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UNIVERSAL EMERGENCY SERVICE NUMBER 911 FEATURE
ENHANCED 911 SERVICE
FEATURE DOCUMENT
1 AND 1A *ESS*™ SWITCHES

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1. INTRODUCTION

DEFINITION

1.01 This document describes the E911 (Enhanced 911) feature capabilities available for 911 service in 2-wire 1 and 1A ESS switches. This document does not provide a detailed description of the B911 (Basic 911) feature. For a detailed description of the B911 feature, refer to Part 6 A(1).

REASON FOR REISSUE

1.02 This practice is reissued for the following reasons:

(a) To include addendum Issue 4.

(b) To state that option number 4 must be specified on ESS Form 1303B1 for RI 0112 in order for an interrupted high tone to be returned to the PSAP (public service answering point) attendant if a selective transfer request is invalid.

(c) To include the Service Code Confirmation Timing and Pulsed Digit Reception Blocking enchancements available in the 1AE8A.07 and later generic programs.

Since this reissue is a major revision, change arrows have been omitted.

AVAILABILITY

1.03 The E911 feature is an optionally loaded feature group available in the 1E5 generic program for the 1 ESS switch and in the 1AE5 generic program for the 1A ESS switch.

BACKGROUND

1.04 The number 911 is the 3-digit telephone number that has been designated for public use throughout the United States to report an emergency and/or request emergency assistance. The number 911 is intended as a nationwide universal telephone number that provides the public with direct access to a PSAP. A PSAP is an agency or facility which is designated and authorized to receive and respond to emergency calls requiring one or more public services such as police, fire, and/or ambulance services. Any one agency or a group of agencies may be designated as a PSAP.

ASSIGNMENT

1.05 The E911 customer premises equipment may be equipped for a maximum of 15 dedicated E911 trunks from the E911 tandem office and may serve up to 15 attendant lines. Refer to Part 2A.

1.06 For a 1 ESS switch E911 tandem office without a PDSP (peripheral data storage processor), the maximum number of different ESNs (emergence service numbers) assigned per number group is eight. If a PDSP is used with a 1 ESS switch E911 tandem office, the maximum number of different ESNs per number group in the PDSP is 511. For a 1A ESS switch using a 1AE5 generic program, the maximum number of ESNs per number group is eight. In 1AE6 and later generic programs, a 1A ESS switch may have a maximum of 511 ESNs per number group.

1.07 The maximum number of secondary DNs (directory numbers) associated with a primary PSAP for selective transfer is six. Assigned PSAP DNs must be local DNs.

2. USER PERSPECTIVE

USER PROFILE

2.01 Any individual, coin, Centrex/ESSX-1 (centrex tariff restructure), and PBX (Private Branch Exchange) customer station, or any other facility [that can access the DDD (direct distance dialing) network], which is served by an office located in an E911 service area, can be used to originate a 911 call to a PSAP without charge to the calling station. A 911 call may be originated from an individual (nonbusiness) or coin station by going off-hook and dialing the digits 911 after receiving dial tone. A 911 call may be originated without coin deposit from a dial tone first coin station. If coin deposit is required before receiving dial tone, coin return is made after the digits 911 are dialed. Centrex/ESSX-1 and PBX customers must dial the network access digit prior to dialing 911 (i.e., 9 + 911) to obtain access to the message network unless the customer is provided "assume dial 9" service. With "assume dial 9" service, the network access code does not have to be dialed.

2.02 A municipality providing E911 service may be generally referred to as an E911 customer. Dedicated E911 trunks are required between each office in the E911 service area and the E911 tandem office. Dedicated E911 outgoing trunks are required from the E911 tandem office to each PSAP. The dedicated E911 PSAP trunks are used as one-way trunks and cannot be used to originate calls from a PSAP. Regular customer service can be provided (via lines or trunks) for a PSAP facility to have standard message network originating and terminating service. The E911 network (Figure 1) is intended as a dedicated public emergency service network for emergency calls to PSAPs.

CUSTOMER PREMISES EQUIPMENT

2.03 Each PSAP facility requires one or more attendant terminals, which may be regular type telephone sets, CALL DIRECTOR® telephone sets, key telephone sets, attendant consoles, or equivalent equipment. If optional services, such as selective transfer and/or ANI (automatic number identification) display are provided, each PSAP facility requires E911 customer premises equipment as well as attendant terminals to be located on the customer premises. Refer to Figure 2 for a block diagram of an E911 CPS (Customer Premises System) equipped with E911 equipment. The E911 common equipment, contained in the J53060A equipment cabinet, provides interface and control functions for all 911 calls to the PSAP. Attendant station (terminal) equipment may be either 2B ACD (Automatic Call Distribution) attendant positions, key telephone system with key telephone sets or equivalent equipment. In addition to the required common and attendant station equipment, an optional 10A1-50 selector console may be provided for each equipped attendant position. The selector console is required if either selective transfer, fixed transfer, or ANI display services are provided. The ALI (automatic location identification) display is required when the optional ALI service is provided. The voice recorder and teleprinter units are optional customer equipment.

A. J53060A Equipment Cabinet

2.04 The E911 common equipment is housed in the J53060A equipment cabinet which measures approximately 22 inches deep by 31 inches wide by 50 inches high. See Figure 3. The J53060A equipment cabinet contains the following equipment.

(a) J53060A, L1 Cabinet—Provides framework, assembly, wiring, and equipment arranged for a maximum of 15 attendant lines and 15 CO (central office) trunks.

(b) J53060AA Basic Carrier—Provides common equipment for four attendant lines and four CO

trunks. Common modular equipment includes circuit packs for a controller, clocks, memory, touch-tone service, dial tone, MF (multifrequency) receivers, trunk switches, attendant circuits, and a voltage regulator.

(c) J53060AB Supplementary Carrier—Provides optional common equipment to expand the E911 CPS to 15 attendant lines and 15 CO trunks.

(d) J53060BA L2 Rectifier—Optional, required when no external reserve power (e.g., 105E battery plant) is provided.

(e) J53060BA L1 DC Power Supply Unit—The J53060BA unit contains dc-dc converters to supply +5, +12, -12 dc voltages and 10 V ac for the cabinet components via the fuse panel on the basic carrier. The unit also contains the optional J53060BA L3 (KS-21906 L1) holdover battery. The unit provides audible ringback and external alert signaling for the system.

(f) J53060BA L3 Holdover Battery Unit—The optional J53060BA L3 battery unit provides -48V to the system as a reserve battery plant in case of commercial power failure. Battery capability is 11 minutes for a full system. This unit is required when external battery power (e.g. 105E battery plant) is not provided.

(g) AC Power Distribution Box—The ac power distribution box, via the power cord, is connected directly to a dedicated, customer-provided 117 V ac 20A 60-Hz power receptacle. The box provides ac power receptacles for the power supply unit and rectifier. Also, two fused power receptacles are mounted on the box to facilitate use of test equipment.

(h) J53060BA L4 +5V Power Unit—The J53060BA L4 +5V power unit is required when J53060AB L1 supplementary carrier is provided.

(i) Fuse Panel—The fuse panel, mounted to the bottom of the basic carrier, contains the system's fuses and provides circuit protection for the circuit packs. Type 70 self-indicating fuses are used. Mounted on the fuse panel are LED (light emitting diode) indicators monitoring fuse failure, ac power failure, and low voltages. Also mounted on the fuse panel are voltage test points and connectors for a logic probe and service access position.

(j) Maintenance Circuit Pack—The maintenance circuit pack, mounted in the basic carrier, contains LED indicators, maintenance control switches, and fixed/selective transfer speed call switches. The LED indicators indicate the operational status of the CPS. The switches are used to configure the CPS equipment for test modes and to assign fixed transfer/selective transfer speed call codes for the 10A1-50 selector consoles.

2.05 For a PSAP requiring more than 15 attendant lines and 15 CO trunks, additional equipment cabinets may be provided. For detailed information concerning E911 CPS equipment, refer to Part 6 A(2) through A(4).

2.06 The E911 CPS equipment design also provides for access leads for optional connections to customer-provided voice recorders and teleprinters.

(a) Voice recordings for 911 calls may be made on a per-trunk basis. Access leads are available to provide connection to voice recording equipment. Start leads are also available to turn on the recorders if start/stop operation is employed. If continuous recorder operation is desired, the start leads are not connected.

(b) A teleprinter may be interconnected to the E911 common equipment to record certain information available for 911 calls. The common equipment is designed to store certain 911 call data. The common equipment may be arranged so that upon disconnect, there will be a teleprinter printout for each call. The output data consists of the trunk number, an ANI number, the attendant position(s) handling the call, and the time of day of receipt of the call, answer, transfer (if applicable), and disconnect.

B. E911 Attendant Terminal Equipment

2.07 Either a 2B ACD or a KTS (key telephone system) may be used by an E911 customer. Attendant consoles are used with a 2B ACD. Either CALL DIRECTOR telephone or key telephone sets are used with a key telephone system. For a description of a 2B ACD arrangement, refer to Part 6 A(41). Listed below are key telephone sets that may be used with E911.

- 2565 key telephone set
- 2636 CA CALL DIRECTOR telephone
- 2637 DA CALL DIRECTOR telephone

- 2830 key telephone set
- 2831 key telephone set
- 2832 key telephone set.

Controls and Indicators

2.08 Standard controls and indicators are equipped on attendant consoles, key telephone sets, and CALL DIRECTOR telephone sets used for PSAP attendant terminals. Unique controls and indicators are not required for the attendant terminals since the 10A1-50 selector console provides for the unique E911 control and indicator functions. Refer to other documentation for detailed information concerning controls, indicators, and the method of operation for a specific type of attendant terminal.

Tones

2.09 Standard tones (e.g., dial tone, busy tone, reorder tone, audible ringing tone) are provided by the E911 tandem office for attendant transfer calls. Also, interrupted high tone (120 ipm) is provided when selective transfer is attempted but not allowed for a 911 call.

> ***Note:*** For an incoming 911 call, if the PSAP is equipped with a key telephone system, all attendants are alerted via an external common alert (such as a ringer, bell, klaxon, horn, or light) and by a flashing trunk lamp. If the PSAP is equipped with a 2B ACD, an attendant is alerted by a zip tone. Audible is returned to a 911 calling party from the E911 PSAP customer premises equipment.

C. 10A1-50 Selector Console

2.10 In addition to the attendant terminals, the 10A1-50 selector console is required for the optional ANI display and selective and/or fixed transfer services. The selector console is an adjunct-type console equipped with an 8-digit LED display and 12 nonlocking keys (pushbuttons). Refer to Figure 4. The selector console, also referred to as the ANI display unit, displays the ANI telephone number of the station from which a 911 call is originated. If the ANI telephone number is not available, then other associated data (indicating the originating local office or call status) is displayed. The pushbuttons permit the attendant to initiate and release call transfers, and to retire E911 CPS system alarms. One selector console is provided for each equipped attendant position. Even when this unit is employed, all E911 call pickup and release functions are accomplished in the conventional manner using the pickup and control buttons of the attendant terminal equipment provided (i.e., key telephone set, CALL DIRECTOR telephone or ACD console).

8-Digit LED Display

2.11 The 8-digit LED display and 12 nonlocking pushbuttons are located as shown in Figure 5. The 8-digit display consists of three display segments. The first segment is a single digit display used to indicate a digit representing the NPA (numbering plan area) from which a 911 call originated in those cases when the 911 service area includes two or more NPAs. The display digit representing an NPA is called the NPD (numbering plan digit). If the 911 service area has only one NPA, no digit is displayed. Otherwise, the digits 1, 2, and 3 are used to indicate the lowest NPA, second NPA, and highest NPA, respectively. The second and third segments are used to display the ANI TN (telephone number) of the originating station, which includes the office code (NXX) and the telephone extension number (XXXX).

2.12 In cases where special attention and handling may be required, the displayed digits may be (optionally) flashed off and on to alert the attendant. Examples of such cases are a 911 call originated via a FX (foreign exchange) line serving a station which is not physically located in the 911 service area or a TN which does not have an ESN assigned.

2.13 If the ANI telephone number of the originating station is not available, a fictitious telephone number (XXX-XXXX) is displayed as follows:

(a) 911 OTTT—The NPD (numbering plan digit) is not displayed. The digits TTT indicate the local office from which the call originated. This format is displayed when default routing occurs due to the inability to obtain the originating station ANI TN because of an ANI failure and 911 calls from multiparty lines. Such circumstances prohibit ANI identification and result in default routing to an associated PSAP.

(b) 911-0000—This format is displayed to indicate an anonymous call to the PSAP. An anonymous call is a 7-digit direct dialed call (not 911) to the DN of a PSAP, which is routed to the PSAP via a dedicated E911 trunk. For example, a customer

direct dials a 7-digit number that is assigned and translated as a PSAP telephone number. ANI identification is not available for such (non-911) calls. Also, the NPD digit is not displayed. A PSAP may be assigned a nondialable number (such as an unassigned NXX code) to preclude such anonymous calls.

(c) 000-0000—This number is displayed if there is an ANI failure between the E911 tandem office and the PSAP.

Control and Transfer Keys

2.14 The 12 nonlocking control keys are located as shown in Figure 5. Four control keys are provided as follows:

(a) ***ADD***—This key is provided to manually request dial tone for direct dialed manual call transfers. This key is ***not*** used to initiate either selective or fixed transfers. After operating the ***ADD*** key and receiving dial tone, the PSAP attendant manually dials any valid DDD number or 2-digit speed calling code (i.e., *2X, *3X, or *4X) for the desired destination using the touch-tone pad equipped on the attendant terminal equipment.

(b) ***CANCEL***—This key is used to cancel any type of transfer (selective, fixed, or manually dialed) prior to destination answer. The key is also used, after a call transfer has been answered, to release the called party (destination). In this case, the added party is released, but the originating party and the PSAP attendant remain connected for 2-way conversation.

(c) ***ALM***—The ***ALM*** key is used to turn off an audible alarm which sounds when certain conditions occur in the E911 CPS equipment. Generally, an alarm indicates a malfunction or failure condition in the customer premises equipment.

(d) ***RPT ALI***—This key is associated with ALI (Automatic Location Identification) service. The ***RPT ALI*** (repeat ALI) key is used to regenerate a request for ALI information.

2.15 Eight transfer keys are equipped to provide for selective and/or fixed call transfer services. Refer to Figure 5. Selective and fixed transfer services are discussed in paragraph 2.21. The eight transfer keys are placarded (designated) according to their use. Any of the transfer keys may be assigned as either selective or fixed transfer keys.

(a) Selective transfer keys are placarded according to the type of agency (i.e., fire, police, etc.) to which a 911 call may be selectively transferred via the E911 tandem office. With selective transfer, the attendant only needs to determine the type of agency and operate the corresponding transfer key. The call is automatically extended to the correct agency location (secondary PSAP) associated with the originating station. With selective transfer, the attendant does not have to determine the particular agency location which serves the calling party.

(b) Fixed transfer keys are placarded according to the type of agency and the particular agency location (i.e., fire A, fire B, police A). With fixed transfer, the attendant must determine both the type of agency and the particular agency location in order to transfer the call to the correct agency location which serves the originating station location.

D. ALI Display Unit

2.16 The ALI display unit is an informer model CM911 receive only CRT (cathode ray tube) display unit. When the ALI feature is provided, each PSAP attendant position may be provided with an ALI display unit, which displays location information (i.e., street address) of the station from which a 911 call is made. The ALI display unit is an integral part of the ALI system, which interfaces with the E911 CPS.

FEATURE DESCRIPTION

2.17 The E911 feature provides enhanced 911 service capabilities and optional PSAP customer services for completing and handling 911 calls. With E911 service, a 1 or 1A ESS switch serves as an E911 tandem office for all 911 calls from other local offices in the 911 service area and as a local office for 911 calls originated by customers served by the E911 tandem office. The E911 tandem office may serve one or more PSAPs in the 911 service area. The E911 feature provides the capability for the E911 tandem office to serve several PSAPs existing within the 911 service area. The main characteristic of E911 service is the capability of the E911 tandem office to selectively route a 911 call originated from any station in the 911service area to the correct primary PSAP that is designated to serve the originating station's location.

The following services are available with the E911 feature.

(a) Selective routing

(b) Default routing

(c) Alternate routing (for traffic busy PSAPs, for PSAPs on night service, and for PSAPs which have a power failure)

(d) Central office transfer (selective, fixed, or manual transfer)

(e) ANI

(f) ALI/DMS (Data Management System)

(g) Forced disconnect

(h) Night service

(i) Service code confirmation timing (1AE8A.07 and later)

(j) Pulsed digit reception blocking (1AE8A.07 and later).

2.18 ***Selective routing*** provides the capability to selectively route a 911 call to the primary PSAP associated with the originating station. Selective routing is based on either the office code, the number group (thousand's group), or the ANI TN of the originating station, rather than the digits dialed. The ANI TN is the billing TN of the originating station, which is used for normal toll or message rate billing. The ANI TN may not be the actual TN of the station. Selective routing is an optional E911 service which may be provided on a per office code, per number group, or per TN basis. Therefore, when selective routing is provided, each station in an E911 service area is associated (either indirectly via the station's office code or number group, or directly via the station TN) with a primary PSAP. Thus, selective routing automatically routes a 911 call to the correct primary PSAP designated to serve the originating station.

2.19 ***Default routing*** is a standard arrangement with E911 service which provides the capability to automatically route a 911 call to a predesignated (default) PSAP (or some designated location) either when selective routing is not provided or when selective routing is provided but a particular 911 call cannot be selectively routed for any reason. Default routing is an inherent capability with the E911 feature.

2.20 ***Alternate routing*** is a standard service available for each PSAP and provides the capability for a traffic busy PSAP, a PSAP on night service, or a PSAP which has a power failure to have 911 calls alternate routed to a predesignated location. With alternate routing, if all trunks to a particular PSAP are traffic busy, or made busy for night service, or the PSAP is out of service due to a power failure, 911 calls normally routed to that particular PSAP are automatically alternate routed to the predesignated DN assigned for that alternate location.

2.21 ***Central office transfer*** is a standard service available for each PSAP and provides the capability for an established 911 call to a PSAP to be transferred via the E911 tandem office to another PSAP or to some other desired destination by the PSAP attendant. A call transfer is accomplished at the E911 tandem office via a 3-way conference connection, which permits a simultaneous 3-way connection to be established for the calling party, primary (or controlling) PSAP attendant, and the desired destination, which may be another PSAP or some other DN. Three types of central office transfer services (selective, fixed, and manual) are available for a PSAP. Either selective transfer, fixed transfer, or manual transfer, or any combination of these transfer services may be provided for an E911 PSAP.

(a) ***Selective transfer*** service allows an established 911 call to be selectively transferred by the E911 tandem office from the primary PSAP to the correct secondary PSAP associated with the calling station ANI TN without the primary PSAP attendant having to determine and manually dial the digits for the correct destination. Each primary PSAP may have up to six secondary PSAPs associated with it for selective transfer. Selective routing is required if the selective transfer option is provided. To initiate selective transfer to the correct secondary PSAP, the PSAP attendant operates a key associated with the particular type (e.g., fire department) of secondary PSAP desired. The E911 tandem office automatically determines the specific secondary PSAP designated (e.g., fire department A) to serve the calling station and selectively transfers the 911 call to that secondary PSAP.

Note: A PSAP may be designated as primary or secondary, which refers to the order in which 911 calls are directed for answering. Primary

PSAPs respond first; secondary PSAPs receive calls on a transfer basis only.

(b) ***Fixed transfer*** allows an established 911 call to be transferred by the PSAP attendant to another *specific* PSAP (e.g., fire department A) or some other specific destination. Fixed transfer by the operation of a transfer key uses the speed calling feature of the E911 tandem office.

Fixed transfer provides for call transfer to any of a limited number of specific destinations, which may be other PSAPs or some other destinations to which 911 calls may be transferred. With fixed transfer service, the PSAP attendant determines the specific destination desired and operates the particular key associated with the specific (fixed) destination.

(c) With the ***manual dial transfer*** service, the PSAP attendant determines the specific destination desired and manually dials the number of the destination or associated speed calling code (if speed calling is provided for manual dial transfer).

2.22 *ANI* is an optional service which allows (for 911 calls only) the ANI TN of the calling station to be automatically forwarded to the PSAP and displayed at the answering PSAP attendant position on a special ANI display unit. When the ANI TN of the calling station is available, the display will indicate a NPD (numbering plan digit), which provides an indication of the numbering plan area of the calling station, and the 7-digit ANI TN of the calling station. In cases where the ANI TN is available but the call either cannot be properly routed by the E911 tandem office or the call requires special attention by the PSAP attendant, the ANI TN displayed may be optionally flashed to alert the answering PSAP attendant. In cases where the ANI TN is not available, the display provides an indication of the telephone office from which the call originated. Also, the display will indicate an anonymous call to a PSAP.

2.23 *ALI* is an optional service which provides street address information for 911 calls to PSAPs to be displayed at the answering PSAP. An integral part of the ALI system is a ***DMS.*** The main functions of the DMS are maintenance of the E911 data base, the processing of telephone company and customer data or inclusion in the E911 data base, and the generation of selective routing update data. ***Forced disconnect*** is an inherent capability with E911 service and is provided to prevent a calling station, which remains off-hook, from indefinitely holding the connection to a PSAP. Forced disconnect allows a PSAP attendant to release a 911 call connection even though the calling party has not hung up, thereby preventing a tie up or jamming of dedicated 911 facilities.

2.24 ***Night service*** is a standard feature available for each PSAP. When night service is in effect for a PSAP, all 911 calls to that PSAP are automatically forwarded to the predesignated (alternate) DN assigned for that PSAP. The alternate DN may be associated with a secondary PSAP or some other alternate location.

> ***Note:*** One predesignated (alternate) DN may be assigned for a particular PSAP. Therefore, if a PSAP is provided with alternate routing for a traffic busy condition, night service, and/or power failure condition, the same predesignated DN is used for alternate routing due to any of these conditions.

2.25 ***Service code confirmation timing*** is a 1AE8A.07 and later enhancement providing timing after a service code is dialed, e.g., 911, so that inadvertently dialed 911 numbers are not routed to the PSAP. The confirmation timing is variable from 1-4 seconds and results in increased call set up time to the PSAP for true 911 emergency calls.

The delay option is controlled by choosing a value for a 2-bit field in the office options table. Bits 19 and 20 of word 1 of the office options table result in the following delay:

00 — no delay (default)
01 — 1-2 second delay
10 — 2-3 second delay
11 — 3-4 second delay.

2.26 ***Pulsed digit reception blocking*** is a 1AE8A.07 and later enhancement that rejects dial pulse digits after a DTMF (Dual Tone Multifrequency) digit is received at the central office from a given line. Without pulsed digit reception blocking the flash signals generated during dialing by a customer depressing the switchhook multiple times can be interpreted by the 1A *ESS* switch as "ones" dial pulse digits and result in misrouted calls. The pulsed digit reception blocking feature is set in the PDRB bit, bit 12 word 1, in the office options table.

2.27 Demand for the basic 911 service and various special or "custom" features to improve 911 service capabilities in various localities has increased

significantly since 911 service was initially introduced. The E911 feature provides certain customers with the initial or basic 911 service. The intent of the background information contained herein is to provide general information concerning 911 service per se and to generally describe, for comparison purposes only, the capabilities of and differences between B911 service and E911 service. This document does not provide detailed information for B911 service. For detailed B911 service information, refer to Part 6 A(1). Part 6 B(1) through B(13) provide additional planning, engineering, and marketing information for 911 service.

2.28 Close coordination among agencies providing various emergency services is a valuable capability provided by 911 emergency service. Advantages to the public include one universal 3-digit number that is easy to remember and that can be called for any of the various emergency services provided within a given 911 service area. Confusion is avoided, and time is saved since a caller does not have to remember or look up one or more 7-digit directory numbers to report an emergency situation or request emergency services.

2.29 A 911 service area is established on a municipal basis. PSAPs within the 911 service area are designated by the municipality. PSAPs have previously been referred to as ESBs (emergency service bureaus). As used herein, a municipality may be a city, town, community, county, or a combination of these or other various political entities. The scope of services to be provided and agencies associated with a PSAP are determined by the municipality. For example, a municipality may desire one or more of the following agencies/services to be associated with a 911 service arrangement:

- Ambulance
- Civil Defense
- Drug Abuse
- Emergency Medical Services
- Fire Department
- Forestry
- Highway Patrol
- Hospital
- Poison Control
- Police
- Public Works
- Sheriff
- State Police
- Suicide Prevention
- Weather Warning.

Any agency or combination of agencies may be designated as a PSAP.

2.30 One or more attendants are located at a PSAP facility to receive and handle emergency calls in accordance with municipal requirements. PSAP attendants may be personnel from one or more of the various agencies, such as the police or fire department, or any other agency designated to receive 911 emergency calls. Depending on municipal requirements and procedures, a PSAP attendant may need to serve 911 emergency calls by:

(a) Serving as a dispatcher for one or more agencies

(b) Transferring the call to the proper agency

(c) Collecting and relaying emergency information to the proper agency.

2.31 One or more PSAPs may be required for any given municipality or metropolitan area. For example, a small community having only one police and one fire department to serve the entire community may require only one PSAP. However, a larger municipality having several police and/or fire districts may desire to have a PSAP associated with each district since the public within a particular district is generally served by the agencies within (or associated with) that district.

2.32 Assuming a municipality desiring 911 service is served by one or more 1/1A ESS switch central offices capable of providing either the B911 or E911 services, the choice of 911 service and service options will be made by the telephone company and the municipality, and will be based on an analysis of customer needs at each location and on the availability of facilities in each area. Some of the basic considerations for 911 service include the following:

(a) Type of 911 services and options desired or required

(b) Population and area (including growth potential) of the municipality

(c) The number of districts (or zones) within the 911 service area which are served by the same agencies or set of agencies

(d) Telephone office wire center boundaries compared to the districts (zones) or other political subdivisions within the 911 service area.

A. Basic 911 Service Capabilities

2.33 With B911 service, a 1 or 1A ESS switch office will route 911 emergency calls to only one PSAP. For discussion purposes, the office that provides B911 telephone service to a PSAP is referred to as the B911 central office. With B911 service, all 911 emergency calls originating within the B911 central office are routed to the same PSAP regardless of incongruities between telephone wire center boundaries and municipal agency districts or other political subdivisions within the 911 service area. Also, all 911 calls received by the B911 central office from other offices via the message network (interoffice or tandem trunks) are routed to the same PSAP. Service provisions available with B911 to provide additional call handling capabilities for PSAP attendants are:

- Forced disconnect
- Switchhook status (optional)
- Called party hold (optional)
- Emergency ringback (optional).

Note: Selective routing, default routing, alternate routing, central office transfer, ANI display, ALI/DMS, and night service are not available with B911 service.

2.34 ***Forced disconnect*** allows a PSAP attendant to terminate, at any time, any established 911 call regardless of the action of the calling party. Forced disconnect prevents the dedicated facilities (lines or trunks) to the PSAP from being tied up by calling parties who remain off-hook. After a PSAP attendant releases from a 911 call, the dedicated 911 trunk to the PSAP is automatically released and made available for other 911 calls.

2.35 ***Switchhook status*** is an optional service which automatically provides a visual indication of the switchhook status of the originating station on an established 911 call. Visual switchhook status indications are not provided for 911 calls completed via interoffice or tandem (message network) connections. In addition to visual switchhook status indications, tones provided by the B911 central office enable the attendant to determine the 911 call status.

2.36 ***Called party hold*** (also referred to as forced hold) allows the PSAP attendant to hold the connection established for a station from which a 911 call was originated, regardless of calling party actions. Called party hold enables the call to be traced to determine the calling party location. Actions by the calling party will not affect the connection being held. The connection is held until the PSAP attendant releases the call. Called party hold cannot be provided for 911 calls completed via interoffice or tandem connections since an incoming trunk cannot be forced held at the B911 central office.

2.37 ***Emergency ringback*** allows the PSAP attendant to ring back a calling station regardless of the station switchhook (on-hook or off-hook) status. Emergency ringback cannot be provided for 911 calls completed via interoffice or tandem connections.

B. Basic 911 Service Arrangements

2.38 Consider a municipality that desires 911 service for public service agencies which include the police department, fire department, and ambulance service. Assume that since the greatest number of emergency calls (based on previous experience) are police calls, police department personnel will serve as the PSAP attendants. A municipality in which the same three agencies serve the entire municipality (911 service area) may require only one PSAP. For example, if a central dispatch system is used at a PSAP facility for all emergency services provided, then only one PSAP may be required. If only one PSAP is required, selective routing and central office transfer services are not necessary. Therefore, unless ANI display is required, B911 service appears to be adequate for the hypothetical municipality being considered.

2.39 Figure 6 illustrates a simplified example of a B911 arrangement having one PSAP and using both dedicated (direct) and tandem trunking for 911 calls. For this example, the entire 911 service area was assumed to be served by the same set of agencies without any further district or political subdivisions. Switchhook status, called party hold, and emergency ringback services can only be provided for 911 calls

originated by lines of the B911 central office (office "C"). Calling line status, called party hold, and emergency ringback **cannot** be provided for incoming 911 calls routed from other offices via the message network to the B911 central office for completion to the PSAP. Also, these services cannot be provided for add-on calls, calls from 51A CPS customer attendants, or calls originated via Centrex/ESSX-1 customer tie trunks. However, a PSAP may be served by more than one central office; therefore, if calling line status, called party hold, and emergency ringback capabilities are desired for 911 calls originating from other offices, dedicated 911 trunks direct to the PSAP from the other offices may be provided.

2.40 Now, consider a similar municipality except there are two separate districts within the municipality. Refer to Figure 7. Each district (J and K) is independently served by the police and fire agencies within that district. The municipality desires a separate PSAP for each district. Assuming selective routing is either not required or not desired, B911 service can be provided by serving each PSAP (Y and Z) from separate B911 central offices (A and B) with the municipal district "J" boundary. Some stations served by offices "A" and "C" are located in district "K". Since selective routing is not provided with B911, all 911 calls originating in offices "A" and "C" are completed to PSAP "Y". Therefore 911 calls originated from stations served by offices "A" and "C" but located in district "K" are routed to the incorrect PSAP. In this type of situation, a method of handling 911 calls to the incorrect PSAP should be recommended to the municipality. Consider station "X" in district "K". A 911 call from station "X" is routed to PSAP "Y". Depending on municipal requirements, facilities, and procedures, PSAP "Y" attendants could handle the call directly if the station "X" customer location is to be served by the agencies (police, fire, etc.) from district "J". Otherwise, such calls may require transfer service (if available) or the emergency information may be relayed by an attendant at PSAP "Y" to an attendant at PSAP "Z" or handled in some other prescribed manner. For example, if the PSAPs are interconnected via private 2-way tie lines, the 911 call may be transferred via the private tie lines from one PSAP to another PSAP. Otherwise, the answering PSAP attendant could relay the information via either private tie lines or regular dial lines (if provided) or else the calling party may have to disconnect and direct dial the correct agency via the regular message network. This example does not mean that a municipality with two or more public service districts would necessarily have more than one PSAP. The necessary 911 services and options are determined jointly by the telephone company and the municipality.

C. Enhanced 911 Service Arrangements

2.41 Several factors contribute to a more efficient 911 service arrangement by providing E911 service, rather than B911 service, for some 911 service areas. An area having several agencies and requiring several PSAPs in the 911 service area may need E911 service for selective routing due to telephone wire center and political (district) boundary mismatches or for central office transfer service due to PSAP agency associations, or for any of the other services available only with the E911 feature. The population and area, the number of separate districts and agencies, and the hierarchical arrangement of PSAPs within a 911 service area are significant factors in the type of 911 service required.

2.42 To serve an E911 service area correctly, all telephone wire centers that are wholly or partially within the E911 service area must be part of the E911 arrangement. Thus the collection of telephone wire centers may serve areas outside the E911 service area. For this discussion, it is not important what type of 911 service, if any, is provided for those areas outside the E911 service area. Those areas could be non-911 or B911 service areas.

2.43 When E911 service is provided, a 1 or 1A ESS switch is used as the E911 tandem office for the E911 network (Figure 1) to route all 911 calls to the correct (primary) PSAP designated to serve the calling station. It should be understood that the E911 tandem office (which must be a 1 or 1A ESS switch) serves as a tandem office for all 911 calls. The office can also serve as a regular class 5 local office. The E911 tandem office serves all PSAPs in the E911 service area. The E911 tandem office routes 911 calls from other offices and from customers served by the E911 tandem office to the PSAPs designated by the municipality to serve the customer stations.

2.44 The E911 feature was developed primarily to provide routing to the correct PSAP for all 911 calls. Selective routing allows a 911 call originated from a station located in a particular district, zone, town, etc., to be routed to the primary PSAP designated to serve the customer stations in that particular district regardless of wire center boundaries. Thus, selective routing eliminates the problem of wire center boundaries not coinciding with district or other political boundaries.

2.45 Selective routing may not be necessary for certain E911 service areas. For example, if telephone wire center and political boundaries coincide, selective routing may not be necessary, since in this case, proper routing to the correct PSAP can be accomplished using the default routing capability. However, if selective transfer is provided, selective routing must be provided since selective transfer requires selective routing data. The term "selective routing" refers to the E911 tandem office capability to route the call based on information concerning the calling station (i.e., ANI TN, number group, or office code) rather than the dialed address digits. Selective routing and the completion of a 911 call to a PSAP are separate functions of the E911 tandem office. The selective routing translation data provides a local directory number (DN) or list of local DNs served by the E911 tandem office to which a particular 911 call should be routed. The DN can be any valid local DN which typically leads (translates) to a dedicated outgoing 911 trunk group to a PSAP.

2.46 The services (previously defined) available with the E911 feature include:

- Selective routing (optional)
- Default routing (standard)
- Alternate routing (standard)
- Central office transfer (selective, fixed, and/or manual transfer service) (standard)
- ANI (optional)
- ALI/DMS (optional)
- Forced disconnect (standard)
- Night service (standard).

Note: Switchhook status, called party hold, and emergency ringback services available with B911 service are not available with E911 service. The E911 ANI and/or ALI display services generally satisfy the need for these types of services.

2.47 The majority of 911 calls in an E911 network will be from stations served by local offices other than the E911 tandem office. Generally, a 911 call, when both ANI and selective routing are provided, is completed as follows:

(a) Local office (or E911 tandem office) customer dials 911.

(b) Local office (or E911 tandem office) obtains ANI TN of originating station.

(c) Local office seizes a dedicated outgoing 911 trunk (capable of sending ANI) to the E911 tandem office and sends the ANI information to the E911 tandem office.

(d) The E911 tandem office receives and uses the ANI information as an input for selective routing to obtain the correct emergency service number and DN of the primary PSAP designated for the calling station. If the 911 call was originated by a customer served by the E911 tandem office, the E911 tandem office provides the TN used for selective routing.

(e) After the DN of the correct primary PSAP is obtained, the E911 tandem office translates the DN to obtain the route index and routes the call via a dedicated outgoing 911 trunk to that PSAP. If ANI display service is provided for that PSAP, the ANI TN of the calling station is transmitted to the PSAP, where the ANI information is displayed at the answering PSAP attendant position.

2.48 To illustrate the advantage of the E911 ***selective routing*** capability, assume a 911 service area consists of two towns (town "A" and town "B"). Refer to Figure 8. The 911 service area is divided by each type of agency into one or more serving areas. Thus, in Figure 8, the 911 service area, consisting of towns "A" and "B", is subdivided according to police and fire department service districts. In this example, police department "A" has jurisdiction in town "A" and police department "B" has jurisdiction in town "B". For illustrative purposes, three fire departments, "X", "Y", and "Z", serve their respective areas in the 911 service area. Police and fire departments may have coincident boundaries, but in some areas they do not. After all of the boundaries of the selective agencies are drawn, the 911 service area consists of a collection of cells. These cells are termed ESZ (emergency service zones).

2.49 An ESZ is a geographical area in which all residents are served by the same set of selective agencies. For example, in Figure 8, all residents in ESZ 2 are served by police department "A" and fire department "Y". Each ESZ is assigned a distinct number

called the ESN (emergency service number). Thus an ESN is associated with a particular set of selective agencies which serve a specific geographical area. For this example, assume that selective routing, selective transfer, and ANI are provided. Each set of selective agencies has a primary PSAP (which is assigned the primary ESN) and possibly one or more secondary PSAPs (which are assigned secondary ESNs). Secondary PSAPs are only provided with selective transfer. All telephone numbers assigned for stations located within an ESZ are associated with the primary ESN assigned for that ESZ. Therefore, each station is associated with a primary PSAP (and possibly one or more secondary PSAPs) based on the ANI TN to ESN assignment. Table A lists and indicates these example associations.

