

JUL 12 1979

**PRELIMINARY**

NO. 10A REMOTE SWITCHING SYSTEM (RSS)  
REMOTE TERMINAL (RT)  
FUNCTIONAL TESTING  
AUTOMATIC LINE INSULATION TEST (ALIT) CIRCUIT  
(Part of FE-116, Power Alarm (PA), Circuit Pack)  
WITH A NO. 1 ESS HOST OFFICE

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1. GENERAL INFORMATION

1.1 Description

1.11 This section provides a method of testing the RSS RT Automatic Line Insulation Test (ALIT) Circuit. The ALIT circuit conducts insulation and foreign voltage checks of outside plant loop line facilities. This function is conducted automatically on a periodic basis or as requested by the operator.

1.12 Checks of the ALIT circuit consist of 1) requesting the ALIT circuit to run checks on those lines presently defined at the RT at the time the test is conducted, and 2) requesting checks of specifically designated lines on which known resistance values have been inserted.

1.13 ALIT conducts the following checks:

- a. The ability of the line to originate and restore
- b. Short Circuit and Ring to Ground (TRG) Insulation Range
- c. Tip and Ring to Ground (TRG) Insulation Range
- d. Foreign Potential (FEMF) on Tip and Ring
- e. Contactor - Short Circuit at 640K Range

1.2 Sequence

1.21 Refer to Handbook 308, Section 1.1 for an overall sequence of KSS RT testing.

1.22 A self check of the RSS ALIT circuit (part of FE-116 CP) is not performed prior to a sequential ALIT test. An ALIT diagnostic is provided for routine and demand testing of the ALIT circuit. The ALIT diagnostic should have been conducted during the Section 510 series of testing.

1.3 References

1.31 The following documents will be useful as references:

<u>Document</u>	<u>Title</u>
CD FE-116	Power and Alarm (PA) Board Circuit Description
SD FE-116	Power and Alarm (PA) Board Schematic Drawing
CD FE-105	Universal Service Circuit (USC) Circuit Description
SD FE-105	Universal Service Circuit (USC) Schematic Drawing
IM-1A001	No. 1 ESS 2-Wire Input Message Manual
OM-1A001	No. 1 ESS 2-Wire Output Message Manual
PR-1A041-03	No. 1 ESS Host Office ALIT Programs
PR-1A628	Remote Line Insulation Test Program
BSP 231-090-052	Feature Document, ALIT Failures
PA-591003	Translations Output Configurations

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**PRELIMINARY****2. TEST RECORDS AND TEST REQUIREMENTS**

2.1 Test Records - This section's test records should be recorded on Forms SD-97-1313 and SD-97-1315. Handbook 3, Section 6B may be referenced for detailed information on test record completion.

2.2 Test Requirements - This section's testing is intended to satisfy BSP Performance Requirements, BSP 820-760-002, No. 10A RSS RT General Equipment Requirements, Electronic Switching Systems.

**3. TEST EQUIPMENT****3.1 Test Sets**

3.11 The following test set will be required to perform the assigned tests:

<u>ITE</u>	<u>Description</u>
5001	ALIT Resistor Test Set

**3.2 Accessories**

3.21 The following accessories may be used:

<u>ITE</u>	<u>Description</u>
9116	6' Cords; one end Pin Jack, other end Alligator Clip
9140,L-1	12" Clip leads, Alligator Clip

**4. TEST PROCEDURES****4.1 Test Description**

4.11 The ALIT function performs four basic tests as follows:

- a. Tip to Ring Short and Ring to Ground (SRG): This test is used to detect insulation leaks between the tip and ring, and leaks between ring and ground. This test is depicted in Figure 1.
- b. Tip and Ring to Ground (TRG): This test is used to detect insulation leaks between tip and ground, and leaks between ring and ground. This test is depicted in Figure 2.
- c. Foreign Potential (FEMF) on Tip or Ring: This test is used to detect insulation leaks between tip and ring and battery. This test is depicted in Figure 3.

- d. Tow Cable Pressure Contactors: Certain designated tip/ring pair or pairs have switched resistance activated by reduced cable pressure. The resistance is of a high enough value so as not to degrade circuit functions but is still detectable by the ALIT circuit.

4.12 The TTY input message requesting an ALIT test may request any one of the four basic tests or a general test. The general test includes the SRG, TRG and FEMF tests. The initial test (refer to Figures 1, 2, and 3) is designed to detect insulation failures on tip and ring together while the retest, conducted on the ring lead only, provide resolution of where the breakdown is.

4.13 The "Group Range" specified in translations must be obtained before testing may commence. This value has an effect on failure severity so one of three sets of tables must be used, both to select the "Test Combinations" and to indicate test failure severity. This is indicated in greater detail in Table 2. The "Group Range" permits the TelCo to specify one particular resistance range of the three selectable (low, medium or high) in accordance with the general condition of their outside plant which is dependent upon age, environment, type and other conditions which have an impact upon insulation values. If the outside plant is very old, buried in soil with poor drainage, or the cables are not pressurized, the TelCo may elect to select the "low" group range option. If the opposite is true, the "high" group range may be selected. The real result of group range selections is one of test failure severity on all tests.

