911 EMERGENCY SERVICE BUREAU
SOFTWARE SUBSYSTEM DESCRIPTION
NO. 3 ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section provides a functional description of the software required to perform the nine-one-one (911) emergency service bureau (ESB) call processing operations in the No. 3 Electronic Switching System (ESS) offices. The areas discussed include:

• Originating functions

• Terminating functions

• Disconnect functions.

1.02 Whenever this section is reissued, the reason(s) for reissue will be listed in this paragraph.

1.03 A glossary of terms and abbreviations used in this section is contained in Part 5.

1.04 The purpose of this software subsystem description (SSD) is to give an overview of the software required to perform the 911-call (or ESB-call) processing functions for the No. 3 ESS. Generic programs, other than the special emergency software described in this section, are invoked in the 911-call processing functions. These programs are common to normal or basic No. 3 ESS call processing; however, they are referenced in this section as applicable. Accordingly, this section may also serve as a pointer to the generic programs and associated software required in the 911-call origination, termination, and disconnect functions. The following software documents provide additional information relative to software functions referenced in this section.

SECTION	TITLE
233-151-105	Call Processing SSD, No.3 ESS
233-151-110	Call Trace SSD, No. 3 ESS
233-151-115	Operator Functions SSD, No. 3 ESS
233-151-120	Charging SSD, No. 3 ESS
233-151-125	Input Processing and Scanning SSD, No. 3 ESS
233-151-130	Basic Call Processing SSD, No. 3 ESS
233-151-135	Custom Calling SSD, No. 3 ESS
233-151-140	Network Path Hunt SSD, No. 3 ESS
233-151-145	Digit Processing SSD, No. 3 ESS
233-151-150	Translations SSD, No. 3 ESS
233-151-155	Peripheral Control SSD, No. 3 ESS
233-152-105	Recent Changes, No. 3 ESS

SECTION	TITLE
233-152-125	System Control SSD, No. 3 ESS
233-154-135	Translation Subroutines SSD, No. 3 ESS
233-154-140	Call Processing Subroutines SSD, No. 3 ESS

1.05 Table A, Program Identification, contains the name, title, number, and primary function of each program referenced. The program listing (PR-3HXXX) should be used when a detailed code analysis is necessary for the respective program. A complete listing of all software documentation is contained in Section 233-150-100, No. 3 ESS Software General Description.

1.06 Consistent with other No. 3 ESS call processing, the ESB- or 911-call processing is accomplished in time bursts or segmented time intervals and not in a continuous, uninterrupted series of actions. This enables many calls to be processed at the same time as described in Section 233-151-105, Call Processing, No. 3 ESS.

2. EMERGENCY SERVICE BUREAU

DEFINITION

2.01 The emergency service bureau is also known as the nine-one-one (911) ESB. The ESB is intended to provide customers a universal method for reporting an emergency or requesting emergency assistance.

2.02 The ESB can be accessed from any telephone including coin stations served by the No. 3 ESS office. Calls to the ESB are referenced throughout this section and in the processing software as 911-calls unless otherwise noted.

2.03 For purposes of this document, it is assumed the ESB is staffed by an attendant who receives the 911-calls for emergency assistance. Upon receipt of a 911-call, the ESB attendant either dispatches emergency vehicles directly or transfers (ie, relays) calls to the participating agencies for dispatching the necessary emergency assistance.

TABLE A

PROGRAM IDENTIFICATION

NAME	TITLE	NUMBER	FUNCTION
AUDITS	Audit Monitor, Audit Subroutines, and Some Audit Programs	PR-3H002	Schedules and initiates audits for verifications of system software functions.
COIN	Coin Clean-Up Routine	PR-3H150	Contains progress marks for collecting and returning coins from coin lines.
CUSTER	Customer Error Program	PR-3H151	Administers such error treatment as partial dial and permanent signal.
DIGPRO	10-Millisecond Interrupt Program—Digit Receiving and Sending	PR-3H153	Performs digit receiving and sending functions during interrupt level.
DISCON	Disconnect Progress Marks	PR-3H154	Performs disconnect functions for calls.
DNTRP	Digit Interpretation Progress Marks	PR-3H155	Performs digit interpretation functions and routes calls to other routines once sufficient interpretation has been completed to determine the next call processing function needed.
FASTTK	Fast Trunk Scanning Program	PR-3H159	Scans immediate start and operator trunks for scan point state changes.
INPUT	Input Monitor Program	PR-3H160	Processes inputs from trunk and line scan points and schedules the base level scans.
LNORIG	Line Originator Program	PR-3H162	Processes line originations.
OPER	Operator Calls Program	PR-3H164	Processes operator calls.
OUTCAL	Outgoing Call Program	PR-3H165	Performs outgoing functions for calls.
PATHNT	Network Path Hunt, Busy and Idle	PR-3H166	Finds or idles paths through the network.
POINT	Peripheral Order Interpreter	PR-3H168	Processes peripheral orders and distinguishes between peripheral work in the TCR and digit sending work. Transfers control to DIGPRO for digit sending.
RING	Ring and Answer—Completion of Intraoffice Calls	PR-3H172	Controls ringing in accordance with TCR; turns the ringing on and off for intraoffice calls.
SCANS	Base Level Scanning Program	PR-3H173	Scans trunks (except immediate start and operator), junctors, and lines for scan point state changes.

TABLE A (Contd)

PROGRAM IDENTIFICATION

NAME	TITLE	NUMBER	FUNCTION
TCRSCN	Base Level TCR Scan	PR-3H174	Processes TCRS sequentially and checks for processing required by base level progress mark routines.
TERM	Completion of Incoming and Intraoffice Calls	PR-3H175	Performs terminating functions for calls Performs 4-digit interpretation on digits.
TKORIG	Trunk Origination Program	PR-3H176	Performs originating functions for trunks, initializes TCR, and performs some digit interpretation on the digits dialed.
TKPROC	Trunk/Junctor/Service Circuit Input Processing	PR-3H177	Processes inputs from trunks, junctors, and service circuits.
XSLSUB	Basic Translation Subroutines	PR-3H180	Contains the translation and clear TCR routines.
XSL3DG	Three-Digit Translation Program	PR-3H181	Performs 3-digit translations on digits dialed.
XSL4DG	Four-Digit Translation Program	PR-3H182	Performs 4-digit translations on digits dialed.
XSLSPN	Scan Point Number Translation	PR-3H179	Performs scan point number translations to provide the scan point number of a terminal.

