CODE COMPRESSOR TROUBLE INDICATOR

AUTOMATIC TROUBLE ANALYSIS—TROUBLE REFERENCE GUIDE

NO. 1 CROSSBAR SYSTEM

CONTENTS	PAGE

1. GENERAL

Scope

1.01 This section provides information to help in analyzing code compressor troubles. These troubles may be indicated by trouble indicator lamps, or by automatic trouble analysis (ATA) exception reports. Information about each trouble category, or bin, is contained in a short narrative description covering the key circuit operations at the time that the trouble is detected. This section also contains specific reference to source documents which may be useful in troubleshooting.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 This issue of this section corresponds to:

Issue 7 of SD-96525-01—Subscriber Sender Recycle Circuit

Issue 6 of SD-96526-01—Code Compressor Connector Circuit

Issue 6 of SD-96527-01—Code Compressor Circuit

Description of Bin Format

1.04 The following format will be used to describe each bin:

(a) **Bin Name**—Consists primarily of letters which identify the trouble category.

(b) **Description of Circuit Operation**—Description of the key circuit operations at the time that the trouble is detected.

(c) **Description of Failure**—Description of the circuit operation which failed to occur and caused a trouble record to be generated. This could also be a positive indication of troubles such as cross-detecting troubles.

(d) **Sequence of Operation**—Sequence charts showing normal circuit operations at the time of the failure are referenced in this paragraph.

(e) **Reference Documents**—SD numbers, associated FS numbers and SC numbers, CD numbers, and paragraph numbers are referenced here and correspond to the circuit issues listed in 1.03.

2. BIN LISTING

2.01 The following index is a listing of all of the trouble categories, or bins, associated with the code compressor trouble indicator.

3. BIN DESCRIPTIONS

3.01 The following pages contain the descriptions of the bins listed in Part 2.

BIN NAME

CC*ASR-FAIL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No ASR Class Mark: The code compressor furnishes a signal to operate the ASR relay when the translator circuit in the compressor determines that the area code is not one to be compressed. The ASR relay locks to off normal ground furnished by the sender.

DESCRIPTION OF FAILURE

The ASR lead is grounded, but the ASR relay in the recycle circuit is not operated.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. N-24

REFERENCE DOCUMENTS

CD-96527-01
SD-96527-01

BIN NAME

CC*BL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Blocking: Relay BL is operated by false grounds on the critical recycle circuit leads SK, SK1, RCY, ASR, and OFR.

DESCRIPTION OF FAILURE

A false ground operating relay BL that does not originate on one of the critical leads listed above will also cause the code compressor to block and call in the trouble indicator.

SEQUENCE OF OPERATION

N/A

REFERENCE DOCUMENTS

CD-96527-01
SD-96527-01   3E7

BIN NAME

CC*BL-ASR

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Blocking-ASR Lead: The ASR lead is used to transmit a ground to operate relay ASR in the recycle circuit upon completion of the transmission checks.

DESCRIPTION OF FAILURE

A false cross or ground on the ASR lead will operate relay BL and block completion of the code compressor circuit. The code compressor will time out and call the trouble indicator. Using the exception report support data, the ground may be isolated to the offending recycle circuit, connector, or code compressor circuit.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

CD-96527-01
SD-96527-01   3E7, 3E2

BIN NAME

CC*BL-OFR

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Blocking; OFR Lead: The OFR lead is used to transmit a ground to operate relays OFR in the recycle circuit to set an overflow condition in the subscriber sender.

DESCRIPTION OF FAILURE

A false cross or ground on the OFR lead will operate relay BL and block completion of the code compressor circuit. The code compressor will time out and call the trouble indicator. Using the exception report support data, the ground may be isolated to the offending recycle circuit, connector, or code compressor.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

CD-96527-01
SD-96527-01   3E7, 3F2

BIN NAME

CC*BL-RCY

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Blocking; RCY Lead: The RCY lead is used to transmit a ground to operate relay RCY in the recycle circuit upon completion of the transmission checks.