4.14 The "Sub-Group Range" specifies one of four ranges (A, B, C, and D) within a group range. Insulation values detected below the range of the "Sub-Group Range" selected will have an associated trouble printout. This is of most value on the general test where checks are made on designated groups of lines with the starting line being associated with its directory number or equipment identification. Thus, if only those lines with the lowest values of insulation resistance are desired to be indicated, sub-group range "A" is used. The selection of higher sub-group ranges (B to C to D) should include more and more lines with "failures" within the sub-group range selected.

4.15 General tests are conducted first. During the general tests, one selected loop start line is made to fail as a rough verification that the ALIT function cycled as requested.

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4.16 Specific tests are then conducted (in accordance with the Test Combinations indicated in Tables 3 to 11) and known values of resistance are hung on the selected line. The ALIT function is then checked to verify that it properly detected the "insulation leakage". Also a check is made to verify that the ALIT function can detect foreign voltages on the tip and ring.

## 4.2 Test Preparation

4.21 The Host Office ALIT Circuit must be "available" when conducting RSS RT ALIT tests. The Host office ALIT program is designed to operate the host and RT ALIT circuits in parallel when doing RT ALIT testing. Whereas, the host

office ALIT will not be actually conducting any real tests of host office terminated lines, it must still be in a state "agreeable" to the Host Office ALIT program.

## 4.3 Conduct Table 1 Test Procedures

4.31 The basic test procedures for this section are presented in Table 1. Table 1 references Tables 3 to 11 for specific Test Combinations (TCs). Table 2 indicates which of the Tables 3 to 11 are used, depending upon one of three resistance "Group Ranges" which are specified for your RT. Tables 12 to 16 present the general form of 5 Host Office TTY input/output messages pertinent to these test procedures.

TABLE 1  
ALIT TEST PROCEDURES

PN	OPERATOR ACTION	SYSTEM RESPONSE	REMARKS
1	VFY-CSTG-62 bbbb.	TR92 a a b c d e	<ol style="list-style-type: none"> <li>1. Refer to Tables 14 and 16 for the general form of these messages.</li> <li>2. The field "e" of the output message contains the RT "Group Range".</li> <li>3. All reference to Tables 3 to 11 will now be via that Group Range obtained in this output message. Refer to Table 2.</li> </ol>
2	Clip lead a 30K resistor on any selected Module 0, and if available, Module 1 loop start (LS) line(s).		<ol style="list-style-type: none"> <li>1. It is suggested that all clip lead resistors for PN-2 and following be conducted at the distributing frame.</li> </ol>
3	ALT START R G D 000 0000 ****.	AL01 START ALL D d e ffff 000 00 00 hhh hhhh AL01 FAIL SRG 0 d e ffff ggg gg gg hhh hhhh AL01 END ALL D d e ffff	<ol style="list-style-type: none"> <li>1. Refer to Tables 12 and 15.</li> <li>2. ggg gg gg of the AL01 FAIL message indicates the line which failed. Other failures (real insulation problems) in addition to that expected from the clip lead of PN-2 may be found. These are not "test failures", but do indicate problems in cabling from the RSS RT to the distributing frame and should be repaired. A failure from the clip lead resistor of PN-2 should be printed out; if not, this indicates a failure of the ALIT function and should be repaired.</li> </ol>

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TABLE 1 (Cont.)

PN	OPERATOR ACTION	SYSTEM RESPONSE	REMARKS
3 (Cont.)			3. Two failures should be obtained if Module 1 is present.
4	Remove clip leaded resistor(s) of PN-2.		
5	ALT START R G D 000 0000 ****.	AL01 START ALL D d e ffff EEE EE EE hhh hhhh	
6	Before the "END" TTY output message of PH-5 is received:  ALT START T S D ddd ddd ****.	AL01 START SRG D d e ffff EEE EE EE hhh hhhh  AL01 PASS SRG D d e ffff EEE EE EE hhh hhhh  AL01 END SRG D d e ffff EEE EE EE hhh hhhh  AL01 END ALL D d e ffff	1. The AL01 START SRG message should be received before the "END" message of PN-5. In other words, the ALIT function should honor the TTY input message of PN-6 and conduct the request. Also, it should continue on with the request of PH-5 after that of PH-6 has been completed.
7	Set up the initial Test Combinations (TC) indicated in Table 3, 4, or 5.		1. Refer to Table 2.
8	ALT START T S A ddd dddd ****.	AL01 START SRG A d e ffff EEE EE EE hhh hhhh  AL01 NTST SRG A O e ffff EEE EE EE hhh hhhh  AL01 END SRG A d e ffff	
9	Set up the record TC indicated in Table 3, 4 or 5.		
10	ALT START T S C ddd dddd ****.	AL01 START SRG c d e ffff EEE EE EE hhh hhhh  AL01 FAIL SRG c d e ffff EEE EE EE hhh hhhh  AL01 END SRG c d e ffff	

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TABLE 1 (Cont.)

