

STUCK SENDER TRUNK
 IDENTIFICATION FEATURE (SSTI)

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1. GENERAL INFORMATION

1.1 Description

1.11 This section describes supplementary and operational tests of the Stuck Sender Trunk Identification Feature on the following circuits:

- SD-25161-01 Incoming Trunk Test Frame (ITT)
- SD-25221-01 Originating Sender Test Frame(OST)
- SD-28101-01 Trunk Scan Control Circuit (TSCC)
- SD-28102-01 Sender Test Connector Control Circuit (STCC)
- SD-28103-01 Printer and Printer Control Circuit (PPC)
- SD-28120-01 Trap Circuit

1.2 Sequence of Operations

1.21 The sequence of operations is as follows;

- a) Connect switchboard cable and/or local wire at all SSTI units (TSCC, TRAP, STCC and PPC) and make lead verification between units.
- b) Modify the Originating Sender Test Circuit (OST) per DCS-25221-103 and test for prior functions. See Paragraph 3.
- c) Modify the Incoming Trunk Test Frame per DCS-25161-66 and test per Paragraph 4.
- d) Fuse new circuits per Paragraph 5.
- e) Run Preliminary Tests of PPC, Paragraph 6.
- f) Run Preliminary Tests of TSCC, Paragraph 7.

g) Run Preliminary Test of STCC, Paragraph 8.

h) Run Preliminary Test of TRAP Ckt, Paragraph 9.

i) Operational Tests, Paragraph 10.

1.3 Refer to Figures 1 and 2 attached for a block diagram of the SSTI feature and a typical stuck sender printout. Method of operation and trouble locating flow charts are furnished in BSP 216-610-101.

2. TEST EQUIPMENT

<u>Amt</u>	<u>Code</u>	<u>Description</u>
1	ITE-4442A	Volt-Ohmmeter
1	ITE-5280	Logic Test Probe
*1	ITE-4029	Pulse Checking Test Set
	or	
	J94723	
*1	ITE-4325	Timing Test Set
	or	
	J24753A	

* The ITE- set is not required if Telephone Company J- set is available.

3. OST PRIOR FUNCTIONS

- 3.1 The tests of this paragraph are made to verify functions of the OST that, after modification, are controlled through normal contacts of relays AA, B and B1 on the Sender Test Connector Control Circuit.
- 3.2 At the OST set up a basic test call (i.e. 3 digit Operator, 7 digit MF etc.) and leave Test Class key normal.

- 3.21 Operate key ST. In 60 to 90 seconds lamp TA is lighted and minor alarm sounds.
- 3.22 Operate key TA. Alarm is silenced. Restore key ST and operate key CA to restore test frame.
- 3.23 Operate keys ST and MGB. Lamp MGB is lighted. Immediately restore keys MGB and ST. Momentarily operate key CA to restore frame. Lamp MGB is extinguished.
- 3.24 Hold key PCR operated until lamp EC is lighted. Observe lighting of the proper Group (G-), Select (T-) and Hold (U-) lamps as switch advances. Operate key RN to restore to normal.
- 3.25 Operate Test Class keys. Operate key ST. Observe completion of test on two senders. Restore key ST and momentarily operate key RN.
4. PRELIMINARY TESTS ITT
- 4.01 The tests of this paragraph are performed to verify, prior functions of this circuit which are affected by the modification for SSTI and some operational functions of the new feature.
- 4.02 Observe that the test circuit is normal and then operate key CP.
- 4.03 Operate key ST. The test circuit proceeds to test each trunk until all trunks have been tested. Observe lighting of GRP, SEL and HLD lamps. Restore keys CP & ST.
- 4.04 Block operated relay STOP. Relay CA3 and RAC operate and lamp SST is lighted. If the frame is arranged for ROTL access, relays SSS, RCB, BCB, SRA and CBY operate and lamp CBY is lighted.
- 4.05 Release relay STOP. All relays release and lamps are extinguished.
- 4.06 Operate keys CP and ST. The test circuit proceeds to test each trunk.
- 4.07 Block operated relay STOP. Sequential testing is stopped upon completion of the trunk test in progress. Observe the number of the trunk tested as indicated on the GRP, SEL and HLD lamps.
- 4.08 Release relay STOP. Testing resumes with the next trunk in sequence.
- 4.09 Make a trunk busy so that, when selected on a sequential test, the test circuit times out (BY1 relay operated).
- 4.10 Operate key AOSS. Block operated relay STOP. Verify that relay CA3 is operated.
- 4.11 Release relay STOP. The test circuit is returned to repeat the test on the same trunk.
- 4.12 Release keys AOSS, CP and ST. Momentarily operate key RN to restore test circuit to normal.
- 4.13 Remove busy condition from trunk selected in Paragraph 4.09.
5. FUSING
- 5.1 Using an ITE-4442A Volt-Ohmmeter or equivalent, check fuse posts for absence of battery or ground.
- 5.2 Using fuses of the correct type, as indicated by circuit drawings and fuse panel designations, install fuses one at a time. Verify that each fuse is associated with correct equipment as follows:

