REMOTE OFFICE TEST LINE AND PROCESSOR CONTROLLED INTERROGATOR OPERATION AND TROUBLE LOCATION PROCEDURES (CTX-6 AND LATER GENERIC PROGRAMS) 2 WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM

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FIGURES

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1. GENERAL

1.01 This section provides operational and trouble locating procedures for the remote office test line (ROTL) and processor controlled interrogator (PCI) features in a No. 1 Electronic Switching System (ESS). The ROTL and PCI are used for manually initiating automatic transmission tests on out-going and two-way trunks in office with CTX-6 or later generic programs.

1.02 This section is reissued to reorganize the information and add additional trouble location information. A procedure was added for testing ROTL buildout resistors and incorporating new information concerning the HILO 4-wire ROTL frame. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

Note: Where different information applies to the HILO 4-wire ROTL frame, this information will be enclosed in brackets.

1.03 The automatic transmission measuring system (ATMS) PCI (see Section 231-133-101) provides the ability to use a No. 1 ESS ROTL to perform manually initiated automatic transmission tests on outgoing and two-way trunks to a 100-, 102-, or 105-type far-end test line (FETL) terminating in a distant office. The tests are initiated from either the teletypewriter (TTY), trunk and line test panel (TLTP), supplementary trunk test panel (STTP), or manual trunk test position (MTTP). With CTX-7 and later generic programs, the PCI is not limited to transmission tests to 100-, 102-, or 105-type test lines but can be used to measure the level of a milliwatt tone present on any given trunk.

1.04 The description and purpose of the ROTL and PCI and authorizing a testing location to make-busy trunks are covered in Section 231-133-101. Recent changes for ROTL are covered in Section 231-118-325. Growth procedures are covered in Section 231-119-333. For information on other CAROT and ROTL equipment, see the 103 division of practices. For more detailed information on input-output teletypewriter messages, refer to IM-1A001 and OM-1A001. For specific operating procedures for tests performed from the TLTP/STTP/MTTP, refer to Section 231-130-301 (TLTP/STTP) and 231-130-320 (MTTP).

1.05 When trouble is encountered in performing a PCI test, an AT01 message containing a failing address is printed. For all issues of CTX-6 and CTX-7 prior to issue 8, this is an absolute address that can be converted to a relocatable address by subtracting the origin of the pident (ATTT for CTX-6 or APCI for CTX-7) from the absolute address. This relocatable address can be found in PR1A073. The address is on the extreme left-hand side of the listing and will provide a corresponding alter number, the number to the right of the octal data field. This alter number can then be located in the appropriate column of Table A. This will provide a cross reference to the paragraph in this section which describes troubleshooting procedures for the failure indicated in the AT01 message. For CTX-6 and CTX-7 issue 8 and later generics, the failing address is printed in the AT01 message. If this address is below the program store address range (ie, less than 1,000,000), it is a relocatable address in pident ATTT (CTX-6 only) or pident APCI (CTX-7 and later generic programs). If the address is in the program store address range, it is in a patch area associated with one of the two previously mentioned pidents. Use the failing address and PR-1A073 to obtain the corresponding NOTE number. Table A can then be used to translate this NOTE number into the corresponding paragraph number within this section.

1.06 Troubleshooting techniques found in this BSP are designed to localize trouble down to a single unit. Individual units associated with the ROTL frame include

(1) 52A Responder—SD-1C399

(2) 8A Tone Detector—SD-99551

(3) PCI—SD-1C478

(4) 105 FETLs and Test Panel Unit—SD-96601

(a) ROTL 105 test line—FS28 option ZE [FS29]*

(b) 105 far-end test line—FS28 option ZD [FS27 option ZS]

(c) Test panel unit—FS1

(5) ROTL Applique—SD-1A314 [SD-1A433]

(6) Test Progress Tone Generator—SD-96603

(7) Signal Distributor Applique—SD-1A146

(8) Master Scanner Applique—SD-1A133

(9) PCI Access Port—SD-1A218 [SD-1A361]

(10) ROTL Access Ports—SD-1A218 [SD-1A361]

(11) ROTL Test Port—SD-1A166 [SD-1A362]

(12) Test Coupler Circuits—SD-1A303 [SD-1A388 + SD-1A392 (HILO interface ckt)].

* Brackets are used in this section to identify those items pertaining to the HILO 4-wire feature.

1.07 52A responder and 8A Tone Detector problems can be localized down to the circuit pack level using Section 103-252-500 and Section 201-578-502

TABLE A

NOTE NUMBER (AT01 FAILURE ADDRESS) TO SECTION
PARAGRAPH NUMBER (DESCRIPTION OF FAILURE) TRANSLATOR

NOTE NUMBER	TYPE OF FAILURE	PARAGRAPH IN SECTION	CTX-6 ATTT ALTER NUMBER	CTX-7 AND LATER APCI ALTER NUMBER
NOTE 1	ggg = BLK*	4.02	5142	1766
NOTE 2	ggg = ERR*	4.03(a)	—	1788
NOTE 3	ggg = ERR*	4.03(b)	5260	—
NOTE 4	ggg = ERR*	4.03(c)	5242	1840
NOTE 5	ggg = INV*	4.04(a)	5290	1893
NOTE 6	ggg = INV*	4.04(b)	5211	1798
NOTE 7	ggg = INV*	4.04(c)	5180	1825
NOTE 8	ggg = BSY	4.05	5161, 5189	2139.05
NOTE 9	ggg = O/S	4.06	5164	2139.05
NOTE 10	ggg = UA	4.07	5151	2139.05
NOTE 11	ggg = H&W	4.08	—	2139.21
NOTE 12	ggg = TMB	4.09	5171	2139.05
NOTE 13	ggg = CGA	4.10	5171	2139.05
NOTE 14	ggg = TTP	4.11	5168	2139.05
NOTE 15	ggg = NTL	4.12	5253	1853
NOTE 16	ggg = BLK*	5.02(a)	5492	2091
NOTE 17	ggg = BLK*	5.02(b)	5359	1969
NOTE 18	ggg = BLK*	5.02(c)	2083, 2123	1442, 1536
NOTE 19	ggg = ERR*	5.03(a)	5371	1978
NOTE 20	ggg = ERR*	5.03(b)	5375	1982
NOTE 21	ggg = TPU	5.04	5498	2097
NOTE 22	ggg = POB*	5.05(a)	5362	1973
NOTE 23	ggg = POB*	5.05(b)	2081, 2121	1490, 1534
NOTE 24	ggg = POB*	5.05(c)	2093, 2145	1503, 1560

TABLE A (Cont)

NOTE NUMBER (AT01 FAILURE ADDRESS) TO SECTION
PARAGRAPH NUMBER (DESCRIPTION OF FAILURE) TRANSLATOR

NOTE NUMBER	TYPE OF FAILURE	PARAGRAPH IN SECTION	CTX-6 ATTT ALTER NUMBER	CTX-7 AND LATER APCI ALTER NUMBER
NOTE 25	ggg = POB*	5.05(d)	2132, 2121	1534, 1545
NOTE 26	ggg = POB*	5.05(e)	2103	1516
NOTE 27	ggg = POB*	5.05(f)	2110	1523
NOTE 28	ggg = NEQ	5.06	5285	1888
NOTE 29	ggg = OPF	5.07	2088, 2140	155, 1498
NOTE 30	ggg = LTR	5.08	2094, 2146	1504, 1562
NOTE 31	ggg = TOF*	5.09	2095, 2147	1508, 1565
NOTE 32	ggg = FED*	5.10(a)	2097, 2149	1510, 1566
NOTE 33	ggg = FED*	5.10(b)	2106	1519
NOTE 34	ggg = FED*	5.10(c)	—	—
NOTE 35	ggg = TON*	5.11	2080, 2120, 2105, 2131	1459, 1518, 1533, 1544
NOTE 36	ggg = INV*	5.12(a)	2084, 2135	1493, 1549
NOTE 37	ggg = INV*	5.12(b)	2124	1537
NOTE 38	ggg = TSF	6.03	5775	2391
NOTE 39	ggg = ISC*	6.04(a)	5660.6	2281
NOTE 40	ggg = ISC*	6.04(b)	5676, 5678	2294, 2299
NOTE 41	ggg = DRF	6.05(a)	5615	2230
NOTE 42	—	—	—	—
NOTE 43	ggg = POB*	6.06(a)	5587.07, 5719	2196.09, 2343
NOTE 44	ggg = POB*	6.06(b)	5597	2216
NOTE 45	ggg = POB*	6.06(c)	5743	2362
NOTE 46	hh = NC/FC	6.07	6031	2666
NOTE 47	iii = FLT	6.08	5692, 5693.1	2318
NOTE 48	iii = UND	6.09	—	—

TABLE A (Cont)

NOTE NUMBER (AT01 FAILURE ADDRESS) TO SECTION
PARAGRAPH NUMBER (DESCRIPTION OF FAILURE) TRANSLATOR

NOTE NUMBER	TYPE OF FAILURE	PARAGRAPH IN SECTION	CTX-6 ATTT ALTER NUMBER	CTX-7 AND LATER APCI ALTER NUMBER
NOTE 49	iii = INV	6.10	—	—
NOTE 50	iii = NEQ	6.11	—	—
NOTE 51	ggg = 51B	6.12	—	2676
NOTE 52	ggg = DTI	—	—	2657

* Use failure address to determine specific failure.

respectively. PCI problems will be localized down to the circuit packs level within this section. CAROT problems should be resolved using Section 103-251-300. Trunk problems should be resolved using system diagnostics. Refer to the appropriate schematic drawings to localize trouble in the remaining units.

1.08 To rule out intermittent troubles, always repeat the failing test several times before proceeding to localize the problem. Rule out troubles outside your office, (ie, trouble on the trunk under test (TUT) or the FETL) by performing the same test on a different trunk that terminates to a different FETL of the same type. Next, try to cause a consistent failure using the simplest type of test. Tests listed in ascending order of complexity are

(1) Code 102 home office test line test

(2) Code 100 home office test line test

(3) All possible tests to a code 102 FETL

(4) All possible tests to a code 100 FETL

(5) Loss and noise to a 105 FETL

(6) Noise with tone, gainslope, PAR, or balance to a 105 FETL

(7) All possible tests to a code 105 FETL.

Multiple FETLs, ROTL access ports, or PCI ports may serve to cause inconsistent results. If inconsistent results are occurring, place all but one of each of the above circuit types on the out-of-service list. Try various combinations of these circuits until a consistent type of failure occurs. Once the same failure condition can be consistently reproduced using the simplest type of test, proceed in accordance with 1.05 in order to translate the AT01 message's failing address to the corresponding paragraph number in this Section.

1.09 Sometimes, the only practical way of isolating a trouble condition to a single unit involves monitoring the signals that the PCI, ROTL applique, 52A responder, and FETL use to communicate with each other. A basic automatic transmission measuring system might be composed of a PCI, a near-end 52A responder and a far-end 51B/52A responder. The PCI communicates with the near-end responder via multifrequency commands (see Table B), some of which are passed on to the far-end responder (see Table C). The near-end responder passes its measurement results to the PCI via frequency-shift data signals which consist of a leading guard band of 1200 Hz, a data band of 2200 Hz and a trailing guard band of 1200 Hz (ie, a guard-data-guard signal). Likewise, the far-end responder passes its measurement results through the near-end responder to the PCI via guard-data-guard signals. Basically, there are three key monitor points:

(1) The PCI tip-ring (PCI TS1, pins 55 and 56)

(2) The 52A responder control tip-ring (52A CP20, pins 208 and 216)

(3) The 52A responder testing tip-ring (52A CP2, pins 6 and 24). [52A CP2 pins 6 and 24 (transmit), pins 4 and 22 (receive)].

These can be monitored with any high-impedance balanced input speaker (WE 106F loadspeaker set or equivalent). Figure 1 shows when specific tones should be present at specific monitor points for an all possible self-check sequence to a 105 FETL. If a unit fails to generate, pass through, or react to a specified signal, it is considered faulty.

1.10 Abbreviations used in this section are listed in Part 12.

2. APPARATUS

2.01 106F loadspeaker set or equivalent. Used to monitor tones on typical transmission test connection.

2.02 Patching cord, P3E cord, 3 feet long equipped with two 310 plugs (3P7B cord). Used for patching test access jacks together.

2.03 Testing cord, 893 cord, 3 feet long equipped with two 360A tools (1W13A cord) and two KS-6278 connecting clips, insulated with 108 cord tips. Used to connect terminal strip terminals together.

2.04 J94022A (22A) milliwatt reference meter (Section 103-222-100) used in buildout resistor testing.

2.05 Patching cord, P3K cord, 6 feet long equipped with two 310 plugs (3P15A cord) used with 22A milliwatt meter.

2.06 768A blocking tool.

3. INITIATING AN AUTOMATIC TRUNK TRANSMISSION TEST

3.01 Transmission tests can be initiated via the maintenance TTY using

(a) The T-TNN- input message (Table D) if a single trunk is to be tested using the far-end test line (FETL) obtained by calling the directory number specified in the automatic trunk test table.

(b) The TEST-TRK- input message (Table E) if a single trunk is to be tested using the FETL obtained by calling the directory number specified in the input message.

(c) The TRK-GROUP- input message (Table F) if all the idle trunks in a trunk group are to be tested using the FETL obtained by calling the directory number specified in the automatic trunk test table.

(d) The AUTO-TRK- input message (Table G) if a loss and noise test sequence is to be run on a single trunk or a trunk group using the FETL obtained by calling the directory number specified in the automatic trunk test table; the results are compared to the limits specified in the input message and an all test pass (ATP) or the failing data is printed. In the CTX-7 and later generic programs, the AT01 message is suppressed for all test pass results. This message is designed primarily to test large numbers of trunks using paper tape input.

3.02 In offices which have the CTX-6 generic, ROTL transmission tests can be initiated via the local or remote maintenance TTYs. In CTX-7 and later generics, the trunk maintenance TTYs are two-way and can also be used.

3.03 Single and trunk group transmission tests can also be initiated from a TLTP/STTP/MTTP using the FETL obtained by calling the directory number specified in the automatic trunk test table. The key sequences are shown in Tables H and I.

3.04 Regardless of which one of the above test positions (TTY, TLTP, STTP, or MTTP) is used to initiate testing, the following input information must be specified.

A. Trunk(s) to be Tested

3.05 A 6-digit TNN or a 4-digit TGN must be specified. In general, any outgoing or 2-way trunk can be tested. Trunks on which transmission tests are not performed include

(a) Operator trunks or trunks requiring no outpulsing

(b) Dial 0 (0-) TSPS trunks, because there is no way to avoid routing the call to an operator

(c) Trunks terminating at a location where no FETL is available

(d) Trunks on active carrier group alarm (CGA) or operated trunk make busy (TMB) key

(e) Nonidle trunks which are requested as part of a group test from TTY using the TRK-GROUP message, from paper tape using the AUTO-TRK- message, or from the TLTP/STTP/MTTP

(f) High and wet trunks (if the measure milliwatt function is requested, high and wet trunks will be tested)

(g) Some CCSA trunks, when the far-end switcher is not capable of terminating the call to a test line

(h) 1XX tie lines with dial tone start

(i) Test and service circuits (measure milliwatt tests can be performed on the following test and service circuits: SD-1A225, SD-1A218, SD-1A303, and SD-1A310) [SD-1A388 and SD-1A386]

(j) Incoming trunks (if the measure milliwatt function is requested, incoming trunks will be tested).

B. Type of FETL

3.06 If no FETL and corresponding directory number are specified in the input message, the automatic trunk test table provides this information. Directory numbers, which are stored in this table per trunk group, should provide access to the most comprehensive FETL (ie, the test line capable of providing the broadest range of tests; thus, the 100-type FETL is more comprehensive than the 102-type FETL but less comprehensive than the 105-type FETL). If the automatic trunk test table entries for a given trunk group are blank or if a FETL other than the one in the automatic trunk test table is desired, the TEST-TRK-message can be used.

C. Type of Transmission Test(s)

3.07 Digit one of the 2-digit test code selects the test(s) that the PCI will perform in conjunction with the near-end ROTL responder and the available FETL. The PCI will prime the responder to insert the 2 dB pad on TP2 trunks. Presently, the PCI is capable of performing the following tests:

(a) With the Type 100 FETL:

(1) Loss—far to near (F-N) at 1004 Hz, 0 dBm transmit level at the 0-level point (0 dBm0)

(2) Noise (F-N)—C message weighted noise.

(b) With the type 102 FETL:

(1) Loss (F-N)—loss 1004 Hz, 0 dBm0 transmit level.

(c) With the type 105 FETL:

(1) Loss (F-N and N-F)—loss at 1004 Hz, 0 dBm0 transmit level

(2) Noise (F-N and N-F)—C message weighted noise

(3) Gainslope (F-N and N-F)—loss at 405 Hz, -16 dBm0 transmit level (if responders are so equipped)

(4) Gainslope (F-N and N-F)—loss at 1004 Hz, -16 dBm0 transmit level (if responders are so equipped)

(5) Gainslope (F-N and N-F) -loss at 2805 Hz, -16 dBm0 transmit level (if responders are so equipped).

Note: The gainslope is the slope of a frequency response curve and measures the flatness of the curve. When the gainslope test is requested, the dB level is measured at 3 discrete frequencies: GS4 (405 Hz), GS1 (1004 Hz), and GS2 (2805 Hz). This provides data for determining the flatness of the frequency response curve in the transmitted voiceband frequency range.

(6) Noise with tone (F-N and N-F)—C message noise with a -16 dBm0 1004 Hz tone (if responders are so equipped).

(d) The following 105-type FETL tests are implemented in the PCI and ROTL program but are not available at this time. Hardware changes to the 52A responder are required before these tests can be performed.

(1) PAR (F-N and N-F)—Ratio of the peak and full wave rectified average values of a low duty cycle test pulse

(2) Balance (F-N and N-F)—echo return loss (560-1965 Hz)

(3) Balance F-N and N-F)—singing return loss low (260-500 Hz)

(4) Balance (F-N and N-F)—singing return loss high (2200-3400 Hz).

Note: Balance tests (2, 3, and 4) are considered invalid unless the near-end of the trunk under test (TUT) is in the Tandem II state and the far-end of the TUT is in the tandem state (TM2-TDM).

3.08 For convenience, several transmission tests are grouped together under each test code (Tables D through I). Therefore, a single input test request will result in the performance of a sequence of tests.

3.09 Since the interrogator is in effect a digital meter, the raw PCI test results are level measurements (ie, results of loss, gainslope, and balance tests are negative, whereas results of noise, noise with tone, and PAR tests are positive). To make the results of loss, gainslope and balance tests correspond with the office records, the PCI control program converts the level measurements into loss measurements by complementing the raw test results. (Printed test results will therefore be positive unless the trunk is being operated at a gain.) In addition, the printed results are made independent of the transmitted level. Thus, if a gain slope test (-16 dBm0 transmitted level) was performed on a trunk with 3.2 dB of actual measured loss (AML), the raw PCI reading would be -19.2 dBm. The PCI control program, however, normalizes this reading to the reference transmit level point by adding 16 dBm. The resulting -3.2 dBm level is then converted to a loss measurement by complementing so the resulting +003.2 dBm loss printed in the AT01 output message can be compared directly with the expected measured loss (EML) shown on the circuit layout record card. With CTX-7 and later generic programs performing toll or tandem switching function, local trunks may be tested in -2 dB (TP2) mode. This 2 dB loss is included in the EML shown on the circuit layout record. The -2 dB test pad is automatically inserted by the PCI based on test pad information contained in the supplementary trunk group translator. This loss measurement can be directly compared with the EML. Loss and gainslope test results are measured in units of 0.1 dB. Noise, noise with tone, PAR, and balancing test results are measured in units of 1 dB.

D. State of TUT

3.10 Digit two of the 2-digit test code selects the state of the near-end and the far-end of the TUT; however, the state of the far-end of the TUT is always ultimately specified by the FETL directory number. Two directory numbers may exist per FETL if the distant office is capable of placing the far-end in either the local (terminating) or the tandem (switched through) state. If no directory number is specified (ie, the TEST-TRK-message was not used), digit two of the 2-digit test code is used in conjunction with the automatic trunk test table to determine the state of both the near-end and the far-end of the TUT.

3.11 If the requested state of the far-end is the local (terminating) state, the first directory number stored in the automatic trunk test table (Fig. 2) for the PCI is used. If, however, it is desired to place the far-end in the tandem (switched through) state, the second directory number is used. If the far-end of the TUT cannot be placed in the requested state (ie, associated automatic trunk test table entry is blank), the program will automatically use the other automatic trunk test table entry and place the far-end of the TUT in that state. The AT01 message will indicate the state used during the test. If both entries are blank, this implies that there is no far-end test line available; the TEST-TRK input message may be used to perform the test if a FETL is available and its directory number is known.

Note: The state of the TUT during this transmission test must be identical to that

specified on the circuit layout record card (CLRC) if a valid comparison of the results is to be made.

4. QUALIFYING THE TRUNK AS TESTABLE

4.01 If the input information is accepted (TTY prints PF for a teletype input, the EQPT ST lamp lights for a single trunk test from TLTP/STTP/MTTP, or the P&E lamp lights for a trunk group test from the TLTP/STTP/MTTP), the request has been loaded into the MACII routine request table. (Transmission tests, like any other type of trunk diagnostic, are controlled out of a trunk maintenance scratch pad.) When the trunk maintenance program (PIDENT MACR in CTX-6 and PIDENT TMAC in CTX-7 and later generic programs) serves this request, it transfers to the PCI control program (PIDENT ATTT in CTX-6 and PIDENT APCI in CTX-7 and later generic programs). At this point an incoming trunk test register (ITTR) is seized, the TUT is qualified as testable, the type of FETL and its corresponding directory number are determined (if necessary using the automatic trunk test table (ATTT) and the 2-digit test code is range checked and translated into PCI priming information. Any of the following output messages can result (see Table J) if a problem develops:

4.02 AT01 with ggg = BLK-if no incoming trunk test register (ITTR) was available.

Action to be taken:

(a) This is usually a temporary condition. Wait and try again.

(b) If conditions persist, monitor and traffic release the PCI and ROTL access ports. To find these trunks use 'VFY-UNTY-1553XXXX' where XXXX = the ROTL member number. Figures 3 and 4 and Tables K and L show the location of the trunk network numbers in the ROTL auxiliary block. Determine if PIDENT ATTT (CTX-6) or PIDENT APCI (CTX-7 and later generic programs) has control of the MACII scratch pad (MAC-CLIENT-). If so, remove the client (ZIP-MACII). Also request a check of the busy path memory for trunk (PMT) words (SA-AUDIT-24777777) and request the call register audit (SA-AUDIT-43777777).

4.03 AT01 with ggg = ERR—The failing address can be used to differentiate between the following failures:

(a) Data in the supplementary trunk group translator for TGN = aaaa is all zero. Bit 22 should be one if this TGN is assigned. Bits 13 and 12 should indicate the trunk group test pad reference point (01 = test at 0 dBm reference point, 10 = test at -2 dBm reference point, 00 = not applicable). Bits 11 and 10 should indicate the trunk group craft force responsibility. Bits 9 through 5 should indicate the trunk group test panel number. Bits 4 through 0 should indicate the trunk group maintenance teletypewriter channel.

(b) Error in the automatic trunk test table (digits 1 through 5). All digits are zero.

(c) Error in the automatic trunk test table (digits 6 through 10). All digits are zero.

4.04 AT01 with ggg=INV—The failing address can be used to differentiate between the following failures.

(a) Test code 1 is invalid.

(b) Test code 2 is invalid.

(c) The trunk is incoming (CTX-6 generic only) or the trunk was incoming or miscellaneous and the measure milliwatt test was not requested (CTX-7 and later generic programs).

4.05 AT01 with ggg=BSY if the specified TNN is presently traffic busy. The TNN will not be tested and will not be made maintenance busy when it is traffic released.

4.06 AT01 with ggg=O/S if a trunk group test has been requested and the TNN presently being tested is on the trunk out-of-service list.

4.07 AT01 with ggg-UA if the specified TNN is unassigned.

4.08 AT01 with ggg-H&W if the specified TNN is on the high and wet list.

4.09 AT01 with ggg=TMB if the specified TNN is on an active trunk make busy key.

4.10 AT01 with ggg=CGA if the specified TNN is on an active carrier group alarm.

4.11 AT01 with ggg=TTP if the specified TNN is presently being tested by someone at a TLTP or STTP.

4.12 AT01 with ggg=NTL if the automatic trunk test table (ATTT) indicates that no FETL is available to test the TUT. (See 3.11.)

Action to be taken:

(a) Use the VFY-TKGN input message to determine the trunk table number (TTN). Field c in the resulting TR10 message is the TTN, except when C=7. In this case, the second word of the TGN auxiliary block contains the TTN in the right-most 10 bits. (T-READ-fffffff02 where field fffffff of the TR10 message is the TGN auxiliary block address).

Note: TTN=0 indicates that there is no automatic trunk test table associated with this trunk group.

(b) Each trunk group translator (Fig. 5) may contain a TTN which points to a 5-word entry in the automatic trunk test table (ATTT) (Fig. 2). This 5-word entry may contain a permanent busy, synchronous, nonsynchronous and two ATMS directory numbers. If two or more trunk groups have all five directory numbers exactly alike, their TTNs should be identical.

(c) If this trunk group goes to a No. 1 ESS or a No. 5 XBAR office, the trunks may be capable of being tested in more than one mode. In such cases, using the first of the two ATMS directory numbers (DNs) should cause the far-end of such trunks to be placed in the local state; whereas using the second ATMS directory number should cause these same trunks to be placed in the tandem state. The state of the far-end of the TUT is always ultimately specified by the FETL directory number.

(d) If the far-end office is a No. 1 ESS, the following observations can be made. A No. 1 ESS office with CTX-5 and earlier generics can test trunks only in the tandem state. A No. 1 ESS office with CTX-6 and later generics can test trunks in both the local and tandem state. A code 105 FETL in this office may be reached by two arbitrarily assigned DNs which point to fixed RIs of 108 (TUT is placed in the tandem state) and 173 (TUT is placed in the local state); these RIs may point to a 105 FETL trunk group equipped to test a TP0 and/or may specify a variable next RI which points to a 105 FETL trunk group equipped to test at TP2. The supplementary trunk group translator provides information relative to testing at TP0 or TP2 for CTX-7 and later generic programs. See Table M for a complete list of fixed RIs for code 100, 102, and 105 FETLs. See Table N for pseudo route indices for HILO 4-wire test lines.

(e) Update the automatic trunk test table as follows:

(1) Octal 23 is the index number into the master head table (F4HHTP) associated with the ATTT. Add octal 23 to the starting address of the master head table, aaaaaaa. The sum, bbbbbbb, is the pointer to the ATTT.

(2) Type in T-READ-bbbbbbb01.

(3) The resulting TW02 message contains an 8-digit octal number. Delete the leading zero. This address, ccccccc, is the starting address of the ATTT and corresponds to a TTN of zero.

(4) Obtain a TNN. Use an existing TTN if its corresponding five DNs exactly match those for this trunk group. Otherwise, choose the next available TTN. If the next available TTN is greater than six, this trunk group must be assigned a TNN-TGN auxiliary block.

(5) Multiply the TTN by five. Convert the resulting decimal number into octal. This number will be referred to as ddddddd.

(6) Verify that ddddddd is in range of the ATTT. Add octal 205 to aaaaaaa. The sum, eeeeeee, is the pointer to the length of the ATTT.

(7) Type in T-READ-eeeeeee01.