LOCATION

2.04 The ESB may be located within the facility of a participating agency. The agency may be a police department or fire department that essentially functions as the emergency communication center. Figure 1 depicts a physical relationship of the ESB with a participating agency. The actual location of the ESB is an option of the operating company implementing the service.

OPERATION

2.05 The No. 3 ESS ESB call processing software is structured to meet the following ESB operational reuirements.

(a) A service-hold capability is required on calls from a local station to the ESB.

(b) The 911-trunk is rung as though it were a line.

(c) When the ESB attendant tries to originate, or goes off-hook for an idle 911-trunk, reorder tone is returned to the ESB for up to 6 minutes. A minor alarm is given to the ESS office and a maintenance teletypwriter (TTY) message is printed after that period of time.

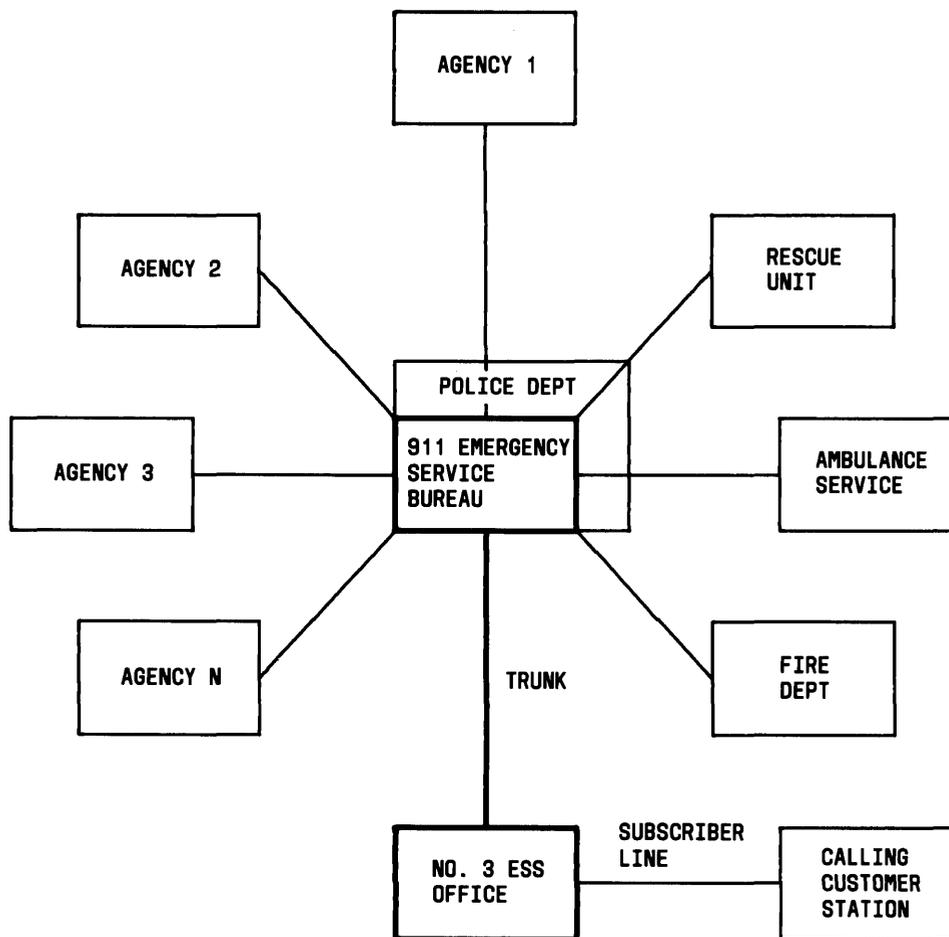(d) When the caller goes on-hook after the ESB attendant answers, one of two possible actions must be taken.

Fig. 1—ESB With Participating Agencies

(1) If the call originated from an incoming trunk, the ESB is given reorder tone.

(2) If the call originated from a local station, the ESB is given a low tone and an optional tip and ring reversal. When the ESB attendant does a switch-hook flash while in this state, the calling line is rung back.

(e) Three digits (911) or seven digits (NXX-XXXX) may be dialed to access the ESB.

3. SOFTWARE STRUCTURE

3.01 As referenced, various software that performs the basic No. 3 ESS call processing must interface with the special emergency software to provide total software support for the ESB operations. The software interface enables the efficient use of the common call processing code for the 911-call processing origination, termination, and disconnect functions. The special emergency software is designed to interface with the common call processing code that must be invoked and to perform unique functions for the 911-call processing.

3.02 The special emergency software includes the emergency (EMERG) generic program, predefined data layouts and records, and special translation data.

EMERGENCY PROGRAM

3.03 The emergency (EMERG) program, PR-3H156, is a stored generic program comprised of 3A Central Control (CC) instruction code and data layouts unique to the 911-call processing functions. Also embedded in the code are branch instructions, subroutine calls, macro calls, and designated entry points essential to invoke code as required.

3.04 The EMERG program provides several features required for ESB operations.

(a) Returning low tone to the ESB attendant when the calling customer on a local station goes on-hook after the ESB attendant answers, and optionally reversing the tip and ring to the ESB.

(b) Providing the service-hold condition on a call from the local station.

(c) Returning reorder tone to the ESB when the attendant seizes an idle trunk. When the seizure persists for longer than six (6) minutes, a minor alarm is sounded and a message is printed.

DATA LAYOUTS AND RECORDS

3.05 Predefined data layouts and records are used for the data and software interactions essential to the 911-call processing. The data elements, word definitions, bit configurations, and word sizes are described in the using programs in which they are contained and controlled.

3.06 Data layouts and records which are significant in originating and processing 911-calls are described in the following paragraphs.

A. Transient Call Record

3.07 The EMERG program 911-call origination and processing functions are organized in accordance with the transient call record (TCR) layout contained in EMERG, PR-3H156. The TCR contains control data, terminal and path data, and sending and receiving data applicable to the 911-call. These data items identify the call while it is in the transient state or until it becomes a stable call.

3.08 The first five words of the 16-word TCR for the 911-call are basically the standard format. The layout of the next, or last, eleven words may be one of two possible formats for the 911-call. The TCR layout used for these eleven words depends upon whether the 911-call is a local customer origination or a 911-trunk origination.