<u>CIRCUIT</u>	<u>FUSE DESIG.</u>	<u>TEST LOCATION</u>
SD-28101-01	A	T.S.D Pch. 11
	B	L Wdg. RST2 Relay
	C	L Wdg. ES Relay
	D	L Wdg. TG1 Relay
SD-28102-01*	A	L Wdg. A1A Relay
	B	2U SO Relay
	C	L Wdg. GO Relay
	D	BOT SGO Lamp
	D1	BOT SG20 Lamp
	E	BOT SG10 Lamp
	F	2U RLS4 Relay
	F1	2L SG20 Relay
F2	2U LGO Relay	
F3	2U LG20 Relay	
G	LWDG A1C Relay	
H	4F GR Relay	
J	LWDG CTR0 Relay	
K	2L T1A Relay	
L	LWDG AA Relay	
SD-28103-01**	A	PIN 25 PM Conn (02)
SD-28120-01	A	2U MTS Relay

* Operate key CANCESS at OST and all SG- keys as STCC before fusing this circuit.

** Before fusing this circuit pull circuit packs out far enough that they are no longer seated in their connectors, also verify that the J25 connector is properly seated and secured at the Printer.

6. PRELIMINARY TESTS PPC

CAUTION 1: PRECAUTIONS NORMALLY PERFORMED ON SOLID STATE CIRCUITRY SHOULD BE FOLLOWED.

CAUTION 2: BEFORE REPLACING ANY CIRCUIT BOARD, POWER SHOULD BE REMOVED BY PULLING THE POWER MODULE BOARD PM (A1130) IN POSITION 02.

- 6.01 Insert circuit packs one at a time, power module (PM) last. Indicators, BUSY and ALM, should be lighted.
- 6.02 Connect printer power cord (115V, 60 Hz). PRINTER PWR indicator lights, momentarily operate TIME SET switch.
- 6.03 Operate DATA PWR switch. DATA PWR indicator is lighted, NO DATA indicators (GREEN) on circuit boards 10-16 are lighted and if paper is not loaded, PAPER OUT indicator lights.
- 6.04 Refer to CD 28103-01 for paper loading procedure. With paper loaded, PAPER OUT indicator is extinguished and READY indicator is lighted.
- 6.05 Operate ALM RLS key. BUSY and ALM indicators are extinguished.
- 6.06 Operate key LT. Indicators PRINT, NO PRINT, PRINT TEST, BUSY and ALM are lighted. Release key LT, indicators are extinguished.
- 6.07 Unplug the printer power cord. Indicators PRINTER PWR and READY are extinguished and BUSY and ALM are lighted.
- 6.08 After approximately 1 minute, plug in printer power. PRINTER PWR, PWR INT and READY indicators are lighted. Momentarily operate TIME SET switch. PWR INT indicator is extinguished.
- 6.09 Operate ALM RLS switch. BUSY and ALM indicators are extinguished.
- 6.10 Operate PRINT TEST key. PRINT TEST and PRINT indicators light. The printer functions to print the date, time, a T in column 9, M in column 13, T in column 15 and 0 in columns 10-12,14 and 16-20. PRINT TEST and PRINT indicators are extinguished.
- 6.11 To set current date and time, operate the CLK/CAL UPDATE switch to desired position and operate TIME SET switch to advance the time and data circuitry of the printer. Set CLK/CAL UPDATE switch to OFF.

