

**SUBSCRIBER SENDER LINK AND CONTROLLER**  
**TROUBLE INDICATOR ROUTINE FOR HANDLING ALARMS AND DISPLAYS**  
**NO. 1 CROSSBAR OFFICES**

1. GENERAL

1.01 This section covers the procedures to be followed in connection with the routine handling of subscriber sender link and controller trouble indicator alarms and displays.

1.02 The purpose of the subscriber sender link and controller trouble indicator is to record information which will facilitate the location of troubles that interfere with the completion of a connection between a subscriber line and an originating sender.

1.03 When a subscriber attempting to originate a call is not successfully connected to a subscriber sender within a predetermined interval the subscriber sender link and controller associated on the call blocks and after timing out summons the controller trouble indicator, provided it is idle, to take a record of the equipment involved on the call. When this occurs the controller trouble indicator lamp TI lights attended by a minor alarm. After the information is recorded in the controller trouble indicator the subscriber sender link and controller is released. If the controller trouble indicator is busy when an attempt is made to connect to it, the subscriber sender link and controller circuit making the attempt is immediately released and a record of the equipment involved on the call is not obtained. The frame number of the subscriber sender link and controller circuit making this attempt is, however, recorded by the controller trouble indicator. When this occurs the major alarm is sounded.

1.04 The indicator lamp panel is arranged to display the following:

- (a) The number of the particular subscriber sender link frame from which a record is being taken.
- (b) The number of the particular line link frame involved.

(c) The number of the particular group of twenty district junctors involved.

(d) The number of the particular subgroup of ten district junctors.

(e) The numbers of the idle district junctors within the subgroup.

(f) The number of the subgroup of subscriber senders involved.

(g) The number of the particular subscriber sender.

(h) Various lamps indicative of the progress of the call in the subscriber sender link and controller.

1.05 The lamp designations in 2.03 and also in the accompanying trouble indications appear in the order as determined by their location on the frame, starting at the top and proceeding from left to right on each row. This arrangement of lamps is intended to correspond with the progress of a call through the sender link and controller. It is necessary to analyze these lamps collectively in order to obtain a trouble indication.

1.06 The descriptions accompanying the indications under 2. Method give general information which points to the probable causes of the trouble. However, no attempt is made to cover all possible causes for these troubles. The lamps attending the various trouble indications in 2. Method are indicated by the equipment number or a check mark (✓).

2. METHOD

2.01 When it is observed that the controller trouble indicator TI lamp is lighted, in response to an intermittent minor or a major alarm, operate the LP key and obtain a record of the trouble condition that is indicated by the lamps listed in 2.03. To silence the alarm operate the ACO key.

Note: A complete record of indicator displays should be obtained since in some cases it may be necessary to have records of recurring indications in order to locate the trouble.

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2.02 Release the LP key and momentarily operate the RL key to restore the trouble indicator to normal.

indicator is busy. If an attempt is made to connect to the trouble indicator before it is released, the major alarm will be sounded.

Caution: Restore the trouble indicator to normal as soon as possible, since a second trouble indicator record cannot be obtained as long as the trouble in-

2.03 The various lamps appearing on the subscriber sender link and controller trouble indicator are listed below with the general information to be obtained from each lamp.