(8) The resulting TW02 message contains an 8-digit octal number. Delete the leading zero and the result, fffffff, is the length of the present ATTT. Subtract octal 5 from

ffffffff. If the resulting number, ggggggg, is less than ddddddd, the address is out of the range of the ATTT. This means that the ATTT is not long enough to include the new 5-word entry. If a new entry is to be added to the ATTT, it is necessary to move the entire ATTT and to increase the size of the ATTT. (Section 231-119-320 contains the proper procedure to accomplish this.)

(9) Add ddddddd to ccccccc. The sum, hhhhhhh, is the address in the ATTT where word 0 of the TTN being changed is stored.

(10) Compute any of the five (0 through 4) data words associated with the TTN using Figure 2.

(11) Convert each word into an 8-digit octal number, yyyyyyyy. Compute the octal address xxxxxxx=hhhhhhh + word number (0-4).

(12) Enter the data by typing in

RC:PSWD:
ADDxxxxxxx,
DATyyyyyyyy!

(13) System response should be a TTY acknowledgment of OK and RC18 mnnnnnn ACPT output message.

(14) Repeat Steps (12) and (13) if other data words in the ATTT require changing.

(15) Since the ATTT is not an RC hunted table, this RC is not effective until the PS memory cards have been updated. Write the PS memory cards.

(16) Verify the information by typing in T-READ-hhhhhhh05.

5. ESTABLISHING A TESTING CONFIGURATION

5.01 After the program qualifies the TUT as testable, it attempts to establish a test configuration (see Fig. 6). First, a trunk-to-trunk path is established between the PCI port and a ROTL access port. The ROTL is normally accessed by the PCI via ROTL access port 1 (ie, the manual port, RI=111); however, if this port is unavailable, access to the ROTL can be gained via ROTL access port 0 (ie, the automatic port, RI=110). Second, a bid for the common equipment (ROTL applique, tone detector, and ROTL test port) is made; control of the common equipment alternates between the two ROTL access ports when they are both active. Third, an incoming register (IR) is seized.

> ***Note:*** Information about the access connection (PCI port and ROTL access port) is kept in an ITTR and information about the test connection (ROTL test port and TUT) is kept in an IR. When both connections have been made, all information about the entire test connection is moved to the ITTR, and the IR is released.

Fourth, a network path is reserved between the ROTL test port and the TUT. Fifth, the TUT is blind-idled. Sixth, the ROTL applique is placed in the LISTEN state so that it will be able to detect test progress tone (TPT) and cut through (CT) from the FETL. Seventh, the validity of the directory number is checked (if possible). Eighth, a transmitter is connected to the TUT and outpulsing takes place. Ninth, the TUT is connected to the ROTL test port. Tenth, the near-end of the TUT is placed in the specified state and the ROTL test port is placed in the by-pass state. Eleventh, information on the test connection is moved from the IR into the ITTR and the IR is released. Twelfth, the tone detector monitors the TUT until it detects the presence of the FETL (ie, cut through). Thirteenth, the near-end responder is connected into this test configuration by placing the ROTL in the SEIZE state. And finally, the ROTL is placed in the TEST state. A test configuration has now been established. Failure to achieve this test configuration results in one of the following messages:

5.02 AT01 with ggg=BLK. The failing address can be used to differentiate between the following failures:

(a) No incoming register (IR) was available.

Action to be taken:

(1) This is usually a temporary condition. Wait and try again.

(2) If condition persists, request a call register audit (SA-AUDIT-43777777).

(b) No ROTL access port, no PCI access port, or no network path between these two trunks was available.

Action to be taken:

(1) If there is no network path available between a ROTL access port and a PCI access port, the condition will be temporary. Wait and try again.

(2) Check if the two ROTL access ports and the interrogator port are maintenance idle. To find these trunks, use 'VFY-UNTY-1553XXXX' where XXXX = the ROTL member number. Figure 4 shows the location of the trunk network numbers in the ROTL auxiliary block. If any of these trunks are out of service, diagnose, repair if required, and return the trunk(s) to service.

(3) If neither ROTL access port nor the interrogator port is out of service and this condition persists, verify the route index translations by using the following messages: VFY-EXP-420170, VFY-EXP-420110, and VFY-EXP-420111. Figures 7 and 8 show what these translations should indicate.

(c) No network path between the ROTL test port and the trunk under test was available, or the incoming register associated with the trunk-to-trunk connection between the ROTL test port and the TUT was lost.

Action to be taken:

(1) This will be a temporary condition. Wait and try again.

5.03 AT01 with ggg=ERR—The failing address can be used to differentiate between the following failures:

(a) Error in the ROTL unit type auxiliary block translation (ROTL portion) or TGN auxiliary block for a ROTL access port

(b) Error in the ROTL unit type auxiliary block translation (interrogator portion) or TGN auxiliary block for a PCI access port.

Action to be taken:

(1) Use the VFY-UNTY-1553XXXX message (where XXXX = the ROTL member number) in order to check the ROTL unit type auxiliary block. Compare the resulting TR13 messages with Fig. 4.

(2) Use the TAG-TNN-TGN message to verify the trunk network number to trunk group number and class code translation for the two ROTL access ports, the ROTL test ports, and the PCI access ports. T-READ for one word the address in the resulting TR21 message. The resulting TW02 message contains the address of the three word auxiliary block. T-READ this address for three words and compare the results with Figure 9. Trunk class code expansion is shown in Fig. 10 and program indices for the parts are shown in Table O.

5.04 AT01 with ggg=TPU—if the ROTL test port is unavailable (ie, maintenance busy or out of service). [The failing address can be used to determine whether the 2-wire or HILO 4-wire ROTL test port is unavailable.]

Action to be taken:

(a) Check if the applicable ROTL test port is maintenance idle. To find this trunk use 'VFY-UNTY-1553XXXX' where XXXX = the ROTL member number. Figure 4 shows the location of this trunk network number in the ROTL auxiliary block. If this trunk is out-of-service, diagnose, repair if necessary, and return the trunk to service.

5.05 AT01 with ggg=POB—The failing address can be used to differentiate between the following failures:

(a) Trouble operating relays in a ROTL access port (port 1 is the manual access port, it will be used for PCI test unless it is busy or out of service, in which case, port 0 will be used), trouble operating relays in the PCI access port, or a network continuity check failure in the path between the ROTL access port and the PCI access port.

Action to be taken:

(1) If a network continuity check failed, an NT04 T-T SUPF message will also be printed. If a retry passes, the trouble is in the network. If a retry fails, diagnose both the ROTL access port and the PCI port. If a diagnostic fails, repair the trunk. A failing diagnostic will result if a cross-connect is faulty or missing.

(2) If no NT04 T-T SUPF message is printed, the trouble is associated with either a ROTL access port or the PCI access port. Diagnose these trunks and repair the faulty trunk.

(b) For a code 102 FETL, a code 105 FETL, or a code 102 home office test line, a failure of the ROTL applique to make the transition from the IDLE state through the DIAL state (relays A,B,E,L or A,B,D,K operated) to the LISTEN state (relays A,B,C,E,L or A,B,C,D,K operated). (See Fig. 11 and Table N.)

Action to be taken:

(1) Use T-MISD-a b ccc dddd messages to operate and release the (A,B,C,E,L) or(A,B,C,D,K) relays in the ROTL applique. To find b (SD frame type), ccc (frame number), and dddd (terminal strip number), use VFY-UNTY-1553XXXX where XXXX = the ROTL member number. Figure 4 shows the location of the base MTDN for this circuit.

(c) After 1 second of milliwatt or test progress tone, a far-end disconnect occurred. Then, while releasing the test connection, a peripheral order failure occurred while idling the test port.

Action to be taken:

(1) Diagnose the TUT. If the diagnostic fails, repair the trunk. If the diagnostic passes, test a trunk that terminates into a different office.

(2) If a test into a different office passes, test another trunk in the same trunk group as the original TUT. This test should pass indicating that the original TUT is faulty.

(3) If a test into a different office fails, diagnose and repair the ROTL test port.

(d) For a code 100 FETL or a code 100 home office test line, a failure of the ROTL applique to make the transition from the TEST state (relays (C,E,L) or (C,D,K) plus appropriate padding relays operated) to the LISTEN state (relays A,B,C,E,L or A,B,C,D,K operated). (See Fig. 11, 12, and Table Q.)

Action to be taken:

(1) Use T-MISD-a b ccc dddd messages to operate and release relays A and B in the ROTL applique. To find b (SD frame type), ccc (frame number), and dddd (terminal strip number), use VFY-UNTY-1553XXXX where XXXX = the ROTL member number. Figure 4 shows the location of the base MTDN for this circuit.

(e) For a code 102 FETL, a code 105 FETL, or a code 102 home office test line, a failure to release the B relay in the ROTL applique to make the transition from the LISTEN state (A, B, and C operated) to the SEIZE state (A and C operated). For a code 100 FETL or a code 100 home office test line, a failure of the ROTL applique to make the transition from IDLE state to the LISTEN SEIZE state (B and C relays operated). (See Fig. 11, 12, and Table Q.)

Action to be taken:

(1) Verify that the B and C relays in the ROTL applique can be released by using the T-MISD a b ccc dddd messages. To find b (SD frame type), ccc (frame number), and dddd (terminal strip number), use VFY-NTY-1553XXXX where XXXX = the ROTL member number. Figure 4 shows the location of the base MTDN for this circuit.

(f) For a code 102 FETL, a code 105 FETL, or a code 102 home office test line, a failure occurred while making the transition from the SEIZE state (A and B relays operated) through the TONE OFF state [A, C, (E or D; L or K relays operated) to the TEST state (C, (E or D), (L or K) and appropriate padding relays operated]. (See Fig. 11, 12, and Table Q.)

For a code 100 FETL or a code 100 home office test line, a failure occurred while making the transition from the LISTEN SEIZE state (B and C relays operated) through the TONE OFF state [A, C, E or D; L or K relays operated] to the TEST state [C, (E or D; L or K) and appropriate padding relays operated]. (See Fig. 11, 12, and Table Q.)

Action to be taken:

(1) Verify that the A and B relays in the ROTL applique can be released, and that the C relay in the ROTL applique can be operated. Use T-MISD- messages.

5.06 AT01 with ggg=NEQ—if the FETL (TL=ddd) was not equipped to perform the requested test. This message results only if a test other than all possible tests or loss and noise was requested (ie, a test code > 1) and the FETL was either a code 100 or code 102. Code 100 FETLs can only perform 1-way loss and noise: code 102 FETLs can only perform 1-way loss.

Action to be taken:

(a) Use the TEST-TRK- input message if the directory number for a more comprehensive FETL is known. If a more comprehensive test line does not exist or its directory number is not known, request tests that the available FETL can perform.

(b) If the requested test must be performed, perform the test at the TLTP/STTP/MTTP, using portable or rack mounted transmission equipment (Section 231-131-501, Trunk Transmission Tests Using Trunk and Line Test Panel and Supplementary Trunk Test Panel 2-Wire No. 1 ESS Offices or Section 231-131-520, Trunk Transmission Tests Using Manual Trunk Test Position).

5.07 AT01 with ggg=OPF—if there was an outpulsing failure over the TUT. This failure could have occurred as a result of one of the following reasons: loss of the incoming register associated with the ROTL test port to TUT connection, failure to seize a transmitter, failure to find or connect a network path between the transmitter and the TUT, bad transmitter, no wink from the far-end, failure to place the TUT in the HOLD OFF state immediately after outpulsing, failure to idle the transmitter, failure to operate relays in the ROTL test port, failure to place the near-end of the TUT in the specified state (LOC, TM1, TM2), or loss of the incoming trunk test register associated with the ROTL access port to PCI access port connection.

Action to be taken:

(a) A retry will pass if the failure occurred as a result of any of the following reasons: loss of the incoming register associated with the ROTL test port to TUT connection, failure to seize a transmitter, failure to find or connect a network path between the transmitter and the TUT, bad transmitter, loss of the incoming trunk test register associated with the ROTL access port to PCI access port connection, or failure to idle the transmitter.

(b) If a retry fails, diagnose the TUT. If the diagnostic fails, repair the trunk. If the diagnostic passes, test a trunk that terminates into a different office.

(c) If a test into a different office fails, proceed to step (d); otherwise, test another trunk in the same trunk group as the original TUT. If this test fails, the trouble is in the far-end office and a test call from TLTP/STTP/MTTP to the same test line should similarly fail. If this test passes, the original TUT is faulty and a test call over this TUT from TLTP/STTP/MTTP should similarly fail.

(d) Diagnose and repair the ROTL test port.

5.08 AT01 with ggg=LTR—low tone (ie, any tone except 1000 Hz or 2225 Hz) was received from the far-end. This could happen if all FETLs were busy, if a wrong number was outpulsed, or if the far-end routed the call to overflow.

Action to be taken:

(a) This could be a temporary condition. Wait and try again.

(b) If the Automatic Trunk Test Table (ATTT) was used to obtain the directory number, dial that same number from the TLTP/STTP/MTTP (do not depress the OP OVRD key). If low tone is received, the directory number is wrong.

(c) If the directory number was inputted via the TEST-TRK- input message, dial the same number from the TLTP/STTP/MTTP (do not depress the OP OVRD key). If low tone is received, the directory number is wrong.

5.09 AT01 with ggg=TOF—a time-out (30 seconds) occurred while waiting for the FETL to cut through. Normally, the sequence would be as follows: the list 1 tone detector would be connected to the ROTL test port in order to listen for TPT (FETL=105) or milliwatt (FETL=100 or 102). If 1 second of milliwatt or the presence of TPT (2225 Hz) and then its absence is detected by the tone detector, the tone detector causes the cut through (CT) scan point to saturate. (See Table R.)

Action to be taken:

(a) Test a trunk that terminates into a different office. If this test fails, proceed to step (b). If this test passes, test the original TUT using a different type of FETL. A pass indicates the original FETL was faulty. If the test to a different type of FETL also fails, diagnose the original TUT. If the diagnostic fails, repair the TUT. If the diagnostic passes, the trouble is in the far-end office.

(b) If the test into a different office fails, the problem is either in the tone detector (SD-99551), the ROTL applique, or the ROTL test port. Perform steps (c) through (q) from the TLTP/STTP/MTTP. If unspecified results occur during any step in this procedure, knowledge of the testing configuration should provide sufficient information to allow conventional troubleshooting techniques. All hardware used during these steps is assumed to be initially idle.

(c) If the failure occurred on the HILO 4-wire test port, proceed to step (d); otherwise, diagnose the ROTL test port. If diagnosis fails, repair the test port. If diagnosis passes, proceed to step (f).

(d) Transfer the HILO 4-wire test port to TAT 2 operate relay A.

(e) Operate relays B and L in the ROTL applique (see Fig. 4 and Table Q) to bridge TPT to the transmit tip-ring of the HILO 4-wire test port. If TPT is present on TAT 2, the test port is probably operational; release the B and L relays in ROTL applique and proceed to step (g). If TPT is not present on TAT 2, repair the test port and realign the padding resistors.

(f) Transfer ROTL test port to TAT 2 and operate relay A. If testing the 2-wire test port of the HILO 4-wire ROTL, operate relay M in the ROTL applique.

(g) Transfer ROTL access port 1 to TAT 1 and operate relay A. This step obtains a source of TPT to be used later to check the list 1 tone detector.

(h) Display the ROTL applique supervisory scan points (see Fig. 4, 13, and Table R).

(i) Operate B and C relays in ROTL applique to connect the ROTL test port to the list 1 tone detector.

(j) Patch TAT 1 to TAT 2. TPT is routed through ROTL test port to the list 1 tone detector. ROTL supervisory scan point SC05 (TPT) should saturate.

(k) Remove patch from TAT 1 and TAT 2. ROTL supervisory scan point SC05 (TPT) unsaturates and ROTL supervisory scan point SC04 (CT) saturates.

(l) Operate E and L relays in ROTL applique to remove TPT from ROTL access port; ROTL supervisory scan point SC04 (CT) should be saturated. Recycle list 1 tone detector by releasing and reoperating relay C in the ROTL applique. ROTL supervisory scan point SC04 (CT) should unsaturate.

(m) Operate relay B in ROTL interrupter applique (see Fig. 4 and Table Q) to connect steady low tone to ROTL access port 1.

(n) Patch TAT 1 to TAT 2. Low tone is being routed through ROTL test port to the list 1 tone detector. ROTL supervisory scan point SC06 (LT) saturates for 3 seconds.

(o) Remove patch from TAT 1 and TAT 2. Release access port 1 from TAT 1. Release relay B in ROTL interrupter applique. Release relays E and L in ROTL applique and recycle the list 1 tone detector by releasing and reoperating relay C in ROTL applique.

(p) Transfer any milliwatt tone trunk to TAT 1. Operate relay A.

(q) Patch TAT 1 to TAT 2. Milliwatt is routed through ROTL test port to the list 1 tone detector. ROTL supervisory scan point SC04 (CT) is saturated. [ROTL supervisory scan point SC05 (TPT) may momentarily saturate.]

(r) Remove patch from TAT 1 and TAT 2. ROTL supervisory scan point SC04 (CT) remains saturated.

(s) End of test—idle all hardware and release all connections.

5.10 AT01 with ggg=FED—if the FETL disconnected. The failing address can be used to differentiate between the following:

(a) The FETL disconnected almost immediately after cut through was detected. Cut through is defined as 1000 Hz (milliwatt) for one second or the presence of 2225 Hz (TPT) and then its absence.

(b) The FETL disconnected while the near-end responder was being connected.

(c) The FETL disconnected while transmission tests were being performed.

Action to be taken:

(1) Perform a home office test line test (T-TNN-TT08aaaaaa in CTX-6 or T-TNN-MM08aaaaaa in CTX-7 and later generic programs where aaaaaa = TNN of the office's milliwatt test circuit). If the home office test passes, proceed to step (b); otherwise, use the RMT-MB-EE1 message to put the software control program in the error mode. Use the TEST-TRK-08 aaaaaa100bbbbbbbbbbb message (where aaaaaa = TNN and bbbbbbbbbbb = corresponding directory number). If a PCI self-check failure occurs, the corresponding failure address should be used to localize the fault. If a far-end disconnect is still the only indication, monitor the PCI's tip and ring to determine if an extraneous release command is present. If 80 msec of MF followed by 80 msec of quiet (ie, the release command) is present, replace the indicated PCI circuit packs in the following order: CP3, CP13, CP6, CP4, CP9, CP10, CP11, CP5, CP7, CP8, CP2, CP12, CP6.

(2) If the home office test passes, test a trunk that terminates into a different office. If this test fails, proceed to step (3); otherwise, test the original TUT using a different type of FETL. A pass indicates the original FETL was faulty. A failure indicates trouble in the far-end office.

(3) The test port is suspected of not sending off-hook to the FETL. Diagnose and repair ROTL test port.

5.11 AT01 with ggg=TON—if there was a time-out while trying to seize the near-end ROTL responder (18 seconds).

Action to be taken:

(a) Cause a maintenance seizure of the responder by 105 test line 0. This can be accomplished as follows: at the ROTL frame operate the MB0 and TST keys on the test panel unit (SD-96601-01); set the line select switch at the test panel unit to 0; put the TNN associated with 105 test line 0 on the trunk out-of-service list.

(b) Bid for the responder from ROTL. This is accomplished by operating the B, C, D, and K relays in the ROTL applique using T-MISD messages.

(c) Operate program control keys to display the seven ROTL applique supervisory scan points (MCC-BEGIN-1). At this point, ROTL supervisory scan point SC02 (RESP) should be unsaturated (see Table R and Figure 4); the bid for the responder from ROTL is being blocked by the maintenance seizure of the responder by 105 test line 0.

(d) Idle the TNN associated with 105 test line 0. ROTL supervisory scan point SC02 (RESP) should now be saturated.

(e) Use T-MISD- messages to release relay B and operate relay A in the ROTL applique circuit. At this point ROTL supervisory scan point SC02 (RESP) should still be saturated.

(f) Terminate display of ROTL supervisory scan points (MCC-BEGIN-3). Operate program

control keys to display the two ROTL directed scan points (MCC-BEGIN-1). At this point, ROTL directed scan point SC01 (release busy) should be unsaturated.

(g) At the ROTL frame, momentarily short pin 22 (MBRL) to pin 32 (MBR) of terminal strip B on trunk transmission test line circuit 2 (SD-96601-01). This terminal strip is located in frame position 14 (Fig. 15). ROTL directed scan point SC01 (release busy) should now be saturated. Remove short.

(h) Terminate display of ROTL directed scan points (MCC-BEGIN-3). Operate program control keys to display the seven ROTL supervisory scan points (MCC-BEGIN-1). ROTL supervisory scan point SC02 (RESP) should be saturated.

(i) At ROTL frame, momentarily ground pin 57 (RL) on terminal strip A of the test panel unit (SD-96601-01). This terminal strip is located in frame position 27 (see Fig. 15). ROTL supervisory scan point SC02 (RESP) should now be unsaturated.

5.12 AT01 with ggg=INV—if information about the TUT or its corresponding directory number is invalid. The failing address can be used to differentiate between the following failures:

(a) The directory number specified is invalid. The number of digits may be invalid. For trunks requiring revertive or panel call indicator outpulsing, a digit count of 1, 2, 3, 5, 6, or 9 is invalid; a digit count of zero is always invalid.

Note: The directory number is not considered invalid if the directory number to route index to trunk group number translation does not point to a trunk group containing the TUT; the directory number is simply outpulsed as is (ie, no digits are inserted or deleted). Directory numbers of six digits or less are also outpulsed as is, unless the TUT requires revertive or panel call indicator outpulsing; in those cases, only directory numbers of exactly four digits are outpulsed as is. No directory number verification is performed in such cases. The directory number to route index translator is shown in Fig. 16 and route index expansions for each of the ROTL ports and far-end test lines are shown in Figures 7 and 17, respectively.

(b) The specified trunk is miscellaneous and not one of the following: SD-1A225 (combined milliwatt and loop-around test circuit), SD-1A218 (tone or recorded announcement circuit), SD-1A303 (ATMS coupler circuit), SD-1A310 (balance termination test circuit), SD-1A386 (combined 100/102 test line) or SD-1A388 (104/105 test coupler).

Action to be taken:

(1) Test and service circuits trunks (except those mentioned above) cannot be tested by ROTL.

6. INTERROGATOR AND RESPONDER TESTS

6.01 Once the test configuration has been established, a PCI self-check is performed. A PCI internal self-check essentially verifies that all 23 PCI output scan points will saturate in response to the operation of all input signal distributor relays (except DRCVDX) and that the analog-to-digital circuitry can correctly decode an internally generated guard-data-guard signal. (All measurement results from 51B or 52A responders are in the form of frequency-shift data signals, which consist of a leading guard band of 1200 Hz, a data band of 2200 Hz, and a trailing guard band of 1200 Hz. The length of time of the data band is proportional to the value of the transmission test result measured in decibels.) A PCI self-check failure terminates transmission testing. If the PCI self-check is successful, a loss responder self-check is always done next. A loss responder self-check results when the PCI is primed to request a noise with tone, gainslope and PAR, or balance test so that the PCI can examine the length of the trailing guard of the far-end responder's guard-data-guard loss self-check reply in order to determine if the far-end responder is equipped to perform the requested test. (See 6.12) The remainder of the test sequence varies, depending on the type of transmission tests requested; Table S shows the possible combinations. The PCI communicates with the near-end responder via multifrequency tones (MF commands). An MF command consists of two of a set of six frequencies: 700, 900, 1100, 1300, 1500, and 1700 Hz. The MF commands are sent in layers. The MF command received in layer 0 tells the responder the impedance of the TUT, the transmission level point, and the type of FETL. Layer 0 is absorbed by the near-end responder and is not passed on to the far-end responder.

Layer 1 has been set aside for future use; it is automatically bypassed by both the near-end and the far-end responders. Layer 2 and all remaining layers are decoded by the near-end responder and relayed onto the far-end responder. MF commands received in layers 2 and 3 tell the responders which self-check or test to perform. An 1100-Hz + 1700-Hz MF signal is referred to as a "layer" tone and provides the logic information to the responder's MF circuits to differentiate between the layers. Table B contains an interpretation of the MF commands.

6.02 Preceding any type of transmission test, the PCI always commands both responders to perform the corresponding responder self-check. A responder self-check is performed by each responder on itself in order to check its ability to acurately conduct the corresponding test; a success results in the performance of the corresponding test. In either case, this cycle of a successful responder self-check followed by the performance of the corresponding test and an unsuccessful responder self-check followed by the skipping of the corresponding test continues until all the tests in the requested series have been performed. If this cycle does not run to completion, one of the following output messages will result.

6.03 AT01 with ggg=TSF (test state failure)—if there was trouble associated with the operating of the STARTX (START TEST) signal distributor input relay or the associated output scan point TSX (TEST STATE). Possible failures include: the TSX scan point did not saturate in response to the operation of the STARTX signal distributor relay, the TSX scan point was already saturated prior to the operation of the STARTX relay, or the TSX scan point unsaturated prematurely during a test sequence.

Action to be taken:

(a) Verify that the PCI is powered up.

(b) Verify that the PCI power pack (CP1) is functional. The following voltages should be present: +5V (TP14), +15V (TP5), and -15V (TP8). These voltages should be measured with respect to circuit ground (TP1).

(c) Enter RMT-MB-EE1 message to turn on the error mode.

(d) Request a home office test to an office milliwatt test line (SD-1A225) (use VFY-EXP- input message, Table L, and TRK-LIST- input message to find a specific TNN). The home office test is performed in CTX-6 via the T-TNN-TT08aaaaaa message and in CTX-7 and later generic programs via the T-TNN-MM08aaaaaa message where aaaaaa = TNN of the home office milliwatt. If the first two lines of test results in the resulting AT01 output message, indicate that the PCI has passed its internal self-check (ie, these lines read exactly ISC FC FLT +0715.15 and ISC NC -000.0), proceed to step (e); otherwise, proceed to 6.04.

(e) Replace the indicated PCI circuit packs, one at a time, in the following order: CP9, CP10, CP11.

6.04 AT01 with ggg=ISC—if an interrogator self-check failure has occurred. The failing address can be used to differentiate between the following failures.

(a) At least one PCI scan point was found saturated before the PCI self-check began. All interrogator scan points should be unsaturated when the PCI is idle.

Action to be taken:

(1) Remove power from the PCI and then remove circuit packs CP7, CP8, and CP9. Keeping these circuit packs in the vertical position, firmly tap the top of each mercury relay. Temporarily store these packs in a vertical position and with the PCI still powered down, scan the 23 directed scan points, using two T-SCAN messages (the location of the PCI directed scan points should be obtained by using the VFY-UNTY-1553XXXX input message and Figure 4). If any scan points are still saturated (see Table T for an identification of these scan points), these scan point(s) are defective and should be repaired. If all scan points are unsaturated, insert CP7, CP8, and CP9; power up the PCI; and repeat the T-SCAN messages. If the problem has not been corrected, replace the applicable circuit pack(s) among the following: CP7 (TFX, DT2-0X—DT2-7X), CP8 (DB3-0X—DB3-3X, DB2-0X—DB2-3X, DB1-0X—DB1-2X), CP9 (OLDX, DPTX, SIGNX).

(2) If replacing CP7, CP8, and/or CP9 did not correct the problem, replace one or more of the following packs: CP4 (DB3-0X—DB3-3X, DB2-0X—DB2-3X, DB1-0X—DB1-2X, SIGN), CP10 (DT2-0X—DT2-7X), CP11 (DPTX), CP13 (OLDX).