7. PRELIMINARY TESTS TSCC7.1 Lamp Test

- 7.11 Hold operated switch LT. All NET (0-9) indicators should light. Release switch LT.
- 7.12 If all indicators do not light, check and repair or replace necessary portions of the Lamp Test Circuit per FS8 and FS10 on SD-28101-01.
- 7.13 Repeat Paragraph 7.11.

7.2 Manual Detector Check

- 7.21 Set switch DS to OFF position. Momentarily operate switch MDC. Relays MDC and DSC are operated. Verify that NET-indicators are not lighted.
- 7.22 Rotate switch DS thru positions 0-9. Observe that the corresponding NET-indicator is lighted in each position. (NOTE: Indicator for Even numbered detector is at bottom of Component Assembly.) If any or all detector indicators fail to light, perform Detector Tuning Procedure per CD-28101-01, Section II, Paragraph 13.03. Momentarily operate switch AR to restore circuit to normal. Set switch DS to OFF position.

7.3 CIB Leads and Select and Hold Magnet Operation

- 7.31 Verify that ITT Frame is idle. At the TSCC block operated relay CIB. All CIB-relays at ITT are operated and all GRP-lamps are lighted.
- 7.32 At the TSCC, insulate contact 2M, relay ON.
- 7.33 Manually operate relay ON. Verify that it locks operated.
- 7.34 Manually operate relay S0. Relay S0 locks operated. Verify that Select Magnet 0 on all ITC switches is operated.
- 7.35 Manually operate relay S1. Relay S0 releases and S1 locks operated. Verify that Select Magnet 1 on all ITC switches is operated.
- 7.36 Continue operation of relays S2 thru S9 verifying operation of corresponding Select Magnets on all ITC switches. Manually release relay S9.

- 7.37 Manually operate, one at a time, re-lays H0 to H19. Verify operation of the corresponding numbered Hold Magnet on all ITC switches. Manually release relay H19.
- 7.38 Remove blocking tool from relay CIB and remove insulator from relay ON. Relay ON is released.
- 7.4 Pulse Generator
- 7.41 Using the Pulse Checking Test Set, verify the Pulse Generator Circuit per SD-28101-01-F2.
- 7.5 Scan and Detect Control
- 7.51 At the OST release CANCSS key. Verify that the Printer Printer Control MB switch is not operated. Operate TSCC switch PO. Verify that Key AOSS at the ITT Frame is operated.
- 7.52 Connect ground to ST lead (Terminal Strip "F" pch. 28). This circuit makes two complete scans of the Incoming Trunk Test Connector. A two line record is printed at the printer circuit. The first line should contain a character S in Column 9, a M in column 13 and a T in Column 15. The second line has a character T in Column 9, a G in Column 13 and a D in Column 15. When relay RLS is operated, remove ground from the ST lead.
- NOTE: A trunk number or partial trunk number printed in Columns 16-20 would indicate a false tone, such as a singing repeater, detected on a particular trunk. Telco should investigate and clear problem.
- 7.53 At the OST, lamp MTR should be lighted. Momentarily operate key SGRLS, lamp MTR is extinguished.
- 7.6 Trunk Number and Resistor Check
- 7.61 Run a temporary cable (pair) from the STCC to the OGT Jack Bay. At the STCC, connect the tip to contact 2 fixed, relay TNT and ring to contact 1 fixed. Insulate 1 and 2 break. At the OGT end connect tip and ring to a 309 plug or a cord equipped with a 309 plug for access to a trunk T0 jack.
- 7.62 Locate an idle trunk associated with Connector Switch 0 and make it busy. Insert temporary tone plug into jack T0.
- 7.63 At the TSCC, connect ground to ST lead (T.S. F pch. 28). This circuit starts to scan and when the trunk is found causes a record to be printed. When relay RLS operates, remove ground from ST lead. Verify that the printed record indicates the trunk number of the selected trunk.
- 7.64 Repeat Paragraphs 7.62 and 7.63 for each equipped connector switch.
- 7.65 Disconnect temporary cable and remove insulators from relay TNT.
- 7.7 Alarms
- 7.71 Block operated relay TT. The slow operate relay PDT operates to cause a detector failure record with a character T in Column 9, B in Column 13, D in Column 15 and a 0 in Column 17. The minor alarm is sounded and lamp DF at the OST frame is lighted.
- 7.72 Release relay TT. Momentarily operate key SSAR at the OST frame to release alarm condition.
- 7.73 Manually operate relay TFB. A test frame busy record is printed with the character S in Column 9, M in Column 13 and a B in Column 15. The minor alarm is sounded and lamp TFB at the OST frame is lighted.
- 7.74 Momentarily operate key SSAR at the OST frame to release alarm condition.
- 7.75 At the Printer Control Circuit operate switch MB. Lamp PRF at the OST is lighted and the minor alarm sounds.
- 7.76 Release switch MB at the Printer Control Circuit. Lamp PRF is extinguished. Momentarily operate key SSAR to silence alarms.
8. PRELIMINARY TESTS STCC
- 8.1 Timing Tests
- 8.11 Using the Timing Test Set, verify timers A, AL, AL1, PM, RLS, RLSP and TIB per the Timing Requirements Table of SD-28102-01-F1.
- 8.2 OST Control
- 8.21 At the SMB frame make busy an idle sender.
- 8.22 Verify that the OST frame is idle and release key CANCSS if operated.