B. Terminal Memory Record

3.09 The terminal memory record (TMR) is a four-word block of writable memory for those data items which identify the 911-call connection. The TMR layout for 911-calls is similar to the standard TMR used by the basic call processing programs.

C. Entry Code Layout

3.10 The entry code layout is a one-word block of data that is used upon entry to EMERG from either the input monitor or TCR scan program. This layout contains three one-bit flags which are used to indicate the on- or off-hook (ONFF), the flash (WK_FL), and the trunk or junctor supervision (TJ) states.

D. Group Member Number Layout

3.11 The group member number (GRP_MEM_NO) layout is a one-word block of data that identifies the trunk group number and the trunk member number for the 911-trunk origination. The data in GRP_MEM_NO is used for the TTY message that is printed when a 911-trunk origination occurs from the ESB.

E. Office Option Layout

3.12 The office option layout is a two-word block of data that defines the office options for the EMERG program.

TRANSLATIONS

A. Data

3.13 The ESB functions require the support of translation data. The translation data defines the physical details of the No. 3 ESS office to the originating and call processing programs. The translation data is comprised of data words and flags which, when accessed, distinguish the 911-call from other calls processed.

B. Routines

3.14 Translation routines designed to access the translation data are coded into and invoked by the generic programs. These routines access the translation data via tables, as required during various stages of the 911-call processing.

C. Tables

3.15 The translation data is stored in the translation tables in memory. These tables are accessible through the stored master table index (MTI). The MTI contains, or provides, the linkage to the various parameters and translation data for the translation routines as they are invoked.

D. Forms

3.16 The source of information for the No. 3 ESS translation tables is the standard translation input forms prepared in accordance with the No. 3 ESS Translations Guide. Following approval of these forms, the information is processed and loaded into the translation tables using normal procedures.

3.17 The translation forms used for the information that affects the implementation of the ESB operations include the following.

(a) Form ESS 3202-3—Trunk Group Table is used to establish a trunk group number for each trunk group entering or leaving the office. Thus, this form is used to identify the 911-trunk group, the direction of traffic over the trunk group, and the type of physical circuit (circuit code = 3) to be used for the 911-service.

(b) Form ESS 3204-1—Trunk Feature Table is used to identify the specific features available to a particular trunk group. This form is used to mark the 911-trunk as outgoing, service hold, and single wink features for the 911-service.

(c) Form ESS 3300-1—Three- and Six-Digit Translation Table contains the information that is the starting point for establishing routing and subsequent treatment for three-digit NXX and numbering plan area (NPA) codes and six-digit NPA-NXX codes. This form identifies the ESB code.

(d) Form ESS 3301-1—Rate and Route Table is used for the screening translations required to properly route and charge the call.

(e) Form ESS 3303-3—Route Index Expansion Table is used to define the final routing information needed for completing a local call or for routing a call to a distant office. Either the entry type 07 or 18 code must be specified for the 911-service.

(f) Form ESS 3304-1—Code Index Table is used for the code index assigned to the office code group to be routed and charged.

(g) Form ESS 3300-2—Three- and Six-Digit Translation Search Type Table is used for the search table that is searched when no entry can be found in the local or foreign area translator for an NXX or NPA code.

E. Trunk and Service Circuit Group

3.18 Four important data elements in the trunk group data are accessed frequently by the software to process the 911-call.

(a) HOLD—A two-bit data field that is set to code "10" to indicate to the software that the 911-call has the service-hold capability (3.21).

(b) IDXLN—A three-bit data element that directs the incoming digit translations. IDXLN is set to code "000" to indicate the trunk is one-way outgoing. All trunks assigned to the ESB 911-trunk group are designated as one-way outgoing by setting these bits accordingly.

(c) SNG_WK—A one-bit flag called the single wink bit. SNG_WK is set to a code "1" to distinguish 911-trunks from other outgoing trunks. This bit also serves as a check bit in preventing ESB originations from idle 911-trunks (4.36).

(d) CKT_CODE—A five-bit data element that is set to indicate the trunk is an incoming reverse battery trunk. Circuit code number three (3) is used for the 911-service.

F. Office Option Word

3.19 The two-word office option word translation contains the miscellaneous office parameters. Included is a reverse (RV) bit that is set to code "1" to designate a reverse of tip and ring for the ESB operations. When set, this flag causes the ESB to be given a tip and ring reversal by changing the trunk state.

3.20 For more information relative to the MTI, the translation tables, and the administration of these tables, see Section 233-152-105, Recent Change Processing and Translation Data, No. 3 ESS.

SERVICE HOLD

3.21 The stable 911-call has the service-hold capability unless the call is an incoming trunk to the ESB. Service-hold provides the ESB attendant control over the 911-call. This means that only the ESB, or 911-trunk, can tear down or disconnect the 911-call originating from a local station. The calling customer on a local station cannot initiate a disconnect of a stable 911-call by going on-hook before the ESB attendant goes on-hook.

3.22 The 911-call processing software is designed such that if the ESB attendant goes on-hook first, the calling customer will have provided the ESB with sufficient information concerning the emergency.

3.23 Service-hold makes it possible for the ESB attendant to ring back the calling customer who goes on-hook before enough information can be obtained by the attendant. When the customer goes off-hook, the talk path is reestablished.

3.24 When a calling customer on an incoming trunk goes on-hook after the ESB attendant answers, the ESB is given reorder tone after a sufficient delay. Because the service-hold does not apply to the incoming trunk, the ESB attendant must go on-hook. When this happens, the talk path is not reestablished and the connection is dropped immediately.

4. SOFTWARE FUNCTIONS

4.01 The 911-call processing for ESB operations is divided into three major functions for the purposes of describing the software designed to perform the respective functions. These software functions are described in the logical order of their occurrence for performing the 911-call origination functions, termination functions, and disconnect functions for ESB services.

ORIGINATION

4.02 A valid origination request to the ESB may be initiated by one of the following:

(a) The local customer dialing either 911 or a special seven-digit code (NXX-XXXX)

(b) An incoming trunk to the ESB.

Thus, the originating request can be either a line origination or a trunk origination to the No. 3 ESS office implementing the ESB service as depicted in Fig. 2.

4.03 A line origination request is detected by the base level scanning (SCANS) program and then reported to the base level input monitor (INPUT) program. The line originations (LNORIG) program assumes control of the line origination to the ESB, and then performs initialization of the TCR to obtain translation information.

