COMMON SYSTEMS
COIN STATION TEST LINE CIRCUIT
(SD-1C297-01)

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1. GENERAL INFORMATION

1.1 Description of Tests: The Coin Station test line circuit was designed to determine the operational status of coin phones. This section describes the operational tests used to determine the ability of the Coin Station test line circuit to test coin phones.

1.2 Sequence of Tests: It is recommended that the sequence of tests be performed as directed by the section.

1.3 This circuit will not function properly when used in conjunction with Dial Long Line Circuits and Auxiliary Trunk Circuits.

2. RECORDS AND REQUIREMENTS

2.1 Records: Forms SD-97-1313 and SD-97-1315 are required for recording the results of these tests. For further information on records see Section 6B, Handbook 3.

2.2 Requirements: One cycle of operational tests consists of applying all the tests in Paragraph 7 to each test line clear of trouble over one cycle.

3. TEST EQUIPMENT

3.1 Test Sets

Note	Amt	Description
T	1	1C Type Rotary or Touch Tone Coin Station modified for dial tone first.
	1	ITE-5250A Digital Multimeter or equivalent.
	1	ITE-5391 or J93025B Coin Test Line Calibration Set for Option ZP.
T	1	1500D Telephone Set E/W 310 Plug.
	1	ITE-5590 Fuse Alarm Verification Test Set.

3.2 Cords

Amt	ITE	CDRS	One End	Other End	Description
6	9140 List 3	1	Allig. Clip	Allig. Clip	Call Thru Test
T1	P11C	11 Pins	No. 86-Cp11 Plug	No. 78S11 Socket	Test Cord
1	3W4B		310 Plug	3 Allig. Clips	

3.3 Accessories

Amt	Code	Description
1		55K ohm Resistor
1		100K ohm Resistor
1	723B	Card Extractor
1	158A	Adapter, Extender Card, Fixed
1	R-3110	Screwdriver, Phillips
1	ITE-4423	300 ohm 19 Type Resistor
3	364	Tools
1	T	Dry Cell Battery 3 Volt
1	T	Dry Cell Battery 9 Volt

3.4 Note

T - Telephone Company maintenance equipment which should be available on the job.

4. FUSING TEST

4.01 NOTE: A test receiver should not be used to make any tests on this circuit.

4.02 Using a volt-ohmmeter, check fuse posts for absence of battery and ground.

4.03 Insert the ITE-5590 into the vacant fuse holder. Verify that the alarm sounds and that the alarm lamp associated with the frame fuse lights. Verify also that the aisle pilot lamp lights.

4.04 Remove the ITE-5590. Alarm silences and alarm lamps go out.

4.05 Repeat Paragraphs 4.03 and 4.04 for the remaining fuses dedicated to this circuit.

4.06 Using fuses of the correct type, as indicated by circuit drawing and fuse panel designations, install the fuses one at a time, checking that each fuse is associated with the correct equipment and is free from crosses with other unfused posts on the fuse panel.

4.07 Using a volt-ohmmeter check for ground at: T.S.(B) terminals 11, 31, and 51 with Option V, TS(C) terminals 11 and 31.