(b) All output scan points did not saturate in response to the operation of all input signal distributor relays, or the PCI's analog-to-digital circuitry did not correctly decode an internally generated guard-data-guard signal.

Action to be taken:

A PCI self-check can be looked on as a 15-step test. The No. 1 ESS control program, however, does not retain information for those steps indicated below with an asterisk (*). These steps are useful only to localize the cause of the failure to a smaller set of PCI circuit packs. The procedure below is a manual version of a PCI self-check. The relay operation described should be performed, using T-MISD messages (the location of the PCI signal distributor applique points should be obtained by using the VFY-UNTY-1553XXXX input message and Figure 4). See Tables T and U for the layouts of the PCI signal distributor points and PCI master scanner points.

(1) Release the 13 PCI signal distributor relays.

(2) Operate and release relay 2 (DRCVDX). This clears the PCI's logic circuitry.

(3) Scan the 23 PCI directed scan points using two T-SCAN messages. The resulting TW02 messages should indicate 177777 and 177 (ie, all scan points are unsaturated). If the correct results were obtained, proceed to step (4). If not, proceed to 6.04 (a).

(4) Prime the PCI (see Table U) to perform its internal self-check by operating relay 1 (RELINHX), relays 3-7 (TP2-0X— TP2-4X) and relays 8-12 (TR2-0X—TR2-4X).

*(5) Scan the 23 PCI directed scan points, using two T-SCAN messages. The resulting TW02 messages should indicate 177577 (DT2-0X is saturated) and 157 (SIGNX is saturated). If the correct results were obtained, proceed to (6). If not, verify that each scan point will saturate by shorting the pairs of pin locations indicated in Table T together, a pair at a time (use T-SCAN messages to verify the saturation). Failure of a scan point to saturate indicates a bad master scan applique circuit, a bad scan point, or bad translation information (Figure 4, AUX + 27). If all scan points function properly, replace the indicated PCI circuit packs, one at a time, in the following order: CP10, CP4, CP7, CP8 and CP9.

(6) Operate relay 0 (STARTX). This signals the beginning of the PCI self-check.

(7) Supervisory scan point SC00 (TSX) should saturate in response to the operation of the STARTX relay. Also, supervisory scan point SC01 (DRDYX) should saturate to indicate that stable new data is present on the PCI's 23 directed scan points. Verify that the two supervisory scan points have saturated, using a T-SCAN message (the location of the PCI supervisory scan points should be obtained by using the VFY-UNTY-1553XXXX input message and Figure 4). Also, scan the 23 directed scan points using two T-SCAN messages; the resulting TW02 messages should indicate 000000 and 000 (ie, all scan points are saturated). If the correct results were obtained, proceed to step (8). Otherwise, replace indicated PCI circuit packs, one at a time, in the following order: CP10, CP9, CP7, CP8, CP13, and CP4.

(8) The PCI has just verified that all output scan points will saturate in response to the operation of all input signal distributor relays. Operate and release relay 2 (DRCVDX) to allow the PCI to proceed to the next phase of the self-check which involves a check of the analog-to-digital circuit's ability to correctly decode an internally generated guard-data-guard signal.

(9) Supervisory scan point SC00 (TSX) should have remained saturated. Supervisory scan point SC01 (DRDYX) unsaturates in response to the DATA READY—DATA RCEIVED HANDSET (performed in step (8)) and then immediately resaturates to indicate new stable data is present on the PCI's 23 directed scan

points. Verify that the two supervisory scan points are saturated using a T-SCAN message. Also scan the 23 directed scan points using two T-SCAN messages; the resulting TW02 messages should indicate 177577 (DT2-0X is saturated) and 077 (OLDX is saturated). If the correct results were obtained, proceed to (10). Otherwise, replace the indicated PCI circuit packs, one at a time, in the following order: CP10, CP4, CP7, CP11, CP13, CP2, and CP3.

(10) The PCI has just verified that its analog-to-digital circuitry can correctly decode an internally generated guard-data-guard signal. Operate and release relay 2 (DRCVDX) to allow the PCI to proceed to the next phase of the self-check.

(11) Supervisory scan point SC01 (DRDYX) unsaturates in response to the DATA READY—DATA RECEIVED HANDSHAKE (performed in (10)) and then remains unsaturated because there is no new data present on the PCI's 23 directed scan points. At this point, supervisory scan point SC00 (TSX) should unsaturate to indicate the end of the PCI's internal self-check. Verify that the two supervisory scan points are unsaturated using a T-SCAN message. If the correct results were obtained, proceed to (12). Otherwise, replace the indicated PCI circuit packs one at a time in the following order: CP10, CP11, and CP13.

*(12) Scan the 23 PCI directed scan points, using two T-SCAN messages. The resulting TW02 messages should indicate 177577 (DT2-0X is saturated) and 157 (SIGNX is saturated). If the correct results were obtained, proceed to (13). Otherwise, replace the indicated PCI circuit packs, one at a time, in the following order: CP10, CP11, and CP13.

(13) Release relay 0 (STARTX).

*(14) Release relay 1 (RELINHX). Scan both supervisory scan points and the 23 directed scan points. DT2-0X should be the only saturated scan point. If the correct results were obtained, proceed to (15). Otherwise, replace the indicated PCI circuit packs, one at a time, in the following order: CP13, CP10, and CP4.

*(15) Release relays 3 through 7 (TP2-0X—TP2-4X) and relays 8 through 12 (TR2-0X—TR2-4X). This completes a PCI internal self-check.

6.05 AT01 with ggg=DRF (DATA READY failure)—if there was trouble associated with the DRCVDX (DATA RECEIVED) signal distributor input relay or the associated output, scan point DRDYX (DATA READY). Enter RMT-MB-EE1 message to turn on the error mode. The timing associated with the DATA READY failure (ie, 300 ms versus 6 seconds) as described below can be used to differentiate between the two types of failures.

(a) If, during a test sequence (ie, while the TSX scan point is saturated), 6 seconds elapses without either PCI supervisory scan point (TSX or DRDYX) changing state, a DATA READY failure will occur. This software timer is provided to protect the No. 1 ESS system from waiting indefinitely for a response from the PCI in a situation where the PCI hardware is locked up and no response is forthcoming. The PCI has a 2-second hardware timer, which is started by the end of an MF command or the end of the trailing guard tone of a guard-data-guard signal. To disable this timer [ie, stop it from timing out and indicating a no data received (test fault 7) condition], the PCI must detect the beginning of a leading guard tone. If the 6-second software timer times out first, the 2-second timer circuitry may be faulty; the responder may be sending test progress tone, milliwatt tone or continuous guard without data, or there may be an insufficient quiet period between the trailing guard of one guard-data-guard signal and the leading guard of another guard-data-guard signal.

Action to be taken:

(1) Test a trunk that terminates into a different office. If this test fails, proceed to (2). If this test passes, the trouble is associated with the original TUT or FETL.

(2) If a test into a different office fails, monitor the PCI tip and ring (SD-1C478 TS1 pins 55 and 56) with a WE 106C loadspeaker set (or equivalent). Verify that the PCI sends two bursts of MF tone (see Table C). If it does, proceed to (3). Otherwise, replace the indicated PCI circuit packs, one at a

time, in the following order: CP6, CP10, CP5, CP11,CP12, CP2.

(3) If guard-data-guard signals are not received from the near-end responder, proceed to (4). Otherwise, replace the indicated PCI circuit packs, one at a time, in the following order: CP2, CP3, CP13.

(4) Have CAROT perform a demand test which accesses the responder as a far-end. If this test passes, proceed to (5). If this test fails, verify that the responder receives the two bursts of MF tone and does not return a guard-data-guard signal to the PCI (monitor this signal at SD-96601 CKT 2 TS(B) pins 13 and 23). Repair the responder using the 52C alignment unit.

(5) Have CAROT perform a demand test which accesses the responder as the near end. If this test fails, the responder is faulty; repair the responder using the 52C alignment unit. If this test passes, the PCI is faulty; replace the indicated PCI circuit packs, one at a time, in the following order: CP4, CP7, CP8, CP9.

(b) If, at a point in a test sequence where both the TSX and DRDYX scan points are saturated, the DRDYX scan point fails to unsaturate in 300 ms in response to the operation of the DRCVDX signal distributor relay, a DATA READY failure will occur.

Action to be taken:

(1) Replace the indicated PCI circuit packs, one at a time, in the following order: CP9, CP7, and CP4.

(2) The DRCVDX SD relay may be faulty. Test it using the T-MISD message.

6.06 AT01 with ggg=POB—if a peripheral order failure occurs while trying to operate any of the PCI signal distributor applique relays (see Table U). The failing address can be used to differentiate between the following failures:

(a) Trouble operating or releasing the DRCVDX relay.

Action to be taken:

(1) Use T-MISD messages to operate and release relay 2 (DRCVDX) in the signal distributor applique at the top of the ROTL frame.

(b) Trouble operating relay 0 (STARTX) or operating or releasing relay 1 (RELINHX); relays 3-7 (TP2-0X—TP2-4X), or relays 8-12 (TR2-0X—TR2-4X).

Action to be taken:

(1) Use T-MISD messages to operate and release each of these relays.

(c) Trouble releasing relay 0 (STARTX) at any time during an entire test sequence or releasing relay 1 (RELINHX), relays 3-7 (TP2-0X—TP2-4X), or relays 8-12 (TR2-0X—TR2-4X) at the end of the entire test sequence.

Action to be taken:

(1) Use T-MISD messages to operate and release each of these relays.

6.07 AT01 with ggg=(LOS, NOI, GS4, GS1, GS2, NWT, PAR, ERL, SLH, or SRL) and hh=(FC or NC)—if a responder self-check failure occurred. The raw test results are specified in ±jjj.j. For a responder loss self-check the acceptable self-check measurement limits are ±0.1 dB; for responder noise, noise with tone, PAR, and balance self-checks, the acceptable self-check measurement limits are ±1.0 dB; for a responder gainslope self-check, the acceptable self-check measurement limits are ±0.2 dB.

Action to be taken:

(a) If both a near-check and a far-check failure do not occur, proceed to (b). If both failures occur, the PCI is suspected; replace the indicated PCI circuit packs, one CP11, CP2, CP7, CP8, CP13, CP3. If this does not correct the problem, proceed to (b).

(b) If hh=NC, proceed to (d). If hh=FC, test a trunk that terminates into a different office. If this test passes, the original TUT or FETL is faulty; proceed to (c). If this test fails, have CAROT perform a demand test on the

original TUT. If this test fails, the near-end responder is faulty; repair it using 52C alignment unit. If this test passes, the PCI is faulty; replace the indicated PCI circuit packs one at a time in the following order: CP4, CP11, CP7, CP8.

(c) Perform a test using another trunk in the same trunk group as the original TUT. If this test passes, the original TUT is faulty; diagnose and repair it. If this fails, the original FETL is faulty.

(d) Have CAROT perform a demand test which accesses the responder as the far-end. If this passes, proceed to (e). If this test fails, the responder is faulty; repair the responder, using the 52C alignment unit.

(e) Have CAROT perform a demand test which accesses the responder as the near-end. If this test fails, the responder is faulty; repair the responder, using the 52C alignment unit. If the test passes, the PCI is faulty; replace the indicated PCI circuit packs, one at a time, in the following order: CP9, CP11, CP2, CP7, CP8, CP13, CP3.

6.08 AT01 with ggg=(LOS, NOI, GS4, GS1, GS2, NWT, PAR, ERL, SLH, or SRL) and iii=FLT—if the PCI's error detection circuitry has detected a test fault (TFX is saturated). The particular type of test fault is indicated by jjj.j as follows:

(a) If jjj.j = 001.0, a loss of priming information occurred when scan point TSX was saturated and the STARTX relay was released or when signal distributor relays 3-12 (TEST PREPARATION and TEST REQUEST) change state such that invalid priming information was present.

(b) If jjj.j = 002.0 and hh = NC or FC, responder or PCI self-check data is underrange [ie, the data interval between the leading and trailing guard of the guard-data-guard signal was so small (2.5 ±.5 ms or less) that the PCI's analog-to-digital circuitry could not accurately measure it].

(c) If jjj.j = 007.0, no guard-data-guard signal was received from the near-end responder in 2 seconds following the PCI's transmission of MF commands to the near-end responder (hh=NC) or no guard-data-guard signal was received from the far-end responder in the 2 seconds since the trailing guard of the near-end responder's guard-data-guard reply (hh=FC).

Note: Test faults 1 and 7 result in the PCI transmitting an immediate release command which causes the FETL to disconnect.

6.09 AT01 with ggg=(LOS, NOI, GS4, GS1, GS2, NWT, PAR, ERL, SLH, or SRL), gg=(FN or NF), and iii=UND. A transmission measurement is underrange (ie, the data interval between the leading and trailing guard of the guard-data-guard signal was so small (2.5 ±.5 ms or less) that the PCI's analog-to-digital circuitry could not accurately measure it). This measurement should only be considered passing for a noise or noise with tone test. An underrange indication on a loss test, for instance, could indicate that no milliwatt tone was received by the responder. When iii=UND, ±jjj.j indicates the minimum measurement that the PCI can read; the actual measurement is, therefore, below this value.

Type of Test	Minimum Measurable Result
loss	+15.8 dB
noise	+15.0 dBrnc (—75dBm)
gainslope	+14.0 dB
noise with tone	+34.0 dBrnc (—56dBm)
PAR	+02.0 dB
balance	+00.0 dB

6.10 AT01 with ggg=(LOS, NOI, GS4, GS1, GS2, NWT, PAR, ERL, SLH, or SRL) and iii=INV—if the measured data is inaccurate. The failing address may be used to differentiate between the following failures:

(a) For a valid balance test (ggg=ERL, SLH, or SRL) the near-end of the TUT must be in the Tandem II state and the far-end of the TUT must be in the tandem state. In this instance, ±jjj.j is the reading obtained with the TUT in the state indicated by eee-fff.

(b) Responder measurements are linear over a defined range. When test results exceed this range, the results are inaccurate. In this

instance, ±jjj.j indicates the actual reading and ±kkk.k indicates the maximum accurate measureable result.

Type of Test	Maximum Accurate Measurable Result
loss	—005.0 dB (gain)
noise	+55.0 dBrnc (—35dBm)
gainslope	+036.0 dB
noise with tone	+080.0 dBrnc (—10dBm)
PAR	+100.0 dB
balance	+040.0 dB

6.11 AT01 with ggg=(PAR, ERL, SLH, or SRL) and iii=NEQ—If a 52A responder is not equipped to perform the particular measurement requested, it will return a data signal consisting of one second of 1200 Hz leading guard, at least one second of 2200 Hz data, and 50 ms of 1200 Hz trailing guard. Old (51B) responders are not provided with this function and will lock-up if commanded to perform a test that they are not equipped to perform; therefore, even if a test request other than all possible tests or loss and noise is made, the far-end responder is always commanded by the No. 1 ESS control program via the PCI to perform a loss self-check before a self-check for the requested test is attempted. The PCI then examines the length of the trailing guard of the far-end responder's guard-data-guard loss self-check reply. If the trailing guard tone is approximately 100 ms, the PCI causes the OLDX scan point to saturate, indicating that the far-end responder is a 51B model. If the trailing guard tone is approximately 50 ms, the PCI does not cause the OLDX scan point to saturate, indicating that the far-end responder is a 52A model. If an old responder is present at the far-end, an AT01 message with ggg=51B will result. If a new responder is present at the far-end, the requested test will be attempted. Presently, 52A responders are not equipped to perform PAR or balance tests. Therefore, if one of these tests is requested, an AT01 with ggg=PAR, ERL, SLH, or SRL and iii=NEQ will result.

6.12 AT01 with ggg=51B—if a 51B responder is not equipped to perform the particular measurement requested. If a test request other than all possible tests or loss and noise is made, the far-end responder is commanded to perform a loss self-check before a self-check for the requested test is attempted. The PCI then examines the length of the trailing guard of the far-end responder's guard-data-guard self-check reply. If the trailing guard tone is approximately 100 ms, the PCI causes the OLDX scan point to saturate, indicating that the far-end responder is a 51B model. An AT01 message with ggg=51B then results. If a 51B responder was commanded to perform a test that it was not equipped to perform, the responder would not respond and a no-data-received (test fault 7) indication would result.

6.13 DR04 (Table V) with cccccccc = an octal address in the ATTT program—if the ATMS processor controlled trunk interrogator task has been aborted from MACII because of a maintenance interrupt, a ZIP-MACII input message, or a MACII time-out (CTX-6 generic).

6.14 DR04 messages with cccccccc = an octal address in the APCI program — if the program fails a sanity check and aborts transmission testing (CTX-7 and later generics).

6.15 MA02C (Table W) message if the PCI has been aborted by MACII because of a maintenance interrupt, a ZIP-MACII input message, or a MACII time-out (CTX-7 and later generics).

7. AUTOMATIC TRUNK TRANSMISSION TEST RESULTS

7.01 If the cycle runs to completion or at least one cycle is successful, an AT01 message will be printed with ggg equal to one or more of the following tests:

(1) ERL—echo return loss

(2) GS1—gainslope at 1004 Hz

(3) GS2—gainslope at 2805 Hz

(4) GS4—gainslope at 405 Hz

(5) LOS—loss

(6) NOI—noise

(7) NWT—noise with tone

(8) PAR—peak-to-average ratio

(9) SLH—singing return loss high

(10) SRL—singing return loss low.

7.02 In this case, ±jjj.j is the test result which can be compared with the office's records for that trunk group to determine if the transmission test passed or failed.

8. SUPPRESSING ATMS TEST RESULTS

8.01 Some test results are of little or no interest to a PCI user and can be suppressed without any detrimental effect. The following interrogator test results are suppressed (except when the error mode is turned on):

(1) Passing interrogator self-check data

(2) Passing responder self-check data.

9. ENABLING A TEST LOCATION TO MAKE BUSY TRUNKS

9.01 The ability of testing locations to make busy trunks in the ROTL near-end office is accomplished by the RMT-MB-aa b input message (Table X). The message is entered at the near-end ROTL office. The RMT-MB-aa b input message initializes a list in call store and is used to temporarily give as many as four of the eight possible authorized testing locations in the system's security call back (SCB) table the ability to make busy trunks in the near-end ROTL office.

9.02 If a ROTL near-end office is manned, the office personnel should make busy trunks as needed.

Note: A phase three or higher of system reinitialization will zero the call store list of testing locations which are currently enabled to make busy trunks in the ROTL office.

9.03 The suggested criteria for enabling a testing location to make busy trunks are listed below:

(a) Testing locations (except CAROT) should be enabled to make busy trunks only when the ROTL near-end office is unmanned. One of these testing locations should be given the ability to exceed the automatic maintenance limit (AML).

(b) A centralized automatic-reporting on trunks (CAROT) testing location should continuously have the ability to make busy trunks in the near-end ROTL office. However, the CAROT must never have the ability to exceed the AML in the ROTL near-end office.

(c) When the personnel return to the unmanned ROTL near-end office, those testing locations (except CAROT) which were given permission to make busy trunks should be removed from the call store list via the RMT-MB-aa b TTY input message (Table X).

10. MEASURING THE LEVEL OF MILLIWATT PRESENT ON A GIVEN TRUNK

10.01 In CTX-7 and later generics, the PCI can be used to measure the level of milliwatt present on any OGT, ICT, or two-way trunk as well as the following miscellaneous trunks:

SD-1A225 (code 102 FETL), SD-1A218, SD-1A303, SD-1A310, SD-1A386 or SD-1A388.

10.02 A special application of this feature, which is also available in CTX-6, is the ability to compare the 52A responders internal milliwatt source to the level of the home office milliwatt supply. This can be done as follows:

(a) Use the TTY input message

T-TNN-TT08 aaaaaa (CTX-6)

T-TNN-MM08 aaaaaa(CTX-7)

where aaaaaa is the six-digit TNN of the home office 102 test line.

(b) The ±jjj.j field of the AT01 output message should read 000.0 ±000.1 dBm if the two milliwatt sources are in agreement. Positive readings indicate the level of the 52A Responder's milliwatt is greater than the level received from the home office milliwatt supply; negative readings indicate the opposite. If the reading is not within tolerance, one of the following units is maladjusted:

(1) Milliwatt test circuit (SD-1A218, SD-1A225) or associated distribution network. (See Section 103-335-515.)

(2) 52A Responder (see Section 103-252-500).

(3) ROTL buildout resistors (see 11).

11. TESTING ROTL BUILDOUT RESISTORS

11.01 Block operate relay C on ROTL applique (SD-1A314). On the 52A Responder, strap TP6 to TP12 on CP3 (this provides a -2 dBm tone at 600 ohms on the 52A Responders testing tip-ring). Transfer ROTL test port (SD-1A166) to TAT-1 (operate TEST and TRUNK keys; key in TNN+ST; momentarily operate the TRFR key; release TEST key; operate the XMSN key at TAT-1); and operate relay A (operate TEST and OP keys; key in 1909+ST). Measure level at AT1 (Section 231-130-501 Fig. 1) SD-1A176 or SD-1A322 using 22A milliwatt meter.

(a) If level measured is between -1.0 and -1.7 dBm, recheck milliwatt source (see 10.01) and then repeat test from 11.01.

(b) If level measured is between -2.0 and -3.0 dBm, check the cable length (should be less than 846 feet). Repeat from 11.01 after correcting cable length.

(c) If level measured is between -1.7 and -2.0 dBm, proceed with 11.02.

11.02 On the 52A responder, strap TP2, TP6, and TP8 on CP1 to ground (changes output impedance to 900 ohms at 0 dBm). Measure the tone at AT1 again. If the level is not between the 0 and +.3 dBm range of the buildout resistors, check the alignment of the 52A responder.

(a) If the level measures between the 0 and +.3 dBm range of the buildout resistors, locate the measured level in column 1 of Table Y to determine the relays to be operated to reduce the measured level to 0 dBm.

(b) Block-operate the ROTL applique relays as indicated in Table Y and measure tone level. A measured level other than 0 ±.02 dBm indicates a fault in the relay or associated pad. Correct problem; then repeat 11.02.

(c) Compare the pad setting computed in 11.02 (a) and verified in 11.02 (b) to the setting in the RPADS table for the TLN on which the test access trunk appears. Determine the setting in the RPADS table (Fig. 18) using the following procedure:

T-READ-110563301 (start of RPADS table) convert (16)X (ROTL MEMBER NUMBER) + TLN to octal and add to output of T-READ (address of data). T-READ-data and find match in Table Y, column 4. If this value matches the value determined in 11.02, (a) remove the straps and blocking tools; then proceed to (d). If the RPADS value is different, change it to agree with the value determined in 11.02 (a) by making parameter overwrites using the single card writing procedure in Section 231-104-302; then begin test procedure again.

(d) Release the XMSN key at TAT-1. Operate the RLS key at TAT-1. Operate RMV BUSY key at MTL. Transfer MW test circuit (SD-1A310) to TAT-1 (operate TEST and TRUNK keys; key in TNN+ST; momentarily operate the TRFR key; release TEST key; operate the XMSN key at TAT-1); and operate relays A and C (operate TEST and OP keys; key in 1909+ST and 1929+ST). The level measured at AT1 should be 0 ±.05 dBm. If level measured is not within tolerance, recheck MW source (Section 103-335-515) and return trunk to service.

12. ABBREVIATIONS

A	Abort (use in AUTO-TRK input message)
APCI	ATMS Processor Controlled Interrogator (pident APCI, PR-1A073)
ATI	Automatic Trunk Interrogating
ATMS	Automatic Transmission Measuring System
ATP	All Tests Passed
ATTT	Automatic Trunk Test Table or Automatic Transmission Testing (pident ATTT, PR-1A073)
AUX	Auxiliary
BLK	Blocked

BSY	Busy
CAROT	Centralized Automatic Reporting on Trunks
CCSA	Common Control Switching Arrangement
CGA	Carrier Group Alarm
CLRC	Circuit Layout Record Card
CP	Circuit Pack
CPI	Circuit Program Index
CT	Cut Through (a ROTL applique supervisory scan point)
CTX	Centrex
dB	Decibel (unit of power)
dBm	Decibel (reference to 1 milliwatt)
dBm0	The dBm level at the reference transmission point
dBrnc	Decibels above reference noise (-90 dBm) measured through a C-message weighting filter
DN	Directory Number
DNY	Deny
DPTX	Decimal Point (a PCI directed scan point)
DRDVCX	Data Received (a PCI SD point)
DRDYX	Data Ready (a PCI supervisory scan point)
DRF	Data Ready Failure
DT	Data Type (PCI directed scan point)
DTI	Data Type Incorrect
EML	Expected Measured Loss
EQPT ST	Equipment State (lamp on TLTP/STTP)
ERL	Echo Return Loss
ERR	Error
ESS	Electronic Switching System
FC	Far Check
FED	Far-End Disconnect
FETL	Far-End Test Line
FLT	Fault
FN(F-N)	Far to Near
G	Group (used in AUTO-TRK input message)
GS1	Gainslope at 1004 Hz
GS2	Gainslope at 2805 Hz
GS4	Gainslope at 405 Hz
Hz	Hertz (cycles per second)
INV	Invalid or Inaccurate
IPM	Interruptions Per Minute
IR	Incoming Register
ISC	Interrogator Self-Check
ITE	Installation Test Equipment
ITTR	Incoming Trunk Test Register
LOC	Local
LOS	Loss
LT	Low Tone
M	Minus (used in AUTO-TRK input message)
MACII	Maintenance Control No. 2 (Trunk Maintenance Control)

MACR	Maintenance Control Program (pident MACR, PR-1A005)
MB	Make Busy
MB0	Make Busy 0
MBR(MBRL)	Make Busy Release
MCC	Master Control Center
MEMN	Member Number
MF	Multifrequency
MM	Measure Milliwatt (used in T-TNN input message)
MTDN	Miscellaneous Trunk Distributor Number
MTTP	Manual Trunk Test Position
MW	Milliwatt
NC	Near-Check
NEQ	Not Equipped
NF(N-F)	Near to Far
NG	No Good
NO	Number
NOI	Noise
NOTR	Number of Trunks
NTL	No Test Line
NWT	Noise With Tone
OGT	Outgoing Trunk
OP	Outpulsing (key on TLTP/STTP)
OPF	Outpulsing Failure
OP OVRD	Outpulsing Override (key on TLTP/STTP)
O/S	Out-of-Service
PAR	Peak to Average Ratio
PCI	Processor Controlled Interrogator
P&E	Progress and Error (Lamp on TLTP/STTP)
PF	Printout Follows
PI	Program Index
PMT	Path Memory for Trunks
POB	Peripheral Order Buffer
REG	Register (Lamp on TLTP/STTP)
RELINHX	Release Inhibit (a PCI SD point)
REQ	Requested
RESP	Responder
RI	Route Index
RL	Release
RMT	Remote
ROTL	Remote Office Test Line
RS	Return Supervision
RUB	Rub-Out (a TTY character)
S	Single trunk (used in AUTO-TRK input message)
SCB	Security Call Back Table
SD	Signal Distributor or Schematic Drawing
SLH	Singing Return Loss (high intercept)
SRL	Singing Return Loss (low intercept)
ST	Start (a PCI SD point) or Start (a key at TLTP/STTP)
STTP	Supplementary Trunk Test Panel
TAT	Test Access Trunk (at a TLTP/STTP)

TC	Test Code
TCC	Trunk Class Code
TEL	Telephone
TFX	Test Fault (a PCI directed scan point)
TGD	Trunk Guard Timing
TGN	Trunk Group Number
TG0	Trunk Group Zero
TLTP	Trunk and Line Test Panel
TMB	Trunk Make Busy Key
TMLA	Trunk Maintenance Auxiliary List
TM1	Tandem I
TM2	Tandem II
TNN	Trunk Network Number
TNP	Toll Network Protection
TOF	Time Out Far-End
TON	Time Out Near-End
TP	Test Point
TPT	Test Progress Tone
TPU	Test Port Unavailable
TR	Test Request
TRFR	Transfer (a TLTP/STTP key)
TRK	Trunk
TSF	Test State Failure
TSPS	Traffic Service Position System
TST	Test (a TLTP/STTP key)
TSX	Test State (a PCI supervisory scan point)
TT	Transmission Test
TTEI	Transmission Test Equipment Indicator
TTN	Test Table Number
TTP	Trunk Test Panel
TTY	Teletypewriter
TUT	Trunk Under Test
UND	Underrange
UNTY	Unit Type
VFY	Verify
VM	Voltmeter (a key on TLTP/STTP)
XMSN	Transmission (a TLTP/STTP key)
2TP	2 dB Test Pad

TABLE B

INTERPRETATION OF MF COMMANDS

INTERPRETATION OF MF COMMANDS					
MF SIGNALS (Hz)		LAYER 0		LAYER 2	LAYER 3
	TP2-0X	TP2-1X	TP2-2X TP2-3X TP2-4X	TR2-0X TR2-3X TR2-1X TR2-4X TR2-2X	TR2-0X TR2-3X TR2-1X TR2-4X TR2-2X
700+900	600	0	105	LOS NC LOS FC	SLH NC SLH FC
700+1100	600	0	102	LOS FN LOS NF	SLH FN SLH NF
700+1300	600	0	100	NOI FC	—
700+1500	900	2	100	PAR FN PAR NF	PAR NC PAR FC
700+1700	900	0	102	ERL FN ERL NF	ERL NC ERL FC
900+1100	900	0	105	NOI NF	—
900+1300		RELEASE COMMAND			
900+1500	900	2	102	SRL FN SRL NF	SRL NC SRL FC
900+1700	900	0	100	GS1 FN GS1 NF	GS1 NC GS1 FC
1100+1300	600	2	105	GS4 FN GS4 NF	GS4 NC GS4 FC
1100+1500	600	2	102	NOI NC	—
1100+1700		LAYER COMMAND			
1300+1500	600	2	100	NOI FN	—
1300+1700	100	2	105	GS2 FN GS2 NF	GS2 NC GS2 FC
1500+1700		—		NWT FN NWT NF	NWT NC NWT FC

Note: If layer 3 is used, the 1100+1700 Hz layer command must be transmitted in layer 2. Layer 1 has been set aside for future use; it is automatically bypassed by both the near-end and the far-end responder.

