FEATURE DOCUMENT

CALL TRACING

NO. 3 ELECTRONIC SWITCHING SYSTEM

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Printed in U.S.A.

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INTRODUCTION

1. GENERAL INFORMATION

1.01 This document covers the Call Tracing feature which allows identification of calling and called lines in a No. 3 Electronic Switching System (ESS) office to determine the source of nuisance or threatening calls and to identify lines in emergency situations. There are two basic modes of operation. One is identification of a particular call while it is in progress. The other, primarily used for nuisance calls, identifies all calls placed to a particular directory number. In either case, if the call originated in the No. 3 ESS office, the call trace output message contains the time of day when the message was formed and identification of the other party involved in a call when one party is known. In the case of an incoming call from another office, the call trace output message does not identify the calling line; however, the incoming trunk is identified.

1.02 This is the initial issue of this document. When this document is reissued, the reason for reissue will be found in this paragraph.

FEATURE AVAILABILITY

1.03 Call Tracing is a software feature and is available in any No. 3 ESS office with any generic program. Since this is a software feature, no additional hardware is required.

2. DEFINITION

2.01 Call tracing service allows identification of calling and called lines to determine the source of nuisance or threatening calls and to identify lines in emergency situations.

DESCRIPTION

3. USER OPERATION

3.01 The No. 3 ESS Call Tracing feature allows identification of lines for the following situations:

- In-progress calls
- Incoming calls
- Outgoing calls.

IN-PROGRESS CALLS

3.02 An in-progress trace request is used to identify the other party of a call currently active in the system when one end of the network path is known. This type of trace request is normally used to identify a line in an emergency situation.

3.03 An in-progress trace is invoked by a teletypewriter (TTY) input message which indicates either the directory number (DN) or the terminal equipment number (TEN) of one side of the connection. If the trace is successful, the other party (the unknown side of the connection) is identified via a successful TTY trace message.

INCOMING CALLS

3.04 When a customer in a No. 3 ESS office has received nuisance or threatening calls, the source of these calls may be determined by tracing all calls to that number. This type of call tracing is activated by a TTY recent change message which sets the trace bit in the line translation data. Once activated, all calls to the line with the trace bit set cause the calling party to be identified via a TTY message.

3.05 When the trace is no longer desired on the No. 3 ESS line, the trace bit must be removed from the line translation data by a recent change message.

OUTGOING CALLS

3.06 When the operating telephone company is notified that a No. 3 ESS office is the source of nuisance or threatening calls to particular lines in other offices, all outgoing calls to those lines can be traced. A special calling line identification (CLID) table contains the outgoing directory numbers to be traced. Entries may be made in the CLID table by TTY input message. Once a directory number is entered into the CLID table, all outgoing calls to that number cause the calling party to be identified via a TTY message.

3.07 A directory number should be removed from the CLID table when outgoing calls to that number no longer need to be traced. The number is removed via a TTY input message.

4. SYSTEM OPERATION

4.01 The following types of call tracing can be implemented in No. 3 ESS:

- In-progress call tracing
- Incoming call tracing
- Outgoing call tracing.

IN-PROGRESS CALL TRACING

4.02 An in-progress trace request is used to identify the other party of a call currently active in the system when one end of the connection is known. This type of trace is normally used to identify a line in an emergency situation. An in-progress trace request is invoked by a TTY input message which provides either the DN or TEN of one side of the connection. See Figure 1. The known side of the connection can be either the calling or called party. If the DN of one side of the connection is known, the in-progress trace request TTY message is:

TRC:TN(aaa,bbbb)!

where aaa is the office code and bbbb is the telephone number of the known side of the connection.

4.03 If the TEN of one side of the connection is known, the in-progress trace request TTY message is:

TRC:OE(aa,bcde)!

where aa is the concentrator group, b is the concentrator, c is the switch group, d is the switch, and e is the input level of the known side of the connection.

4.04 If the trace message is accepted, then subroutine MESREC in CTRACN is given control for in-progress call tracing. If the call trace message identified the known side of the connection with a directory number, this is translated into the terminal equipment number.

4.05 The terminal memory records (TMR) are examined for a match with the known TEN. Any errors encountered in the in-progress call trace result in an error message being printed. Error messages are as follows:

tt REPT ERR TRL OC (Office Code)

tt REPT ERR TRL DN (Directory Number)

tt REPT ERR TRL PBX (A line in a PBX)

tt REPT CCT ERR OE xx xxxx (A bad office equipment number).

