# FEATURE DOCUMENT

**CODE 108-TYPE TEST LINE FEATURE**

2-WIRE NO. 1 AND NO. 1A ELECTRONIC SWITCHING SYSTEMS

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INTRODUCTION

1. GENERAL INFORMATION

SCOPE

1.01 This feature document describes the code 108-type test line (108TL) feature when utilized with the No. 1 or No. 1A Electronic Switching System (ESS).

REASONS FOR REISSUE

1.02 The reasons for reissuing this section are listed below. Since this reissue is a general revision, no revision arrows have been used to denote significant changes.

(1) Reformatted contents from 23-part to 18-part format
(2) Add coverage for HILO 4-wire switching feature
(3) Add coverage for toll common channel interoffice signaling (CCIS) feature.

FEATURE AVAILABILITY

1.03 The 108TL feature is available in all issues of CTX-7 and later generic programs for No. 1 ESS, and 1AE1 and later generic programs for No. 1A ESS. The capability of accessing 108-type test lines without DN translations (via call type 3) is available in Issue 8 of CTX-7 and 1E3 for No. 1 ESS, and in 1AE1 for No. 1A ESS. For ESS offices equipped with the HILO 4-wire switching feature, the 108TL feature is available with 1E4 and later generic programs for No. 1 ESS, and 1AE4 and later generic programs for No. 1A ESS. For ESS offices equipped with the toll CCIS feature, the 108TL feature is available with 1E5 and later generic programs for No. 1 ESS, and 1AE5 and later generic programs for No. 1A ESS.

1.04 The 108TL feature software is contained in generic program base for 2-wire applications. HILO 4-wire and toll CCIS 108TL feature software is available in the HL4W and CCISTM feature packages, respectively.

2. DEFINITION/BACKGROUND

DEFINITION

2.01 The code 108-type test line (108TL) feature provides far-end loop-around termination for in-service testing of echo suppressors and is to be used with the 58-type echo suppressor measuring system (ESMS).

BACKGROUND

2.02 Echo suppressors may be required on certain regional center-to-regional center trunks, and should be used on interregional high-usage intertoll trunks, interregional toll connecting trunks, and end office toll trunks which have echo path delays exceeding specifications.

DESCRIPTION

3. USER OPERATION

CUSTOMER

3.01 Not applicable.

TELEPHONE COMPANY

3.02 The functional arrangement of the 108TL feature is shown in Fig. 1. No maintenance personnel actions except routine equipment maintenance of 108-type test line(s) are required in a No. 1 or No. 1A ESS office containing the 108TL feature (terminating end).

3.03 The user perspective of the way the 108TL feature is activated is presented from the maintenance personnel point of view at the originating (or near) end. The operation of the 108TL feature by near-end maintenance personnel is shown in Fig. 2. Refer to the applicable Equipment Test List and Method of Operation BSP documentation for more detailed information.

3.04 On non-CCIS trunk test calls, certain conditions cause the ESS to return failure signals to the near end. A 60-ipm signal is returned if the 108-type test line is busy, that is, both test port 0 and test port 1. If no calibration tone is received upon initial connection, maintenance personnel have actually reached test port 1 because test port 0 is already busy by another office. A 120-ipm signal is returned if the switching network is congested,
3.05 On toll CCIS trunk test calls, certain conditions cause the ESS to return failure messages to the near end. If the 108-type test line is busy (both ports 0 and 1), a national trunk congestion message is returned. If no calibration tone is received upon initial connection, the test line is to be considered busy, and the clear forward message must be returned to the far end. A national switching congestion message is returned if the network is blocked, no incoming trunk test registers are available, or a peripheral order buffer failure occurs. If an invalid number is dialed, a vacant national number message is returned.
A 2100 HZ DISABLING TONE MUST BE INITIALIZED OVER THE AUXILIARY TRUNK PRIOR TO TESTING BY MAINTENANCE PERSONNEL.

ASSUMES ALL TESTS PASS. OTHERWISE LEAVE TRUNK OUT OF SERVICE AND FOLLOW NORMAL MAINTENANCE PROCEDURES.