4.04 In the case of a trunk origination, it is controlled by the incoming trunk origination (TKORIG) program following the trunk scan detection routine and INPUT program functions.

4.05 As noted, the operating company has the option of designating either three (911) or seven (NXX-XXXX) digits to be dialed for accessing the ESB. Regardless of the number of digits dialed, however, the appropriate No. 3 ESS generic programs for digit processing functions are invoked as described in Section 233-151-145, Digit Processing, No. 3 ESS.

4.06 When the seven-digit (NXX-XXXX) code is dialed from a local station to access the ESB, the call is still identified in the software as a 911-call. The call will be in control of the completion of incoming and intraoffic call (TERM) program when dialing is complete. In this case, the four-digit translation routine provides the special route index. The call is then routed to the outgoing call (OUTCAL) program for further processing as an outgoing call if the entry type code is 07. If the code is an 18, the call is routed to the operator (OPER) program for processing.

4.07 When the 911 number is dialed from a local station to access the ESB, the digit interpretation program (DNTRP) obtains a special route index before OUTCAL assumes control of the call for further processing. DNTRP interprets the dialed digits to define the call as outgoing.

4.08 OUTCAL gains control of the call to the ESB through the base level progress mark in the TCR. While OUTCAL has control, the program selects the trunk information and stores pertinent data into the TCR for the call.
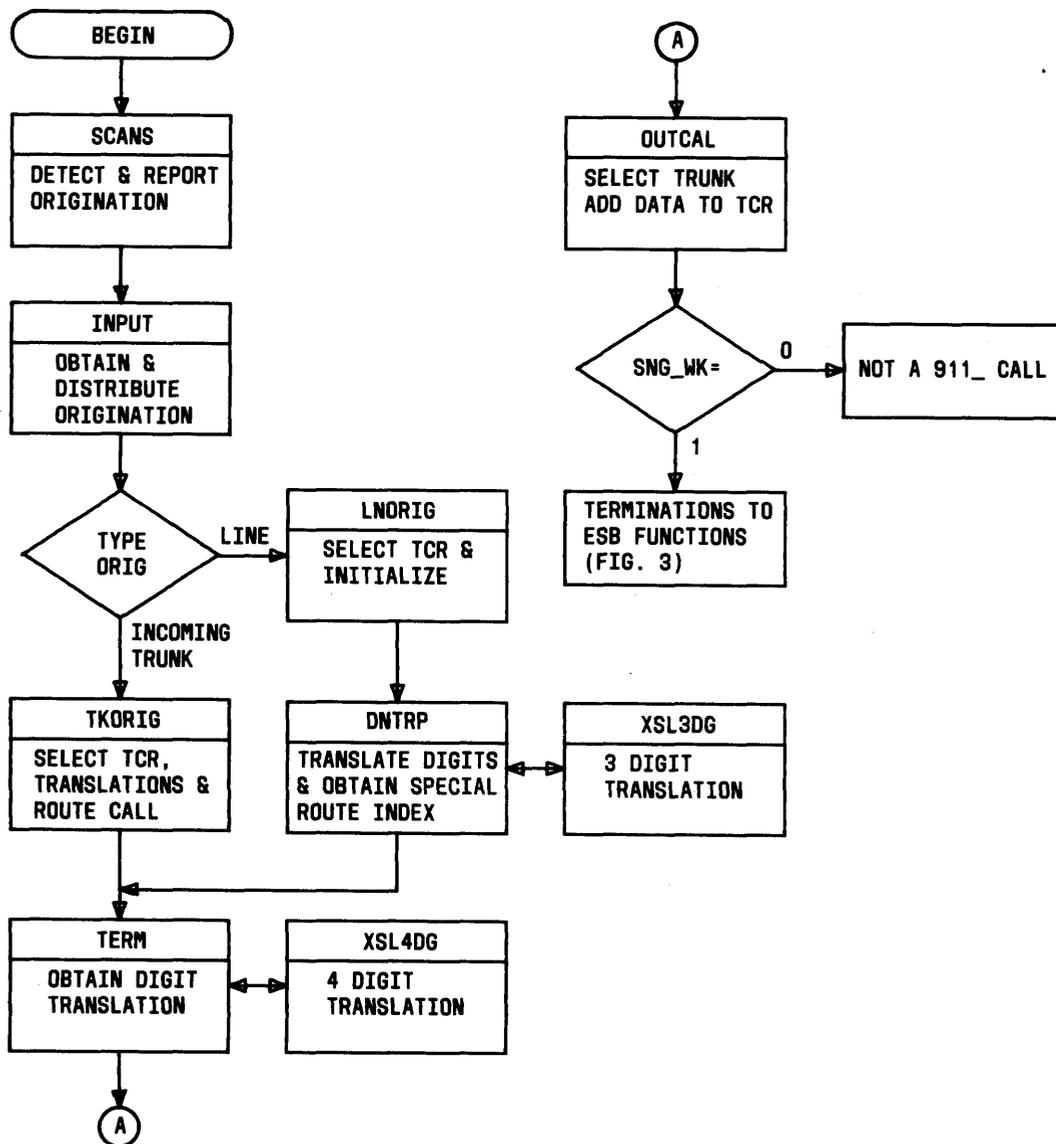
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   ┌──────────────┐                              ╭───╮
   │    BEGIN     │                              │ A │
   └──────┬───────┘                              ╰─┬─╯
          │                                        │
   ┌──────▼───────┐                        ┌───────▼────────┐
   │    SCANS     │                        │     OUTCAL     │
   ├──────────────┤                        ├────────────────┤
   │ DETECT &     │                        │ SELECT TRUNK   │
   │ REPORT       │                        │ ADD DATA TO TCR│
   │ ORIGINATION  │                        └───────┬────────┘
   └──────┬───────┘                                │
          │                                        │
   ┌──────▼───────┐                          ◇─────▼─────◇       0  ┌──────────────┐
   │    INPUT     │                         ◇  SNG_WK=   ◇─────────▶│ NOT A 911_   │
   ├──────────────┤                          ◇─────┬─────◇          │    CALL      │
   │ OBTAIN &     │                                │ 1             └──────────────┘
   │ DISTRIBUTE   │                                │
   │ ORIGINATION  │                        ┌───────▼────────┐
   └──────┬───────┘                        │ TERMINATIONS TO│
          │                                │ ESB FUNCTIONS  │
          │         ┌──────────────┐       │ (FIG. 3)       │
    ◇─────▼─────◇   │   LNORIG     │       └────────────────┘
   ◇   TYPE    ◇───▶├──────────────┤  LINE
    ◇  ORIG    ◇    │ SELECT TCR & │
    ◇─────┬─────◇   │ INITIALIZE   │
          │         └──────┬───────┘
          │ INCOMING       │
          │ TRUNK          │
   ┌──────▼───────┐ ┌──────▼───────┐  ┌──────────────┐
   │    TKORIG    │ │    DNTRP     │  │   XSL3DG     │
   ├──────────────┤ ├──────────────┤◀▶├──────────────┤
   │ SELECT TCR,  │ │ TRANSLATE    │  │ 3 DIGIT      │
   │ TRANSLATIONS │ │ DIGITS &     │  │ TRANSLATION  │
   │ & ROUTE CALL │ │ OBTAIN       │  └──────────────┘
   └──────┬───────┘ │ SPECIAL      │
          │         │ ROUTE INDEX  │
          │         └──────────────┘
   ┌──────▼───────┐ ┌──────────────┐
   │    TERM      │ │   XSL4DG     │
   ├──────────────┤◀▶├──────────────┤
   │ OBTAIN DIGIT │ │ 4 DIGIT      │
   │ TRANSLATION  │ │ TRANSLATION  │
   └──────┬───────┘ └──────────────┘
          │
        ╭─▼─╮
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        ╰───╯
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Fig. 2—Originations to the ESB