- 8.23 At the STCC release key SG- for the subgroup containing the made busy sender. The corresponding SG- lamp is extinguished.
- 8.24 Connect ground to the associated number lead on Terminal Strip T. Lamp SS at the OST is lighted. A two line printed record is taken. The first line contains the Sender Number, the second line indicates a detector OK test. Lamp SS is extinguished. The test frame restores to normal. Lamp MTR at the OST is lighted and the minor alarm is actuated. Lamp SG- at the STCC flashes at 120 IPM.
- 8.25 Remove the ground from (T) T.S. Operate key SSAR to silence alarms. Operate key SGRLS, lamps MTR and SG- are extinguished.
- 8.26 At the OST start a sequential test. At the STCC ground the numbered lead on T.S. (T). The test in progress is allowed to complete. The results are the same as Paragraph 7.24 except that when lamp SS is extinguished the sequential test resumes. Repeat Paragraph 8.25.
- 8.27 At the OST operate key REP. At the STCC ground the numbered lead on T.S. (T). The test in progress is allowed to complete. The results are the same as Paragraph 8.24 except that when lamp SS is extinguished the repeat test is resumed on the same sender. Repeat Paragraph 8.25.
- 8.28 At the OST release keys REP and ST.
- 8.3 Permanent Stuck Sender
- 8.31 Connect ground to numbered lead of the made busy sender at T.S.(T). When the TSCC starts to scan, manually operate its TD relay. A printed record is made containing the sender number and a partial trunk number. The SG- lamp at the STCC and lamp SGPO at the OST are lighted and the minor alarm sounds.
- 8.32 Remove the ground from T.S.(T). Operate key SGRLS to extinguish lamps. Operate key SSAR to retire alarms.
- 8.4 Presence Monitor Check
- 8.41 Connect ground to numbered lead of the made busy sender. When the TSCC starts to scan, remove the ground. A printed record is made containing the Sender number and an unexpected loss of sender indication (U in Column 9).
- 8.5 Check Failure
- 8.51 At the SMB make busy another idle sender in the same subgroup as the previously made busy sender.
- 8.52 At the STCC temporarily strap the numbered leads for the two made busy senders.
- 8.53 Connect ground to the strapped terminals. The RLS relay should operate. Remove ground as soon as possible (Circuit will recycle until ground is removed).
- 8.54 Remove temporary strap from (T) terminal strip and remove make busy plugs at SMB frame.
- 8.55 At STCC operate key SG-. (All SG- keys operated all SG- lamps lighted)
- 8.6 Time Out Alarm
- 8.61 Block operated relay AA. In approximately two minutes lamp TO at the OST is lighted and the minor alarm is activated.
- 8.62 Remove blocking tool from relay AA.
- 8.63 At the OST, operate key SSAR. Lamp TO is extinguished and alarms are retired. Operate key CANCESS.
9. PRELIMINARY TESTS TRAP CIRCUIT
- 9.01 Using a Test Receiver or Volt-Ohmmeter, verify ground is present on T.S. A, pch. 25. (CANCESS Key at OST operated)
- 9.02 Momentarily operate relays MTS and MTT one at a time. Verify that ground is removed from T.S. A, pch. 25 while relay is operated.
- 9.03 Block operated relay MTS and verify ground is present on contact 3M, relay SD13, at the MDT.
- 9.04 At the TSCC, momentarily operate relay RLS. Relay STLO operates and locks and SDR TRAP indicator is lighted. Verify that, relays SNTA and TRAP at the STCC are operated, lamp TRP at the OST is lighted and ground is present on contact 10M, relay SD13 at the MDT.
- 9.05 Remove blocking tool from relay MTS and momentarily operate switch MTR. Verify that all relays are released and indicators are extinguished.