TABLE C

NUMBER OF TONES AT VARIOUS MONITOR POINTS

TYPE OF TEST	MONITORED AT PCI TIP-RING OR RESPONDER CONTROL TIP-RING		MONITORED AT RESPONDER TESTING TIP-RING*	
	NO. OF MFs	NO. OF GUARD-DATA-GUARD SIGNALS	NO. OF MFs	NO. OF GUARD-DATA-GUARD SIGNALS
PCI SELF-CHECK	0	0	0	0
RESP LOSS SELF-CHECK	2	2	1	1
RESP NOISE NEAR-END SELF-CHECK	2	1	1	0
RESP NOISE FAR-END SELF-CHECK	2	1	1	1
RESP GAINSLOPE 405 Hz SELF-CHECK	3	2	2	1
RESP GAINSLOPE 1004 Hz SELF-CHECK	3	2	2	1
RESP GAINSLOPE 2805 Hz SELF-CHECK	3	2	2	1
RESP NOISE WITH TONE SELF-CHECK	3	2	2	1
RESP LOSS TEST	2	2	1	1
RESP NOISE NEAR-END TEST	2	1	1	0
RESP NOISE FAR-END TEST	2	1	1	1
RESP GAINSLOPE 405 Hz TEST	2	2	1	1
RESP GAINSLOPE 1004 Hz TEST	2	2	1	1
RESP GAINSLOPE 2805 Hz TEST	2	2	1	1

TABLE C (Cont)

NUMBER OF TONES AT VARIOUS MONITOR POINTS

TYPE OF TEST	MONITORED AT PCI TIP-RING OR RESPONDER CONTROL TIP-RING		MONITORED AT RESPONDER TESTING TIP-RING*	
	NO. OF MFs	NO. OF GUARD-DATA-GUARD SIGNALS	NO. OF MFs	NO. OF GUARD-DATA-GUARD SIGNALS
RESP NOISE WITH TONE TEST	2	2	1	1
RESP PAR SELF-CHECK	3	2	2	1
RESP PAR TEST	2	2	1	1
RESP ERL SELF-CHECK	3	2	2	1
RESP SRL SELF-CHECK	3	2	2	1
RESP SLH SELF-CHECK	3	2	2	1
RESP ERL TEST	2	2	1	1
RESP SRL TEST	2	2	1	1
RESP SLH TEST	3	2	2	1

* For HILO 4-wire ROTLs, there are two responder testing tip-rings (transmit (T, R) and receive (T_1, R_1)). All MF signaling takes place on the transmit tip-ring and all GUARD-DATA-GUARD signaling is on the receive tip-ring.

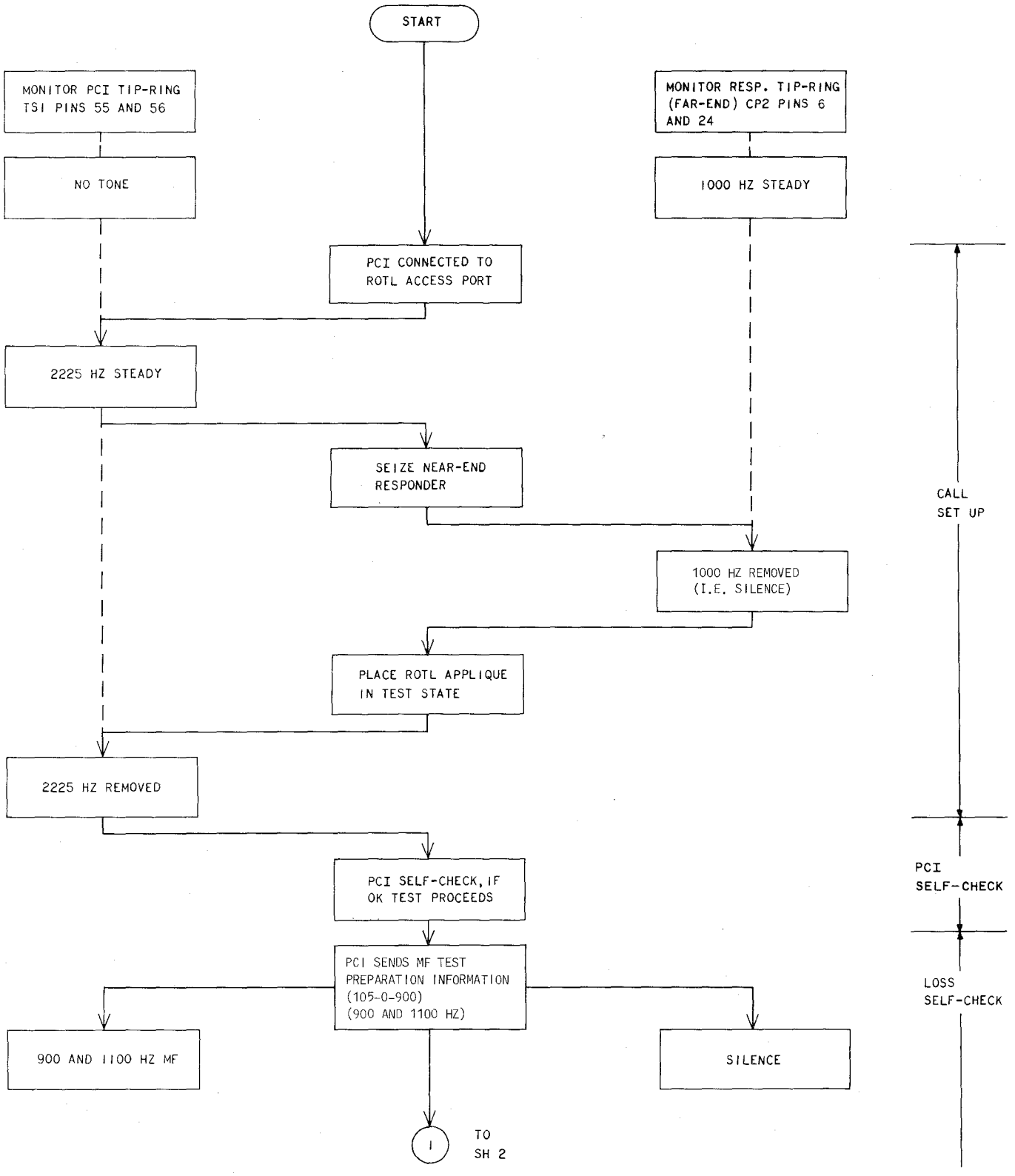


Fig. 1—PCI-Responder Signaling Sequence Chart (Sheet 1)

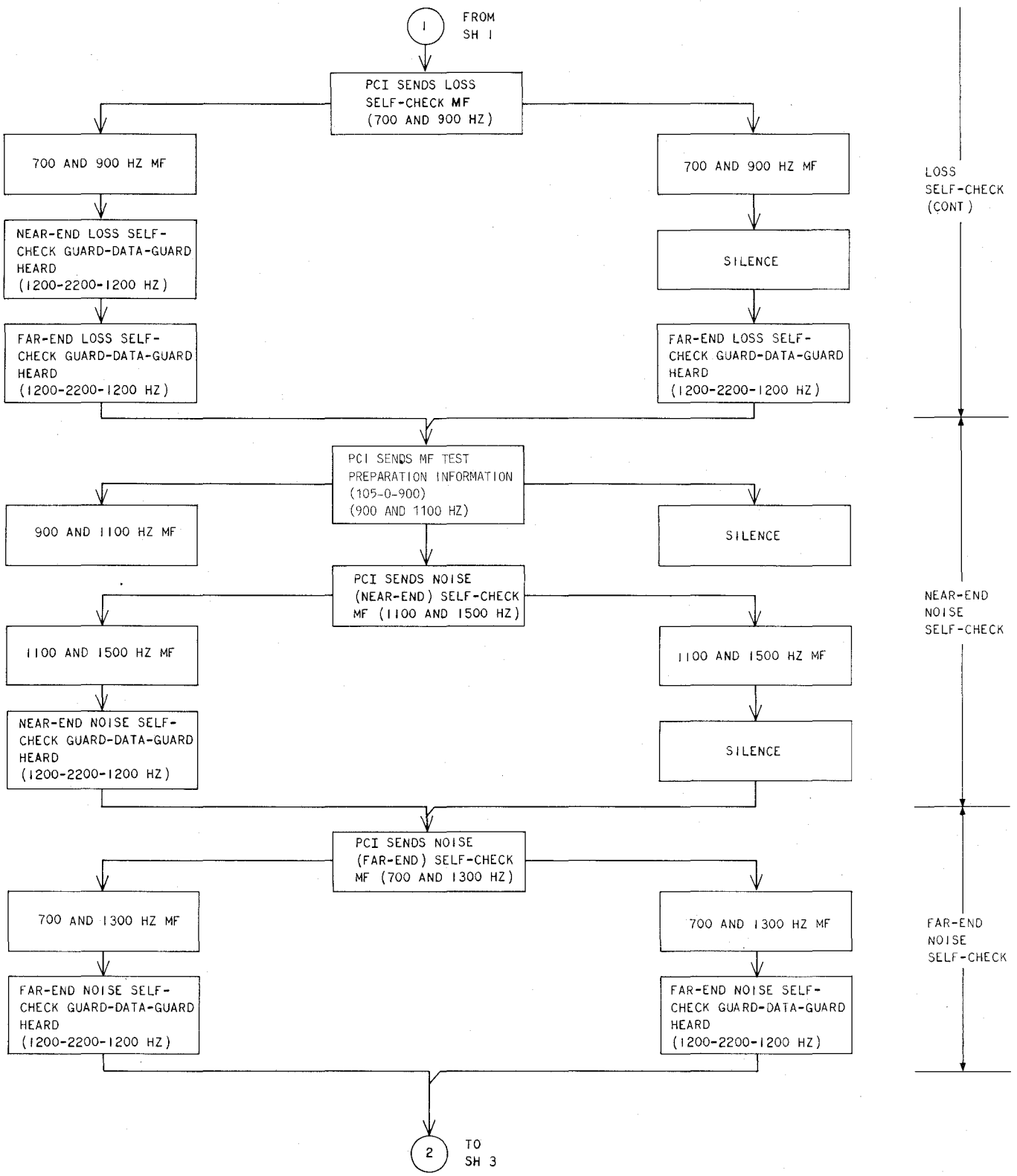


Fig. 1—PCI-Responder Signaling Sequence Chart (Sheet 2)

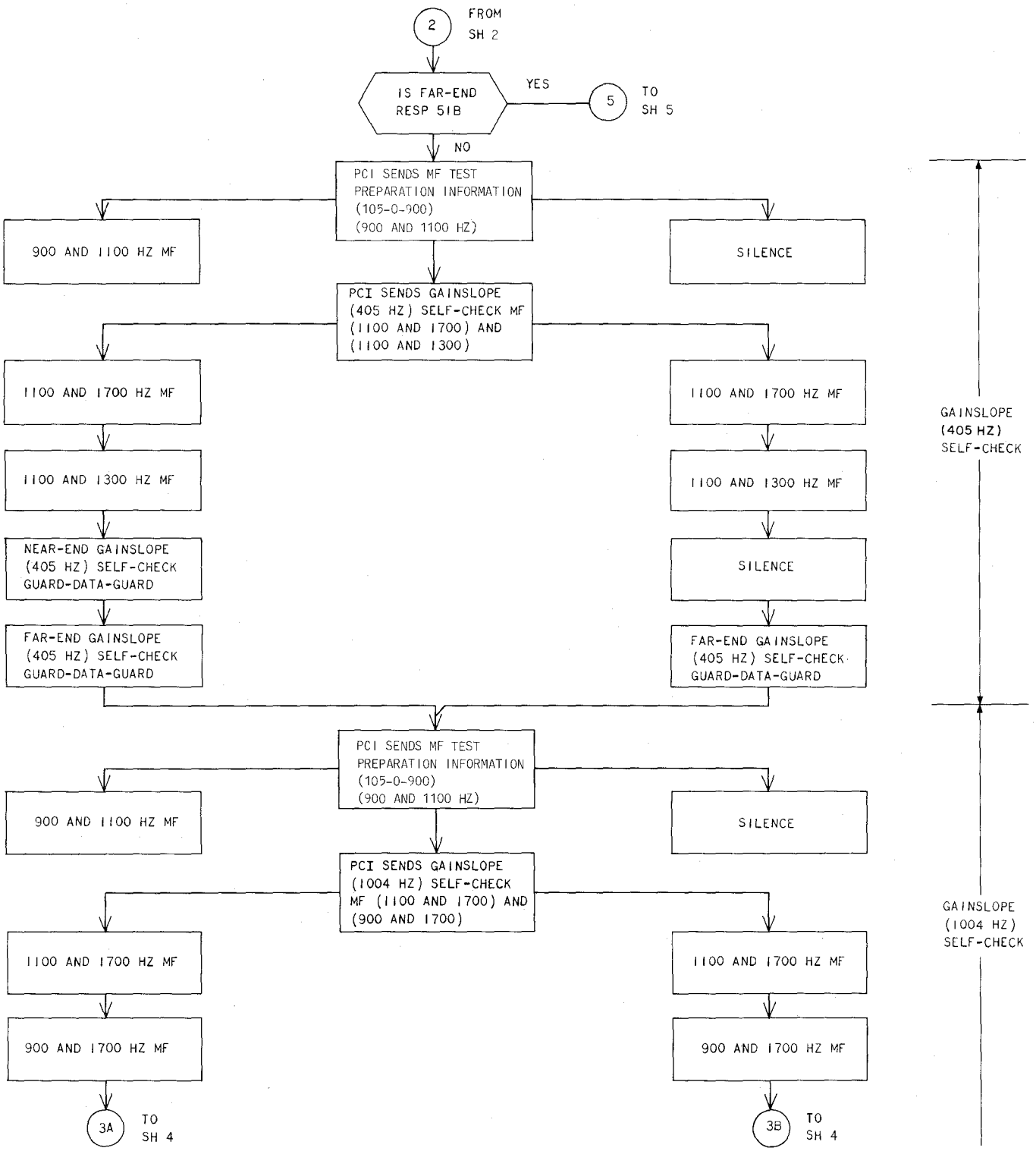


Fig. 1—PCI-Responder Signaling Sequence Chart (Sheet 3)

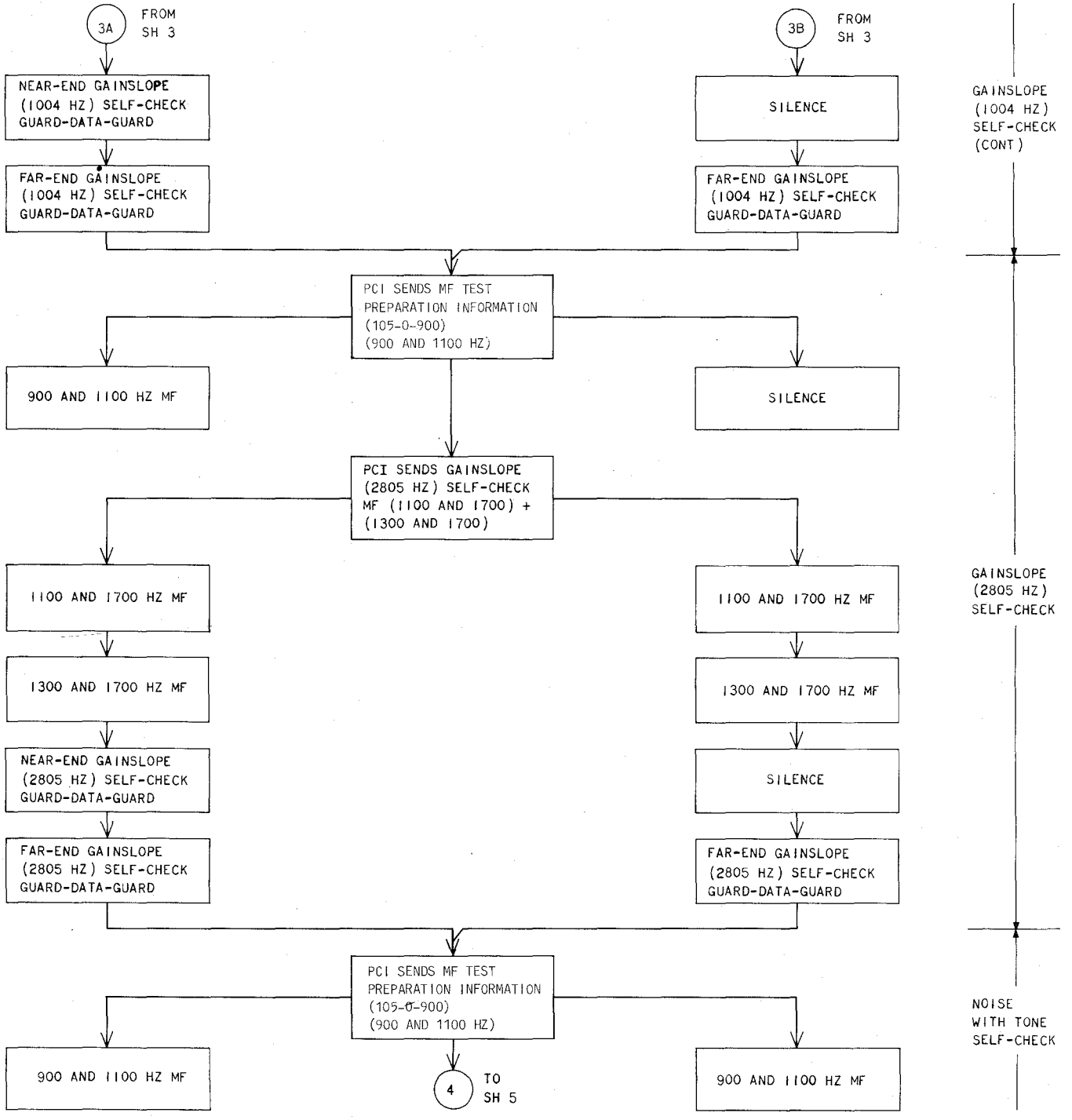


Fig. 1—PCI-Responder Signaling Sequence Chart (Sheet 4)

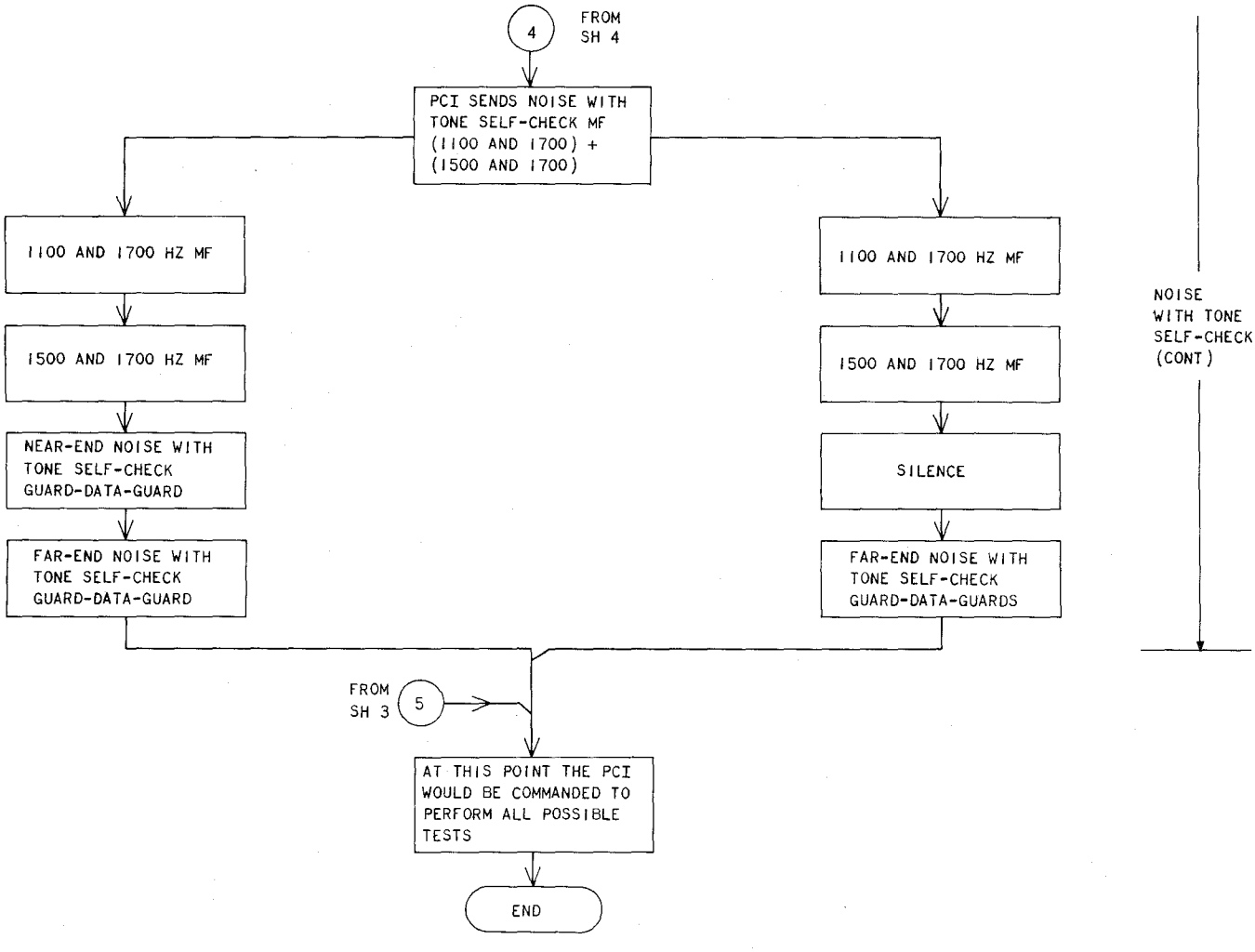


Fig. 1—PCI-Responder Signaling Sequence Chart (Sheet 5)

TABLE D

T-TNN INPUT MESSAGE

INPUT MESSAGE FORMAT:

T-TNN-aa b c dddddd.

Used to request that the ATMS processor controlled interrogator perform the specified trunk transmission tests using the far-end test line found in the automatic trunk test table.

EXPLANATION OF VARIABLE FIELD

FIELD	TTY CHARACTERS	DEFINITION
aa	TT	Trunk transmission test
b	0	All possible tests using the FETL specified in the automatic trunk test table
	1	Loss and noise tests
	2	Noise with tone test
	3	Gainslope and PAR tests
	4	Balance tests
c	7	Near-end = local, far-end = local [For HILO 4-wire trunks, near-end = tandem I*, far-end = local]
	8	Near-end = tandem I, far-end = tandem [For HILO 4-wire trunks, near-end = tandem I*, far-end = local]
	9	Near-end = tandem II, far-end = tandem [Invalid for HILO 4-wire trunks]
dddddd	—	Trunk network number (TNN) of trunk to be tested.

SYSTEM RESPONSE

PF — Followed by an AT01 message with failing and/or passing information. A DR04 and/or MA02C message could result if an MACII abort occurs.

NG — If input test I.D. (field aa) is not valid

NO — If no room in MACII routine request Table A

* For HILO 4-wire trunks, the talk state is referred to as tandem I state.

TABLE E

TEST-TRK INPUT MESSAGE

INPUT MESSAGE FORMAT:

TEST-TRK-bc, dddddd, eee, f-ggg-hhhhhhh.

Used to request that the ATMS processor controlled interrogator perform the specified trunk transmission tests using the far-end test line secured with the specified directory number.

EXPLANATION OF VARIABLE FIELD

FIELD	TTY CHARACTER	DEFINITION
b	0	All possible tests using the specified FETL (see f-ggg-hhhhhhh)
	1	Loss and noise tests
	2	Noise with tone test
	3	Gainslope and PAR tests
	4	Balance tests*
c†	7	Near-end = local, far-end = local [For HILO 4-wire trunks near-end = tandem I ‡, far-end = local]
	8	Near-end = tandem I, far-end = tandem [For HILO 4-wire trunks near-end = tandem I ‡, far-end = local]
	9	Near-end = tandem II, far-end = tandem [Invalid for HILO 4-wire trunks]
dddddd	—	Trunk network number TNN of trunk to be tested
eee§	100	Code 100 FETL (5-second milliwatt, quiet termination)
	102	Code 102 FETL (milliwatt interrupted at 10-second intervals)
	105	Code 105 FETL (ATMS responder)
f	0	Access code
	1	Access code
	X	No access code needed
ggg	—	Valid three-digit area code
	XXX	No area code required
hhhhhhh	—	Combination of leading default characters (X), if needed, and decimal DN digits

TABLE E (Cont)

TEST-TRK INPUT MESSAGE

Notes:

* To obtain valid results for a balance test, the near-end of TUT must be placed in tandem II state and a FETL directory number used which will place the far-end of TUT in the tandem state. [For HILO TUTS the near-end must be placed in the tandem I state, the far-end in the tandem state.]

† Field c and the FETL directory number must both indicate the same state of the far-end of the trunk under test. The program has no way of verifying this.