Lamp Designations

Indications

Equipment Identification Lamps

TI	<u>Trouble Indicator:</u> The trouble indicator has been seized.
TC	<u>Test Call:</u> District junctor test frame call.
EM 0, 100	<u>Emergency Sender Link and Controller 0, 100:</u> Emergency sender link and controller using trouble indicator.
CRL EM 0, 100	<u>Emergency Sender Link and Controller 0, 100:</u> Emergency sender link and controller attempted to connect to busy trouble indicator.
SILF (0-19), (100-119)	<u>Subscriber Sender Link Frame (0-19), (100-119):</u> Subscriber sender link using trouble indicator.
CRL (0-19), (100-119)	<u>Subscriber Sender Link (0-19), (100-119):</u> Subscriber sender link attempted to connect to busy trouble indicator.
LLT 0-15	<u>Line Link Tens 0-15:</u> Line link frame tens or hundreds and tens digit.
LLU 0-9	<u>Line Link Units 0-9:</u> Line link frame units digit.
DG 0-4	<u>District Group 0-4:</u> Group of twenty district junctors.
DSG 0-9	<u>District Junctor Subgroup 0-9:</u> Subgroup of ten district junctors.
D 0-9	<u>District Junctor 0-9:</u> District junctors available when subgroup is selected.
SG 0-9	<u>Sender Group 0-9:</u> Sender group LL relay operated and connected ground to the S lead to lock operated the SG relay.
SGP 0-39	<u>Sender Subgroup 0-39:</u> Subgroup of ten senders. The C and SGC relays associated with the sender subgroup operated.
S 0-9	<u>Sender 0-9:</u> Individual sender in subgroup. The S relay operated and ground was connected to the SC lead to the subscriber sender circuit.

Progress Lamps

ON	<u>ON Relays:</u> Subscriber sender link controller G relay operated and connected ground to the OG lead.
OC	<u>OC Relays:</u> Subscriber sender link controller SS relay operated to extend ground to the winding of relay OC, indicating the completion of sender group selection.

Progress Lamps (Cont'd)

DS DS Relay: At least one of the subscriber sender link D relays operated. The DS relay should have operated and district selection was completed.

OH OH Relay: The DS and OC relays and the primary and secondary select magnets operated and sender selection was completed. The OH relay should have operated.

GH GH Relay: The OH relay operated. The GH relay should have operated to close the circuits to the line link secondary and sender link primary hold magnets.

SL SL Relay: The sender link GH and the sender SC1 relays operated and the sender link cross-points connecting the district junctor to the sender were closed. The sender link SL relay should have operated.

AB AB Relay: The sender link SL, DC and DR and the sender ON2 relays operated. The release stage was reached in the sender link and the AB relay should have operated.

H H Relay: Ground on line link primary hold magnet lead. Sender link RL relay may not have operated.

DC DC Relay: Sender link DC or DR relay failed to operate. Possible double connection in the sender link with a busy link.

RL RL Relay: Sender link RL relay operated and the GH relay released. The sender link H lead was grounded and connected to the line link RL lead.

Miscellaneous Lamps Not Directly Associated With the Trouble Indicator

EC (0-19), (100-119) Emergency Controller (0-19), (100-119): Emergency controller connected to a particular sender link.

LI 0, 100 Load Indication 0, 100: Provided when the automatic traffic release feature is used to release subscriber sender link and controllers experiencing delays in selecting a sender subgroup due to load conditions. This lamp lights whenever a sender subgroup is busy.

EM IA 0, 100 Emergency Controller Alarm 0, 100: Failure of the emergency sender link and controller in use to complete.

CW Call Waiting: One lamp is provided for each group of dialing districts or interoffice districts and when lighted indicates a delay in completing connections due either to trouble or traffic delays.

SL IA Sender Link Alarm: One lamp is provided for each subscriber sender link frame and when lighted indicates an AL alarm on that frame.

LL IA Line Link Alarm: One lamp is provided for each line link frame and when lighted indicates an AL alarm on that frame.

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Trouble Indications (See 1.06)

2.04 On indications 1 to 5 none of the DG, DSG or D lamps are lighted indicating that district junctor subgroup relay BA or BB associated with the group selected failed to operate. Indications 1 to 4 indicate a trouble associated with a particular line link frame. Indication 5 involves a different line link frame in a similar trouble condition. Failure to close the A or B lead will result in trouble indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
1	✓				1		0	1				0	0	7	✓	✓							✓	
2	✓				1		0	1				0		7	✓	✓							✓	
3	✓				1		0	1				0	0	9	✓	✓							✓	
4	✓				1		0	1				0	0	6	✓	✓							✓	
5	✓				2		3	0				5	12	0	✓	✓							✓	

