modifications for the dial "0" Trunks consisted of:

1. The change in talking - 48v battery to +48v.
2. The removal of coin control from the ring side of the line.
3. The application of automatic coin refund upon operator answer.

8. INCOMING TOLL SWITCH (USE TOUCH-TONE 1C DTF SET)

PROCEDURE	ACTION
Request operator to call coin test station using Toll Switch Trunk.	Test station rings.
Attempt to assimilate coin signals by depressing any button.	48v+ polarity on trunk should disable touch-tone dial.
Request operator to identify a nickel.	Operator can identify deposit
Request operator to refund coin.	Coin is refunded.
Deposit coin and request operator to collect.	Coin is collected.
RESTRICTED COIN ZONE & OVERFLOW	
Deposit dime and originate call to a restricted zone.	Operator answers and coin is refunded.
Verify that call is routed to 48v + trunk by requesting the trunk number, asking operator to identify a nickel or assimilating coin signals.	
Make all DTF "O", 611, 411 or 911 trunks busy.	
With no deposit originate a call to the busy trunk group.	Call should route to overflow, not the 7A announcement.



COIN GROUND REMOVAL RELAY TEST - DIAL TONE FIRST

FOR SINGLE SLOT TYPES ONLY

The Ground Removal Relay is used to remove the coin ground during a conversation to reduce line noise. This test should be made in connection with all trouble reports involving "hum", noise and transmission difficulties. To perform this test, proceed as follows:

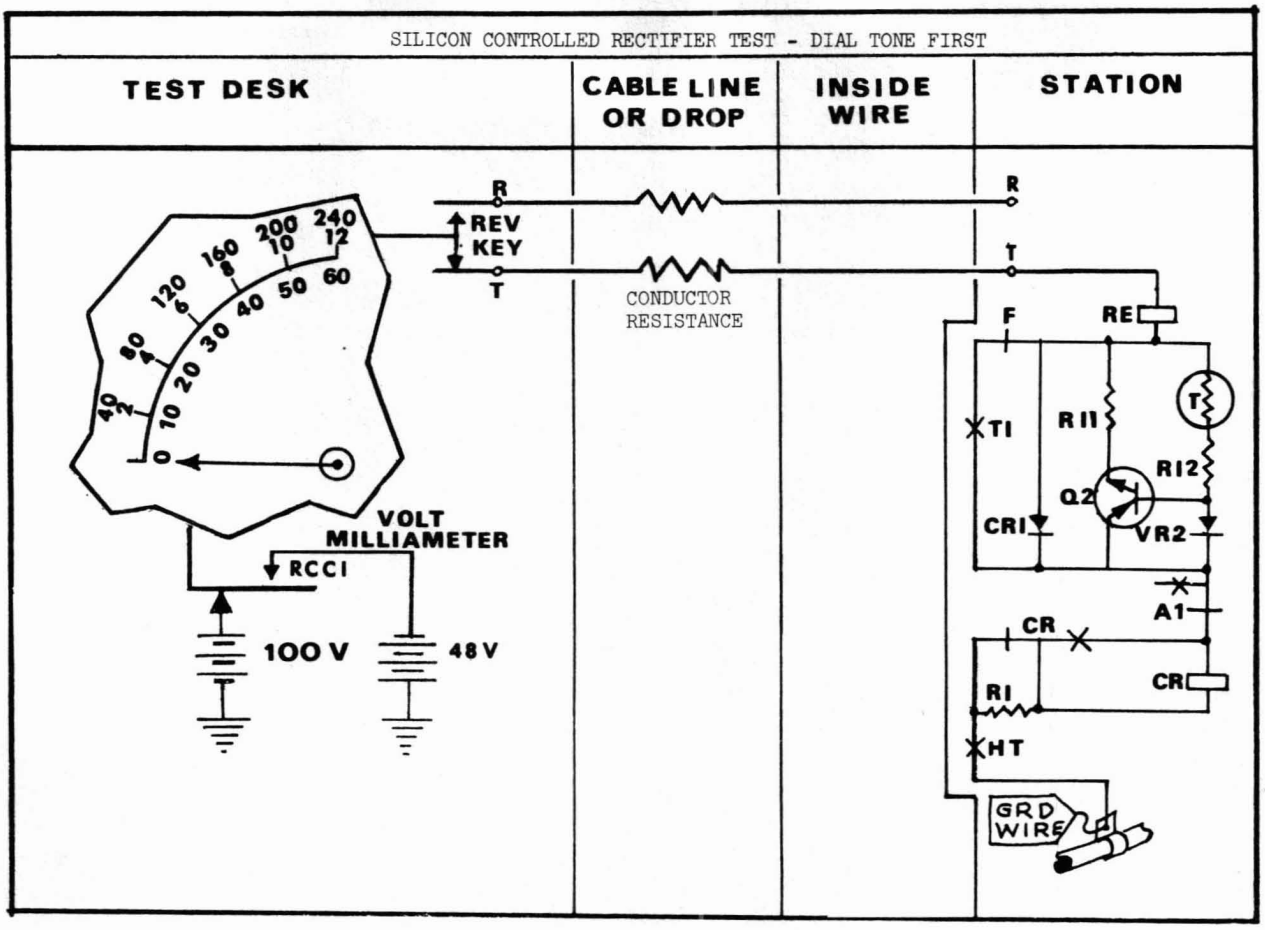
1. Make connection to the line to be tested.
2. Signal station and operate T and RCCI keys.
3. When station answers relay A (Ground Removal) should operate through ROH. Contact A1 breaks and opens coin ground circuit.
4. Request attendant or craftsman to wait a few seconds and then deposit 10¢, keeping receiver off hook.
5. During the pause, operate CR and G keys applying refund current to the tip and 1800 ohm ground to the ring.
6. Relay A should either remain operated or release and reoperated, keeping the coin ground path open.
7. Milliammeter should read 20 MA or better.
8. When coin deposited, ground is connected to the coin relay. Milliammeter reading should not change proving that the ground removal relay is operated and contact A1 is open.
9. Restore CR and G keys and operated REV key. Relay A should now release and close contact A1, completing coin ground path.
10. Milliammeter should now read the coin ground on the tip side.
11. Restore REV key and operate CR key to return coin. Restore all other keys to normal.