PN	OPERATOR ACTION	SYSTEM RESPONSE	REMARKS
11	Repeat PN-9 and PH-10 for each TC of Table 3, 4 or 5.  <u>NOTE:</u> These procedures <u>MUST</u> be conducted for both Module 0 <u>and</u> Module 1, if available.		
12	Set up the initial TC indicated in Table 6, 7 <u>or</u> 8.		
13	ALT START T T A ddd dddd ****.	AL01 START TRG A d e ffff EEE EE EE hhh hhhh  AL01 NTST TRG A O e ffff EEE EE EE hhh hhhh  AL01 END TRG A d e ffff	
14	Set up the second TC indicated in Table 6, 7 <u>or</u> 8.		
15	ALT START T T C ddd dddd ****.	AL01 START TRG c d e ffff EEE EE EE hhh hhhh  AL01 FAIL TRG c d e ffff EEE EE EE hhh hhhh  AL01 END TRG c d e ffff	
16	Repeat PH-14 and PH-15 for each TC of Table 6, 7 <u>or</u> 8.  <u>NOTE:</u> These procedures <u>MUST</u> be conducted for both Module 0 <u>and</u> Module 1 if available.		
<b>FEMF TESTING (TABLES 9, 10 <u>OR</u> 11)</b>			
17	Set up for the first TC indicated in Table 9, 10 <u>or</u> 11.		

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TABLE 1 (Cont.)

PN	OPERATOR ACTION	SYSTEM RESPONSE	REMARKS
18	ALT START T T A ddd dddd ****.	AL01 START FEF c d e ffff EE EE EE hhh hhhh  AL01 FAIL FEF c d e ffff EE EE EE hhh hhhh  AL01 END FEF C d e ffff	
19	Repeat PN-17 and PH-18 for each TC of Table 9, 10 or 11.  <u>NOTE:</u> These procedures must be conducted for both Module 0 and Module 1 if available.		
20	Remove and test resistors and clip leads from the distributing frame.		

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TABLE 2

## ALIT GROUP AND SUB-GROUP RANGES WITH ASSOCIATED ALIT TEST LIMITS

GROUP RANGE (1)	SUB-GROUP RANGE,	ALIT TEST LIMITS (OHMS)
LOW	A	0 - 80K
	B	0 - 169K
	C	0 - 640K
	D	0 - 2.5M
MEDIUM	A	0 - 80K
	B	0 - 320K
	C	0 - 1.25M
	D	0 - 5M
HIGH	A	0 - 320K
	B	0 - 1.25M
	C	0 - 2.5M
	D	0 - 5M

NOTES:

- The group range is set in translations (the RSS RT Common block of translations) and must be retrieved to select the proper subsequent sets of tables from which to conduct testing procedures.as follows:

LOW - Tables 3, 6 and 9

MEDIUM - Tables 4, 7 and 10

HIGH - Tables 5, 8 and 11

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TABLE 3

TIP TO RING SHORT AND RING TO GROUND (SRG)  
RESISTANCE TEST OF ALIT CIRCUIT  
WITH "LOW" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)			
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D
1	GS		0/1				--	--	*/NT			
2	LS		0/1				30K	R/G	*/1,1	*/0,0	*/0,0	
3	LS		0/1				120K	R/G	*/P	*/2,2	*/0,0	
4	LS		0/1				470K	R/G		*/P	*/2,2	*/0,0
5	LS		0/1				30K	T/G	*/P			
6	LS		0/1				30K	T/R	*/1,3			
7	LS		0/1				30K	T/R	*/0,2			
7	--		--				62K	R/G				
8	LS		0/1					T/R				
8	--		--					R/G				
8	--		--					T/G				

## TABLE 3 CONVENTIONS:

1. Table 3 "table conventions" may not be defined (if used) in subsequent tables of this section.
2. "DIRECTORY NUMBER" Column - This column is listed in this section's tables for tester convenience and could be used to list Directory Number (DN)/"other test combination" parameters if desired.
3. "CON, SE, LEV" Column - This column is listed in this section's tables for tester convenience and could be used to list CON (Concentrator), SW (Switch), LEV (Level)/"other test combination" parameters if desired.
4. Table 3 ACRONYMS:

TC - Test Combination  
 LT - Line Type  
 MOD - Module  
 CON - Concentrator  
 SW - Switch  
 LEV - Level  
 RVC - Resistor Value  
 LOC - Location  
 R - Ring  
 G - Ground  
 T - Tip  
 EQL - Equipment Location  
 RS - Resistor

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TABLE 3 (Cont.)

## TABLE 3 CONVENTIONS: (Cont.)

## 5. CTI/A, B, C, D Columns

## \*/NT is:

\*: Request or conduct a test on this TC (Test Combination) indicated by this line.

NT: The system should not conduct requested test on GS (Ground Start) lines and an appropriate TTY message should be received.

## \*/P is:

\*: as in \*/NT previous

P: This TC is expected to "Pass" (P).

## \*/d1, d2 is:

\*: as in \*/NT previous

d1: Initial test failed at specified range as follows:

0 - 1/4 range  
1 - 1/2 range  
2 - at specified range

d2: Retest results as follows:

0 - failed at 1/4 range  
1 - failed at 1/2 range  
2 - failed at specified range  
4 - passed

## 6. BS LOC - The resistor with the appropriate resistance value is placed or connected between those points indicated (as shown in following examples):

T/G: connect resistor between tip and ground.