4.06 If a match with the known TEN is found in a TMR, the other party is examined to determine whether it is a line or a trunk. If the other party is a line in the same No. 3 ESS office, the TEN is translated into the DN before the successful trace message is printed. When the other party is a trunk, the TEN is translated to the supervisory scan point of the trunk and then to the trunk group and member number. The information is then converted to binary coded decimal (BCD) characters for printing. The successful TTY trace message printed is:

tt REPT CCT AA aaa bbbb JC xx xx

where tt is time
AA indicates the type of party

AA=LN normal line
aaa office code
bbbb directory number

AA=TRK trunk
aaa group number
bbbb member number

AA=OE multiparty
aa concentrator group
bbbb concentrator, switch group, switch, level

JC = junctor number.

4.07 After printing the message, call waiting will be checked. If the traced party is the controlling party of a stable call waiting call, another TMR scan is performed for a second match. The message ***REPT CCT FAIL*** will be printed when the second TMR cannot be found. Otherwise, one of the successful TTY trace messages will be printed.

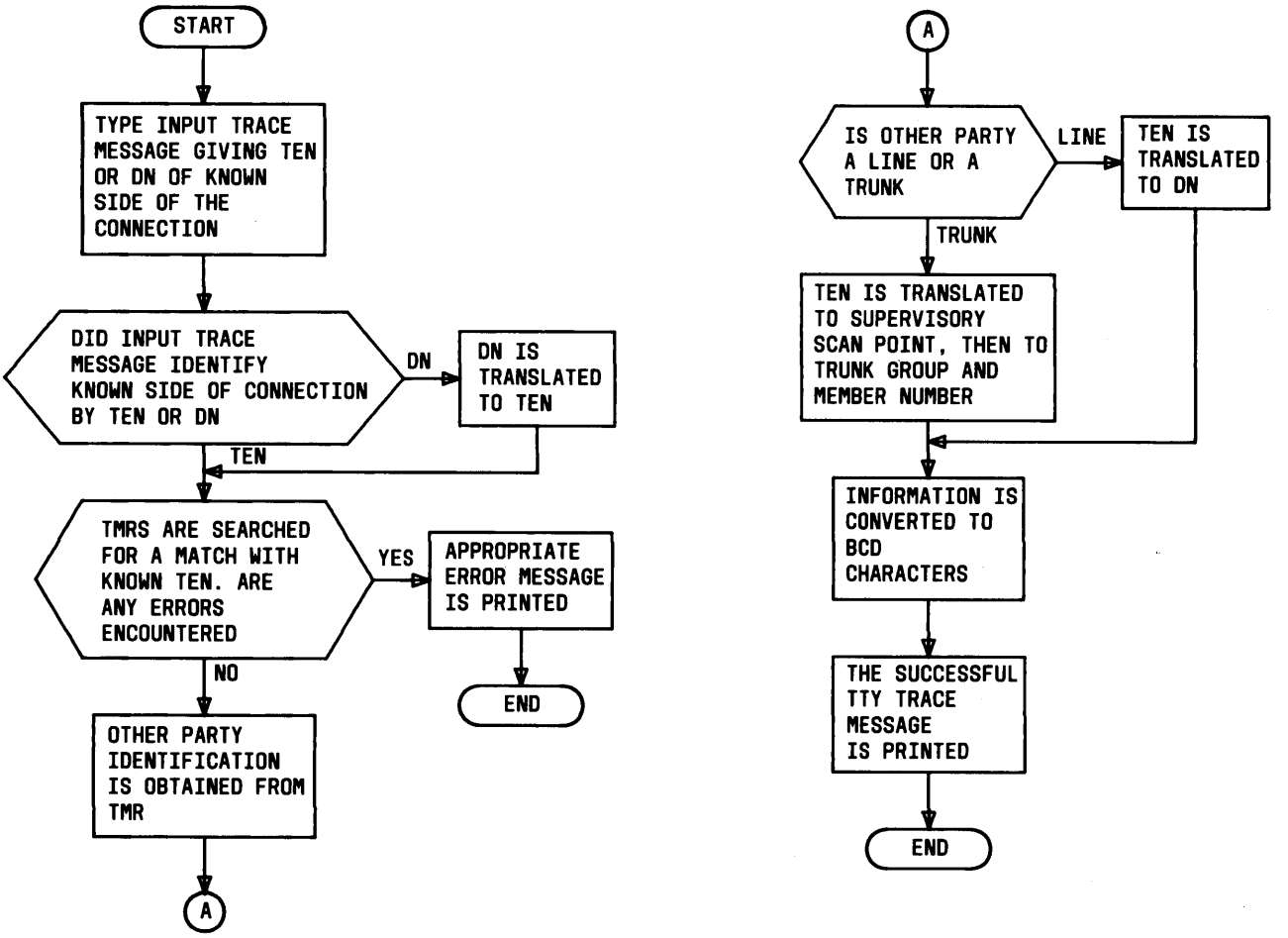

Fig. 1—In-Progress Call Tracing—Feature Flow Diagram

INCOMING CALLS

4.08 Identification of incoming calls to a particular directory number is implemented after a customer complains about nuisance or anonymous threatening calls. This method of call tracing is initiated by the TRC item in the TTY recent change message. The parameter area of the TRC keyword determines the alarm level. The parameters are MJ, MN, YES, and NO which indicate major, minor, no alarm, and no trace, respectively.