If relay A fails to operate as described in step 6, following will take place:

(a) Milliammeter current will increase momentarily to 45 MA or better when the coin is deposited.
(b) With coin ground path now closed, the coin relay should operate and return the coin, since the CR and G keys are operated.
(c) When the coin relay restores, coin ground is removed and the milliammeter reading should return to about 20 MA.
(d) If in (b) above, the loop is near maximum length, the coin relay may not operate, since it is parallel with the station transmitter circuit.
(e) If the coin relay fails in (d) above, advise attendant or craftsman to hang up receiver so that coins may be returned in a normal manner.

REF: BSP 662-300-500 or BSP 662-400-500

Part 3



SILICON CONTROLLED RECTIFIER TEST - DIAL TONE FIRST

FOR SINGLE SLOT TYPES ONLY

The Silicon Controlled Rectifier is used to provide a path for the coin return signal for a single 5¢ deposit. This test should be made in connection with all trouble reports of can't refund single nickel deposits. To test this circuit operation, proceed as follows:

1. Connect to the line to be tested.
2. With connection established, signal attendant or craftsman at station and operate T and RCCI keys.
3. Request a 5¢ deposit and the receiver left off hook.
4. Restore all keys and operate REV key - meter reads the coin ground on the tip.
5. This indicates either Diode CR1 or VR2 is conducting with positive test battery.
6. Restore REV key and operate CR key to return coin.
7. Failure to return coin indicates a defective SCR or one of its parallel components.
8. Release all test connections and restore all keys to normal.

REF: BSP 662-300-500 or BSP 662-400-500

SWITCHING SERVICES FLASH SUMMARY OF COIN SERVICE ITEMS

Issue No.	Date	Title
39	12/18/72	Repeated Customer Reports Coin Service
42	12/29/72	Use of Loop Extenders and Voice Repeaters
44	1/ 3/73	Loop Extender and Gain Device Requirements
45	1/ 5/73	"Cut Off" A series Station
46	1/ 5/73	Station Troubles Referred as C.O. Troubles
101	10/10/73	"TSP" – ETL's
49	1/15/73	Repeated Customer Reports "C" Series Station
91	9/14/73	False Operation of DLL SD-32053
111	11/ 7/73	Defective Ckt. Packs–Coin Station Test Line
123	12/27/73	No Release No. 1 Crossbar
145	4/20/74	Coin Station Test Line