2.05 On indications 6 and 7 neither the DS lamp nor any of the D lamps are lighted indicating that a district junctor was not selected. Two district junctor subgroups on the same sender link frame appear to be involved in the trouble. Failure of the sender link and controller to prepare for reserve selection of a district junctor by operating the RS relay will result in indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
6	✓				0		2	1	1	3		2	2	9	✓	✓							✓	
7	✓				0		2	1	1	2		3	1	4	✓	✓							✓	

2.06 On indications 8 to 12 neither the DS lamp nor any of the D lamps are lighted indicating that a district junctor was not selected. This may have been due to failure in the sender link and controller to connect BT lead battery to the associated D relay or due to the line link controller receiving a false idle indication from a subgroup of district junctors in which all district junctors were busy. Indications 8 to 11 involve a particular sender link and subgroup of district junctors in a trouble condition. Indication 12 involves a different sender link in a similar trouble.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
8	✓				2		1	1	3	6		8	4	6	✓	✓							✓	
9	✓				2		0	1	3	6		8	4	2	✓	✓							✓	
10	✓				2		0	1	3	6		7	5	3	✓	✓							✓	
11	✓				2		0	6	3	6		6	0	9	✓	✓							✓	
12	✓				10		0	7	3	7		7	3	2	✓	✓							✓	

2.07 On indications 13 to 17 the OC lamp extinguished indicates failure to complete sender group selection. The indications involve all district junctor groups except zero on a particular sender link frame. Failure to close the LL lead will result in indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
13	✓				1		3	2	3	6	3 to 9				✓		✓						✓	
14	✓				1		3	1	1	2	1 to 3				✓		✓						✓	
15	✓				1		0	5	2	4	0,1,6 to 9				✓		✓						✓	
16	✓				1		1	8	4	8	0 to 9				✓		✓						✓	
17	✓				1		2	0	4	8	0 to 9				✓		✓						✓	

2.08 On indications 18 to 21 the lighted SG lamp indicates that the associated sender subgroup LL relay operated. However, the SGP and S lamps are extinguished indicating failure to complete sender selection. Indications 18 to 20 involve the same sender link frame with a particular sender subgroup. The indication on line 21 involves the same sender link frame in a similar trouble with a different sender subgroup. Failure to close the SS lead will result in indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
18	✓				2		2	0	2	4	0,3,4,8,9	4			✓		✓						✓	
19	✓				2		1	3	2	5	5,7,9	4			✓		✓						✓	
20	✓				2		2	0	2	4	0,3,4,8,9	4			✓		✓						✓	
21	✓				2		0	2	3	7	4,6,9	6			✓		✓						✓	

2.09 On indications 22 to 26 the lighted SG lamp indicates that the associated sender subgroup LL relay operated. Indications on lines 22 to 24 involve the same sender link with a particular sender group, while on lines 25 and 26 this sender group is involved with different sender link frames. Failure to operate a sender subgroup SGE relay will result in indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL	
22	✓				0	2	0	3		4	2,4 to 9	9			✓		✓				✓	✓	✓	✓	✓
23	✓				0		1	4	4	9	6 to 9	9			✓		✓				✓	✓	✓	✓	✓
24	✓				0	2-3	0	9	4	9	0,2,4 to 9	9			✓		✓				✓	✓	✓	✓	✓
25	✓				1		1	0	0	1	3 to 9	0			✓		✓				✓	✓	✓	✓	✓
26	✓				2	4	0	3	4	8	2,5 to 9	1			✓		✓				✓	✓	✓	✓	✓