4.09 Whenever a call is placed to a local No. 3 ESS line, the translation is performed. See Figures 2 and 3. If the translation indicates the trace feature for the called number, both intraoffice or incoming calls are traced. In addition, if the translation indicates the trace feature for the called number, it will also indicate the alarm level, either major, minor, or no alarm.

4.10 A trace is accomplished by obtaining the calling party data from the transient call record (TCR), formatting the data, and printing the TTY trace message. When the calling party is a local No. 3 ESS private line, 2-party line, or a PBX/MLHG, the TEN is translated to the directory number. Since the directory number cannot be determined for a 4- or 8-party line, the TEN is printed instead.

4.11 When a traced call is found to be incoming from another office, the calling line is not identified; however, the incoming trunk is identified. The TEN of the incoming trunk is translated first into the supervisory scan point number and then to the trunk group and member number.

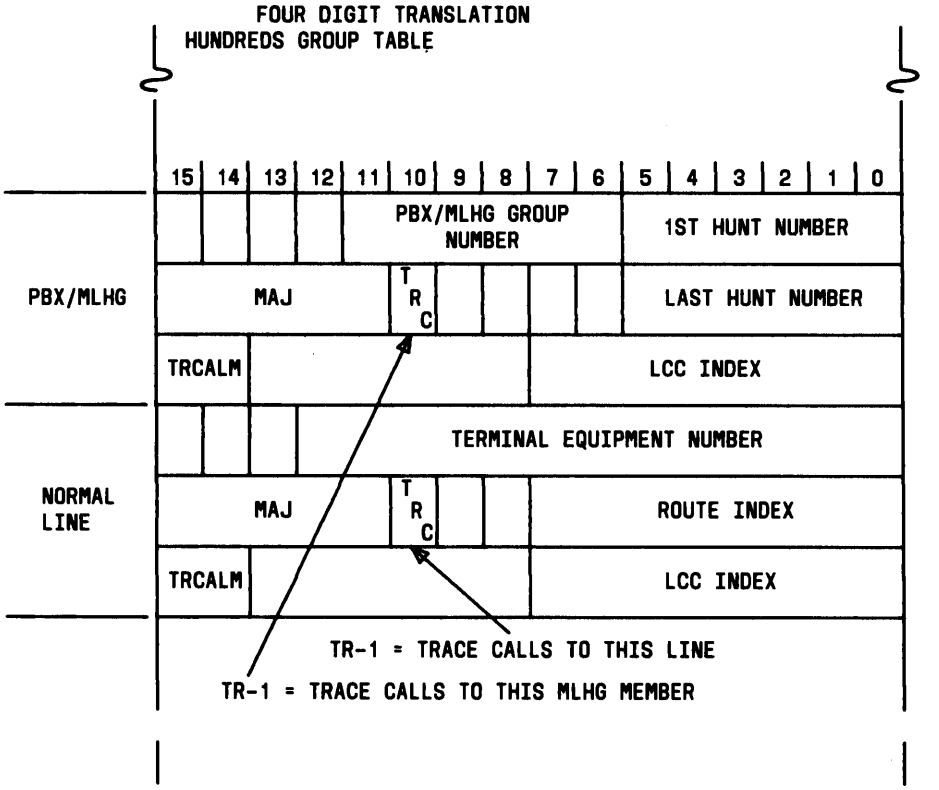

Fig. 2—Incoming Call Tracing—Transmission Expansions

4.12 If the called party is a No. 3 ESS private line, the called party's TEN is translated to the directory number before the TTY trace message is printed. If the called party is a 2-party line, the TEN is printed. The TTY trace output message format is:

tt AA REPT ICT BB aaaa bbbb to CC
aaaa bbbb JC xx xx

where tt is time

AA is type of alarm

AA=**major alarm
AA= *minor alarm
AA= no alarm

BB is calling party type

BB=TN normal line
aaaa office code
bbbb directory number

BB=MP PBX
aaaa office code
bbbb directory number

BB=OE 4- or 8-party line
aa = concentrator group
bbbb = concentrator, switch group, switch, level