4.08 With option X (Touch Tone Receiver) check for ground at T.S.(C) terminal 51.

4.09 Check for -48 volt battery at: TS(B) terminals 14 and 34, TS(C) terminals 13 and 33.

4.10 With option X (Touch Tone Receiver) check for battery at IM relay (ON).

4.11 Check for (+115-135V) at TS(B) terminal 18.

4.12 Check for (-115-135V) at TS(B) terminal 58.

4.13 Check for +46 volt battery (option V only) at TS(B) terminal 54.

4.14 Check SUP R (80V AC) at TS(C) terminal 16.

5. POWER SUPPLY TEST

5.1 4-Volt Power Supply Test and Adjustment

5.11 Place CP A966 on the card extender and remove CP A973.

5.12 Measure voltage between terminal 13 (NEGATIVE) and 26 (POSITIVE).

5.13 Meter should read 4.0 to 4.25 volts D.C. above the -36 volt reference voltage.

5.14 If voltage is beyond limits adjust potentiometer (R2) until required voltage is obtained.

5.15 If required voltage cannot be obtained exchange circuit pack and repeat Steps 5.11 thru 5.14.

5.16 Remove card extender and place CP A966 in position. Reinsert CP A973.

6. TEST SETUP

6.1 In order to test all the features of the Coin Station test line circuit, it is a must that 1C Type Rotary or T.T. Coin Phone be modified for Dial Tone First even though Dial Tone First is not used in the particular office. If it is not modified, the Ground Removal Test will fail. After the 1C Type Rotary Coin Phone has been modified per BSP 506-411-401 Tables M and N for Dial Tone First, remove the cover plate and the money bank (see Figure 1). The 1C type Rotary Coin Phone housing must not be grounded during the tests in Paragraph 7.

NOTE: The installer shall contact Telephone Company representative to verify maximum Loop Resistance value of the particular office before adjusting the Coin Station test line circuit.

6.2 Connect the cord with the three spade tips to TB1 on the coin station's chassis as follows and insert the plug end into the test set CP jack if ZP option is provided, otherwise into the CSTL TJ jack.:

(A) Tip to T
(B) Ring to R
(C) Sleeve to G

6.3 (ZP Option) Using the cord with the 310 plugs, connect one end to the test line's TJ jack and the other to the calibration set's TJA jack.

6.4 (ZP Option) Set the calibration set as follows:

(A) Leakage - none
(B) GRD RES - SHORT
(C) LOOP RES - none
(D) LOOP ADJ - normal (optional)

6.5 For No. 5 Crossbar Offices operate switch (MB).

6.6 If S option (Coin First) is provided, insulate contacts 2M of relay COL and 10M of relay RET. Remove insulated contacts upon completion of Paragraph 7.109.

7. OPERATIONAL TESTS

7.001 Paragraph 7 covers the operational tests to be applied to the Coin Station test line.

7.002 Beep Tones: Beep tones are supplied as test answers to various tests. The number of beep tone constitutes a code which indicated the test results of the tests being performed. Each code is heard three times. Beep tone is produced by interrupted high tone at 120 IPM.

7.003 Coded Ringing: Coded ringing is supplied as test answer to certain tests. With the coin station headset on-hook, the number of rings constitutes a code which indicates the results of the test being performed. The ringing current is interrupted at a rate of 60 IPM. The handset may be lifted during ringing and beep tones will replace coded ringing at the same 60 IPM rate.

7.004 HU Tone: Hang up tone consists of steady high tone and is applied whenever it is desired to have the coin station's handset placed on-hook.

NOTE: A steady tone is also heard in the Coin Relay Time Test (Paragraph 7.110) to indicate a time duration of 425-475ms for the operation of the station's coin relay.

7.005 C Tone: C (Coin) tone is supplied whenever a coin is desired in the coin hopper. Coin tone consists of alternate application of high and dial tones at a rate of 120 IPM.

7.006 Coin Present and Ground Removal Test

7.007 This test checks the ability of the test line to detect the presence of a coin or coins at the coin station and to determine if the ground removal relay will operate.

7.008 Lift the handset off hook, C tone is heard.

7.009 Hang up the handset, and make sure that timer DISC is engaged. In approximately 60 seconds the circuit disconnects.

7.010 Lift the handset off hook, C tone is heard.

7.011 Deposit initial rate, 1 beep is heard, repeated three times, then 120 IPM dial tone is heard.

7.012 Hang up the handset, the circuit disconnects and the coin is returned.

7.013 Strap terminals 4 and 8 at TB 3 board of chassis assembly which jumpers ground removal relay A contacts. See Figure 1.

7.014 Lift handset off hook and deposit initial rate. 2 beeps are heard repeated three times, then 120 IPM dial tone is heard.

7.015 Hang up the handset, the circuit disconnects and the coin is returned. Remove strap from terminals 4 and 8.

7.016 Illegal Digit Reception Test

7.017 This test checks the ability of the test line to reject an illegal digit and request a legal digit.

7.018 Lift the handset off hook, C tone is heard.

7.019 Deposit initial rate 1 beep is heard repeated three times, then 120 IPM dial tone is heard.

7.020 Dial an illegal digit 1. After dialer is released 120 IPM dial tone continues. Repeat step 7.020 for remaining illegal digits 6, 7 and 8 and 9 if option ZO is not provided.