R/-48: connect resistor between ring and -48 volts.

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TABLE 4

TIP TO RING SHORT AND RING TO GROUND (SRG)  
RESISTANCE TEST OF ALIT CIRCUIT  
WITH "MEDIUM" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)				
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D	
1	GS		0/1				--	--	* /NT				
2	LS		0/1				30K	R/G	* /1,1	* /0,0	* /0,0		
3	LS		0/1				120K	R/G	* /P	* /1,1	* /0,0		
4	LS		0/1				470K	R/G		* /P	* /1,1	* /0,0	
5	LS		0/1				30K	T/G	* /P				
6	LS		0/1				30K	T/R	* /1,3				
7	LS		0/1				30K	T/R	* /0,2				
7	--		--				82K	R/G					
8	LS		0/1					T/R					
8	--		--					R/G					
8	--		--					T/G					

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TABLE 5

TIP TO RING SHORT AND RING TO GROUND (SRG)  
 RESISTANCE TEST OF ALIT CIRCUIT  
 WITH "HIGH" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)			
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D
1	GS		0/1				--	--	*/NT			
2	LS		0/1				30K	R/G	*/0,0			
3	LS		0/1				120K	R/G	*/1,1	*/0,0		
4	LS		0/1				470K	R/G	*/P	*/1,1	*/0,0	
5	LS		0/1				30K	T/G	*/P			
6	LS		0/1				30K	T/R	*/0,3			
7	LS		0/1				30K	T/R				
7	--		--				62K	R/G				
8	LS		0/1					T/R				
8	--		--					R/G				
8	--		--					T/G				

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TABLE 6

TIP AND RING TO GROUND (TRG)  
RESISTANCE TEST OF ALIT CIRCUIT  
WITH "LOW" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)				
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D	
1	GS		0/1				--	--	*NT				
2	LS		0/1				30K	R/G	*1,1	*0,0			
3	LS		0/1				120K	R/G	*P	*2,2	*0,0		
4	LS		0/1				470K	R/G		*P	*2,2	*0,0	
5	LS		0/1				30K	T/G	*1,3				
6	LS		0/1				30K	T/R	*P				
7	LS		0/1				30K	T/R					
7	--		--					R/G					
8	LS		0/1										
8	--		--										
8	--		--										

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TABLE 7

TIP AND RING TO GROUND (TRG)  
 RESISTANCE TEST OF ALIT CIRCUIT  
 WITH "MEDIUM" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)				
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D	
1	GS		0/1				--	--	*/NT				
2	LS		0/1				30K	R/G	*/1,1		*/0,0		
3	LS		0/1				120K	R/G	*/P		*/1,1    */0,0		
4	LS		0/1				470K	R/G		*/P		*/1,1    */0,0	
5	LS		0/1				30K	T/G	*/1,3				
6	LS		0/1				30K	T/R	*/P				
7	LS		0/1				30K	T/R					
7	--		--					R/G					
8	LS		0/1										
8	--		--										
8	--		--										

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TABLE 8

TIP AND RING TO GROUND (TRG)  
RESISTANCE TEST OF ALIT CIRCUIT  
WITH "HIGH" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)			
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D
1	GS		0/1				--	--	*/NT			
2	LS		0/1				30K	R/G	*/0,0			
3	LS		0/1				120K	R/G	*/1,1	*/0,0		
4	LS		0/1				470K	R/G	*/P	*/1,1	*/0,0	
5	LS		0/1				30K	T/G	*/0,3			
6	LS		0/1				30K	T/R	*/P			
7	LS		0/1				30K	T/R				
7	--		--					R/G				
8	LS		0/1									
8	--		--									
8	--		--									

TABLE 9

FOREIGN ELECTROMOTIVE FORCE (FEMF)  
APPLIED VOLTAGE TEST OF ALIT CIRCUIT  
WITH "LOW" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)			
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D
1	LS		0/1				30K	R/-48				
2	LS		0/1				930K	R/-48				
3	LS		0/1				30K	T/-48				
4	LS		0/1				930K	T/-48				
5	LS		0/1				120K	R/-48				
5	--		--				470K	T/-48				

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TABLE 10

FOREIGN ELECTROMOTIVE FORCE (FEMP)  
APPLIED VOLTAGE TEST OF ALIT CIRCUIT  
WITH "MEDIUM" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)			
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D
1	LS		0/1				30K	R/-48				
2	LS		0/1				930K	R/-48				
3	LS		0/1				30K	T/-48				
4	LS		0/1				930K	T/-48				
5	LS		0/1				120K	R/-48				
5	--		--				470K	T/-48				

TABLE 11

FOREIGN ELECTROMOTIVE FORCE (FEMP)  
APPLIED VOLTAGE TEST OF ALIT CIRCUIT  
WITH "HIGH" GROUP RANGE SET IN TRANSLATIONS

TC	LT	DIRECTORY NUMBER	MDD	EQL			TEST RV	RS LOC	CONDUCT TEST INDICATOR (CTI)/ EXPECTED FAILURE SEVERITY PER SUB-GROUP RANGE (A,B,C,D)			
				CON	SW	LEV			CTI/A	CTI/B	CTI/C	CTI/D
1	LS		0/1				30K	R/-48				
2	LS		0/1				930K	R/-48				
3	LS		0/1				30K	T/-48				
4	LS		0/1				930K	T/-48				
5	LS		0/1				120K	R/-48				
5	--		--				470K	T/-48				

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TABLE 12

## ALT-START

1. INPUT MESSAGE FORMAT

ALT-START-a b c ddd dddd dddd.

