

FALSE ROUTING OF CALLS TO INTERCEPT NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers methods to be followed when calls are falsely routed to intercept.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

2. INDICATIONS OF TROUBLE CONDITION

2.01 Traffic forces report that working lines are being routed to intercept falsely. No central office alarm indications are received.

2.02 Incoming test frame calls are routed to intercept falsely.

3. REACTIONS DUE TO TROUBLE

3.01 Failure to complete calls to working lines.

4. IMMEDIATE PROCEDURE TO FOLLOW

4.01 Analyze the information given by the Traffic or Plant Department as to the calling and called line numbers to determine the equipment involved. Trace connections, if held, to determine the incoming trunk involved. Remove the plugs from the CCT jacks at the terminating trouble indicator frame. Remove the affected equipment from service as soon as it is located.

5. ANALYSIS OF TROUBLE

Individual Line Troubles

5.01 An open or incorrectly cross-connected line S lead, an open or inoperative line hold magnet, a bent select finger at the line hold magnet vertical or an incorrectly cross-connected NF or NC punching at the block relay frame will cause the release of the marker HG relay and route the call to intercept. If both NF and NC cross-connections are removed in error, the call will be routed to intercept after the marker INA relay releases. Lines involved in service orders may route to intercept even though there is no apparent trouble, when the line choice and frame information on the order is in error. For instance, the order may read "Line choice and frame - OA, Column, switch and file - 26-35" when actually the column

switch and file is located in line choice 3, frame B. When a marker attempts to establish a connection, the HG relay is released as the line hold magnet fails to close its cross-points. In periods of light traffic, the other troubles covered in this section may result in a report on only an individual line, and therefore these trouble conditions should be investigated.

Number Group Connector Troubles

5.02 If the upper or lower half of a twenty block relay is open, calls to the ten lines appearing on the inoperative half will be routed to intercept by the release of the marker INA relay, and the subsequent operation of the LIN or TIN relay.

5.03 If a common NS lead is open, calls to five per cent. of the lines in the number group will be routed to intercept by the release of the marker HG relay and the subsequent operation of the LIN or TIN relay.

Incoming Trunk Troubles

5.04 If the ring side of a trunk is crossed with battery at the incoming trunk F relay, calls on this trunk will be routed to trouble intercept by the operation of the marker PU relay. All trunks associated with the same primary switch will be affected by a battery cross on the ring lead between the F and LC relays.

5.05 If the incoming trunk fails to place ground on the sleeve of the connection after the release of the incoming trunk F relay, the call will be rerouted to intercept by the release of the marker HG relays. If the trouble is still present when the marker sets up the connection to intercept, a trouble indication is received with the LIN and GLH lamps lighted.

Line Link Troubles

5.06 The following line link troubles will affect more than one individual line. The terminating marker HG relay releases on a call encountering these troubles depending on the density of traffic and whether or not the line tests are cancelled:

- (a) Primary select magnet inoperative.
- (b) Horizontal link sleeve open.

- (c) Secondary select magnet inoperative.
- (d) Secondary select finger bent.
- (e) Secondary hold magnet inoperative.
- (f) Secondary hold magnet off-normal contacts failing to make contact.

Troubles (c) to (f) are revealed by "GC" or "GLH" lamp terminating trouble indications during periods of light traffic when the line tests are not canceled. Troubles (a) and (b) are not revealed by trouble indications but will result in reports by subscribers having difficulty in originating calls.

Terminating Marker Troubles

5.07 If a large number of calls are routed to intercept, it is most likely caused by a terminating marker trouble, especially where the lines appear in various line links and number groups, and the calls are coming from various incoming trunk frames. Some troubles which cause false routing to intercept are as follows:

- (a) Slow releasing XS5 relay. This will hold the twenty block relay operating lead open and if the INA relay releases before this lead is closed the call will be routed to intercept as the F and C leads will not be closed at the twenty block relay.
- (b) Dirty contacts 1 and 2 bottom SGA relay. In periods of light traffic this will allow the LE7 relay to release which in turn allows the INA relay to release and route the call to intercept. In periods of heavy traffic, terminating trouble indications will result showing the LE and L- lamp extinguished.
- (c) CON relay fails to release from the previous call. If this happens and the line hold magnet is slow to operate, the GT relay will release early, opening the FC lead, and allowing the SL and SL1 relay to release before the line hold magnet is operated. The HG relay subsequently releases and routes the call to intercept.
- (d) Welded contacts 3 and 4 top JHA relay. This will cause wrong numbers on jump hunt calls as the original L relay will not release. The original L relay may be associated with a vacant terminal after the marker jump hunts and the call is routed to intercept.
- (e) Welded contacts 9 and 10 bottom GLH relay. This holds the GLH1 relay operated which in turn operates the LIN or TIN relay from the normal HG relay after the marker

seizes the incoming frame. All calls will be routed to intercept.