DESCRIPTION OF FAILURE

A false cross or ground on the RCY lead will operate relay BL and block completion of the code compressor circuit. The code compressor will time out and call the trouble indicator. Using the exception report support data, the ground may be isolated to the offending recycle circuit, connector, or code compressor circuit.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

CD-96527-01
SD-96527-01   3E7, 3D2

BIN NAME

CC*BL-SKIG

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Blocking; SK1 Lead: The SK1 lead from the recycle circuit is used to detect the absence of any CC- relays operated on recycle calls and is grounded on nonrecycle calls.

DESCRIPTION OF FAILURE

A false ground on the SK1 lead on a recycle call will operate relay BL when relay SK operates from the CC- two-out-of-five test over lead SK. Relay BL blocks the code compressor completion. The code compressor times out and calls in the trouble indicator. Using the exception report support data, the ground may be isolated to the offending recycle circuit, connector, or code compressor circuit.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

SD-96527-01 Sect. II, Par. 1.152, 1.27
SD-96527-01 3E7, 3D2

BIN NAME

CC*BL-SKG

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Blocking; SK Lead: The SK lead from the recycle is used to check the valid registration of the compressed code on two-out-of-five CC relays. On nonrecycle calls, the SK lead is not grounded.

DESCRIPTION OF FAILURE

A false ground on the SK lead on a nonrecycle call (relay CAS operated) will operate relay BL when relay SK operates from the normal ground provided on SK1 lead. Relay BL blocks the code compressor circuit completion. The code compressor times out and calls in the trouble indicator. Using the exception report support data, the ground may be isolated to the offending recycle circuit, connector, or code compressor circuit.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

CD-96527-01
SD-96527-01   3E7, 3C2

BIN NAME

CC*CAK-FAIL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Code Compressor Connector CA- Relay Operated: The connector is started bilaterally. Operation of relay CST in the recycle circuit sets the preference for operating the sender connector SA- relay and, at the same time, sets the compressor preference for operating the compressor connector CA- relay. The condition imposed on the sender is that the previous sender has disposed of its compressor.

DESCRIPTION OF FAILURE

Under normal operating conditions, the check relays CSK and CAK remain operated if no compressor connector is busy on a call. If one of these is released when no call is present, the compressor signals an alarm.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. AB-10

REFERENCE DOCUMENTS

CD-96526-01 Par. 1.1
SD-96527-01 B1-B2

BIN NAME

CC*CONN-FAIL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Connector Failure: Release of both normally operated connector check relays CAK, CSK starts relay TM to call the trouble indicator.

DESCRIPTION OF FAILURE

Lack of continuity of both leads CAK and CSK simultaneously.

SEQUENCE OF OPERATION

N/A

REFERENCE DOCUMENTS

SD-96527-01   B4-B2

BIN NAME

CC*CSK-FAIL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No CS- Relay Operation: The normal CS- relays in the code compressor connector provide a path for ground from the code compressor circuit normal relays RR, TK, SK, STB, and CAS. This ground will operate the CSK relay. The CS relay in the connector will then operate. The CSK relay is released.

DESCRIPTION OF CIRCUIT FAILURE

Connector Circuit Relay CS- failed to return to normal; false ground on the CSK lead or one of the following relays in the code compressor circuit remained operated: CAS, STB, SK, TK, or RR.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. AE12

REFERENCE DOCUMENTS

CD-96527-01 Sect. II, Par. 1.1
SD-96527-01 B4-B2

BIN NAME

CC*INVALID-CC

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Invalid Code Compression: The translation by the code compressor circuit compresses the code to a single digit. This digit is registered on two relays of a group of five, the (CCO, -1, -2, -4, -7), relays which provide the two-out-of-five registration. This register furnishes the compressed code on a two-out-of-five signal basis to the originating marker when such a circuit is connected. The marker changes this registration back to a decimal digit 0 to 9.