BB=TRK trunk
aaaa trunk group number
bbbb trunk member number

CC is called party type

CC=TN indicates called party is a normal line
aaa office code
bbbb directory number

CC=OE indicates called party is a multiparty line
aa concentrator group

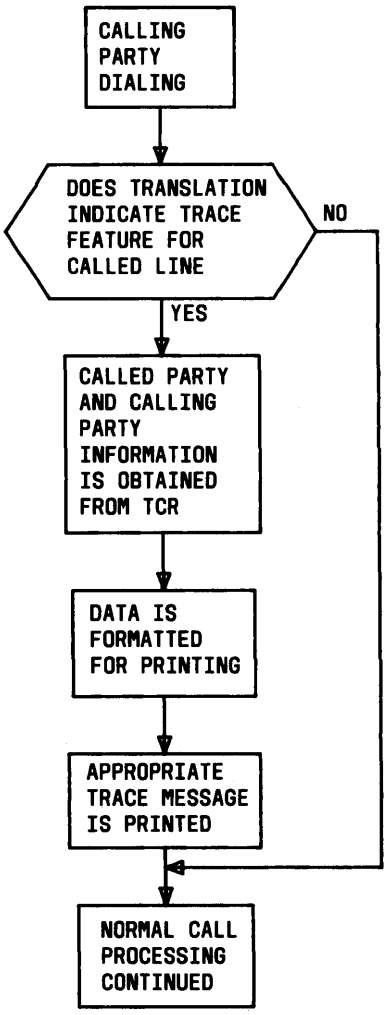

Fig. 3—Incoming Call Tracing—Feature Flow Diagram

bbbb concentrator, switch group, switch, level

CC=MP indicates PBX lines
aaa = office code
bbbb = directory number

JC is junctor number.

4.13 As stated in paragraph 4.09, when the trace is no longer desired on the No. 3 ESS line, the trace bit can be removed from the line translation data by using the recent change message RC:LINE TRC followed by no.

OUTGOING CALLS

4.14 When it is known that a No. 3 ESS office is the source of nuisance or threatening calls to particular lines in other offices, all outgoing calls to those lines can be traced. IDDD calls can be traced on the first nine digits. In addition, 911, 411, and 611 calls can be traced by treating the three digits as an area code. Because outgoing calls are not placed over a specific trunk to another office, trunk translation information cannot be used to contain call trace information. A special calling line identification (CLID) table contains the outgoing directory numbers to be traced. See Figure 4. The table consists of three 4-word entries; therefore, calls to four numbers can be traced at a time. A number can be entered into the CLID table by a TTY input message which supplies the directory number as shown:

TRC:ENTER (aaa,bbbb)[,DNP ccc] [;AL]!

where [ ] identifies the optional items.

AL=MJ major alarm
AL=MN minor alarm
AL=no alarm

DIGIT	DIGIT	DIGIT	DIGIT
DIGIT	DIGIT	DIGIT	DIGIT
DIGIT	DIGIT	DIGIT	ALARM
15 14 13 12	11 10 9 8	7 6 5 4	3 2 1 0

Fig. 4—CLID Table Format

aaa=office code (OC)
bbbb=directory number (DN)
ccc=area code (AC)

4.15 The trace will be performed on the first three (either AC or OC), the first six (AC+OC), or the full telephone number (AC+OC+DN or OC+DN). The routine has two error messages:

tt REPT ERR CLID IE (tried to trace a number already in the CLID table)

tt REPT ERR CLID TF (CLID table is full).

With the absence of these two messages, the entry will be entered in the CLID table properly. A standard TTY OK message will be appended to the input message.

4.16 Each outgoing call is examined to determine if it should be traced. See Figure 5. If the call is from a manual line or is a 0-call, which is sent to a Traffic Service Position System (TSPS), then the call is processed in the normal manner and the call is not traced.