* ALL CCIS MESSAGES SENT/RECEIVED OVER SIGNALING LINK.
† CALIBRATION TONE RETURNED ONLY WHEN AUXILIARY PORT NOT CONNECTED.
‡ A 2100 HZ DISABLING TONE MUST BE INITIALIZED OVER THE AUXILIARY TRUNK PRIOR TO TESTING BY MAINTENANCE PERSONNEL.
§ ASSUMES ALL TESTS PASS. OTHERWISE LEAVE TRUNK OUT OF SERVICE AND FOLLOW NORMAL MAINTENANCE PROCEDURES.

Fig. 2—User Operation of the 108TL Feature (Sheet 1)
Fig. 2—User Operation of the 108TL Feature (Sheet 2)

4. SYSTEM OPERATION

HARDWARE

4.01 Hardware associated with the 108TL feature is shown in Table A. The function of a 2-wire test line is to provide a 108-type test termination for certain incoming 2-wire toll trunks. The function of a HILO 4-wire test line is to provide a 108-type test termination for certain incoming HILO 4-wire toll trunks. More technical information may be found in the appropriate Circuit Description.
and Equipment Design Requirements BSP documentation for No. 1/1A ESS.

OFFICE DATA STRUCTURES

A. Translations

4.02 The 108TL feature uses the local/toll 3/6-digit translator to process an incoming 108-type test call. The code 108 can use a call type 3 translation (108 to route index (RI)), or a call type 28 translation (108 to DN translator). A DN translator (DN to RI) is also used for 7-digit test call processing. Call type 3 is the most efficient of the three methods. The result of all methods is to identify the applicable RI and to identify the incoming call as a test call. This is accomplished via the call indicator word for call type 3 shown in Fig. 3 where the RI is 178 and test (TST) item set to 1. RI 178 is only assigned to the 108TL feature. If the DN translator is used, a type 4 entry word contains this information. The program index item is set to 1 to indicate a test call. Refer to Fig. 4.

4.03 For the 108TL feature for testing 2-wire toll trunks, RI 178 points the trunk under test (TUT) to the trunk group number (TGN) of test port 0 in its route index expansion table (Fig. 5). RI 179 is also assigned to the 108TL feature, and is used to point the auxiliary trunk to the TGN of test port 1. This also is accomplished in its route index expansion table. If the TGN for test port 0 is busy (as expected), the call is alternate routed to the TGN of test port 1. Both trunk groups contain only one trunk connected to a 2-wire 108-type test line.

4.04 For the 108TL feature for testing HILO 4-wire toll trunks, RI 178 will be correlated to pseudo route index (PRI) 010 in the PRI table. PRI 010 will contain a nonfixed RI which points to the TGN of test port 0 in its route index.

TABLE A

108TL FEATURE HARDWARE DATA

<table>
<thead>
<tr>
<th>ITEM</th>
<th>2-WIRE TEST LINE</th>
<th>HILO 4-WIRE TEST LINE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Electronic Switching System No. 1, Arranged for 2-Wire Features, Echo Suppressor Test Termination Circuit (108-Type)</td>
<td>Electronic Switching System Common, Arranged for 2-Wire Features, Echo Suppressor Test Termination Circuit (for HILO 4-Wire Switching)</td>
</tr>
<tr>
<td>SD Number</td>
<td>SD-1A331</td>
<td>SD-1A389</td>
</tr>
<tr>
<td>J Number</td>
<td>J1A033JR</td>
<td>J1A033MF</td>
</tr>
<tr>
<td>Frame</td>
<td>Miscellaneous Trunk Frame (MTF)</td>
<td>MTF</td>
</tr>
<tr>
<td>Mounting Space</td>
<td>2 inches</td>
<td>2 inches</td>
</tr>
<tr>
<td>Cable Length Limit</td>
<td>1190 Feet</td>
<td>1190 Feet</td>
</tr>
<tr>
<td>Number of Circuits per unit</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* A HILO interface circuit is an integral part of HILO 4-wire trunk circuits for the HILO 4-wire switching feature, but is presented here for information purposes: SD-1A392; J1A090BH-1; Trunk Order Code 14200; HILO MTF or HILO universal trunk frame; plug-in; two circuits per unit.
**SECTION 231-090-404**

<table>
<thead>
<tr>
<th>Type 8</th>
<th>23 22 17 16 15</th>
<th>Call Type = 3</th>
<th>Route Index = 178</th>
</tr>
</thead>
</table>

* BIT 23 DOES NOT EXIST IN THE TRANSLATION WORD FOR NO. 1 ESS. IT IS EQUAL TO 0 IN THE NO. 1A ESS.