DESCRIPTION OF FAILURE

Incorrect combination of CC- relays: A combination of CC- relays other than those combinations listed below are not valid.

4,7 = 0	0,4 = 4	0,7 = 7
0,1 = 1	1,4 = 5	1,7 = 8
0,2 = 2	2,4 = 6	2,7 = 9
1,2 = 3		

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. P-15

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.251
SD-96527-01 B2-G6
SD-96525-01 B2-F4

BIN NAME

CC*NO-ASR

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Auxiliary Sender Request: The code compressor furnishes a signal to operate the
ASR relay when the translator circuit in the compressor determines that the area code is not one to be
compressed. The ASR relay locks to off normal ground furnished by the sender.

DESCRIPTION OF FAILURE

No ground on lead ASR.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. N-24

REFERENCE DOCUMENTS

CD-25527-01 Par. 1.26
CD-25525-01 Par. 2.2
SD-25527-01 B3-E3
SD-25525-01 B2-B2

BIN NAME

CC* NO-CC/CAS

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No CC Relays or No CAS Relay: The compressed code is normally registered on the CC relays whenever the translator in the code compressor determines that the dialed area code requires compression. The code compressor further determines that this type of call requires the sender to recycle its A, B, and C registers. This is necessary to provide room in the sender register for storing the other digits dialed on a 10-digit call.

DESCRIPTION OF FAILURE

Recycle calls: No compressed code relays were operated in the recycle circuit.
Nonrecycle calls: No operation of relay CAS.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. P-16

REFERENCE DOCUMENTS

CD-96525-01 Par. 2
CD-96527-01 Par. 1.12
SD-96525-01 B2F6

BIN NAME

CC*NO-HD   (

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Hold Ground: Operation of relay (CST) in the recycle circuit furnishes a compressor   (
start signal. This signal seizes an idle compressor by operating relay (HD) through the connector circuit
when compressor preference is established.

DESCRIPTION OF FAILURE

No ground on lead "HD", or no battery on lead "HD1".

SEQUENCE OF OPERATION

See sequence chart page E1 Loc. X-12

REFERENCE DOCUMENTS

CD-96527-01   Par. 1.1
SD-96527-01   B3-A5
BSP 216-258-505   Page 8

BIN NAME

CC*NO-RCY

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Recycle Call Class Mark: When the translator in the code compressor circuit determines that the dialed area code requires compression, the code is registered on CC- relays. The compressor circuit also determines if the sender requires recycle of its A, B, and C register for storing the other digits dialed. After the successful completion of all integrity checks, a ground is applied to the RCY lead, and the RCY relay is operated in the subscriber sender recycle circuit.

DESCRIPTION OF FAILURE

No ground on lead RCY.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. P-25

REFERENCE DOCUMENTS

CD-95525-01 Par. 2.1
SD-96525-01 B1-D6
SD-96527-01 B3-D8

BIN NAME

CC*NO-RR

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No RR Relay: The receiving leads are checked for crosses by the operated RR relay upon completion of the transmission check.

DESCRIPTION OF FAILURE

Relay RR failed to operate.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

CD-96527-01   Sect. II, Par. 1.232
SD-96527-01   B4-B2, B3-A4

BIN NAME

CC*NO-SK

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Sender Check: On auxiliary sender calls, dialed area codes, which are not to be compressed, operate relay CAS while the CC- relays in the recycle circuit would remain normal. The normal CC- relays furnish ground to lead SK1. This ground is extended by operated contacts on CAS, normal contacts on XTRL, TIC, TRL, BL, and XR, operate contacts on TK1 and diode SK to the winding of the SK relay, which locks and completes the sender check.

On Compressed Calls: Contacts on the CC- register relay in the recycle circuit furnish a ground over the SK lead whenever the compressed code is satisfactorily registered, as indicated by their two-out-of-five check. Relay SK will operate from the grounded SK lead over normal contacts on relays CAS, XTRL, TIC, TRL, BL, and XR, operated contacts on TK1, and diode SK. Relay SK locks to the connector grounded LK2 lead.