2.50 ***Selective transfer*** is based on the selective routing capability. Selective transfer allows an established 911 call to be transferred from the primary PSAP to the correct secondary PSAP designated to serve the calling station without the PSAP attendant having to determine which is the correct PSAP, then dialing the correct digits. Consider the 911 service area depicted in Figure 8. Assume police "A" and "B" are designated as the primary PSAPs in their respective towns. The fire departments "X", "Y", and "Z" are designated as secondary PSAPs in each town. This E911 service area has four emergency service zones. Each town has one primary PSAP (police) and two secondary PSAPs (for the fire departments). Refer to Table A. If a 911 emergency call is originated from a station served by police "A" and fire department "Y", the call is ***selectively routed*** to the designated primary PSAP (police "A"). If a fire is involved, ***selective transfer*** service allows the call to be transferred automatically by the E911 tandem office (upon attendant request) to the correct secondary PSAP (fire "Y"). The primary PSAP attendant does not have to determine which fire department (secondary PSAP) serves that calling station's location. Thus attendant "look-up" and dialing time is eliminated.

2.51 In the example E911 service area, every customer station is located within a particular ESZ. Each particular ESZ contains a unique set of public service agencies. Each ESZ has a designated primary PSAP and secondary PSAP. Based on the simple example described, it is apparent that each E911 service area can be unique and that a particular E911 service area could be quite complex. However, a 1 or 1A ESS switch E911 tandem office with the E911 feature is able to provide efficient 911 service even for complex E911 networks.

2.52 Consider the same E911 service area except fixed transfer is provided in lieu of selective transfer. In this case, fire departments "X", "Y", and "Z" are not designated as secondary PSAPs. For fixed transfer service, a transfer key and speed calling code is assigned for each fire department. If a 911 emergency call is originated from a station served by police "A", the call is selectively routed to the designated primary PSAP (police "A"). If a fire is involved, the attendant determines the correct fire department that serves the calling station location and operates the fixed transfer key associated with that particular fire department.

INPUT/OUTPUT MESSAGE FORMATS

2.53 E911 traffic and error data are available in the EN01, EN02, and EN03 output messages at the maintenance terminal. These output messages may be selectively turned off or on at the maintenance terminal using the EMCALL-PRT input message. For a detailed description of these output and input messages, refer to Part 6 B(19) through B(22).

EN01 Output Message

2.54 The EN01 message is an E911 error message containing pertinent data available at the time the error occurred. Following the EN01 message may be TWO2 messages, which are dumps of associated registers. The EN01 message contains a variable number of printed lines. Only the first line is printed if there are no registers associated with the error. If there are registers but no TNNs (trunk network numbers) associated with the error, the first three lines are printed. Four lines are printed if there are any TNNs.

2.55 The first line is in the form:

EN01 E911 ERR (aaaa) bbb

Where aaaa = the error number

bbb = the error category.

2.56 The error category and error number can be used to obtain additional information about the particular error. The error category and error number define a particular E911 error. A description of the particular error is contained at the end of the ESMG (error message program) listing. The abbreviations for the error categories are also used in the input message EMCALL-PRT to control the printing of the EN01

output message and the EN02 E911 ERROR SUMMARY output message. The printing of the EN01 message is automatically turned on for program and translation error categories once a day at approximately 2:30 a.m. A summary of the EN01 errors by error category is printed hourly on the half hour by the EN02 output message.

2.57 Probable causes for a particular error category are as follows where bbb equals:

(a) *PRG*—An E911 call has reached an invalid program point. The E911 error description in program ESMG defines the specific invalid point. This type of error can be caused by faulty program logic, nonsensical data, or translation errors.

(b) *TDA*—Translation data is in error.

(c) *DGC*—Digit collection errors are probably caused by bad hardware: incoming trunk or MF digit receivers in the E911 tandem office, the outgoing trunk, or MF transmitters in the originating office.

(d) *ANO*—ANI outpulsing errors are probably caused by hardware problems: outgoing trunk or MF transmitter in the E911 tandem office or equipment problems at the PSAP.

(e) *PDS*—Peripheral data storage errors are caused by either software or hardware problems associated with the peripheral data storage processor.

(f) *HDW*—Trunk circuits and/or network connections within the E911 tandem office are at fault. Hardware error messages have probably been printed giving further information about the error.

EN02 Output Message

2.58 The EN02 message is an E911 error summary of the errors that have occurred in the past hour. The EN02 output format is in the form:

```
EN02 E911 ERROR SUMMARY
aa/aa/aa bbb cc:cc:cc
TOTAL TGN ddd
eee fff gg
. . .
. . .
```

The second line printed indicates the month, day, year, the day of week, and the time of day that the EN02 message is loaded into the terminal buffer, not the time of printing. The third line indicates the E911 incoming or outgoing TGN (trunk group number) for which errors are being counted. The fourth and subsequent lines specify the error category, the total error count per particular category, and the TGN error count for a particular error category.

2.59 The format of the error data is as follows.

eee = The error category:

= PRG—Program

= TDA—Translation

= DGC—Digit collection

= ANO—ANI outpulsing

= PDS—Peripheral data storage

= HDW—Hardware.

fff = The total error count for the particular error category. The count contains the errors which have occurred during the past hour. The maximum count is 63 if no TGN is specified, and 126 if one is specified. If the count reaches maximum, it will stay there and not recycle to zero.

gg = The TGN error count for the particular error category. The count contains the errors which have occurred during the period of time a TGN was specified. At most, this period of time will be the past hour. The TGN counts are zeroed when the EN02 message is printed hourly, when the TGN is changed, and when counting TGN errors are stopped. An EN02 message is printed before the counts are zeroed. The maximum count is 63; if the count reaches the maximum, it will stay there and not recycle to zero.

Note: If there are no errors for a particular category, that line is not printed.

2.60 This message is printed every hour on the half hour if errors have occurred in the previous

hour. This message can also be printed upon demand by using input message EMCALL-PRT. A total count is given for each error category. If requested (through input message EMCALL-PRT), a TGN count can be given for each error category. The TGN count is a count of errors associated with a particular E911 incoming or outgoing trunk group. The second line of the EN02 message gives the date and the time that the message is loaded into the terminal buffer. Individual E911 errors are represented by the EN01 message. Printing of the EN01 message is controlled by input message EMCALL-PRT-.

EN03 Output Message

2.61 The EN03 message is an E911 traffic summary message. This is a summary of the E911 traffic over the past hour or over the past day. The EN03 message is printed either every hour on the half hour or once per day at approximately 2:30 a.m., depending on what has been specified by input message EMCALL-PRT. This message can also be printed upon demand by using input message EMCALL-PRT. This is a separate set of counts and is not related to the TC24A, TC24B, and TC24C traffic messages. The EN03 message is not printed if there has been no E911 traffic since the last scheduled printout. A total count is given for each traffic category. If requested (through input message EMCALL-PRT), a TGN count can be given for each traffic category. The TGN count is a count of traffic on a particular E911 incoming or outgoing trunk group.

2.62 The EN03 format is as follows:

```
EN03 E911 TRAFFIC SUMMARY
aa/aa/aa bbb cc:cc:cc
TOTAL TGN ddd
eee ffffff gggggg
. . .
. . .
. . .
```

The second line printed indicates the month, day, year, the day of week, and the time of day that the EN03 message is loaded into the terminal buffer, not the time of printing. The third line indicates the E911 incoming trunk group for which 911 traffic is being counted. The fourth and subsequent lines specify the traffic category, the total traffic count per particular category, and the TGN traffic count for a particular traffic category.

2.63 The format of the traffic data is as follows:

eee = The traffic category:

= ITS—Dedicated E911 incoming trunk seizures

= OGC—Number of originating E911 calls

= ANC—Valid ANI digits received

= ANI—ANI information digit indicates ANI failure

= ANT—ANI time-out occurred while collecting ANI

= ANF—ANI did not agree with ANI format

= ANM—ANI information digit indicates multiparty or QZ billing

= OTS—Seizures of trunks to PSAPs

= DFT—Number of calls routed to default PSAPs due to system problems

= OPF—Failures to outpulse ANI to PSAPs.

ffffff = The total traffic count for the particular traffic category. The count contains the traffic which has occurred during the past hour or day, as specified by input message EMCALL-PRT. The maximum count is 131,071 if no TGN is specified, and 262,142 if one is specified. If the count reaches maximum, it will recycle to zero. This is not expected to happen; if it does, changing from daily counts to hourly counts will help.

gggggg = The TGN traffic count for the particular traffic category. The count contains the traffic which has occurred during the period of time in which a TGN was specified. At most, this period of time will be the past hour or

day. The TGN counts are zeroed when the EN03 message is printed hourly or daily, when the TGN is changed, and when counting TGN traffic is stopped. An EN03 message is printed before the counts are zeroed. The maximum count is 131,071; if the count reaches maximum, it will recycle to zero. This is not expected to happen; if it does, changing from daily counts to hourly counts will help.

Note: If there is no traffic for a particular category, that line does not print.

2.64 The EN03 traffic counts give three types of information: the type of E911 traffic, an indication of the stages of progress achieved by E911 calls, and an indication of traffic overload and errors. Particular traffic counts or combinations of traffic counts may point out that something is wrong and needs to be corrected. More information can be obtained by taking traffic counts on different E911 incoming trunk groups. Also, the EN02 E911 error summary message and the EN01 immediate error message can be correlated with the EN03 message to possibly provide answers to the problems.

EMCALL-PRT Input Message

2.65 The EMCALL-PRT message is used to control the following:

(a) The printing of the EN01 immediate error message and the associated TW02 messages.

(b) TGN counts (E911 incoming and outgoing trunk groups) that are printed in the EN02 E911 ERROR SUMMARY message and the EN03 E911 TRAFFIC SUMMARY message.

(c) The printing of the EN02 and EN03 summary messages upon demand.

(d) The printing of the EN03 E911 TRAFFIC SUMMARY message either daily or hourly.

2.66 The input message format is EMCALL-PRT aaa bbb. There are four groups of valid input parameters for the fields aaa bbb. Within a group, any parameter aaa can be used with any parameter bbb. By using a slash (/) at the end of the input message instead of a period (.), more than one set of aaa and bbb parameters can be easily specified. More than one terminal request may be required to accomplish what is desired. There are no restrictions as to the order in which terminal requests are made.

(a) The group 1 parameters are:

aaa = ON0—Turn on printing of the EN01 message.

= ON1—Turn on printing of the EN01 message and one TW02 message. This TW02 will be a dump of the register most closely related to the error.

= ON3—Turn on printing of the EN01 message and up to three TW02 messages. The registers that can be dumped are originating registers, incoming registers, incoming SXS registers, E911 call registers, and outpulsing registers.

= OFF—Turn off printing of EN01 and TW02 messages.

bbb = PRG—Do the above for error category - program.

= TDA—Do the above for error category - translation.

= DGC—Do the above for error category - digit collection.

= ANO—Do the above for error category - ANI outpulsing.

= PDS—Do the above for error category - peripheral data.

= HDW—Do the above for error category - hardware.

= ALL—Do the above for all error categories.

(b) The group 2 parameters are:

aaa = TGN—TGN information is to follow.

bbb = SUM—Apply the specified TGN only to the E911 summary messages--EN02 and EN03. Error and traffic counts will be taken for the specified E911 incoming or outgoing trunk group.

= ALL—Apply the specified TGN to the E911 immediate error message EN01, in addition to the E911 summary messages explained directly above. Printing of EN01 messages will be restricted to only those that are associated with the specified TGN.

= ()—The parentheses represent any 3-digit E911 incoming or outgoing trunk group number. This specifies a TGN; it will be used according to bbb parameters SUM or ALL. Only the last TGN specified can be in effect at any given time. If a TGN is already in effect and another one is specified, EN02 and EN03 messages are printed and then the TGN counts are zeroed to initialize for the new TGN.

= 000—Remove the influence of the TGN, stop taking TGN error and traffic counts, and stop restricting the printing of EN01 messages to those associated with a particular TGN. EN02 and EN03 messages are printed and then the TGN counts are zeroed.

(c) The group 3 parameters are:

aaa bbb = SUM NOW—Print immediately the EN02 E911 ERROR SUMMARY message and the EN03 E911 TRAFFIC SUMMARY message. Current counts are printed which cover a period of time starting at the last hourly or daily printout. Then TGN counts may cover a period of time (starting from when the particular TGN was input via EMCALL-PRT-TGN) if a TGN was specified after the last scheduled printout. The counts are not zeroed.

(d) The group 4 parameters are:

aaa = TRF—Traffic information is to follow.

bbb = HLY—Print the EN03 E911 TRAFFIC SUMMARY message every hour on the half hour. This message is not printed if all traffic counts were zero for the past hour.

= DLY—Print the EN03 E911 TRAFFIC SUMMARY message once a day at 2:30 a.m. This message is not printed if all traffic counts were zero for the past day.

2.67 The possible system output responses to the EMCALL-PRT input message are:

- OK - The request is done.
- PF - The requested printout is forthcoming.
- NO - The request cannot be done because the requested printouts did not fit into the terminal buffer; or the requested printouts are not necessary because all the data is zero.
- NG - The input parameters are invalid.
- NA - This response should not be received; it means there is a program error in the EMCALL-PRT-code.
- NP - The request cannot be done because the E911 feature is not loaded in the generic program.

2.68 Examples of the uses of the EMCALL-PRT message are provided below:

(a) Assume an initial state for EN01 printing is all error categories printing, category "program" with up to three register dumps, and the other categories with no register dumps:

EMCALL-PRT-ON0 ALL/
ON3 PRG

(b) Assume that trouble develops in an ANI trunk group supplying E911 traffic to the office and the result is a large number of EN01 messages of category DGC. After using the messages to determine the problems, it may be desirable to turn off the printing of these messages temporarily until the problem is fixed:

EMCALL-PRT-OFF DGC.
Then, to restore printing.
EMCALL-PRT-ON0 DGC.

(c) Assume that several trunk groups develop trouble at one time. Large numbers of EN01 messages for each trunk group may make it hard to see patterns of errors for a particular office. Restricting the printing of the EN01 messages to those associated with a particular E911 incoming

trunk group will allow one E911 incoming trunk group at a time to be inspected:

EMCALL-PRT-TGN xxx/
TGN ALL
where xxx = a 3-digit E911 incoming trunk group number.

To change to another E911 TGN:

EMCALL-PRT-TGN yyy.

(d) Each office from which E911 traffic originates can be checked to see whether performance standards are being met by looking at hourly printouts of the EN02 E911 ERROR SUMMARY and EN03 E911 TRAFFIC SUMMARY messages. The TGN counts of these messages provide the capability to gather data on an individual office. For this application, the TGNs that are specified should only affect the summary messages and not restrict the printing of the EN01 messages. This can be accomplished with the following:

EMCALL-PRT-TGN xxx/
TGN SUM/
TRF HLY.

(e) To check the present error and traffic counts without waiting for the scheduled printout of the summary messages, the following message is typed:

EMCALL-PRT-SUM NOW.

To stop taking TGN counts, the following message is typed:

EMCALL-PRT-TGN 000.

A. Interactions

Static

2.69 Not applicable.

Dynamic

2.70 If a PDSP is used to store the selective routing translations, the PIU (peripheral interface unit) interface feature is required. The PDSP provides the correct ESN to the E911 tandem office for a 911 call that is selectively routed. If an anomaly occurs and the PDSP does not provide the ESN, the E911 tandem office routes the 911 call to the default ESN obtained from the ESCO (emergency service central office) translator.

2.71 For central office transfer, centrex translations are required for those PSAPs having that service. The dedicated E911 outgoing trunks are marked for the trunk dial transfer feature.

2.72 The E911 feature affects the services available in a 911 service area previously having B911 service. For example, assume that a 911 service area has B911 service. Each B911 PSAP is directly served by a local office and each B911 PSAP has the optional called party hold, switchhook status, and emergency ringback services. If part of the 911 service area later requires E911 service, the B911 PSAPs can still be part of the E911 network. However, the local offices (which directly served B911 PSAPs) that become local offices in an E911 network route all 911 calls to the E911 tandem office. The E911 tandem office routes all 911 calls in the E911 service area to the assigned PSAP. In this case, a 911 call may be routed to a B911 PSAP; however, the optional called party hold, switchhook status, and emergency ringback services are no longer available for 911 calls routed via the E911 tandem office to a B911 PSAP since tandem trunking is used to complete these 911 calls. Thus, E911 service may have an affect on an existing B911 service area.

OPERATIONAL LIMITATIONS

2.73 Nonprefixed speed calling cannot be provided for an E911 PSAP. Prefixed speed calling requires the 2-digit speed calling feature.

2.74 The maximum number of incoming 911 calls from other offices to the E911 tandem office is limited by the number of trunks incoming from any particular office. The maximum number of locally originated 911 calls at the E911 tandem office is limited by the E911 choke mechanism as discussed in paragraph 3.22.

2.75 The maximum number of 911 calls that can be completed to an E911 PSAP at any particular time depends on the number of dedicated E911 outgoing trunks to that PSAP. Queueing is not provided for 911 calls. A 911 call to a traffic busy PSAP is either alternate routed to the predesignated CFBL DN for that PSAP if CFBL service is provided, or the 911 call is routed to overflow.

2.76 Night service and/or power failure alarm may be provided for an E911 PSAP. A 911 call to an E911 PSAP on night service or experiencing a power failure is alternate routed to the CFBL DN predesignated for that PSAP. If traffic busy, night service and power failure alarm options are provided, all 911 calls that are alternate routed due to either traffic busy, night service, or power failure are routed to the same predesignated CFBL-DN. Separate CFBL DNs are not provided for an E911 PSAP having these service options.

Note: Night service and power failure alarm are locally engineered services.

2.77 The called party hold, emergency ringback, and switchhook status options, which are available with B911 service, are not available with E911 service. The ANI and ALI display services are available in lieu of these services.

2.78 Any DN assigned in the ESN translator must be a local DN. The DN cannot be a DN in another office; however, the local DN can remote call forward to a DN in another office.

2.79 In an extremely large E911 service area which requires more than one E911 tandem office, the E911 feature cannot function properly in a multitandem environment. This limitation affects calls that are transferred from a PSAP served by one E911 tandem office to a PSAP served by another E911 tandem office. In this case ANI is not transferred to the secondary PSAP served by another E911 tandem office. For example, consider a transfer call from a PSAP served by one E911 tandem office (E911 T_1) to a PSAP served by another E911 tandem office (E911 T_2).

(a) The PSAP DNs assigned in E911 T_1 for the secondary PSAPs served by E911 T_2 must be dialable, therefore a local office code and DN are assigned. Since the DN assigned in E911 T_2 for the PSAP must be dialable from E911 T_1, the use of nondialable DNs to preclude anonymous calls is not available.

(b) To transfer a call, the E911 T_1 PSAP attendant either dials the code for the DN of the PSAP served by E911 T_2; or if selective transfer is provided, the DN obtained for selective transfer in E911 T_1 remote call forwards to the E911 T_2 PSAP DN.

(c) E911 T_1 recognizes the call as ***not*** to an E911 T_1 PSAP, thus the call is treated as a regular call to other than an E911 PSAP. No ANI is sent for such calls. The call is routed over the regular message network to the E911 T_2 PSAP DN. This is why the DNs must be dialable.

(d) E911 T_2 receives the call via the message network and translates the received DN as a local DN which leads to an E911 T_2 PSAP. No selective routing is involved and since the call is to the dialable PSAP DN, it is an anonymous call (non-911) to the E911 T_2 PSAP. Thus, if the E911$_2$ PSAP has ANI display, 911-0000 is displayed.

(e) If a subsequent transfer is required for the call, the E911 T_2 PSAP can use either manual dial or fixed transfer services (if provided) but cannot use selective transfer since no ANI is available and selective routing data is not available in E911 T_2 for this particular call.

RESTRICTION CAPABILITY

2.80 Not applicable.

PLANNING

A. E911 Network

2.81 The telephone company and the E911 customer are responsible for determining the E911 services necessary for a particular E911 service area. However, certain environmental factors may influence which E911 services are necessary and which E911 tandem office arrangement is most desirable. Thus environmental factors influence the E911 network requirements.

(a) The environmental factors include:

(1) Population and size of the E911 service area

(2) Number, location, and type of telephone offices serving stations located in the E911 service area

(3) Number and location of PSAPs to be served

(4) Type of customer premises equipment available or to be provided for each PSAP

(5) Number of ESZs and characteristics of each ESZ

(6) ESZ and telephone wire center boundaries.

(b) The E911 network, as shown in Figure 1, includes:

(1) All local offices serving stations located in the E911 service area.

(2) Dedicated E911 trunks from each local office to the E911 tandem office.

(3) The E911 tandem office, which may also serve as a class 5 local office, can be either a 1A ESS switch, 1 ESS switch with a PDSP for storing the selective routing data, or 1 ESS switch without a PDSP. (When serving as a class 5 office, dedicated E911 intraoffice trunks are not used for 911 calls from customers served directly by the E911 tandem office.)

(4) Dedicated outgoing E911 trunks from the E911 tandem office to each PSAP.

2.82 The environmental factors directly affect the hardware and software requirements at the E911 tandem office. Consider, for example, an E911 service area where all telephone wire center boundaries were congruent with all ESZ boundaries. In such a case, selective routing is not necessary to route 911 calls to the proper PSAP, since all 911 calls from a particular office will route to the same PSAP. Now, consider an E911 service area where many telephone wire center boundaries are not congruent with ESZ boundaries. In such a case, selective routing must be provided to properly route 911 calls from those wire centers with incongruent boundaries to the correct PSAP. The degree and amount of selective routing necessary affects the amount of software and hardware required at the E911 tandem office, and the amount of effort to establish and maintain a data base for selective routing data.

2.83 Selective routing may be provided on either a per office code (NXX), per number group number, or per TN basis. If selective routing is provided on a per TN basis, additional considerations and special actions are required for the telephone company to implement the feature. A large amount of memory area is required to store TN-to-ESN translation data. When using a 1A ESS switch as an E911 tandem office, the selective routing data is always stored in the 1A ESS switch memory. If adequate memory is not available, additional memory modules must be added to store the selective routing data. However, when a 1 ESS switch is used as an E911 tandem office, two options are available for storing the TN-to-ESN selective routing data. The data may optionally be stored in either the 1 ESS switch memory or in a 3A PDSP (peripheral data storage processor). Use of a 3A PDSP is not available with the 1A ESS switch. Therefore, a 3A PDSP may not be used when E911 service is provided via a 1A ESS switch E911 tandem office. The decision whether to use a 1A ESS switch, 1 ESS switch with a PDSP, or 1 ESS switch without a PDSP is based on both economic and other factors.

2.84 The EBRCC (E911 Bulk Recent Change) feature is initially available in the 1AE8A.05 generic program for the 1A ESS switch. The EBRCC feature efficiently stores, updates, and manages a very large E911 selective routing data base. The E911 selective routing data base is stored and maintained in an APS (attached processor system). With the EBRCC feature, the APS serves the same purpose for the 1A ESS switch as the PDSP does for the 1 ESS switch. This optional arrangement should be included as part of the E911 tandem office considerations described in paragraphs 2.88 through 2.93 and 3.51. For detailed information concerning the EBRCC feature, refer to Part 6 A(55) and A(56).

B. Data Management System/Automatic Location Identification System

2.85 The telephone company, with the help of the municipality, is responsible for developing, establishing, and maintaining the selective routing data base. The municipality is responsible for providing information concerning emergency services, emergency agencies, emergency zones (or other political subdivisions), and other data which may be necessary to establish the correct station-to-PSAP (TN-to-ESN) associations. If selective routing is provided on an office code or number group number basis, the task of developing and building the data base may be relatively simple. However, if a data base is required for TN-to-ESN translations on a per TN basis, developing and building the initial data base is a complex and major task. Since the data base should be kept current on a daily basis, the amount of update activity required for recent changes becomes a factor in selecting the type of E911 tandem office to be used. Regardless of where the TN-to-ESN selective routing data is stored, a method or system referred to as a DMS (Data Management System) is necessary to build and maintain the data required for the selective routing data base. The standard DMS available for E911 is described in Part 6 A(42) through A(46).

Note: The initial DMS/ALI standard arrangement has been revised. For detailed information concerning the current DMS/ALI standard arrangement, refer to Part 6 B(31) through B(33).

2.86 The type of data management system necessary depends on the particular E911 service area, and may be relatively simple or very complex. The data base may be considered as routing tables which define the correct PSAPs associated with each TN. The logic and format of this data in the E911 tandem office (or 3A PDSP) is part of the standard E911 feature; however, to obtain and compile the data is the responsibility of the telephone company. The data is compiled from telephone company customer records and from address information received from the responsible emergency service agencies about the boundaries (service area) of each PSAP.

2.87 The output of the standard DMS is in a form suitable for inputting to the 1/1A ESS switch memory or to the 3A PDSP when that option is employed. Since the DMS is used to initialize and update the TN-to-ESN data, a complex DMS can represent a major portion of the total cost for E911 service. Refer to Table B for a comparison of the 1 ESS switch, 1A ESS switch, and PDSP attributes for the selective routing data base.

2.88 The standard DMS available as an option for E911 builds and updates the data base containing subscriber data and is designed to provide all the necessary data for an E911 system. The standard DMS also provides all the necessary data for the ALI system.

2.89 The ALI system provides street address information for 911 calls to PSAPs. The DMS is an integral part of the ALI system. ALI information is displayed for 911 calls via the ALI display unit located at the PSAP answering attendant position. For detailed information concerning the DMS and ALI, refer to Part 6 A(42) through A(46).

Note: The initial DMS/ALI standard arrangement has been revised. For detailed information concerning the current DMS/ALI standard arrangement, refer to Part 6 B(31) through B(33).

C. E911 Tandem Office Considerations

2.90 Currently the telephone companies can choose among three arrangements for use as an E911 tandem office. The E911 tandem office may be either a 1A ESS switch, 1 ESS switch with a PDSP, or 1 ESS switch without a PDSP. The use of a PDSP is not available with a 1A ESS switch. If both a 1A ESS switch and a 1 ESS switch are available, the decision must be made whether to use one of these existing systems or to buy a PDSP for use with the 1 ESS switch. Both economic and other factors must be considered when selecting an E911 tandem office. The following paragraphs identify basic considerations essential in the selection of an E911 tandem office arrangement. For more detailed planning information for the E911 network, refer to Part 6 B(18).

Availability of Candidate E911 Tandem Offices

2.91 The most important considerations in choosing an E911 tandem office arrangement are the transmission and switching system costs associated with each plan. The recommended E911 transmission plan imposes an overall route mileage limit of 150 miles between any class 5 originating office and any PSAP answering 911 calls from that originating office. If neither a 1A ESS switch nor a 1 ESS switch satisfying this constraint is available during the period that E911 service is required, then E911 service cannot be offered in that area. Electromechanical switching machine replacement plans may affect the availability of candidate E911 tandem offices.

System Size and Growth Characteristics

2.92 The selection of an E911 tandem office to serve an E911 network with selective routing is critically dependent upon the size and growth characteristics of the area to be served. The significant items to be forecast is the total number of assigned main stations plus equivalents by central office for the entire E911 service area over the assumed 5-year product life. The memory available in a given candidate E911 tandem office for storing selective routing translations can be a limiting resource. Limited capability in one candidate E911 tandem office may force consideration of using another candidate E911 tandem office. For example, it might be necessary to eliminate those 1A ESS switch candidates facing imminent unduplicated call store exhaust. Economic studies should ideally include the effect of buying the additional equipment required to support the forecasted system growth over the 5-year E911 service life. As a first approximation, the system size at the end of the 5-year growth period can be used to determine the ultimate equipment requirements. After the system size and growth rate have been determined, the complexity of the selective routing translations must be determined. Then the

memory requirements and associated cost can be calculated.

Call Volume and Service History

2.93 The expected additional call volume imposed upon an E911 tandem office should not significantly affect the switching system capacity. The service history of the candidate E911 tandem office is an important consideration for choosing an E911 tandem office. If two candidate offices are fairly equal with respect to costs and capacity, the office with the best service history (i.e., fewest number of service outages) should be chosen.

Initial Data Base

2.94 The cost and time of building the initial E911 selective routing data base is an important factor in selecting an E911 candidate office. The 1 ESS switch and 1A ESS switch data bases must be initialized using a TSA (translations data assembly) or TGP (translations growth procedure), both of which take approximately 1 month. 1 and 1A ESS switches do not provide for unassigned line status. The PDSP data base is initialized using PROMATS 9-track tape input, which has an input rate of approximately 18,000 RC messages per hour. The PDSP provides for unassigned line status.

Daily Updates and Audits

2.95 The handling of daily updates of the data base is perhaps the single most significant factor (other than overall system cost) to consider when selecting an E911 tandem office. Updates can be entered into the PDSP at the same rate as the initial data base load (approximately 18,000 per hour). Based on experience, 1 ESS switch update rates are approximately 150 E911 type RC updates per hour. 1A ESS switch update estimates have varied from as low as 200 RC messages per hour to about 500 RC messages per hour. The telephone company should use RC update rates consistent with local experience and procedures in assessing the time required to perform daily updates. Another relevant RC concern is the effect of the E911 RC activity on the card writing interval of a 1 ESS switch and filling the RC roll-back area of a 1A ESS switch. The monthly additional card writing expenses due to adding E911 to a 1 ESS switch office occur due to two different reasons: (1) increasing the number of translation mods that must be written during each interval and, (2) reducing the card writing interval. A concern with the 1A ESS switch is filling of the RC roll-back area, thereby requiring that the contents be copied onto tape. Copying the 1A ESS switch roll-back area onto tape is a simple process which generally takes less than 15 minutes. No audit and/or compare capability is available with either the 1 ESS switch or 1A ESS switch after the RC message input. The PDSP provides for a system audit to periodically insure that every TN is either unassigned or is assigned a valid ESN. In addition, the PDSP has the capability to periodically compare the selective routing data base in the PDSP to the DMS data base by processing a tape prepared by the DMS for this purpose.

System Costs, Exhaust, and Retrofit Considerations

2.96 The primary switching system costs associated with E911 are those incurred to store selective routing translations. The right-to-use fees for the E911 feature must also be considered. A large E911 selective routing requirement could potentially cause an office to exhaust its memory capacity. If the switching system is exhausted due to E911, the cost of moving up a processor retrofit or adding an additional switching system must be included in the economic analysis. If a 1 ESS switch office (with or without a PDSP arrangement) is a candidate as an E911 tandem office, the effect of a retrofit to a 1A ESS switch for that office must be considered since a 1A ESS switch will not support a PDSP. In the event that two candidates are available and approximately equal in cost, a 1A ESS switch would be preferred over a 1 ESS switch because of its more modern technology and cheaper memory costs.

HARDWARE REQUIREMENTS

> ***Note:*** This part contains cost factors and determination of quantities. COEES (Central Office Equipment Engineering System) Planning and Mechanized Ordering Modules are the recommended procedures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

2.97 The standard customer premises equipment design for an E911 PSAP requiring ANI display and/or central office transfer is the E911 equipment discussed in Part 2. Refer to Part 6 A(2) through A(4) for a detailed description of the E911 PSAP equipment.

2.98 No special ESS switch hardware is required for the E911 feature. When a 1 ESS switch uses a

PDSP for selective routing translations, a processor interface frame is required for the PIU feature. For the PIU feature and the related hardware requirements and costs for the processor interface frame, refer to Part 6 A(12) and A(21).

2.99 The dedicated E911 incoming and outgoing trunks at the E911 tandem office require scan point and SD (signal distributor) point assignments. Refer to Table C for dedicated E911 incoming trunk data and hardware costs. Refer to Table D for dedicated E911 outgoing trunk data and hardware costs. The first three digits of the trunk order code, which correspond to the CPI (circuit program index), are given in the tables. The dedicated incoming E911 trunks use the same type trunk circuits as used for 1 ESS switch CAMA (centralized automatic message accounting) service using the signaling protocol for TSPS (traffic service position system). For complete trunk order codes, trunk uses, and trunk options, refer to Part 6 D(7).

2.100 The E911 equipment on the customer premises may be equipped to serve a maximum of 15 attendant lines and a maximum of 15 dedicated E911 trunks from the E911 tandem office.

2.101 The number of dedicated E911 outgoing trunks to a PSAP is traffic engineered by the Business Services Facilities Organization; however, the customer may elect to provide additional outgoing trunks to a PSAP. The customer decides the number of attendant positions to provide at each PSAP based on business services recommendations. A minimum of two dedicated E911 trunks should be equipped for each PSAP. For engineering considerations, refer to Part 6 A(54).

2.102 A minimum of two dedicated E911 incoming trunks from each local office must be provided. It is recommended that if T_1 carrier is used for a particular trunk group, the individual trunk group members should be spread over different T_1 carrier systems if possible.

2.103 Traffic data is used for engineering the E911 trunks and determining traffic patterns in an E911 tandem office. Peg and usage counts are compiled for each dedicated E911 incoming trunk group. Peg and overflow counts are compiled for 911 calls originated by customers served by the E911 tandem office. Peg, usage, and overflow counts are compiled for each dedicated E911 outgoing trunk group.

2.104 The average busy season busy-hour load must be developed for E911 service. After developing the busy-hour load per 1000 main stations served, the busy-hour load offered to a particular dedicated E911 trunk group can be calculated. The Neal-Wilkinson basic trunk capacity tables are used. Refer to Part 6 A(38), A(54), and B(17). Tariff regulations specify that a minimum of P.01 service be provided.

2.105 Additional MF receivers and MF transmitters may be required at the E911 tandem office for E911 service. When a 1/1A ESS switch is serving as an E911 tandem office, all MF receivers and MF transmitters should be provided per toll criteria. Refer to Part 6 A(39) and A(40). Additional 3-port conference circuits may be required for central office transfer services provided for E911 PSAPs. Touch-tone CDR usage may also be impacted to a minor extent as the result of central office transfer. Each office should be analyzed individually to determine whether or not added capacity is required. Note that a majority of all call transfers will be initiated via speed calling codes.

2.106 All calls incoming on E911 dedicated trunk groups will require an MF receiver. The quantity of incoming MF digits to be received will depend upon whether the incoming trunks are bylink or nonbylink, and whether the ANI TN is to be transmitted. Unless an office serves a high percentage of 4- and 8-party lines, assume that the ANI TN will be transmitted on all calls. For engineering purposes, assume that all bylink calls will contain ten MF digits (KP, Info digit, ANI TN, ST) with a holding time of 2.6 seconds. Assume that nonbylink calls will contain an additional five MF digits (KP, 911, ST) with a total holding time of 3.3 seconds. Multiply individually the ABS BH bylink and nonbylink calls by the applicable holding time and compute MF receiver CCS for E911 calls using the toll criteria. This quantity should only be added, in total, to the other MF receiver CCS requirements if the E911 busy hour is coincident with the MF receiver group busy hour. If not, some portion of the added CCS should be subtracted to allow for the noncoincidence.

2.107 MF transmitters are required to outpulse ANI information to PSAPs when an E911 customer has purchased this feature. Ten MF digits are always outpulsed to a PSAP. Therefore, a holding time of 2.3 seconds may be used for initial E911 engineering. Multiply the number of ABS BH E911 calls to all PSAPs by the holding time and compute MF transmitter CCS using toll criteria. As with MF receiver

requirements for E911 calls, the E911 MF transmitter CCS should only be added in total to other MF transmitter CCS requirements if the E911 busy hour is coincident with the MF transmitter group busy hour. If not, some portion of the E911 MF transmitter CCS should be subtracted to allow for the noncoincidence.

2.108 The use of any one of the central office transfer services (selective, fixed, or manual) by PSAP attendants requires the provision of 3-port conference circuits. The total amount of ABS BH CCS capacity required will be dependent upon many variables such as the percent of calls which will be transferred and the customer's operating procedures; that is, will the initial PSAP hold on a call until the second PSAP answers or disconnect immediately upon transfer. These variables should be investigated to make a determination of call rates and holding time to determine 3-port conference circuit CCS for E911. Once service has been established, an exact determination of 3-port conference circuit usage by E911 PSAPs may be determined by measuring the centrex group to which the E911 PSAPs have been assigned. Refer to Part 6 B(15) and B(23).

SOFTWARE

Note: This part contains cost factors and determination of quantities. COEES Planning and Mechanized Ordering Modules are the recommended procedures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

A. Memory

1 ESS Switch

Fixed

2.109 The following memory is required whether or not the 9FE911 feature package is loaded.

(a) ***Base Generic Program (Program Store):*** 100 words are required.

Conditional

2.110 The following memory is required when the 9FE911 feature package is loaded.

(a) ***Optionally Loaded Feature Package (Program Store):***

(1) 9FE911 feature package-3264 words are required.

(b) ***Call Store:***

(1) 24 words of call store are required for E911 traffic and error memory block.

(2) One 9-word E911 call register is required per dedicated E911 outgoing PSAP trunk plus one spare E911 call register is provided in the E911 tandem office.

(3) 32-word conference registers are required when central office transfer services are provided. Conference registers are provided for equipped 3-port conference circuits on a per office basis.

2.111 When a PDSP is used with a 1 ESS switch for selective routing data, the PIU package must also be loaded. The following memory is required when the 9FPIU feature package is loaded for use with the E911 feature.

(a) ***Optionally Loaded Feature Package (Program Store):***

(1) The 9FPIU feature package requires 7360 words of program store.

(b) ***Call Store:***

(1) The 3A PDSP request block requires 42 words of call store.

(2) The 3A PDSP message blocks require 42 words of call store (6 words per block X 7 blocks = 42 words).

(3) The 3A PDSP message block control box block requires 15 words of call store.