7.021 In sixty seconds the coin is returned, C tone is heard.

7.022 Hang up the handset, in sixty seconds the circuit disconnects.

7.023 Option ZP Ground Resistance, Loop Resistance, and Leakage Tests

7.024 Adjustment

7.025 Remove CP A962B, place it on the card extender, and place the card extender into the circuit.

7.026 Disengage the DISC timer (adjacent to DISC relay).

7.027 Carefully rotate R3 and R5 potentiometers counterclockwise until the permanent stop is reached. Do not force past the stops.

NOTE: R3 potentiometer is closest to card connector.

7.028 At calibration set, set the switches as follows:

(A) GRD RES --SHORT
(B) LOOP RES --NONE
(C) LEAKAGE RES---NONE

7.029 Lift the handset offhook, C Tone heard.

7.030 Deposit initial rate-one beep heard 3 times, followed by 120 IPM dial tone.

7.031 Dial digit 2. The coin is returned, three beeps are heard, repeated three times, followed by HU tone. Hang up the receiver. The coin station bell rings once, repeated three times.

7.032 Set the calibration set switches as follows:

LEAKAGE RES - NONE
GRD RES - SHORT
LOOP ADJ - NORMAL
(WHEN PROVIDED)
LOOP RES - SET TO TYPICAL LOOP REQUIREMENTS PLUS 50 OHMS (SEE TABLE A)

NOTE: If this value is not provided on the TEST SET, connect two resistors whose combined value is equal to this value across the EXT-T&R Binding Post and operate LOOP RES switch to EXT-1.

7.033 Lift the receiver off hook. C tone is heard. Deposit the initial rate coin. One beep is heard, repeated three times, followed by 120-IPM dial tone.

7.034 Block the AUX-1 relay operated, then dial digit 2. When the CPT relay releases, block the TMR-1 relay nonoperated. Set the GRD RES switch to 150. Remove the blocking tool from the AUX-1 relay. Verify that the RT relay operated.

7.035 Adjust the R3 potentiometer clockwise until the ANS-1 relay just operates, taking care not to exceed the permanent stop on the R3.

7.036 Set the GRD RES switch to 100. Momentarily open contact 4M of GRT relay (Note: If Contact 4 is shorted to adjacent contacts it will damage the 1246 pack) and verify that the ANS-1 released and did not reoperate. Set the GRD RES switch to 150 and verify that the ANS-1 relay operated. Momentarily open contact 4M of GRT relay and verify that the ANS-1 relay released and reoperated. Rotate the GRD RES switch to short and verify that the ANS-1 relay remains operated.

7.037 Block the TMR-2 relay nonoperated. Remove the blocking tool from the TMR-1 relay and verify that the coin is returned.

7.038 If the calibration set is equipped with a loop adjust switch, set same to 300. If the calibration set is not equipped with a loop adjust switch, remove the plug or spade tips from the coin phone jack of the calibration set and connect a 300 ohm resistor across the tip and ring leads on the coin phone (CP) jack.

7.039 Block the TMR-3 relay nonoperated and remove the blocking tool from the TMR-2 relay. Verify that LRT relay operates.

7.040 Adjust potentiometer R5 on CPA 962B clockwise until relay ANS-2 just operates. (R5 is next to the R3).

(A) Set LOOP RES switch to a 50 ohm lower position than used in step 7.032.

(B) Momentarily open contact 8M of LRT relay. Relay ANS-2 should release and not reoperate. If ANS-2 reoperates adjust R5 1/4 turn CCW and repeat step (B).

(C) Set LOOP RES switch to a 50 ohm higher position. Relay ANS-2 operates.

(D) Open contact 8M of LRT relay. Relay ANS-2 releases. Close 8M and the LRT reoperates.

7.041 If the calibration set is equipped with a loop adjust switch, remove the blocking tool from the TRM-3 relay and immediately set the loop adjust switch to normal. 2 beeps are heard, repeated three times.

7.042 If the calibration set is not equipped with a loop adjust switch, remove the blocking tool from the TMR-3 relay and immediately disconnect the 300 resistor and connect the coin station to the Coin Phone (CP) jack of the calibration set. Hang up the receiver and verify that 1 ring is heard repeated three times.