**TST** - TEST CALL

---

**Fig. 3**—Rate and Route Pattern Table Translator—Call Identification Word for Call Type 3

<table>
<thead>
<tr>
<th>23 22 17 16 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>* ABBR = 10 0</td>
</tr>
<tr>
<td>ROUTE INDEX = 178</td>
</tr>
<tr>
<td>0 0 PI = 1</td>
</tr>
</tbody>
</table>

* BIT 23 DOES NOT EXIST IN THE TRANSLATION WORD FOR NO. 1 ESS. IT IS EQUAL TO 0 IN THE NO. 1A ESS.

ABBR - ABBREVIATED TERMINATING CODE

PI - PROGRAM INDEX

**Fig. 4**—DN Translator—DN Subtranslator-Type 4 Entry (Trunk)

**Fig. 5**—Route Index Expansion Table Translator

**4.05** The trunk class code expansion table of the 108TL feature must provide trunk usage 3 and circuit program index (CPI) 110 for 2-wire 108-type test lines, or CPI 139 for HILO 4-wire 108-type test lines. See Fig. 6.

**4.06** The trunk network number to peripheral equipment number (TNN-to-PEN) auxiliary block contains the information shown in Fig. 7.
Test Port 0

<table>
<thead>
<tr>
<th>WORD 0</th>
<th>WORD 1</th>
<th>WORD 2</th>
<th>WORD 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>WRDN=4</td>
<td>QUANT=2</td>
<td>MISCELLANEOUS TRUNK DISTRIBUTOR NUMBER</td>
<td>SUPERVISORY-MSN (SC0)</td>
</tr>
<tr>
<td>CENTRAL PULSE DISTRIBUTOR NUMBER = 0</td>
<td>(1 FOR HILO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DIRECTED-MSN=0</td>
</tr>
</tbody>
</table>

Test Port 1

<table>
<thead>
<tr>
<th>WORD 0</th>
<th>WORD 1</th>
<th>WORD 2</th>
<th>WORD 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>WRDN=4</td>
<td>QUANT=2</td>
<td>MISCELLANEOUS TRUNK DISTRIBUTOR NUMBER</td>
<td>SUPERVISORY-MSN (SC1)</td>
</tr>
<tr>
<td>CENTRAL PULSE DISTRIBUTOR NUMBER = 0</td>
<td>(1 FOR HILO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DIRECTED-MSN=0</td>
</tr>
</tbody>
</table>

* BIT 23 DOES NOT EXIST IN TRANSLATION WORDS FOR NO. 1 ESS
IT IS EQUAL TO 0 IN THE NO. 1A ESS

4.07 The master scanner translator (Fig. 8) provides the trunk network number (TNN) and trunk program index 9.

B. Parameters/Call Store

4.08 Incoming trunk test registers (ITTRs) are required for processing certain trunk test calls. Refer to Fig. 9 for the layout of the registers for the 108TL feature.

FEATURE OPERATION

A. 2-Wire Trunk Testing (Non-CCIS Trunks)

4.09 The 108TL feature in the No. 1/1A ESS is designed to receive dialed code 108 or any assignable 7-digit DN, and to test 2-wire trunks in the tandem state only. Test point level is not relevant. The first dialing is for the connection of the TUT to test port 0 of the 2-wire 108-type
Fig. 8—Master Scanner Translator

Fig. 9—Layout of Incoming Trunk Test Register (Sheet 1)

A. NON-CCIS TRUNKS

4.10 Normal call processing using call types 3, 28, or the DN translator will analyze and receive digits from an incoming 108-type test call. The DN subtranslator type 4 entry or call indicator word for call type 3 identifies the call as a test...
### Fig. 9—Layout of Incoming Trunk Test Register (Sheet 2)

<table>
<thead>
<tr>
<th>WORD 0</th>
<th>PMAD</th>
<th>RI</th>
<th>TOA</th>
<th>LI</th>
<th>PMFI</th>
<th>TO</th>
<th>PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(22)</td>
<td>(21-16)</td>
<td>(15)</td>
<td>(14)</td>
<td>(13-9)</td>
<td>(8)</td>
<td>(7-0)</td>
<td></td>
</tr>
</tbody>
</table>