(4) The 3A PDSP maintenance data requires 55 words of call store

Note: For engineering guidelines, refer to Part 6 B(28).

Variable

2.112 The following memory is required when E911 service is provided and selective routing translations are either not required or are stored in a PDSP.

(a) *Translations (Program Store):*

(1) The 3-digit translator requires 1 word.

(2) The route pattern expansion table requires 1 word.

(3) The route pattern auxiliary block for screening if any DN is not to be allowed access to E911 service requires 6 words.

(4) The office options table requires 1 word for the E911 intraoffice choke mechanism.

(5) The TNN-to-TGN translator requires 1 primary translation word per TNN plus a 2-word auxiliary block if the trunk group is 2-way, or a 3-word auxiliary block if the trunk group is equipped with carrier group alarm.

(6) The TGN translator requires 4 or 5 words per TGN plus 1 word per trunk member if trunk group is 2-way.

(7) The TGN supplementary translator requires 4 words per dedicated E911 incoming trunk group.

(8) The TCC (trunk class code) expansion requires 4 words per trunk class code.

(9) The MSN (master scanner number) translator requires 1 word per MSN.

(10) The ESCO translator requires 2 words plus 1 word per ESCO where $1 \leq ESCO \leq 255$.

(11) The ESN translator requires 2 words plus 1 word per ESN where $1 \leq ESN \leq 511$.

(12) The ESN auxiliary block requires 8 words per primary ESN with selective transfer.

(13) The 911 DN auxiliary block requires 2 words per PSAP DN without CFBL or make-busy alternate routing options, 3 words per PSAP DN with the CFBL option, and 5 words per PSAP DN with the CFBL and make-busy options.

(14) The RI (route index) expansion table requires 2 words per RI.

(15) The centrex common block requires one 32-word block when an E911 customer group is provided central office transfer services.

(16) If optional 2-digit speed calling is provided, each thirty-code 2-digit speed calling list requires 60 words. E911 PSAPs can share a thirty-code list or each PSAP can have its own such list.

2.113 In addition to the memory costs given in paragraph 2.112, if selective routing is provided, memory is required in either the 1 ESS switch tandem office program store or in the optional 3A PDSP for the selective routing translations. If stored in the 1 ESS switch, the selective routing data is contained in the DN-to-ESN translator, which can provide for selective routing on a per office code basis, per number group basis, or per DN basis. The memory word costs depend on the level at which selective routing is provided. The DN-to-ESN translator word costs are as follows:

(a) ***DN-to-ESN head table:*** 5 words

(b) ***DN-to-ESN subtranslator:*** 1000 words per NPD

(c) ***DN number group list:*** 10 words per office code requiring greater than 3-digit translation

(d) ***DN index list:*** 258 left half words or 151 right half words per number group requiring 7-digit translation.

1A ESS Switch

Fixed

2.114 The following memory is required whether or not the 9FE911 feature package is loaded.

(a) ***Base Generic Program (Program Store and File Store):*** 125 words are required.

Conditional

2.115 The following memory is required when the 9FE911 feature package is loaded.

(a) *Optionally Loaded Feature Package (Program Store and File Store):*

(1) 9FE911 feature package - 4080 words.

(b) *Duplicated Call Store:*

(1) E911 traffic and error memory block (duplicated call store) - 24 words.

(2) E911 call register - One 9-word E911 call register per dedicated E911 outgoing PSAP trunk plus one spare E911 call register is provided in the E911 tandem office.

(3) When central office transfer services are provided, 32-word conference registers are required. Conference registers are provided for equipped 3-port conference circuits on a per office basis.

Note: For engineering guidelines, refer to Part 6 B(30).

Variable

2.116 The following memory is required when E911 service is provided and selective routing translations are not required.

(a) ***Translations (Unduplicated Call Store and File Store):***

(1) 3-digit translator - 1 word.

(2) Route pattern expansion table - 1 word.

(3) Route pattern auxiliary block for screening if any TN is not to be allowed access to E911 service - 6 words.

(4) Office options table - 1 word for the E911 intraoffice choke mechanism.

(5) TNN-to-TGN translator - 1 primary translation word per TNN plus a 2-word auxiliary block if the trunk group is 2-way, or a 3-word auxiliary block if the trunk group is equipped with carrier group alarm.

(6) TGN translator - 4 or 5 words per TGN plus 1 word per trunk member if trunk group is 2-way.

(7) TGN supplementary translator - 4 words per dedicated E911 incoming trunk group.

(8) TCC expansion - 4 words per trunk class code.

(9) MSN translator - 1 word per MSN.

(10) ESCO translator - 2 words plus 1 word per ESCO where $1 \leq ESCO \leq 255$.

(11) ESN translator - 2 words plus 1 word per ESN where $1 \leq ESN \leq 511$.

(12) ESN auxiliary block - 8 words per primary ESN with selective transfer.

(13) 911 DN auxiliary block - 2 words per PSAP DN without CFBL or make-busy alternate routing options, 3 words per PSAP DN with the CFBL option, and 5 words per PSAP DN with the CFBL and make-busy options.

(14) Route index expansion table - 2 words per RI.

(15) Centrex common block - One 32-word centrex common block is required when an E911 customer group is provided central office transfer services.

(16) If optional 2-digit speed calling is provided, each thirty-code 2-digit speed calling list requires 60 words. E911 PSAPs can share a 30-code list or each PSAP can have its own such list.

2.117 In addition to the memory costs given in paragraph 2.116, if selective routing is provided, additional unduplicated call store and file store is required in the 1A ESS switch for the DN-to-ESN translator. The DN-to-ESN translator can provide for selective routing on a per office code basis, per number group basis, or per TN basis. The memory word costs depend on the level at which selective routing is provided. The DN-to-ESN translator word costs are as follows:

(a) DN-to-ESN head table: 5 words.

(b) DN-to-ESN subtranslator: 1000 words per NPD.

(c) DN number group list: 10 words per office code requiring greater than 3-digit translation.

(d) DN index list: Depending on the number of ESNs per number group, the DN index list contains a minimum of 151 words and a maximum of 1013 words. Refer to Table D.

REAL TIME

2.118 The amount of processor real time required to process an E911 call that does not require a transfer is similar to that required to process any local or tandem call. The real time cycle cost for a 911 call depends on the originating source (trunk or line), terminating PSAP, certain modifiers, and whether or not a call is transferred. Table E provides the real time cycle counts for E911 calls. The cycle counts listed are for a 1 ESS switch E911 tandem office which provides selective routing based on the complete 7-digit DN. Real time cycle count modifiers are given for various service conditions. Real time cycle counts for a 1A ESS switch are approximately double those given for a 1 ESS switch.

2.119 The cycle time for a 1 ESS switch is 5.5 microseconds per cycle. The cycle time for a 1A ESS switch is 0.7 microsecond per cycle.

3. ENGINEERING

HARDWARE

3.01 A dedicated E911 network generally includes dedicated E911 trunks from each local office in the E911 system to the E911 tandem office, and dedicated E911 trunks from the E911 tandem office to each PSAP. Other than the dedicated E911 incoming and outgoing trunks, the only other dedicated hardware required for the E911 tandem office is the memory required for E911 data storage, translation, and call processing. A 1 ESS switch E911 tandem office may (optionally) utilize a 3A PDSP for selective routing data storage. Customer premises equipment is required for the attendant terminal(s) at each PSAP facility. If either ANI display, ALI, or selective transfer service is provided, E911 equipment is required on the customer premises. Customer premises equipment is discussed in paragraphs 2.03 through 2.16.

A. Dedicated E911 Trunks

3.02 To permit selective routing, ANI information is required by the E911 tandem office. Generally, local office trunks to the E911 tandem office are ANI type trunks. The dedicated E911 incoming trunks at the E911 tandem office use the same type of incoming trunk circuits that are used for incoming CAMA (centralized automatic message accounting) trunks. The trunk circuits used at the E911 tandem office for dedicated E911 incoming trunks, summarized in Table F, are as follows:

(a) From SXS (Step-by-Step) offices:

(1) SD-1A163 [DP, 2-wire E&M (receive and transmit) signaling]

(2) SD-1A237 (DP, 4-wire E&M signaling)

(3) SD-1A311 (DP/Loop, 2-wire loop signaling)

(b) From 1 or 1A ESS switch local offices:

(1) SD-1A192 (MF/DP, 2-wire loop signaling)

(2) SD-1A312 (MF, 2-wire E&M signaling)

(3) SD-1A166-05 (MF, 2-wire loop signaling)

(c) From other types of local offices:

(1) SD-1A192 (MF/DP, 2-wire loop signaling)

(2) SD-1A312 (MF, 2-wire E&M signaling)

(3) SD-1A236 (MF, 4-wire E&M signaling)

(4) SD-1A166-05 (MF, 2-wire loop signaling).

Note: A 1 or 1A ESS switch serving as a local office in an E911 network should use either the SD-1A165, SD-1A203, or the SD-1A252-type trunk circuits for the dedicated E911 outgoing trunks to the E911 tandem office. These types of trunks are capable of ANI operation and they are the same type trunks used for TSPS (traffic service position) operation. The SD-1A252 trunk circuit should be used when the E911 tandem office uses the SD-1A312 trunk circuit. Either the SD-1A165 or the SD-1A203 trunk circuit should be used when the E911 tandem office uses the SD-1A192 or SD-1A166-05 trunk circuit. The SD-1A165 circuit is preferred since trunks using this circuit can be automatically diagnosed according to a routine schedule.

3.03 If a local office is not equipped for ANI operation for whatever reason (e.g., an older non-ANI office about to be replaced), it can still be part of an E911 system. The local office can route 911 calls over dedicated or message trunks to the E911 tandem office. If message trunks are used, either the digits "911" must be outpulsed or, if the incoming trunk group at the E911 tandem is classed as a tandem incoming trunk group, the outpulsed digits "11" are sufficient. The E911 tandem office routes incoming

911 calls received via such trunks to the default ESN for the PSAP associated with that particular trunk group. Typically, the default ESN is that ESN for the PSAP which would otherwise receive the majority of calls from that originating local office if selective routing (based on ANI information) was provided. The E911 tandem office also generates a fictitious ANI code for these calls for transmittal to the PSAP so that the PSAP attendant is aware both of the approximate origin of the call and the possibility that the call might have to be transferred. The form of the fictitious ANI code is 911-0XXX, where XXX designates the originating local office. Each local office is assigned an ESCO number, thus XXX equals the 3-digit ESCO number.

3.04 The dedicated outgoing trunks from the E911 tandem office to an E911 PSAP equipped for ANI display and central office transfer utilize one of the following types of trunk circuits.

(a) SD-1A165 (Loop signaling)

(b) SD-1A163 (E&M signaling)

(c) SD-1A237 (E&M signaling).

Note: The SD-1A163 and SD-1A237 trunk circuits are intended for long haul applications in an E911 network where one or more intermediate office facilities are used between the E911 tandem office and a distant PSAP. Each of these type trunk circuits require an E&M applique circuit SD-99774-01 (or equivalent). The E&M signaling must be converted to loop reverse battery signaling in the last intermediate office to be compatible with the PSAP signaling requirements.

3.05 The E911 tandem office may also serve a PSAP not equipped with the standard design E911 customer premises equipment (referred to as a ringing PSAP). Either regular lines or the SD-1A319 special line access trunk circuit may be used for a ringing PSAP. PSAPs not equipped with the standard design E911 customer premises equipment cannot be provided with ANI display, ALI, central office transfer, or night service.

B. PDSP Interfaces

3.06 When the PDSP is optionally used with a 1 ESS switch E911 tandem office, the PDSP is connected to the 1 ESS switch via the PIU (peripheral interface unit). Refer to Figure 9. The PDSP arrangement consists of a duplex configuration of the 3A central control, memory, PIU, and TDC (tape data cartridge); and a simplex configuration of the PROMATS and DATASPEED® 40 terminal. The input/output channel used by the DATASPEED 40 terminal has four ports. Any of the four ports can be used with a data set to accommodate a remote location. This input/output channel operates in what is sometimes called an ECHOPLEX mode. That is, inputs from any source are displayed at all terminals.

3.07 The PROMATS is used only for recent change input and is not used for data base backup or as an output device. All recent change messages input via the PROMATS are also valid if inputted via the DATASPEED 40 terminal. The PROMATS tapes are generated from the Data Management System data. When recent changes are input via the PROMATS and a message has an error, the DATASPEED 40 terminal prints the message and an error description.

3.08 The TDC is used for program and memory data backup. The data base backup is always stored on duplicate TDC tapes. Recent change messages will not overwrite the data base stored on the TDC. After a set of recent changes are entered, whether via the PROMATS or DATASPEED 40 terminal, the current set of TDC tapes should be stored and the data base is copied on other previously stored backup tapes. The recording mechanism is similar to a simple cassette tape recorder. The recording process, referred to as a TDC update, takes about 10 minutes. If the recent changes are later found to be erroneous or cause system problems, the stored TDC tapes may be used to restore the data base.

3.09 A detailed description of the 3A PDSP is beyond the scope of this document. For No. 3A common systems hardware and descriptive information, refer to Part 6 A(5) through A(11). For detailed hardware and software information concerning the 3A used as a PDSP for E911 service, refer to Part 6 A(12) through A(21).

SOFTWARE

A. Translations

3.10 Generally, 911 calls to a PSAP are completed using standard trunk translations for the incoming and outgoing E911 trunks and regular 3/6-digit, RRP (rate and route pattern), DN, and RI translations for routing determination. Selective routing,

default routing, and selective transfer services require special 911 translations to obtain the ESCO number, NPD, DN-to-ESN, and ESN data. Only those translations unique to E911 are discussed in this part. For detailed information concerning translations and translation data structures, refer to Part 6 B(23) through B(25). Due to the types and complexity of the translations used for E911, the translations and translation data structures are presented functionally rather than describing each translator separately. Translations required for 911 calls at the E911 tandem office, include the following functions:

(a) Receiving and routing E911 incoming trunk calls

(b) Routing locally originated E911 calls

(c) ESCO derivation

(d) ESCO to NPD and/or default ESN translation

(e) NPD and DN-to-ESN translation

(f) ESN to PSAP DN translation

(g) PSAP DN translation

(h) Routing and trunk translations for E911 outgoing trunks to PSAPs

Dedicated E911 Incoming Trunk 911 Calls

3.11 The trunk circuits which may be used as dedicated E911 incoming tandem trunks are listed in Table F, which also includes the CPI (circuit program index), TPI (trunk program index), and SPI (supervisory program index) data. Trunk class code translations are used as for any trunk class. For detailed information on trunk class code expansion data, refer to Part 6 B(23) through B(25).

3.12 A dedicated E911 tandem trunk group is designated as such in the local tandem trunk group auxiliary block with item E911 = 1 in word 2 as shown in Figure 10. Dedicated E911 incoming trunk groups must also have the Q option word in the supplementary TGN auxiliary block as shown in Figure 11.

3.13 On incoming 911 calls (excluding test calls) a 1- or 8-digit ANI number (in the standard ANI format) is always expected, but it may be preceded by the digit(s) 1, 11, or 911 as indicated by the ECD (emergency call digit) item shown in Figure 11. A 1-digit only ANI number provides an information digit. An 8-digit ANI number provides an information digit plus the ANI TN. If the ANI contains a TN, the ANI TN and the ESCO number obtained from the TGN supplementary auxiliary block (word Q) are used for selective routing. Otherwise, if no ANI TN is available (e.g., rural party, QZ billing, or ANI failure), the 911 call is routed to the default ESN associated with the ESCO number. The default ESN is obtained from the ESCO translator.

> ***Note:*** If a local office in an E911 service area serves two NPAs, two separate dedicated E911 trunk groups must be used because the ESCO, assigned on a per trunk group basis in the E911 tandem office, determines the NPD.

3.14 For dedicated E911 incoming trunks, start dial conventions similar to CAMA are used. If item ECD = 4 (ANI only) in option word Q (Figure 11), then the TCC start dial signal = 0 and steady off-hook is returned to prompt ANI. For MF trunks, if item ECD ≠ 4, then TCC start dial signal = 2 (wink). In this case a wink signal is used to prompt the emergency call digit(s) 1, 11, or 911 or test code digits. Following the wink signal and subsequent digit reception, a steady off-hook signal is used to prompt ANI (except for a test call with item ETST = 1). If item ECD ≠ 4 and the trunks are bylink trunks from an SXS office, the digits are immediate dial dial pulse digits. Following the reception of the DP digits, a steady off-hook signal is used to prompt ANI.

> ***Note:*** If item ECD has the value 4 or 5 then the incoming start dial item in TCC word 2 equals 00 (no) regardless of the title of the trunk class data layout. If, in addition, the trunk group is composed of incoming bylink trunks, the inpulsing type in TCC word 2 will be 001 (MF), not 010 (DP). For complete TCC data, refer to Part 6 B(23).

Dedicated E911 Incoming Trunk Test Calls

3.15 Two methods are available for test calls on dedicated E911 incoming trunks. One method uses an assigned 3-digit test code (either followed or not followed by ANI). The other method uses ANI in lieu of a 3-digit test code. Some types of local offices send ANI following the test code and some do not. Item ETST is used to distinguish these. No ANI follows the test code if ETST = 1. If item ETST = 2, the ANI digits received following a test code are absorbed by the ESS switch E911 tandem office. Typically, ETST

= 1 for an incoming trunk group from any type of ESS switch local office and ETST = 2 for an incoming trunk group from a No. 5 X-Bar local office.

(a) Assigned test codes are used if item ETST = 1 (test code not followed by ANI) or ETST = 2 (test code followed by ANI) in the trunk group option Q word (Figure 11). Test codes can only be used if item ECD ≠ 4 or 5. The test code must be 3 digits distinct from the digits expected for a 911 (regardless of whether item ECD = 1, 2, or 3). For example, if ECD = 1, test codes cannot be 1XX; if ECD = 2, test codes cannot be 11X; and if ECD = 3, the test code cannot be 911. The tandem table associated with a dedicated E911 trunk group (see Figure 10) translates the test code digits to a data type four (DTYP = 4) entry.

(b) If item ETST = 0, no 3-digit test codes are used for that trunk group and item ECD = 4 (ANI only). The ANI contains the encoded test code. With this method, the ANI and the ESCO are used to obtain the ESN (as for a 911 call) which leads to a test line rather than a PSAP. When this method is used, item TNDTBL = 0 in word 2 of the TGN auxiliary block (Figure 10). Typically, this method is used for an incoming trunk group from a 1 crossbar or panel local office.

Note: Test calls from step-by-step local offices can be either type. If digits plus ANI are received for a test call, the test code digits for the test call are dial pulse digits just as they are for regular calls.

Incoming 911 Calls Via Message Network Trunks

3.16 The message network may be used to route 911 calls from local offices to the E911 tandem office. For example, this arrangement provides for local offices not equipped for ANI which are going to soon be taken out of service. Any message network trunk group can be arranged to handle 911 calls. The manual seizure type trunk group (ECD = 5) can provide what is sometimes referred to as "Hot-Line" Service for routing 911 calls to the E911 tandem office where no digits and no ANI will be received.

3.17 Two methods are possible for obtaining the ESCO for 911 calls via message network trunks. The ESCO is obtained from either the supplementary TGN translator option Q-word (Figure 11) or from the 3/6-digit translator. If the trunk group option Q-word exists for a particular trunk group and item ESCO ≠ 0, then that ESCO number assigned for the trunk group is used for routing. Otherwise, if the trunk group option Q-word does not exist, or exists and an ESCO is not specified (ESCO = 0), then the ESCO obtained from the 3/6-digit translator is used. In the latter case, the digits for 911 calls are translated via the 3-digit translator as call type 22 (4FESCO). Refer to Figure 12. If the 3/6-digit translator yields an ESCO and the call is via a message network trunk group with an assigned ESCO, the assigned ESCO for the trunk group is used in lieu of the ESCO obtained from the 3/6-digit translator.

3.18 Several cases are possible with the trunk group option Q-word for translation and routing 911 calls incoming via nondedicated E911 trunks.

(a) If the trunk group has AIOD (automatic identified outward dialing), either the AIOD billing TN or else the trunk group billing TN and the ESCO, or just the ESCO, can be used to obtain the ESN assigned. If the trunk group has CAMA ANI, either the billing TN (received as ANI or used because of ANI failure) and the ESCO, or just the ESCO, can be used to obtain the ESN assigned.

(b) If the trunk has a screening LEN (indicated by a word type 5 in word 2 of the TGN translator), the billing TN associated with the screening LEN and the ESCO are used to select the ESN.

(c) Otherwise, without ANI or a screening LEN, the 911 call will be routed to the default ESN assigned in the ESCO translator.

Note: For 911 calls routed to a default ESN, if ANI display is provided for the terminating PSAP, the E911 tandem office will generate and send a special ANI code in the form 911-aaaa (where aaaa equals the ESCO number). This provides an indication of the approximate originating location.

E911 Tandem Office Local 911 Calls

3.19 The 3-digit translator is used to obtain the call type and ESCO item for 911 calls originated from lines served by the E911 tandem office. The 3-digit translator is also used for 911 calls from customer tie trunks and message network trunks which require 3-digit translation. For such calls, the 3-digit translator contains or points to RRP data. As shown in Figure 12, call type = 22 (4FESCO) is associated with 911 calls. For the rate center used for the E911 tandem

office local customers, the associated RRP, PTW, or RRP auxiliary block also contains the ESCO number (ESCO ≠ 0) assigned for that E911 tandem office rate center. Chart column screening can be used to intercept 911 calls from lines which are not in the E911 service area. A 911 call from such a line may be routed to an announcement, overflow tone, or intercept.

> ***Note:*** If the E911 tandem office serves as a local office with two or more NPAs, the 3/6-digit translator must yield a different ESCO for each NPA.

3.20 The TN of the calling line used for selective routing is the TN which would be used as the billing TN. To reiterate this arrangement, the billing TN is the special billing TN or AIOD TN if available; otherwise, it is the calling TN or, for multiline groups with multiline hunt type not equal to three [MLHTYP (multiline hunt type) ≠ 3], the pilot TN. Exceptional cases are rural party or QZ billed lines (i.e., STB = 1 in LENCL 3) which have no defined billing TNs. With E911, a 911 call originated from a line without an identified or defined TN is routed to the ESCO default ESN with an appropriate ANI information digit and digit sequence to indicate the originating office (if the PSAP has ANI display).

Retaining the Conference Circuit on E911 Call Transfer

3.21 Bit 21 in the first word of the office options table is set to retain the conference circuit used when a primary PSAP operator transfers an E911 call to a secondary PSAP operator until the secondary PSAP operator flashes or goes on-hook.

Intraoffice E911 Call Limit for the E911 Tandem Office

3.22 Bits 0 through 8 in the second word of the office options table contain the maximum number of simultaneous intraoffice E911 calls allowed for the E911 tandem office. See Figure 13. The intraoffice E911 call limit is referred to generally as the E911 "choke" mechanism. It is desirable to limit the number of 911 calls that can be handled from any office to prevent 911 facilities from being tied up due to a large influx of 911 calls originating from any one office. This limit is normally inherent in the number of trunks in the dedicated incoming 911 trunk group(s) from another local office(s). The E911 choke mechanism allows a similar call limiting capability within the E911 tandem office for local 911 calls. This method prevents having to use loop around trunks in the E911 tandem office to accomplish the same objective. The maximum number of intraoffice calls allowed is determined in the same manner as if loop around trunks had to be engineered. Peg and overflow counts are available for intraoffice 911 calls. Refer to Part 5.

ESCO Translator

3.23 To provide selective routing, the ESCO is translated to an NPD. The NPD and ANI TN of the calling station are translated to obtain the primary ESN associated with the calling station. The ESN identifies the primary PSAP associated with the calling station.

3.24 The ESCO translator (Figure 14) is pointed to by word 23 of the master head table annex. The ESCO translator provides a PTW (primary translation word) for each assigned ESCO (255 maximum). An ESCO PTW contains a default ESN, an NPD, an EPDSP (emergency peripheral data storage processor) item, and an EN01 item. When selective routing translations are resident in the E911 tandem office, item EN01 = 1. When selective routing translations are resident in a PDSP, item EPDSP = 1. The default ESN is used if both the EPDSP and EN01 items are zero indicating no selective routing, if there is an ANI failure, if the TN-to-ESN translation does not yield a valid ESN, or when the ANI information is not a TN (e.g., rural party lines). The default ESN is also used if item EPDSP = 1 but the PDSP does not return proper ESN data to the E911 tandem office. The NPD assigned is used to index into the DN-to-ESN translations. If the EPDSP item is set, then DN-to-ESN translations are accomplished in the PDSP; otherwise, they are resident in the E911 tandem office. Item EN01, when set, indicates selective routing translations are stored in the E911 tandem office.

3.25 The NPD item contains two bits for NPD data. An E911 service area may sometimes serve multiple NPAs. The NPD item is used to indicate the NPA from which an E911 call originated. A PSAP with ANI display always receives eight digits for display. The first digit sent to the PSAP indicates the NPD obtained from item NPD in the ESCO translator as shown in Figure 14. If the first digit sent to a PSAP is 0, 1, 2, or 3 (corresponding to NPD 0, 1, 2, and 3), the ANI display is not flashed. If the first digit is 4, 5, 6, or 7 (corresponding to NPD 0, 1, 2, and 3), the ANI display is flashed.

> ***Note:*** If a local office does not send ANI or does not require selective routing, the ESCO PTW for that office can have item EPDSP = 0 and item EN01 = 0. In this case, the ESCO PTW

will provide the NPD and the default ESN used for default routing. Otherwise, selective routing is done based on the NPD and ANI TN to obtain the primary ESN.

NPD and DN-to-ESN Selective Routing Translations

1 ESS Switch

3.26 If a PDSP is used, NPD and DN-to-ESN translations for selective routing are resident in the PDSP. The selective routing translations in the PDSP are structured similar to those in the E911 tandem office. Selective routing translations and data base generation in a PDSP are discussed in Part 6 A(20). The following paragraphs discuss selective routing translations resident in the E911 tandem office only. The DN-ESN translator (Figure 15) which provides for selective routing includes the following:

(a) DN-to-ESN head table

(b) DN-to-ESN subtranslator (office code subtranslator)

(c) DN number group list (number group subtranslator)

(d) DN index list.

Note: In the E911 ESS switch data structures, the ANI TN is used as DN; therefore, the data structure layouts reflect the term "DN" in lieu of "ANI TN".

3.27 Generally, the ESN can be obtained from either of several levels of translations, depending on the level required to accomplish selective routing. For example, if an entire office code is served by only one set of agencies, the ESN may be obtained from the office code subtranslator. Other levels from which the ESN may be obtained are the number group subtranslator and the DN index list. If an entire thousands group is served by the same PSAP, the primary ESN may be obtained from the number group subtranslator. If the thousands group is served by more than one PSAP, the ESNs are obtained on a per DN basis from the DN index list.

3.28 The NPD obtained from the ESCO translator indexes the DN-to-ESN head table, which contains the address of the office code subtranslator. The office code of the ANI TN indexes the proper office code PTW, which either yields the ESN, or contains a pointer to the number group subtranslator, or contains an unassigned entry. When a number group subtranslator is used, the fourth digit of the ANI TN is used to index the appropriate number group translation word which either yields the ESN or contains the address of the DN index list.

3.29 The DN index list is similar to the abbreviated 3/6-digit translator. The last three digits of the ANI TN select an AESN (abbreviated ESN) which then expands to a full ESN as shown in Figure 15. Up to 8 ESNs may be assigned per number group in a 1 ESS switch. Therefore, an AESN is a three-bit binary representation, which points to the full ESN. The DN index list contains a valid AESN for every DN index regardless of whether or not the DN is assigned to a customer. Furthermore, by convention, AESN = 0 (the primary ESN which is assigned the majority of the DNs in the list) should be used for unassigned lines. The primary ESN contained in word 0 is pointed to by AESN = 0, which should be the most frequently used AESN for assigned lines. This does not mean that AESN = 0 is an error type of default ESN. It is merely preassigned to DNs that would otherwise not be assigned an ESN.

Note: The digit "0", which normally has a value = 10, is converted to value = 0 for indexing the DN index list.

1A ESS Switch

3.30 In the 1AE5 generic program, up to 8 ESNs may be assigned per number group. The DN-to-ESN selective routing translations in a 1A ESS switch (with a 1AE5 generic program) are identical to those in a 1 ESS switch except left half memory does not exist in a 1A ESS switch. See Figure 15. Therefore, a left half DN index list does not exist in a 1A ESS switch.

3.31 In the 1AE6 and later generic programs, up to 511 ESNs may be assigned per number group. The maximum number of ESNs per office is also 511 ESNs. Each number group can have a different ESN limit (i.e., either 8, 16, 32, 64, 125, 256, or 511) which depends on the number of ESNs needed per number group. The DN-to-ESN translations are the same except item ESNLM (ESN limit) has been added in word 0 of the DN index list and the size of the DN index list varies according to the number of ESNs required per number group. Also, a minus one word, containing the length of the DN index list, is used for those DN index lists that have an ESN limit greater than eight. Figure 16 shows the DN-to-ESN translator for a 1A ESS switch with a 1AE6 or later generic program. Figure 16 depicts the translator with an ESN limit of 32. The size of the DN index list will vary according to the number of ESNs per number group as shown in Table G.

ESN Translator

3.32 The ESN obtained from the selective routing translations must be translated to a PSAP DN via the ESN translator shown in Figure 17. A single entry PTW (type 3) in the ESN head table is used when selective transfer does not apply for a particular ESN. When selective transfer service is provided, the PSAP primary DN and a list of secondary PSAP DNs (six maximum per primary ESN) are contained in the ESN auxiliary block. With selective transfer, the primary PSAP is the initial answering point. The primary PSAP or subsequent answering points (secondary PSAPs if equipped for selective transfer) can generate a selective transfer access code and an ETD (emergency transfer digit), which indexes the selective transfer list.

3.33 Any assigned DN is considered valid in the ESN translator; however, standard usage DNs are considered as those DNs associated with a nonringing PSAP, ringing PSAP, maintenance testing, and remote call forwarding to another PSAP.

3.34 If a PSAP is provided ANI display, the first digit sent to the PSAP indicates both the NPD (from the ESCO translator) and whether or not the ANI display should be flashed to alert the attendant for special 911 call situations. For example, a PSAP arranged for flashing ANI display may be assigned as the primary ESN for all FX (foreign exchange) lines that terminate outside the E911 service area. If item FCLD (flash calling line display data) is set (FCLD = 1) in the ESN translator, the first digit sent to the primary PSAP to indicate the NPD also indicates that the ANI display should be flashed. The first digit sent to a PSAP to indicate the NPD and FCLD contains the following information.

FIRST DIGIT	NPD	FCLD
0	0	0
1	1	0
2	2	0
3	3	0
4	0	1
5	1	1
6	2	1
7	3	1
8 (not used)		
9 (not used)		

Note: If a call requiring special attention is subsequently transferred to a secondary PSAP equipped with ANI display, the same ANI information including the first digit is sent to the secondary PSAP.

PSAP DN Translations

3.35 The PSAP DN obtained from the ESN translator is translated via DN translations. The DN subtranslator (word type 7) contains the address of the 911 DN auxiliary block. Refer to Figure 18 for data contained in the 911 DN auxiliary block. Any DN may be assigned as a valid PSAP DN. The four standard types of DN assignments recommended are as follows:

(a) DN with a terminating major class of 3 and a program index of 3 for a nonringing PSAP. This type may be used when providing expanded 911 service. Each PSAP should have only one such DN.

(b) DN with a terminating major class of 28 and a program index of 3 for a ringing PSAP. Generally, ringing PSAPs are associated with B911 service; however, the E911 tandem office can also route calls to a ringing PSAP.

(c) DN with a terminating major class of 3 and a program index of 1 for incoming maintenance test calls over dedicated E911 incoming trunks arranged for ANI operation. Refer to paragraph 3.15.

(d) DN with remote call forwarding major class that routes to another PSAP (e.g., a small town fire-house) served by another office. This DN should not be part of a centrex group.

3.36 The RI in word 0 (Figure 18) is the RI assigned for the outgoing dedicated 911 trunk group to the particular PSAP. The terminating major class data indicates either a PSAP without ringing (TMAJ = 3) or a PSAP with ringing (TMAJ = 28). The program index equals three (PIND = 3) for 911 service.

3.37 With TMAJ = 3 and PIND = 3, the DN auxiliary block may optionally contain the CFBL word (word 2). If CFBL is specified, the special line format may also be specified with a make-busy MSN and the BS (busy sense) option indicator (i.e., no MTDNs allowed). The CFBL and make-busy MSN options may be arranged to provide the following call forwarding services.

(a) Night service and/or power failure call forwarding forwards calls to the CFBL DN only if the MSN is made busy due to either night service or a PSAP power failure. For this option, the items specified are CFBL and CFILB (call forwarding inhibit line busy) = 1, and the MSN is specified in word 3.

(b) Traffic busy forwarding only forwards calls to the CFBL DN only if the PSAP is traffic busy. For this option, the items specified are CFBL and CFILB = 0 (and no MSN specified in word 3).

(c) Night service/power failure and traffic busy forwarding forwards calls to the CFBL DN if either the MSN is made busy (night service/power failure) or the PSAP is traffic busy. The same CFBL DN is used for either condition. For this option, the items specified are CFBL and CFILB = 0, and the MSN is specified in word 3.

Note: Call forwarding for E911 PSAPs will accommodate the usual five levels of forwarding. No detailed or usage sensitive billing is available. Also, if a PSAP is transferring a 911 call to another PSAP and the forwarding mechanism routes the call back to the transferring PSAP, the E911 tandem office provides overflow tone.

RI (Route Index) Expansion

3.38 The RI obtained from the 911 DN auxiliary block must be expanded to obtain trunk group data. Regular RI expansion is done via a 2-word RI expansion table indexed using the RI assigned for the PSAP DN. Refer to Figure 19. In word 0, the next RI equals stop and the TGN is assigned. Item TROK (transfer okay) equals one (TROK = 1), if central office transfer is provided; otherwise, TROK = 0. DEL NO (digits deleted) and prefix digits equal zero. If the RI expansion is for a PSAP without ANI display, item XMTYP (transmitter type) equals zero. If the RI expansion is for a PSAP with ANI display, item XMTYP equals one.

Dedicated E911 PSAP Trunk Translations

3.39 Regular TGN and TCC translations are required for dedicated E911 outgoing trunks to PSAPs. Standard trunk translations are used. The trunk circuits which can be used to complete 911 calls to PSAPs are SD-1A165, SD-1A163, and SD-1A237 trunk circuits. Figure 20 shows the TCC expansion data. For detailed translation requirements and data structures for these trunk circuits, refer to Part 6 B(23) through B(25).

3.40 When a PSAP is provided central office transfer service, the trunk group must be a centrex tie trunk group with a screening LEN. Word 1 in the TGN auxiliary block is marked as trunk group type six (TGTYP = 6) and the screening LEN is marked in word 2. The screening LEN auxiliary block is marked for attendant major class and release link operation. Otherwise, if the PSAP is not provided central office transfer service, the trunk group can be marked as TGTYP = 1 (one-way outgoing) in the TGN auxiliary block.

Centrex Data for PSAPs

3.41 Central office transfer service requires centrex translations for the E911 PSAPs with transfer service. Centrex translations are required to implement call transfer service for those E911 trunk groups to E911 PSAPs requiring call transfer. TDT (trunk dial transfer) is provided for those E911 PSAP trunk groups. Excluding any special dialing plan considerations, all PSAPs in the E911 service area can belong to the same centrex group. For a detailed description of the centrex common block items and data structure, refer to Part 6 B(23) through B(25). The LDN contained in word 0 may be the DN for a particular PSAP or may be some other DN assigned for the customer group. The PSAP trunks are assigned screening LENs, which may be provided selective, fixed, or manual dial transfer. Since these E911 trunks are in a centrex trunk group and "9+" dialing is not desirable for PSAP attendants, "assume dial 9" service is used. Because of this, the initial digits 0 through 9 all translate to data type 4. Thus the only initial digits usable for other features and/or dialing patterns are * (digit 11) and # (digit 12). The digit 11 (*) is used as the initial digit of assigned centrex extension numbers for secondary PSAPs. Furthermore, if the PSAP DNs are nondialable, the speed calling codes of the PSAPs must translate to the centrex extension number. Otherwise, if they translate to a regular DN, the call will not complete since the DNs are nondialable.

3.42 When selective and/or dial transfer services are provided, the CTI (call transfer individual) and CTU (call transfer unlimited) items must be marked (CTI = 1, CTU = 1) in word 1 of the centrex common block. Another use of CTI is available. CTO (call transfer outside) already allowed the controlling party to add a DOD (direct outward dialed) call to either a DID (direct inward dialed) or DOD call. The added

option (valid only if CTO = 1) allows the controlling party to abandon after adding a DOD call to a DID call without disconnecting both parties. When this option is provided, item CTDD (call transfer DID or DOD) in word 20 is set (CTDD = 1).

3.43 The selective transfer service uses the data type 5, subtype 5, sub-subtype 3 (DTYP5, STYP5, SSTYP3) for the access code in the centrex digit interpreter table. The selective transfer access code (in the form of *1X) includes the ETD (emergency transfer digit = X) which is translated via the ESN auxiliary block (Figure 17). The form *1X is used where X = 1≤ ETD ≤ 6.