7.043 Remove CP A962B from card extender and place back into position. Place CP A963B on the card extender.

7.044 At calibration set, set switches as follows:

(A) LEAKAGE -- 110K (T-G)
(B) GRD RES -- SHORT
(C) LOOP RES - NONE

NOTE: When testing with DTF office, using coin trunk SD-32359-01, connect a 55K ohm resistor across EXT LEAK terminal and operate the leakage switch to EXT (T-G).

7.045 Set potentiometer R5 on the CPA 963 to full counter clockwise position. Lift handset off hook and deposit initial rate, one beep is heard, repeated three times, followed by 120 IPM dial tone.

7.046 Dial 2, the coin returns, three beeps are heard, repeated three times, followed by hang up tone. Block relay TMR1 and TMR2 nonoperated, then hang up handset.

7.047 Adjust potentiometer R5 on the CPA 963B clockwise until neon lamp DS2 is just extinguished and then turn the potentiometer one turn counter clockwise. DS2 is adjacent to the R5 POT.

7.048 To verify the leakage adjustment perform the following:

(A) Place the leakage switch in the 100K (T-G position). Lamp DS2 should not light.

(B) Set leakage switch to 110K (T-G).

(C) Momentarily operate the AUX4 relay, DS2 lamp dimly lights.

7.049 At the calibration set, set switches as follows:

(A) LEAKAGE -- 100K (T-G)
(B) GRD RES -- SHORT

7.050 Remove blocking tools from TMR1 and TMR2 relays. Two rings are heard repeated three times, then disconnects.

7.051 These tests check the ability of the test line to determine if the coin station's loop and ground falls within preselected limits and it can detect leakage less than 100K ohms.

7.052 Lift the handset off hook, C tone is heard.

7.053 Deposit initial rate, 1 beep is heard repeated three times, followed by 120 IPM dial tone.

7.054 Dial digit 2:

(A) Coin returned.

(B) 3 beeps are heard, repeated three times, indicating loop and ground is OK.

(C) HU tone is heard.

7.104 Coin Collect Test

7.105 This test checks the ability of the test line to detect and collect a coin. This test is sequenced the same as coin return except attempts will be made to collect the coin.

7.106 Lift handset off hook, deposit initial rate, one beep is heard, repeated three times, followed by 120 IPM dial tone.

7.107 Dial digit 3, HU tone is heard.

7.108 Hang up handset, coin collected on first attempt, lift handset off hook after bell rings once, one beep is heard, repeated twice. If ZO option is furnished verify relay CRM operates after the first attempt.

7.109 After 120 IPM dial tone is heard hang up handset, the circuit disconnects.

7.110 Coin Relay Timing Test

7.111 This test checks the ability of the test line to determine the operating time of the coin relay in the coin station. (See NOTE of Paragraph 6.6.)

7.112 Disengage the DISC timer.

7.113 If the coin relay test fails, see Paragraph 5.1 for power supply adjustments.

7.114 At the coin station on the coin relay, turn the Phillips head screw two turns counter clockwise.

7.115 Lift the handset off hook, C tone is heard.

7.116 Deposit initial rate, one beep is heard, repeated three times, followed by 120 IPM dial tone.

7.117 Dial digit 5, the coin returns. The Coin Station test line repeats the answer three times as follows:

Operate Time	Answer
400ms	1 beep
400 - 425ms	2 beeps
425 - 475ms	Steady Tone
475 - 500ms	3 beeps
500ms	4 beeps

7.118 Upon completion of the beep tone, C tone will be heard. Turn the Phillips head screw on the coin relay a quarter turn clockwise. Deposit initial rate. The coin returns and the test line repeats an answer, as in 7.117, three times.

7.119 Repeat Paragraph 7.118 until the entire range of answers has been verified.

7.120 After the steady tone has been verified and C tone is heard, flash the switch hook for one second. This will return interrupted dial tone to the tester.

7.121 Engage the DISC timer and hang-up the handset, the circuit disconnects.

7.122 Message Register Test (ZE Option).

7.123 This test checks the use of the message registers used to count each dialed test digit.

7.124 At message register location record readings of all registers associated with the CSTL.

7.125 Use Sections 7.023, 7.085, 7.104, and 7.110 to perform one test call dialing the digits 2, 3, 4, and 5 respectively.