- **PMAD (22)**: PATH MEMORY ADDRESS 0 (OR TNN1) (22-0)
- **RI (21-16)**: PATH MEMORY ADDRESS 1 (22-0)
- **TOA (15)**: CCIS STATE WORD ADDRESS (22-0)
- **LI (14)**: RI (15-5)
- **PMFI (13-9)**: FIXED_RI = 178 (15-5)
- **TO (8)**: TL_ROUTINE (22-0)
- **PT (7-0)**: HPQ_ID (22-0)
- **BLKD OR_BUSY_INDICATION (22-0)**

**WORD 0** Refer to Part A

**WORD 9** RI - NONFIXED ROUTE INDEX USED TO COMPLETE CONNECTION TO TEST LINE (HILO 4-WIRE)

**WORD 10** FIXED_RI - FIXED RI OF TEST LINE

**WORD 11** TL_ROUTINE - ADDRESS OF APPROPRIATE TEST LINE ROUTINE

**WORD 12** HPQ_ID - RETURN ADDRESS FOR HUNT A POB ROUTINE

**WORD 13** § - ICT TOLL CCIS HILO 4-WIRE TRUNK = 1; ICT TOLL CCIS 2-WIRE = 0

**WORD 14** BLKD OR_BUSY_INDICATION - INDICATES WHETHER CIN (CHANGE IN NETWORK ENCOUNTERED BLOCKED OR BUSY CONDITION)

### B. TOLL CCIS TRUNKS

call and associates RI 178 with it. The associated incoming register is released, and an idle ITTR seized. Alternate routing to RI 179 for test port 1 via the route index expansion table is then allowed, and a correlation between RI 178 and its (test port 0) trunk group is made. This trunk group contains only one trunk assigned to test port 0 of the 2-wire 108-type test line.

4.11 The system then abandons the applicable receiver connection and connects the TUT to the only applicable TNN. Refer to Fig. 1.
TUT and test port 0 are put in the appropriate hardware state. Following this, supervision for disconnect is set up on the TUT via scanning and the master scanner translator. A 1000-Hz calibration tone is returned for the near end to calibrate its 58 ESMS. The tone will remain on this TUT until disconnect or connection of the auxiliary trunk to test port 1.

4.12 The second dialing over the auxiliary trunk is processed in a similar manner as above except that it is alternate routed to RI 179 (recall that test port 0 is still busy) for connection to test port 1 trunk group. At this time, calibration tone is removed from test port 0. Following application of a 2100-Hz disabling tone over the auxiliary trunk for disabling echo suppressors, maintenance personnel are ready to perform the seven required parameter checks on the TUT via the 58 ESMS.

4.13 After TUT disconnect by the near end, the ESS effects the following actions: idle the trunk and test port 0 hardware; abandon network connections; restore trunk and test port software, and release the applicable ITTR. Other trunks (to the ESS office) may be tested by simply redialing, connection to test port 0, and performing the parameter checks. No recalibration is necessary until a different auxiliary trunk is employed. Upon disconnect by the near end of the auxiliary trunk, the ESS also effects the above actions for test port 1.

4.14 Certain conditions cause the ESS to return failure signals to the near end. A 60-ipm signal is returned if the 108-type test line is busy, that is, both test port 0 and 1. (If no calibration tone is received upon initial connection, this means that the maintenance personnel have actually reached test port 1 instead of test port 0 because test port 0 is already busy by another office.) A 120-ipm signal is returned if the TLN is congested, no ITTRs are available, or if a peripheral order buffer fails.

4.15 The operation of the 108TL feature in a No. 1/1A ESS equipped with the HILO 4-wire switching feature is very similar to the 2-wire trunk testing described above. However, certain exceptions must be noted. These exceptions are the following:

(a) HILO 4-wire trunks are tested in the talk state.
(b) RI 178 correlates to PRI 010 which contains a nonfixed RI for test port 0 trunk group.
(c) RI 179 does not exist for test port 1 trunk group. Instead the route index expansion of the nonfixed RI in the PRI table will contain another nonfixed RI for the test port 1 trunk group.
(d) Supervision for disconnect will be set up by scanning the 108-type test line test ports.
(e) Certain translation word data will be different.

B. HILO 4-Wire Trunk Testing (Non-CCIS Intertoll Trunks Only)

4.16 In this operation description of the 108TL feature for a No. 1/1A ESS equipped with the toll CCIS switching feature, it should be remembered that the ESS may switch 2-wire and/or HILO 4-wire trunks, depending on how it is equipped, and that all interactive communications between offices is done over signaling links instead of toll trunks.