3.44 The 2-digit speed calling feature uses the DTYP5, STYP2, SSTYP0 as the access code. Speed calling codes *2X, *3X, and/or *4X (where X = 0 through 9) may be used for manual dial transfer using the speed calling feature. Fixed transfer uses the speed calling code *2X only (where X = 1 through 6).

> ***Note:*** These speed calling code formats are not in accordance with the standard numbering and dialing plan for central office vertical services. However, due to the design of the E911 feature, they must be used in this application. (See paragraph 3.31.)

3.45 The secondary PSAP DNs can be part of the centrex extension range either as DTYP2 or DTYP6 entries. Speed calling entries for secondary PSAPs must have the PSAP centrex extensions listed, not the PSAP DNs. For example, if *23 is the speed calling code assigned for the PSAP DN 727-6601, then the 5-digit centrex extension entry is *6601. If a secondary PSAP has ANI display, the original ANI will be sent to the secondary PSAP for transferred 911 calls.

B. Parameters/Call Store

3.46 The E911 feature requires parameters to provide call store memory for:

(a) E911 call registers

(b) Traffic and error counts for 911 calls

(c) Peripheral processor request data. (This call store memory is required only when a PDSP is used to store the TN-to-ESN data for a 1 ESS switch E911 tandem office.)

For detailed parameter and call store information, refer to Part 6 B(26) through B(28).

E911 Call Registers

3.47 E911 call registers are specified by parameter word I4E911. Refer to Figure 21. Parameter word I4E911 is located in the I4REGS table at I4REGS+17. I4REGS is a table of pointers to variable call store giving the start address of each register type and the number of registers. Set card NE911 defines the number of E911 call registers specified by parameter I4E911. If NE911 equals zero, I4E911 data equals zero. Otherwise, the I4E911 data is as follows:

$$14 = NE911,\ 23 = E911$$

where NE911 is the number of E911 call registers and E911 is the call store address of a call store block of size 9* NE911. NE911 = 1 plus the number of outgoing trunks to E911 PSAPs.

3.48 E911 registers are used to complete all 911 calls to an E911 PSAP. An E911 register is used for the duration of a 911 call. The register contains state, queue, link, scan, path memory, ANI, and other related information for a 911 call. See Figure 22 for the E911 call register data layout.

E911 Traffic and Error Data Block

3.49 A block of variable call store memory is required to record traffic and error counts for E911 service. When feature package 9FE911 is loaded, parameter word E9TFCT (Figure 23) contains the call store address of the third word (word 0) of a 24-word call store table. The E911 feature package set card is 9FE911. If 9FE911 equals zero, E9TFCT equals zero. If 9FE911 equals one, E9TFCT data is as follows:

$$14 = 0,\ 23 = csadr + 2$$

where csadr is the address of a 24-word call store block.

3.50 The variable call store block for E911 traffic is used to control the printing of the EN01 (E911 error) output message and to collect the counts that are printed as EN02 (E911 error counts) and EN03 (E911 traffic counts) output messages. Refer to Figure 24. The odd-numbered words are counts pertaining to the TGN being monitored. The even-numbered words are total office counts minus the counts pertaining to the TGN being monitored. Therefore, for E911 traffic, the

total traffic count for the office is the total of the odd- plus even-word counts in the register.

1 ESS Switch Memory for PDSP

3.51 When a PDSP is used to provide TN-to-ESN data for a 1 ESS switch E911 tandem office, the PIU feature is required. The PIU serves as a data buffer for the directional communications (requests and data) between the 1 ESS switch and the PDSP. Refer to Figure 9. The PIU is coupled to the 1 ESS switch call store bus. For a description of the PIU interface feature, refer to Part 6 A(21).

3.52 When a PDSP is used, feature package 9FPIU is loaded in the generic program. Parameters are required for the PIU interface. Two parameter words required for the PIU interface, but not unique to E911 service, are P2PPMSG and P2PPMC.

(a) Parameter word P2PPMSG (Figure 25) is used to build peripheral processor message blocks in variable call store to receive incoming messages (data) from the PIU. Set card PPMB specifies the number of message blocks to be built. Parameter word P2PPMSG contains the number of message blocks (PPMB), block size (BLKSZ = 7), and the call store address of the first message block.

(b) Parameter word P2PPMC (Figure 26) is used to build a block of call store (referred to as a box block), which provides for peripheral processor message block control data. Data in the box block controls the use of the peripheral processor message blocks pointed to by P2PPMSG. Control data in the box block is used to identify message confirmations received after a message is sent to the PIU and for retaining requests for message blocks when none are idle. The P2PPMC control data controls the transfer of data from the PDSP (via the PIU) to the appropriate 1 ESS switch application program(s). Parameter word P2PPMC, specified by set card PPMC, contains the number of words (length = 15) in the call store box block (control block) and the call store address.

3.53 Parameter word P2PPRB (Figure 27) is provided when feature packages 9FPIU and 9FE911 are loaded in the generic program. P2PPRB builds a block of variable call store used to buffer 1 ESS switch processor requests for data from the PDSP. Set card PPRB specifies the number of simultaneous requests allowed for E911 data from the PDSP. If a PDSP is not used for E911 service, item PPRB equals zero. When a PDSP is used for E911 service, item PPRB equals ten (PPRB = 10). Item csadr is the address of the call store block of size 4*PPRB+2.

3.54 The call store message buffer formats for 1 ESS switch requests to the PDSP and replies from the PDSP (via the PIU) for E911 TN-to-ESN data, and ESN verification data are shown in Figure 28. For detailed information concerning the PDSP and PIU, refer to Part 6 A(5), A(8), and A(12) through A(21).

FEATURE OPERATION

3.55 The E911 tandem office completes 911 calls received from local offices and 911 calls originated by local customers served by the E911 tandem office. As with any other call, the call processing includes the originating phase, the terminating phase, and the disconnect phase. In addition, when selective routing is provided, selective routing may be considered as a separate phase.

3.56 The originating phase includes digit reception and translations required to determine the call type, rate and route pattern, and initial routing information. Selective routing provides the primary PSAP DN associated with the calling station's ANI TN. The terminating phase includes the final routing and connection based on the ESN, DN, RI, and trunk translations to complete the call to a particular PSAP via a dedicated E911 outgoing trunk group. The disconnect phase includes supervision of the established connection. Disconnect actions depend on whether the 911 call is a local or tandem call and whether the calling party or the PSAP attendant disconnects first. In this description of feature operation, PSAP call transfer and maintenance test calls are discussed after the descriptions of the originating, selective routing, terminating, and disconnect phases for an E911 call.

A. Call Origination

E911 Tandem Office Trunk Originated 911 Call

3.57 The E911 tandem office is capable of processing incoming 911 traffic from step-by-step, panel, crossbar, and ESS switch local offices. The incoming 911 traffic from local offices may be received via either dedicated E911 trunks equipped for ANI operation or regular message network trunks.

(a) If 911 calls from a local office are to be selectively routed and/or are routed to a PSAP with ANI display, the incoming 911 calls from that local

office must be over dedicated E911 trunks arranged for ANI transmission. This is necessary because the ANI information provides the ANI TN used for both selective routing and for the ANI display. If the ANI does not provide a TN or if there is an ANI failure, the 911 call will be routed to a default ESN based on the incoming trunk group. If the ESCO translator indicates that selective routing does not apply, the default ESN is used to route the call. Paragraphs 4.11 through 4.15 describe the translations for a 911 call via an E911 dedicated trunk group.

(b) If all 911 calls from a local office are to be routed to the same ESN and ANI display is not provided, the incoming 911 calls from that local office can be received via regular message network trunks since ANI information is not required. This is not a recommended arrangement, however, since it does not provide the service protection for 911 calls that is provided by using dedicated trunks for the E911 network. The 911 calls that are received over message network trunks are typically routed (on a per incoming trunk group basis) to the default ESN obtained from the ESCO translator. Exceptions to this are message network trunks which have either AIOD or CAMA ANI operation and tie trunks with screening LENs. This more detailed routing occurs only if selective routing translations are provided for the ESCO assigned for a particular trunk group. With CAMA ANI, the ANI TN and the ESCO are used to obtain the correct PSAP ESN. With AIOD, either the AIOD billing TN or else the trunk group billing TN and the ESCO, or just the ESCO, can be used to obtain the ESN. For customer tie trunks, the billing TN associated with the screening LEN is used to obtain the PSAP ESN. In general, for 911 calls received via message network trunks, the ESCO from 3/6-digit translations is used unless the TGN has the supplementary TGN Q option word with item ESCO $\neq$ 0. In this case, the ESCO in the Q option word is used.

3.58 Several different signaling combinations are possible, depending on the type of incoming trunk and the type of local office routing 911 calls to the E911 tandem office. TGN and TCC translations are discussed in paragraphs 3.11 through 3.18. The dedicated E911 incoming trunks (Table F) may be immediate dial dial pulse (DP) trunks for bylink operation or MF trunks for nonbylink operation. The dedicated E911 outgoing trunks from local offices are the same as would be used for outgoing CAMA trunks. The format of the ANI which a local office sends to an E911 tandem office is the same format as used for an outgoing call to a TSPS. Primed start pulses, as allowed by these formats, are accepted as start pulses by an E911 tandem office; however, an E911 tandem office does not require primed start pulses. Sometimes a local office is equipped with excess TSPS type outgoing trunks, which could be reassigned for use as dedicated E911 outgoing trunks.

(a) E911 dedicated trunks from non-SXS offices are incoming MF type trunks equipped for MF ANI operation. On these type trunks, a 911 call is recognized when any of the following digit combinations are received.

(1) KP - 911 - ST + ANI (typical from No. 5 crossbar)

(2) KP - 11 - ST + ANI (preferred from ESS switch because 10X test codes can be used for testing)

(3) KP - 1 - ST + ANI (possible from ESS switch)

(4) Direct seizure + ANI (typical from panel or 1 crossbar, CAMA or LAMA).

(b) E911 dedicated trunks from SXS offices are always bylink incoming trunks equipped for MF ANI operation. On these type trunks, a 911 call is recognized when any of the following digit combinations are received.

(1) 911 + ANI (possible from senderized SXS)

(2) 11 + ANI

(3) 1 + LB Direct seizure + ANI (bylink trunks are not required in this case).

Note: For any given trunk group, only one digit combination is allowed.

(c) 911 calls originating via nondedicated message network trunks are detected as normal seizures with 911 or 11 being received to indicate a 911 call as discussed in paragraph 3.16. The digits "11" can only be received via those tandem trunks for which one "X11" code can be associated. Manual seizure trunks are direct trunks to the E911 tandem office requiring no digits and no ANI to be sent.

3.59 The originating phase is described according to the type of trunk and type of inpulsing signal

received. The possible digit sequences received over dedicated E911 trunks are:

(a) MF digits + MF ANI (only from non-SXS offices

(b) DP immediate dial digits + MF ANI (only from SXS offices

(c) Direct seizure + MF ANI (from either SXS or non-SXS offices)

(d) Direct seizure without ANI

(e) 911 calls incoming via message network trunks.

3.60 ***MF Digits Followed by MF ANI:*** The E911 tandem office detects the seizure on a dedicated 911 incoming trunk and bids for an idle MF receiver. If the local office times out before the E911 tandem office can seize and connect an idle MF receiver, the local office will return reorder tone to the calling party and will send an on-hook signal (indicating trunk release) to the E911 tandem office. Otherwise, if an idle MF receiver is connected prior to local office time-out, the normal sequence of events occurs as discussed below. Actions due to failure modes are described where appropriate.

(a) After seizure, the E911 tandem office attaches an MF receiver, sends the start pulsing signal (wink signal) to the local office, and begins standard PSPD timing for receipt of the digits. If PSPD time-out occurs, the incoming 911 trunk is put on the high and wet list. Otherwise, the digits are received before the PSPD time-out.

(b) After the digits are received, the E911 tandem office transmits the ANI start pulsing signal (steady off-hook) and begins 8- to 9-second timing for receipt of the complete ANI information. If time-out occurs prior to receiving complete ANI information, the E911 tandem office completes the call as an ANI failure. An ANI failure causes the call to be routed to the default ESN associated with the ESCO assigned for the incoming trunk group. Refer to paragraphs 3.13 and 3.24. Otherwise, the complete ANI information is received prior to time-out.

(c) After receiving the ANI information, the E911 tandem office processes and routes the call according to the ESCO, the NPD, and ANI TN obtained from translations. Refer to paragraphs 3.11 through 3.14. Selective routing, the terminating phase, and the disconnect phase are discussed in subsequent paragraphs. After call completion, the call is supervised for disconnect and for a PSAP transfer request (if transfer service is provided).

3.61 ***Dial Pulse Immediate Dial Digits Followed by MF ANI:*** The E911 tandem office detects the seizure on the incoming bylink trunk and sets up for immediate digit collection and begins PSPD timing for permanent signal or early dial. If time-out occurs due to a permanent signal or if early dial is detected, the incoming 911 trunk is connected to reorder tone, and if disconnect is not received, the incoming trunk is eventually put on the high and wet list. Otherwise, after reception of the dial pulse digits (i.e., 1 or 11), the E911 tandem office attempts to connect an MF receiver.

(a) If an MF receiver is not available, the E911 tandem office sends the steady off-hook ANI start dial signal directly to the E911 incoming trunk so that the local office will transmit ANI and cut through the calling customer. Of course the ANI digits do not register at the E911 tandem office since no MF receiver is connected. Approximately 1 to 2 seconds after sending the off-hook signal, the E911 tandem office default routes the call to the default ESN based on the ESCO of the incoming trunk group.

(b) Otherwise, after the dial pulse digits are received and an MF receiver is connected, the call proceeds as described in paragraph 3.60, subparagraphs (b) and (c).

3.62 ***Direct Seizure Followed by MF ANI:*** After the trunk is seized, the E911 tandem office immediately sends a steady off-hook signal and begins 8- to 9-second timing for receipt of the complete ANI information. The call proceeds as described in paragraph 3.60 subparagraphs (b) and (c).

3.63 ***Direct Seizure Without ANI:*** After the trunk is seized by the local office, the E911 tandem office returns off-hook to the local office and immediately default routes the call to the default ESN based on the ESCO of the incoming trunk group.

3.64 ***911 Calls Incoming Via Message Network Trunks:*** This type of 911 call is received as any other tandem call. After the local office determines a calling party has dialed 911, the local office attempts to seize a message trunk to the E911 tandem office. If no trunks are available, the local office returns reorder tone to the calling party. Otherwise, a message trunk is seized and the digits 911 or 11 are outpulsed to the

E911 tandem office. The digits are translated as a call type 22 (911 call) and the call is typically routed to either the ESN associated with the ESCO obtained from 3/6-digit translations, or to the default ESN based on the ESCO of the incoming trunk group. Refer to paragraphs 3.16 through 3.18.

E911 Tandem Office Line Originated 911 Call

3.65 An E911 tandem office line originated 911 call is translated via 3-digit translations as a call type 22 (4FESCO). Route pattern expansion yields the ESCO number associated with the E911 tandem office. Refer to paragraphs 3.19 and 3.20 and Fig. 12.

3.66 The ESCO number is translated via the ESCO translator (Fig. 14) to obtain the NPD, default ESN, and to determine whether or not selective routing applies. If the ESCO translator indicates that selective routing does not apply (i.e., selective routing data for that ESCO does not exist in either the 1 or 1A ESS switch or a PDSP), the default ESN is considered to be the primary ESN and is used for routing the call. If selective routing applies for an ESCO, the selective routing translations are stored in either the E911 tandem office or in a PDSP (for 1 ESS switch only) as indicated by items EN01 and EPDSP in the ESCO translator (Fig. 14). If selective routing applies for an ESCO, the NPD and the calling station's ANI TN are used to index selective routing translations to obtain the primary ESN associated with the calling line.

3.67 During the initial 911 call processing, if the maximum number of 911 intraoffice calls already exist (based on the E911 intraoffice choke mechanism, paragraph 3.22), overflow tone is returned to the originating line. In cases where a billing TN does not exist (such as for multiparty or QZ billing lines), or an ANI failure occurs, the call is routed to the default ESN obtained from the ESCO translator. Otherwise, the call is selectively routed using the NPD obtained from the ESCO translator and the ANI TN of the originating line.

B. Selective Routing

3.68 Selective routing translations are resident in either the E911 tandem office or in a PDSP used in conjunction with a 1 ESS switch tandem office. Item EPDSP in the ESCO translator indicates that selective routing translations are resident in a PDSP (EPDSP = 1) or not in a PDSP (EPDSP = 0). Item EN01 in the ESCO translator indicates that selective routing translations are resident in the E911 tandem office (EN01 = 1) or not in the E911 tandem office (EN01 = 0). If both EPDSP = 0 and EN01 = 0 selective routing are not provided for that ESCO, the default ESN is used.

3.69 If a PDSP is used, an ESN data request is sent to the PDSP via the PIU interface. Refer to paragraphs 3.51 through 3.54. The ESS switch request for PDSP ESN data includes the NPD and ANI TN of the calling station. The PDSP reply data contains the correct ESN for the NPD and ANI TN. Refer to Fig. 28 for the message buffer formats for ESS switch request and PDSP reply data. The selective routing translations in the PDSP are structured similar to and provide the same function as those resident in the E911 tandem office. If the PDSP fails or if an invalid ESN is returned, the call is routed using the default ESN which was initially obtained from the ESCO translator and stored in the PPRB memory block (Fig. 27). Otherwise, if the selective routing translations are resident in the E911 tandem office, the call is routed using the ESCO translator data and the selective routing translations described in paragraphs 3.26 through 3.31.

3.70 The NPD obtained from the ESCO translator and the ANI TN of the calling station are used to index the NPD and DN-to-ESN translations which may provide selective routing translation data on a per office code, per number group, or per TN basis. Refer to paragraphs 3.26 through 3.31 and Fig. 15 and 16. The NPD and DN-to-ESN translations yield the ESN for the 911 call.

C. Call Termination

3.71 The call termination phase includes ESN, PSAP DN, RI, and trunk group translations. Either the default ESN obtained from the ESCO translator or the ESN obtained from the DN-to-ESN translator is translated via the ESN translator (paragraphs 3.32 through 3.34 and Fig. 17) to obtain the PSAP DN assigned for the ESN. The PSAP DN obtained is translated via the 911 DN auxiliary block (paragraphs 3.35 through 3.37 and Fig. 18) to obtain program index, terminating major class, RI, and call forwarding data. Typically, an E911 call will route to a DN for nonringing E911 PSAP with PIND = 3 and TMAJ = 3. If a nonringing E911 PSAP is indicated, an E911 call register (paragraphs 3.47 and 3.48 and Fig. 22) is initialized and linked for the call.

> ***Note:*** The PSAP DN can be any valid DN. With the E911 feature, the E911 tandem office may also route 911 calls to ringing PSAPs.

Ringing PSAPs are typically associated with B911 service. For a 911 call to a ringing PSAP, if all 911 lines to that PSAP are busy, busy tone is returned to the calling party. Otherwise, ringing is provided and the call connection is established upon receipt of answer. Alternate routing is not available for ringing PSAPs.

3.72 The RI obtained from the 911 DN auxiliary block is expanded via RI expansion (paragraph 4.38) to obtain the TGN assigned for the particular PSAP. Regular TGN and TCC translations are used to find an idle 911 trunk to the PSAP. The E911 tandem office hunts for and attempts to seize an idle 911 trunk to the PSAP. One of several conditions can be encountered.

(a) If no idle trunk in the trunk group can be found, and the optional call forwarding service (traffic busy alternate routing) is not provided, the calling station receives reorder tone.

(b) If no idle trunk can be found due to either a traffic busy condition, night service, and/or a power failure condition, and alternate routing is provided for traffic busy, night service and/or power failure, the call is alternate routed to the CFBL-DN contained in the 911 DN auxiliary block (Fig. 18). The CFBL-DN must be translated and the connection phase must be repeated for the CFBL-DN. The CFBL-DN may be associated with another E911 PSAP, a B911 PSAP, or any other facility which may be assigned a DN; however, the CFBL-DN typically is associated with another E911 PSAP. As for any alternate routing, up to five attempts may be made for alternate routing. If the alternate routing results in the call being routed to an entity other than an E911 PSAP, the E911 feature no longer has any impact on the call.

(c) Otherwise, if a 911 trunk to the PSAP is available, the trunk is seized either on a manual seizure basis or the trunk is seized which requires an MF transmitter. The trunk seizure and connection phase depends on whether or not the PSAP has the ANI display, which requires MF outpulsing.

Connection to an E911 PSAP Without ANI Display

3.73 For an E911 PSAP without the ANI display option, an idle 911 trunk to the PSAP is seized on a manual seizure basis and the call is automatically cut through to the PSAP. The network connections are established as for any other line or trunk-to-trunk connection. When the trunk seizure is detected by the PSAP customer premises equipment, the PSAP customer premises equipment signals the attendant(s) and returns audible ringing to the originating line via the path established. The E911 tandem office supervises the calling line for abandon and the 911 trunk for answer. When the 911 call is answered at the PSAP, the talking connection is established at the PSAP and the off-hook answer signal is returned to the E911 tandem office. After the answer signal is received, the E911 tandem office supervises the call for disconnect and for a call transfer request if call transfer service is provided.

Connection to an E911 PSAP With ANI Display

3.74 MF outpulsing is required to send ANI information to an E911 PSAP having the ANI display option. An idle 911 trunk to the PSAP is seized and an attempt is made to seize and connect an idle MF transmitter to the outgoing 911 trunk. If an MF transmitter is not available, the call is routed to reorder tone. Otherwise, when an MF transmitter is available, it is seized and connected to an E911 outgoing trunk to the PSAP. Standard start dial timing is done for receipt of the ANI start signal (approximately 250 ± 50 millisecond wink signal) from the PSAP customer premises equipment. There are several failure modes that can occur after the E911 tandem office seizes a dedicated E911 outgoing trunk and connects an MF transmitter.

3.75 The normal sequence of events after 911 trunk seizure is described below. Failure modes are discussed as they are applicable to a particular sequence.

(a) The E911 tandem office sends an off-hook signal to the PSAP indicating 911 trunk seizure.

(b) The E911 tandem office times, for a period of 16 to 20 seconds, for receipt of the ANI start pulsing wink signal from the PSAP. The normal call sequence continues if the PSAP returns the start pulsing wink signal. If the start pulsing wink signal is not received within 16 to 20 seconds, the E911 tandem office puts the trunk on the trunk maintenance list and makes one retry on a different E911 trunk to the PSAP. In this case, trunk hunting and the connection phase begins again.

(c) When the PSAP recognizes the E911 trunk seizure, it will typically return an ANI start pulsing wink signal (250 ± 50 millisecond wink

signal) to the E911 tandem office in less than 4 seconds. After sending the start pulsing wink signal, if the MF pulses are not received in 4 seconds or garbled pulses are received, the PSAP completes the call as if an ANI failure occurred. That is, the PSAP customer premises equipment immediately signals the attendant(s) and returns audible ringing tone to the calling station via the E911 network. In this case, when the attendant answers, all zeros are displayed on the ANI display. Otherwise, receipt of the start pulsing wink signal typically causes the E911 tandem office to start MF outpulsing.

(1) The MF outpulsing consists of a stream of MF tone pulses 55 to 65 ms duration separated by silent intervals of 55 to 65 ms. The NPD plus ANI TN digits are preceded by a KP digit of 115 to 125 ms duration and succeeded by an ST digit of 55 to 65 ms duration. The E911 tandem office begins MF outpulsing the ANI information to the PSAP in the form KP-A-NXX-XXXX-ST where NXX-XXXX is typically the ANI TN of the calling station and item A is the encoded information digit, indicating the NPD and flash calling line display data as discussed in paragraph 3.34. The encoded information digit is used at the E911 PSAP as follows:

Digit	Use
0	dummy digit (not displayed, ANI TN displayed steady)
1	digit 1 plus ANI TN displayed steady
2	digit 2 plus ANI TN displayed steady
3	digit 3 plus ANI TN displayed steady
4	dummy digit (not displayed, but ANI TN flashed)
5	digit 1 plus ANI TN displayed flashing
6	digit 2 plus ANI TN displayed flashing
7	digit 3 plus ANI TN displayed flashing
8	for maintenance test call (not displayed).

(2) If valid ANI is not available at the E911 tandem office, a fictitious NXX-XXXX ANI is sent as follows:

- 0-911-0TTT: This format is sent due to ANI failures, multiparty or QZ billing lines, and possibly a 911 call received via a message trunk. The digits TTT indicate the ESCO number associated with the originating office.

- 0-911-0000: This format is sent when an anonymous call is made to a PSAP. An anonymous call is a 7-digit call (non-911) to the DN of a PSAP.

Note: The information digit is not displayed if valid ANI is not available. Also, if an ANI failure occurs between the E911 tandem office and the PSAP, the digits displayed are 000-0000.

(d) When the PSAP receives the complete MF outpulsed ANI information, the PSAP signals the attendant(s) and returns audible ringing to the calling party. When the call is answered, the PSAP disconnects audible ringing, connects the call to the answering attendant position, causes the appropriate information to be displayed on the adjunct selector console display, and returns an off-hook signal to the E911 tandem office indicating answer.

(e) After answer is detected, the E911 tandem office supervises the call for disconnect and for a PSAP transfer request (if transfer service is provided).

D. Call Disconnect

Disconnect for Tandem E911 Calls From Local Offices

3.76 For an established E911 tandem call, disconnect supervision is maintained at the E911 tandem office for the incoming and outgoing E911 trunks. Disconnect actions depend on whether disconnect is received from the PSAP or from the local office first.

3.77 When the PSAP attendant disconnects first, the PSAP sends an on-hook (disconnect) signal to the E911 tandem office. The on-hook signal duration must be greater than the flash timing period (1.2 seconds) to be interpreted as a disconnect signal. The E911 tandem office passes the on-hook to the local office and begins 4- to 5-second timing for an on-hook

signal returned from the local office. Either the local office returns on-hook within the 4- to 5-second period or time-out occurs. When either on-hook is received or when time-out occurs, the E911 tandem office disconnects the tandem E911 call connection, sends on-hook to the PSAP, idles the E911 trunk to the PSAP, and releases the E911 call register. If time-out occurred prior to receiving on-hook from the local office, the incoming dedicated 911 trunk is put on the high and wet list.

> ***Note:*** The 4- to 5-second timing for on-hook is also done for message network trunks from local offices carrying 911 calls.

3.78 The following is an example of how disconnect should occur when the PSAP attendant disconnects first.

(a) When the PSAP attendant disconnects, the PSAP equipment sends an on-hook to the E911 tandem office.

(b) The E911 tandem office begins 1.2-second flash timing, which times out in this case, thus signaling a disconnect.

(c) The E911 tandem office sends an on-hook signal to the local office and begins 4- to 5-second timing for receiving an on-hook from the local office. This 4- to 5-second timing is unique for E911 calls to a PSAP and, in fact, is the forced disconnect service for the E911 feature.

(d) If the 911 call is from a local office, when the local office receives disconnect from the E911 tandem office, it immediately disconnects the call and returns on-hook to the E911 tandem office. Thus, the E911 tandem office normally receives on-hook from the local office prior to time-out, disconnects the call, and sends on-hook to the PSAP.

(e) If the on-hook signal is not received from the local office within the 4- to 5-second timing interval, the E911 tandem office disconnects the call, returns on-hook to the PSAP, and puts the dedicated E911 incoming trunk on the high and wet list.

3.79 When the calling party disconnects first, the local office sends an on-hook signal to the E911 tandem office and releases the outgoing trunk if it is a message network trunk. If the outgoing call was via a dedicated E911 trunk, the trunk is released after on-hook signal is received from the E911 tandem office. When the E911 tandem office receives the on-hook signal, the tandem connection is released and an on-hook signal is sent to the local office. The incoming dedicated E911 trunk is released and idled. If the outgoing dedicated E911 trunk to the PSAP is a loop type trunk, the trunk is released and idled. If the outgoing dedicated E911 trunk to the PSAP is an E&M type trunk, the trunk to the PSAP is left busy and supervised until disconnect is received. When disconnect is received from the PSAP, the E911 trunk is idled.

Disconnect for E911 Calls From E911 Tandem Office Customers

3.80 When the PSAP attendant disconnects first, the PSAP sends an on-hook signal (disconnect) to the E911 tandem office. The on-hook signal duration must be greater than 1.2 seconds (time greater than for a flash signal) to be interpreted as a disconnect signal. The E911 tandem office processes the disconnect, returns an on-hook signal to the PSAP, immediately releases and idles the E911 trunk to the PSAP, and restore verifies the line so that the line will receive dial tone if still off-hook. Regular PSPD timing and treatment are provided for the calling line.

3.81 When the calling customer disconnects first, the E911 tandem office disconnects the connection and sends an on-hook signal indicating disconnect to the PSAP. The PSAP does not recognize an on-hook signal with a duration of less than 250 ms to be a disconnect. If the outgoing dedicated E911 trunk to the PSAP is marked as an operator trunk, the E911 tandem office supervises the E911 trunk for an on-hook signal from the PSAP. Upon receipt of the on-hook signal, the E911 tandem office releases and idles the E911 trunk. If the outgoing dedicated E911 trunk to the PSAP is an E&M type trunk, the trunk is left busy and supervised until disconnect is received. When disconnect is received from the PSAP the E911 trunk is idled.

E. E911 PSAP Central Office Transfer

3.82 For central office call transfer capability, a dedicated E911 outgoing trunk to a PSAP must be in a centrex tie trunk group having the TDT feature. For information regarding the TDT feature, refer to Part 6 A(22). The dedicated E911 outgoing trunk must be marked for flash timing in the TCC expansion table (Fig. 20). Typically, a PSAP is arranged to provide selective or prefixed 2-digit speed calling service using

the transfer keys on the 10A1-50 selector console. The PSAP equipment can be arranged to automatically generate and send selective transfer codes with the form of *1X and/or the prefixed 2-digit transfer codes with the form *2X. The PSAP equipment cannot be arranged to automatically generate and send prefixed 2-digit speed calling codes with the form *3X or *4X. However, these speed calling codes can be used and are simply manually dialed.

Note: The prefixed access code (*2X) used for E911 service does not conflict with the standard 2-digit speed calling codes. Since PSAPs are in a centrex group to provide E911 transfer services, the recommended (standard use) 2-digit speed calling codes are not applicable.

3.83 A request for transfer is recognized when a flash signal (500 ± 50 ms on-hook signal) is received from the PSAP. For E911 service, there are three types of transfers, selective, fixed, and manual transfer.

(a) With selective transfer the list of secondary PSAP DNs (identified in the ESN translator, Fig. 17) is used to selectively transfer an E911 call according to the ETD (emergency transfer digit) received. Selective transfer has the form of *1X, where X = 1, 2, 3, 4, 5, or 6. The *1 yields DTYP5, STYP5, SSTYP3. The call program then collects one more digit, the "X" digit of *1X, where X equals the ETD. In this way, the secondary PSAP DN to be used is dependent on the initial selective routing to the primary PSAP associated with the particular calling station. Selective transfer is always based on the primary ESN obtained for a particular call regardless of the number of times a call is transferred from one E911 PSAP to another E911 PSAP. The primary ESN is stored in the E911 call register (Fig. 22) as long as the call is connected to an E911 PSAP.

(b) With fixed transfer the prefixed 2-digit speed calling code has the form of *2X. The 2-digit speed calling code yields DTYP5, STYP2, SSTYP0 unless the associated PSAP DNs are part of a centrex extension range. The PSAP DNs can be part of a centrex extension range either as DTYP2 or DTYP6 entries. If the DNs assigned to PSAPs are nondialable DNs, the number obtained from the speed calling list must be the centrex extension of the desired PSAP. Refer to paragraphs 3.44 and 3.45.

Note: The transfer keys on the selector console (paragraph 2.15) can be arranged for selective transfer, fixed transfer (based on 2-digit speed calling), or a combination of both. In either case, the E911 PSAP equipment is arranged to automatically generate and send the appropriate transfer code to the E911 tandem office.

(c) With manual dial transfer, the attendant either manually dials the DN or the speed calling code (if speed calling is provided) for the desired destination. Manually dialed speed calling codes for an E911 PSAP have the form *2X, *3X, or *4X. The same data types used for fixed transfer are used for manually dialed speed calling codes.

Note: Code *2X may be used for either fixed or manual dial transfer.

3.84 If the routing DN leads to a secondary E911 PSAP with ANI display, the 8-digit ANI code that was sent to the answering (primary) PSAP is also sent to the add-on (secondary) PSAP. If the secondary PSAP has alternate routing (for night service and/or traffic busy) and the alternating routing loops back to the PSAP that is requesting the transfer, the transfer is blocked and the PSAP attendant receives overflow tone (120 ipm) to indicate the transfer is not allowed. Otherwise, once the transfer is complete, all parties are connected via a 3-port conference circuit at the E911 tandem office until either of the parties disconnects from the call. While all three parties are connected, the primary PSAP can cause the added party (secondary PSAP) to be disconnected (forced off) by sending an on-hook flash signal to the E911 tandem office. The E911 tandem office will reestablish the call as a two-party call between the calling party and the primary PSAP.

Note: If a selective transfer request is made and the request is not valid, interrupted high tone (120 ipm) is returned to the PSAP attendant requesting the transfer. An invalid request occurs upon receipt of a selective transfer code (*1X) when there is no DN in the ETD slot for ETD X in the ESN auxiliary block.

E911 Call Transfer Sequence

3.85 When the PSAP attendant initiates selective or fixed transfer using the transfer keys on the 10A1-50 selector console (Fig. 4), the PSAP automatically generates and sends an on-hook flash signal (approximately 500 milliseconds duration) to the E911 tandem office. Otherwise, for a manual dial transfer, the PSAP attendant operates the **ADD** key which causes a timed on-hook flash to be generated and sent

to the E911 tandem office. In either case, when the flash signal is detected, the E911 tandem office attempts to seize a 3-port conference circuit and a touch-tone receiver. One of three events can occur.

(a) If a 3-port conference circuit is not available, the flash signal is ignored.

(b) If a touch-tone receiver is not available within 3- to 4-seconds of receiving the flash signal, the flash is ignored. If a receiver is not immediately available, an attempt is made to queue for a receiver during the 3- to 4-second interval; however, it may not be possible to queue due to a queue overload.

(c) Otherwise, a 3-port conference circuit and receiver are seized. The calling party, receiver, and 911 trunk are connected (with the calling party split) and dial tone is returned to the PSAP.

3.86 For manual dial transfer, after receiving dial tone, the PSAP attendant manually dials the DN or speed calling code (*2X, *3X, or *4X) for the desired destination. The speed calling code *2X, may be used for either fixed or manual dial transfer. For selective or fixed call transfer, the PSAP equipment generates and sends the transfer code (*1X or *2X) to the E911 tandem office. The transfer code is sent no sooner than 500 milliseconds after receiving dial tone. The transfer code contains standard touch-tone digits of minimum duration (50 milliseconds on, 50 milliseconds off). Regular PSPD timing (16- to 24-seconds) is done for receipt of the transfer digits unless the E911 tandem office is in an overload condition. In this case, permanent signal timing is 10 to 15 seconds and partial dial timing is 5 to 10 seconds. After the transfer digits have been received, the calling party is unsplit and the talking connection between the calling party and the PSAP attendant is restored.

3.87 The E911 tandem office collects and interprets the digits dialed (for manual transfer) or the speed calling code (for selective, fixed, or manual transfer) and attempts to add on the destination.

(a) If a manual dial transfer, standard 3/6-digit and DN translations are performed to route the call. If speed calling is used for manual dial transfer, standard centrex translations yield the DN.

(b) If a selective transfer, the selective transfer code (*1X) yields the ETD (X=ETD=1, 2, 3, 4, 5, or 6) which is used as an index to the ESN auxiliary block (Fig. 17) to obtain the secondary PSAP DN. For selective transfer, the secondary PSAP DN is translated via the 911 DN auxiliary block (Fig. 18) and an attempt is made to complete the transfer call (add-on connection) using the RI, TCC, and TGN translations as is done to complete any 911 call to an E911 PSAP DN. Refer to paragraphs 3.72 through 3.75. Note that a secondary PSAP DN, just as the primary PSAP DN, does not have to translate to an E911 PSAP DN. A PSAP may be assigned any valid DN.

(c) If a fixed transfer, the prefixed speed calling code (*2X) typically is the code representing the centrex extension of an E911 PSAP. Secondary PSAP DNs can be part of the centrex extension range either as DTYP2 or DTYP6 entries. Refer to paragraph 3.45. Standard centrex translations yield the DN associated with the particular speed calling code. The DN may lead to another E911 PSAP or some other facility. Standard DN translations are used to route the transfer call and add on the predesignated destination.