‡[For HILO 4-wire trunks, the talk state is referred to as tandem I state.]

§ Field eee and the FETL directory number must both indicate the same type of FETL. The program has no way of verifying this.

SYSTEM RESPONSE
NG — Invalid input information. f-ggg-hhhhhhh contains an alphabetic character other than the default character X, or a default character is embedded in DN digits. All other errors are detected and later printed in an AT01 message.
NO — No incoming trunk test register available or no room in MACII request Table A.
PF — Followed by an AT01 message with failing and/or passing information. A DR04 and/or an MA02C message could result if a MACII abort occurs.

TABLE F

TRK-GROUP INPUT MESSAGE

INPUT MESSAGE FORMAT:

TRK-GROUP-aa b c dddd.

Used to request that the ATMS processor controlled interrogator perform the specified transmission tests on all idle trunks in the specified trunk group using the far-end test line found in the automatic trunk test table.

EXPLANATION OF VARIABLE FIELD

FIELD	TTY CHARACTERS	DEFINITION
aa	TT	Trunk group transmission test
b	0	All possible tests using the FETL specified in the automatic trunk test table
	1	Loss and noise tests
	2	Noise with tone test
	3	Gainslope and PAR tests
	4	Balance tests*
c	7	Near-end = local, far-end = local [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]
	8	Near-end = tandem I, far-end = tandem [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]
	9	Near-end = tandem II, far-end = tandem [Invalid for HILO 4-wire trunks]
dddd	—	Trunk group number (TGN) to be tested

Note:

* For a valid balance test, near-end of TUT must be in tandem II state and far-end in tandem state [For HILO TUTS the near-end must be placed in the tandem I state, the far-end in the tandem state]

†[For HILO 4-wire trunks, the talk state is referred to as tandem I state]

SYSTEM RESPONSE

NG — If information is invalid

NO — No general buffer table is available or no room in MACII routine request Table B.

PF — Followed by a TN15 (begin TGN test); followed by an AT01 message with failing and/or passing information for each trunk in the group; followed by a TN15 (end TGN test). A DR04 and/or a MA02C message could result if a MACII abort occurs

TABLE G

AUTO-TRK INPUT MESSAGE

INPUT MESSAGE FORMAT:

AUTO-TRK-a b cccccc deeee fgggg hiiii jkkkk.*

Used to request that the ATMS processor controlled interrogator perform a loss and noise test sequence on a single trunk or a trunk group using the far-end test line found in the automatic trunk test table and compare the results with the specified limits.

EXPLANATION OF VARIABLE FIELD

FIELD	TTY CHARACTERS	DEFINITION
a	A	Abort group test in progress
	G	Group of trunks (TGN specified in cccccc field)
	S	Single trunk (TNN specified in cccccc field)
b	7	Near-end = local, far-end = local [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]
	8	Near-end = tandem I, far-end = tandem [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]
	9	Near-end = tandem II, far-end = tandem [Invalid for HILO 4-wire trunks]
cccccc	—	Trunk group number (TGN) (two leading zeros plus 4 digit TGN)
	—	Trunk network number (TNN) (6 digits)
d	M	eeee field is minus
	P	eeee field is positive
eeee	0 D1 D2 D3	Expected measured loss (EML); nominal value of loss for TNN or TGN being tested (there is an assumed decimal point between D2 and D3)
f	M	gggg field is minus
	P	gggg field is positive
gggg	0 D1 D2 D3	Upper limit of loss for TNN (there is an assumed decimal point between D2 and D3)
h	M	iiii field is minus
	P	iiii field is positive

TABLE G (Cont)

AUTO-TRK INPUT MESSAGE

EXPLANATION OF VARIABLE FIELD (Cont)		
FIELD	TTY CHARACTERS	DEFINITION
iiii	0 D1 D2 D3	This is the lower limit of loss for TNN (there is an assumed decimal point between D2 and D3)
j	M	kkkk field is minus
	P	kkkk field is positive
kkkk	D1 D2 D3 0	This is the upper limit of noise for TNN (there is an assumed decimal point between D3 and 0)

Note:

* This message is designed for automatic paper tape operation. Each message on paper tape should be followed by X-OFF (ASCII DC3) and 5 or more RUB (ASCII DEL) characters.

† [For HILO 4-wire trunks, the talk state is referred to as tandem I state.]

SYSTEM RESPONSE
NO — Unassigned trunk group specified. — Request for trunk in trunk group 0 (a = s) or request for trunk group 0 (a = g & cccccc = 000000). — Invalid abort request. — Unable to handle request presently (no room on MACII Routine Request Table). — The requesting channel is not authorized to test specified trunk group or trunk (Centrex 7 and later). OK — Abort request accepted. PF — Test request accepted. Followed by AT01 output message.

AT01 with ggg = ATP are suppressed in CTX-7 and later generic programs.

TABLE H

REQUESTING PCI TRANSMISSION TESTS FROM TLTP/STTP

KEYS OPERATED	DIGITS DIALED								
TEST TRUNK OP	TNN 1	TNN 2	TNN 3	TNN 4	TNN 5	TNN 6	TC 1	TC 2	ST
TEST OP	TGN 1	TGN 2	TGN 3	TGN 4	TC 1	TC 2	ST		
	TC DIGIT DEFINITIONS								
TC1	0	All possible tests using FETL specified in automatic trunk test table							
	1	Loss and noise tests							
	2	Noise with tone test							
	3	Gainslope and PAR tests							
	4	Balance tests*							
TC2	7	Near-end = local, far-end = local [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]							
	8	Near-end = tandem I, far-end = local [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]							
	9	Near-end = tandem II, far-end = tandem [Invalid for HILO 4-wire trunks]							

Notes:

* Balance test is invalid unless near-end of TUT is in tandem II state and far-end is in tandem state. [For HILO 4-wire trunks, the talk state is referred to as tandem I state.]

†[For HILO 4-wire trunks, the talk state is referred to as tandem I state.]

SYSTEM RESPONSE

SINGLE TEST

When key sequence has been completed, the initial state of TUT will be indicated by the EQPT ST lamp in CTX-7 and earlier generic programs:

(a) Steady — TUT is traffic idle and maintenance idle
(b) 60 IPM — TUT is traffic busy, camp on TUT
(c) 120 IPM — TUT is traffic idle and maintenance busy.

TABLE H (Cont)

REQUESTING PCI TRANSMISSION TESTS FROM TLTP/STTP

When the key sequence has been completed, the initial state of the TUT will be indicated by the EQPT ST and REG lamps in CTX-8 and later generic programs:

EQPT ST	TUT MCTE STATE	REG	TUT TRAFFIC STATE
Steady	Active	Steady	Traffic Idle
60 IPM	Locked out	60 IPM	Traffic busy
120 IPM	Disabled		

SINGLE TEST (Cont)

If test cannot be performed, one of the following output messages will be printed:

(a) TL01 aa bb cccccc REQ — if the TNN is already being tested at another panel.
(b) TL01 aa bb ccc LIST — if the TNN is on a link list (TMLA, TGD, or receiver queue) which is too long to search at this time. It should be off this list shortly.
(c) TL02 aa TNN — if TNN is invalid.
(d) TL01 aa bbb cccccc DNY — if test could not be performed because of no room in MACII routine request Table A.

After ATMS processor controlled interrogator has performed the requested transmission tests, the P&E lamp will indicate:

(a) Steady — test complete
(b) 60 IPM — POB failure

When the P&E lamp lights, monitor the TTY until an AT01 message is printed to indicate the exact results of the transmission tests. A DR04 and/or MA02C message could occur on a MACII abort.

GROUP TEST

When key sequence has been completed, the P&E lamp will light steady for 5 seconds if the input TGN exists.

If a test cannot be performed, one of the following output messages will be printed:

(a) TL02 aa DE — if TGN is unassigned
(b) TL01 aa bbb cccccc DNY — if test could not be performed because of no room in MACII routine request Table B.

When the P&E lamp lights, monitor the TTY until an AT01 message is printed to indicate the exact results of the transmission tests. A DR04 and/or MA02C message could occur on a MACII abort.

TABLE I

REQUESTING PCI TRANSMISSION TESTS FROM MTTP

KEYS OPERATED	DIGITS DIALED									
TEST TNN TC	TNN 1	TNN 2	TNN 3	TNN 4	TNN 5	TNN 6	*	TC 1	TC 2	#
TEST TGN TC	TGN 1	TGN 2	TGN 3	TGN 4	*	TC 1	TC 2	#		

TC DIGIT DEFINITIONS		
TC1	0	All possible tests using FETL specified in automatic trunk test table
	1	Loss and noise tests
	2	Noise with tone test
	3	Gainslope and PAR tests
	4	Balance tests*
TC2	7	Near-end = local, far-end = local [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]
	8	Near-end = tandem I, far-end = local [For HILO 4-wire trunks, near-end = tandem I†, far-end = local]
	9	Near-end = tandem II, far-end = tandem [Invalid for HILO 4-wire trunks]

Notes:

* Balance test is invalid unless near-end of TUT is in tandem II state and far-end is in tandem state. [For HILO TUTs the near-end must be placed in the tandem I state, the far-end in the tandem state.]

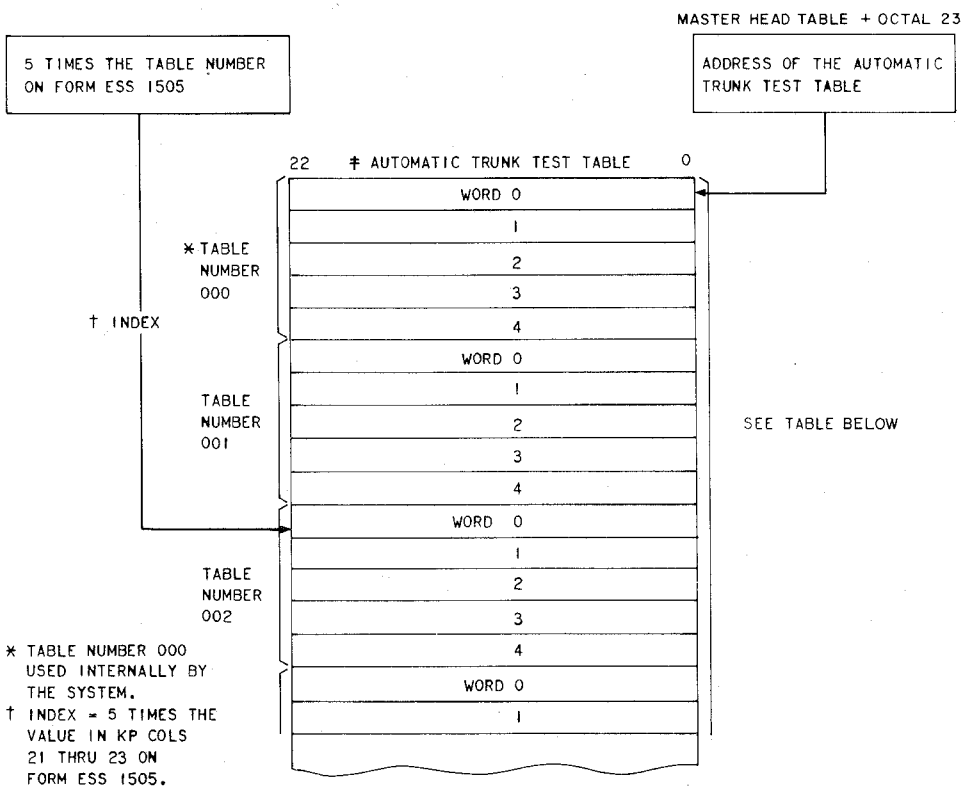
†[For HILO 4-wire trunks, the talk state is referred to as tandem I state.]

SYSTEM RESPONSE
SINGLE TEST
When key sequence has been completed, the initial traffic and maintenance states will be indicated by the appropriate lamps.

TABLE I (Cont)

REQUESTING PCI TRANSMISSION TESTS FROM MTTP

SINGLE TEST (Cont)
If test cannot be performed, one of the following output messages will be printed: (a) TL01 aa bb cccccc REQ — if the TNN is already being tested at another panel. (b) TL01 aa bb ccc LIST — if the TNN is on a link list (TMLA, TGD, or receiver queue) which is too long to search at this time. It should be off this list shortly. (c) TL02 aa TNN — if TNN is invalid. (d) TL01 aa bbb cccccc DNY — if test could not be performed because of no room in MACII routine request Table A. After ATMS processor controlled interrogator has performed the requested transmission tests, the P&E lamp will indicate: (a) Steady — test complete (b) 60 IPM — POB failure When the P&E lamp lights, monitor the TTY until an AT01 message is printed to indicate the exact results of the transmission tests. A DR04 and/or MA02C message could occur on a MACII abort.
GROUP TEST
When key sequence has been completed, the P&E lamp will light steady for 5 seconds if the input TGN exists. If a test cannot be performed, one of the following output messages will be printed: (a) TL02 aa DE — if TGN is unassigned (b) TL01 aa bbb cccccc DNY — if test could not be performed because of no room in MACII routine request Table B. When the P&E lamp lights, monitor the TTY until an AT01 message is printed to indicate the exact results of the transmission tests. A DR04 and/or MA02C message could occur on a MACII abort.



	22 20	19 16	15 12	11 8	7 4	3 0
WORD 0	ØPT	D1	D2	D3	D4	D5
1	ØPT	D1	D2	D3	D4	D5
2	ØPT	D1	D2	D3	D4	D5
3	TWO TLT	D1	D2	D3	D4	D5
4	TWO TLT	D1	D2	D3	D4	D5

WORD 0: PERMANENT BUSY TEST NUMBER

WORD 1: SYNCHRONOUS LINE TEST NUMBER

WORD 2: NON-SYNCHRONOUS LINE TEST NUMBER
ØPT = OPTIONS
0 = SINGLE LINE ENTRY (LESS THAN 6 DIGITS), NOT A PRIMARY TEST
1 = SINGLE LINE ENTRY (LESS THAN 6 DIGITS), PRIMARY TEST
4 = TWO-LINE ENTRY (GREATER THAN 6 DIGITS), NOT A PRIMARY TEST
5 = TWO-LINE ENTRY (GREATER THAN 6 DIGITS), PRIMARY TEST

WORD 3: ATMS DIRECTORY NUMBER (LOCAL)
TWØ = 0 IF OUTPULSING INFORMATION IS 5 DIGITS OR LESS
= 1 IF OUTPULSING INFORMATION IS GREATER THAN 5 DIGITS (IN THIS CASE, THE REMAINING DIGITS ARE STORED IN THE SECOND BLOCK OF 5 DIGITS)
TLT = FAR-END TEST LINE TYPE
TYPE 100 = 00
TYPE 105 = 01
TYPE 102 = 10

WORD 4: ATMS DIRECTORY NUMBER (TANDEM)
TWØ = 0 IF OUTPULSING INFORMATION IS 5 DIGITS OR LESS
= 1 IF OUTPULSING INFORMATION IS GREATER THAN 5 DIGITS (IN THIS CASE, THE REMAINING DIGITS ARE STORED IN THE SECOND BLOCK OF 5 DIGITS)
TLT = FAR-END TEST LINE TYPE
TYPE 100 = 00
TYPE 105 = 01
TYPE 102 = 10

Fig. 2—Automatic Trunk Test Tables Translator

TABLE J

AT01 OUTPUT MESSAGE

OUTPUT MESSAGE FORMAT:

AT01 TGN = ¢¢¢a TNN = bbbbbb ¢ccc TL = ddd eee-fff

ggg ¢¢¢ ¢¢¢ ± ¢¢¢ .¢ ± ¢¢¢ .¢ ± ¢¢¢ .¢

•
•
•

¢n¢n¢n¢n¢n¢n¢n

This message reports the results of requested ATMS processor controlled interrogator transmission tests

EXPLANATION OF VARIABLE FIELD

FIELD	TTY RESPONSE	DEFINITION
¢¢¢a		Trunk group number of trunk under test (TUT)
bbbbbb		Trunk network number of TUT
¢ccc	TLTP	Source of request is trunk and line test panel or supplementary trunk test panel
	TTY	Source of request is TTY message (T-TNN-, TEST-TRK, or TRK-GROUP-messages)
	ATI	Source of request is TTY automatic trunk interrogating (AUTO-TRK-message)
ddd	100	Code 100 far-end test line (FETL)
	102	Code 102 FETL
	105	Code 105 FETL
eee	LOC	Near-end of TUT is in local state
	TM1	Near-end of TUT is in tandem I state [For HILO 4-wire TUTs, the near-end is in talk state]
	TM2	Near-end of TUT is in Tandem II state
fff	LOC	Far-end of TUT is in local state
	TDM	Far-end of TUT is in tandem state
ggg	BLK*	Blocked, try again
	BSY	TNN traffic busy

TABLE J (Cont)

AT01 OUTPUT MESSAGE

FIELD	TTY RESPONSE	DEFINITION
ggg (cont)	CGA	TNN on active carrier group alarm
	DRF	Data ready failure
	DTI	Data type incorrect
	ERL	Echo return loss test results
	ERR*	Translation error
	FED*	Far-end disconnect
	GS1	Gainslope test results at 1004 Hz
	GS2	Gainslope test results at 2805 Hz
	GS4	Gainslope test results at 405 Hz
	H&W	TNN is high and wet
	INV*	Input message information invalid
	LOS	Loss test results
	LTR	Low tone received
	NEQ	The available FETL (specified in ddd) was not equipped to perform the requested test
	NOI	Noise test results
	NTL	No test line information in the automatic trunk test table
	NWT	Noise with tone test results
	OPF*	Out pulsing failure over TUT
	O/S	TNN out of service
	PAR	Peak-to-average ratio test results
	POB*	POB failure (bad signal distributor relay or master scan point)
	ISC*†	Interrogator self-check failure
	SLH	Singing return loss (high intercept) test results
	SRL	Singing return loss (low intercept) test results
	TGO	TNN in trunk group O.

TABLE J (Cont)

AT01 OUTPUT MESSAGE

FIELD	TTY RESPONSE	DEFINITION
ggg (cont)	TMB	TNN on operated trunk make busy key
	TOF*	Time-out far end
	TON*	Time out near end
	TPU*	ROTL test port not available
	TSF	Test state failure
	TTP	TNN is presently up at another test panel
	UA	TNN is unassigned
	51B*	Far-end has 51B responder which can only perform 2-way loss and noise tests
hh‡	FC	Far-end self-check
	FN	Far-to-near test result
	NC	Near-end self-check
	NF	Near-to-far test result
jjj§	FLT*	An interrogator test fault has occurred
	NEQ*	Far-end 52A responder not equipped to handle requested test
	UND*	Measurement is under range of interrogator measuring equipment
	INV*	Test results may be invalid
±jjj.j	0 D1 D2.D3	(For loss and gainslope measurements) readout of interrogator 3 digit binary coded decimal output data
	D1 D2 D3.0	(For noise, noise with tone, PAR and balance measurements) readout of interrogator binary coded decimal output data.

TABLE J (Cont)

AT01 OUTPUT MESSAGE

FIELD	TTY RESPONSE	DEFINITION
±kkk.k	0 D1 D2.D3	Limit of loss for AUTO-TRK-message test; when loss exceeds a specified limit, this limit is printed. If iii = INV, this field indicates the maximum value of loss or gainslope that the responder can accurately measure. If iii = UND, this field indicates the minimum value of loss or gainslope that the responder can accurately measure.
	D1 D2 D3.0	Limit of noise for AUTO-TRK-message test; when noise exceeds a specified limit, this limit is printed. If iii = INV, this field indicates the maximum value of noise, noise with tone, PAR, or balance that the responder can accurately measure. If iii = UND, this field indicates the minimum value of noise, noise with tone, PAR, or balance that the responder can accurately measure.
±jjj.j	0 D1 D2.D3	Normal loss value for AUTO-TRK-message test; when loss exceeds a certain limit, the normal value is printed.
mmmmm mmmmm	—	The failing address, if a failure occurs. This is the address in the program at time of failure. (See 1.05)

Notes:

* Use failing address mmmmmmmmmm to locate failing point in PR-1A073 for additional failure information.

† When ggg = ISC, then ±jjj.j may be helpful in determining why the interrogator self-check failed. A successful interrogator self-check would indicate ISC FC FLT - 0 7 15.15 (part 1) and ISC NC ±000.0 (part 2).

‡ When ggg = (LOS, NOI, GS4, GS1, GS2, NWT, PAR, ERL, SLH, or SRH) and hh = FC or NC then ±jjj.j may be helpful in determining why the responder self-check failed. For loss and gainslope responder self-checks, the acceptable limits are ±000.1 and ±000.2, respectively. For noise, noise and tone, PAR, and balance responder self-checks, the acceptable limit is ±001.0

§ When jjj = FLT, then:
jjj.j = 001.0 - Loss of priming information
002.0 - Underrange
003.0 - Test faults 1 & 2 above
004.0 - Not equipped
005.0 - Test faults 1 & 4 above
006.0 - Not logically feasible (hardware problem)
007.0 - No data received
Test faults 1, 3, 5 and 7 cause a release signal to be sent to the far-end; in these cases, testing is immediately terminated.

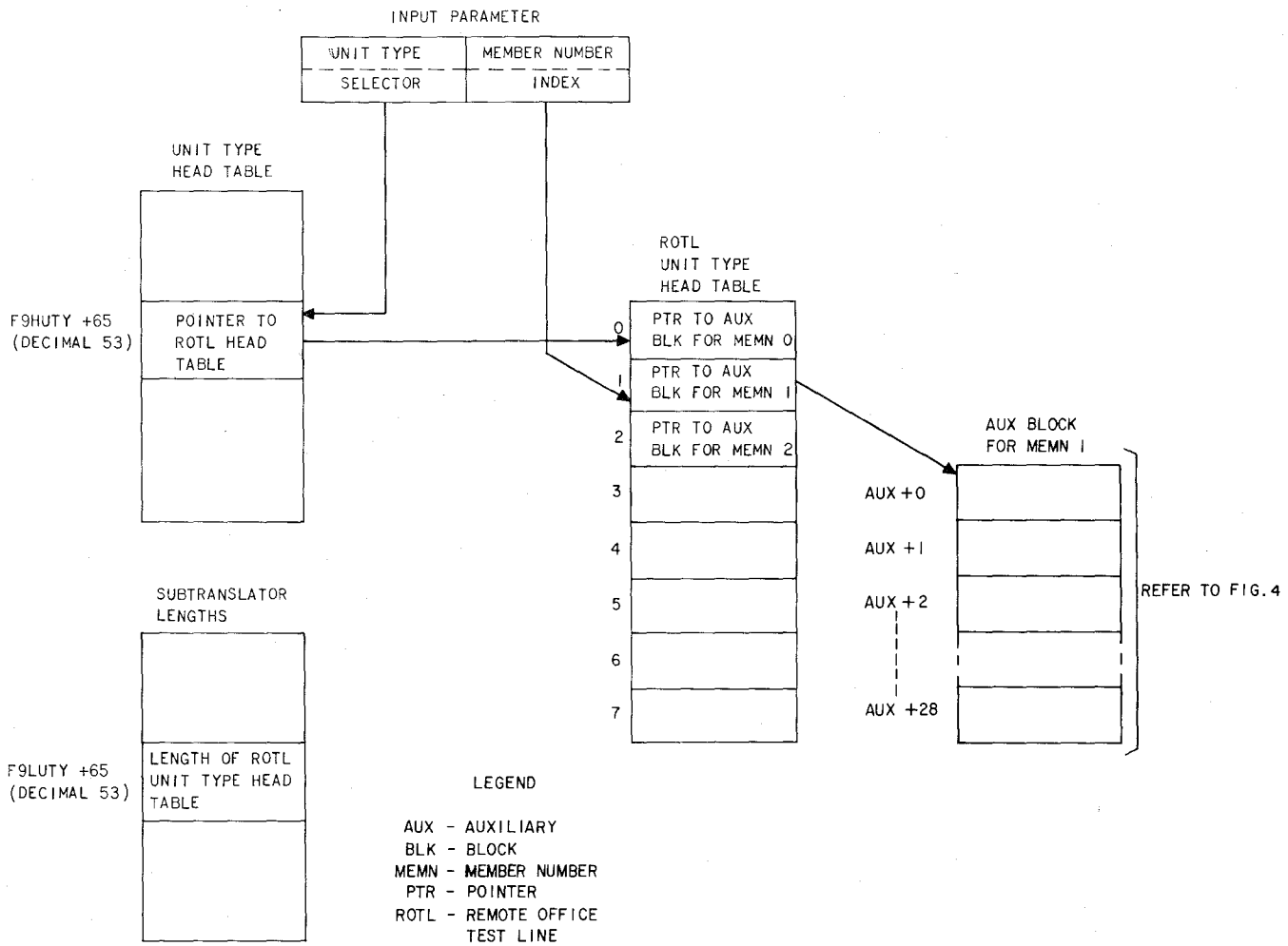


Fig. 3—Layout of Remote Office Test Line Translator (Unit Type 53)

UNIT TYPE (UTYN) 53 ROTL AUXILIARY BLOCK

	22 21 20 19 18	17 16 15 14 13 12 11 10 9 8 7	6 5 4 3 2 1 0	
AUX +0	WRDN = 29	0 0 0 0 0 0 0 0 0 0 0	MEMN	A
+1	QTY = 11 [12]	MTDN (ROTL APPLIQUE)		B
+2	QTY = 2	MTDN (ROTL INTERRUPTER APPLIQUE)		B
+3	QTY = 7	0 0	MSN - SUP (ROTL APPLIQUE)	C
+4	QTY = 2	0 0	MSN - DIR (ROTL APPLIQUE)	C
+5	0 0 0 0 0 0 0 0	TNN-ROTL ACCESS PORT 0		D
+6	0 0 0 0 0 0 0 0	TNN-ROTL ACCESS PORT 1		D
+7	0 0 0 0 0 0 0 0	TNN-2-WIRE ROTL TEST PORT (SD1A166-02)		D
+8	ACC CODE 0	D9	D10 D1 D2 D3	E
+9	MB TCL	D8	D4 D5 D6 D7	F
+10	ACC CODE 0	D9	D10 D1 D2 D3	E
+11	MB TCL	D8	D4 D5 D6 D7	F
	≷			≷
+22	ACC CODE 0	D9	D10 D1 D2 D3	E
+23	MB TCL	D8	D4 D5 D6 D7	F
+24	QTY = 13	MTDN (PCI SD APPLIQUE)		B
+25	0 OR [TNN-HILO 4-WIRE ROTL TEST PORT (SD1A362)]			[D]
+26	QTY = 2	0 0	MSN - SUP (PCI)	C
+27	QTY = 23	0 0	MSN - DIR (PCI)	C
+28	0 0 0 0 0 0 0 0	TNN - PCI ACCESS PORT (SD1A218-01)		D

NOTES:

1. WORD 1-7 APPLIES TO THE ROTL APPLIQUE CIRCUIT, SD-1A314-01 [SD-1A433-01].
2. WORDS 8 THROUGH 23 CONTAIN CALL BACK NO'S. 1 THROUGH 8.
3. ACC CODE = 00 IF NO PREFIX
   ACC CODE = 01 IF PREFIX IS 0
   ACC CODE = 10 IF PREFIX IS 1
4. THE MB ITEM IS SET TO 1 IF THE LOCATION IDENTIFIED BY THE SECURITY CALL BACK NUMBER IS ALLOWED TO OVERRIDE AUTOMATIC TRUNK MAINTENANCE LIMIT.
5. TCL = 00 - BOTH LOCAL AND LONG LINES
   TCL = 01 - LOCAL ONLY
   TCL = 10 - LONG LINES ONLY
6. WORDS 24 AND 26-28 APPLY TO PROCESSOR CONTROLLED INTERROGATOR (PCI).