4.17 After the near-end maintenance personnel dials the appropriate digits, a test initial address message (IAM) is formatted and sent over the signaling link. The ESS then verifies the digits. If invalid, a vacant national number message is returned; if valid a continuity check circuit is connected to the TUT. A continuity (COT) test is automatically performed by the near-end switcher. Regardless of the COT results, the near end sends a COT message and the far end proceeds with the 108-type test call. The check circuit is abandoned, the incoming register released, and an idle ITTR seized. (If none available, ESS sends the national switching congestion (NSC) message. The near end must send the clear forward (CLF) message. The ESS then sends the release guard (RLG) message and the test call is terminated.)

4.18 From the digits 108 in the test IAM, the ESS determines RI 178 for the test port 0 trunk group. If HILO 4-wire, it correlates PRI 010 to obtain a nonfixed RI from the PRI table for the test port 0 trunk group. The TUT is then
connected to the only TNN of the applicable test port 0 trunk group, the trunks are put into the appropriate hardware state, and an address complete, charge (ADC) and an answer, charge (ANC) message is returned. Toll CCIS trunks are tested in different test states than non-CCIS trunks. Toll CCIS 2-wire trunks are tested in tandem-talk-on-hook-with-transformer-or-2-dB-pack (TANONX) state. Toll CCIS HILO 4-wire trunks are tested in the continuity-check-state-on-hook-toward-trunk-HILO-4-wire (CNTN4) state. The 1000-Hz calibration tone is returned and remains until a CLF message is received or until connection of the auxiliary trunk to test port 1.

4.19 A second test IAM is formatted and sent over the auxiliary trunk, and is likewise processed by the ESS. When the system finds test port 0 TNN traffic busy, it alternate routes to RI 179 or nonfixed RI indicated in the applicable route index expansion table for connection to the test port 1 trunk group. The 108-type test line removes calibration tone from test port 0, maintenance personnel apply the 2100-Hz disabling tone, and then perform the 108-type parameter checks on the TUT via the 58 ESMS.

4.20 Upon test completion, the maintenance personnel releases the TUT which causes a CLF message to be sent to the far end. The ESS effects the following actions: idle the trunk and test port 0 hardware; abandon network connections; restore trunk and test port software; release the applicable ITTR; and return a RLG message. Other trunks may be tested by seizing another TUT, dialing, and repeating the above TUT procedure. No recalibration is necessary until a different auxiliary trunk is employed. Upon receipt of a CLF message for the auxiliary trunk, the ESS will also effect the above disconnect actions for test port 1.

4.21 Certain network conditions cause various ESS failure messages to be returned. If the test line (both ports 0 and 1) is busy, a national trunk congestion message is returned. (If no calibration tone is received upon initial connection, the test line is to be considered busy. The trunk should be idled immediately by sending the CLF message.) A NSC message is returned if the network is blocked, no ITTRs are available, or a peripheral order buffer failure occurs.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The 108TL feature is to be provided on a toll office basis where incoming toll trunks equipped with echo suppressors terminate.

6. LIMITATIONS

OPERATIONAL

6.01 A 108-type test line is capable of being used by only one 58-type ESMS location at a time. Once the test and auxiliary ports are seized, the system gives all other attempts from different 58-type ESMS locations a busy trunk indication. Two 108-type test lines in an office (i.e., one 2-wire and one HILO 4-wire test line) may be operated simultaneously by the 108TL feature.

6.02 If two offices try to access a 108-type test line at the same time only one office receives calibration tone. The office not receiving calibration tone should abandon the seizure and retry at a later time.

ASSIGNMENT

6.03 One 108-type test line is needed per toll office where applicable, except in toll offices where both 2-wire and HILO 4-wire incoming toll trunks equipped with echo suppressors exist. In these situations the 108TL feature consists of two 108-type test lines, one 2-wire type and one HILO 4-wire type.

6.04 Every 108-type test line must be assigned two trunk groups, one for test port 0 and one for the test port 1. These trunk groups must not contain any other type of circuit.

6.05 The code 108 or any available 7-digit DN may be assigned the 108TL feature for dial access.

7. INTERACTIONS

7.01 Not applicable.

8. RESTRICTION CAPABILITY

8.01 Not applicable.
INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 Figure 10 illustrates the procedure to add the 108TL feature, providing the appropriate generic program exists in the office. Refer to paragraph 1.03.