3.88 If the transfer attempt fails, the E911 tandem office restores the 911 call connection to the original two-party call configuration. If the destination (E911 PSAP) is traffic busy and has the optional CFBL service, an attempt is made to route the transfer call to the CFBL DN obtained from the 911 DN auxiliary block. Otherwise, if the destination is busy and does not have CFBL service, if there is no answer, or if the destination is no longer desired, the PSAP attendant controlling the 911 call can release the destination by operating the **CANCEL** key on the 10A1-50 selector console. Operation of this key causes the PSAP equipment to generate and send a timed on-hook flash signal to the E911 tandem office, which interprets the flash signal as a request to disconnect the added destination. The E911 tandem office releases the destination and 3-port conference circuit and restores the initial two-party 911 call connection.

3.89 Otherwise, after the destination answers, the 3-way talking connection is established at the E911 tandem office via the 3-port conference circuit. The 3-way call is supervised for disconnect by either party and for a request from the controlling PSAP attendant to release the added party. If the added destination is an E911 PSAP, then:

(a) If the added PSAP disconnects, the initial two-party 911 connection is restored and the PSAP attendant can initiate another transfer request.

(b) If the controlling PSAP disconnects, a two-party connection is established between the calling party and the added PSAP. If the added PSAP also has transfer service, the added PSAP can also initiate a transfer for the 911 call.

Disconnect Supervision for Three-Party Connection

3.90 *Controlling PSAP Disconnects First:* Upon receipt of an on-hook signal from the controlling PSAP, the E911 tandem office begins flash timing (approximately 1.2 seconds). One of two events can occur.

(a) If the controlling PSAP returns off-hook before flash timing ends, then the signal is actually a flash signal indicating a request to release the added party. The E911 tandem office releases the added party and the 3-port conference circuit and restores the 911 call to a two-party connection between the calling party and the controlling PSAP. Supervision is maintained for disconnect and for another transfer request.

(b) If the controlling PSAP remains on-hook (beyond the flash timing period), the on-hook signal is a disconnect signal. The 3-port conference circuit and 911 trunk to the controlling PSAP are retained for the duration of the call between the added PSAP and the calling party. The call is supervised for disconnect and a transfer request (if transfer is provided) as is done for any established 911 call. The second PSAP can also transfer the 911 call to another E911 PSAP or DN.

(1) Selective transfer to other secondary PSAPs associated with the primary ESN for the calling station continues to work because the primary ESN initially obtained for the call is saved in the E911 call register (Fig. 22).

(2) A fixed transfer from the controlling secondary PSAP to another E911 PSAP or some other DN depends on the fixed transfer assignments for the controlling PSAP.

(3) For any type of transfer which terminates to another E911 PSAP with ANI display, the original ANI information (retained in the E911 call register) is sent to that PSAP destination for the transfer call. No matter how many transfers occur and no matter in what order PSAP attendants disconnect, as long as transfer is from one E911 PSAP to another E911 PSAP, the original ANI will be passed to the added E911 PSAPs having ANI display.

3.91 *Added Party Disconnects First:* Upon detection of an on-hook (disconnect) signal from the added party, the E911 tandem office begins 10- to 11-second timing. If the added party is an E911 PSAP, then after 10- to 11-second timing is done, the connection to the added party is disconnected. If an off-hook signal is received before the end of timing, the three-party connection is held. If the added party is other than an E911 PSAP, upon receipt of an on-hook signal, the E911 tandem office begins 10- to 11-second timing. One of four events can occur.

(a) If the added party returns off-hook before time-out occurs, timing is terminated and the added party remains on the three-party connection.

(b) If the controlling PSAP sends a timed on-hook flash before time-out occurs, timing is terminated and the connection to the added party and the 3-port conference circuit are released and idled. The call is reestablished as a two-party call between the calling party and the controlling PSAP.

(c) If time-out occurs, the connection for the added party and the 3-port conference circuit is released and idled. The call is reestablished as a two-party call between the calling party and the controlling PSAP.

(d) If either the calling party or the controlling PSAP disconnects before time-out occurs, the disconnecting party is immediately released. Timing continues until either time-out occurs (all connections are released and idled), or the added party goes off-hook. In this case, the call is established as a two-party call between the remaining party and the added party.

3.92 *Calling Party Disconnects First:* Upon detection of calling party disconnect, the calling party connection is released; however, the 3-port conference circuit is not released. The controlling PSAP remains connected via the 3-port conference circuit to the added party until either the added party disconnects, the controlling PSAP releases the added party, or the controlling PSAP disconnects.

F. Trunk Maintenance Test Calls

3.93 Test calls may be made to verify the dedicated E911 incoming trunks from local offices to the

E911 tandem office and to verify the dedicated E911 outgoing trunks from the E911 tandem office to E911 PSAPs. Test calls for the dedicated E911 incoming trunks are originated from the local offices. Test calls for the dedicated E911 outgoing trunks to E911 PSAPs are originated from the E911 tandem office.

Test Calls for Dedicated E911 Tandem Office Incoming Trunks

3.94 In addition to receiving 911 traffic on dedicated E911 incoming trunks, it is very desirable to be able to receive test codes. The test codes are interpreted by the E911 tandem office to connect the incoming trunk to a test appearance (e.g., milliwatt test, permanent busy, quiet termination, etc). Test codes are discussed in paragraph 3.15. The method used to detect the test code depends on the type of digit stream that is expected for the particular trunk. The two basic types of digit streams are (1) digits plus ANI, and (2) direct seizure plus ANI. Item ETST in the supplementary TGN auxiliary block (Fig. 11) specifies the type of trunk test code expected.

3.95 Assigned 3-digit test codes are used if item ETST = 1 or 2 in the trunk group option Q word (Fig. 11). Refer to paragraph 3.15. When digits plus ANI or digits only are received for a particular E911 trunk group, the call is recognized as a test call based on the received digits. The test codes are always 3-digit codes regardless of the number of digits expected for the 911 calls. Test codes are interpreted as 3-digit codes which are distinct from the digits received for 911 calls. For example, if a dedicated E911 incoming trunk group is arranged such that KP - 11 - ST is received for 911 calls, then any 3-digit code other than 11X may be used as a test code. The test code may or may not be followed by ANI, depending on the type of local office originating the call. For example, No. 5 crossbar offices always send ANI on ANI trunks even when the trunks are accessed for test calls and ANI is not required (ANI is ignored). ESS switch local offices do not send ANI when an ANI trunk is accessed for test calls. Examples of local office test call originations are as follows:

(a) For a SXS office trunk group which normally sends digits + ANI, a standard plug-in handset is plugged into the trunk test jack at the SXS office and the maintenance person dials the appropriate 3-digit test code. In this case, no ANI is sent.

(b) For No. 5 crossbar offices, tests are performed manually from the test panel. The trunk to be tested is seized from the test panel and the appropriate test code is dialed by a maintenance person. The No. 5 crossbar office automatically appends ANI following the dialed 3-digit test code.

(c) For 1/1A ESS switch local offices, trunk testing may be performed automatically via standard trunk progression testing if the dedicated E911 outgoing trunks use the SD-1A165 trunk circuits (which are loop trunks) at the local office end. For this type trunk, the 3-digit test codes may be placed in an automatic trunk test table referenced by the test table number (item TTN) in the TGN auxiliary block for the outgoing trunk group number. If the dedicated E911 outgoing trunks use the SD-1A203 or the SD-1A252 (E&M type) trunk circuits, automatic trunk progression testing is not available. These trunks are manually tested from the test panel of the local office. In either case, ANI is not sent following the 3-digit test code.

3.96 For dedicated E911 incoming trunk groups arranged for direct seizure followed by ANI, the ANI information in conjunction with the selective routing translation is used to recognize and complete test calls. For such trunk groups, item ETST = 0 and item ECD = 4 in the trunk group option Q word (Fig. 11), which also contains the ESCO for the particular trunk group. The ANI contains the encoded test code since no digits are received. The ANI and the ESCO are used to obtain the assigned ESN (as for a selectively routed 911 call) which leads to a test line rather than a PSAP. An example of a test call from a No. 1 crossbar office using encoded ANI is given as follows:

(a) An office coil in the No. 1 crossbar office is assigned either an NNX, NXX, or XXX code not used as an office code in the E911 area.

(b) Fictitious TNs may be assigned for the office coil. Each TN assigned for that coil would correspond to an ESN in the E911 tandem office. The recommended way for assigning TNs is to assign different number group digits for the No. 1 crossbar TNs so that selective routing for test calls at the E911 tandem office can be done at the number group level. For example if an office coil is assigned for test calls such that NXX = 777, then the number group digits can be assigned for different tests as indicated in Table H. Thus, there is a simple correlation between the No. 1 crossbar TN assigned and the ESN and TN assigned at the E911 tandem office for a particular test facility.

(1) For a test call from a No. 1 crossbar office, the test panel is used to manually seize the dedicated E911 outgoing trunk. Based on Table H, assume a milliwatt test is to be done. The maintenance person sets up the test panel for the desired test (milliwatt test = 777-3XXX). After the outgoing trunk is seized, the No. 1 crossbar ANI equipment identifies 777-3XXX as the ANI to be outpulsed to the E911 tandem office for that test call.

(2) The E911 tandem office receives the ANI TN (777-3XXX) and accesses the selective routing data base using the ANI TN and the ESCO. In this case, the selective routing data base yields the ESN (ESN "C") at the number group level. The ESN translator yields the TN assigned in this example for milliwatt test lines, rather than a PSAP.

Note: It is not mandatory to use a separate XXX "office" coil (which would be an under utilized office coil) at the No. 1 crossbar office. Any equivalent ANI TN to test facility TN association may be used.

3.97 For direct seizure + ANI trunks from SXS and panel offices, a portable MF transmitter is plugged into the outgoing trunk test jack and the appropriate assigned test TN must be manually keyed.

Test Calls for Dedicated E911 Outgoing Trunks to E911 PSAPs

3.98 For an E911 PSAP equipped with customer premises equipment for ANI display, test calls are made from the E911 tandem office using encoded ANI. The E911 PSAP customer premises equipment decodes the special ANI as a test call and connects the trunk under test to a test termination facility in the E911 PSAP customer premises equipment. Specifically, when KP - 8 - ST is outpulsed to the E911 PSAP, the E911 trunk under test is connected to a permanent busy circuit in the E911 PSAP customer premises equipment. This allows the E911 tandem office to verify the integrity of the trunk circuit using the trunk diagnostic program. The test call sequence is as follows:

(a) After seizing the selected idle trunk and receiving the wink start signal prior to time-out, the E911 tandem office outpulses KP - 8 - ST to the PSAP.

(b) The PSAP interprets the digit 8 as a maintenance test call and connects the incoming E911 trunk to permanent busy tone (continuous 60-ipm tone). Tone is returned to the E911 tandem office within 20 seconds after receipt of the wink start pulse; otherwise, the E911 tandem office considers the trunk test a failure.

(c) Approximately 5 seconds after receiving the 60-ipm tone, the E911 tandem office disconnects and idles the trunk under test. It is not necessary for the PSAP to do any timing for a maintenance call, but merely react to the seizure and disconnect from the E911 tandem office.

3.99 One trunk test table may be assigned in the E911 tandem office for all E911 PSAP trunk groups such that the trunk test table only contains an entry for the permanent busy test (single digit 8). This is recommended for the E911 PSAP trunk groups that are automatically tested as part of the standard 1/1A ESS switch trunk progression test.

FEATURE ASSIGNMENT

3.100 E911 service is provided on a per system basis. In an E911 service area, one 1/1A ESS switch office is designated as an E911 tandem office for all 911 calls. The E911 tandem office serves all PSAPs in the E911 service area and can provide selective routing for incoming 911 calls from other offices.

3.101 Dedicated E911 trunks are equipped in the E911 tandem office for each PSAP served. Dedicated 911 trunks are used for incoming 911 calls to the E911 tandem office from other offices. An exception for providing dedicated 911 trunks would be a local office about to be replaced as discussed in paragraph 3.03. Effectively, an E911 network is established for an E911 service area.

4. IMPLEMENTATION

DATA ASSIGNMENTS AND RECORDS

A. Installation/Addition/Deletion

4.01 Set cards applicable to the E911 feature are as follows:

- 9FE911 for optional feature package 9FE911.
- NE911 specifies the number of E911 call registers.
- 9FPIU for optional feature package 9FPIU if a PDSP is used with a 1 ESS switch for selective routing.

- PPRB specifies the number of simultaneous requests to the PDSP for E911 data.
- PPMC specifies the control data block for the PDSP.
- PPMB specifies the number of message blocks for PDSP communications.

4.02 Each PSAP must have one or more attendant positions and E911 customer premises equipment must be available or installed if ANI display, ALI display, and/or central office transfer services are to be provided. For detailed information regarding E911 customer premises equipment planning, installation, and testing, refer to Part 6 A(2) through A(4).

4.03 Dedicated E911 incoming trunks (or message network trunks) from each local office in the E911 service area must be equipped and assigned. Dedicated E911 outgoing trunks to each PSAP must be equipped and assigned. Trunk circuits for an E911 network are discussed in paragraphs 3.02 through 3.05. For detailed information regarding the SD-1A165, SD-1A163, and SD-1A237 trunk circuits, refer to Part 6 B(29). Refer to Part 6 A(23), A(24), A(47), and B(16) for recent change procedures for equipping and assigning trunks.

4.04 If a PDSP is used to store the selective routing translations, the PIU feature package 9FPIU is required in the generic program. A processor interface frame and a 3A PDSP must be available or installed. For information regarding the processor interface frame and PDSP, refer to Part 6 A(19) and A(21).

4.05 Recent change procedures for adding, changing, or deleting E911 service without a PDSP are provided in Part 6 A(25). Recent change procedures and data base generation for PDSP E911 data are provided in Part 6 A(20). Recent change messages for E911 service are listed in Table I.

TRANSLATION FORMS

4.06 Translation forms used for the E911 feature are as follows:

(a) ***ESS 1101—Directory Number Record:*** Each PSAP DN has the assigned route index, program index (PIND=3), ringing code, and terminating major class (TMAJ=3) data recorded on ESS 1101 form. The assigned route index is also entered on the ESS 1303C form.

Note: If a PSAP is provided central office transfer service, the dedicated PSAP trunk group must be a centrex tie trunk group with a screening LEN recorded on both the ESS 1101 and ESS 1208 forms. The PSAP also requires entries on the ESS 1109 form indicating CTI and CTU. The centrex tie trunk group also requires an entry on ESS 1107 form for the TDT service.

(b) ***ESS 1107A—Supplementary Information Record:*** Entries are recorded for PSAP DNs having night service and/or traffic busy forwarding. An entry is also recorded for a PSAP having central office transfer service.

(c) ***ESS 1109—Centrex Group Record:*** PSAPs with central office transfer service require entries for the CTI and CTU options. All PSAPs having such service(s) may be part of the same centrex group excluding any special dialing patterns. The access code(s) used for the selective and/or fixed transfer service options are also recorded.

(d) ***ESS 1204—Trunk Class Code Record:*** The trunk class data for the dedicated E911 incoming and outgoing trunks used for E911 service is entered on ESS 1204 form. Other standard forms used to record trunk data include the ESS 1201, ESS 1202, and ESS 1203 forms.

(e) ***ESS 1209A—Trunk Group Tandem Record:*** An entry is recorded for dedicated E911 incoming trunks.

(f) ***ESS 1216A—Trunk Group Supplementary Record:*** A type 17 entry is required for dedicated E911 incoming trunks and is optional for other trunks associated with E911. Any other trunk group that may have incoming E911 calls for which an ESCO number different from the ESCO on the ESS 1305 form is desired, must also have a type 17 entry.

(g) ***ESS 1303B1—Trunk and Service Circuit Record:*** Option number 4 is specified in this form for route index number 0112. This specifies an interrupted high tone for this RI. RI 0112 is the preferred next route index for route index number 0107.

(h) ***ESS 1303C—Trunk and Service Circuit Route Index Record:*** Entries are recorded for the dedicated E911 outgoing trunks to the PSAPs. The NXTRID, TGN, TROK, XMTYP, DEL NO, and

prefix digit entries are also recorded. If the ANI display service is provided, MF is entered for the transmitter type.

(i) ***ESS 1304—Rate and Route Chart:*** Call type 22 is entered for E911 service. Regular routing (REGL) and charging (CHG=000) are entered for the chart and column assigned for 911 calls.

(j) ***ESS 1305—Rate and Route Pattern Record:*** The ESCO number for the E911 tandem office, the call type 22, and screening codes that result in a free or intercepted call are recorded on this form.

(k) ***ESS 1313—Expanded 911 Emergency Service Central Office Record:*** Entries are made on this record to associate an ESCO with an ESN. Entries recorded include the ESCO, NPD, NXX, 1000's digit, ESN, PDSP, and default ESN data.

(l) ***ESS 1314 A/B—Expanded 911 Abbreviated Emergency Service Number Record:*** Entries on this form are required when a PDSP is not used for E911 service and an entire thousands group is not served by the same PSAP. Entries are made for each DN in the thousands group to associate each individual DN with the proper ESN.

(m) ***ESS 1315—Expanded 911 Primary Emergency Service Number Record:*** Entries are made on this form to associate a 7-digit DN with each primary ESN. All PSAP DNs defined are recorded on the ESS switch 1101 form. Entries are also made for the ANI display and selective transfer options for each ESN.

(n) ***ESS 1316—Expanded 911 Secondary Emergency Service Number Record:*** Entries are made on this form to record and assign ETD (emergency transfer digits) for secondary PSAPs. Each primary PSAP DN with selective transfer can have up to six secondary PSAP DNs associated.

(o) ***ESS 1500D—Office Option Record:*** The maximum number of simultaneous intraoffice 911 call originations allowed for the E911 tandem office is entered on this form.

RECENT CHANGES

4.07 Standard recent change messages are used for E911 service to build the translations required for the trunks, trunk class codes, chart column, RI expansion, rate and route pattern, and DN translations. No new messages are required for these standard types of recent changes. Unique RC messages are used for the E911 feature to build data for the ESCO translator, DN-to-ESN translator, and ESN translator. RC messages for E911 service are listed in Table I.

4.08 The ESN expansion for a 1A ESS switch with 1AE6 and later generic programs uses two new keywords (ESNLM and THGRP) for RC:TNESN. ESNLM is used to specify the ESN limit per number group. See Table G. THGRP specifies the office code and thousands group (number group) for which the ESN limit is to be increased. For detailed RC procedures, refer to Part 6 A(51).

4.09 Detailed RC procedures for E911 service using a 1 ESS switch are given in Part 6 A(25). Detailed RC procedures for E911 service using a 1A ESS switch are given in Part 6 A(32) and A(51). Detailed RC procedures and data base generation for E911 selective routing translations stored in a PDSP are given in Part 6 A(20). The RC procedures for the RC messages listed in Table I are described in Part 6 A(23) through A(36) and A(47) through A(53).

Testing

4.10 No special tests are used to verify that the E911 feature, per se, has been properly assigned. Recent change messages used to enter the various translation data are verified using the appropriate input messages as specified in the RC procedures referenced in Part 6A.

4.11 For E911 trunks, trunk maintenance test calls can be made to verify the dedicated E911 incoming and outgoing trunks as discussed in paragraphs 3.93 through 3.99.

4.12 After installation is complete, 911 calls can be made to assure proper routing to the various PSAPs and to verify optional PSAP services provided.

Other Planning Topics

4.13 The planning required for 911 service depends on the type of 911 service, B911 or E911, and the options required or desired by the 911 customer. General considerations for 911 service are discussed in paragraphs 2.27 through 2.52.

4.14 Special planning is required for the E911 feature since a DMS must be used to build and maintain

the selective routing data base. The initial planning also includes consideration of the type of E911 tandem office arrangement to utilize. Telephone company considerations for the E911 network, DMS, and PDSP are discussed in paragraphs 2.81 through 2.96. Developing the DMS data base can require an extensive amount of effort and time. Therefore, the DMS should be considered a long lead-time item. E911 customer premises equipment and the PDSP should also be considered long lead-time items if they are to be provided.

4.15 Close coordination and cooperation are necessary between the telephone company and the E911 customer to establish and provide the services required for an E911 customer.

4.16 Customer training may be required for the use of the customer premises equipment and for attendant call handling.

4.17 The type of trunks to utilize from local offices to the E911 tandem office requires careful planning and close coordination to develop the desired E911 network. The types of trunks to utilize depends on each particular type of local office in the E911 service area and whether or not selective routing is to be provided.

4.18 If the E911 tandem office otherwise serves as a local office only, it is likely that the tandem reorder tone or announcement (fixed RI 184) is not assigned. For the E911 feature, fixed RI 184 should be assigned to an appropriate tone or announcement trunk group since incoming 911 calls to a busy PSAP without alternate routing will route to fixed RI 184.

4.19 Interrupted high-tone should be available for the E911 feature. Fixed RI 112 must route to a trunk group to the ringing and tone plant which supplies interrupted high-tone. Two or three trunks should be sufficient for this trunk group.

4.20 The PSAP E911 customer premises equipment provides for two E911 trunk circuits on one circuit board. Thus, if a circuit board fails, two dedicated E911 PSAP trunks may fail. If a trunk member fails, the E911 tandem office tries the call again using the next trunk member number. Therefore, the dedicated E911 PSAP trunk members should not be assigned consecutively.

4.21 At the E911 tandem office, 911 calls from facilities outside the E911 service area (for example, FX lines) may be routed to an announcement, a regular station, or other desired termination. This can be accomplished by assigning an ESN in the selective routing translations (for all such FX lines). The ESN leads to a DN with an RI which routes to an announcement, station set, B911 PSAP, E911 PSAP, or other types of terminating facilities desired for such 911 calls.

4.22 Chart column screening can be used for local offices to restrict those lines which are not in the E911 service area, but which are served by a local office that is part of the E911 network. 911 calls from such restricted lines may be routed by the local office to an announcement, overflow tone, or intercept.

5. ADMINISTRATION

MEASUREMENTS

5.01 Standard trunk group measurements are available for trunks used for E911 service. Traffic and error counts are made for E911 trunks. Peg and usage counts are compiled for each dedicated E911 incoming trunk group on a per trunk group basis. Peg, usage, and overflow counts are compiled for each dedicated E911 outgoing trunk group on a per trunk group basis.

5.02 Office counts, available on the hourly H and C schedules and selected quarter hour DA15 and the S1, S2, S3 schedules, are compiled for the following types of ANI failures on dedicated E911 incoming trunks. The type measurement code for these measurements is 005.

(a) *Office Count 429—911 ANI Failure Digit Peg Count:* This count equals the number of times the ANI information digit is received indicating an ANI failure.

(b) *Office Count 430—911 ANI Time-Out Peg Count:* This count equals the number of times an 8-second time-out occurs prior to the reception of complete ANI information.

(c) *Office Count 431—911 ANI Format Failure Peg Count:* This count equals the number of times the received ANI information does not satisfy ANI format requirements.

(d) *Office Count 498—E911 Intraoffice Overflow:* This count is incremented by one each time an E911 tandem office locally originated 911

call cannot be completed because the number of such calls exceeds the E911 intraoffice call limit as specified in the office options table.

(e) *Office Count 499—E911 Intraoffice Peg Count:*—This count is incremented by one each time a 911 call is originated locally at the E911 tandem office.

5.03 E911 traffic and error information is available via TTY output messages. The EN01 and EN02 output messages provide E911 error information. The EN03 output message provides E911 traffic information. These output messages may be selectively turned on or off from the maintenance TTY. Input and output messages are discussed in paragraphs 2.51 through 2.65. For detailed information concerning input and output messages, refer to Part 6 B(19) through B(22). Detailed information for traffic counts is provided in Part 6 B(23).

AUTOMATIC MESSAGE ACCOUNTING

5.04 With E911 service, a 911 call originated within the 911 service area is established without charge to the originating line, both coin and noncoin.

5.05 For central office transfer, standard billing to the PSAP billing TN is done for any E911 transfer call to the DDD network.

USOC (UNIFORM SERVICE ORDER CODES)

5.06 The E911 tariff contains two major groups of rate elements which are:

(a) The five service offerings

(b) The PSAP terminal equipment.

Table J lists the USOC codes for the service offerings. Table K lists the USOC codes for the PSAP terminal equipment. For tariff and pricing guidelines, refer to Part 6 B(13).

5.07 The E911 service offerings are available under a "network access" tariff structure with rates applicable per thousand main and equivalent main telephones within the E911 exchange area. Table L is a matrix providing a check list of the components used in developing the rate structure for the E911 service offerings.

6. SUPPLEMENTARY INFORMATION

GLOSSARY

Attendant—A person, situated at a position (usually a console) on a customer's premises, who serves customer calls.

Attendant position—The equipment, usually a console from which calls requiring assistance can be answered and completed by the attendant.

CIL (Call indicator lamp)—An attendant console may be equipped with one or more CILs. A CIL is used to indicate to the attendant the nature or source of an attendant call. CILs may be optionally assigned according to customer requirements.

DMS (Data Management System)—The DMS is a system of manual procedures and computer programs used to create, store, and update the data required for selective routing.

Default routing—Default routing is provided when a 911 call cannot be selectively routed due to an ANI failure, garbled digits, or other causes which may prevent selective routing. Such 911 calls are routed to a default PSAP. Each E911 incoming trunk group is associated with a default PSAP.

ESN (Emergency Service Number)—The emergency service number is a number that defines the set of emergency services (e.g., police, fire, hospital) within a particular district or zone. An ESN is associated with a primary PSAP and possibly one or more secondary PSAPs.

Fixed transfer—Fixed transfer is an optional transfer service which enables a PSAP attendant to transfer a 911 call to a particular secondary PSAP by operating the button assigned on the 10A1-50 selector console for that particular secondary PSAP.

Forced disconnect—Forced disconnect is a standard service with the 911 feature which allows a PSAP attendant to release a 911 call even though the calling party has not hung up. This service is provided to prevent dedicated 911 PSAP trunks from being tied up.

FCLD (flash calling line display)—The FCLD is an optional arrangement for an ESN that will cause the ANI display to be flashed to indicate to the attendant

that special attention (additional handling) may be required for the 911 call.

Incoming trunk—A trunk facility which is used to receive incoming calls from another switching location.

Municipality—A municipality is primarily an urban political unit having corporate or other recognized status with the power of self-government. As used within this document, a municipality may be a town, city, county, or any other recognized community, area, or district having certain governmental powers and authority.

Number group—A number group is a group of one thousand telephone numbers available in an office. The term "number group" is synonymous with the term "thousand group".

NPA (numbering plan area)—The NPA is the established area code for a particular area.

NPD (numbering plan digit)—The NPD (value from 0 to 3) specifies the NPA or area code. If nonzero, it is also the first digit displayed on the ANI display when provided.

Outgoing trunk—A trunk facility which is used to complete outgoing calls to another location or facility.

PSAP (public safety answering point)—A PSAP is an agency or facility designated by a municipality to receive and handle emergency 911 calls. A PSAP may be designated as primary or secondary, which refers to the order in which calls are directed for answer. Primary PSAPs receive 911 calls first; secondary PSAPs receive calls on a transfer basis only. PSAPs have also been generally referred to as ESBs (emergency service bureaus).

Selective routing—Selective routing ensures that a 911 call is routed to the correct primary PSAP which is designated to serve the calling station location. Selective routing is done at the E911 tandem office based on the DN of the calling station. Selective routing may be provided on a per office code, per number group, or per complete 7-digit DN basis.

Selective transfer—Selective transfer is an optional transfer service which allows a PSAP attendant to transfer a 911 call to the correct secondary PSAP by operating the button assigned on the 10A1-50 selector console for the particular type of secondary PSAP desired. The E911 tandem office selectively transfers the call to the correct secondary PSAP assigned for the calling station.

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(2) TOP (Task Oriented Practice) 533-400-001—E911 System Answering Point—Installation, Test, and Trouble Locating Procedures

(3) 533-400-101—E911 System Answering Point—System Description Customer Premises System

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(5) 254-300-100—3A Processor Description—Common Systems

(6) 254-300-110—3A Central Control (3A CC) Description—Common Systems

(7) 254-300-120—3A Central Control (3A CC) Theory of Operation—Common Systems

(8) 254-300-130—I/O Interfaces—Common Systems

(9) 254-300-150—Main Store and Supplementary Store Description and Theory of Operation—Common Systems

(10) 254-300-170—Tape Data Controller Description and Theory of Operation—Common Systems

(11) 254-300-200—Programmed Magnetic Tape System Description and Theory of Operation—Common Systems

(12) 231-144-005—Processor Interface Frame Description for Peripheral Data Storage Processor (PDSP)

(13) 231-144-101—Peripheral Data Storage Processor (PDSP) Initialization Description

(14) 231-144-103—Processor Interface Unit Software

(15) 231-144-301—System Initialization and Recovery Procedures—Peripheral Data Storage Processor (PDSP)

(16) 231-144-303—Data Base Reallocation Procedures—Peripheral Data Storage Processor (PDSP)

(17) 231-144-304—Updating Generic Program—Peripheral Data Storage Processor (PDSP)

(18) 231-144-305—Tape Data Facility Operating Procedures—Peripheral Data Storage Processor (PDSP)

(19) 231-144-306—System Growth Procedures—Peripheral Data Storage Processor (PDSP)

(20) 231-144-360—Recent Change Procedures and Data Base Generation for E911—Peripheral Data Storage Processor (PDSP) and Data Base Description

(21) 231-190-136—Feature Document —Interface With the Peripheral Data Storage Processor Feature

(22) 231-090-079—Feature Document—Call Transfer Features

(23) 231-118-323—Trunk Translation Recent Change Procedures for TG, TGBVT, TRK, and CFTRK, and TGMEM (CTX-6 Through 1E5 Generic Programs)

(24) 231-318-303—Trunk Translation Recent Change Procedures for TG, TGBVT, TRK, CFTRK, and TGMEM (Through 1AE5 Generic Program)

(25) 231-118-342—Recent Change Procedures for Expanded 911 (E911) Service, 1E5 Generic Program

(26) 231-118-324—Rate and Route Translation Recent Change Procedures for NOCNOG, DNHT, NOGRAC, RATPAT, DIGTRN, TOLDIG, CCOL, RI, CHRGX, DITABS, TNDM, IDDD, and TDXD (CTX-6 Through 1E5 Generic Programs)

(27) 231-118-325—RC Procedures for PSWD, GENT, PSBLK, SUBTRAN, (CTX-6 Through 1E5 Generic Programs)

(28) 231-318-304—Rate and Route Translation Recent Change Procedures for NOCNOG, DNHT, NOGRAC, RATPAT, DIGTRN, TOLDIG, CCOL, RI, CHRGX, DITABS, TNDM, IDDD, and TDXD (Through 1AE5 Generic Program)

(29) 231-318-305—RC Procedures for PSWD, PSBLK, SUBTRAN, and GENT (Through 1AE5 Generic Program)

(30) 231-118-321—General Recent Change Information (CTX-6 Through 1E5 Generic Programs)

(31) 231-318-301—General Recent Change Information and Rollback Procedures

(32) 231-318-308—RC Procedures for DALNK, DAMBI, DAMSK, DATER, ESCO, ESN, and TNESN (Through 1AE5 Generic Program)

(33) 231-118-335—Line Recent Change Procedures for LINE, TWOPTY, MPTY, SCLIST, MLHG, ACT, and CFV—CTX-7, CTX-8, 1E4, and 1E5 Generic Programs

(34) 231-318-302—Line Recent Change Procedures for LINE, TWOPTY, MPTY, SCLIST, MLHG, ACT, and CFV (Through 1AE5 Generic Program)

(35) 231-118-331—Centrex/CO ESSX-1 Recent Change Procedures for CTXCB, CTXDI, CTXEXR, CXDICH, DITABS, DLG, FLXDG, FLXRD, and FLXRS (CTX-6 Through 1E5 Generic Programs)

(36) 231-318-309—Centrex CO Recent Change Procedures for CTXCB, CTXCI, CTXEXR, CXDICH, DITABS, DLG, FLXDG, FLXRD, and FLXRS (Through 1AE5 Generic Programs)

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(43) 255-500-101—Data Management System (DMS) and Automatic Location Identification (ALI) System Used With Enhanced 911 (E911), DMS/ALI Computer Operating Procedures

(44) 255-500-102—Data Management System (DMS) and Automatic Location Identification (ALI) System Used With Enhanced 911 (E911), DMS Operating Procedures

(45) 255-500-103—Data Management System (DMS) and Automatic Location Identification (ALI) System Used With Enhanced 911 (E911), ALI Operating Procedures

(46) 255-500-104—Data Management System (DMS) and Automatic Location Identification (ALI) System Used With Enhanced 911 (E911), DMS/ALI Acceptance Tests

(47) 231-048-303—Trunk Translation Recent Change Formats for TG, TGBVT, TRK, CFTRK, TGMEM, CCIS, and TKCONV (1E6 and 1AE6 Generic Programs)

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(49) 231-048-305—RC Formats for PSWD, PSBLK, SUBTRAN and GENT (1E6 and 1AE6 Generic Programs)

(50) 231-048-307—Traffic Measurement Recent Change Formats for DIGTRN, TRFSLB, TRFLCU, TRFHC, TNCTX, CTRF, and NUTS (1E6 and 1AE6 Generic Programs)

(51) 231-048-308—RC Formats for AC, ACTABL, CUSTCB, DALNK, DAMBI, DAMSK, DATER, ESCO, ESN, SAC, TCM and TNESN (1E6 and 1AE6 Generic Programs)

(52) 231-048-309—Centrex-CO/ESSX-1 Recent Change Formats for CTXCB, CTXDI, CTXEXR, CXDICH, DITABS, DLG, FLXDG, FLXRD, and FLXRS (1E6 and 1AE6 Generic Programs)

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(55) 231-390-385—E911 Bulk Recent Change Capability—Feature Document

(56) 231-302-301—E911 Bulk Recent Change Capability—Implementation and Maintenance Procedures.

B. Other Documentation

(1) GL 73-04-203—Office of Telecommunications (OTP) National Policy for Emergency Telephone Number 911

(2) GL 73-05-121—Rate Considerations Involved In Providing Basic 911 Service

(3) GL 73-09-013—1 ESS Switch—Development of New Features for Universal Emergency Service Number 911

(4) GL 73-10-060—911 Emergency Service Recommended Rate Treatment of the 911 Emergency Service Trunk

(5) GL 74-04-149—1 ESS Switch—Development of New Features for Universal Emergency Service Number 911

(6) GL 74-12-121—911 Emergency Service—Additional Information on 911 CO Equipment Including No. 2 ESS Switch and Crossbar Tandem

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(8) GL 76-03-292—Marketing of 911 Emergency Service

(9) GL 76-09-034—Rate & Tariff Guidelines for the 8A Key Telephone System for Use With Basic 911 Service

(10) GL 77-07-045—Operating Instruction Manual for 8A Key Attendant's Position

(11) GL 77-09-023—Illustrative Tariff for Universal Emergency Number Service (Basic 911)

(12) GL 77-09-171—Expanded 911 Emergency Service—System Description

(13) SL 79-10-344—E911 (Enhanced 911) Service—Tariff and Pricing Guidelines

(14) GL 77-11-200—Detailed Information on Conversion of Traffic Facilities Practices and Dial Facilities Practices to the Bell System Practices Series

(15) GL 78-03-243—1/1A ESS Switch—Traffic Counts on 3-Ports

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(17) IL 80-04-346—Network Trunk Forecasting and Servicing Guidelines for E911 (Enhanced 911) Service

(18) IL 80-08-367—E911 Network Planning Guidelines

(19) Output Message Manual OM-1A001

(20) Output Message Manual OM-6A001

(21) Input Message Manual IM-1A001

(22) Input Message Manual IM-6A001

(23) Translation Guide TG-1A

(24) Translation Output Configuration PA-591003

(25) Translation Output Configuration PA-6A002

(26) Office Parameter Specification PA-591001

(27) Office Parameter Specification PA-6A001

(28) Parameter Guide PG-1

(29) Trunk and Service Circuit Engineering Specification J1A063A-1

(30) Parameter Guide PG-1A

(31) NPA-03510-02—Automatic Location Identification/Data Management System User Manual

(32) NPA-03510-03—Data Management System Administrative Reference Manual

(33) NPO-03510-01—Data Management System Operations Manual.

7. COMMENT FORM

7.01 A comment form is located at the back of this practice to provide a communications channel from the user to the writer.