2. EXPLANATION OF MESSAGE

This message is used to start automatic line insulation (ALIT) tests at a specified directory number, LREN, or LEN; or to test a single directory number, LREN, or LEN. The test results are printed on the teletypewriter. If the request is for a sequential test, the plant service center TTY will always receive a copy. Fields a, b, and c are not entirely independent. See allowable combinations in Note 2.

a = Control action code:

- = S - Start sequential directory number (DN) testing at the DN specified by ddddddd\*\*\*\*.
- = P - Start sequential private branch exchange (PBX) DN testing at the PBX DN specified by ddd dddd dddd.
- = A - Start sequential automatic call distribution (ACD) DN testing at the ACD DN specified by ddddddd\*\*\*\*.
- = D - Test the single DN or PBX DN specified by dddddddddd/dddddd\*\*\*\*.
- = L - Test the single line equipment number (LEN) specified by ddddddd\*\*\*\*. (In offices involved in a cutover, this request must not be used if the specified LEN is marked as pre-cut inactive or post-cut inactive. It will result in the cutoffs being closed.)
- = X - Start sequential LEN testing at the LEN specified by ddddddd\*\*\*\*.
- = T - Test the single remote line equipment number (LREN) specified by ddddddd\*\*\*\*.
- = R - Start sequential LREN testing at the LREN specified by ddddddd\*\*\*\*. (That is, test the specified LREN and all higher LRENS in the specified RSS (first two digits of LREN).

b = Type of test:

- = S - Short circuit and ring around test
  - = T - Tip and ring ground test
  - = F - Foreign potential tip and ring test (PX on RSS line)
  - = G - General test (all of the above)
  - = C - Contactor test
- c = Letter (A through D) used to specify one of four resistance ranges within a group of ranges. One of three groups (high, medium, or low) is selected by the cross-connect strapping on the line insulation test circuit. For Remote Switching System (RSS) offices, the RI ALIT field in the RSS common block specifies the high, medium or low resistance group.
- = E (If field b = C)

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3. SYSTEM RESPONSES

FF - Followed by an ALO1 output message.

NG - Issued if an invalid letter combination is entered; if an incorrect number of digits is specified for a given control action; or if a DN does not result in an intraoffice DN when converted from BCD to binary.

NO - Issued if a test is in progress and another test has already been queued; or if a sequential test is requested while another sequential test is in progress.

NOTES: 1. Example of input required to perform the tip and ring ground (TRG) test on DN 682-2973, using the 0 to 25MEG resistance range; range c, assuming the office is provided for the high option.

ALT-START-DTC6822973\*\*\*\*.

2. Allowable Combination

Field a	Field b	Field c
S,P,A,D,L,X,T,R	STGF	ABCD
	C	E

ddd dddd dddd - An 11-digit field used to specify a DN, a PBX DN plus X number, LEN or LREN. The digits entered must be left-adjusted in the field and unused positions must be filled with asterisks. The field is interpreted in one of the following four ways:

- 123456\*\*\*\* - 7-digit DN followed by four asterisks used with a = S, A, or D.
- 12345678\*\*\* - 8-digit LEN followed by three asterisks used with a = L or X.
- 12345671234 - 7-digit DN followed by 4-digit extension number used with a = D or P.
- 1234567\*\*\*\* - 7-digit LREN followed by four asterisks used with a = R or T.

**PRELIMINARY**

**PRELIMINARY**

## TABLE 13

## ALT-TEST

1. INPUT MESSAGE FORMAT

ALT-TEST-a b c.

2. EXPLANATION OF MESSAGE

This message is used to start or stop sequential automatic line insulation (ALIT) tests. It can also be used to modify the type of test performed by the routine scheduled ALIT test.

To test a single line or start sequential testing at a specified line use the ALT-START input message.

a = Control action code:

- = S - Start sequential testing at the lowest directory number. (Includes PBX and ACD lines, but not ground start lines in general)
- = P - Start sequential testing at the lowest PBX directory number.
- = A - Start sequential (ACD) tests at lowest ACD directory number.
- = C - Test list of contactors. (If C is specified, variables b and c must be C and E, respectively, that is, those LENS and LRENS listed in the unit type 48 member number 0 auxiliary block).
- = M - Modify test type and range information as specified by b and c variables. This information is used by subsequent clock starts. The ALIT program will be started by the system clock according to the schedule set by input message TC-TIME. Modifying the test parameters will not affect the series of tests already in progress.
- = E - End any sequential testing in progress. (If entered, b and c are disregarded).

b = Type of test:

- = S - Short circuit and ring ground test.
- = T - Tip and ring ground test.
- = F - Foreign potential tip and ring test.
- = G - General test (all of the above).
- = C - Contactor test.

c = Letter (A through E) used to specify one of four resistance ranges within a group of ranges, or the contactor test range.