(f) Dirty contacts 3 and 4 bottom GLH relay. This opens the common path in the marker for operating the line hold magnet. The HG relay is released and the call is routed to intercept. This affects all calls in a marker.

(g) Dirty contacts 4 and 5 top of one of the LO-19 relays. This prevents the line hold magnet from operating and the HG relay subsequently releases. This causes approximately five per cent. of the calls in a marker to be routed to intercept.

Terminating Sender Troubles

5.08 If a large number of calls is being routed to intercept falsely, the trouble may be in one of the terminating senders. The following are some of the troubles that cause wrong numbers, some of which may route to intercept.

- (a) An open winding on one of the P2 to P6 relays. This will prevent the counting of pulses past the P relay preceding the one in trouble and will result in understeps in registration of the selections.
- (b) When a P1 to P6 relay operates it closes a circuit, through an operated pair of contacts, in preparation for the operation of the next P relay. If these contacts are dirty or fail to close, the result will be the same as in (a).
- (c) If the operated contacts of the STP relay do not make properly, the operation of the GR relay may be erratic and the pulses registered in the terminating sender may not correspond to the pulses sent to the originating sender.
- (d) Poor contact make or dirty contacts on either pair of contacts of the GR relay may result in registering pulses in the terminating sender that do not correspond to the pulses sent to the originating sender.
- (e) Poor contact make on the L3, L4 or L5 relays will result in incorrect registration of pulses in the terminating sender.

6. SUGGESTED PROCEDURE FOR LOCATING AND CLEARING TROUBLES

Individual Line Troubles

6.01 Originate test calls from the outgoing trunk test frame to determine that calls are being routed to intercept. The terminating trouble indicator may be used to determine if the NF and NC cross-connections are correct but will not reveal sleeve troubles causing false routes to intercept. The message register test trunk may be used to assist in the analysis of the trouble. Patch the line equipment to the test jack, originate a call to the line number and note if the red BY lamp lights momentarily. If the lamp lights momentarily it is an indication that the sleeve lead is continuous but that the line hold magnet failed to operate or close its cross-points. If the BY lamp fails to light, it is an indication that the sleeve is open, that the sleeve does not terminate at the hold magnet to which the patching cord is connected or that the NF and NC cross-connections are open. Check the assignments for errors in the line choice number or the frame letter. Check the cross-connections to verify that they are wired to the proper punchings. If an open sleeve is indicated, block the line hold magnet normal and check at the LDF vertical number block for the presence of battery. If battery is present, check at the twenty block relay NS contact for battery. To check the contacts of the twenty block relay, set up the line number on the terminating trouble indicator, operate any NS key other than the one corresponding to the desired line and start calls by means of a 32A test set plugged into the F jack at the block relay frame. When the twenty block relay operates, check the contacts for battery. If the sleeve is closed but the line routes to intercept, originate calls from a test line to the affected line and observe whether the hold magnet of the line in trouble operates and closes its cross-points on each of the ten horizontals.

Number Group Connector Troubles

6.02 If ten lines associated with the upper or lower half of a twenty block relay are being routed to intercept, originate calls to one of the numbers by means of the terminating trouble indicator, and using a 32A test set plugged into the F jack at the block relay frame, observe if both halves of the relay under test operate.

6.03 If lines ending in the same digit, as for instance 2508, 2528, 2548, are routing to intercept, it is an indication of an open common NS lead (number 8 in this instance). Originate calls at the number group frame by means

of the terminating trouble indicator having any NS key operated other than the one corresponding to the common NS lead in trouble. Check at the proper contact of the marker cut-in relay for the presence of battery. If battery is not present, originate calls at the block relay frame and determine the location of the open by testing at various twenty block relays.

Incoming Trunk Troubles

6.04 If lines are reaching trouble intercept falsely, block the LTI and TTI relays normal in a terminating marker. When the marker is associated with the trunk in trouble, a trouble indication will be received. Check the ring of the trunk and the ring lead between the F relay and the LC relay for false battery.

6.05 If working line numbers are recorded in trouble indications showing the LIN and GLH lamps lighted, note the trunk number registered in the display. Check that the D relay of this trunk, when operated, applies ground to the sleeve of the cross-points.

