

CENTRAL OFFICE COIN SERVICE

GENERAL

1.01 This section is provided to give a basic overview of how various central offices handle coin service. The following is not a comprehensive or detailed circuit description and should be used as an aid to existing technical documents, i.e., Bell System Practices, CDs, PDs, etc. For central office checking with a coin test station, see the Public Service Review Guides referenced at the end of each subsection. The following new AT&T letters should be referenced in addition to the letters cited in this section:

- RL 79-09-413—Enablement of TOUCH-TONE® Dials
- GL 78-09-401—Coin Improvements in No. 1, No. 2, and No. 3 ESS
- RL 79-08-311—Coin Station Test Line Enhancements
- EL 6271—Dial-Tone-First Conversion
- GL 78-08-005—Local Coin Overtime in ESS Offices
- IL 79-12-074—Test Board Modifications.

1.02 The section will address the two basic methods of handling coin service (Dial-Tone-First and Coin-First) a third method Postpay will not be covered due to its rapid replacement by dial-tone-first.

1.03 General—Coin Service:

(a) Coin service is always segregated from other services by a special class of service. Note, all coin lines are to be essential service, except as detailed in the Traffic Facilities Practice. All switching systems provide -48 volt battery toward the customers coin phone, on the ring side of the line. Coin-first lines have an open tip during a normal receiver on-hook condition. When a customer goes off-hook, the central office takes no action and in fact cannot detect

the off-hook condition due to the lines conditioning for ground start. When the customer deposits the initial rate (controlled by the coin station totalizer) the coin ground (through the hopper trigger in the coin station) is extended to the ring side of the line. The ground operates the line equipment in the central office as a signal to provide dial tone. Dial-tone-first offices provide both battery and ground toward the coin station and therefore provides dial tone the same as for a POTS phone. All coin service is very current sensitive in that the central office must provide at least 23 ma of line current and 41 ma of coin control current to the farthest (longest loop) coin station (see Range Extension Chart). At this point the switching systems vary in their handling of the call.

1.04 No. 5 Crossbar:

(a) The No. 5 crossbar coin-first offices require a dual wound line relay with both windings in series when serving coin-first service (SD-26030 V option removed, SD-25554 option K removed). If any coin-first lines are served in a No. 5 crossbar office the originating registers must have the ability to desensitize the (pulsing) L relay by providing a resistive ground through its tertiary winding via the coin class of service relay.

(b) Dial-tone-first offices require that the dual wound Line Link Frame L relays be equipped as follows: SD-26030 V option provided, SD-25554 option K provided, these options effectively strap out one of the two windings of the relay. The line relay now will prevent originations from the coin station when the loop substantially exceeds the offices design parameters.

(c) The No. 5 crossbar offices can provide coin return from the following equipment: Originating Registers, TSPS/Cordboard trunks, Ring and Tone trunks, Announcement trunks, and Coin Supervisory circuits. Coin Collect

current is only provided from TSPS/Cordboard trunks and Coin Supervisory circuits. The only circuit that provides for a stuck coin test (Recycle Feature) is the coin supervisory circuit.

(d) The No. 5 crossbar offices handle coin actions on locally completed calls in the coin supervisory circuit (CS). All trunks must have access to the CS circuit (including ring and tone trunks) or use coin junctors or coin IAO trunks that have such access. The use of coin junctors or coin IAO trunks negates the need to have every other trunk hardwired to the Coin Supervisory Link (access to coin supervisory circuit). When the trunks supervisory relays indicate a coin action is required the trunk bids for an idle coin supervisory circuit through the Coin Supervisory Link. The bridged connection allows the coin supervisory circuit to apply the proper collect or return current toward the coin phone and test to determine if the action was successful.

(e) The No. 5 crossbar offices handle coin actions required by DDD calls or TSPS operators in the No. 5 crossbar TSPS trunk. The TSPS base unit signals the No. 5 office (coin collect, return, or ring back) by either frequencies or multiwinks. The No. 5 office receives these signals and the trunk applies **one** pulse of coin collect or return (approximately 425 ms) or ring back. The No. 5 crossbar TSPS trunk does not make a test to determine if the required coin action is successful. If the coin is still present the call is abandoned and the coin remains on the trap.