4.09 OUTCAL checks the single wink bit (SNG_WK) in the trunk group data to determine if the call is a 911-trunk. If the bit is off or not set (SNG_WK = 0), the call is not a 911-call and it receives normal call processing.

4.10 When OUTCAL determines this bit is set (SNG_WK = 1), the program branches to the 911_NTRY entry point in the EMERG program which is designed to prepare the TCR of the 911-call for subsequent processing for the termination to the ESB.

TERMINATION

4.11 The termination of a 911-call to the ESB requires the interfacing of the EMERG program with the normal or basic call terminating programs in the No. 3 ESS. TCR modifications are necessary to make the TCR agree with the terminating program TCR formats.

4.12 The 911-call termination to the ESB begins with the EMERG program performing the TCR interface process (Fig. 3). EMERG assumes control of the TCR from OUTCAL via the 911_NTRY

entry point. During the TCR processing, EMERG issues a standard macro (DSTRBOF) to place the 911-trunk in a bypass state which enables ringing the trunk as a line.
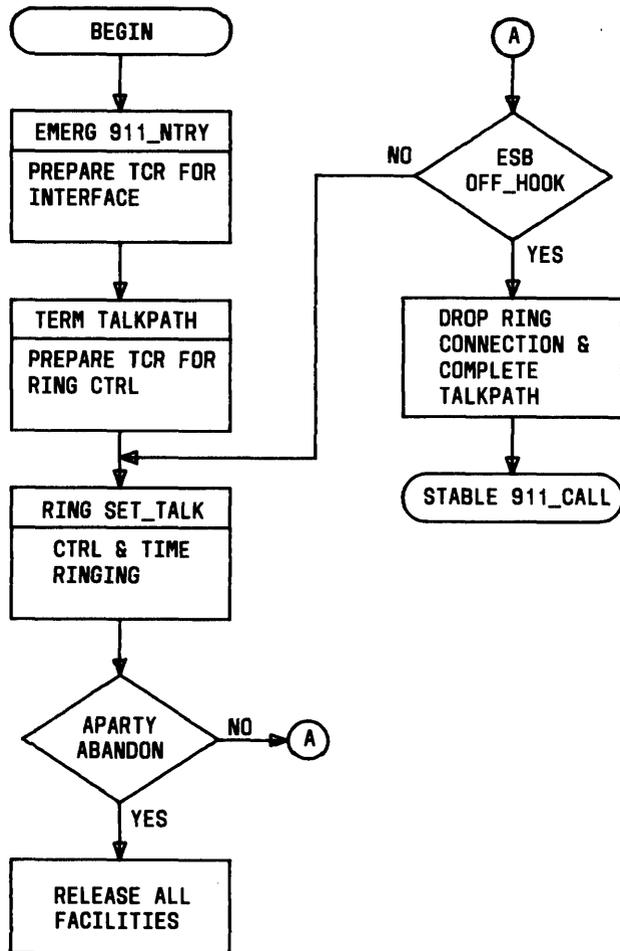

Fig. 3—Terminations to the ESB

4.13 EMERG then adds a dummy charge index and branches to the TALK PATH entry point in the TERM program for further processing. In this state, the 911-call may be treated as a simple terminating call.

4.14 The TERM program processes the 911-call for ringing facilities and talk path. The process includes testing the call for multiparty, setting up the ring and the ring path, and establishing the ring period. TERM initializes the TCR for

the ringing control to be done by the ring and answer—completion of intraoffice calls (RING) program. TERM then sets the progress mark for the RING program.

4.15 The RING program controls the 911-call from the time ringing is initiated until the ESB attendant goes off-hook. The ringing is turned on and off according to the ringing state code in the TCR. Ringing continues until the ESB goes off-hook, until the calling party goes on-hook, or until the call is abandoned.

4.16 If a calling party on-hook is detected, all facilities are released normally.

4.17 If the ESB attendant goes off-hook, the ringing connection is dropped and the talking path is established for the 911-call. The TMR for the 911-call is then set for a stable condition. Thus, the 911-call is terminated to the ESB.

DISCONNECT

4.18 The No. 3 ESS disconnect (DISCON) program is designed to act on supervision received from a stable 911-call (Fig. 4). When an on-hook is detected for a stable 911-call, DISCON is invoked at the DISCON entry point.

4.19 DISCON initializes the TCR with data derived from the TMR. DISCON then determines the classification of the call or the type of connection.

4.20 If the DISCON tests determine the connection is tandem or trunk-to-trunk, service-hold does not apply. In this case, the connection is released and, after disconnect timing, reorder is given to the ESB as though the ESB were trying to originate.

4.21 If DISCON determines the 911-call connection is a line-to-trunk, the program checks for trunk supervision or an ESB on-hook state. When an ESB on-hook is detected, the call is disconnected normally.