2.10 On indications 27 to 30 the lighted SGP lamp indicates that the sender group C relay operated. However, the S lamp extinguished indicates failure to select a sender. Indications 27 and 28 involve a particular sender link and subgroup of senders while indications 29 and 30 involve a different sender link and subgroup of senders. Failure to operate an S relay in the selected subgroup of senders will result in indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
27	✓				2		1	1	1	2	5 to 9	3	4		✓	✓	✓						✓	
28	✓				2		1	1	1	2	5 to 9	3	4		✓	✓	✓						✓	
29	✓				4	3	1	7	1	3	0,3 to 9	3	0		✓	✓	✓						✓	
30	✓				4	5	0	1	2	4	3,7 to 9	8	0		✓	✓	✓						✓	

2.11 On indications 31 to 36 the lighted AB lamp indicates that the release stage has been reached. The indications on lines 31 to 34 involve a particular group of district junctors on calls from a particular line link frame. The indications on lines 35 and 36 are of the same general type but involve different equipment. Indications of this type may be caused by failure to close the SC lead towards the district junctor, failure to lock operated the G relay in the line link or any similar trouble affecting the continuity of the sleeve holding circuit.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
31	✓				3		2	0	1	3	8,9	3			✓		✓				✓	✓	✓	
32	✓				3		2	0	1	3	8,9	2			✓		✓				✓	✓	✓	✓
33	✓				3		2	0	1	3	8,9	5			✓		✓				✓	✓	✓	✓
34	✓				3		2	0	1	3	8,9	3			✓		✓				✓	✓	✓	✓
35	✓				6		2	0	0	1	7 to 9	1			✓		✓				✓	✓	✓	
36	✓				7		2	3	1	3	0,4,7,9	3			✓		✓				✓	✓	✓	

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2.12 On indications 37 to 39 a particular sender is involved on calls from any sender link frame. With the SL lamp extinguished, failure to close the sleeve lead from the sender to the sender link frame is indicated.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
37	✓				3	0	0	8	1	2	5,7 to 9	2	0	5	✓	✓	✓	✓	✓				✓	
38	✓				4	0-2	0	6	0	0	6 to 9	3	0	5	✓	✓	✓	✓	✓				✓	
39	✓				2		1	2	0	0	4 to 9	1	0	5	✓	✓	✓	✓	✓				✓	

2.13 On indications 40 to 44 the DC lamp lighted indicates a double connection. The failure may be due to a double connection in the sender link with a busy link or failure of either the DC or DR relay to operate.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
40	✓				3		0	3	0	1	2,4 to 9	2	5	6	✓	✓	✓		✓	✓			✓	✓
41	✓				3		1	3	3	6	3,6 to 9	8	0	6	✓	✓	✓	✓		✓			✓	✓
42	✓				3		1	3	3	6	3,8 to 9	8	0	6	✓	✓	✓	✓		✓			✓	✓
43	✓				3		2	3	3	6	5,9	7	1	7	✓	✓	✓	✓		✓			✓	✓
44	✓				3		2	4	1	3	2 to 9	3	4	8	✓	✓	✓	✓		✓			✓	✓

2.14 On indications 45 to 48 a particular line link frame is involved on calls to a particular group of district junctors. With the SGP, S, OH, GH and DC lamps extinguished and the RL lamp lighted a failure in the release stage is indicated. Failure of the line link secondary hold magnet to lock under control of the district junctor will result in indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
45	✓				0		1	3	0	1	4,6,8,9	2			✓		✓			✓	✓	✓		✓
46	✓				0		1	3	0	1	4,6,9	1			✓		✓			✓	✓	✓		✓
47	✓				0		1	3	0	1	4 to 9	0			✓		✓			✓	✓	✓		✓
48	✓				0		1	3	0	1	4 to 9	0			✓		✓			✓	✓	✓		✓