4.17 If the call is not from a manual line and is not a 0-call, the CLID table is searched for a match with the called number. If a match is not found, the call is processed in the normal manner and the call is not traced.

4.18 If the called number matches a CLID table entry, the CLID entry (called number) is set up for printing, and the calling party information is obtained from the TCR for the call. The trace message is then printed in the following output message format:

tt AA REPT OCT FROM BB aaa bbbb to ccc dddd eeee JC xx xx

where tt is time

AA is type of alarm

AA=**major alarm
AA= *minor alarm
AA= no alarm

BB is calling party type

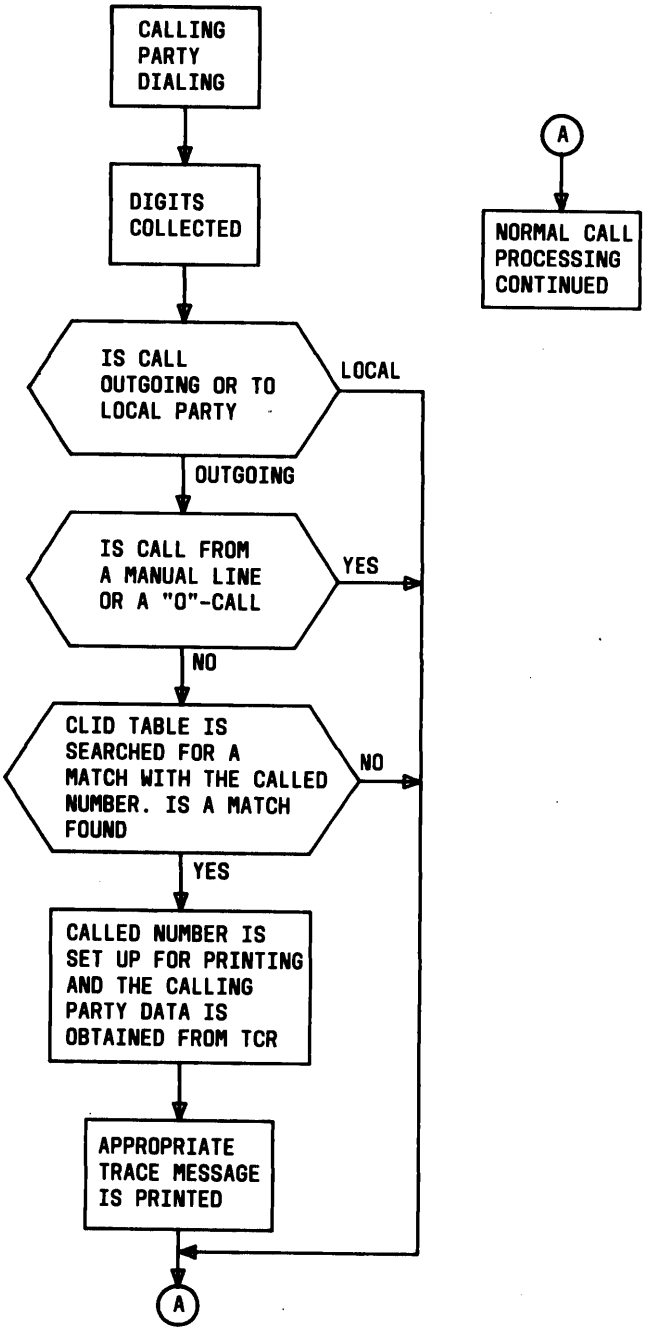

Fig. 5—Outgoing Call Tracing—Feature Flow Diagram

BB=TRK trunk
aaa group number
bbb member number

BB=MP PBX lines
aaa office code
bbbb directory number

BB=OE indicates terminal equipment number is printed (4- or 8-party line)
aa concentrator group
bbbb concentrator, switch group, switch, level

BB=TN normal line
aaa office code
bbbb directory number

Called Party
cccc = area code
dddd = office code
eeee = directory number.

4.19 A directory number is removed from the CLID table when outgoing calls to that number no longer need to be traced. The number is deleted in response to the following TTY input message:

TRC:ERASE(aaa,bbbb),DNP ccc!

where aaa is the office code, bbbb is the telephone number, and ccc (optional) is the area code.

