

NO. 3 ESS  
 SYSTEM VERIFICATION  
 AUTOMATIC LINE INSULATION  
 (ALIT)

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1. GENERAL INFORMATION

1.1 Description

1.11 This section provides a method for automatic testing of line insulation values in No. 3 ESS. The values and the ability of lines to originate are checked by the program ALIT. Line insulation tests are performed only on defined loop-start lines. Line ferrod saturation tests are also performed on defined loop-start lines. The program sequences through all of the terminal equipment numbers (TENS) in the office until all non-busy lines are tested. No test is made on unequipped or unassigned terminals, trunk or service circuit terminals or busy line terminals. The test may be started manually via the local teletypewriter (TTY) or automatically by program (time and tests determined by operating company).

1.2 Sequence

1.21 Refer to Handbook 269, Chart A in Section 1 for the preferred test sequence information.

1.3 References

1.31 The following documents may prove useful during the execution of the tests herein and for troubleshooting:

<u>Document</u>	<u>Description</u>
SD-3H520-01	Line Insulation Test Circuit
PR-ALIT	Line Insulation Test Program
-FB523	
CPS-FB524	Circuit Pack Schematics
-FB525	
PA-3HXXX	Office Data Tables Layout
IM-3H000	Input/Output Manuals
OM	

1.4 Test Requirements

- 1.41 The ALIT program requires full line translations because only those lines which are defined will be tested.
- 1.42 The tests in this section are based on the No. 3 ESS Performance Requirements as specified in BSP 820-650-180.

1.5 Test Records

1.51 The results of the tests in this section shall be recorded on forms SD-97-1313 and SD-97-1315. Detailed information for completing the record forms appears in Handbook 3, Section 6B.

2. TEST EQUIPMENT

2.1 Test Sets

2.11 The following test set is required to perform the tests in this section:

<u>Amt.</u>	<u>ITE No.</u>	<u>Description</u>	<u>With ITE No.</u>
1	5001	ALIT Resistor Test Set	5653

2.2 Accessories

2.21 The following accessories may be required:

<u>Amt.</u>	<u>ITE No.</u>	<u>Description</u>	<u>With ITE No.</u>
6	9116	6' Cord	5653
8	9140,L-1	12" Clip Lead	5653

3. TEST PROCEDURES

3.1 Refer to the Input Message Manual for a detailed explanation of each message used in this section.

3.2 Perform each step in Table 1 in the indicated sequence. Where an output message is indicated, the required response should be looked up in the Output Message Manual to verify that the constants in the variable field(s) are correct for the message typed in. Any troubles should be cleared before proceeding to the next step.

3.3 Table 5 contains a tabulation of the three test ranges of the No. 3 ESS LIT circuit as well as the corresponding test limits for the three test ranges. The LIT circuit only checks for resistance within the test limits.

TABLE I  
TEST PROCEDURES

STEP	PROCEDURE OR TYPE-IN	SYSTEM RESPONSE	REMARKS
<b>PREPARATIONS:</b>			
<p>The SRG, TRG and FEMF tests will require a total of 16 lines, which the installer must select. These lines or combinations of lines will be used in Tables II - IV. Of these, one must be a ground start line, 5 must be loop start test lines, and the remaining 10 loop start (customer) lines.</p> <p>Record the directory numbers and associated terminal equipment number (TEN) information selected from the Translation Data Input Forms ESS 3100 and 3105 in Tables II - IV. Note that some lines will be used more than once.</p>			
<b>GENERAL TEST</b>			
1	In order to interpret the test results of the general test, the daily line insulation test parameters for the LIT circuit must be determined. Refer to Telephone Company information to find the test and range to be run in the default case (no TEN specified in the input message).		
2	TST:LINE!	tt TST LINE START tt TST LINE a bcde TN f g COMPL  where a bcde = last TEN tested	The output format is:  tt TST LINE a bcde TN f g ERR h  where: a bcde = terminal equipment number f = telephone number g = severity (1,3 or 7) within test range specified on input h = failing test
<b>SHORT CIRCUIT AND RING TO GROUND (SRG) TEST</b>			
1	Connect the indicated resistors in Table II onto each line's T & R leads on the CDF. In Table II the columns under 80K, 320K, and 2.56M contain the expect severity numbers (i.e., "g" in the output message) for the "range" specified in the input message. Column 2.56M can be used for troubleshooting, if needed.		Make sure that the resistors make good contact with the pins on the CDF.

TABLE I (Cont.)