Line Link Troubles

6.06 If calls to various lines in the same line link are being routed to intercept, request the intercept operator to obtain the calling office. If the originating office is always the same, attempt to locate a trunk involved. Remove the trunk from service and originate calls from this trunk to a test line in the line link in trouble by means of the incoming trunk testing circuit associated with the OGT board. When the call is initially established before routing to intercept, note which incoming secondary switch and vertical is involved. The line junctor designation strip on the incoming link frame will provide the associated line link secondary switch and vertical. Check the line link secondary hold magnet for operation and closure of cross-points and off-normal contacts. Check that the hold magnet holds operated through the cross-points and off-normal contacts. In periods of light traffic, when plugs are not inserted in the CCT jacks at the terminating trouble indicator, these troubles will be revealed by "GC" or "GLH" lamp trouble indications. The indications should be analyzed to determine location of the trouble.

6.07 If calls from various incoming frames to lines in the same line link are routed to intercept, check that the line link select magnets on both the primary and secondary

switch are operating properly on calls originated to a test line in the line link in trouble. When it is noted that calls route to intercept when using a particular link, also check the continuity of the link sleeve between the primary and secondary switches of the line link.

Terminating Marker Troubles

6.08 If a large number of calls from various incoming frames to lines in various number groups and line links are routed to intercept a terminating marker is usually the cause of the trouble. Make the markers busy one at a time to determine the one in trouble. Terminating trouble indicator test calls may or may not reveal the trouble. When the marker in trouble is in service, it will operate its LIN relay on a higher percentage of calls than markers not in trouble and by observing these relays in the various markers, the marker in trouble may be determined.

Terminating Sender Troubles

6.09 If a large number of calls is being routed to intercept falsely, test the terminating senders by means of the automatic test frame, using one of the falsely intercepted numbers for the test.

6.10 Where an automatic test frame is not provided, the terminating sender causing the trouble may be located by connecting in parallel the windings of the DL and LIN relays in one of the terminating markers by means of a suitable test cord. All calls that are routed to intercept, legitimately or falsely, by the operation of the LIN relay in this marker will cause a display to be recorded on the terminating trouble indicator. The sender in trouble, if any, will soon be indicated by its appearance on an unusual number of the displays. When the sender causing the trouble has been located, remove it from service and remove the test cord from the marker DL and LIN relay windings.

7. TROUBLE CONDITIONS CAUSING REACTIONS

Individual Line Troubles

- 7.01 Open S lead due to a loose connection or open in the wiring at the twenty block relay contact, the vertical or horizontal LDF or at the line hold magnet, or due to a dirty contact at the individual NS contact at the twenty block relay.
- 7.02 Inoperative line hold magnet due to a filing in the core.
- 7.03 Bent select finger at the line hold magnet vertical.
- 7.04 NF or NC cross-connections in error, or the LDF cross-connection connected to wrong line equipment. Both NF and NC cross-connections missing.
- 7.05 Assignment information in error. Line equipment may not be located in the line choice and frame indicated. Check local chart for verification.
- 7.06 See other troubles. Troubles affecting several lines may be reported as an individual line trouble.

Number Group Connector Troubles

- 7.07 One winding open on a twenty block relay.
- 7.08 Common NS lead open at the block relay frame or number group connector.

Incoming Trunk Troubles

- 7.09 Battery cross on the ring of the trunk at the F relay or on the ring lead between the F relay and the LC relay.
- 7.10 Dirty contact(those used to ground the sleeve of the connection) at the F or D relay.

Line Link Troubles

- 7.11 Primary select magnet inoperative due to bind, open winding, open battery feed or open operating lead at HG relay.
- 7.12 Horizontal link sleeve open.
- 7.13 Secondary select magnet inoperative.
- 7.14 Secondary select finger bent.
- 7.15 Secondary hold magnet inoperative.
- 7.16 Secondary hold magnet sleeve cross-point or off-normal contacts dirty.

Terminating Marker Troubles

- 7.17 Slow releasing XS5 relay.
- 7.18 Dirty contacts 1 and 2 bottom SGA relay.
- 7.19 CON relay failing to release.
- 7.20 Welded contacts 3 and 4 top JHA relay.
- 7.21 Welded contacts 9 and 10 bottom GLH relay.
- 7.22 Dirty contacts 3 and 4 bottom GLH relay.
- 7.23 Dirty contacts 4 and 5 top on an LO-19 relay.

Terminating Sender Troubles

- 7.24 Open winding on one of the P2 to P6 relays.
- 7.25 Dirty contacts on the P1 to P6 relays.
- 7.26 Poor operated contact make on the STP relay.
- 7.27 Poor operated contact make on the GR relay.
- 7.28 Poor contact make on the L3, L4 or L5 relays.

Additional Trouble Conditions May Be Listed Below