10. HARDWARE REQUIREMENTS

COST FACTORS

10.01 Hardware usage costs for the 108TL feature are shown in Table B.

DETERMINATION OF QUANTITIES

10.02 Hardware associated with the 108TL feature is shown in Table A. One 2-wire 108-type test line is required per toll office for testing incoming 2-wire toll trunks with echo suppressors, if any. One HILO 4-wire 108-type test line is required per toll office for testing incoming HILO 4-wire toll trunks with echo suppressors, if any.

11. SOFTWARE REQUIREMENTS

COST FACTORS

A. Memory—No. 1 ESS

Fixed

11.01 The following memory is required whether or not the 108TL feature is used in a toll office.

- **Generic Program (program store):**
  Refer to Table C.

- **Translations (program store):**
  - (a) 4 words for trunk class code expansion table
  - (b) 1 word for DN subtranslator entry, if applicable
  - (c) 1 word for each applicable type call identification word in the rate and route pattern auxiliary block
  - (d) 2 words for master scanner translator
  - (e) 8 words for TNN-to-PEN auxiliary block (4 words per port)
  - (f) 4 words for RI expansion table for HILO 4-wire trunk testing capability.

- **Call Store**
  - (a) The 108TL feature requires two ITTRs, each ITTR using 18 CS words for a total of 36 CS words per 108-type test line. Set card NITT defines the total number of ITTRs required by an office. A minimum of four ITTRs is required for all types of test lines in an office.
  - (b) Peripheral order buffers are required to perform connection between the incoming toll trunks and 108-type test line. They are also used to place the trunk under test, auxiliary trunk, and the test line in the appropriate state during set up. These additions alone should not require any additional peripheral order buffers to be engineered for an office.

Variable

11.03 Not applicable.

B. Memory—No. 1A ESS

Fixed

11.04 The following memory is required whether or not the 108TL feature is used in a toll office.
RC: MSN
SECTION 231-118-337
SECTION 231-318-310
BUILD SUPERVISORY MSN TRANSLATIONS FOR PORTS 0 AND 1 *

RC: TGMEM
SECTION 231-118-323
SECTION 231-318-303
ASSIGN EQUIPPED TNNs TO TRUNK GROUP 0 *

T-TNN-DG
PERFORM TRUNK CIRCUIT DIAGNOSTICS

RC: TGMEM; MOVE
SECTION 231-118-323
SECTION 231-318-303
ASSIGN EQUIPPED TNNs TO ACTIVE TRUNK GROUPS *

VFY-TKGN
VERIFY NEW TRUNK GROUPS *

VFY-TNN
VERIFY TNNs

* ONE PER TEST LINE, IE ONE FOR 2-WIRE AND ONE FOR HILO 4-WIRE APPLICATIONS
Fig. 10—Procedure for Adding the 108TL Feature
TABLE B

108TL FEATURE HARDWARE USAGE COSTS

<table>
<thead>
<tr>
<th>HARDWARE USAGE</th>
<th>SD-1A331 2-WIRE QUANTITIES</th>
<th>SD-1A389 HILO 4-WIRE QUANTITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Distributor Points</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Master Scan Points</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Network Appearances</td>
<td>2*</td>
<td>2†</td>
</tr>
<tr>
<td>Required Trunk Groups</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Order Code</td>
<td>11000</td>
<td>13900</td>
</tr>
</tbody>
</table>

* Transmission Reference Network
† Via HILO Interface Circuit, Trunk Order Code 14200

TABLE C

NO. 1 ESS GENERIC PROGRAM WORDS (108TL)

<table>
<thead>
<tr>
<th>GENERIC PROGRAM</th>
<th>FIXED</th>
<th>CONDITIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-WIRE (BASE)</td>
<td>HILO 4-WIRE (HL4W)*</td>
</tr>
<tr>
<td>Prior to 1E4</td>
<td>40</td>
<td>—</td>
</tr>
<tr>
<td>Effective with 1E4</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>Effective with 1E5</td>
<td>40</td>
<td>35</td>
</tr>
</tbody>
</table>

* Optionally loaded feature package.