LEGEND:

ACC - ACCESS CODE
AUX - AUXILIARY
DIR - DIRECTED
DN - DIGIT NUMBER
G - GRID
MB - MAKE BUSY
MEMN - MEMBER NUMBER
MSN - MASTER SCANNER NUMBER
MTDN - MISCELLANEOUS TRUNK SIGNAL DISTRIBUTOR NUMBER
QTY - QUANTITY
SD - SIGNAL DISTRIBUTOF
SUP - SUPERVISORY
SW - SWITCH
TCL - TOLL/LOCAL CONTROL
TLN - TRUNK LINK NETWORK
TNN - TRUNK NETWORK NUMBER
WRDN - WORD NUMBER

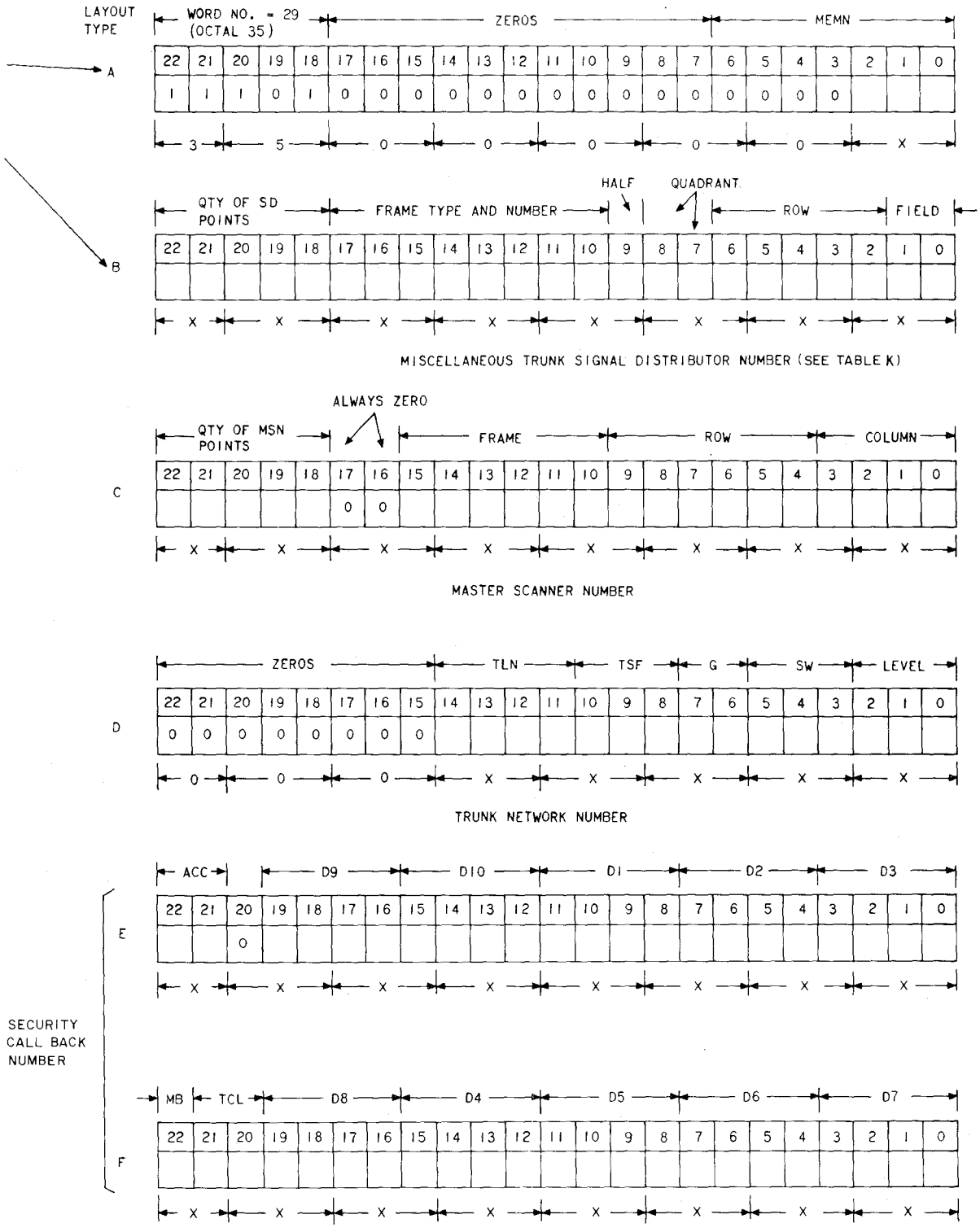


Fig. 4—Layout of Remote Office Test Line Unit Type Auxiliary Block (Unit Type 53)

TABLE K

SD FRAME TYPE, FRAME NUMBER, AND POINT INFORMATION

(1)	(2)	(3)	(4)	(5)
FRAME TYPE AND NUMBER (BITS 10 THROUGH 17 IN AUX +1, 2 OR 24) CONVERTED TO DECIMAL	SIGNAL DISTRIBUTOR FRAME TYPE	FIELD b IN T-MISD INPUT MESSAGE	SUBTRACT THIS NUMBER FROM FRAME TYPE AND NUMBER (1) – (4) = (5)	FRAME STAMPING NUMBER FIELD ccc IN T-MISD INPUT MESSAGE
00 through 15	Supplementary	M	0	00 through 15
16 through 47	Junctor	J	16	00 through 31
48 through 175	Universal trunk	U	48	00 through 127
176 through 207	Supplementary	M	144	32 through 63
210 through 237	—	—	—	—
240 through 255	Supplementary	M	224	16 through 31

TABLE L

NON-TRUNK PROGRAM INDICES
FOR ROTL EQUIPMENT

Equipment Type	NTPI
1. ROTL Frame	27
2. ROTL Applique - Supervisory	55
3. ROTL Applique - Directed	0
4. PCI - Supervisory	56
5. PCI - Directed	0

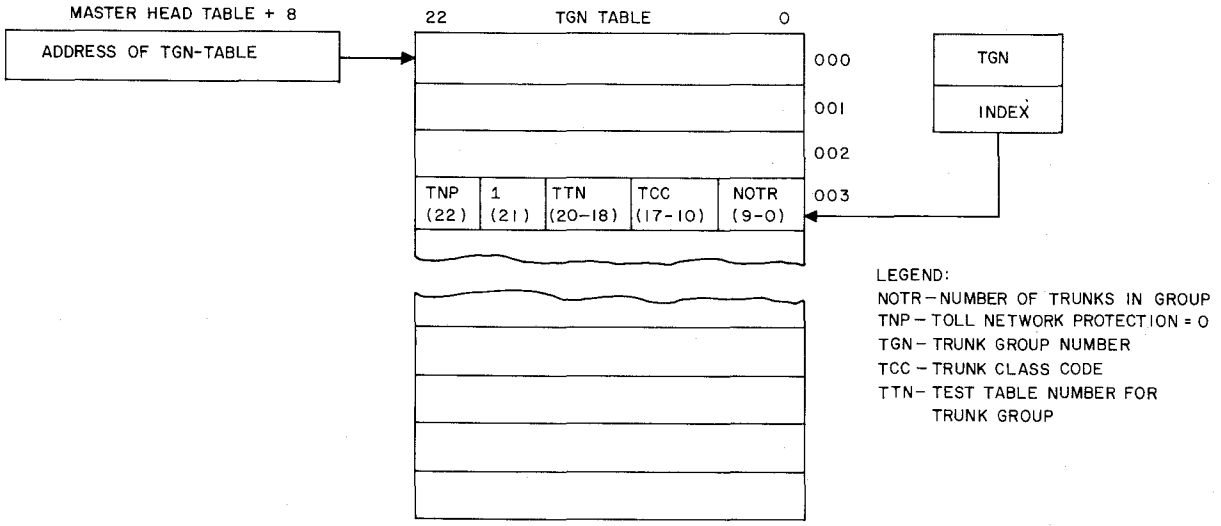
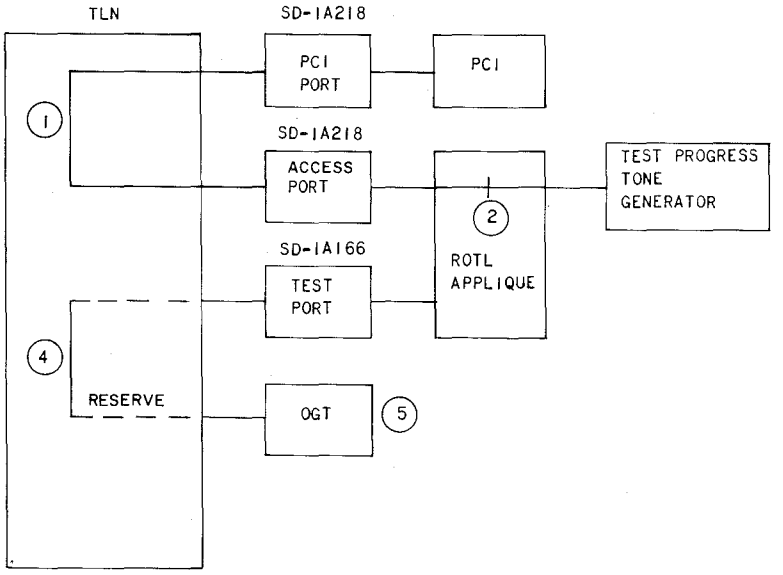


Fig. 5—Trunk Group Number to Trunk Class Code and Number of Equipped Trunks Translation

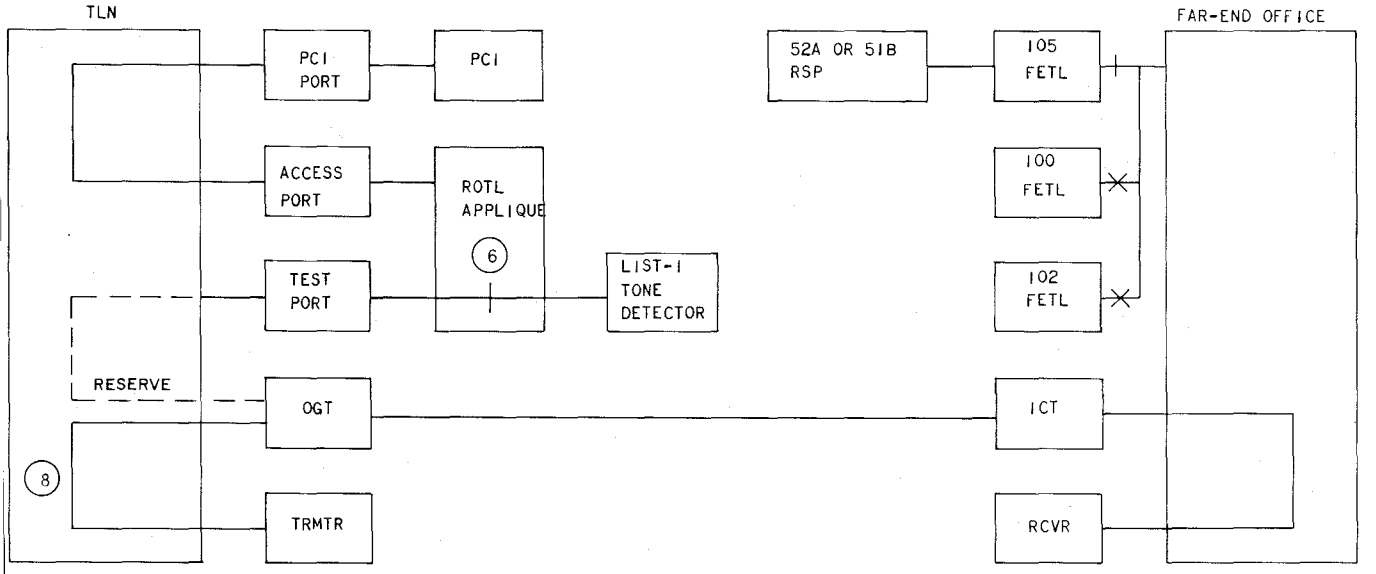
TABLE M

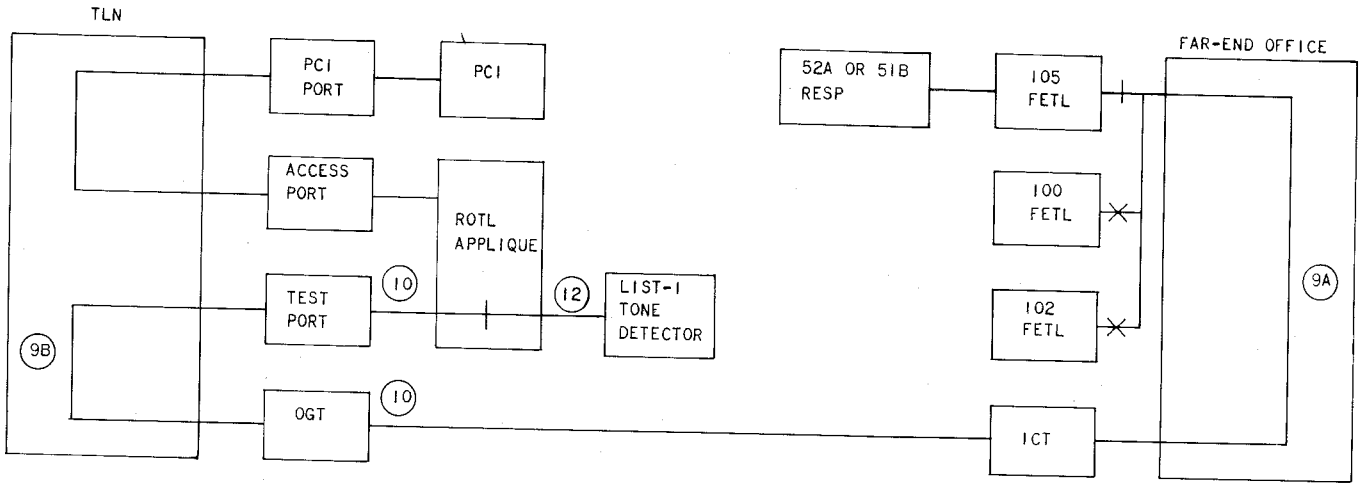
FIXED ROUTE INDICES FOR TRANSMISSION TEST LINES

RI	FETL	STATE OF TRUNK
109	100	TANDEM
171	100	LOCAL
97/99	102	TANDEM
172	102	LOCAL
108	105	TANDEM
173	105	LOCAL



1. ESTABLISH PATH BETWEEN PCI AND ROTL ACCESS PORT.
2. SEIZE COMMON EQUIPMENT (ROTL APPLIQUE, TONE DETECTOR, ROTL TEST PORT).
3. SEIZE AN INCOMING REGISTER.
4. RESERVE A PATH BETWEEN THE ROTL TEST PORT AND THE TUT.
5. TUT IS BLIND IDLED.
6. PUT ROTL INTO LISTEN STATE (A, B AND C RELAYS OPERATED) SO THAT THE TONE DETECTOR CAN DETECT TPT AND CT FROM THE FETL.
7. CHECK VALIDITY OF DIRECTORY NUMBER (IF POSSIBLE).
8. CONNECT A TRANSMITTER TO THE TUT AND OUTPULSE.





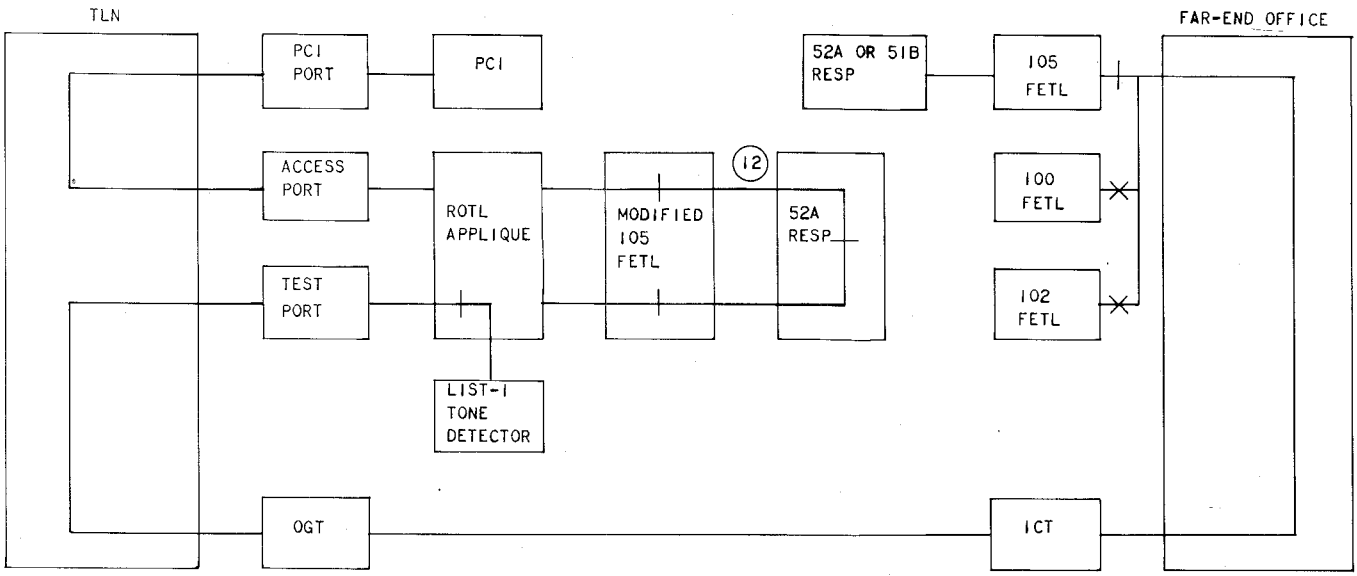
(9A) ICT CONNECTED TO DESIRED FETL

(9B) CONNECT ROTL TEST PORT TO THE TUT

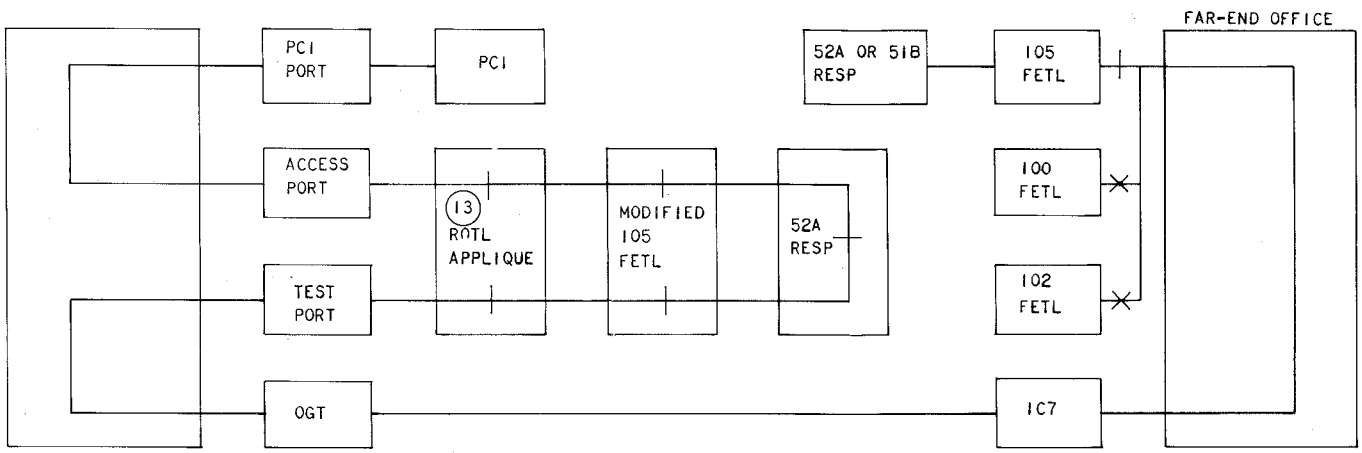
(10) PLACE OGT INTO DESIRED STATE (LOCAL, TAMDEM I, OR TANDEM II) AND TEST PORT IS PLACED IN BYPASS STATE

(11) INFORMATION ON THE TEST CONNECTION IS MOVED FROM THE IR INTO THE ITTR AND THE IR IS IDLED

(12) TONE DETECTOR MONITORS TUT UNTIL CUT THROUGH IS DETECTED

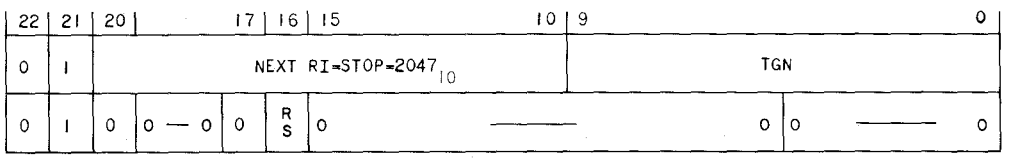


(13) PUT ROTL IN SEIZE STATE (A AND C RELAYS OPERATED) IN ORDER TO GET NEAR-END RESPONDER



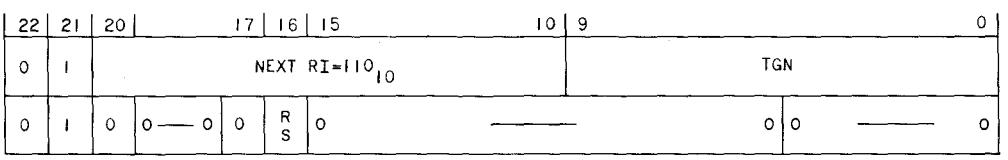
(14) PLACE ROTL APPLIQUE IN TEST STATE (RELAYS C, D AND K OR C, E AND L PLUS APPROPRIATE PADDING RELAYS ARE OPERATED)

Fig. 6—PCI Test Connection Sequence



LEGEND:
RS = RETURN ANSWER SUPERVISION = 1
RI = ROUTE INDEX
TGN = TRUNK GROUP NUMBER

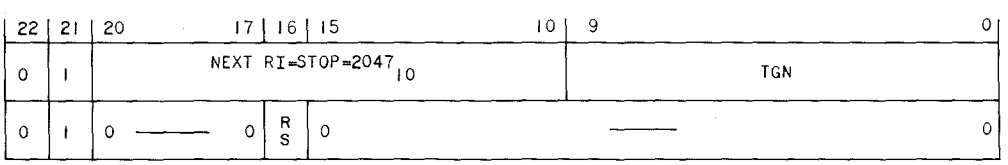
A. ROUTE INDEX EXPANSION FOR ROUTE INDEX 110_{10} USED FOR ROTL ACCESS PORT 0



LEGEND:
RS = RETURN ANSWER SUPERVISION = 1
RI = ROUTE INDEX
TGN = TRUNK GROUP NUMBER

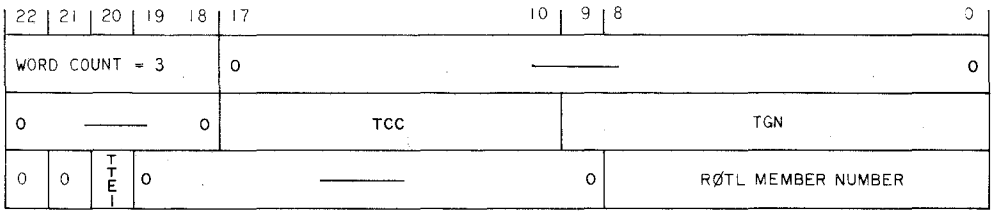
B. ROUTE INDEX EXPANSION FOR ROUTE INDEX 111_{10} USED FOR ROTL ACCESS PORT 1

Fig. 7—Route Index Expansion For ROTL Access Ports



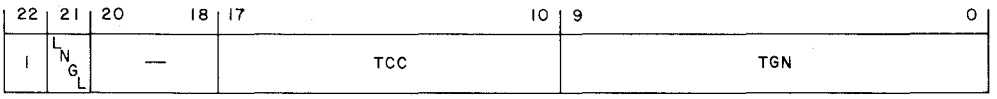
LEGEND:
RS = RETURN ANSWER SUPERVISION = 1
RI = ROUTE INDEX
TGN = TRUNK GROUP NUMBER

Fig. 8—Route Index Expansion For PCI Access Port



LEGEND:
TTEI = TRANSMISSION TEST EQUIPMENT INDICATOR = 1
TCC = TRUNK CLASS CODE
TGN = TRUNK GROUP NUMBER

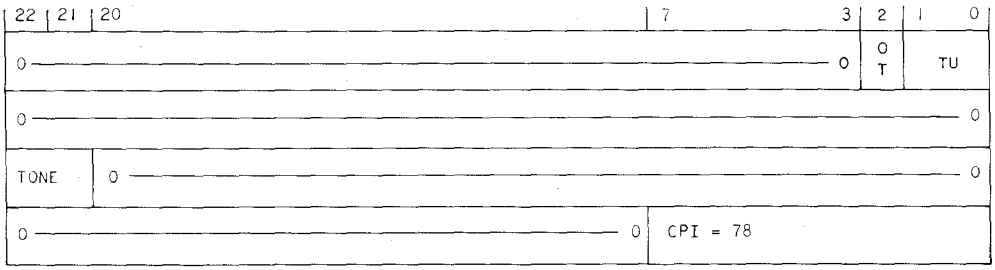
A. TRUNK NETWORK NUMBER TO TRUNK GROUP NUMBER AND CLASS CODE TRANSLATION FOR PCI ACCESS AND ROTL ACCESS AND TEST PORTS



LEGEND:
LNGL = LONG LINES TRUNK INDICATOR

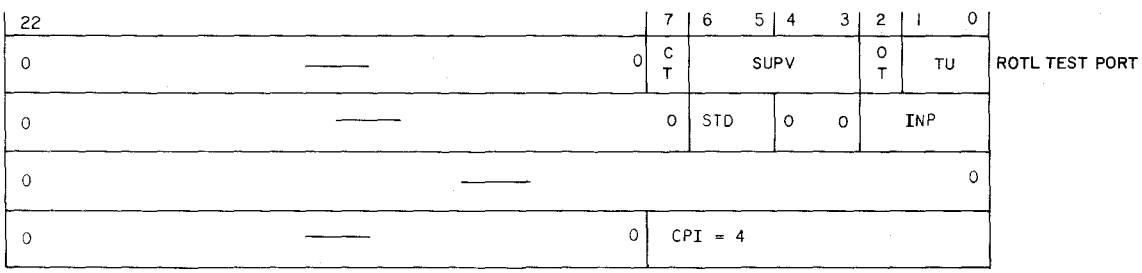
B. TRUNK NETWORK NUMBER TO TRUNK GROUP NUMBER AND CLASS CODE TRANSLATION FOR 105 TEST LINES

Fig. 9—Trunk Network Number to Trunk Group Number and Class Code Translator



LEGEND:

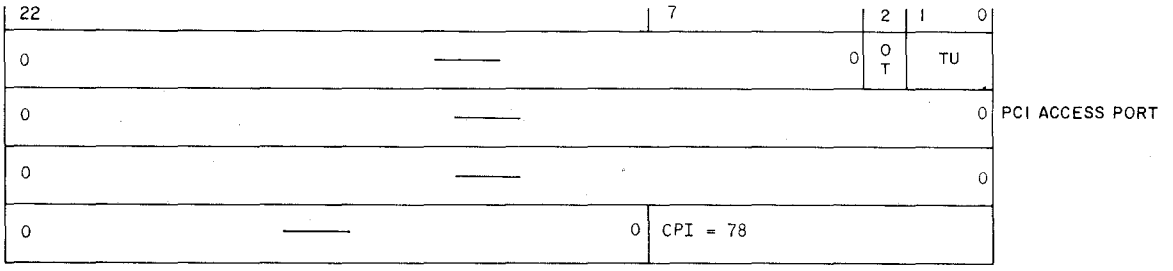
OT = 1 = WORD 3 IS APPLICABLE
TU-TRUNK USAGE = 3 = MISCELLANEOUS
TONE = 1 = STEADY
CPI = 78 = CIRCUIT PROGRAM INDEX
ORDER CODE = 07870
SD = 1A218-01 UNIVERSAL TRUNK - 2 CKTS/UNIT
SPI = 9