3. SYSTEM RESPONSES

PF - Followed by an ALO1 output message.

OK - Response to a request to change the type and range information used by the clock start (a=M).

NO - Issued if the ALIT program is testing sequentially when the TTY request is entered (except a=M), or if no sequential testing is being done when an (a=E) TTY request is entered.

NG - Issued if an invalid letter combination is entered on the TTY.

**PRELIMINARY**

# PRELIMINARY

TABLE 13 (Cont.)

NOTES: 1. Cross-Connect Group Specified Resistance Ranges

	<u>High</u>	<u>Medium</u>	<u>Low</u>
A =	0 - 320K	0 - 80,000	0 - 80,000
B =	0 - 1.25 MEG	0 - 320K	0 - 160K
C =	0 - 2.5 MEG	0 - 1.25 MEG	0 - 640K
D =	0 - 5 MEG	0 - 5 MEG	0 - 2.5 MEG
E =	0 - 640K (always used for testing contactors)		

2. Allowable Combinations Table

Field a	Field b	Field c
S,P,A,M,C	S,T,G,F	A,B,C,D
	C	E
E	dc	dc

**PRELIMINARY**

**PRELIMINARY**

## TABLE 14

## VFY-CSTG

1. INPUT MESSAGE FORMAT

VFY-CSTG-aa bbbb.

2. EXPLANATION OF MESSAGE

This message is used to obtain information pertaining to a specified centrex group, a specified multiline hunt group, the hunt and outdial lists of a multiline group, or a remote switching system (RSS).

aa = Type of list for which information is desired:

- = 34 - The common block for the multiline hunt group.
- = 35 - The common block for the centrex group.
- = 36 - The hunt and outdial lists of the multiline hunt group.
- = 39 - The outdial list of the multiline hunt group.
- = 60 - The preferential hunt list for each terminal of the multiline hunt group.
- = 62 - The common block for the Remote Switching System (RSS).

bbbb = The number of the group (i.e., the centrex number, the multiline hunt group number, or the RSS number).

3. SYSTEM RESPONSES

OK - Followed by one or more of the following:

- A TR09 message if the input is invalid.
- A TR15 message with the common block for the multiline hunt group.
- A TR16 message with the hunt and outdial information for the multiline hunt group.
- A TR17 message with the common block for the centrex group.
- A TR39 message with the preferential hunt list for each terminal in the multiline hunt group.
- A TR46 message with the Centrex supplementary translator data.
- A TR92 with the common block for the remote switching system.

**PRELIMINARY**

**PRELIMINARY**

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TABLE 15

AL01

1. INPUT MESSAGE FORMAT

AL01 aaaaa bbb c d e ffff-gggggggg hhhhhh iiii

2. EXPLANATION OF MESSAGE

This message occurs for one of the following reasons:

1. The ALIT program has started or stopped sequential testing due to either a TTY or a system entry.
2. The specified LEN, LREN, or DN has passed or failed the indicated test.
3. An ALIT test could not continue due to the indicated trouble.

3. EXPLANATION OF VARIABLE FIELD

- aaaaa = START - ALIT testing has started at the LEN, LREN, or DN specified.
- = END - ALIT testing has stopped; the LEN, LREN, or DN specified was the last tested.
  - = FAIL - The ALIT test has failed on the line specified in the LEN or LREN field. (bbb = AIC, TRG, SRG, POX, FEF or CON. The DN will also be printed if available. A DN will not be printed if the ALO1 occurred because of a self-check failure, a request to test a line specified by its LEN, or a request to test the list of contactors.) A failure occurred in attempting to use the test circuit (bbb = ROB, POB, or SCK).
  - = PASS - The ALIT test has passed on the line specified in the LEN or LREN field. (The DN will also be printed if available.)
  - = NTST - The specified LEN, LREN, or DN could not be tested for the reason indicated in field d.
  - = ABORT - NMFL was unable to perform a demand test and has determined the ALIT program is hung up. The cleanup routine has been called (bbb = IDL).
  - = ALIT - The ALIT circuit is unavailable (bbb = UAV).
  - = RLIT - The remote line test circuit in the RSS is out of service, or is currently being used by the Local Test Desk or the duplicate PUC data link failure (bbb = UAV).
- bbb = AIC - Possible failure of the agent interface circuit (line applique for the ACD agent line just tested).
- = TRG - The current test type is the tip and ring ground test.
  - = POX - The current test type is the power cross test at the RSS.
  - = SRG - The current test type is the short circuit and ring ground test.
  - = FEF - The current test type is the foreign potential tip and ring test.
  - = ALL - The current test type is the general test (all possible tests).
  - = CON - The current test is for contactors (test type is SRG).
  - = ROB - An ALIT test could not continue because of a ROB failure.