DESCRIPTION OF FAILURE

Auxiliary Sender Calls: The SK1G lead is grounded, the CAS is operated, but the SK relay is not operated.

Compressed Calls: SK lead is grounded, but relay SK is not operated.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. 2-18

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.25
SD-96527-01 B3-A6/C4

BIN NAME

CC*NO-SK1G

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Sender Check: On auxiliary sender calls, dialed area codes, which are not to be compressed, operate relay CAS, while the CC- relays in the recycle circuit remain normal. The normal CC relays furnish ground to lead SK1. This ground is extended to the code compressor trouble indicator circuit, operating the SK1G lamp.

DESCRIPTION OF FAILURE

This failure is caused by the false operation of a translator relay or a code compressor connector relay problem.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. Z-18

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.252
SD-96527-01 B3-D8

BIN NAME

CC*NO-SKG

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Sender Check Ground, Compressed Code: Contacts on the CC- register relay in the recycle circuit furnish a ground over the SK lead whenever the compressed code is satisfactorily registered, as indicated by their two-out-of-five check. This ground is extended to the code compressor trouble indicator circuit, operating the SKG lamp.

DESCRIPTION OF FAILURE

CC- two-out-of-five code is valid, but no ground on lead SK.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. Z-18

REFERENCE DOCUMENTS

CD-96527-01   Par. 1.251
SD-96527-01   B3-B8

BIN NAME

CC*NO-STB

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Stabilization of Transmitted Sender Register Information: Translation of the dialed information as it appears on the register relays A1, A2, etc, is blocked until the STB relay has operated. The operate time interval of STB relay is sufficient so that it would overlap a possible slow operating register in the A1, A2, A4, A5, B1, C1, C2, C4, and C5 group. This interval of stabilization delays generation of a compressed code signal or auxiliary sender signal until after relay STB operates. Relay CC in the recycle circuit or relay CAS operates, respectively, after the operation of the stabilization period.

DESCRIPTION OF FAILURE

Relay STB fails to operate.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. Z-14

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.24
SD-96527-01 B3-A6, B3-B3

BIN NAME

CC*NO-TK

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Transmission Check Register Information: The receiving leads are checked for opens by a transmission check TK relay. After the translation is completed, the remaining receiving leads are connected to ground on the CK1 and CK2 leads in the recycle circuit which is connected to a grounded CK lead from operated contacts on relay SK. This operates the remaining receiving relays A1, 2, etc. Relay TK is operated from operated contacts on C5, C4, C2, C1, B1, A5, A4, A2, A1, and HD, normal contacts on XTRL, TRL, TIC, and BL, and operated contacts on SK to ground on the LK1 lead.

DESCRIPTION OF FAILURE

A receiving relay failed to operate.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. Y-22

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.231
SD-96527-01 B3-A5/C7

BIN NAME

CC*NO-TK1

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Transmission Check: Whenever a sender check is completed after any type of call, all of the unused auxiliary register relays are operated, followed by their associated register relays. After the sender check is completed, the transmission check relay TK operates, and at the same time, the normally operated TK1 relay releases.

DESCRIPTION OF FAILURE

Relay TK1 did not release after a satisfactory transmission check.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. AB24

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.26
SD-96527-01 B3-A6/B7

BIN NAME

CC*NO-TMC

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—No Timing Control: When the code compressor circuit is seized, timing is started. The operation of relay CST in the recycle circuit furnishes a compressor start signal. This signal seizes an idle compressor by operating relay HD which, in turn, operates relay TMC. These relays remain operated until the compressor has completed its function. If the compressor times out due to a trouble condition, relay TMC remains operated and prevents the recycling of the timing circuit while a trouble record is taken.

DESCRIPTION OF FAILURE

Relays TMC and STB did not operate.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. Z-13

REFERENCE DOCUMENTS

SD-96527-01 B4 Loc. E2

BIN NAME

CC*OPEN-RCV

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Open Receiving Lead: The receiving leads are checked for opens by a transmission check TK relay.