8. ISSUING ORGANIZATION

Published by
The AT&T Documentation Management Organization

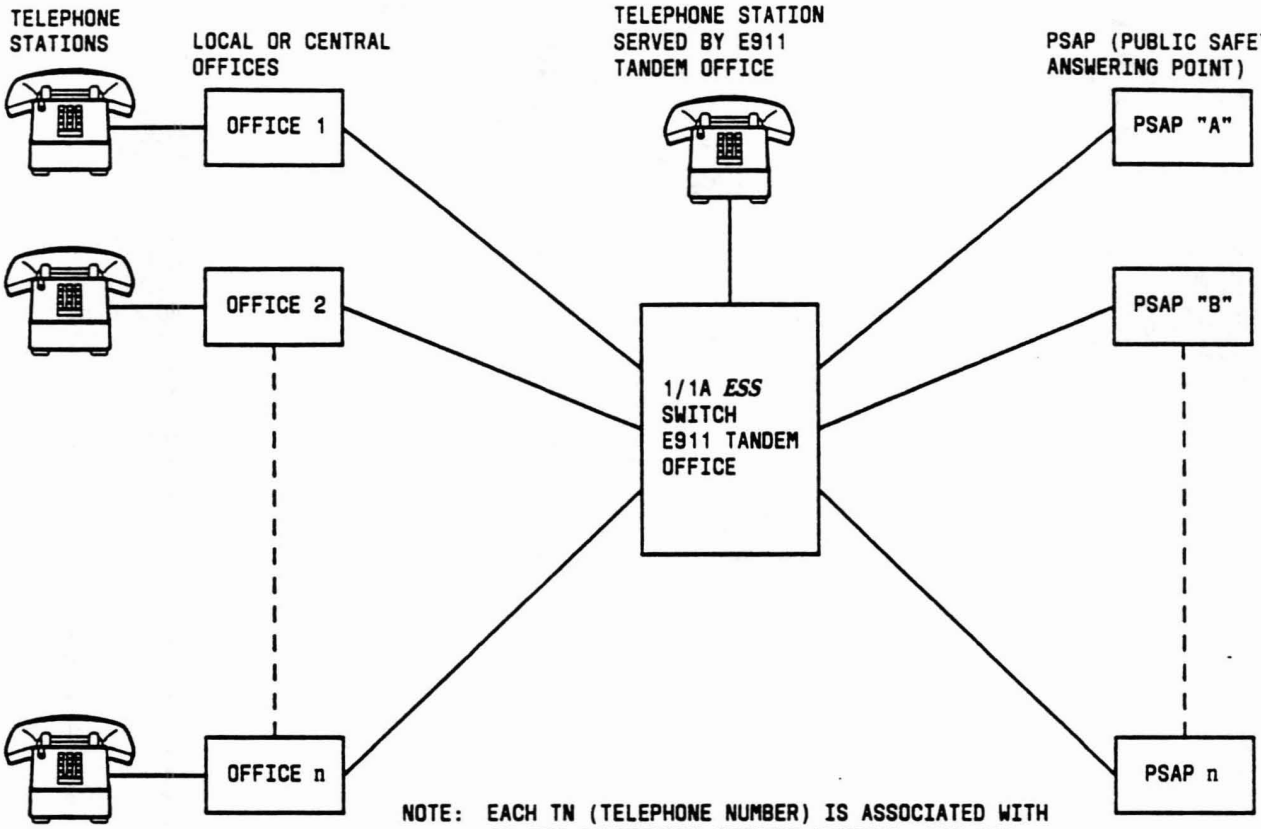


Figure 1—E911 Network Diagram

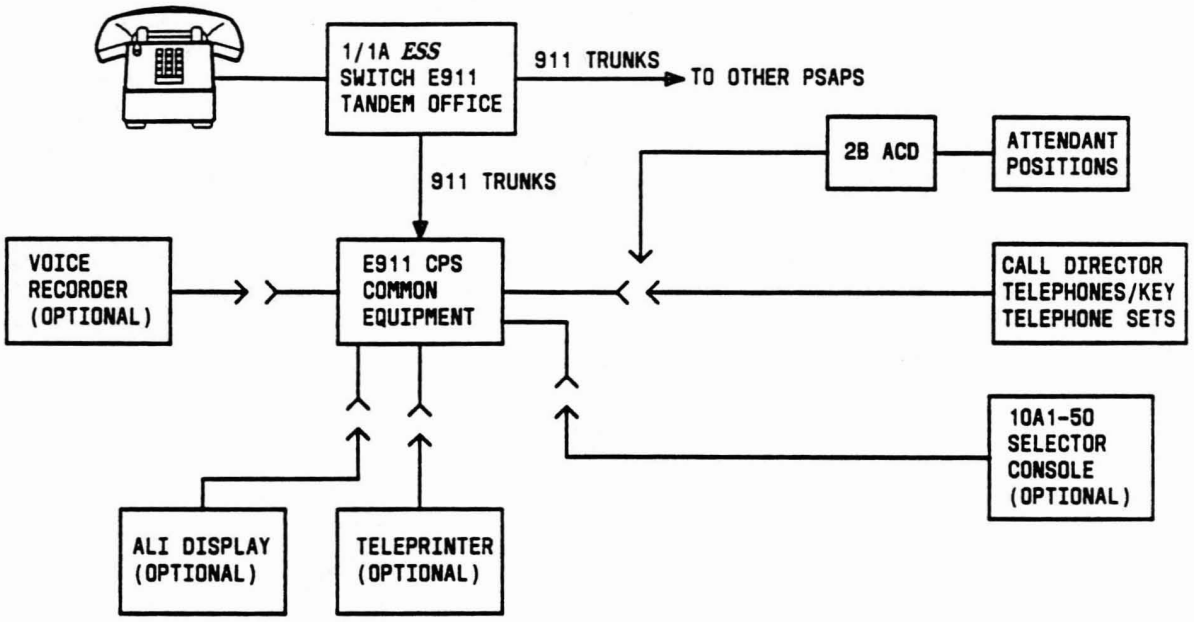


Figure 2—E911 Customer Premises System Interfaces

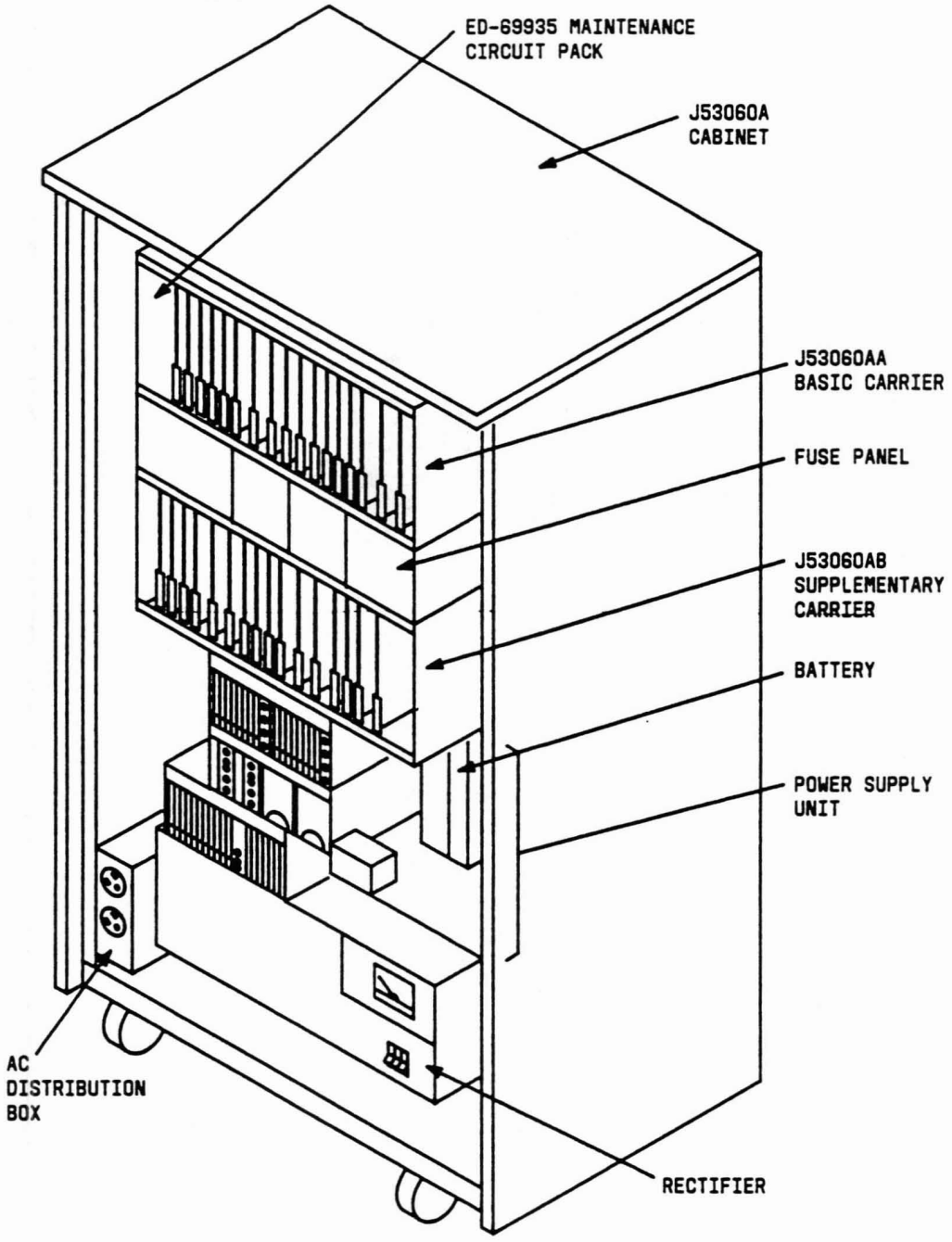


Figure 3—J53060A Equipment Cabinet

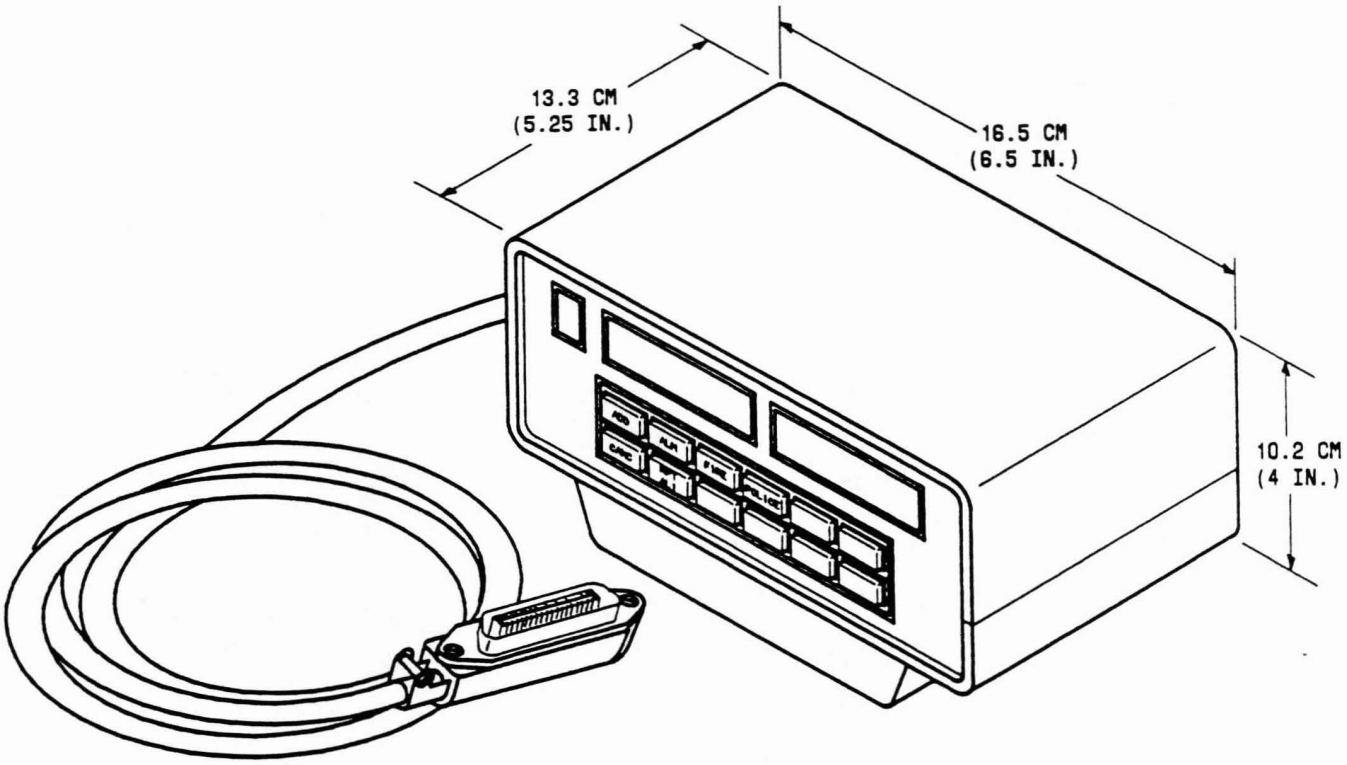
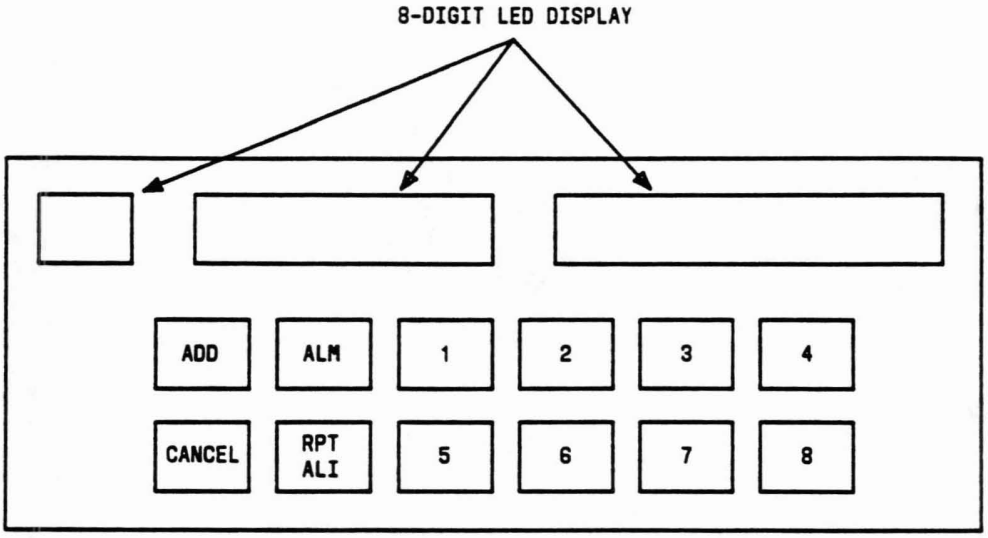


Figure 4—10A1-50 Selector Console



KEY DESIGNATIONS/USES

ADD – USED TO REQUEST DIAL TONE FOR A MANUALLY DIALED TRANSFER USING TOUCH-TONE KEYS

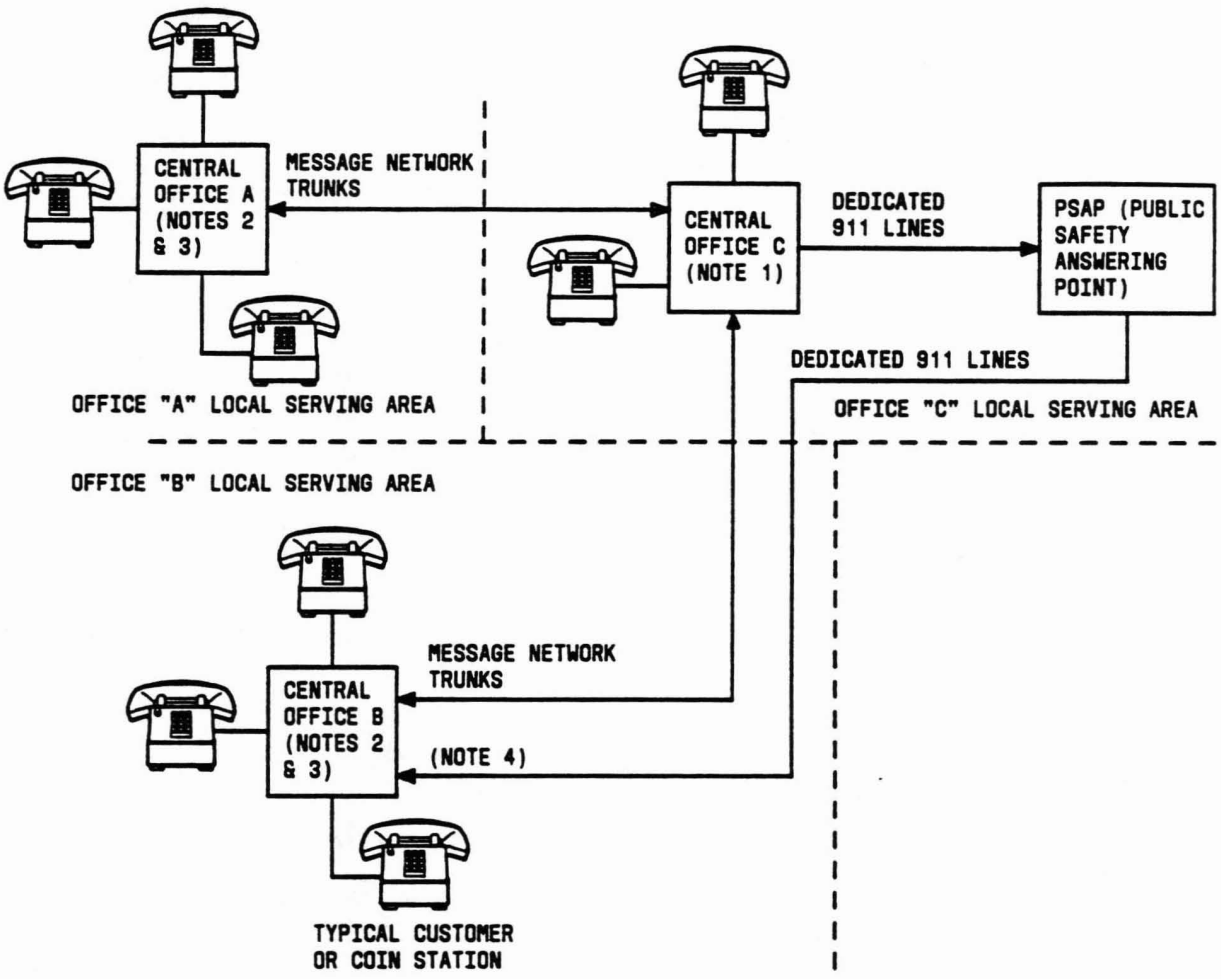
CANCEL – USED TO CANCEL A TRANSFER CALL

ALM – USED TO RETIRE (TURN OFF) AN AUDIBLE ALARM WHICH SOUNDS WHEN CERTAIN E911 CPS TROUBLE CONDITIONS OCCUR.

TRANSFER KEYS – THE EIGHT TRANSFER KEYS (SHOWN BY DIGITS 1 THROUGH 8) ARE ACTUALLY PLACARDED ACCORDING TO USE. FOR EXAMPLE, SELECTIVE TRANSFER KEYS ARE PLACARDED ACCORDING TO THE TYPE OF AGENCY (i.e. FIRE OR POLICE). FIXED TRANSFER KEYS ARE PLACARDED ACCORDING TO THE SPECIFIC AGENCY (i.e. FIRE A, FIRE B, POLICE A). ANY OF THE EIGHT TRANSFER KEYS MAY BE ASSIGNED AS EITHER SELECTIVE OR FIXED TRANSFER KEYS.

RPT ALI – THE REPEAT AUTOMATIC LOCATION IDENTIFICATION KEY IS USED TO REGENERATE A REQUEST FOR ALI INFORMATION.

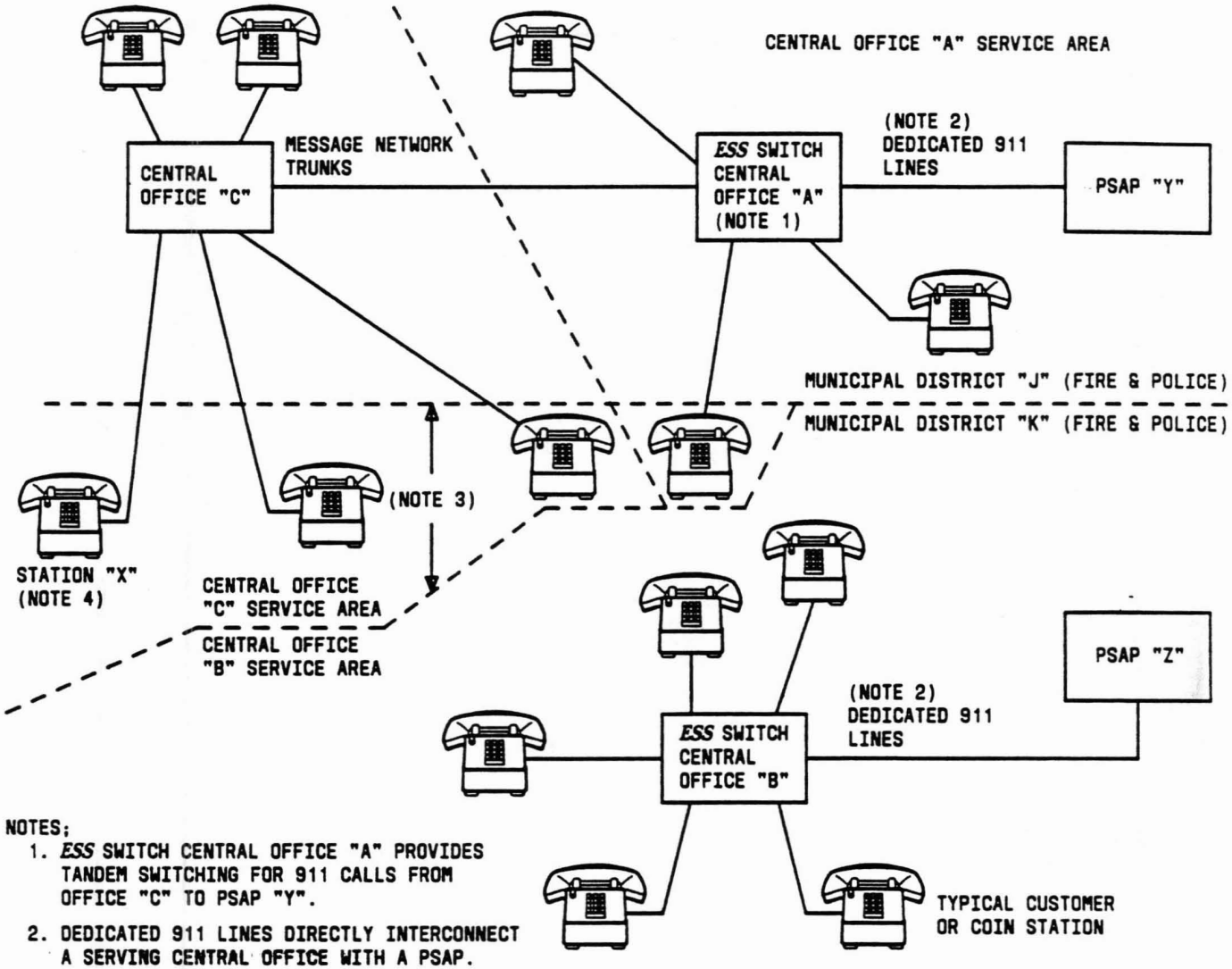
Figure 5—10A1-50 Selector Console Display and Key Arrangement



NOTES:

1. CENTRAL OFFICE "C" MAY PROVIDE BASIC 911 EMERGENCY SERVICE FOR OFFICE "C" CUSTOMERS AND MAY ALSO SERVE AS A TANDEM SWITCHING CENTER FOR OTHER CENTRAL OFFICES PROVIDING 911 SERVICE WITHOUT DIRECT LINES TRUNKS TO THE PSAP.
2. CENTRAL OFFICES "A" AND "B" MAY PROVIDE BASIC 911 EMERGENCY SERVICE FOR THEIR CUSTOMERS BY EITHER PROVIDING DIRECT (DEDICATED) 911 LINES TO THE PSAP OR VIA MESSAGE NETWORK TRUNKS TO AN OFFICE PROVIDING TANDEM SWITCHING TO THE PSAP.
3. IF TANDEM SWITCHING IS PROVIDED FOR BASIC 911 PSAP ACCESS, CALLED PARTY HOLD, SWITCHHOOK STATUS AND EMERGENCY RINGBACK FEATURES CANNOT BE PROVIDED THE PSAP FOR THOSE CUSTOMERS SERVED BY TANDEM CONNECTIONS. THESE FEATURES CAN ONLY BE PROVIDED USING DIRECT (DEDICATED) 911 LINES.
4. CENTRAL OFFICE "B" MAY COMPLETE 911 CALLS VIA EITHER MESSAGE NETWORK TRUNKS OR DEDICATED 911 LINES (BUT NOT BOTH). THE TWO FACILITIES ARE SHOWN FOR COMPARISON ONLY.

Figure 6—Basic 911 Service



NOTES;

1. *ESS* SWITCH CENTRAL OFFICE "A" PROVIDES TANDEM SWITCHING FOR 911 CALLS FROM OFFICE "C" TO PSAP "Y".
2. DEDICATED 911 LINES DIRECTLY INTERCONNECT A SERVING CENTRAL OFFICE WITH A PSAP.
3. MUNICIPAL BOUNDARIES AND CENTRAL OFFICE SERVICE AREAS DO NOT NECESSARILY COINCIDE. ALL 911 CALLS FROM OFFICE "A" & "C" ARE ROUTED TO PSAP "Y".
4. 911 CALLS FROM STATIONS LOCATED IN AN AREA WITH BOUNDARY MISMATCHES WILL NOT BE ROUTED TO THE CORRECT PSAP. FOR EXAMPLE, A 911 CALL FROM STATION "X" WILL BE ROUTED TO PSAP "Y"; HOWEVER, STATION "X" IS LOCATED IN DISTRICT "K", WHICH IS SERVED BY PSAP "Z". A METHOD OF HANDLING SUCH 911 CALLS SHOULD BE ESTABLISHED.

Figure 7—911 Emergency Service Boundary Considerations

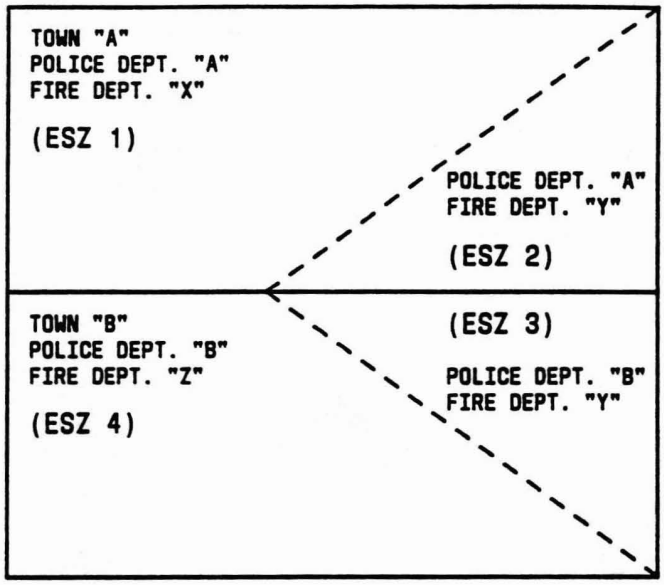
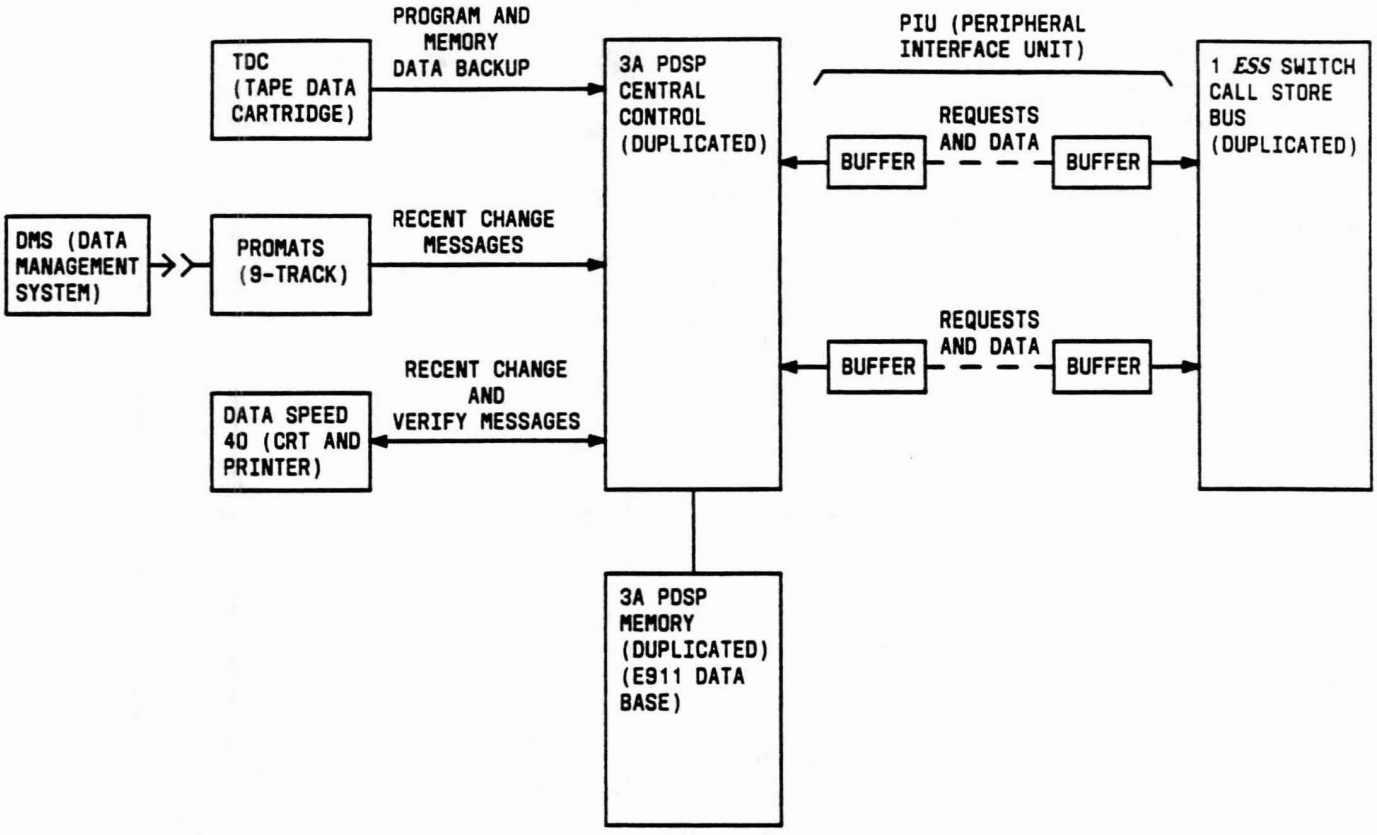
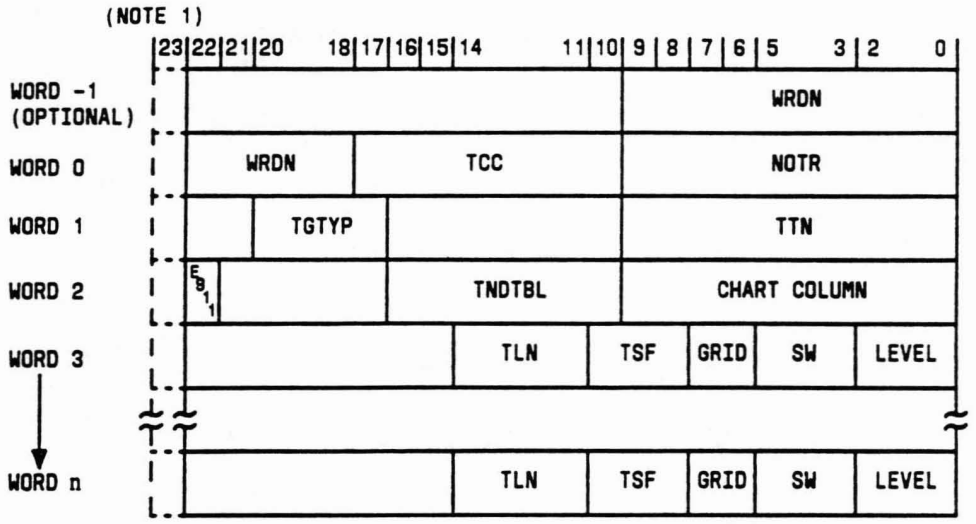


Figure 8—Emergency Service Zones



Note: The 3A data link capability is not used for E911 Service.

Figure 9—3A PDSP Interfaces

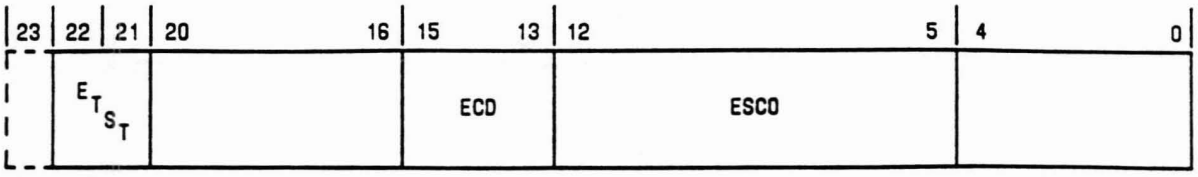


NOTES:

1. BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.
2. THE LIST OF 2-WAY TRUNK NETWORK NUMBERS (WORDS 3 THROUGH n) WILL NOT EXIST IF ITEM E911 = 1 IN WORD 2.

WORD −1	WRDN	– NUMBER OF WORDS IN THE AUXILIARY BLOCK. THIS WORD AND FIELD EXIST ONLY WHEN THE NUMBER OF WORDS IN THE AUXILIARY BLOCK IS GREATER THAN 31.
WORD 0	WRDN	– NUMBER OF WORDS IN THE AUXILIARY BLOCK (IF LESS THAN 32).
	TCC	– TRUNK CLASS CODE
	NOTR	– NUMBER OF TRUNKS IN THE TRUNK GROUP
WORD 1	TGTYP	– TRUNK GROUP TYPE = 15 (FOR INCOMING TANDEM TRUNKS)
	TTN	– TEST TABLE NUMBER (WHEN FURNISHED FOR THE TRUNK GROUP)
WORD 2	E911	– IF A DEDICATED E911 TRUNK GROUP, E911 = 1; OTHERWISE, E911 = 0 FOR LOCAL TANDEM INCOMING TRUNK GROUP.
	TNDTBL	– TANDEM TABLE NUMBER
WORDS 3 THROUGH n (NOTE 2)	TLN	– TRUNK LINK NETWORK
	TSF	– TRUNK SWITCH FRAME
	GRID	– TRUNK SWITCH FRAME GRID
	SW	– TRUNK SWITCH FRAME SWITCH
	LEVEL	– TRUNK SWITCH FRAME LEVEL

Figure 10—TGN Auxiliary Block for Local Tandem and Dedicated E911 Incoming Trunks



NOTE: BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.