LEGEND:

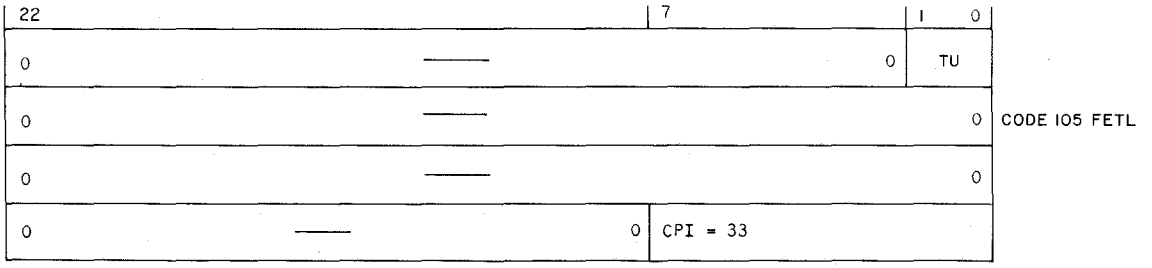
CT = 1 = IDLE CIRCUIT TERMINATION
SUPV = 1 = REVERSE BATTERY
TU-TRUNK USAGE = 1 = INCOMING
STD = 2 = WINK
INP = 1 = MF
OT = 1 = WORD 3 IS APPLICABLE
CPI = 4 = CIRCUIT PROGRAM INDEX
ORDER CODE = 00410
SD = 1A166-02 UNIVERSAL TRUNK - 2 CKTS/UNIT
SPI = 4

Fig. 10—Trunk Class Code Expansions (Sheet 1)



LEGEND:

OT = 1 = WORD 3 IS APPLICABLE
TU-TRUNK USAGE = 3 = MISCELLANEOUS
CPI = 78 = CIRCUIT PROGRAM INDEX
ORDER CODE = 07870
SD = IA218-01 UNIVERSAL TRUNK - 2 CKTS/UNIT
SPI = 9



LEGEND:

TU-TRUNK USAGE = 3 = MISCELLANEOUS
CPI = 33 - CIRCUIT PROGRAM INDEX
ORDER CODE = 03370
SD = IA303-01 TRANSMISSION TEST COUPLER - 4 CKTS/UNIT
TPI = 4

Fig. 10—Trunk Class Code Expansions (Sheet 2)

TABLE N

PSEUDO ROUTE INDICES FOR HILO 4-WIRE TRANSMISSION TEST LINES

PRI	FETL
5	100/102
9	105

TABLE O

PROGRAM INDICES FOR ROTL
TRUNK CIRCUITS

SD NUMBER	TP1	SP1
1A-218	—	9
1A-303	4	—
1A-166	—	4

TABLE P

PROGRAM INDICES FOR HILO
4-WIRE ROTL TRUNK CIRCUITS

SD NUMBER	SPI	TPI
1A-361	0	SCO = 0
1A-388	—	SCI = 9
1A-362	32	—
1A-396	38	—

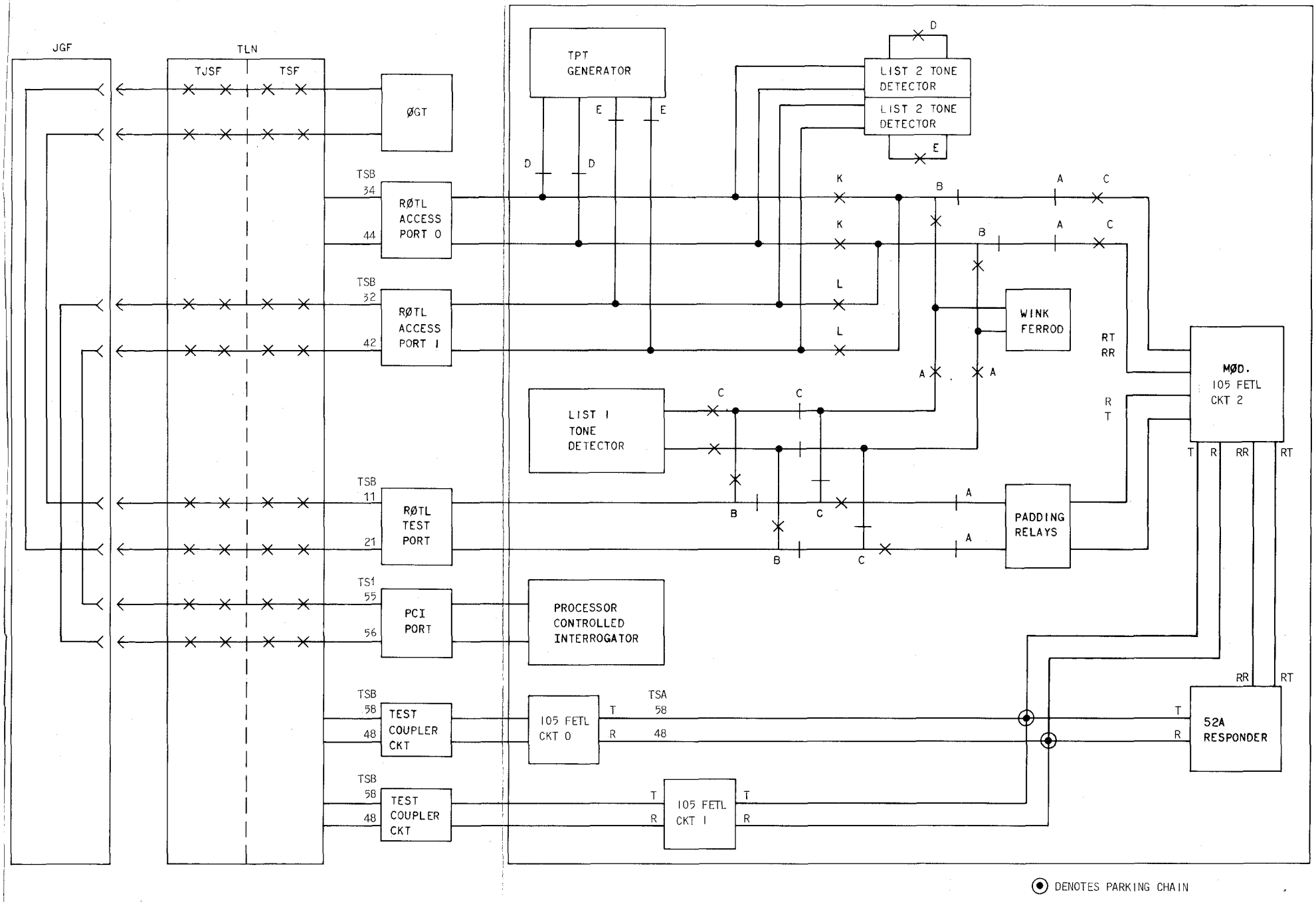


Fig. 11—ROTL Frame Interconnections

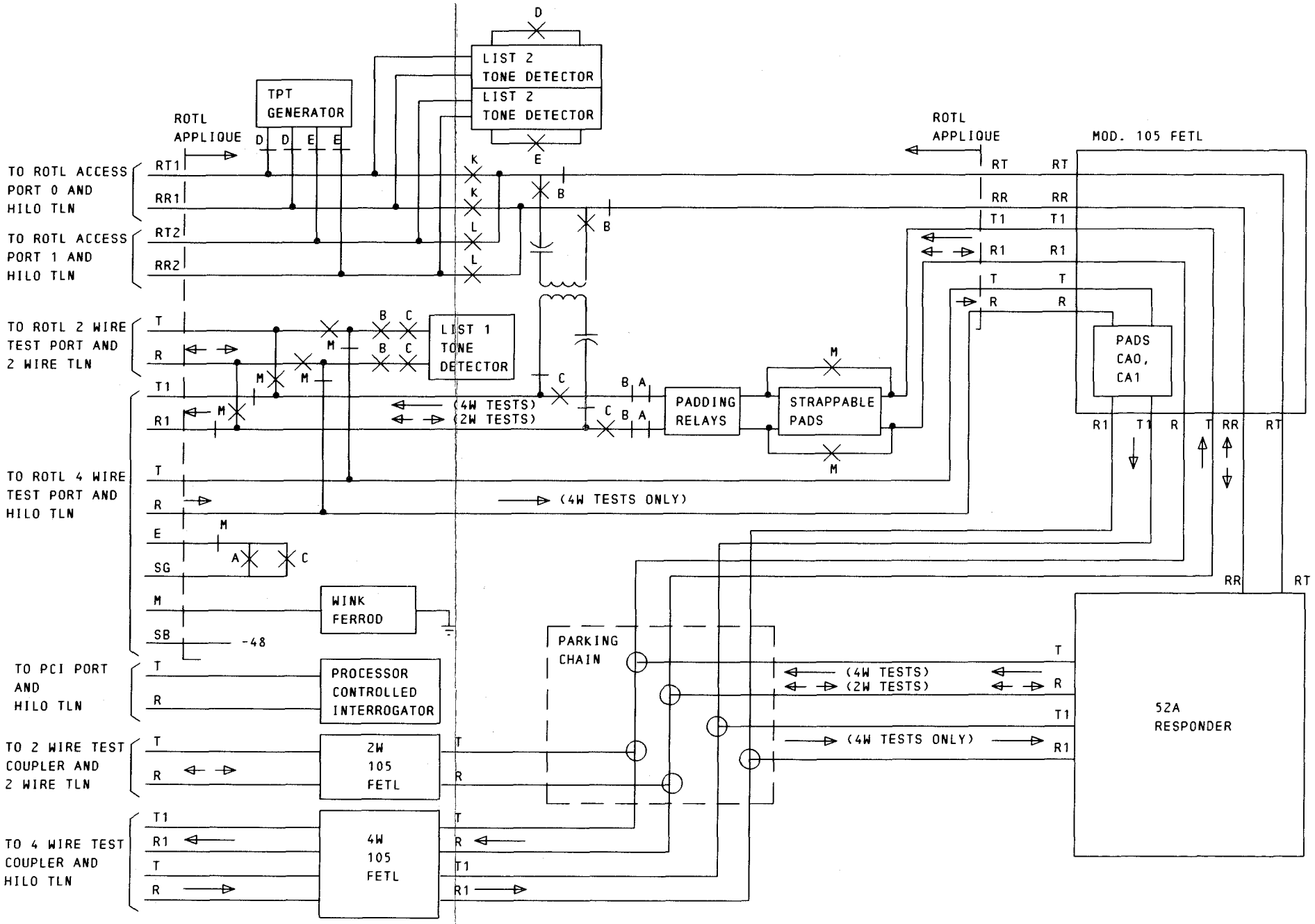
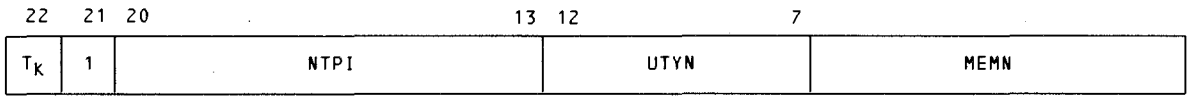


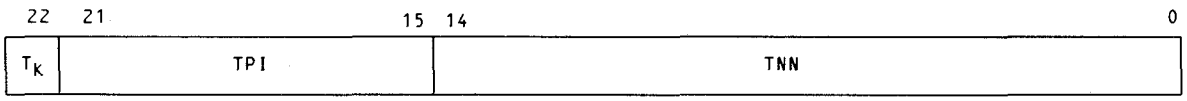
Fig. 12—HILO 4-Wire ROTL Frame Interconnections



TK = TRUNK INDICATOR = 0
NTPI = NON-TRUNK PROGRAM INDEX (SEE TABLE B)
UTYN = UNIT TYPE NUMBER = 53
MEMN = MEMBER NUMBER

7 ROTL SUPERVISORY/2 ROTL DIRECTED/2 ROTL FRAME SUPERVISORY/
2 PCI SUPERVISORY/23 PCI DIRECTED SCAN POINTS

105 TEST LINE SUPERVISORY SCAN POINTS (2 PER TEST LINE)



TK = TRUNK INDICATOR = 1
TPI = TRUNK PROGRAM INDEX = 4
TNN = TRUNK NETWORK NUMBER

Fig. 13—Master Scanner Number Translation

TABLE Q

ROTL SIGNAL DISTRIBUTOR POINTS

ROTL SIGNAL DISTRIBUTOR POINTS

FUNCTION	SIGNAL DISTRIBUTOR RELAY NUMBER	SYMBOL	PIN LOCATIONS* SD-1A314		PIN LOCATIONS† SD-1A433	
State Relays	0	A	TS (E)	13	TS (C)	11
	1	B	TS (E)	23	TS (C)	12
	2	C	TS (E)	14	TS (C)	13
TPT Relays	3	D	TS (E)	24	TS (C)	14
	4	E	TS (E)	15	TS (C)	15
Padding Relays	5	F	TS (E)	25	TS (C)	16
	6	G	TS (E)	16	TS (C)	17
	7	H	TS (E)	26	TS (C)	18
	8	J	TS (E)	17	TS (C)	21
Cut thru Relays	9	K	TS (E)	27	TS (C)	22
	10	L	TS (E)	18	TS (C)	23
2-Wire Relay	11	M	Not Applicable		TS (C)	24

* Signal Distributor Ground (SDG) on TS (E) pin 28

† Signal Distributor Ground (SDG) on TS (C) pin 25

ROTL INTERRUPTER APPLIQUE POINTS

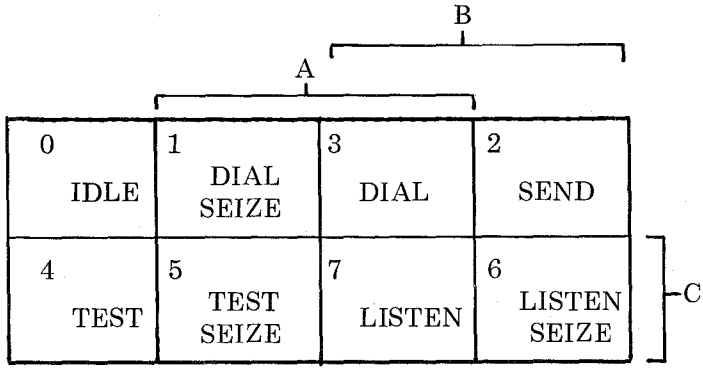
RELAY B	RELAY A	FUNCTION
0	0	OFF
0	1	120 IPM
1	0	Low Tone Steady
1	1	60 IPM

Connection from Interrupter Applique to TS (A) 45 and 35

TABLE Q (Cont)

ROTL SIGNAL DISTRIBUTOR POINTS

ROTL APPLIQUE



(1) DIAL SEIZE ($A\bar{B}\bar{C}$) state — A seizure is placed on the ROTL test port causing the system to connect an MF receiver to the ROTL test port. The ATTT program monitors the WINK scan point in order to recognize that the receiver has been connected. The program then places the ROTL applique circuit in the DIAL state.

(2) DIAL ($AB\bar{C}$) state — The ROTL access port is connected directly through to the ROTL test port so that the MF receiver connected to the ROTL test port can be used to collect priming information from the control location. At this point, the ATTT program would operate the D/E relays removing TPT from the ROTL access port. This serves as a signal to the control location that MF priming information will now be accepted by the ROTL control program.

(3) LISTEN SEIZE ($\bar{A}BC$) state — This state is used only for transmission test to code 100 test lines. Its purpose is to place the basic (list 1) tone detector on the ROTL test port while still maintaining a seizure on the near-end 52A responder. The tone detector is then used to monitor the trunk under test for cut-through to the code 100 test line. During this interval, there is total isolation of the near-end responder from both the ROTL access and the ROTL test ports. When the CT scan point saturates, TPT is sent to the control location via the TPA relay which is under the control of the list 1 tone detector. The ROTL control program immediately places the ROTL applique in the TEST state and transmission testing is ready to begin.

(4) LISTEN (ABC) state — This state is used only for transmission tests to code 102 and 105 test lines. Its purpose is to place the basic (list 1) tone detector on the ROTL test port without placing a seizure on the near-end 52A responder. The tone detector is then used to monitor the trunk under test for cut-through to the code 102/105 test line. When the CT scan point saturates, TPT is sent to the control location via the TPA relay which is under the control of the list 1 tone detector. The ROTL control then places the ROTL applique in the TEST SEIZE state in order to gain control of the near-end 52A responder.

TABLE Q (Cont)

ROTL SIGNAL DISTRIBUTOR POINTS

(5) TEST SEIZE ($A\bar{B}C$) state — This state provides total isolation of the 52A responder from the ROTL test and access ports while placing a seizure on the 52A responder. The ATTT program monitors the RESP scan point in order to recognize that the near-end 52A responder has been seized. At that point, the ROTL control program operates the D/E relay removing the TPT signal to the control location in order to indicate that the near-end 52A responder has been seized. It then places the ROTL applique in the TEST state so that transmission testing can begin.

(6) TEST ($\bar{A}\bar{B}C$) state — The ROTL access port is connected to the modified 105 test line which in turn is connected to the control tip-ring of the 52A responder. The ROTL test port is connected through the program controlled resistance pads to the testing tip-ring of the 52A responder. All transmission testing is performed with the ROTL applique in this state.

(7) SEND ($\bar{A}B\bar{C}$) state — This state is functionally the same as the IDLE state. The purpose of this state is

(a) Not to place a seizure on the ROTL test port
(b) Not to place a seizure on the near-end 52A responder
(c) Provide continuity to the LTM relay so that 60 ipm or steady low tone can be sent back to the control location.

Note: The D/E relay should be operated when the ROTL applique is in this state.

The SD-1A433 ROTL applique differs from the SD-1A314 applique in the following major respects:

(a) It provides either 2-wire or 4-wire priming and access to the 52A responder under the control of an additional relay (M).
(b) When testing a HILO 4-wire TUT, the required padding resistance is independent of the network on which the TUT appears. The required resistance depends only on the length of the wiring between the 52A responder and the ROTL test port circuit (SD-1A362), and on the characteristics of the test port itself. Therefore, when a HILO 4-wire TUT is being tested, the switchable pads are shorted out and replaced by two sets of strappable pads. (One set is located in the ROTL applique and the other in the ROTL 105 test line.)
(c) The HILO 4-wire applique does not need to place a seizure on the 2-wire test port, since digit reception is always performed on the HILO 4-wire network. Seizure and wink detection on the HILO 4-wire test port are accomplished by type II E and M signaling.

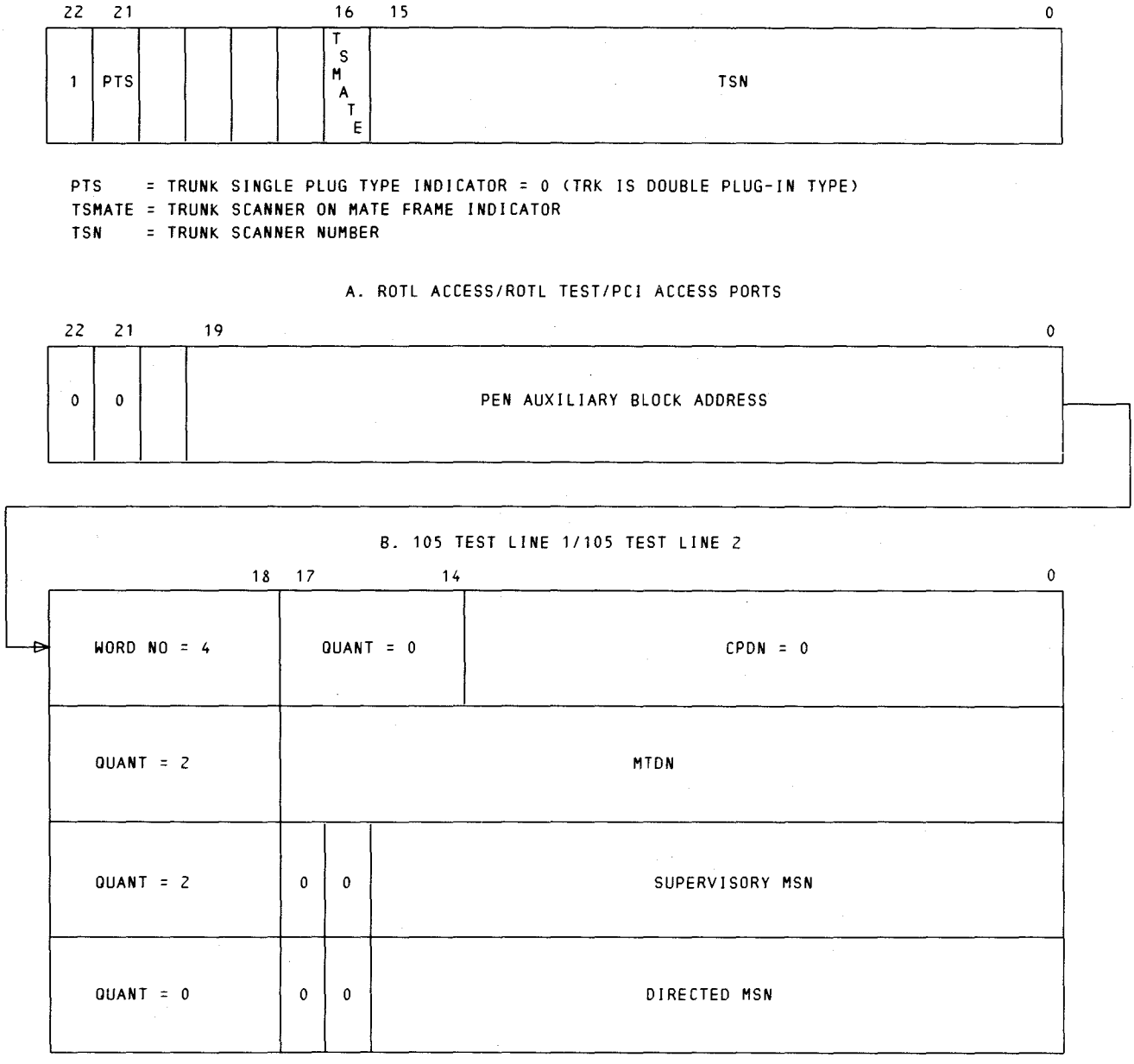


Fig. 14—Trunk Network Number to Peripheral Equipment Number Translator

TABLE R

ROTL MASTER SCANNER POINTS

ROTL DIRECTED SCAN POINTS

	1	0
	RB	TBL

Trouble (TBL) — Not presently used in No. 1 ESS because Responder CP22 (Automatic Self-Checker) is not required.

Release Make Busy (RB) — Two release MF commands within 200 msec of each other. A release command is a 900 + 1300 hz MF signal that is sent to a responder commanding it to disconnect.

LEAD DESIGNATION		DESCRIPTION	PIN LOCATIONS
SC00	TBL	Trouble	TS (A) 25 and 15
SC01	TB	Release Make Busy	TS (A) 44 and 34

ROTL FRAME SUPERVISORY SCAN POINTS

SC01	SC00	(Coded Frame Alarm Scan Points)
0	0	NORMAL
0	1	OFF NORMAL (Manual Power Removed)
1	0	AUDIBLE ALARM OFF
1	1	BLOWN FUSE (Power Alarm)

SC00	TS (MISC) On Control Panel 26 and 25
SC01	TS (MISC) On Control Panel 28 and 27

TABLE R (Cont)

ROTL MASTER SCANNER POINTS

ROTL SUPERVISORY SCAN POINTS

	6	5	4	3	2	1	0
	RCY2	RCY1	LT	TPT	CT	WINK	RESP

Recycle (RCY1/RCY2) — A (1.1 second ±100 msec) burst of 1300 Hz with no frequency component below 1300 Hz.

Low Tone (LT) — Any tone except 1000 Hz or 2225 Hz.

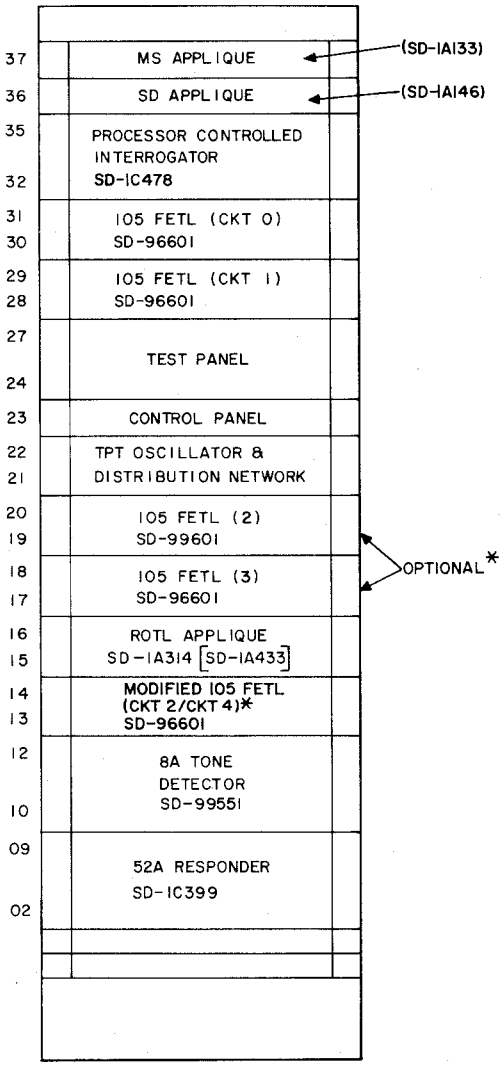
Test Progress Tone (TPT) — The presence of 2225 Hz.

Cut Thru (CT) — 1000 Hz for one second or the presence of 2225 Hz and then its absence.

Wink — Indication that an MF receive is connected to the ROTL test port.

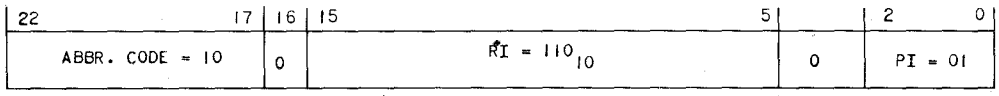
Responder (RESP) — The near-end 52A responder is cut through to the modified 105 test line.

LEAD DESIGNATION		DESCRIPTION	PIN LOCATIONS
SC02	RESP	Responder	TS (A) 24 and 14
SC03	WINK	Wink	TS (A) 43 and 53
SC04	CT	Cut-thru	TS (A) 23 and 13
SC05	TPT	Test Progress Tone	TS (A) 42 and 32
SC06	LT	Low Tone	TS (A) 22 and 12
SC07	RCY1	Recycle Port 0	TS (A) 41 and 31
SC08	RCY2	Recycle Port 1	TS (A) 21 and 11

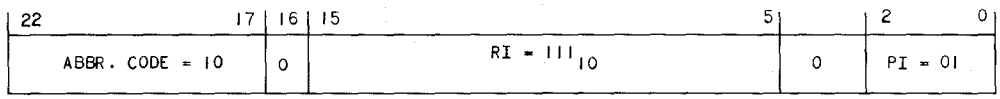


* IF THERE ARE ONLY 2 FETL'S (CKT 0 & CKT 1), THE MODIFIED 105 FETL MUST BE CKT 2. IF THERE ARE 4 FETL'S (CKT 0 THRU CKT 3), THE MODIFIED 105 FETL MUST BE CKT 4. THAT IS THE MODIFIED 105 FETL MUST ALWAYS BE THE HIGHEST NUMBERED FETL SO THAT IT CAN BE SERVED AT THE HIGHEST PRIORITY. THEREFORE WHEN GROWING FROM 2 TO 4 FETL'S IT IS NECESSARY TO REWIRE THE MODIFIED 105 FETL.