7.126 Verify that all four registers have advanced one step each.

7.127 Touch Tone (X Option)

7.128 This test checks that the dialed digit will be translated from the 2 out of 8 code to the proper code for the P1-5 relays by relays LG1-4 and HG1-3.

7.129 Plug the 1500D Telephone Set E/W 310 plug into the test line's TJ jack.

7.130 Block operated relay ON.

7.131 Depress and hold digit 1 key on 1500D telephone set. See Table B for proper sequence of relays P1-5 for digit keyed.

(A) Remove the handset from the 1500D telephone set.

(B) Disengage the disc timer.

7.132 After relay sequence is checked release key and repeat Paragraph 7.131 until all digits have been checked. Re-engage the disc timer.

7.133 Disconnect 1500D telephone set and remove blocking tool from relay ON.

TABLE B

DIGIT KEYED	RELAY P1	P2	P3	P4	P5
1	O	O	R	R	R
2	R	R	O	R	R
3	O	O	O	O	R
4	R	R	O	O	R
5	O	O	R	O	R
6	R	R	R	O	O
7	O	O	R	O	O
8	R	R	O	O	O
9	O	O	R	R	O
O	R	R	O	R	O

O = Operated
R = Released

7.2 Foreign EMF Check (Option ZK)

NOTE: See Paragraph 6 for test setup.

7.201 Remove the DISC timer circuit card.

7.202 Check that the test line circuit is not busy (OH and DISC relays normal), lift the receiver off hook and verify that C tone is heard.

7.203 Deposit a single initial coin rate coin. One beep is heard, repeated three times, followed by 120 IPM dial tone.

7.204 Dial digit O. Verify that the coin is returned. Three beeps are heard, repeated three times indicating ground foreign EMF test is OK. HU tone is heard.

7.205 Hang up the receiver. The coin station bell rings three times, repeated three times indicating the loop FEMF test is OK. Remove the receiver off hook before the third ringing answer cycle has completed.

7.206 Disconnect the G lead from the coin station and connect a 3V dc supply between the lead and the terminal.

NOTE: Record the polarity of the connection.

7.207 Deposit a single initial coin rate coin and verify that 120 IPM dial tone is heard.

7.208 Dial digit O. Relay ANS 1 operates followed by a single beep answer and HU tone.

7.209 Disconnect the 3V source and reconnect the G lead.

7.210 Connect a 100K ohm resistor in series with the 3V battery across the T and G leads.

7.211 Hang up the receiver. A triple ring answer is heard and relay LFP operates.

7.212 Go off hook before the third ring cycle is complete. Dial tone follows.

7.213 Repeat Paragraph 7.206-7.212 by reversing the polarity.

7.214 When dial tone is heard after 7.212 disconnect the 3V battery and resistor and connect a 9V battery in series with the 100K resistor across the T and G leads.

7.215 Deposit the initial rate and dial O. A triple beep answer is heard three times followed by HU tone.

7.216 Hang up the receiver. Relay ANS 2 operates followed by double ring answer heard three times.

7.217 Go off hook before the third ring cycle is complete. Dial tone is heard.

7.218 Connect the 9V battery and resistor across the R and G leads.

7.219 Deposit initial rate coin and dial O.

7.220 Triple beep answer followed by HU tone.

7.221 Go on hook. ANS 2 relay operates followed by double ring answer. Go off hook before the third ring cycle is complete. Dial tone is heard.

7.222 Repeat steps 7.214-7.221 using the reverse polarity.

7.223 Disconnect the battery and resistor and remove the test cord from the TJ jack. Reinsert the DISC timer card.

7.3 Self Diagnostic Calibration Test (Option ZO)

NOTE: See Paragraph 6 for set up.

7.301 Insert CPSA 962B and 963B using 158A card extenders.

7.302 Connect a coin station to jack TJ and ground the coin station.

7.303 Rotate counterclockwise R3 and R5 potentiometers on CP962B and R5 on 963B. Do not exceed stops.

7.304 Go off hook with the coin station and deposit initial rate. A single beep will be heard repeated three times followed by dial tone.