(f) **No. 5 crossbar Typical Coin Troubles:**

- GT5 (Ground Test Failures)
- Permanent Signals—
- ALIT—arranged to test coin lines and report them by telephone number to the LTD.
- CSTR—are the register readings excessive.
- RC & RCF—are the register readings excessive.
- Are there any trunks falsely held up in the Coin Supervisory Link Frame?—(falseground on the BL lead)
- TSPS trunks—do they provide Coin Collect, Coin Return, Ring Back, what is the duration of coin control voltage
- TSPS signaling to the No. 5 crossbar office
 - (1) Dual Frequency—Coin Collection/Coin Return/Ring Back
 - (2) Multiwink—Operator Attached, Coin Collect, Coin Return, Ring Back, and Operator Released.
- Originating Register—option to desensitize L relay (CF only)
- Originating Registers ability to return coins
- Coin Junctor & IAO trunks—proper supervision, ability to signal the coin supervisory circuit for coin collect and return
- Line Link Frame Line relay option
- Coin Control Voltage measurements (130V):
 - (1) Coin Supervisory Circuits
 - (2) Coin Station Test Line equipment
 - (3) TSPS/Cordboard trunks
 - (4) Miscellaneous trunks
- Positive 48V battery on TSPS/cordboard trunks and Coin Supervisory Circuits—DTF only
- Proper duration (time) of coin control voltage from Coin Supervisory Circuits
- LT & CB relay adjustment—Coin Supervisory Circuit
- Recycle feature—Coin Supervisory Circuit GL-7109013
- Immediate coin return (during call set up) provided for toll information and service codes including 911.
- Burnt and/or powdered carbons
- Traffic blockages or overflow

- (1) Originating Registers
- (2) Coin Supervisory Circuits
- (3) Operator trunk groups
- (4) Coin junctors
- (5) Coin 1A0 trunks
- (6) Recording trunks
- (7) Load balance (lines and coin junctors).

Trouble Identification procedures for the previously listed conditions may be found in the No. 5 crossbar Public Services Review Guide (select code 500-714 and 500-719). These may be ordered on a standing order basis from the Western Electric Co., Indiana Publication Center (see RL 80-01-278).

1.05 ESS:

(a) ESS offices use a ferrod to service subscriber requests. The saturation value (operate) is 10 ma. When saturated the ferrod signals the system that a customer is requesting dial tone. The system connects a Customer Dial Pulse or TOUCH-TONE® Receiver; thereby providing dial tone. The receiver is more critical when it checks for a customer's short (receiver off-hook) than the line ferrod. Note, we earlier stated the coin station requires 23 ma of current to properly operate. If the customer loop is only drawing 12 ma of current the customer receiver will abandon the call, but the line ferrod will reoperate. This is a showering line condition and it is reported to the LTD via the Automatic Line Insulation Teletype (ALIT).

(b) ESS offices provide all coin control actions from the coin control circuit. The coin control circuit is switched to a customer's line under program control. The coin control circuits always make a stuck coin test at the end of a call (recycle).

Note: All ESS offices provide coin control actions in a dial-tone-first manner (coin control current on tip, ring open rather than current on both sides of the line).

(c) ESS offices handle coin actions required by DDD calls or TSPS operators by scanning the TSPS trunk (50 ms scan rate), looking for any control signals from the TSPS base unit. When the ESS office sees a request on the TSPS trunk the ESS office momentarily opens the talking path, and attaches a multifrequency (MF) receiver. The MF receiver looks at the tones being sent from the TSPS base unit transmitter and determines if the signals request coin collect, coin return, ring back, or operator attached (operator attached or released signals are only available with Expanded Inband Signaling in Generic Program 1E6. This allows the trunk to switch battery polarity, +48V talk battery during operator attached and -48V talk battery during operator release). DTF offices not equipped with Expanded Inband Signaling provide +48V talk battery for the duration of the call. If the TSPS signal is for coin return the ESS office will again open the talk path, release the MF receiver and switch the customer's line to the coin control circuit which applies the -130V coin return potential. (The coin control potentials are applied for a maximum of 600 ms.) After the coin control function is complete the system will make one recycle attempt if the coin ground is still present.

