SUBSCRIBER SENDER LINK FRAME ALARM ROUTINE NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers the procedure to be followed in response to subscriber sender link and control circuit alarms. It also covers procedures not associated with sender link alarms.

1.02 If alarms occur on two or more sender link frames within approximately 5 seconds of each other it may be assumed that the trouble is in a line link frame rather than a sender link and the procedure for handling line link frame alarms should be followed. This follows from the fact that when an alarm occurs on a sender link frame, the sender link frame forces the call out of the sender link frame and holds itself busy long enough to cause the line link frame to select another sender link frame, and if the trouble is in the line link frame this second sender link frame will also time out and bring in an alarm. Eventually the line link frame times out and brings in an alarm.

1.03 Since this circuit times out under trouble conditions and leaves no record of the equipment involved, a 298A plug may be inserted into the HD jack to hold the circuit the next time the trouble occurs. With the circuit held in this manner the equipment involved is determined as follows.

1.04 The operated BA0 to BA4 or BB0 to BB4 relay indicates the district sub-group (10 districts). These relays must be observed before the line link times out (6 to 13 seconds). The operated G0 to G4 relay indicates the district junctor group.

The operated D0 to D9 relays indicate the idle district junctors. The operated SG0 to SG9 relay indicates the sender sub-group. The operated secondary select magnet indicates the sender. The alarm at the line link frame indicates the line link frame.

1.05 The hold feature results in a sender link control circuit (100 district junctors, a sender sub-group and in some cases a subscriber's line) being out of service during the interval that the trouble is being held for observation. Therefore it is important that this hold feature be used under close maintenance supervision.

2. APPARATUS

2.01 No. 298A (make busy) plugs.

2.02 Orange Stick.

2.03 Handset per D-156219.

3. METHOD

(A) General

3.01 Determine whether the alarm is confined to one, or more than one sender link frame by observing whether more than one frame alarm lamp AL of sender link frames in the same or different aisles is lighted.

3.02 White aisle pilots associated with two sender link aisles, being lighted within approximately 5 seconds of each other indicate that the sender link frames may be located in different aisles.

3.03 If the alarms occur on more than one sender link restore the alarms by momentarily operating the AR keys on the sender links frames. Refer to 1.02.

3.04 If the alarm is confined to one sender link, restore the alarm by operating the AR key momentarily.

3.05 If it is desired to hold the circuit, insert a 298A plug into the HD jack, when the control circuit is normal.

3.06 The trouble may not recur with the plug in the HD jack until the particular district or sender originally involved is selected. Therefore first observe that calls proceed satisfactorily through the sender link before leaving the frame. Refer to 1.05.

3.07 When the trouble recurs with the plug in the HD jack the major alarm is sounded instead of the minor alarm and the aisle pilots indicate the location of the frame.

3.08 If the analysis of the apparatus indicates that the trouble is confined to the control circuit, remove the plug from the HD jack and transfer the frame to the emergency control circuit so as to restore the frame to service, as follows.

Observe the EM lamps on other sender link frames to determine that no other sender link frame is connected to the emergency control circuit. Turn the keys of the A and B switches on the sender link frame in trouble to the OFF position. Turn the keys of the EM A and EM B switches on the same frame, to the ON position.

3.09 If the analysis of the apparatus indicates that the trouble is external to the control circuit, make busy the apparatus involved, in the approved manner.

Then remove the plug from the HD jack unless the holding of the relays will be an aid in clearing the trouble, or unless further analysis is required to clear the trouble.

3.10 If, with the plug inserted in the HD jack, the SS relay is operated and the secondary select magnet is not operated or alarms are appearing on other sender link frames, insert a 275A plug into the associated sender sub-group MB jack on the sender make busy frame. Due to a particular trouble other sender links may seize this particular sender sub-group but they cannot use it as long as it is held on this particular trouble. Making the sub-group busy as just described or by blocking the SGE relay operated permits the sender links which have seized this sub-group to back out and select another sub-group. The trouble may be due to the failure of the proper S0 to S9 or SGE relays to operate.

(B) Alarm With The CF (continuity failure) Lamp Lighted

3.11 The CF lamp being lighted indicates that the call progressed far enough to operate the OH relay which closes the operate circuit to the hold magnets, but the sleeve lead may not be continuous from the sender link, through the sender and back to the sender link.

3.12 When the line link times out, the primary and secondary sender link hold magnets release, but the equipment involved in the call can be located in accordance with 1.04.

3.13 The SC-1 relay in the sender being normal indicates a continuity failure of the SC lead from the sender selection relays to the sender.