**PRELIMINARY**

**PRELIMINARY**

TABLE 15 (Cont.)

- POB - An ALIT test could not continue because of two successive POB failures.
  - IDL - ALIT register will be cleared and idled. (See aaaaa = ABORT.)
  - SCK - The ALIT circuit failed the self-check. To determine the reason for failure, see the scan results and Note 1. In the note, the network and frame digits of the LEN field are octal numbers representing the state of the relays in the failing self-check test; their equivalence is given by the Relays Operated and Failing Condition columns.
  - UAV - The required est circuit is unavailable. To resolve the problem, determine why the circuit is unavailable, and retry the test (aaaa = ALIT or RLIT).
- c = 0 - Initial test failed at 1/4 specified range or, if aaaaa = PASS, initial test passed; or if aaaaa = NTST, this field has no meaning.
- 1 - Initial test failed at 1/2 specified range.
  - 2 - Initial test failed at specified range.
  - 3 - "c" can equal 3 when there is no leakage on a contactor line (this is a failure because contactors have a normal leakage of 500K on a 640K range).
  - Range that is being tested. (Applied only when aaaaa = START.):
  - 1 - Range A.
  - 2 - Range B.
  - 3 - Range C.
  - 4 - Range D.
  - 5 - Contactor (normal leakage of 500K on 640K range).
- d = The following when LEN is specified in output:
- 0 - Retest failed at 1/4 specified range.
  - 1 - Retest failed at 1/2 specified range.
  - 2 - Retest failed at specified range.
  - 3 - Retest did not fail.
  - 4 - Retest was not performed.
- d = The following when LREN is specified in the output. (Note that retests are never performed by the ALIT circuit in the RSS.):
- 0 Invalid request (aaaaa = NTST).
  - 1 - Hardware failure (aaaaa bbb = FAIL ROB).
  - 2 - Blocked (aaaaa = NTST).
  - 3 - Busy (aaaaa = NTST).
  - 4 - Retest was not performed (applies only when aaaaa = PASS or FAIL).
  - 5 - RLIT circuit out of service (aaaaa bbb = RLIT UAV).
  - 6 - RLIT circuit/USC/line test access bus/metallic access bus bys (aaaaa bbb = RLIT UAV).
  - 8 - Duplicate data link failure, and/or RSS in stand-alone mode (aaaaa bbb = RLIT UAV).

**PRELIMINARY**

TABLE 15 (Cont.)

= 9 - No response from remote terminal within 10 seconds (aaaaa bbb = RLIT UAV).

For additional data on failing tests, see Note 1.

e = If printed, the resistance option of the RSS tested (H = high, L = low, M = medium) from RSS parameters. This parameter is not printed when gggggggg is an LEN.

ffff = LEN when an LEN, relay states, or 0 (if ALIT has just been started at a DN).

= LREN when an LREN is being specified in gg g gg gg field.

ggg gg gg = If printed, the LREN tested, or the LREN at which ALIT will begin sequential testing.

gg ggg ggg = If printed, the LEN tested, or the LEN at which ALIT will begin sequential testing.

hhh hhhh = If printed, the DN tested, or the DN at which ALIT will begin sequential testing (following a TTY or system request to start ALIT).

iiii = If printed, the extension number of the PBX DN that was tested, or the extension number at which sequential testing has started or stopped.

**4. ACTION TO BE TAKEN**

If bbb = SCK, check and repair the automatic line insulation test circuit. If no MNO2 output message occurs indicating relay failures, suspect a faulty scanner operation. See Note 2.

**NOTES:**

- The initial test and retest scan results (variables c and d, respectively) of a failing line test may be used with the following to locate the probable cause of test failure. No retest is performed when in the general test mode.

<u>TEST TYPE</u>	<u>RETEST SCAN RESULT</u>	<u>CORRESPONDING FAILURE</u>
bbb = TRG	scan 2 = scan 1	Leak from ring to ground only.
	scan 2 > scan 1	Leak from both tip and ring to ground.
	scan 2 = 3 (pass)	Leak from tip to ground only.
= SRG	scan 2 = scan 1	Leak from ring to ground only.
	scan 2 > scan 1	Leak from both tip and ring and from ring to ground.
	scan 2 = 3 (pass)	Leak from tip to ring only.
= FEF	scan 2 = scan 1	Leak from ring to battery only.
	scan 2 > scan 1	Leaks from both tip and ring to battery.
	scan 2 = 3 (pass)	Leak from tip to battery only.

- The RSS ALIT circuit does not have a self-check capability, but a diagnostic program is available. If RLIT test results appear unreliable (or on a routine basis), the RLIT diagnostic may be requested by the DGN-ALTRSS input message.

**PRELIMINARY**

TABLE 16

TR92

1. OUTPUT MESSAGE FORMAT

```

TR92 aa
b c d e
t u v w x y z A
f g hhh
ii i i ii i i
jj jj jj jj jj . kk kk kk kk kk
l m n
o pp p p pp
qq rrr rrrr sss ssss
:
:

```

2. EXPLANATION OF MESSAGE

This message prints the Remote Switching System (RSS) common block translation information in response to input message VFY-CSTG-62.