ETST – E911 TRUNK TEST CODE
0 = NO TEST CODES
1 = TEST CODE NOT FOLLOWED BY ANI
2 = TEST CODE ACCOMPANIED BY ANI
3 = UNASSIGNED

ECD – EMERGENCY CALL DIGITS
0 = UNASSIGNABLE
1 = DIGIT "1" FOLLOWED BY ANI
2 = DIGITS "11" FOLLOWED BY ANI
3 = DIGITS "911" FOLLOWED BY ANI
4 = ANI ONLY
5 = NO DIGITS AND NO ANI (I.E., MANUAL SEIZURE)
6-7 = UNASSIGNED

ESCO – EMERGENCY SERVICE CENTRAL OFFICE

Figure 11—Supplementary TGN Auxiliary Block Option Word Q

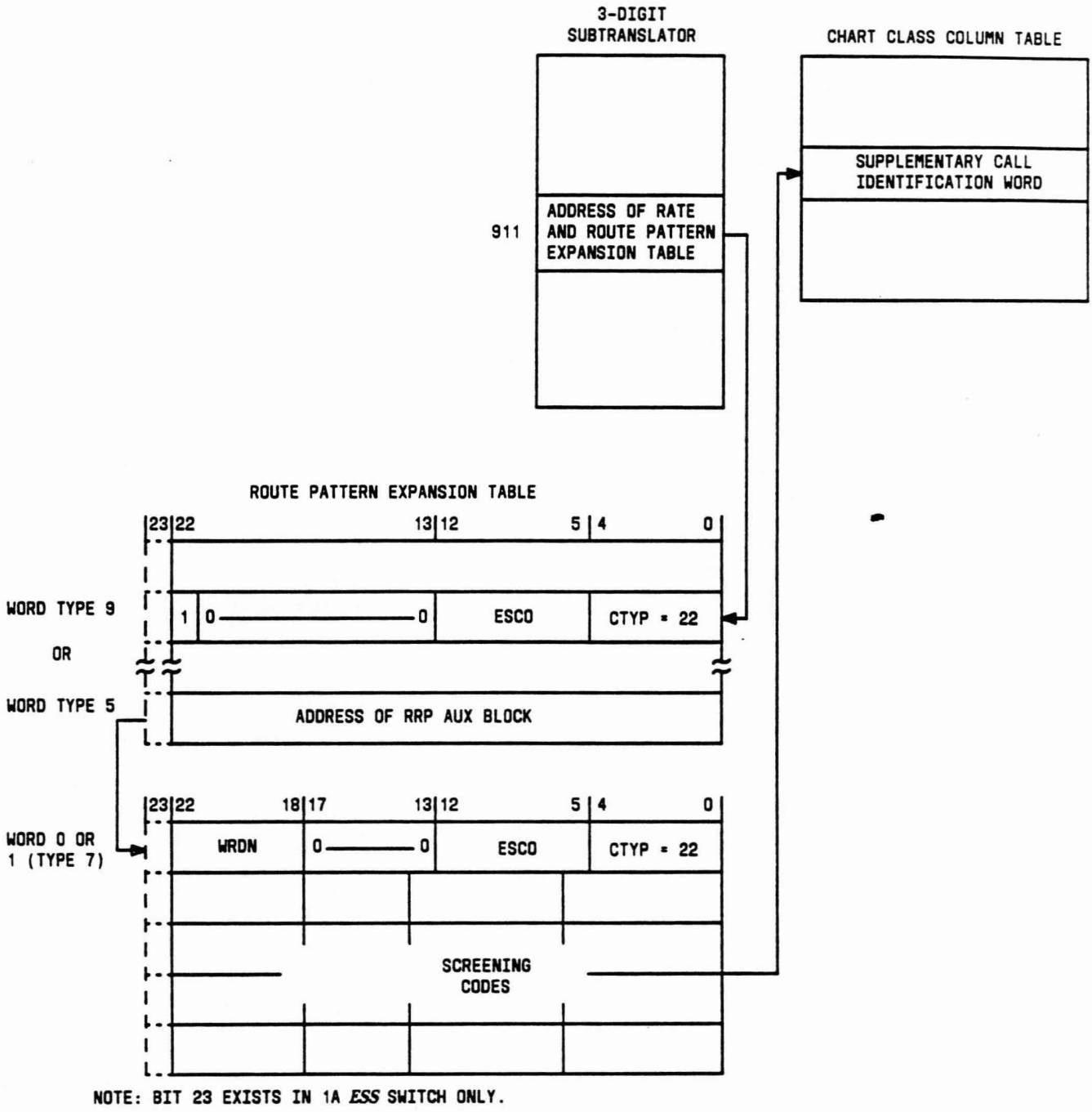
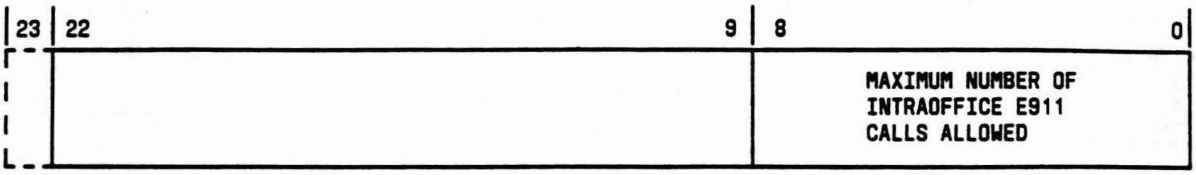
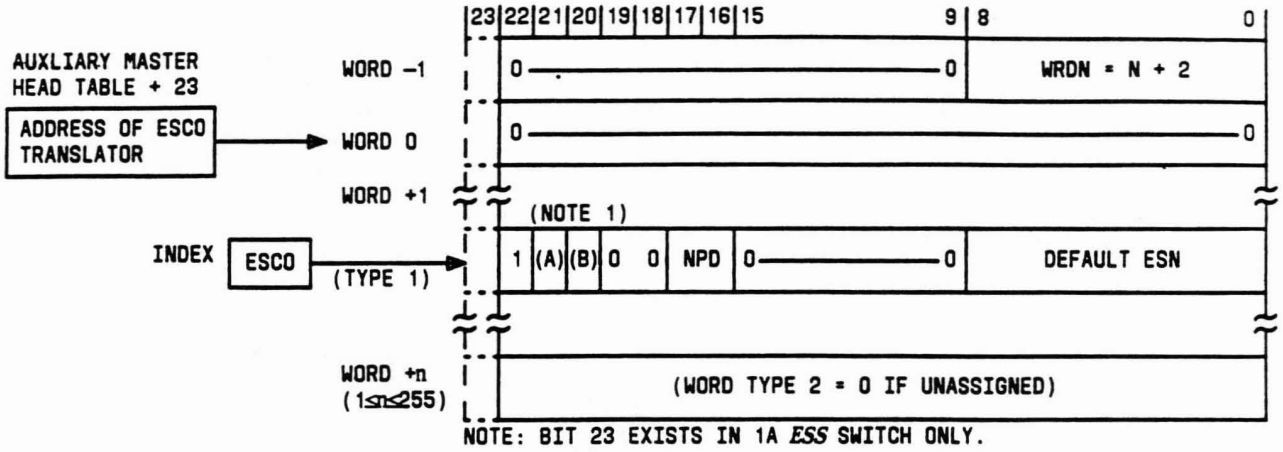


Figure 12—E911 Tandem Office 3-Digit Translation for 911



NOTE: BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.

Figure 13—E911 Intraoffice Choke Mechanism (Office Option Table Word 2)



NOTES:
1. (A) EQUALS EPDSP ITEM.
   (B) EQUALS ENO1 ITEM.
2. FCLD DATA IS CONTAINED IN THE ESN TRANSLATOR.

WORD −1 WRDN – NUMBER OF WORDS IN THE TRANSLATOR WHERE 1≤N≤255.

WORD 0 – WORD 0 IS ALWAYS BUILT AS ALL ZEROS.

WORD 1 THROUGH WORD n EPDSP – EMERGENCY PERIPHERAL DATA STORAGE PROCESSOR ITEM IS SET (=1) IF A PDSP IS USED FOR TN-TO-ESN TRANSLATIONS.

(TYPE 1) ENO1 – WHEN SET, ENO1 INDICATES FURTHER TRANSLATIONS ARE STORED IN THE 1 *ESS* SWITCH.

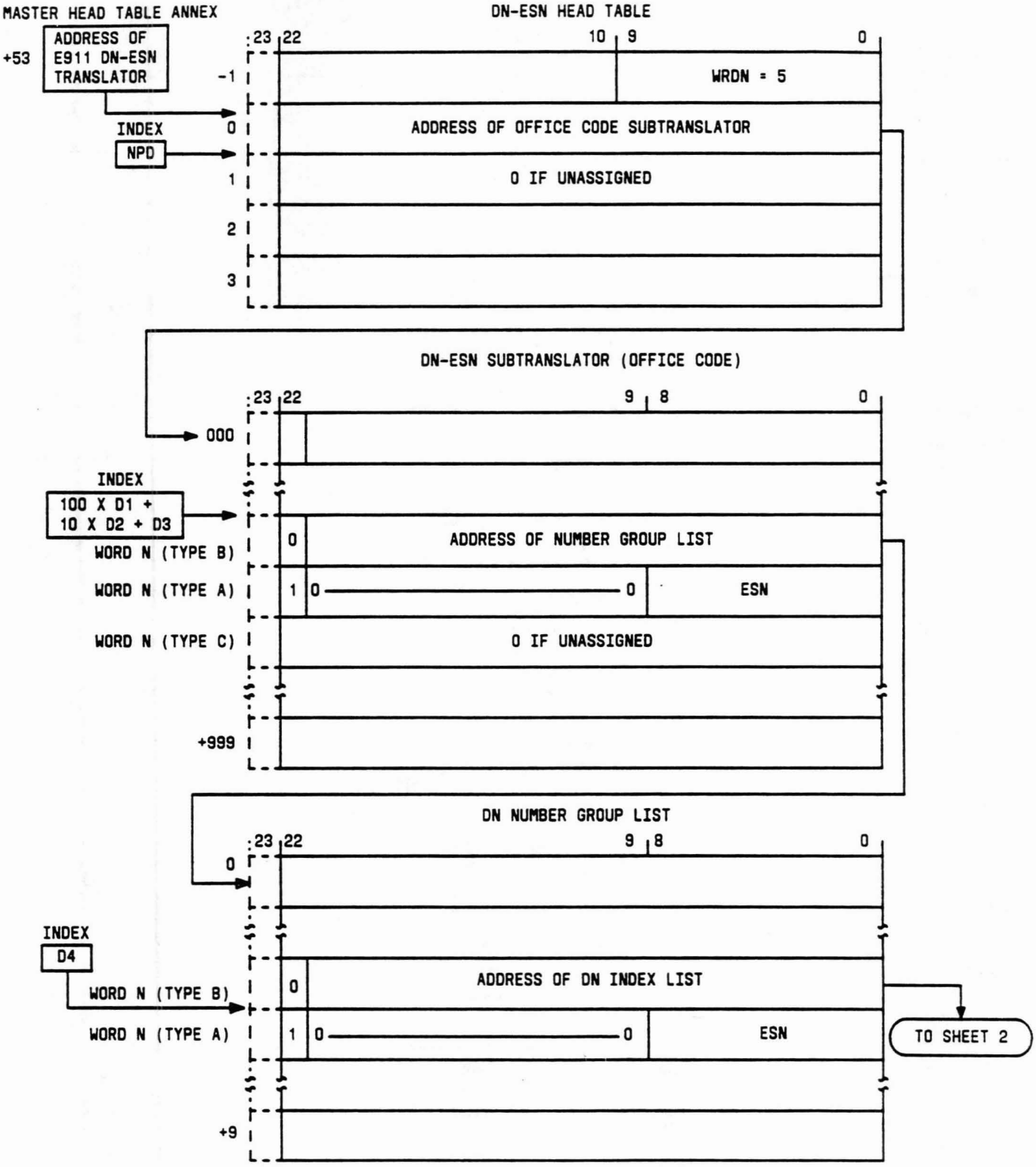
DEFAULT ESN – DEFAULT ESN ASSOCIATED WITH THE ESCO.

NPD – NUMBERING PLAN DIGIT ASSOCIATED WITH THE ESCO. THE FIRST DIGIT SENT TO A PSAP INDICATES NPD AND FCLD DATA AS FOLLOWS.

FIRST DIGIT SENT TO PSAP	NPD	(NOTE 2) FCLD
0	0	0
1	1	0
2	2	0
3	3	0
4	0	1
5	1	1
6	2	1
7	3	1
8 (FOR MAINTENANCE TEST CALLS)		

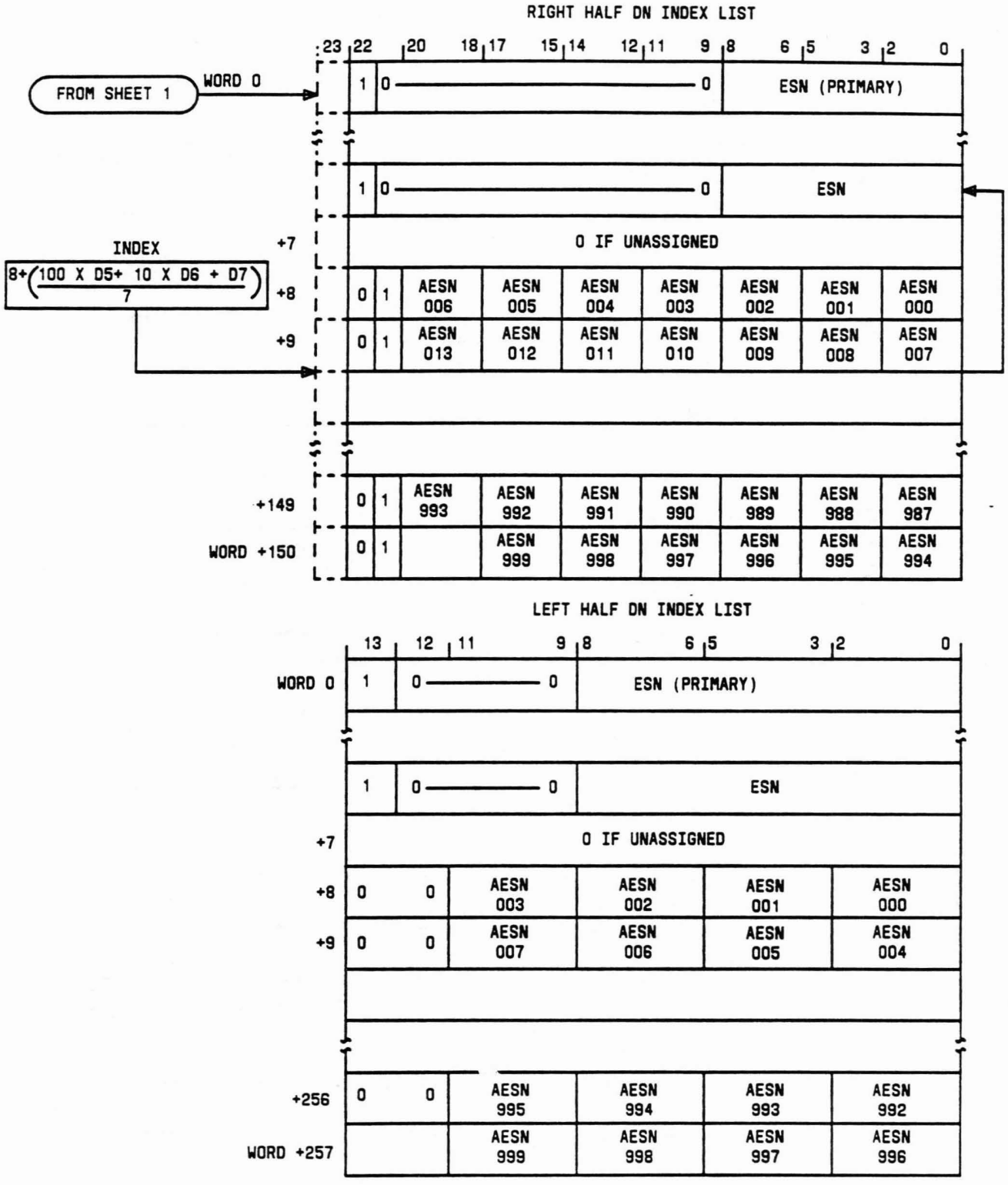
WORD n (TYPE 2) – TYPE 2 IS BUILT AS ALL ZEROS FOR FOR ALL UNASSIGNED ESCOs.

Figure 14—ESCO Translator



SEE NOTES AND LEGEND AT END OF FIGURE.

Figure 15—DN-ESN Translator (Sheet 1 of 3)



SEE NOTES AND LEGEND AT END OF FIGURE.

Figure 15—DN-ESN Translator (Sheet 2 of 3)

Note 1: Bit 32 exists in 1A *ESS* switch only.

Note 2: The left half DN index list does not exist in the 1A *ESS* switch.

LEGEND:

DN-ESN HEAD TABLE WORDS

WORD -1 WRDN - LENGTH OF HEAD TABLE (FIXED AT 5).

WORD 0 - ADDRESS OF OFFICE CODE SUBTRANSLATOR WORD 0 IF BUILT FOR NPD = 0.

WORDS 1,2, & 3 - WORDS 1, 2, & 3 ARE BUILT AS NEEDED FOR NPDs 1, 2, & 3. OTHERWISE, ALL ZEROS ARE ENTERED FOR UNASSIGNED NPDs.

DN-ESN SUBTRANSLATOR (OFFICE CODE)

WORD N (TYPE A) ESN - EMERGENCY SERVICE NUMBER (WHEN TYPE A IS USED, BIT 22 = 1)

WORD N (TYPE B) - CONTAINS THE NUMBER GROUP LIST ADDRESS WHEN FURTHER TRANSLATIONS ARE NECESSARY TO OBTAIN THE ESN.

WORD N (TYPE C) - BUILT AS ALL ZEROS FOR UNASSIGNED OFFICE CODES

DN NUMBER GROUP LIST

WORD N (TYPE A) ESN - EMERGENCY SERVICE NUMBER (WHEN TYPE A IS USED, BIT 22 = 1)

WORD N (TYPE B) - CONTAINS THE TN INDEX LIST ADDRESS WHEN FURTHER TRANSLATIONS ARE NECESSARY TO OBTAIN THE ESN.

DN INDEX LIST

WORDS 0 TO 7 - THESE WORDS MAY CONTAIN UP TO EIGHT ESNs ASSOCIATED WITH A PARTICULAR NUMBER GROUP. WORD 0 SHOULD CONTAIN THE PRIMARY ESN, WHICH IS THAT ESN USED FOR THE MAJORITY OF THE CUSTOMER ASSIGNED TNs IN THAT NUMBER GROUP. BIT 22 = 1 WHEN AN ESN IS ASSIGNED IN WORDS 0 TO 7. WHEN AN ESN IS NOT ASSIGNED IN A PARTICULAR WORD, BIT 22 = 0 IN THAT WORD.

WORDS 8 TO 150 (RIGHT HALF) OR 8 TO 257 (LEFT HALF) - AN ABBREVIATED ESN (AESN) IS ASSIGNED FOR EVERY TN IN THE THOUSANDS GROUP. THESE 3-DIGIT AESNs CORRESPOND TO THE ESNs ASSIGNED IN WORDS 0 THROUGH 7. UNASSIGNED TNs SHOULD CONTAIN THE AESN CORRESPONDING TO THE PRIMARY ESN CONTAINED IN WORD 0. THE TN INDEX LIST IS INDEXED USING THE FIFTH, SIXTH, AND SEVENTH DIGITS OF THE ANI IDENTIFIED CALLING TN.

Figure 15—DN-ESN Translator (Sheet 3 of 3)

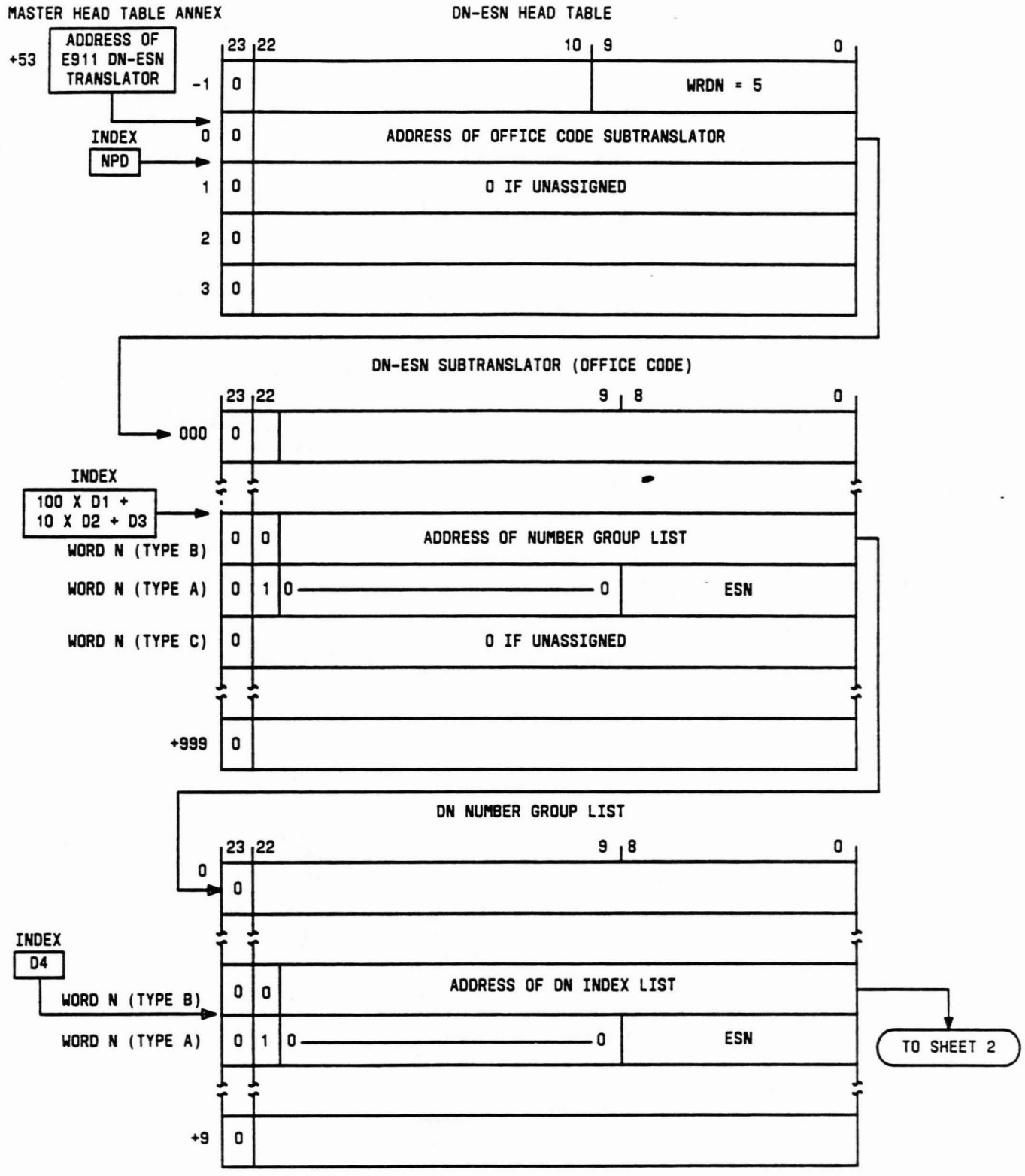
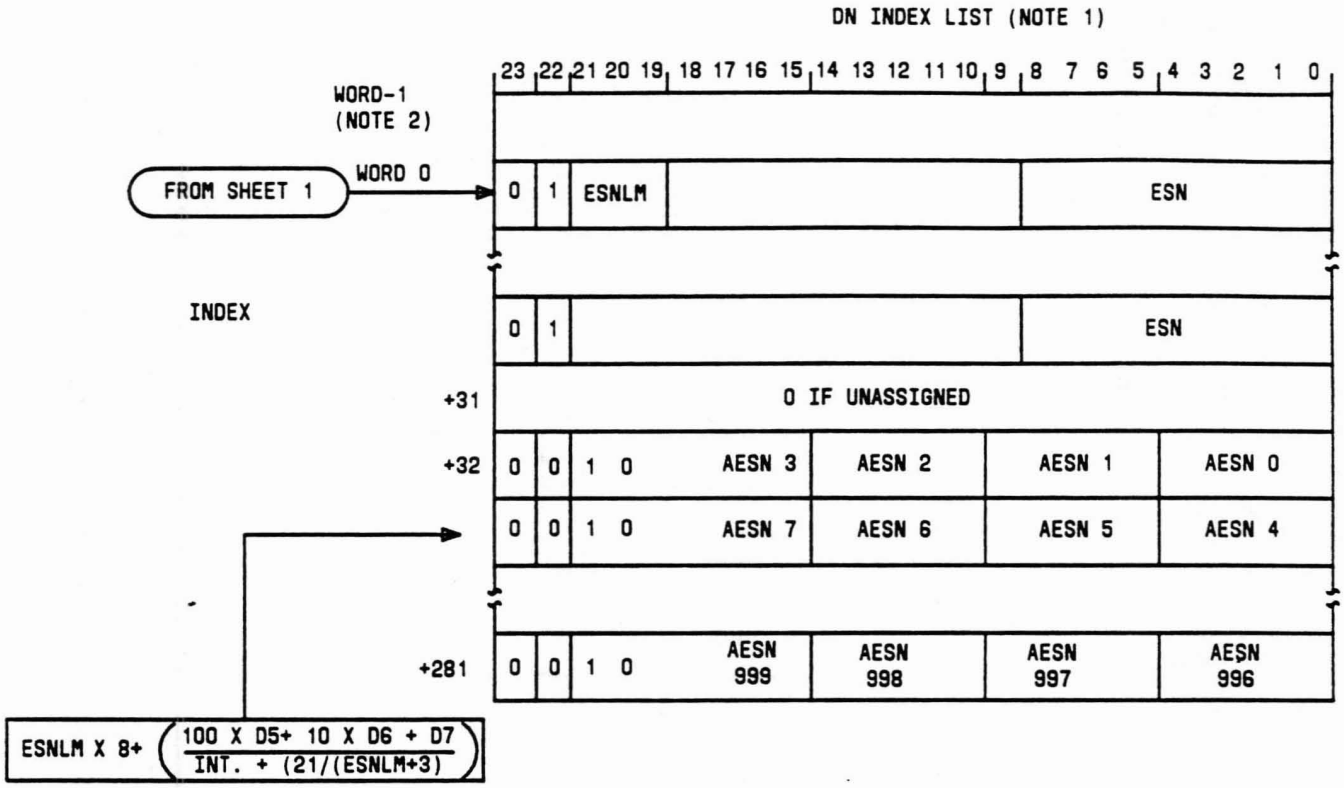
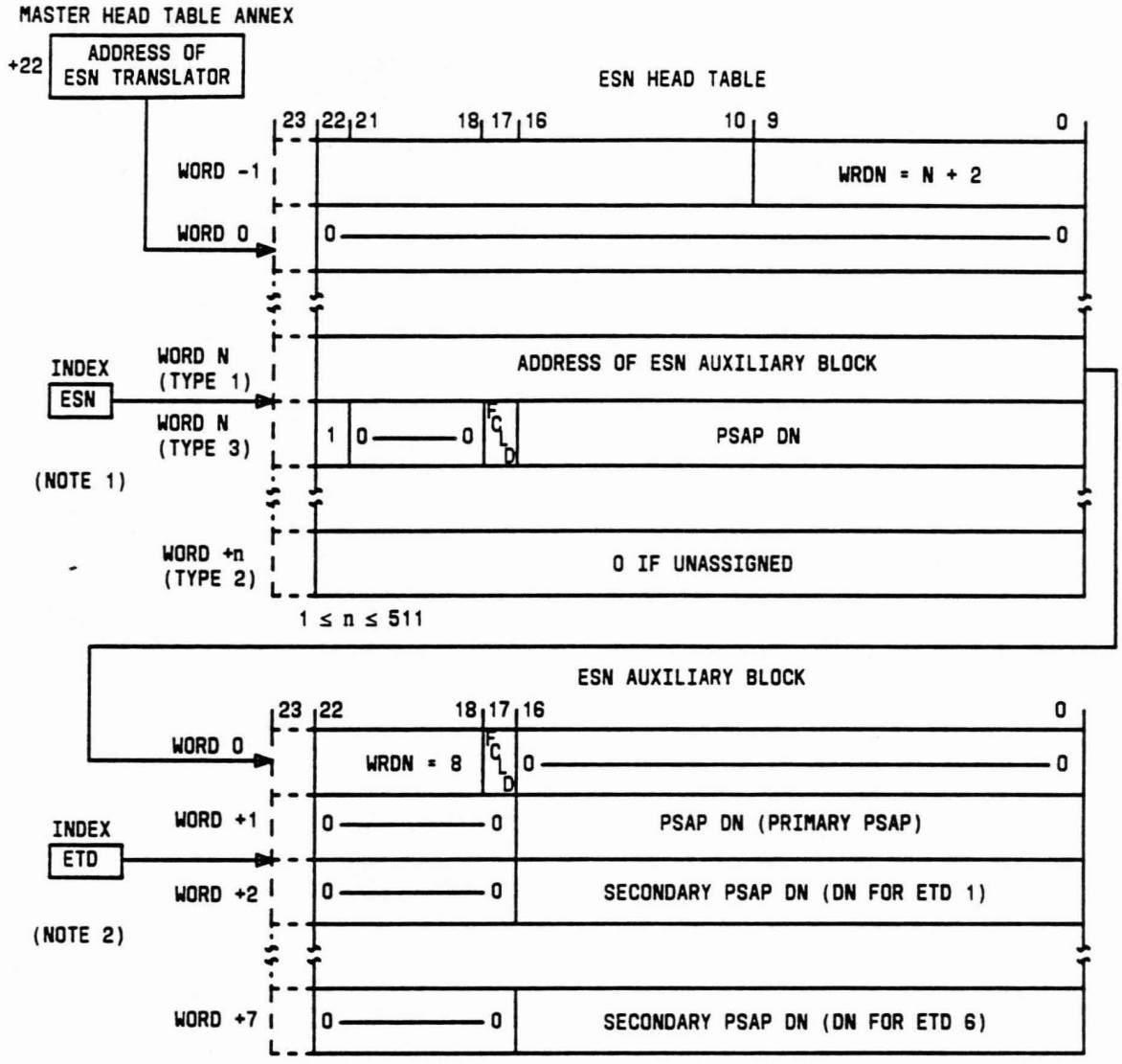


Figure 16—1A ESS Switch DN-ESN Translator for 1AE6 and Later Generic Programs (Sheet 1 of 2)



NOTES:
1. The DN index list shown is for a number group containing up to 32 ESNs. The size of the DN index list varies according to the number of ESNs per number group.
2. A -1 word contains the length of the DN index list for ESN limits greater than eight.

Figure 16—1A ESS Switch DN-ESN Translator for 1AE6 and Later Generic Programs (Sheet 2 of 2)



NOTE: BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.

NOTES:
1. The type 3 word is built when selective transfer does not apply.
2. For those words (2 through 7) that do not define an ETD value, the corresponding word should contain all zero entries.

LEGEND:

ESN HEAD TABLE WORDS

WORD -1	WRDN - NUMBER OF WORDS IN THE HEAD TABLE. THE VALUE OF N SHOULD BE EQUAL TO OR LESS THAN 511.
WORD 0	- ALWAYS BUILT AS ALL ZEROS.
WORD N (TYPE 1)	- ADDRESS OF AN AUXILIARY BLOCK FOR THE ESN WHEN SELECTIVE TRANSFER IS PROVIDED.
WORD N (TYPE 2)	- TYPE 2 WORD IS BUILT FOR ALL UNASSIGNED ESN NUMBERS THAT ARE LESS THAN THE HIGHEST ASSIGNED ESN NUMBER.

Figure 17—ESN Translator (Sheet 1 of 2)

WORD N (TYPE 3) (NOTE 1)	FCLD -	FLASH CALLING LINE DISPLAY (FCLD = 1 IF THE PSAP IS ARRANGED FOR FCLD; OTHERWISE, FCLD = 0.)
	DN -	DIRECTORY NUMBER OF PSAP.

ESN AUXILIARY BLOCK WORDS

WORD 0	WRDN -	THE NUMBER OF WORDS IN THE AUXILIARY BLOCK IS ALWAYS EIGHT.
	FCLD -	FLASH CALLING LINE DISPLAY.
WORD 1	DN -	DIRECTORY NUMBER OF PRIMARY PSAP.
WORDS 2-7	DN -	DIRECTORY NUMBERS CORRESPONDING TO EMERGENCY TRANSFER DIGITS (ETD) 1 THROUGH 6 AS ASSIGNED FOR SELECTIVE TRANSFER SERVICES TO ONE OR MORE SECONDARY PSAPs. (NOTE 2).

Figure 17—ESN Translator (Sheet 2 of 2)

(NOTE 1)

	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
WORD 0		WRDN					0	0	RI										0	0	0		PIND	
WORD 1		RING				CF_{BL}	0	0	0	0	0	0	SL	0	0	0	0	0	TMAJ					
WORD 2 (OPTIONAL)		0	0	CF_{ILB}		0	0	0	CFBL-DN															
WORD 3 (OPTIONAL)		BS	FRAME						ROW						COL				DMAJ					
WORD 4 (OPTIONAL)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTES:
1. BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.
2. WORDS 3 AND 4 ARE BUILT AS A PAIR (WORD 4 = ALL ZEROS) WHEN BUSY SENSE IS USED.

WORD 0 WRDN = WORD NUMBER (2, 3, OR 5)

RI = ROUTE INDEX ASSIGNED FOR AN E911 OUTGOING PSAP TRUNK GROUP

PIND = PROGRAM INDEX EQUALS 3 FOR 911 SERVICE

WORD 1 RING = RINGING CODE ASSIGNED FOR A 911 TRUNK GROUP

CFBL = CALL FORWARD BUSY LINE (EQUALS 1 IF CFBL OPTION IS PROVIDED)

SL = SPECIAL LINE

TMAJ = TERMINATING MAJOR CLASS EQUALS 28 FOR RINGING PSAP OR 3 FOR NONRINGING PSAP

WORD 2 (OPTIONAL WORD BUILT WHEN CFBL IS SPECIFIED IN WORD 1)

CFILB = CALL FORWARD INHIBIT LINE BUSY

CFBL-DN = CALL FORWARD BUSY LINE DIRECTORY NUMBER

WORD 3 (NOTE 2) BS = BUSY SENSE (EQUALS 1 IF REVERSE MAKE BUSY IS SPECIFIED) MAKE-BUSY MSN OPTIONS MAY BE USED FOR NIGHT SERVICE AND/OR TRAFFIC BUSY FORWARDING.

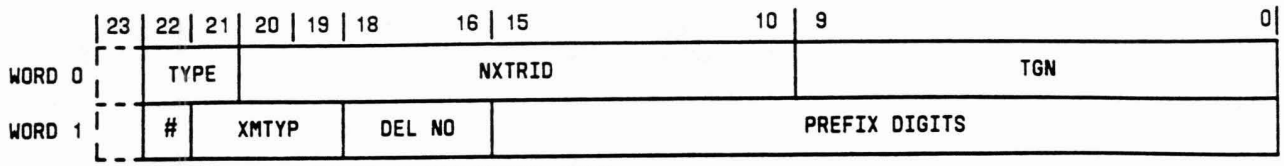
FRAME = MASTER SCANNER FRAME

ROW = MASTER SCANNER ROW

COLUMN = MASTER SCANNER COLUMN

DMAJ = DISPLACED MAJOR CLASS. IF WORD 3 IS BUILT, TMAJ DATA FROM WORD 1 IS PLACED IN THIS FIELD AND THE TMAJ ITEM IN WORD 1 IS SET TO 2

Figure 18—911 DN Auxiliary Block Data for E911 PSAP



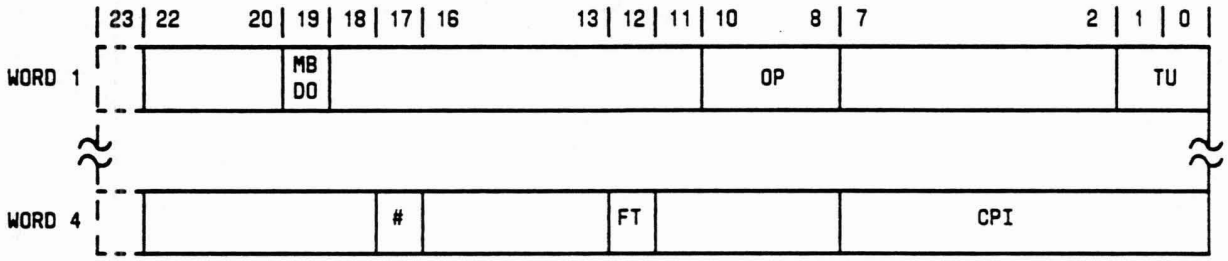
NOTE: BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.

\# = TROK

WORD 0 TYPE – TYPE = 10 FOR E911
NXTRID – NEXT ROUTE INDEX = STOP FOR E911
TGN – TRUNK GROUP NUMBER

WORD 1 TROK – TRANSFER OKAY = 1 FOR E911
XMTYP – TRANSMITTER TYPE = 000 (MANUAL SEIZURE) FOR PSAP WITHOUT CALLING LINE DISPLAY. XMTYP = 001 (MULTIFREQUENCY) FOR PSAP WITH CALLING LINE DISPLAY
DEL NO – DIGITS DELETED = 000 FOR E911
PREFIX DIGITS – NOT USED (=0) FOR E911

Figure 19—RI Expansion Data for E911 Service



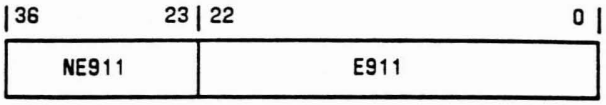
NOTE:
BIT 23 EXISTS IN 1A *ESS* SWITCH ONLY.

\# ITEM OGT-ESB

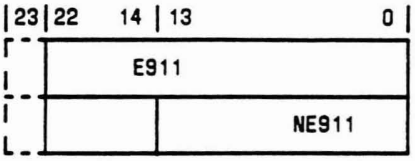
WORD 1 TU = TRUNK USAGE
OP = OUTPULSING
MBDO = MAKE-BUSY DISTANT OFFICE

WORD 4 CPI = CIRCUIT PROGRAM INDEX
FT = FLASH TIMING
OGT-ESB = OUTGOING TRUNK TO EMERGENCY SERVICE BUREAU (OGT TO PSAP)

Figure 20—TCC Expansion Data for Dedicated E911 Outgoing Trunks to PSAPs



A. 1 *ESS* SWITCH I4E911 DATA (PROGRAM STORE)

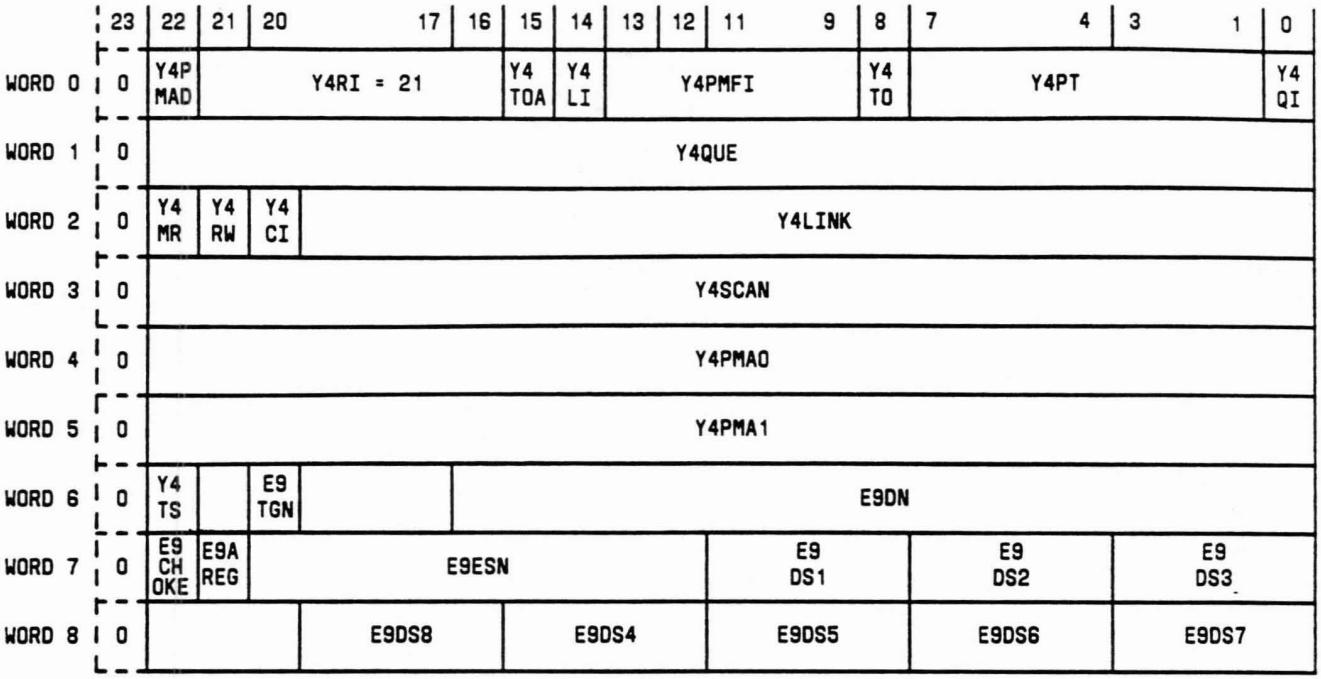


NOTE: BIT 23 IN CALL MEMORY EXISTS
IN 1A *ESS* SWITCH ONLY.