(C) Alarm With The DC (double connection) Lamp Lighted

3.14 Observe which district group (primary switches) have select magnets operated.

3.15 Locate the primary A hold magnet involved by examining the cross points closed on the level corresponding to the operated select magnets on the switch containing the A hold magnets.

3.16 Observe other cross points on this hold magnet for two cross points being operated.

3.17 If two cross points are closed, observe if two select magnets are operated.

3.18 If two cross points are not closed on the primary switch observe the secondary switches and C magnets for double connections using the same procedure as for the primary switches.

3.19 Observe if two secondary select magnets are operated.

3.20 In the event of double connections on either primary or secondary switches insert the handset into the jack at the bottom of the vertical unit of a primary A hold magnet, involved in the double connection, and challenge. If the subscriber or subscribers answer the challenge, advise them that there is trouble on the line and that they should hang up for a short interval and again make the call.

3.21 After the subscribers hang up, open the off normal spring of the primary A hold magnet momentarily, using the orange stick, then disconnect the handset.

3.22 If two cross points are not closed on either primary or secondary switches it indicates that a false ground is present on the sleeve lead, or a false ground on the RL lead from the sender to the sender link.

3.23 Two select magnets operated indicates a false ground or cross that is relayed to the select magnet circuits.

3.24 Two cross points being closed without two select magnets being operated indicates that a select finger is out of adjustment.

(D) Alarm With The CF Or DC Lamps Not Lighted

3.25 The condition of the following relays and magnets indicates the stages which have been reached in the progress of the call. Various troubles are listed which could possibly cause the following conditions of these relays.

3.26 The various relays and switches should be checked in the order given so as to quickly determine the progress of the call.

Relay or Magnets	Possible causes of Failure
3.27 Secondary select magnets not operated.	DP lead continuity failure from the line link to the sender selection relays. Secondary select magnet operating path continuity failure from sender selection relays to the secondary select magnets.
3.28 OH relay (sender link) not operated.	OH relay operating path continuity failure from G relay

Relay or Magnets	Possible causes of Failure
	through both primary and secondary select magnet contacts to OH relay.
	The DS relay non-operated may indicate an A or B lead continuity failure between the line link and the sender link.
3.29 ON-1 relay (sender) not operated. The sender involved is determined by the operated secondary select magnets.	ON lead continuity failure from the line link to the sender.
	CS lead continuity failure from the line link to the sender.
	Crossed CS leads.
	The condition of the open or crossed CS leads can be checked by observing if no CS relay or more than one CS relays in the sender are operated.
	Frame lead continuity failure from the sender link to the sender.
	Crossed frame leads from the sender link to the sender. The condition of open or crossed frame leads can be checked by observing if no frame relays or select magnets or more than one frame relays or select magnets in the sender are operated.
	Crossed leads such as F-0 and F-1 may also prevent the closing of the select magnet off normal contacts, by energizing opposite sides of the select magnet.
	SH lead continuity failure from the sender link to the line link. An SH magnet failing to operate prevents the closure of the ON lead by failing to operate the T relay in the line link and subsequent operation of the subscribers line hold magnet & release of the L & RE relays in the line link.
	H lead continuity failure between the sender link and the line link. The results are the same as an open SH lead.
3.30 ON-2 relay (sender) non-operated.	ON-1 relay (sender) operating failure. GS lead continuity failure from the sender link to the sender.
3.31 AB relay (sender link) not operated.	REL lead continuity failure between the sender and the sender link. A second path for operating the AB relay is through the DC relay normal which may release when the sleeve is grounded by the sender, although it is not required to release.
3.32 RL relay (sender link) is operated.	RL lead continuity failure between the sender link and the line link.

3.33 If primary hold magnets associated with the operated select magnets are operated, the plug should be removed from the HD jack just as soon as the probable cause of the trouble is determined. This is necessary in order to free the subscribers line.

(E) Conditions Not Associated With Sender Link Frame Alarms

Too high a registration on the PC register associated with the false start circuit.

3.34 A high registration (compared to other sender links) on the PC false start register associated with a particular sender link indicates a tip or ring lead continuity failure between a primary line link switch and the sender.

Crossed DP0 to DP4, SH0 to SH9, A0 to A9 or P0 to P4 leads.

3.35 A cross between any two of these leads results in two district junctors being connected to one subscriber, and when the subscriber dials, the district junctor F relays operate. This results in an originating trouble indicator record. The location of the F relays is determined from the trouble indicator lamps.

4. REPORTS

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