(d) Local calls are handled wholly within the ESS machine. When a coin control function is required the program momentarily opens the talk path and switches the customer's line to a coin control circuit which applies the required current.

1.06 ESS Typical Coin Troubles:

- Coin Control Voltage Measurements (130V)
 - (1) Coin Control Circuit
 - (2) Coin Station Test Line
- Excessive stuck coin indicators—faulty coin control circuits
- MF Receiver troubles
- TSPS trunks not scanned at 50 ms
- Excessive switch failures (FCGF and SUPF)
- Reversals in the Network

- Traffic blockages or overflow
 - (1) Customer Dial Pulse receivers
 - (2) Customer TOUCH-TONE® receivers
 - (3) Multifrequency receivers
 - (4) Coin Charge registers
 - (5) Load Balance (lines)
 - (6) Coin Control Jr. registers
 - (7) Coin Control Hardware circuits
- LT Relay adjustment and burned contacts in the Coin Control Circuits
- Lack of +48V talk battery on TSPS trunks (DTF only)
- Burnt and/or powdered carbons
- Lack of immediate coin return on all service codes and directory assistance calls

Trouble Identification Procedures for the previously listed conditions may be found in the ESS Public Services Review Guide (select code - common section 500-714, No. 1 ESS 500-715, No. 2 ESS 500-716, and No. 3 ESS 500-717). These documents may be ordered on a standing order basis from the Western Electric Co., Indiana Publication Center (see RL 80-01-278).

1.07 *Step-by-Step*

- (a) Coin lines in step-by-step are served on dedicated Line Finder groups. The Line Finders are hardwired to a coin box trunk and then cabled to a first selector appearance.
- (b) Step-by-step offices can provide coin return from the following pieces of equipment: coin box trunks, TSPS/cordboard trunks, and miscellaneous trunks.
- (c) Step-by-step offices handle coin actions on local calls in the coin box trunk. The coin box trunk applies the coin control current through the winding of a relay to the coin station hopper trigger ground. When the coin station ground disappears, the coin box trunk relay releases

and allows the connection to restore to normal. Some step-by-step offices have a timed release circuit that will time out after about eight attempts of coin control action (about 60 interruptions per minute), peg the stuck coin register, then release. If the timed release circuit is not provided and a coin ground cannot be removed, the circuit must be manually released. Note, there are many types of coin box trunks with loop limits between 750 to 1050 ohms.

Step-by-step offices handle coin actions required by DDD calls or TSPS operators in the step-by-step TSPS trunk. The TSPS base unit signals (Coin Collect, Return, or Ring Back) to the step office by either frequencies or multiwinks. The step office trunk receives these signals and trunk applies **one** pulse of coin collect or return (approximately 425 ms) or ring back. The trunk does not make a test to determine if the required coin action was successful. If a DDD call was completed to a busy number the step-by-step TSPS trunk will apply one quick pulse of coin return toward the coin station, then the coin box trunk will check and determine if the coin ground has disappeared. If the coin ground is still present the coin box trunk will repeatedly attempt to **collect** the coin.

(d) *Step-by-Step Typical Coin Troubles*

- Excessive Stuck coin alarms
- Switch maintenance - cords, wipers, banks, von springs, etc.
- Improper adjustment of coin box trunk relays, P, P1 R, J
- Lack of proper stuck coin alarms - coin box trunk, Isle pilot, major alarm
- Coin box trunk, timed release circuit, and register troubles
- Improper coin control duration (timing in TSPS trunk)
- Traffic blockages or overflow
 - (1) Line Finder Group
 - (2) Operator Trunk Groups

- Lack of routines in TSPS trunk signaling receivers
- Line relay options in line finders
- Improper coin control voltages
- Burnt or powdered carbons

- Lack of immediate coin return on all service codes and directory assistance calls.

Trouble Identification procedures for the previously listed conditions may be found in the Step-by-Step Public Services Review Guide (select code 500-714 and 500-720). These documents may be ordered on a standing order basis from Western Electric Co., Indiana Publication Center (see RL 80-01-278).