- **Generic Program (program store, file store):** Refer to Table D.
- **Translation (program store):**
  - (a) 1 word for PRI 010 (all offices)
  - (b) 4 words for RI expansion table for RI 178 and RI 179.

- **Generic Program (program store, file store):** Refer to Table D.
- **Translation (unduplicated call store and file store):**
  - (a) 4 words for trunk class code expansion table
  - (b) 2 words for master scanner translator
  - (c) 1 word for DN subtranslator entry, if applicable.

11.05 The following memory is required per test line when the 108TL feature is activated in a toll office.
TABLE D
NO. 1A ESS GENERIC PROGRAM WORDS (108TL)

<table>
<thead>
<tr>
<th>GENERIC PROGRAM</th>
<th>FIXED</th>
<th>CONDITIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-WIRE (BASE)</td>
<td>HILO 4-WIRE (HL4W)*</td>
</tr>
<tr>
<td>Prior to 1AE4</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>Effective with 1AE4</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Effective with 1AE5</td>
<td>50</td>
<td>45</td>
</tr>
</tbody>
</table>

* Optionally loaded feature package.

(d) 1 word for each applicable type call identification word in the rate and route pattern auxiliary block

(e) 8 words for TNN-to-PEN each peripheral equipment auxiliary block (4 words per port)

(f) 4 words for RI expansion table for HILO 4-wire trunk testing capability.

Call Store:

(a) The 108TL feature requires two ITTRs, each ITTR using 18 CS words for a total of 36 CS words per 108-type test line. Set card NITT defines the total number of ITTRs required by an office. A minimum of four ITTRs is required for all types of test lines in an office.

(b) Peripheral order buffers are required to perform connection between the incoming toll trunks and 108-type test line. They are also used to place the trunk under test, auxiliary trunk, and the test line in the appropriate state during set up. These additions alone should not require any additional peripheral order buffers to be engineered for an office.

DETERMINATION OF QUANTITIES

11.07 Refer to COST FACTORS above.

PROCESSOR TIME

11.08 Each connection to the 108-type test line requires approximately 3500 processor cycles for No. 1 ESS, and approximately 7000 processor cycles for No. 1A ESS. The cycle time for No. 1 ESS is 5.5 μsec. The cycle time for No. 1A ESS is 0.7 μsec.

FEATURE DEFINING SET CARDS

11.09 Not applicable.

12. DATA ASSIGNMENTS AND RECORDS

TRANSLATION FORMS

12.01 ESS translation forms, found in reference C(1) in Part 18 requiring completion are as follows:

(a) ESS 1101—Directory Number Record: This form assigns program index for directory numbers employing a route index for completion.

(b) ESS 1201—Miscellaneous Trunk Frame Record: This form relates the equipment location on a frame basis with the trunk network number (TNN), the trunk group, the trunk number, the trunk class code, and CPD points. This form also contains records of signal distributor points.

Variable

11.06 Not applicable.
and supervisory, direct, fast, and common scan
points associated with the trunk group.

(c) ESS 1202—Trunk Group Record: This form
is used to furnish TNN to trunk group and
trunk number translations for all trunks.

(d) ESS 1203—Trunk Network Number Record:
This form relates the TNN to the trunk
group and trunk frame location.

(e) ESS 1204—Trunk Class Code Data: Specifies
data for trunk class code expansion tables.

(f) ESS 1220—Universal Trunk Frame (HILO)
Record: Relates the HILO universal trunk
equipment locations on a frame basis to the
the corresponding trunk network appearances and
and the HILO universal trunks assigned to these
equipment locations.

(g) ESS 1303 A/B/C Trunk and Service Circuit
Route Index Record: This form assigns route
index, next route index, and return supervision
to trunk groups containing test lines.

(h) ESS 1303D—Pseudo Route Index Record:
Specifies data for pseudo route indexes for
HILO 4-wire 108TL feature.

(i) ESS 1305—Rate and Route Pattern Record:
This form enables simulated dialing of 7-digit
directory numbers after receiving a 108-type
test code via call type 28 in call identification
word or provides a route index to complete the
call for special use of call type 3.

(j) ESS 1311—Toll Three/Six-Digit Translations:
This form establishes routings for incoming
3- and 6-digit toll codes via rate and route pattern
number pointing to a call identification word
(1305).

System responses should be checked against the
applicable ESS translation form data.