4.22 When the DISCON check determines the ESB is off-hook, the program then tests the single wink bit in the trunk group data. If this bit is set (SNG_WK = 1), the trunk is a 911-trunk and the connection is to the ESB. On this condition, DISCON branches to the EMERG program TONE_911 entry point. At this stage,
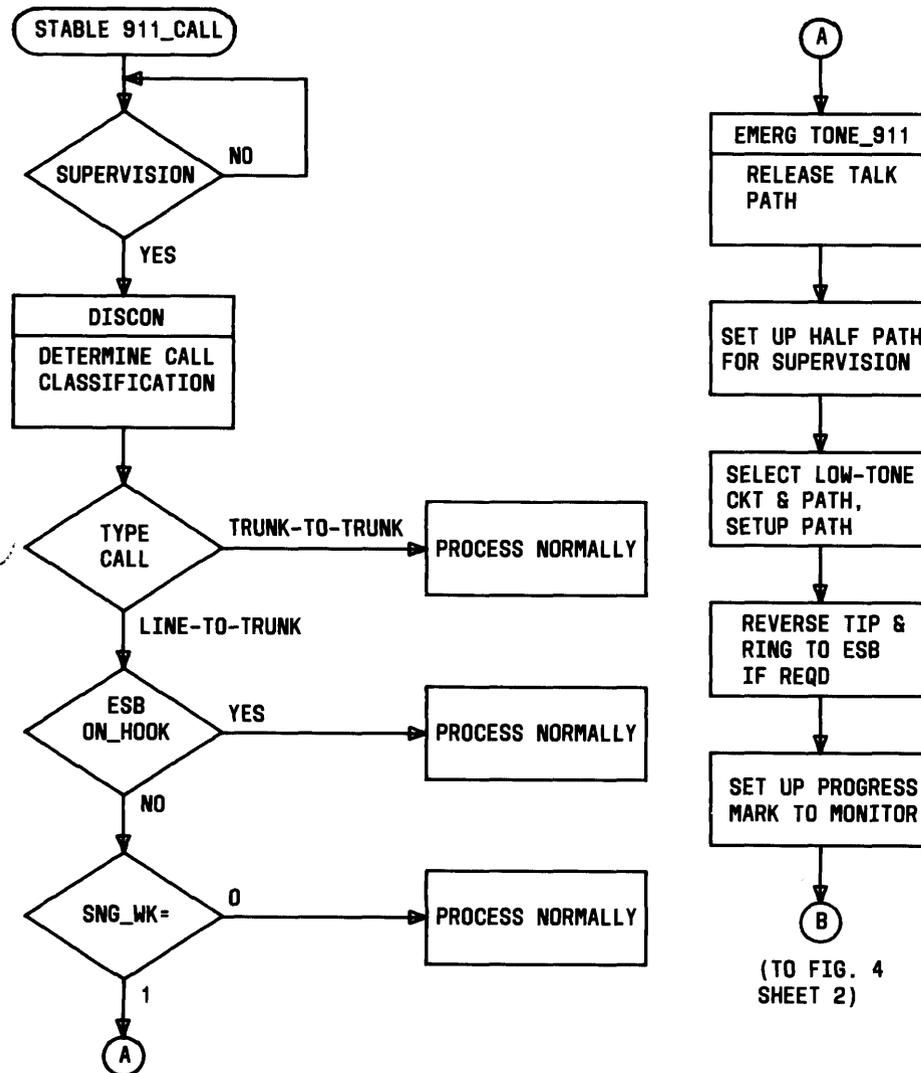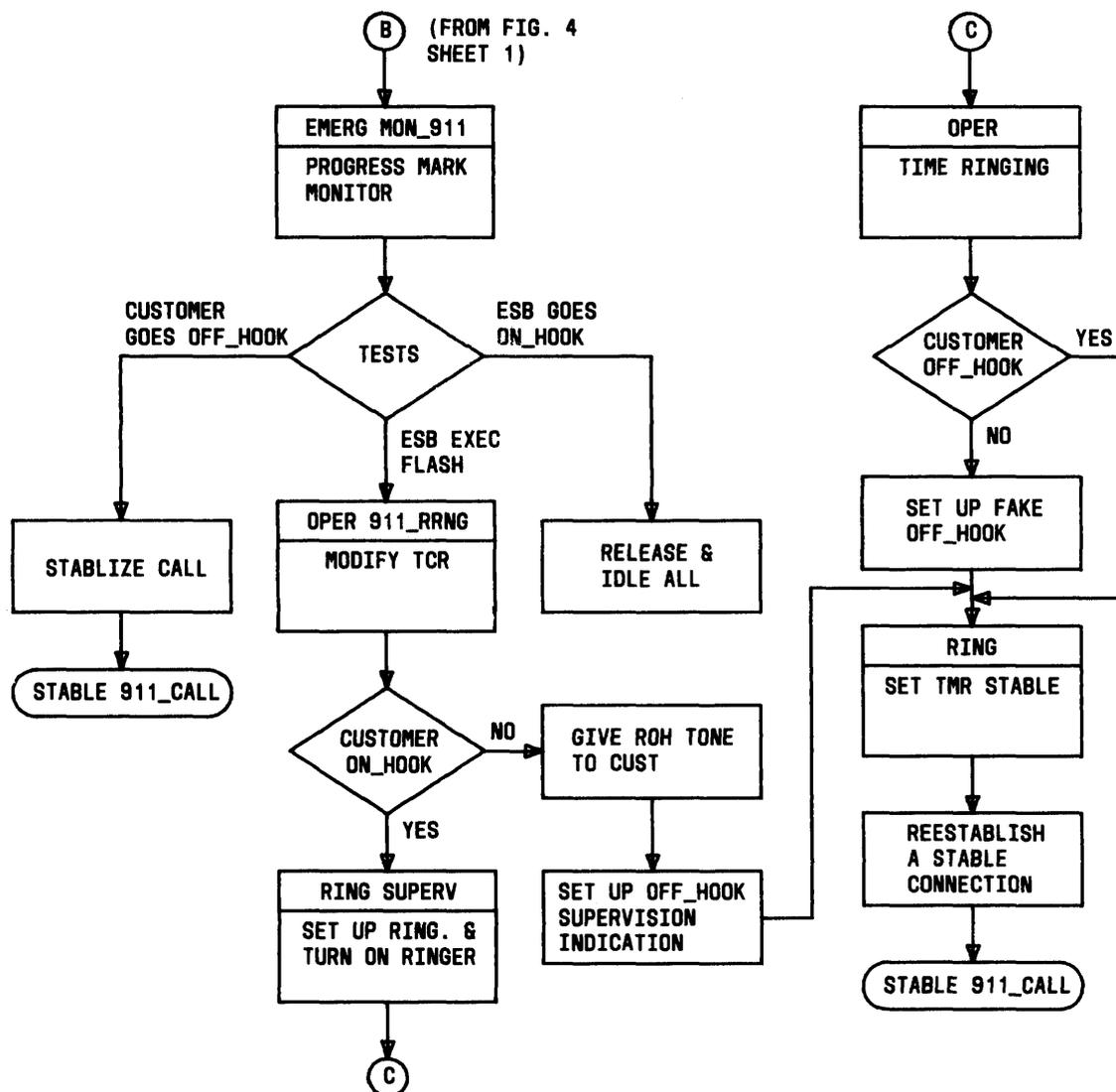
Fig. 4—Disconnections From the ESB (Sheet 2 of 2)