3. SYSTEM RESPONSES

aa = The RSS number (1 through 31).

= t - Miscellaneous Scan and Distribute Board 3 on Mod 1 equipped.

(A 1 means board is equipped; a 0 means board is not equipped.)

= u - Miscellaneous Scan and Distribute Board 2 on Mod 1 equipped.

= v - Miscellaneous Scan and Distribute Board 1 on Mod 1 equipped.

= w - Miscellaneous Scan and Distribute Board 0 on Mod 1 equipped.

= x - Miscellaneous Scan and Distribute Board 3 on Mod 0 equipped.

= y - Miscellaneous Scan and Distribute Board 2 on Mod 0 equipped.

= z - Miscellaneous Scan and Distribute Board 1 on Mod 0 equipped.

= A - Miscellaneous Scan and Distribute Board 0 on Mod 0 equipped.

b = Equipage state:

= 1 - Partially equipped module zero (512-line capacity).

= 2 - Fully equipped module zero (1024-line capacity).

= 3 - Fully equipped module one (2048-line capacity).

c = Multiparty ringing:

= 0 - AC/DC ringing.

= 1 - Superimposed ringing.

d = Stand-alone option indicator.

e = Resistance option for ALIT:

= 1 - Low resistance.

= 2 - Medium resistance.

= 3 - High resistance.

f = Peripheral unit controller (PUC) data link number for line 1.

**PRELIMINARY**

**PRELIMINARY**

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TABLE 16 (Cont.)

g = PUC data link number for data link 0.

hhh = Member number of PUC.

ii i i ii i i = Remote line test remote equipment number (REN) 1st 2 digits = RSS no.).

jj jj jj jj jj = Carrier types for module 0 channel digroups 0 through 4, respectively:  
 = 1 - Digital carrier.  
 = 2 - Analog carrier.

kk kk kk kk kk = Carrier types for module 1 channel digroups 0 through 4, respectively.  
 = 1 - Digital carrier.  
 = 2 - Analog carrier.

l = Stand-alone recorded announcement indicator.

m = Quantity of tone boards equipped in module 0.

n = Quantity of tone boards equipped in module 1.

o = Quantity of remote miscellaneous distributor numbers (RMDNs).

pp p p pp = RMDN for stand-alone recorded announcement (1st 2 digits = RSS no.).

q = Number of dialed digits.

rrr rrrr = Dialed number to be alternate routed during stand-alone mode.

sss ssss = RSS directory number to which call is routed during stand-alone mode.

**PRELIMINARY**

**PRELIMINARY**

(B) RETEST AFTER FAILURE ON COMBINED TEST  
MEASURES RING TO GROUND RESISTANCE

**LEGEND:**

$I_L$  (T-R) = LEAKAGE CURRENT, TIP TO RING

$I_L$  (R-G) = LEAKAGE CURRENT, RING TO GROUND

- RETEST FAILURE OF THE SAME MAGNITUDE AS TEST FAILURE INDICATES LEAK FROM RING TO GROUND ONLY.
- RETEST FAILURE SHOWING LESS LEAKAGE INDICATES LEAKS FROM TIP TO RING AS WELL AS FROM RING TO GROUND.
- NO FAILURE ON RETEST INDICATES A LEAK FROM TIP TO RING ONLY.

Short Circuit and Ring to Ground (SRG) Test

FIGURE 1

**PRELIMINARY**

**PRELIMINARY**

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(B) RETEST AFTER FAILURE ON COMBINED TEST  
MEASURES RING TO GROUND RESISTANCE

**LEGEND:**

$I_L$  (R-G) = LEAKAGE CURRENT, RING TO GROUND

$I_L$  (T-G) = LEAKAGE CURRENT, TIP TO GROUND

- RETEST FAILURE OF THE SAME MAGNITUDE AS TEST FAILURE INDICATES LEAK FROM RING TO GROUND ONLY.
- RETEST FAILURE SHOWING LESS LEAKAGE INDICATES LEAKS FROM BOTH TIP AND RING TO GROUND.
- NO FAILURE ON RETEST INDICATES A LEAK FROM TIP TO GROUND.

Tip and Ring to Ground (TRG) Test

FIGURE 2

**PRELIMINARY**

**PRELIMINARY**

(B) RETEST, AFTER FAILURE ON COMBINED TEST MEASURES  
RING TO BATTERY (F.E.M.F.) RESISTANCE

LEGEND:

$I_R$  RING CURRENT (DC OR AC, CAUSED BY SHORTS  
 $I_T$  TIP CURRENT TO EXTRANEOUS VOLTAGES)

- RETEST FAILURE OF THE SAME MAGNITUDE AS TEST FAILURE INDICATES A LEAK FROM RING TO BATTERY ONLY.
- RETEST FAILURE SHOWING LESS LEAKAGE INDICATES LEAKS FROM BOTH TIP AND RING TO BATTERY.
- NO FAILURE ON RETEST INDICATES A LEAK FROM TIP TO BATTERY ONLY.

Foreign Potential on Tip or Ring (FEMF) Test

FIGURE 3

**PRELIMINARY**