7.305 Block relay AUX-1 operated and dial digit 9. Relays P1, P2, P5 and CAL2 operate.

7.306 When CPT releases block TMR-1 nonoperated and remove block from the AUX-1. Relays RT and GRT should operate.

7.307 Adjust the R3 potentiometer until relay ANS-1 just operates. Add an additional 1/8 turn. R3 is closest to the connector end of the pack.

7.308 Block relay TMR-3 nonoperated and remove the block from TMR-1. Coin returns. LRT relay operated.

7.309 Adjust the R5 potentiometer until ANS-2 just operates.

7.310 Remove the blocking tool from the TMR-3. Double beeps will be heard three times followed by a HU tone.

7.311 Repeat paragraphs 7.304. Block relay AUX 1 operated and dial digit 8. Relays P3, P4, P5 and CAL1 operate.

7.312 Repeat paragraphs 7.306 - 7.309 except ANS1 and ANS2 relays should not operate. Relays ANS 1/2 operate on dial 9 and nonoperate on dial 8.

7.313 Remove the blocking tool from the TMR-3 relay. Three beeps or four beeps if ZX option is provided will be heard 3 times followed by HU tone.

7.314 Block relay TMR2 nonoperated and go on hook.

7.315 Adjust the R5 potentiometer on the 963 pack clockwise until neon lamp DS2 on the pack is just extinguished. DS2 is the lamp adjacent to the POT.

7.316 Momentarily operate relay AUX-4 and verify the lamp glows dimly and then goes out when AUX-4 is released.

7.317 Block TMR-1 nonoperated and remove the block from TMR-2. Lamp DS2 goes out. If not adjust the R5 clockwise until it does.

7.318 Remove the block from TMR-1 and double ring answer will be heard three times.

7.319 Remove all blocks, card extenders and cards and insert all CPs into their proper housing.

7.4 Ground Check, Loop Resistance, and Leakage Tests (Option ZO)

7.401 Using a 3W4B card connect a coin station telephone set to jack TJ of the Test Line circuit.

7.402 Unseat the DISC timer circuit pack.

7.403 Lift the handset off hook, C tone heard.

7.404 Deposit initial rate. One beep heard 3 times followed by 120 IPM dial tone.

7.405 Dial digit 2. The coin is returned, three beeps are heard repeated three times, followed by HU tone. Hang up the receiver. The coin station bell rings once repeated three times. Lift the handset off hook before the third ring.

7.406 When interrupted dial tone is heard deposit single coin and dial digit 8. CAL1 relay operates and coin is returned. Three beeps or foure beeps if ZX option is provided followed by HU tone is heard.

7.407 Place the handset on hook. Three single rings indicate leakage test is OK.

7.408 Take handset off hook before third answer. 120 IPM dial tone is heard.

7.409 Deposit coin and dial 9. CAL2 relay operates and coin is returned.

7.410 Relays ANS-1 and ANS-2 operate and three double beeps followed by HU tone is heard.

7.411 Place handset on hook. Three double rings indicate leak test is OK.

7.412 Replace the DISC timer circuit pack and remove the test cord from jack TJ.

8. CALL THROUGH TEST

8.1 This test is primarily performed to see if the Coin Station test line can be seized through the Central Office equipment.

8.2 Disconnect the IC Coin Station and the Calibration Set from the test line circuit.

8.3 Using jumpers, temporarily cross connect the following leads:

T
R
S
S1

8.4 For No. 5 Crossbar Offices release switch (MB).

8.5 Perform one of the following tests which applies to the particular office.

8.6 Dial Tone First Office

8.61 Lift the handset off hook, dial tone is heard.

8.62 Deposit initial rate and dial the NNX code assigned to the test lines.

8.63 One beep is heard, repeat three times, followed by 120 IPM dial tone if all previous tests were satisfactory, remove jumpers. End of test.

8.7 Coin First Office

8.71 Lift the handset off hook, deposit initial rate, dial tone is heard.

8.72 Dial the NNX code assigned to the test line.

8.73 Two beeps are heard repeated three times followed by 120 IPM dial tone. If all previous tests were satisfactory, remove all jumpers. End of test.

ATTACHMENT
Figure 1 on Page 12.

Manager, Product Engineering
Control Center

Reason for Reissue:
Minor revision per option ZX.

FIGURE 1

1C1 COIN STATION MODIFIED FOR DIAL TONE FIRST