2.15 On indications 49 to 53 the sender link and controller involved blocked in the release stage. This is indicated by the OH and AB lamps being extinguished with the SL lamp lighted. Failure to close the sender link REL lead to operate the AB relay will result in indications of this type being received. Lines 49 to 52 involve a particular line link frame on calls to a particular group of district junctors. Line 53 is a similar trouble indication involving various different equipment. Failure to close the line link secondary cross-points or an unsatisfactory class of service check in the subscriber sender may result in trouble indications of this type.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
49	✓				0		0	5	0	0	5,7 to 9	0	5	4	✓	✓	✓		✓	✓			✓	
50	✓				0		0	5	0	0	5 to 9	1	4	3	✓	✓	✓		✓	✓			✓	
51	✓				0		0	5	0	0	5 to 9	2	2	8	✓	✓	✓		✓	✓			✓	
52	✓				0		0	5	0	0	5 to 9	1	4	6	✓	✓	✓		✓	✓			✓	
53	✓				0		2	2	1	4	0,9	2	2	4	✓	✓	✓		✓	✓			✓	

2.16 The indications on lines 54 to 58 are similar to those shown on lines 49 to 53. In this case, however, a particular sender is involved on calls from various line link and sender link frames indicating that the sender is in trouble.

No.	TI	TC	EM	CRL EM	SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
54	✓				5		0	0	2	4	1 to 9	4	0	8	✓	✓	✓		✓	✓			✓	
55	✓				4		0	0	4	8	6 to 9	8	0	8	✓	✓	✓		✓	✓			✓	
56	✓				4		0	7	4	8	5 to 9	8	0	8	✓	✓	✓		✓	✓			✓	
57	✓				2		0	2	3	6	2,3,5 to 9	6	0	8	✓	✓	✓		✓	✓			✓	
58	✓				5		0	0	2	4	0,7 to 9	4	0	8	✓	✓	✓		✓	✓			✓	

2.17 On indications 59 to 63 a particular sender is involved on calls from a particular sender link frame. Failure to receive a release signal from this sender is indicated by the AB lamp being extinguished. Failure of a sender select magnet to fully operate or close its contact during frame registration will result in indications of this type.

No.	TI	TC	EM	CRL		SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
				EM	EM																				
59	✓					1		1	0	0	0	3 to 9	2	4	6	✓	✓	✓		✓	✓		✓		
60	✓					1		1	3	3	6	1 to 9	7	4	6	✓	✓	✓		✓	✓		✓		
61	✓					1		1	2	3	6	6 to 9	7	4	6	✓	✓	✓		✓	✓		✓		
62	✓					1		2	1	1	2	2,6 to 9	2	4	6	✓	✓	✓		✓	✓		✓		
63	✓					1		2	0	3	6	6,8 to 9	7	4	6	✓	✓	✓		✓	✓		✓		

2.18 On indications 64 to 68 the AB lamp extinguished indicates failure to close the RL lead from the sender to the sender link. The indications on lines 64 to 67 involve a particular sender while on line 68 different equipment is involved in a similar trouble condition. Failure to close the ON lead from the line link through the sender link to the sender will result in indications of this type.

Note: When a particular line link frame is involved in trouble indications similar to the indications on lines 64 to 68 the trouble may be due to crossed LT leads. Section 216-603-301 describes this particular trouble condition.

No.	TI	TC	EM	CRL		SLF	CRL	LLT	LLU	DG	DSG	D	SG	SGP	S	ON	OC	DS	OH	GH	SL	AB	H	DC	RL
				EM	EM																				
64	✓					0	1	1	4	4	8	4 to 9	8	1	4	✓	✓	✓		✓	✓		✓		
65	✓					2		0	5	0	0	8 to 9	0	1	4	✓	✓	✓		✓	✓		✓		
66	✓					3		1	1	0	0	5,8 to 9	1	1	4	✓	✓	✓		✓	✓		✓		
67	✓					4	3	1	5	1	2	1,5	2	1	4	✓	✓	✓		✓	✓		✓		
68	✓					3		5	4	1	3	1,5 to 9	2	5	3	✓	✓	✓		✓	✓		✓		

3. REPORTS

3.01 The required record of these alarms should be entered on the proper form.