DESCRIPTION OF FAILURE

A receiving lead is open. Support data on the ER will indicate the open lead.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. Y-22

REFERENCE DOCUMENTS

CD-96527-01 Sect. II, Par. 1.231
SD-96527-01

BIN NAME

CC*RCY-FAIL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Recycle Failure: When the translator in the code compressor circuit determines that the dialed area code requires compression, the code is registered on CC relays. The compressor circuit also determines if the sender requires recycle of its A, B, and C register for storing the other digits dialed. After the successful completion of all integrity checks, a ground is applied to the RCY lead and the RCY relay is operated in the subscriber sender recycle circuit.

DESCRIPTION OF FAILURE

The RCY lead is grounded; but the RCY relay in the recycle circuit did not operate.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. P-27

REFERENCE DOCUMENTS

CD-96525-01 Par. 2.1
SD-96525-01 B1-D6
SD-96527-01 B3-D8

BIN NAME

CC*RR-FAIL-RLS

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Failure of a Receiving Relay to Release: The receiving leads are checked for crosses by the operated RR relay in the code compressor circuit. The operated RR relay causes the release of all the receiving relays. If one of these receiving relays does not release, the stabilization (STB) relay would not release.

DESCRIPTION OF FAILURE

All receiving relays did not release.

SEQUENCE OF OPERATION

See sequence chart: E1 Loc. AA-25

REFERENCE DOCUMENTS

CD-96527-01 Par. 1.232
SD-96527-01 B4-B2 B3-A4

BIN NAME

CC*TEST

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Test: A test call initiated from the trouble indicator causes this record.

DESCRIPTION OF FAILURE

N/A

SEQUENCE OF OPERATION

N/A

REFERENCE DOCUMENTS

BIN NAME

CC*TRL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Trouble Release: If the trouble indicator fails to operate relay TIC, relay TA operates again to operate relay TRL.

DESCRIPTION OF FAILURE

The trouble indicator failed to release the code compressor.

SEQUENCE OF OPERATION

REFERENCE DOCUMENTS

CD-96527-01   Sect. II, Par. 4.2
SD-96527-01

BIN NAME

CC*USER-DEF

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—User Defined Data Point: Use of the data points is up to the discretion of the individual telephone company. These "user defined" points allow most locally designed nonstandard arrangements to be completed with the standard ATA System.

DESCRIPTION OF FAILURE

A nonstandard data point was grounded.

SEQUENCE OF OPERATION

N/A

REFERENCE DOCUMENTS

N/A

BIN NAME

CC*XR

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Crossed Receive Leads: A cross on an unused transmitting lead anywhere between the code compressor and the sender will result in operation of the XR relay. In the recycle circuit, both CK1 and CK2 leads are connected as long as the recycle circuit is calling for a compressor. The existence of the cross is detected when relay XR operates from ground on lead CK. Under these conditions, the receiving relays all operate because the cross is distributed to every remaining unused transmitting lead.

DESCRIPTION OF FAILURE

A cross or false ground is on the compressor receiving lead(s).

SEQUENCE OF OPERATION

N/A

REFERENCE DOCUMENTS

CD-96527-01 Sect. II, Par. 3
SD-96527-01 B2-D0/E5

BIN NAME

C*XTRL

DESCRIPTION OF CIRCUIT OPERATION

Code Compressor—Cross Trouble Lead: The XTRL relay detects false ground on the TRL lead between the code compressor circuit and the subscriber sender recycle circuit. The XTRL is connected when the circuit is normal or when the code compressor is busy in service. The relay is removed from the TRL lead when TRL operates. When XTRL operates, it blocks the operation of the code compressor circuit by opening the ground paths to both the translator circuit and the stabilization check circuit.

DESCRIPTION OF FAILURE

A false ground or cross is on the TRL lead.

SEQUENCE OF OPERATION

N/A

REFERENCE DOCUMENTS

SD-96527-01   B3-G3