STEP	PROCEDURE OR TYPE-IN	SYSTEM RESPONSE	REMARKS
2	For each TEN being used: a) Type: TST:LINE a bcde l 80K! where: a bcde = TEN b) Verify the severity number (g) in the error printout using Table II (column 80K).	tt TST LINE START tt TST LINE a bcde TN f g ERR 0 tt TST LINE a bcde TN f g COMPL	
3	For each TEN being used: a) Type: TST:LINE a bcde l 320K! where: a bcde = TEN b) Verify the severity number (g) in the error printout using Table II (column 320K).	tt TST LINE START tt TST LINE a bcde TN f g ERR 0 tt TST LINE a bcde TN f g COMPL	
TIP AND RING TO GROUND (TRG) TEST			
1	Connect the indicated test resistors in Table III onto each line's T & R leads on the CDF and disconnect any unused resistors from the SRG tests.		
2	For each TEN being used: a) Type: TST:LINE a bcde 2 2.56M! where: a bcde = TEN b) Verify the severity number (g) in the error printout using Table III (column 2.56M).	tt TST LINE START tt TST LINE a bcde TN f g ERR 1 tt TST LINE a bcde TN f g COMPL	Columns 80K and 320K can be used for trouble-shooting if necessary.
FOREIGN ELECTROMOTIVE FORCE (FEMF) TESTS			
1	Connect the indicated resistors in Table IV onto each line's T & R leads on the CDF and disconnect any unused resistors from the TRG tests.		
2	For each TEN being used: a) Type: TST:LINE a bcde 4 320K! where: a bcde = TEN b) Verify the severity number (g) in the error printout using Table IV (column 320K).	tt TST LINE START tt TST LINE a bcde TN f g ERR 2 tt TST LINE a bcde TN f g COMPL	
3	Remove all test resistors and clip leads from the CDF.		

TABLE II  
SRG TEST LOCATIONS

L I N E S	DIRECTORY NUMBER	TEN					RESISTOR VALUE	RESISTOR TEST LOCATION	EXPECTED FAILURE & SEVERITY NO.		
		NET (1-15)	CON (0-1)	SW GRP (0-2)	SW (0-7)	LEV (0-7)			RANGE SPECIFIED ON INPUT		
		80K	320K	2.56M							
GS							470K	R to G			
TL1							10K	R to G	7	7	7
TL2							30K	R to G	3	7	7
TL3							62K	R to G	1	7	7
TL4							120K	R to G		3	7
TL5							240K	R to G		1	7
1							470K	R to G			7
2							910K	R to G			3
3							1.8M	R to G			1
4							3.0M	R to G			
5							10K	T to G			
6							62K	T to G			
7							120K	T to G			
8							470K	Toto G			
9							30K	T to R	3	7	7
10							62K	T to G	1	7	7

CODE FOR TABLES II-IV:

GS - Ground Start  
TLn - Test Line n  
G - Ground  
R - Ring  
T - Tip

1 - Failed at approximate range  
3 - Failed at approximately 1/2 range  
7 - Failed at approximately 1/4 range

TABLE III  
TRG TEST LOCATIONS

L I N E S	DIRECTORY NUMBER	TEN					RESISTOR VALUE	RESISTOR TEST LOCATION	EXPECTED FAILURE & SEVERITY NO.		
		NET (1-15)	CON (0-1)	SW GRP (0-2)	SW (0-7)	LEV (0-7)			RANGE SPECIFIED ON INPUT		
									80K	320K	2.56M
GS*							470K	R to G			
TL4*							120K	R to G		3	7
TL5*							240K	R to G		1	7
1*							470K	R to G			7
2*							910K	R to G			3
3*							1.8M	R to G			1
4*							3.0M	R to G			
6*							62K	T to G	1	7	7
7*							120K	T to G		3	7
8*							470K	T to G			7
10*							62K	T to R			

\* Information same as Table II, only Failure pattern changes.

TABLE IV  
FEMF TEST LOCATIONS

L I N E S	DIRECTORY NUMBER	TEN					RESISTOR VALUE	RESISTOR TEST LOCATION	EXPECTED FAILURE & SEVERITY NO.		
		NET (1-15)	CON (0-1)	SW GRP (0-2)	SW (0-7)	LEV (0-7)			RANGE SPECIFIED ON INPUT		
									80K	320K	2.56M
GS*							470K	R to G			
TL3#							62K	R to -48V	1	7	7
TL4#							120K	R to -48V		3	7
TL5#							240K	R to -48V		1	7
5*							10K	T to G			
9#							30K	T to -48V	3	7	7
10#							62K	T to -48V	1	7	7

\* Same as Table II.

# Same information, but location changes.

TABLE V  
RANGE GROUPS

GROUP OF RANGES	RANGE	TEST LIMITS*( $\Omega$ )
LOW	1	0-80K
MEDIUM	2	0-320K
HIGH	3	0-2.56M

\* Values outside of the limits are not considered failures