tip and ring reversal (RVSTR) in the 911-trunk. The EMERG program then initializes the TCR to process any supervisory reports while the ESB is receiving low tone. The progress mark monitor (MON_911) routine in EMERG performs the processing of any supervision received.

4.27 MON_911 monitors the 911-connection with the calling customer on-hook for any supervisory reports. The condition will persist until MON_911 detects the occurrence of one of the following actions.

(a) The ESB attendant goes on-hook.

(b) The calling customer goes off-hook.

(c) The ESB attendant executes a switch hook flash.

4.28 Upon receipt of supervisory input, the MON_911 routine invokes appropriate processing code. On supervision from the 911-trunk or when the ESB attendant goes on-hook, the 911_SUP routine is invoked. If the ESB remains

on-hook, the EMERG program invokes code that idles and releases all connections.

4.29 When the customer goes off-hook, MON_911 invokes code to idle the low tone circuit and path and to release the half-path from the calling line to the junctor. The path from the ESB to the calling customer is reestablished and the 911-call is stabilized.

4.30 When the ESB attendant goes back off-hook after being on-hook to execute a switch hook or flash, the EMERG program RE_RING_PREP routine is invoked. EMERG then prepares for reringing the line and branches to the 911_RRNG, entry point in the operator (OPER) program.

4.31 OPER assumes software control of the 911-connection after the ESB attendant flashes for a rering when the calling customer has gone on-hook. Upon entry to 911_RRNG, the 911-connection is in a state of giving low tone to the ESB attendant and the calling customer is on-hook.

4.32 OPER disconnects the low tone path, idles the low tone circuit, and modifies the TCR to indicate a line to the 911-connection. OPER checks for a customer line on-hook state. A reorder tone is given to the customer if the line is in the off-hook state.

4.33 When the calling customer line remains on-hook, a branch is made to the RING program for the preparation of the ringing facilities. RING sets up the ringer to the line and turns on the ringing. The OPER program times the ringing of the customer line.

4.34 When the customer goes off-hook, the RING program invokes code to stabilize the call. RING drops the ringing connection and sets up the TMR to a stable state. The 911-call is then reestablished as a stable 911-call.

4.35 When the customer remains on-hook after being rerung for the ringing period, the OPER program fakes a customer off-hook condition or essentially lies to the RING program. After OPER sets up the fake off-hook condition, RING invokes code that reestablishes the call as a stable 911-call. The ESB attendant must then determine the appropriate action to take (rering, hang-up, etc.).

ORIGINATION (INVALID)

4.36 A call origination from the ESB via an off-hook from an idle 911-trunk is invalid. This type of origination request is prevented by the No. 3 ESS software. Accordingly, as soon as an ESB off-hook condition is detected from an idle 911-trunk, a reorder tone is returned to the ESB for up to six minutes. If the off-hook persists for more than six minutes, a minor alarm is given to the No. 3 ESS office and a message is printed on the maintenance teletyewriter.

4.37 The software interactions for processing originations from the ESB are depicted in Fig. 5.

4.38 An invalid origination request from the ESB begins with the attendant going off-hook from the idle 911-trunk. The off-hook goes to the TKORIG program by the usual process of being scanned by the slow scan (SCANS) trunk scan, being placed in the input hopper, and being reported after hit timing. (See Section 233-151-125, Input Processing and Scanning.)

4.39 When TKORIG assumes control of the origination request, it selects a TCR and puts the trunk in the ignore supervision state. TKORIG invokes code to obtain trunk translation data and to make the trunk busy.

4.40 TKORIG checks the incoming digit translation (IDXLN) code and the single wink (SNG_WK) bit to determine if the trunk is an outgoing trunk and a 911-trunk, respectively. When the SNG_WK is set (SNG_WK = 1), TKORIG sets the SINGWK bit in the incoming information data (SUPPTCR) to designate a 911-trunk. Following some additional processing, TKORIG rechecks the SINGWK bit and, if it is set (SINGWK = 1), TKORIG branches to the 911_ORG entry point in the EMERG program. The 911_ORG is designed as the entry point to EMERG for invalid originations from the ESB.

4.41 When the 911_ORG routine assumes control, it processes the TCR for trunk triplet address data and sets up to reorder tone path. EMERG invokes code that provides the reorder tone to the ESB with 911-trunk supervision.