4.20 The number given in the TTY message is compared with entries in the CLID table. If a matching entry is not found in the CLID table, the following error message is printed:

tt REPT ERR CLID ENF

If a matching entry is found in the CLID table, the entry is deleted, thus ending traces to that number. A standard TTY OK message will be appended to the input message.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 An in-progress trace is invoked by a TTY input message which indicates either the directory number or the terminal equipment number of one side of the connection.

5.02 Incoming calls to a No. 3 ESS line are traced if the trace bit is set in the line translation data. This type of call tracing is assigned on a per-line basis.

5.03 Outgoing calls to lines in other offices can be traced by entering the directory numbers of the lines to be traced into the CLID table. This type of call tracing is assigned to lines in other offices.

6. LIMITATIONS

6.01 When traced calls are found to be incoming from another office, the call trace output messages do not identify the calling line; however, the incoming trunk is identified.

6.02 The CLID table consists of four (modified) 3-word entries. Therefore, outgoing call tracing can be assigned to a maximum of four lines at a time.

7. INTERACTIONS

7.01 For the in-progress call trace, when it is discovered that the traced party is involved in a stable call waiting connection, two messages to this effect will be printed. See paragraph 4.08.

8. RESTRICTION CAPABILITY

8.01 An in-progress call trace is invoked only when requested via TTY input message.

8.02 Recent change methods may be used to delete incoming call tracing from a customer's line translation data.

8.03 A directory number is removed from the CLID table when outgoing calls to that number no longer need to be traced. The number is deleted in response to the proper TTY input message.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 An in-progress call trace is invoked only when requested via the appropriate TTY input message.

9.02 Recent change methods can be used to add or delete incoming call tracing from a customer's line translation data.

9.03 A directory number is added to the CLID table when outgoing calls to that number should be traced. The number is deleted from the CLID table when outgoing calls to that number

no longer need to be traced. The number is added or deleted via the proper TTY input message.

10. HARDWARE REQUIREMENTS

10.01 Call tracing is a software feature and no additional hardware is required.

11. SOFTWARE REQUIREMENTS

11.01 There are 750 generic program words that are attributable to the Call Tracing feature.

11.02 Twelve temporary store words are required for the CLID table which is used for outgoing call tracing.

11.03 One translation bit per line is required for incoming call tracing.

11.04 Processor real-time data required by this feature will be supplied when the data becomes available.

12. DATA ASSIGNMENTS AND RECORDS

12.01 The ESS translation forms, found in TG-3, which are affected by the Call Tracing feature are as follows:

- ESS 3100—Telephone Number Table: It is recommended that lines which are assigned the incoming call tracing function have a notation to that effect in the remarks field of form ESS 3100 as an office record.

- ESS 3105—Multihunting Group Table: It is recommended that a MLHG or number assigned the incoming call tracing function have a notation to that effect in the remarks field of form ESS 3105 as an office record.

12.02 Refer to Part 4 (SYSTEM OPERATION) of this document for RC messages used with the Call Tracing feature.

13. TESTING

13.01 Test calls should be made to lines that are assigned the call tracing functions to determine if the feature is working properly.

14. OTHER PLANNING TOPICS

14.01 No special planning is required for the Call Tracing feature.

ADMINISTRATION

15. MEASUREMENTS

15.01 No plant or traffic measurements are provided for the Call Tracing feature.

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following list identifies terms in this feature document.

- BCD—Binary Coded Decimal

- CLID Table—A special table containing the outgoing directory numbers to be traced.

- DN—Directory Number

- Multiline Hunt Group (MLHG)—A customer optional feature which allows calls to hunt over a group of customer facilities in order to connect a calling party with an idle facility within the group.

- Recent Change (RC)—The ability to change certain translations within No. 3 ESS via teletypewriter input.

- Subroutine—A sequence of instructions which performs a well defined function and is called by another section of instructions.

- TEN—Terminal Equipment Number

- Terminal Memory Record (TMR)—A 4-word block of writable main storage assigned to each junctor. It stores scan point numbers for the calling and called parties while the call is stable.

- Transient Call Record (TCR)—A 16-word block of writable main storage assigned to

a call in the transient state containing control information, terminal and path information, and receiving and sending data applicable to the call.

18. REFERENCES

18.01 The following documents provide supplementary information concerning the Call Tracing feature described in this document.

- PA-3H300—Office Data Tables Layout Specification No. 3 ESS
- OM-3H300—Output Message Manual No. 3 ESS
- TG-3, Translation Guide
- IM-3H300—Input Message Manual
- Section 233-151-110—Call Trace Software Subsystem Description No. 3 ESS