B. 1A *ESS* SWITCH I4E911 DATA (UNDUPLICATED CALL STORE)

ITEM	DESCRIPTION
NE911	= NUMBER OF 9-WORD E911 CALL REGISTERS
E911	= CALL STORE ADDRESS OF E911 CALL REGISTER MEMORY BLOCK

Figure 21—Parameter Word 14E911



NOTE: BIT 23 IN CALL MEMORY EXISTS IN 1A *ESS* SWITCH ONLY.

WORD DESCRIPTIONS FOR THE E911 REGISTER

WORD 0 (STATE WORD)
Y4PMAD - PATH MEMORY ANNEX DISPLACED (EQUALS ONE IF PATH MEMORY IS DISPLACED)
Y4RI - REGISTER IDENTIFIER (INDEX FOR TABLE CONTAINING PROGRAM TAG TABLE WORD)
Y4TOA - TIME OUT ACTIVITY (USED BY PIDENT SARG)
Y4LI - LINK INDICATOR
Y4PMFI - PATH MEMORY FORMAT INDICATOR
Y4TO - TIME OUT INDICATOR (USED BY PIDENT SARG)
Y4PT - PROGRAM TAG
Y4QI - QUEUE INDICATOR

WORD 1 (QUEUE WORD)
Y4QUE - LINK TO NEXT REGISTER WHEN QUEUING

WORD 2 (LINK WORD)
Y4MR - MASTER REGISTER INDICATOR
Y4RW - REQUEST WAITING
Y4CI - CONDITIONAL INHIBIT BIT
Y4LINK - LINK WORD (CONTAINS ADDRESS OF REGISTER LINKED TO RIGHT IF Y4LI = 1)

WORD 3 (SCAN WORD)
Y4SCAN - SCAN WORD

WORD 4 (PATH MEMORY ANNEX ZERO WORD)
Y4PMA0 - PATH MEMORY ANNEX ZERO

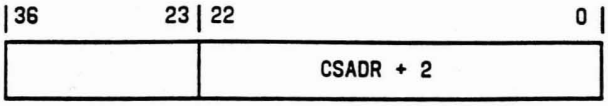
WORD 5 (PATH MEMORY ANNEX ONE WORD)
Y4PAM1 - PATH MEMORY ANNEX ONE

WORD 6
Y4TS - TRUNK STATE BIT
E9TGN - TGN BEING MONITORED FOR PROBLEMS
E9DN - THE DIRECTORY NUMBER ASSOCIATED WITH THIS PSAP

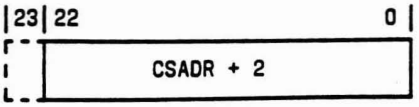
WORD 7
E9CHOKE - LOCAL CHOKE IS ACTIVE ON THIS CALL
E9AREG - THERE IS ANOTHER E911 REG. ON THE CALL
E9ESN - THE EMERGENCY SERVICE NUMBER ASSOCIATED WITH THIS CALL
E9DS1 -
E9DS2 - } DIGIT SLOTS ONE, TWO, AND THREE FOR ANI INFORMATION TO BE SENT TO THE PSAP
E9DS3 -

WORD 8
E9DS8 -
E9DS4 -
E9DS5 - } DIGIT SLOTS FOUR THROUGH EIGHT FOR ANI INFORMATION TO BE SENT TO THE PSAP
E9DS6 -
E9DS7 -

Figure 22—E911 Call Register



A. 1 *ESS* SWITCH E9TFCT DATA (PROGRAM STORE)



NOTE: BIT 23 IN CALL MEMORY EXISTS IN 1A *ESS* SWITCH ONLY.

B. 1A *ESS* SWITCH E9TFCT DATA (UNDUPLICATED CALL STORE)

ITEM CSADR + 2 IS THE CALL STORE ADDRESS OF THE THIRD WORD OF A 24-WORD CALL STORE TABLE FOR E911 TRAFFIC AND ERROR COUNTS.

Figure 23—Parameter Word E9TFCT

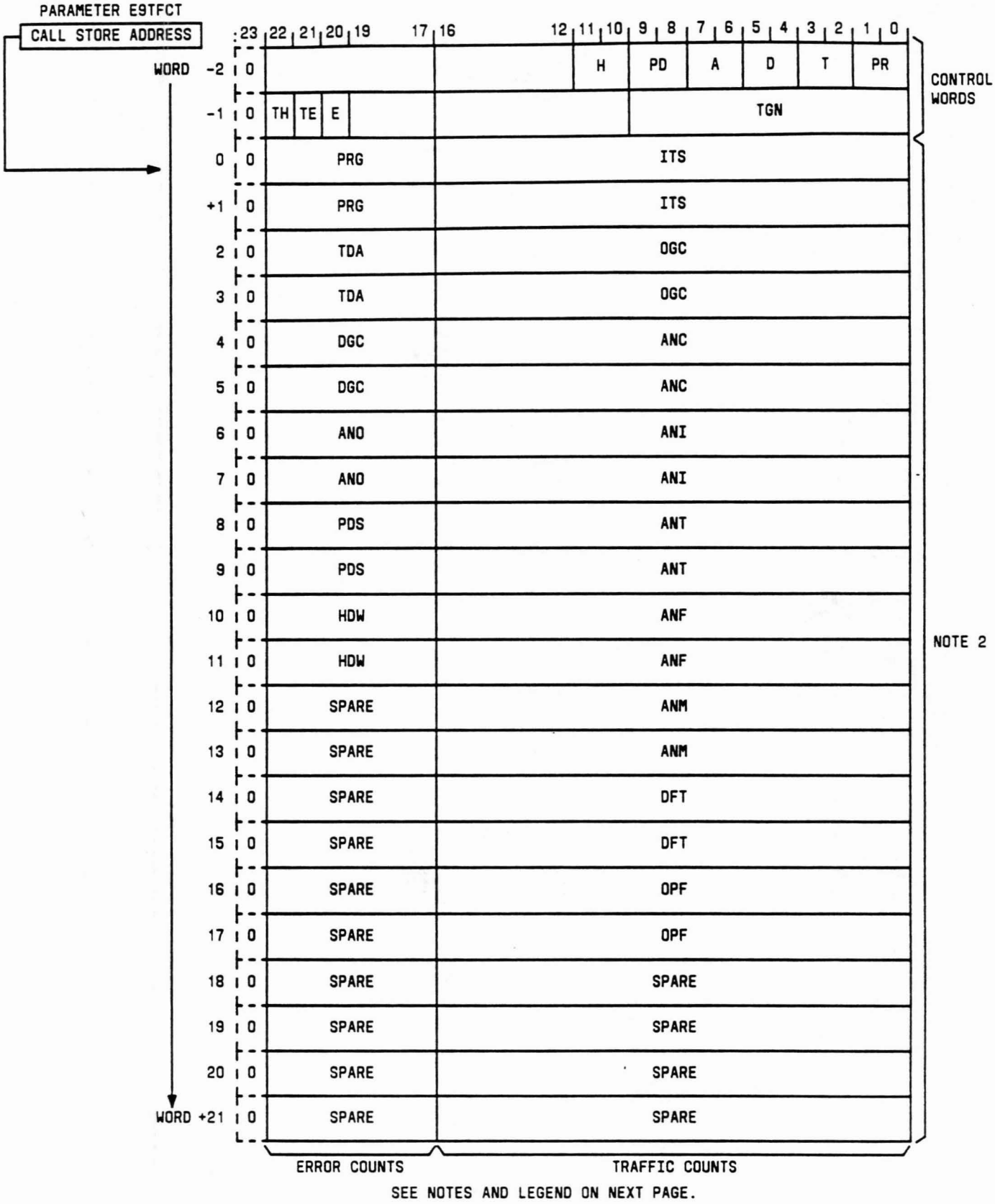


Figure 24—E911 Traffic and Error Call Store Data Block (Sheet 1 of 2)

NOTES:
1. Bit 23 in call memory exists in 1A *ESS* switch only.
2. Error and traffic counts - Odd numbered words are counts for TGN being monitored. Even-numbered words are total office counts minus counts for TGN being monitored. Thus, odd- plus even-word counts equal the total office counts.

LEGEND:
WORD -2 - THIS WORD DETERMINES WHAT ACTIONS TO TAKE IF AN E911 ERROR OCCURS.
PR - PROGRAM ERROR (ITEM PRG)
T - TRANSLATION ERROR (ITEM TDA)
D - DIGIT COLLECTION ERROR (ITEM DGC)
A - ANI OUTPULSING ERROR (ITEM ANO)
PD - PERIPHERAL DATA STORAGE PROCESSOR ERROR (ITEM PDS)
H - HARDWARE ERROR (ITEM HDW)

ACTION TAKEN IF VALUE EQUALS:
0 = DON'T PRINT AN ENO1 OUTPUT MESSAGE IF AN ERROR OCCURS.
1 = PRINT AN ENO1 OUTPUT MESSAGE IF AN ERROR OCCURS AND DUMP ONE CALL REGISTER.
2 = PRINT AN ENO1 OUTPUT MESSAGE IF AN ERROR OCCURS AND DUMP UP TO TWO CALL REGISTERS.
3 = PRINT AN ENO1 OUTPUT MESSAGE, BUT DON'T DUMP ANY REGISTERS.

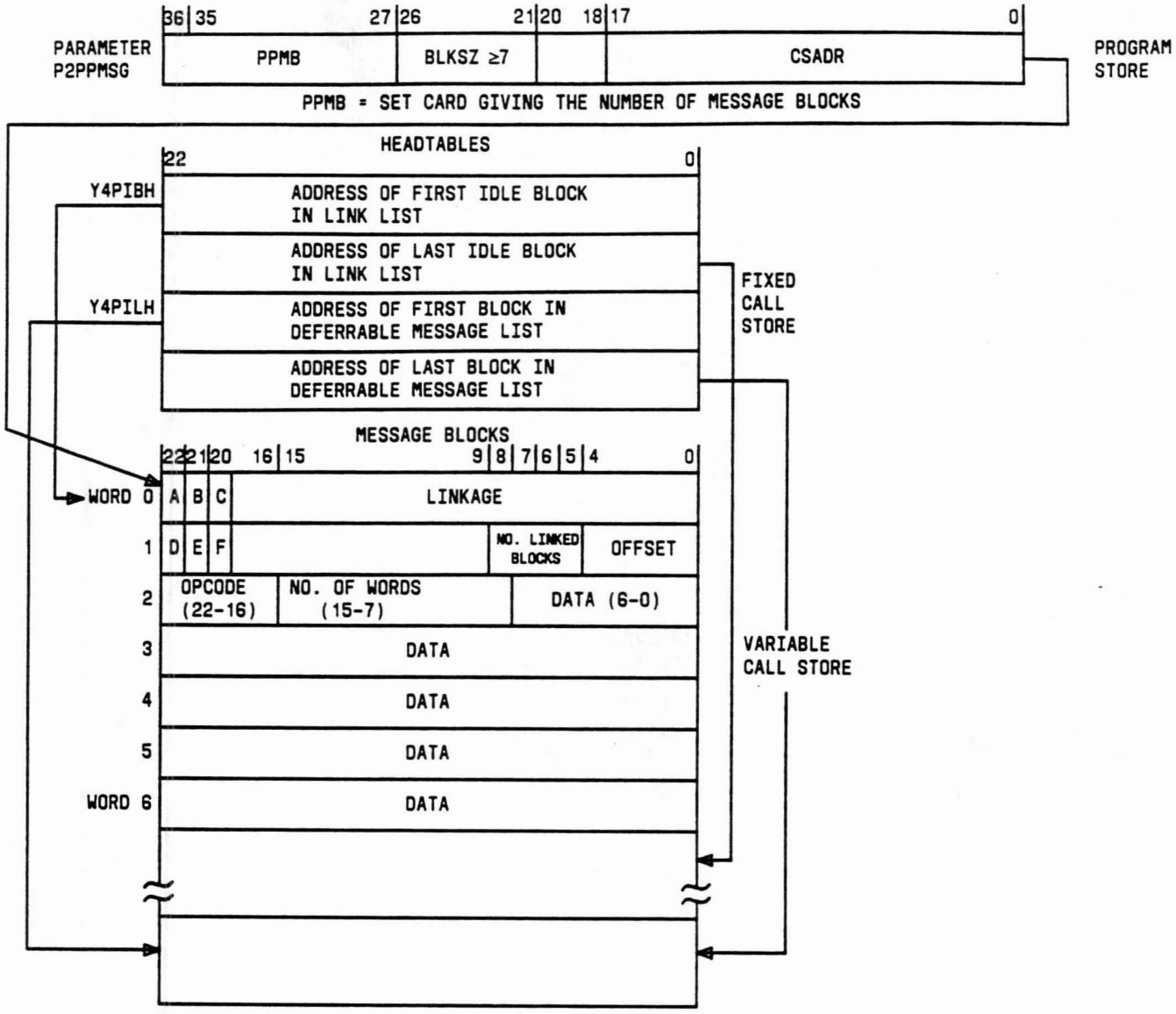
WORD -1
TH - ITEM TGN-HERE MEANS THAT A PARTICULAR E911 TRUNK GROUP IS BEING MONITORED.
TE - ITEM TGN-ENO1 MEANS THAT IF TH=1 AND TE=1, THE ENO1 OUTPUT MESSAGE SHOULD BE PRINTED IF AN ERROR OCCURS ON THE TRUNK GROUP BEING MONITORED.
E - ITEM ENO3-HRLY, IF EQUAL TO ONE, INDICATES THAT ENO3 OUTPUT MESSAGE SHOULD BE PRINTED HOURLY. IF EQUAL TO ZERO, THEN ENO3 OUTPUT MESSAGE SHOULD BE PRINTED DAILY.
TGN - TRUNK GROUP NUMBER BEING MONITORED WHEN ITEM TH EQUALS ONE.

WORDS 0 THROUGH 17 - THESE WORDS STORE THE ERROR AND TRAFFIC COUNTS FOR OUTPUT MESSAGES ENO1, ENO2, AND ENO3.

ERROR COUNT ITEMS
PRG - PROGRAM ERROR COUNT
TDA - TRANSLATION ERROR COUNT
DGC - DIGIT COLLECTION ERROR COUNT
ANO - ANI OUTPULSING ERROR COUNT
PDS - PERIPHERAL DATA STORAGE PROCESSOR ERROR COUNT
HDW - HARDWARE ERROR COUNT

TRAFFIC COUNT ITEMS
ITS - DEDICATED E911 INCOMING TRUNK SEIZURES
OGC - NUMBER OF ORIGINATING E911 CALLS
ANC - VALID DIGIT RECEIVED
ANI - ANI INFORMATION DIGIT INDICATES ANI FAILURE
ANT - ANI TIME-OUT OCCURRED WHILE COLLECTING ANI
ANF - ANI DID NOT AGREE WITH ANI FORMAT
ANM - ANI INFORMATION DIGIT INDICATES MULTIPARTY OR QZ BILLING.
DFT - NUMBER OF E911 CALLS ROUTED TO DEFAULT ESBS DUE TO SYSTEM PROBLEMS.
OPF - NUMBER OF FAILURES TO OUTPULSE ANI TO ESBS.

Figure 24—E911 Traffic and Error Call Store Data Block (Sheet 2 of 2)



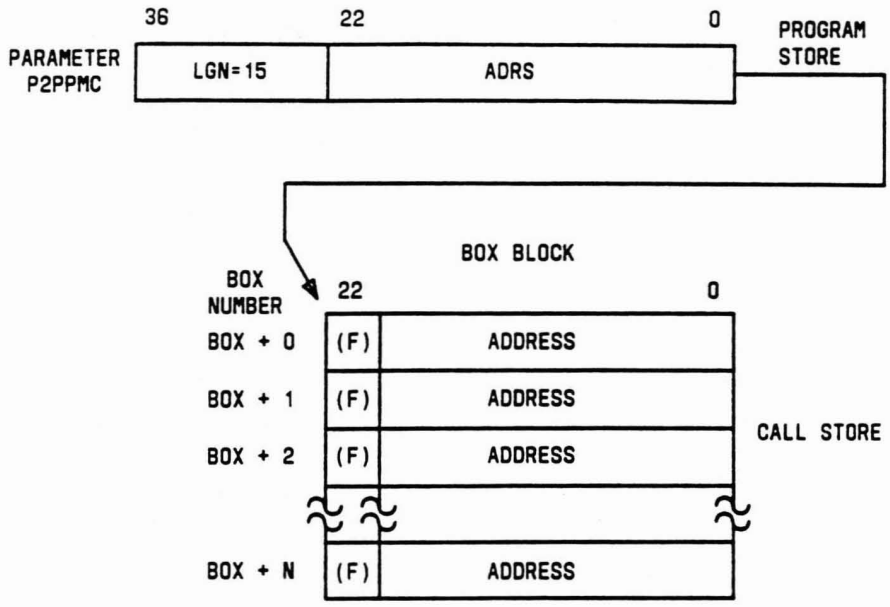
WORD 0
- A = BLOCK IN USE (=1). BUSY BIT
- B = FIRST BLOCK IN MESSAGE (=1)
- C = TIME-OUT BIT (SET TO 1 BY AUDIT)
- LINKAGE = ADDRESS OF NEXT BLOCK WHEN ON IDLE OR DEFERRABLE LINKED LISTS OR WHEN PART OF A MULTIBLOCK MESSAGE.

WORD 1
- D = POLARITY BIT, USED ON DEFERRED MESSAGE LIST TO DETERMINE IF MESSAGE WAS THERE AT ENTRY TIME OR JUST PUT ON LIST FOR NEXT CLASS 'E' ENTRY.
- E = LONG (TIME) MESSAGE BIT.
- F = BLOCK RETURNED BIT IS USED BY THE PDSP WHEN A CONFIRMATION MESSAGE IS SENT TO IT.
- BITS 5-7 = NUMBER OF ADDITIONAL LINKED BLOCKS ON THIS MESSAGE.
- BITS 0-4 = OFFSET OF LAST WORD USED IN THIS BLOCK.

WORD 2

THIS IS THE FIRST DATA WORD OF MESSAGE. IT CONTAINS THE MESSAGE HEADING CONSISTING OF OPCODE (BITS 16-22) AND NUMBER OF WORDS (BITS 7-15) IN MESSAGE.

Figure 25—Parameter Word P2PPMSG and Associated Call Store Message Blocks



LEGEND:

ADDRESS = ADDRESS OF LOCATION IN DEFERRABLE LINKED LIST CONTAINING PARTIALLY ANSWERED REQUEST MESSAGE AWAITING CONFIRMATION.

ADRS = ADDRESS IN CALL STORE OF BOX BLOCK.

(F) = FLAG INDICATING IDLE MESSAGE BLOCK REQUESTED BUT NONAVAILABLE OR AN URGENT OUTGOING MESSAGE AWAITING CONFIRMATION.

LGN = NUMBER OF WORDS IN BOX BLOCK.

Figure 26—Peripheral Processor Message Block Control Parameter P2PPMC and Associated Pointers

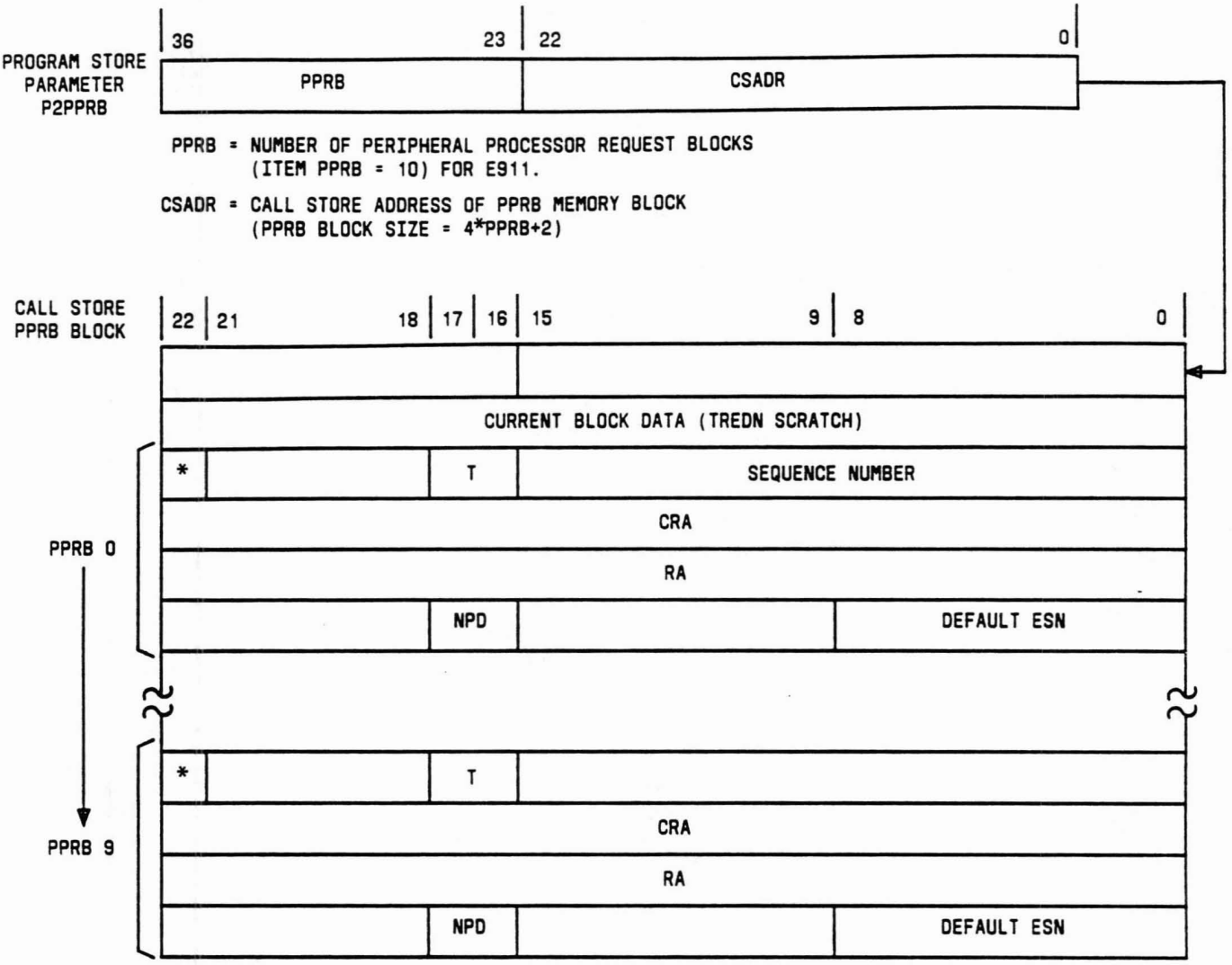


Figure 27—Parameter Word P2PPRB and Call Store PPRB Memory Block

1 *ESS* SWITCH REQUEST DATA FOR PDSP DATA

22 18	17	16	15 12	11 9	8	7 4	3 0
SUBTYPE = 1			SEQUENCE NUMBER				
				D1		D2	D3
			D4	D5		D6	D7
	NPD			WORD COUNT = 4			

NPD = NUMBER PLAN DIGIT

D1 THROUGH D7 = TELEPHONE NUMBER OF STATION (ANI IDENTIFICATION)
DIALING 911

A. ESN DATA REQUEST FORMAT (MESSAGE TYPE 4, SUBTYPE 1)

PDSP REPLY DATA FOR 1 *ESS* SWITCH REQUEST

22 17	16	15 9	8	7	6 0
TYPE = 4		WORD COUNT = 3			SUBTYPE = 1
		SEQUENCE NUMBER			
	*		ESN		

* DATA FOUND BIT: IF DATA FOUND EQUALS 1 (SET)
IF DATA NOT FOUND EQUALS 0 (RESET)

B. ESN DATA REPLY FORMAT (MESSAGE TYPE 4, SUBTYPE 1)

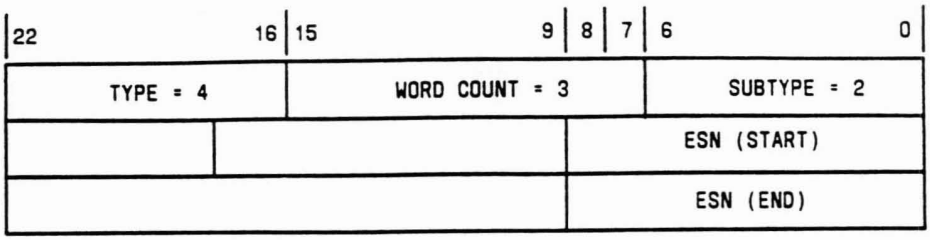
22 18	17	16	15 9	8 0
SUBTYPE = 2				ESN (START)
	*			ESN (END)
				WORD COUNT = 3

* STATUS: 01 = UNASSIGNED
10 = ASSIGNED
00 = NEW ADDITION } RECENT CHANGE
11 = NEW REMOVAL } TYPE STATUS

NOTE - AN ERROR CONDITION EXISTS WHEN:
ESN (START) = ESN (END) = 0
OR
STATUS (*) = 11

C. ESN VERIFICATION REQUEST FORMAT (MESSAGE TYPE 4, SUBTYPE 2)

Figure 28—Message [B]uffer Data Request and Reply Formats (Sheet 1 of 2)



D. ESN VERIFICATION REPLY FORMAT
(MESSAGE TYPE 4, SUBTYPE 2)

Figure 28—Message [B]uffer Data Request and Reply Formats (Sheet 2 of 2)

TABLE A

E911 EMERGENCY SERVICE ZONE DATA

E911 SERVICE AREA	ESZ (EMERGENCY SERVICE ZONE)	PUBLIC SERVICE AGENCIES	PRIMARY PSAP	SECONDARY PSAP	ESN (EMERGENCY SERVICE NUMBER)
Town "A"	ESZ 1	Police "A" Fire "X"	Police "A"	Fire "X"	ESN No. 1
	ESZ 2	Police "A" Fire "Y"		Fire "Y"	ESN No. 2
Town "B"	ESZ 3	Police "B" Fire "Y"	Police "B"	Fire "Y"	ESN No. 3
	ESZ 4	Police "B" Fire "Z"		Fire "Z"	ESN No. 4

TABLE B

COMPARISON OF E911 DATA BASE SYSTEMS

PDSP	1A *ESS* SWITCH	1 *ESS* SWITCH
Initialize SRD Base From 9-Track RC Input	Initialize SRD With Special TDA Assembly or RC	Initialize SRD With Special TDA Assembly or RC
Compare SRD in PDSP With Data Management System	Not Provided	Not Provided
Up to 511 Different ESNs Per 1000s Group	Up to 511 Different ESNs per 1000s Group *	Up to 8 Different ESNs Per 1000s Group
No Cardwriting	No Cardwriting	Cardwriting
Allows Unassigned Line Status; Prints Calls From Unassigned Lines	No Unassigned Line Status	No Unassigned Line Status
Model 40 TTY Verify	Model 40 TTY Verify	Model 35 TTY Verify
Data Base Backup on Tape Data Cartridge	Data Base Backup on Disc and Tape	No Backup for Data Base
Data Base Audit to Insure No TNs Are Assigned Invalid ESNs	Not Provided	Not Provided
Enhanced Data Base Memory Allocation Tools	Data Base Management Using RC:SUBTRAN and RC:PSWD	Data Base Management Using RC:SUBTRAN and RC:PSWD
Zero Words PS Used for Data Base	Data Base in Unduplicated CS	Data Base in Duplicated PS
Additional Verify and Statistical Data Message	No Additional Verify or Statistical Capabilities	No Additional Verify or Statistical Capabilities

* A maximum of 8 ESNs can be assigned in a 1A *ESS* switch using the 1AE5 generic program.

TABLE C

DEDICATED E911 INCOMING TRUNK CIRCUIT COST DATA

SD NUMBER	TRUNK ORDER CODE	SIGNALING	SCAN POINTS PER CIRCUIT	SD POINTS PER CIRCUIT	CIRCUITS PER UNIT	TLN APPEARANCES PER CIRCUIT
SD-1A192	013	MF	2	3	2	1
SD-1A311	045	DP	2	4	2	1
SD-1A312	046	MF	3	4	1	1
SD-1A163	016	DP	3	5	1	1
SD-1A236	021	MF	3	5	1	1
SD-1A237	048	DP	3	5	1	1
SD-1A252	007	MF	4	4	1	1
SD-1A166-05	161	MF	2	3	2	1

TABLE D

DEDICATED E911 OUTGOING TRUNK CIRCUIT COST DATA

SD NUMBER	TRUNK ORDER CODE	SUPERVISORY SIGNALING	SCAN POINTS PER CIRCUIT	SD POINTS PER CIRCUIT	CIRCUITS PER UNIT	TLN APPEARANCES PER CIRCUIT
SD-1A165	002	Loop	2	3	2	1
SD-1A163*	016	E&M	3	5	1	1
SD-1A237*	048	E&M	3	5	1	1

* SD-1A163 and SD-1A237 trunk circuits are used for long haul trunks to distant PSAPs. These long haul E&M type trunks require an E&M to loop converter prior to the connection to the PSAP.

TABLE E

E911 REAL TIME CYCLE COUNTS (NOTES)

ORIGINATING ENTITY	TERMINATING ENTITY		
	E911 PSAP WITH ANI DISPLAY	E911 PSAP WITHOUT ANI DISPLAY	B911 PSAP
Non-SXS Trunk (Seizure + Digits + ANI)	6766 7417	6450 7120	7078 7228
Non-SXS Trunk (Seizure + ANI)	6282 6932	5986 6636	6594 6744
SXS Trunk (Seizure + Digits + ANI)	6456 6982	5972 6498	6768 6918
SXS Trunk (Seizure + ANI)	6153 6950	5669 6655	6464 6615
Line	5547 7262	5251 6966	5709 5446

Notes:

1. The cycle counts listed are for a 1 ESS switch E911 tandem office providing selective routing. The top cycle count number is for the originating entity on-hook first. The bottom number is for the PSAP on-hook first.

2. Real time cycle required for a 1A ESS switch are approximately double those given for a 1 ESS switch.

3. Real time cycle count modifiers are as follows:

   A. Routing based on ESCO (trunk group) — Subtract 240 cycles
   B. Routing based on office code — Subtract 200 cycles
   C. Routing based on number group — Subtract 150 cycles
   D. If 1 ESS switch uses PDSP — Subtract 150 cycles
   E. If night service/alternate routing is required — Add 350 cycles

4. Transfers require additional cycles as follows:

   A. Nonselective transfer (PSAP without ANI display) — 15,100 cycles
   B. Nonselective transfer (PSAP with ANI display) — 15,400 cycles
   C. Selective transfer (PSAP without ANI display) — 14,673 cycles
   D. Selective transfer (PSAP with ANI display) — 14,973 cycles

TABLE F

DEDICATED E911 INCOMING TRUNK CIRCUITS

SD NUMBER	TYPE PULSE	CPI	TPI	SPI
SD-1A163	DP	016	2,3	
SD-1A192	MF/DP	013		12
SD-1A236	MF	021	26,25	
SD-1A237	DP	048	2,3	
SD-1A311	DP/Loop	045	2,3	
SD-1A312	MF	046		4,0
SD-1A166-05	MF	161		4

TABLE G

DN INDEX LIST SIZES FOR 1A *ESS* SWITCH WITH 1AE6 AND LATER GENERIC PROGRAMS

ESN LIMIT	ESNLM VALUE	BITS PER AESN	AESNS PER WORD	AESN BLOCK SIZE	FULL ESN BLOCK SIZE	TOTAL DN INDEX LIST SIZE (NOTE)
8	0	3	7	143	8	151
16	1	4	5	200	16	217
32	2	5	4	250	32	283
64	3	6	3	334	64	399
128	4	7	3	334	128	463
256	5	8	2	500	256	757
511	6	9	2	500	512	1013

Note: The total DN index list size includes the minus one word for all DN index lists except the DN indexlist with an ESN limit of eight, which does not use the minus one word.

TABLE H

TEST CALL DATA ASSOCIATION FOR ANI ONLY TRUNKS

LOCAL OFFICE		E911 TANDEM OFFICE		
TEST TYPE	ASSIGNED TEST TN	ASSIGNED ESN	TN FOR ESN	TERMINATION FOR ASSIGNED ESN TN
Permanent Busy	777-1XXX	ESN A	TN A	Permanent Busy Signal
Nonsynchronous	777-2XXX	ESN B	TN B	Nonsynchronous Test Facility
Milliwatt	777-3XXX	ESN C	TN C	Milliwatt Source

TABLE I

RC MESSAGES FOR E911 SERVICE

TASK	RC MESSAGE
Add New TG Without Members	RC:TG
Equip TNN(s)	RC:TNN
Assign Equipped TNNs To Active TG	RG:TGMEM
Build TCC Expansion Table	RC:PSWD
Enter Chart Column Data	RC:CCOL
Add RI Expansion Data	RC:RI
Add Rate And Route Pattern Data	RC:RATPAT
Add RRP In 3-Digit Translator	RC:DIGTRN
Add DN Entry In DN Head Table	RC:DNHT
Build 911 DN Auxiliary Block	RC:LINE
Build ESCO Translator Data	RC:ESCO
Build DN-to-ESN Translator Data	RC:TNESN
Build ESN Translator Data	RC:ESN

TABLE J

USOC CODES FOR E911 SERVICE OFFERINGS

USOC	E911 SERVICE OFFERINGS
E8X	ANI*
E8R	Selective Routing*
E8T	Combined ANI and Selective Routing*
E8V	Combined ANI and ALI*
E8Z	Combined ANI, ALI, and Selective Routing*
E8K	Each additional E911 exchange line terminating at PSAP (optional)

* USOC Codes E8X, E8R, E8T, E8V, and E8Z are per 1000 main stations in the area served.

TABLE K

USOC CODES FOR E911 PSAP TERMINAL EQUIPMENT

USOC	PSAP TERMINAL EQUIPMENT
E9S	ANI Master Controller
E9E	ANI Auxiliary Controller
E9Y	Additional Trunk Equipment
E9U	ANI Display and Transfer Unit
E9P	Commercial Power Conversion Unit
E8L	ALI Master Controller
E8N	ALI Auxiliary Controller
E8P	ALI Display Unit
E8Q	Interior Wiring

TABLE L

SERVICE COMPONENTS PER SERVICE OFFERING

USOC	SERVICE OFFERING	SERVICE COMPONENT CODES (NOTE)					
		A	B	C	D	E	F
E8X	ANI	X	X	X			
E8R	SR*	X	X	X	X	X	
E8T	ANI/SR	X	X	X	X	X	
E8V	ANI/ALI	X	X	X		X	X
E8Z	ANI/ALI/SR	X	X	X	X	X	X
E8K	Additional E911 Exchange Line			X			

Note: The Service Component Codes are as follows:

A — End Office Trunk
End Office ANI
Facilities between End Office and E911 Control Office

B — E911 Incoming Trunk
Control Office Common Equipment

C — E911 Tandem Office Outgoing Trunk
Alternate Routing
Night Service
Nonselective Transfer
E911 Tandem Office to PSAP facilities and loop

D — Selective Routing equipment based upon type of E911 Tandem Office, 1 ESS switch, 1A ESS switch, or 1 ESS switch with PDSP (Peripheral Data Storage Processor).

E — Data Management System

F — ALI equipment at Telephone Company locations. (This includes any necessary nodes.)

* SR — Selective Routing