(a) For No. 1 ESS T-READ input message is
used to verify trunk class code expansion
table entries. System response should be a
TW02 output message. For No. 1A ESS use
DUMP:CSS, ADR— to verify the call indicator
words. The system response is DUMP:CSS
output message.

(b) Type in on maintenance TTY the VFY-EXP
input message to verify the route index (or
pseudo route index). Refer to output message
TR05 for system responses.

(c) Type in on maintenance TTY the VFY-MSN
input message to verify the master scanner
number. Refer to output message TR12 for
system responses.

(d) Type in on maintenance TTY the VFY-TKGN
input message to verify trunk group numbers.
Refer to output message TR10 for system
responses.

(e) Type in on maintenance TTY the VFY-TNN
input message to verify a trunk network
number translation. Refer to output message
TR14 for system responses.

13.02 Incoming 108-type test calls should be made
over various trunk groups to verify proper
operation of the 108TL feature.

13.03 The 108-type test line circuits are diagnosed
routinely and on-demand by an ESS.
Routine testing is done through automatic progression
testing. Demand testing is accomplished from an
ESS test position or teletypewriter. Refer to
reference A(20) in Part 18.

14. OTHER PLANNING TOPICS

14.01 Refer to the applicable SD drawing for
the particulars concerning nominal power
requirements.

ADMINISTRATION

15. MEASUREMENTS

15.01 None.
16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

Echo Suppressor A voice-operated switching device that reduces echo by introducing loss in the return transmission path of a 4-wire trunk.

18. REFERENCES

18.01 The following documentation contains information pertaining to or affected by the 108TL feature.

A. Bell System Practices

(1) Section 103-105-110—58-Type Echo Suppressor Measuring System (J68658) Description

(2) Section 103-105-310—58-Type Echo Suppressor Measuring System (J68658) Operations

(3) Section 103-105-510—58-Type Echo Suppressor Measuring System, J68658, Near-End Equipment, Tests and Adjustments

(4) Section 231-061-210—Service Circuits, Network Design—No. 1 Electronic Switching System

(5) Section 231-061-220—Trunk and Miscellaneous Circuits, Network Design—No. 1 Electronic Switching System

(6) Section 231-061-450—Program Stores, Network Design—No. 1 Electronic Switching System

(7) Section 231-061-460—Call Stores, Network Design—No. 1 Electronic Switching System

(8) Section 231-062-210—Service Circuits, Network Design—No. 1A Electronic Switching System

(9) Section 231-062-220—Trunks and Miscellaneous Circuits, Network Design—No. 1A Electronic Switching System

(10) Section 231-062-460—Processor Community Engineering, Program Stores, Network Design—No. 1A Electronic Switching System

(11) Section 231-062-465—Processor Community Engineering, Duplicated Call Store, Network Design—No. 1A Electronic Switching System (when published)

(12) Section 231-062-470—Processor Community Engineering, Unduplicated Call Store, Network Design—No. 1A Electronic Switching System

(13) Section 231-062-475—Processor Community Engineering, File Stores, Network Design—No. 1A Electronic Switching System

(14) Section 231-090-366—Feature Document—Hilo 4-Wire Switching Feature, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(15) Section 231-090-416—Feature Document—Toll Common Channel Interoffice Signaling Feature, 2-Wire No. 1 and No. 1A Electronic Switching System

(16) Section 231-118-323—Trunk Translation Recent Change Procedures for TG, TGBVT, TRK, CFTRK, and TGMEM (CTX-6 through 1E5 Generic Programs), 2-Wire No. 1 Electronic Switching System

(17) Section 231-118-324—Rate and Route Translation Recent Change Procedures for NOCNOG, DNHT, NOGRAM, RATPAT, DIGTRN, TOLDIG, COOL, RI, CHRG, DITABS, TDND, IDDD, and TDXD (CTX-6 through 1E5 Generic Programs), 2-Wire No. 1 Electronic Switching System

(18) Section 231-118-325—RC Procedures for PSWD, GENT, PSBLK, SUBTRAN (CTX-6 through 1E5 Generic Programs), 2-Wire No. 1 Electronic Switching System

(19) Section 231-118-337—RC Procedures for ANIDL, CAMA, CFG, CPD, MNS, NMTGC, PLM, ROTL, SIMFAC, and TMGCGA (CTX-6 through 1E5 Generic Programs), 2-Wire No. 1 Electronic Switching System