- 9.06 Block operated relay MTT and verify that ground is present on contact 4M, relay SD13, at the MDT.
- 9.07 At the TSCC momentarily operate relay RLS. Relay TTLO operates and locks and TRK TRAP indicator is lighted. Verify that relays SNTA and TRAP at the STCC are operated, lamp TRP at the OST is lighted and ground is present on Contact 11M, relay SD13 at the MDT.
- 9.08 Remove blocking tool from relay MTT and momentarily operate switch TTR. Verify that all relays are released and indicators are extinguished.
- 9.09 At the TSCC, insulate contact 3B, relay RST1 and connect ground to T.S. F, punching 28.
- 9.10 At the Trap Circuit connect ground to T.S. B, punchings 11 and 41. Operate switches SSG, SSS and SSH to position 0. Operate switch SDR and verify that relay MTS does not operate.
- 9.11 Restore switch SDR and operate switch SG. Relay MTS operates.
- 9.12 Restore switch SG and operate switch SDR. Manually release relay MTS.
- 9.13 Connect ground to T.S. B, punching 43. Relay MTS operates. Restore switch SDR, remove grounds from T.S. B and manually release relay MTS. Restore switches SSG, SSS and SSH to the OFF position.
- 9.14 Connect ground to T.S. B, punchings 16, 18 and 45. Operate switches TGT, TGU, TS, THT and THU to position 0. Operate switch TRK and verify that relay MTT does not operate.
- 9.15 Restore switch TRK and operate switch TL. Relay MTT operates.
- 9.16 Restore switch TL and operate switch TRK. Manually release relay MTT.
- 9.17 Connect ground to T.S. A, punchings 17 and 46. Relay MTT operates.
- 9.18 Restore switch TRK, remove grounds from T.S. A and B and manually release relay MTT. Restore switches TGT, TGU, TS, THT and THU to the OFF position.
- 9.19 At the TSCC, remove ground from T.S. F and remove insulator from contact 3B, relay RST1.
10. OPERATIONAL TESTS
- 10.1 General
- 10.11 The tests of this paragraph are intended to check the overall operation of the SSTI feature by manually simulating a stuck sender and verifying that the proper sender number is printed and that the sender release feature is operational.
- 10.12 The Operating Company should be notified that the stuck sender peg count will be affected by these tests.
- 10.13 A legitimate stuck sender in the subgroup being tested may cause a lock-out of the subgroup or interrupt the sequential printing of sender numbers. If such a lock-out occurs, operate keys SGRLS and SSAR at the OST to release lock-out relays and retire alarms.
- 10.14 During these tests a temporary wiring arrangement in the TSCC will simulate a tone detected on the first trunk appearance. Therefore all print-outs, test or legitimate stuck sender, should have a trunk number of 0-000.
- 10.15 Refer to Office records for Sender Number (position on sender test connector switch) and location of sender (sender frame and unit number).
- 10.2 Preparation
- 10.21 At the TSCC, insulate contact 7B, relay AS.
- 10.22 Install a temporary lead from 11M, relay TG1 to 9B, relay TD.
- 10.3 Operations
- 10.31 At the Incoming Trunk Test Frame (ITT), operate key AOSS.
- 10.32 At the Originating Sender Test Frame (OST), release key CANCSS.
- 10.33 At the Sender Make Busy Frame (SMB), verify that CTR- keys for subgroup to be tested are in the position to stick the senders (pulled-out).
- 10.34 At the STCC, release key SG0.
- 10.35 At the first sender of Subgroup 0, simulate a stuck sender as follows:

- 10.351 If sender is wire spring, SD-27810-01, when sender is idle;
- Block operated relay MB.
 - Block operated relay ON1.
 - Manually operate relay SS.
 - Observe relay CTR, when CTR operates, immediately remove block from ON1 to prevent a subgroup lockout.
 - Remove block from relay MB.
- 10.352 If sender is flat spring, SD-25012-01, when sender is idle;
- Block operated relay MB.
 - Insulate contacts 7-8T, relay DST.
 - Block normal relay LR and if sender is equipped with Fig. A (Timed Release A & M) block relay TM4 normal and ON2 operated.
 - Block operated relays ON1 and DST.
 - Manually operate relay SS.
 - Observe relay AV1, when AV1 operates immediately remove blocking tools from relays ON1, DST, LR, TM4 and ON2 (if blocked).
 - Remove insulator from relay DST.
 - Remove block from relay MB.
- 10.36 Continue as in Paragraph 10.35 for remaining senders in Subgroup 0. When last sender in subgroup is completed, operate key SGO at the STCC. Verify sequential print out of sender numbers at Printer Circuit.
- 10.37 Release key SG- for next subgroup and continue as in Paragraphs 10.35 and 10.36 until all subgroups have been verified.
- 10.38 After all subgroups have been verified, operate key CANCESS at the OST frame and remove insulator and temporary wire from the TSCC.
- 10.39 If the office is not arranged for ATA, the SSTI, at the discretion of the Operating Company, may be opened to service by releasing key CANCESS at the OST and releasing keys SG- at the STCC. Observe that feature functions properly by verifying legitimate stuck sender printouts.
- 10.4 ATA Operation
- 10.41 Make a thorough lead test from TSCC terminal strips A, B, C and G and STCC terminal strips P3, P21 and PRT to the make contacts of the MDT relays, SA-SD assigned for SSTI.
- 10.42 Verify that the ATA computer is programmed to accept SSTI indications. This is accomplished by originating a status request, mdt:stat! from the MDT keyboard printer. The SSTI should appear in the message received. If SSTI is not contained in the message, the Operating Company should arrange to have the ATA Central activate SSTI for this site.
- 10.43 Release the SSTI make busy by releasing key CANCESS at the OST and setting the PO/MTO switch at the TSCC to its center position. A status change printout is received at the MDT Printer.
- 10.44 Set the Sender No Trunk (SNT) Threshold to immediate. See Handbook 297, Section 306, Paragraph 3.084(d).
- 10.45 Simulate a stuck sender condition. See Paragraph 10.35. The printout at the SSTI printer agrees with MDT printout.
- 10.46 Restore SSTI sender no trunk threshold to normal. See Handbook 297, Section 306, Paragraph 3.087.
- 10.47 The SSTI feature may, at the discretion of the Operating Company, be opened to service. Observe that the feature functions properly by verifying that the SSTI printouts agree with printouts at the ATA terminal.

ATTACHMENTS

Figures 1 and 2 on Page 8.