4.42 The AWAIT_SUP routine in the EMERG program initializes the TCR timer for a six-minute delay. EMERG then checks for an ESB
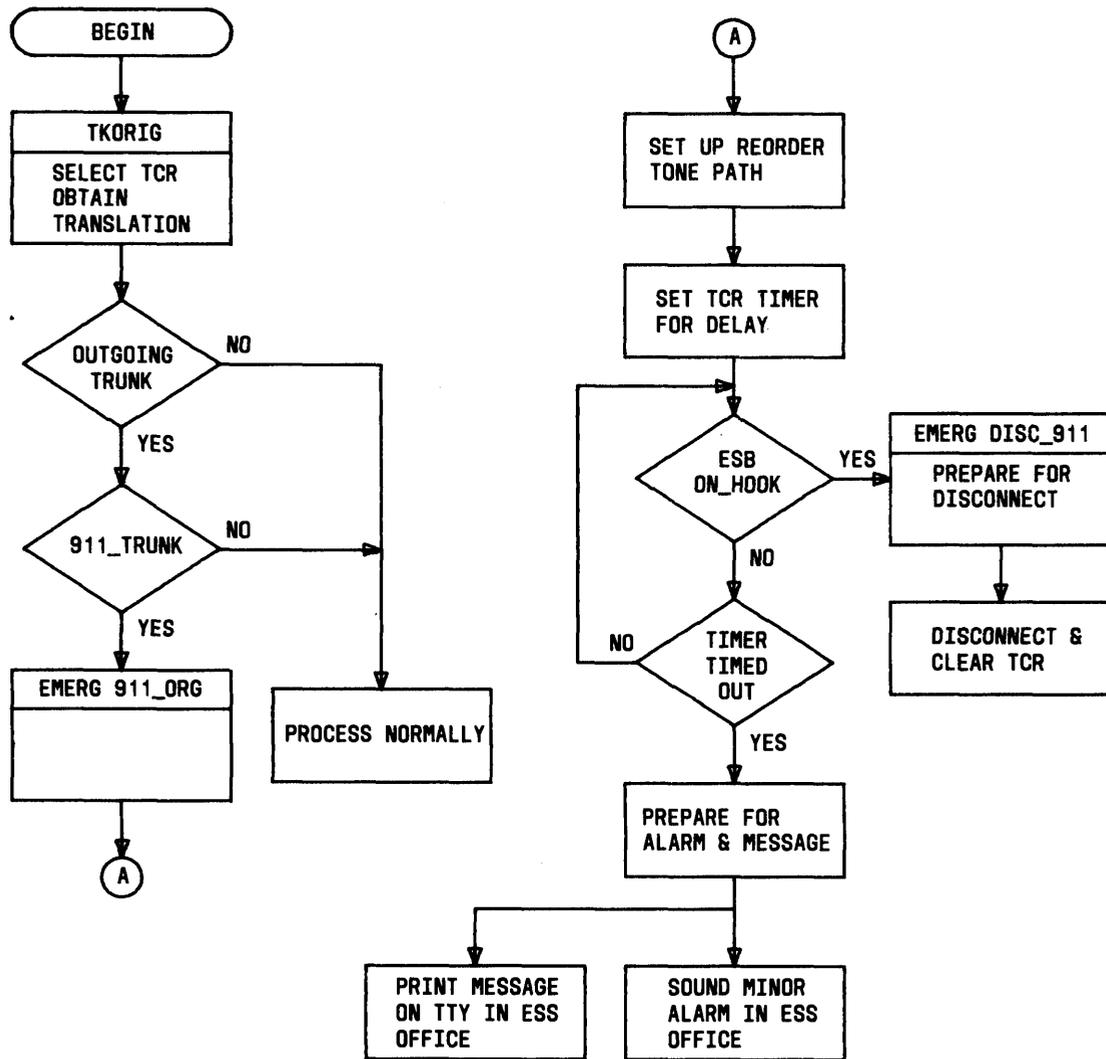
Fig. 5—Originations From the ESB

on-hook or supervision from the 911-trunk. When the ESB attendant goes on-hook before the six-minute time-out, the call is processed for a disconnection.

4.43 Upon detection of the on-hook, a branch is made to the DISC_911 routine in the EMERG program. EMERG invokes code to idle the 911-trunk and path. It then branches to the CLRTCR routine in EMERG. The CLRTCR initiates the action to clear the TCR and to complete the disconnection process.

4.44 When the reorder tone is given for six minutes or the TCR timer times out and the ESB attendant is still off-hook, the EMERG

program prepares the registers to sound the minor alarm and to print a TTY message concerning the origination from the ESB idle 911-trunk. The preparation process includes the EMERG program obtaining the translation information and loading the codes necessary to identify the 911-trunk message when it is printed.

4.45 Upon completion of the preparation process, EMERG invokes the code that sounds the minor alarm in the ESS office and prints the following message on the TTY:

REPT TRK ggg mmm ddd ORG

(Where ggg is the three-digit variable that defines the trunk group; mmm is the three-digit variable that defines the member number; and ddd is the three-digit code—911—that identifies the message as a 911 message).

4.46 The printed message is intended to alert the ESS office to the fact that an origination request from the specific 911-trunk, while idle, persisted for more than six minutes. The trunk is monitored beyond the six-minute period for abandonment.

5. GLOSSARY

5.01 Terms, abbreviations, and definitions used frequently in this document follow.

Base Level—Major software loop including all functions not done during interrupt level.

Bit—The binary unit of information which is represented by one of two possible conditions, such as the digits 0 and 1, high potential or low potential, on or off.

Bypass—A shunt path around some element or elements of a circuit.

Clear—To restore a storage device to the "Zero" state.

Flash—An ESB brief on-hook (.2 through 1.2 seconds), then to off-hook to activate a ring-back on the 911-trunk.

Hoppers—Dedicated areas of writable memory into which entries with a fixed format are made.

Intraoffice Call—A call from one subscriber assigned to a central office to another subscriber within the same office.

Junctor—A circuit associated with the switching network which provides a path for a call through the network.

Line—Anything that connects to a network terminal that is not classified as a trunk or service circuit. Usually a pair of wires that serves to connect a customer telephone to a terminal on the network.

Macro—A sequence of operations called by an abbreviated notation.

NPA—Numbering plan area.

NNX—Represents any number in the range of 220 to 999 that can be used for the office code assignment.

NXX—Represents any number in the range of 200 to 999 that can be used for the service code assignment (Exp: 911).

NXX-XXXX—Represents any 7-digit code structured in accordance with the all-number calling (ANC) plan. XXXX is any number in the range of 0000 to 9999 that can be used for line assignment purposes.

Program—A set of instructions assembled as one unit under a program name.

Progress Marks—Areas in TCR which indicate next software routines to be executed for the call.

Reorder Tone—An audible signal (interrupted tone) sent back over the trunk to indicate that the order should be repeated.

Scan Point—Ferrod sensor used in scanners for supervisory purposes.

SPN—Scan point number.

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

Tandem—Trunk-to-trunk call.

TCR—Transient call record.

TEN—Terminal equipment number.

TMR—Terminal memory record.

Word—A set of characters which occupies one location in storage and is treated by the system as a unit.