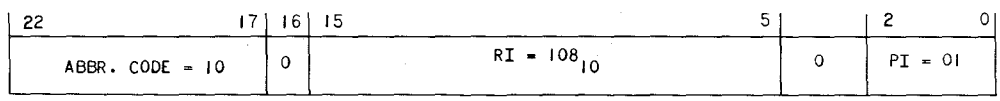
Fig. 15—ROTL Frame

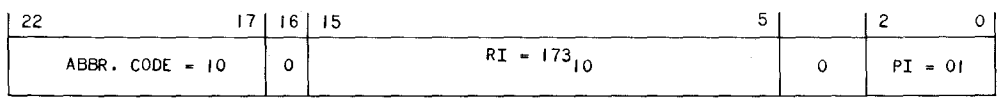


A. FOR DN ASSIGNED TO PORT 0



B. FOR DN ASSIGNED TO PORT 1

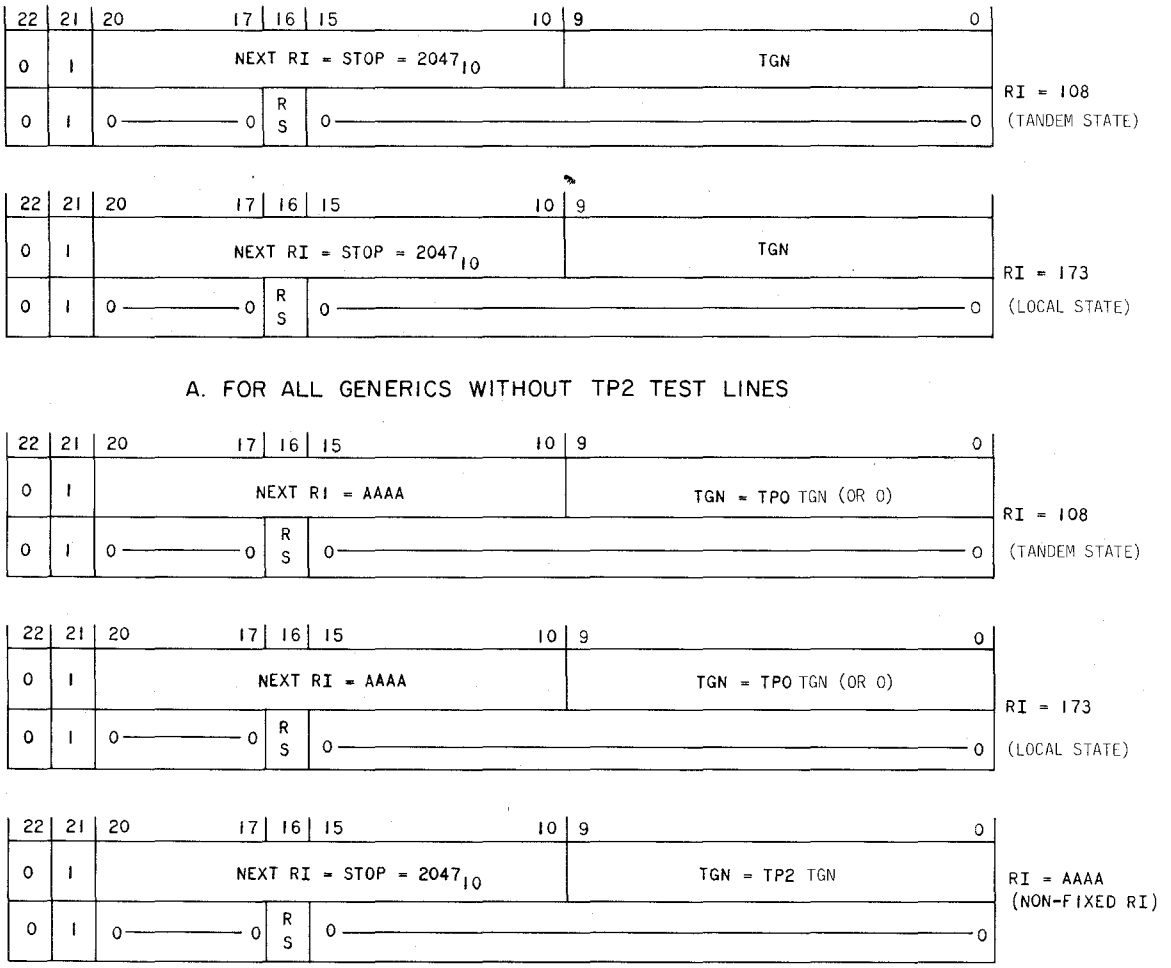




C. FOR DN ASSIGNED TO CODE 105 TEST LINES

LEGEND:
PI = PROGRAM INDEX
RI = ROUTE INDEX

Fig. 16—Directory Number to Route Index Translations



LEGEND:
RS = RETURN ANSWER SUPERVISION = 1
RI = ROUTE INDEX
TGN = TRUNK GROUP NUMBER
TPO TGN = TRUNK GROUP CONTAINING 105 TEST LINES WITHOUT TEST PADS
TP2 TGN = TRUNK GROUP CONTAINING 105 TEST LINES WITH 2 DB TEST PADS

Fig. 17—Route Index Expansion For 105 Test Lines

TABLE S

PCI TRANSMISSION TEST SEQUENCES

Note: The results shown below are typical results when the transmission error mode has been turned on via the RMT-MB-EE1 input message.

TEST	PRIMING	TYPICAL RESULTS
(1) TC1 = 0 or 1 (FETL = 102)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check	All possible self-checks	LOS NC —000.1
Loss test	All possible tests	LOS FN +003.0
(2) TC1 = 0 or 1 (FETL = 100)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check Noise self-check	All possible self-checks	LOS NC +000.0 NOI NC +000.0
Loss test Noise test	All possible tests	LOS FN +005.4 NOI FN UND +015.0
(3) TC1 = 0 (FETL = 105, 51B)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check Noise self-check	All possible self-checks	LOS NC —000.1 LOS FC +000.0 NOI NC —001.0 NOI FC +000.0
Loss test Noise test	All possible tests	LOS FN +003.1 LOS NF +003.6 NOI FN +018.0 NOI NF +018.0
(4) TC1 = 0 (FETL = 105, 52A)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check Noise self-check	All possible self-checks	LOS NC +000.1 LOS FC +000.0 NOI NC +001.0 NOI FC —001.0

TABLE S (Cont)

PCI TRANSMISSION TEST SEQUENCES

TEST	PRIMING	TYPICAL RESULTS
(4) TC1 = 0 (FETL = 105, 52A) (Cont)		
Gainslope self-check (405 Hz) Gainslope self-check (1004 Hz) Gainslope self-check (2805 Hz) Noise with tone self-check	All possible self-checks (Cont)	GS4 NC +000.2 GS4 FC —000.1 GS1 NC +000.2 GS1 FC —000.1 GS2 NC +000.2 GS2 FC —000.1 NWT NC +001.0 NWT FC —001.0
Loss test Noise test Gainslope test Gainslope test Gainslope test Noise with tone test	All possible tests	LOS FN +003.1 LOS NF +003.6 NOI FN +015.0 NOI NF UND +015.0 GS4 FN +003.9 GS4 NF +004.3 GS1 FN +002.8 GS1 NF +003.2 GS2 FN +003.9 GS2 NF +004.3 NWT FN +043.0 NWT NF +043.0
(5) TC1 = 1 (FETL = 105, 51B or 52A)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check	Loss self-check	LOS NC —000.1 LOS FC +000.0
Loss test	Loss test	LOS FN +003.1 LOS NF +003.6
Noise self-check	Noise self-check	NOI NC —001.0 NOI FC +000.0
Noise test	Noise test	NOI FN +018.0 NOI NF +018.0
(6) TC1 = 2 (FETL = 105, 52A)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check	Loss self-check	LOS NC +000.1 LOS FC +000.0

TABLE S (Cont)

PCI TRANSMISSION TEST SEQUENCES

TEST	PRIMING	TYPICAL RESULTS
(6) TC1 = 2 (FETL = 105, 52A) (Cont)		
Noise with tone self-check	Noise with tone self-check	NWT NC +001.0 NWT FC —001.0
Noise with tone test	Noise with tone self-check	NWT FN +043.0 NWT NF +043.0
(7) TC1 = 3 (FETL = 105, 52A)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check	Loss self-check	LOS NC +000.1 LOS FC +000.0
Gainslope self-check (405 Hz)	Gainslope self-check	GS4 NC +000.2 GS4 FC —000.1
Gainslope self-check (1004 Hz)		GS1 NC +000.2 GS1 FC —000.1
Gainslope self-check (2805 Hz)		GS2 NC +000.2 GS2 FC —000.1
Gainslope test (405 Hz) Gainslope test (1004 Hz) Gainslope test (2805 Hz)	Gainslope test	GS4 FN +003.9 GS4 NF +004.3 GS1 FN +002.8 GS1 NF +003.2 GS2 FN +003.9 GS2 NF +004.3
PAR self-check	Par self-check	PAR NC NEQ PAR FC NEQ
(8) TC1 = 4 (FETL = 105, 52A)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check	Loss self-check	LOS NC +000.1 LOS FC +000.0
Echo return loss self-check	Balance self-check	ERL NC NEQ ERL FC NEQ
Singing return loss (low) self-check		SRL NC NEQ SRL FC NEQ

TABLE S (Cont)

PCI TRANSMISSION TEST SEQUENCES

TEST	PRIMING	TYPICAL RESULTS
(8) TC1 = 4 (FETL = 105, 52A) (Cont)		
Singing return loss (high) self-check	Balance self-check (Cont)	SLH NC NEQ SLH FC NEQ
(9) TC1 = 2, 3, or 4 (FETL = 105, 51B)		
PCI self-check	PCI self-check	ISC FC FLT —0715.15 ISC NC +000.0
Loss self-check	Loss self-check	LOS NC +000.1 LOS FC +000.0 51B

TABLE T

PCI MASTER SCANNER POINTS

Supversiory Scan Points

	DRDYX	TSX	

Test State (TSX) — This scan point saturates 80 ms (nominal, 40 ms minimum, 150 ms maximum) after the START relay is operated if valid priming information is present on the TEST PREPARATION and TEST REQUEST inputs. The TEST STATE scan point remains saturated until the PCI has displayed on its 23 directed scan points all data pertaining to the requested test. When the TEST STATE scan point unsaturates, the test sequence is ended. The No. 1 ESS control program then releases the START relay. At this point, new priming information can be provided and a new test begun.

Data Ready (DRDYN) — This scan point saturates 80 ms (nominal, 40 ms minimum, 150 ms maximum) after new stable information is available on the PCI's 23 directed scan points. The No. 1 ESS control program's response to the saturation of DATA READY is to read the 23 directed scan points and to operate the DATA RECEIVED relay. The PCI responds by unsaturating the DATA READY scan point. This, in turn, causes the No. 1 ESS control program to release the DATA RECEIVED relay. This entire operation is referred to as a DATA READY — DATA RECEIVED "handshake."

Scan Point Designation	Lead Designation	Description	Pin Locations
SC(00)	TSX	Test State	TS1 57 and 58
SC(01)	DRDYX	Data Ready	TS2 25 and 26

Directed Scan Points

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
DPTX	DT2 -7X	DT2 -6X	DT2 -5X	DT2 -4X	DT2 -3X	DT2 -2X	DT2 -1X	DT2 -0X	DB1 -2X	DB1 -1X	DB1 -0X	DB2 -3X	DB2 -2X	DB2 -1X	DB2 -0X
									OLDX	TFX	SIGNX	DB3 -3X	DB3 -2X	DB3 -1X	DB3 -0X

Scan Point Designation	Lead Designation	Description	Pin Locations
SC(02)	DB2-0X	Digit 2, Bit 0	TS2 31 and 32 —CP8 TP10
SC(03)	DB2-1X	Digit 2, Bit 1	TS2 41 and 42 —CP8 TP9
SC(04)	DB2-2X	Digit 2, Bit 2	TS2 51 and 52 —CP8 TP8
SC(05)	DB2-3X	Digit 2, Bit 3	TS2 13 and 14 —CP8 TP1
SC(06)	DB1-0X	Digit 1, Bit 0	TS1 17 and 18 —CP8 TP2
SC(07)	DB1-1X	Digit 1, Bit 1	TS2 11 and 12 —CP8 TP3
SC(08)	DB1-2X	Digit 1, Bit 2	TS2 21 and 22 —CP8 TP4
SC(09)	DT2-0X	Data Type	TS2 35 and 36 —CP7 TP6
SC(10)	DT2-1X	Data Type	TS2 45 and 46 —CP7 TP5
SC(11)	DT2-2X	Data Type	TS2 55 and 56 —CP7 TP4
SC(12)	DT2-3X	Data Type	TS2 17 and 18 —CP7 TP14
SC(13)	DT2-4X	Data Type	TS2 27 and 28 —CP7 TP13
SC(14)	DT2-5X	Data Type	TS2 37 and 38 —CP7 TP12
SC(15)	DT2-6X	Data Type	TS2 47 and 48 —CP7 TP11
SC(16)	DT2-7X	Data Type	TS2 57 and 58 —CP7 TP10
SC(17)	DPTX	Decimal Point	TS2 23 and 24 —CP9 TP12
SC(18)	DB3-0X	Digit 3, Bit 0	TS2 33 and 34 —CP8 TP14
SC(19)	DB3-1X	Digit 3, Bit 1	TS2 43 and 44 —CP8 TP13
SC(20)	DB3-2X	Digit 3, Bit 2	TS2 53 and 54 —CP8 TP12
SC(21)	DB3-3X	Digit 3, Bit 3	TS2 15 and 16 —CP8 TP11
SC(22)	SIGNX	Arithmetic Sign	TS1 27 and 28 —CP9 TP13
SC(23)	TFX	Test Fault	TS1 47 and 48 —CP7 TP7
SC(24)	OLDX	Old Responder	TS1 37 and 38 —CP9 TP14

TABLE T (Cont)

PCI MASTER SCANNER POINTS

Data Type (DT2-7X — DT2-2X) — These scan points specify the type of test associated with the numerical test result data (DB1, DB2, DB3).

DT2-7X	DT2-6X	DT2-5X	DT2-4X	DT2-3X	DT2-2X	Data Type
0	0	0	0	0	1	Loss
0	0	0	0	1	0	Noise
0	0	0	0	1	1	Gainslope, 405 Hz
0	0	0	1	0	0	Gainslope, 1004 Hz
0	0	0	1	0	1	Gainslope, 2805 Hz
0	0	0	1	1	0	Noise with tone
0	0	0	1	1	1	PAR
0	0	1	0	0	0	Balance, echo return loss
0	0	1	0	0	1	Balance, singing return loss low
0	0	1	0	1	0	Balance, singing return loss high

Data Type (DT2-1X) — This scan point specifies which responder made the measurement. If the scan point is saturated, the far-end responder made the measurement. If the scan point is unsaturated, the near-end responder made the measurement.

Data Type (DT2-0X) — This scan point specifies whether the numerical test result data (DB1, DB2, DB3) corresponds to a self-check or an actual transmission measurement. If the scan point is saturated, self-check data is being displayed. If the scan point is unsaturated, actual transmission test data is being displayed.

DT2-1X	DT2-0X	Symbol Generated In AT01 Message
0	0	FN
0	1	NC
1	0	NF
1	1	FC

Test Fault (TFX) — This scan point is saturated along with the DATA READY scan point when the numerical test result data (DB1, DB2, DB3) needs a special interpretation. When TEST FAULT is saturated the seven scan points associated with DB1 and DB2 are forced by the PCI to be unsaturated; the three least significant bits of DB3 then have the following message:

	DAB3-2X	DAB3-1X	DAB3-0X	Description
TF1	0	0	1	Loss of priming
TF2	0	1	0	Underrange
TF3	0	1	1	TF1 and TF2
TF4	1	0	0	Not equipped
TF5	1	0	1	TF1 and TF4
TF6	1	1	0	Not used
TF7	1	1	1	No data received

Arithmetic Sign (SIGNX) — This scan point is saturated if the arithmetic sign of the numerical data (DB1, DB2, DE3) is negative (—). This scan point is unsaturated if the arithmetic sign is positive (+).

Digit 1, Digit 2, Digit 3 (DB1, DB2, DB3) — These eleven scan points specify numerical measurement data in a binary-coded decimal form. Digit 1 is the most significant digit and Digit 3 is the least significant digit.

Decimal Point (DPTX) — This scan point is saturated if there is a decimal point between DIGIT 2 and DIGIT 3.

Old Responder (OLDX) — This scan point will saturate 64 ms after DATA READY saturates, if an old (51B) responder is at the far end. The PCI determines the difference between an old (51B) responder and a new (52A) responder by the length of the trailing guard signal. The trailing guard (1200 HZ) tone is approximately 100 ms long in the old responder and 50 ms long in the new responder.

TABLE U

PCI SIGNAL DISTRIBUTOR POINTS

FUNCTION	SIGNAL DISTRIBUTOR RELAY NUMBER			NAME	SYMBOL	PIN LOCATIONS
CONTROL	0	CP9	TP1	Start test	STARTX	TS1 35 & 36
	1			Release Inhibit	REL INHX	TS1 15 & 16
	2			Data Received	DRCVDX	TS1 25 & 26
Test Preparation	3	CP9	TP4	Trunk impedance	TP2-0X	TS1 13 & 14
	4	CP9	TP5	Test Level Point	TP2-1X	TS1 23 & 24
	5	CP9	TP8	Type of FETL	TP2-2X	TS1 33 & 34
	6	CP9	TP9	Type of FETL	TP2-3X	TS1 43 & 44
	7	CP9	TP11	Type of FETL	TP2-4X	TS1 53 & 54
Test Request	8	CP9	TP10	Test requested	TR2-0X	TS1 11 & 12
	9	CP9	TP7	Test requested	TR2-1X	TS1 21 & 22
	10	CP9	TP6	Test requested	TR2-2X	TS1 31 & 32
	11	CP9	TP3	Test requested	TR2-3X	TS1 41 & 42
	12	CP9	TP2	Self-check	TR2-4X	TS1 51 & 52

Start Test (STARTX) - This input should be activated when valid priming information is present on the TEST PREPARATION (TP2-0X through TP2-4X) and the TEST REQUEST (TR2-0X through TR2-4X) inputs in order to inform the PCI to begin the requested test. Valid priming information must be supplied or the PCI will not begin testing. In response to the operation of the START relay, an internal PCI relay called TEST STATE operates and its associated scan point saturates to inform the No. 1 ESS control program that the PCI has begun the requested test sequence.

Release Inhibit (REL INHX) - This input may be activated any time during a test sequence, whenever it is desirable not to send a 2/6 MF release tone to the ROTL responder after the test sequence has been completed. RELEASE INHIBIT is looked at only when TEST STATE is about to be released. If RELEASE INHIBIT is released at that time, 80 ms of MF followed by 80 ms of quiet (ie, the release signal) is sent out. Then the TEST STATE relay is released. Test faults 1, 3, 5, or 7 will also cause the release signal to be sent out. This input must be activated when a PCI internal self-check request is made.

Data Received (DRCVDX) - This input is activated by the No. 1 ESS control program after it has been informed via the supervisory scan point DATA READY that new stable information is available on the PCI's 23 directed scan points and has read that information. Once the DATA READY scan point unsaturates in response to the operation of DATA RECEIVED, the No. 1 ESS control program deactivates the DATA RECEIVED relay.

Trunk Impedance (TP2-0X) - This input specifies the impedance of the trunk under test. If this input is activated the trunk impedance is 900 ohms; otherwise, it is 600 ohms.

Test Level Point (TP2-1X) - This input specifies the test level point of the trunk under test. If this input is activated the test level point is —2 dB; otherwise, it is 0 dB.

TABLE U (Cont)

PCI SIGNAL DISTRIBUTOR POINTS

Type of FETL (TP2-2X — TP2-4X) - This input specifies the type of far-end test line as shown below:

TP2-2X	TP2-3X	TP2-4X	TYPE OF FETL
1	0	0	100
0	1	0	102
1	1	0	105

Test Requested (TR2-0X — TR2-3X) - These inputs specify the type of test requested as indicated below:

TR2-0X	TR2-1X	TR2-2X	TR2-3X	TYPE OF TEST
1	0	0	0	All possible tests
0	1	0	0	Loss
1	1	0	0	Noise
0	0	1	0	gainslope
1	0	1	0	Noise with tone
0	1	1	0	PAR
1	1	1	0	Balance
1	1	1	1	PCI self-check

Self-Check (TR2-4X) - This input is activated if a responder self-check is being requested. If this input is not activated, the actual test will be requested. This input must also be activated when a PCI self-check is requested.

TABLE V

DR04 OUTPUT MESSAGE

OUTPUT MESSAGE FORMAT:
DR04 DGN ABTD ####aa ###b ######## The ATMS processor controlled interrogator has been aborted from MACII because of a maintenance interrupt, a ZIP-MACII input message or a MACII time out.

EXPLANATION OF VARIABLE FIELD	
FIELD	DEFINITION
####aa	TRK (the unit type)
###b	000 (the member number)
########	Octal address in the automatic trunk transmission testing program

TABLE W

MA02 C OUTPUT MESSAGE (CTX-7 and Later)

OUTPUT MESSAGE FORMAT:
MA02C ABTD CLIENT a ###b ccccccc dddd eeeeeeee ffffffff gggggggg hhhhhhhh jjjjjjjj kkkkkkkk llllllll mmmmmmmm A trunk maintenance (MACII) client has been aborted by the trunk maintenance control program.

EXPLANATION OF VARIABLE FIELD	
FIELD	DEFINITION
a	MACII scratch pad index
###b	ATI — Automatic trunk interrogating
	TT — Transmission testing
ccccccc	Trunk network number (TNN)
dddd	Trunk group number (TGN)
eeeeeeee	This field has no meaning in this application
ffffffff through llllllll	Return address (G6RA-1 — G6RA-6)
mmmmmmmm	Address of routine detecting abort condition

TABLE X

RMT-MB-INPUT MESSAGE

INPUT MESSAGE FORMAT:

RMT-MB-aa b

Used to allow a selected user(s) of the remote office test line (ROTL) to have partial/unlimited control over the maintenance busy status of trunks.

EXPLANATION OF VARIABLE FIELD		
FIELD	**TTY CHARACTER**	**DEFINITION**
aa	LC	The ID specified is the location to have AML limited control of non-toll trunks
	LM	The ID specified is the location to have unlimited control of non-toll trunks
	TC	The ID specified is the location to have AML limited control of toll trunks
	TM	The ID specified is the location to have unlimited control of toll trunks
b	O	No location to have this capacity
	1-8	Location to be authorized.

This message is also used to request or terminate expanded trouble messages for ROTL.

EXPLANATION OF VARIABLE FIELD		
aa	EE	The message is to request or terminate error printing
b	O	Don't print trouble messages and turn off error mode
	1	Print trouble messages and turn on error mode

SYSTEM RESPONSE

OK — Request accepted.

NG — Request invalid.

TABLE Y

ROTL BUILDOUT RESISTOR DATA

RELAY NAME	RESISTANCE IN OHMS	LOSS IN DB
F	20	.18
G	10	.09
H	5.05	.05
J	2.58	.02

Switchable Pad
Data Necessary
For 2-Wire
900 OHM Measurements

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
LOSS INTRODUCED BY SWITCHED PADS	RELAYS OPERATED	BINARY DATA IN RPADS (BITS 3-0)	OCTAL DATA IN RPADS (22-0)
0.0 dB	none	0000	00000000
0.02	J	1000	00000010
0.05	H	0100	00000004
0.07	H, J	1100	00000014
0.09	G	0010	00000002
0.12	G, J	1010	00000012
0.14	G, H	0110	00000006
0.16	G, H, J	1110	00000016
0.18	F	0001	00000001
0.20	F, J	1001	00000011
0.23	F, H	0101	00000005
0.25	F, H, J	1101	00000015
0.27	F, G	0011	00000003
0.30	F, G, J	1011	00000013

TABLE Y (Cont)

ROTL BUILDOUT RESISTOR DATA

RESISTANCE (OHMS)	LOSS (db)
2.15	.03
4.42	.06
8.66	.12
17.8	.24

Strappable Pad Data Necessary For HILO 4-Wire 600 Ohm Measurements

REQUIRED LOSS (db)	STRAP-OUT IN ROTL APPLIQUE				STRAP-OUT IN 105 TEST LINE			
	R21/22	R23/24	R25/26	R27/28	A1	A2	A3	A4
0	X	X	X	X	X	X	X	X
.03	X	X	X			X	X	X
.06	X	X		X	X		X	X
.09	X	X					X	X
.12	X		X	X	X	X		X
.15	X		X			X		X
.18	X			X	X			X
.21	X							X
.24		X	X	X	X	X	X	
.27		X	X			X	X	
.30		X		X	X		X	
.33		X					X	
.36			X	X	X	X		
.39			X			X		
.42				X	X			
.45								

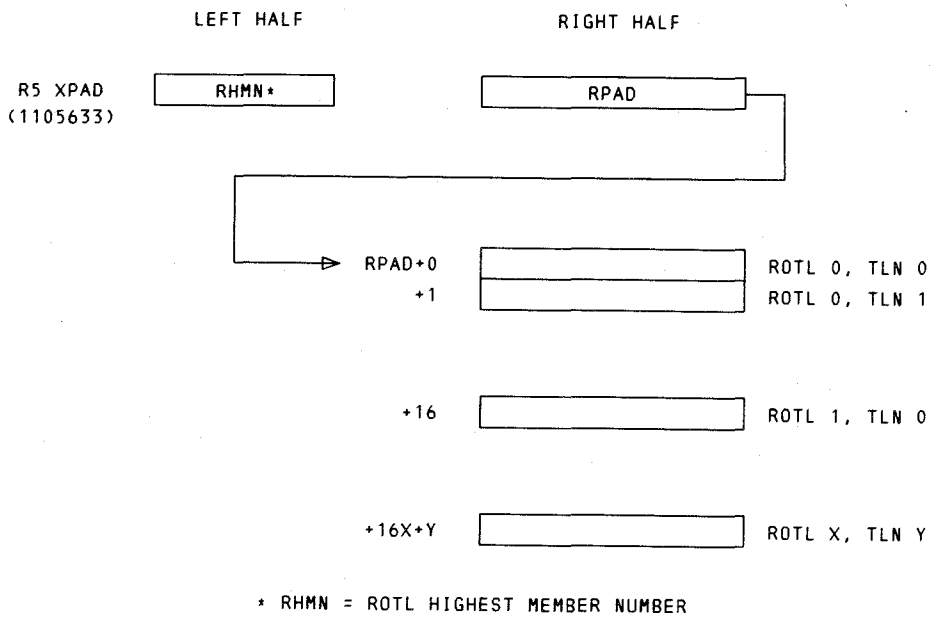


Fig. 18—Layout of RPADS