Manager, Product Engineering
Control Center

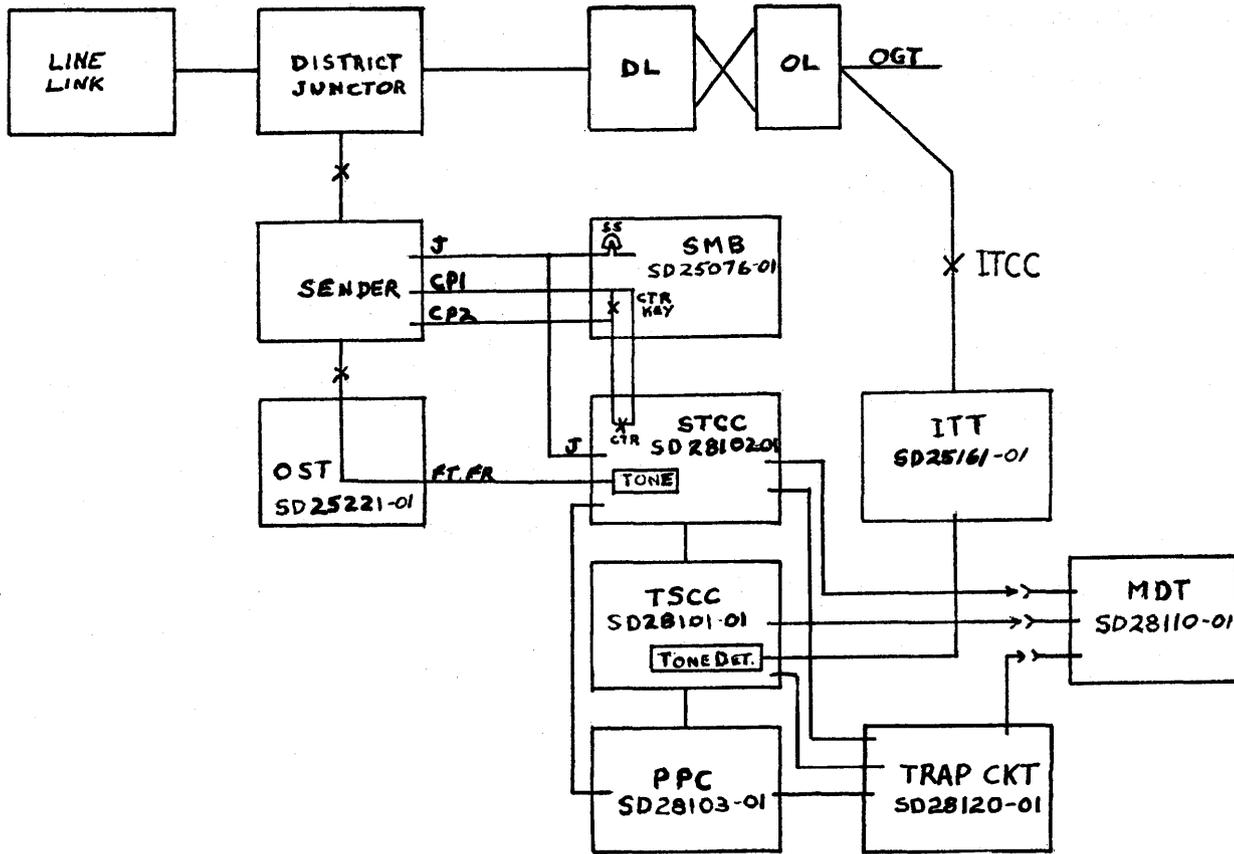
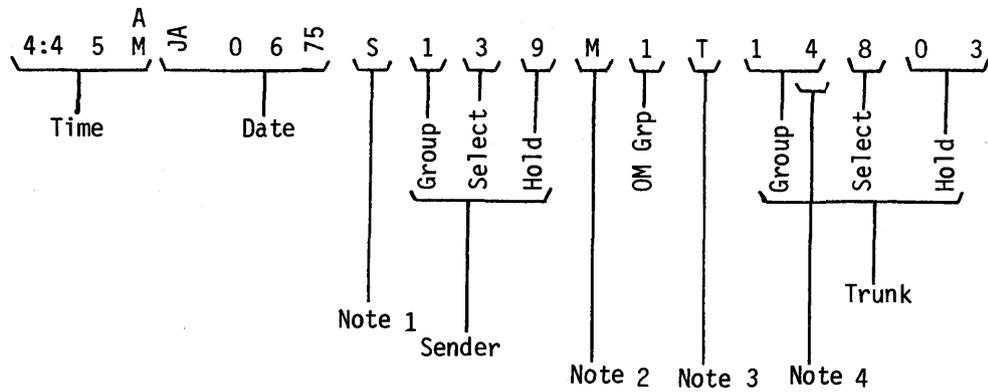


FIGURE 1 - BLOCK DIAGRAM SSI FEATURE



- NOTE 1: S=Stuck Sender; T=Test; U=Unexpected Loss of Stuck Sender
- NOTE 2: M=Originating Marker; G=Detector Test-All Tone Detectors Good; B=Detector Test-At Least 1 Tone Detector Bad
- NOTE 3: T=Trunk; B=ITT Busy; D=Tone Detector Test
- NOTE 4: Detector Test-number of Detector that failed Detector Test

FIGURE 2 - EXAMPLE OF STUCK SENDER PRINTOUT