DELUXE NETWORK ACCESS FEATURE

FEATURE DOCUMENT

ENHANCED PRIVATE SWITCHED COMMUNICATIONS SERVICE

2-WIRE NO. 1 "ESS*" SWITCH

CONTENTS PAGE

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INTRODUCTION

1. GENERAL INFORMATION

SCOPE

1.01 This section contains descriptive information for the optional Deluxe Network Access (DNA) feature that may be used with existing interface circuitry of the Enhanced Private Switched Communications Service (EPSCS) network. ***No attempt is made to define the appropriate intrastate or interstate tariff(s) under which EPSCS is provided. Care must be taken when implementing an EPSCS arrangement to insure that the arrangement is consistent with the tariff(s) currently in effect.***

REASON FOR REISSUE

1.02 Whenever this section is reissued, the reason for reissue will be stated in this paragraph.

FEATURE AVAILABILITY

1.03 The DNA feature is not generic program dependent. It is compatible with any existing or proposed EPSCS switching office.

2. DEFINITION/BACKGROUND

DEFINITION

2.01 The Deluxe Network Access (DNA) feature provides ***off-network*** to ***on-network*** calling without the aid of an EPSCS network attendant.

BACKGROUND

2.02 Access to an EPSCS customer's network from the Public Switched Network (PSN) is via a Message Telecommunications System (MTS) directory number (DN) assigned in a class 5 office. Once access to the EPSCS network is obtained, a dual-tone, multifrequency (DTMF) telephone is required to dial the 7-digit on-network station number and the required 3- to 6-digit authorization code number.

Note: If a rotary dial telephone is used, access is limited to the EPSCS network attendant since dial pulse digits cannot be passed to the EPSCS switch.

2.03 Prior to the DNA feature, ***all*** off- to on-network calls were routed to a specified EPSCS on-network station or to the EPSCS network attendant. With the DNA feature installed, access to the EPSCS network attendant occurs when no on-network station number is dialed within a prescribed time limit after receipt of EPSCS dial tone. This applies regardless of the type of telephone station set used.

2.04 A voice switched gain (VSG) amplifier, an integral part of the DNA feature, provides improved off-network to on-network (PSN to EPSCS) voice transmission quality.

2.05 The DNA feature is essentially a hardware capability that appears as a special application of the Direct Access Line (DAL) feature. The hardware includes: a modular-equipped DNA frame, a cable system, and associated test equipment. The DNA frame may contain up to 52 DNA trunk circuits, a modular 13A Announcement System, and other common equipment.

2.06 The DNA trunk circuit is a 4-wire, microcomputer controlled circuit that is arranged on three circuit packs (CPs) which are identified as follows:

- A VSG Amplifier Circuit (CP100)
- A Jack & Relay Circuit (CP200)
- A Control & Outpulser Circuit (CP300).

Note: The standard DNA trunk firmware is version 3.0.0. Since some version 2.0.0 trunks may be in service, both versions are covered.

2.07 Overall, the circuitry in paragraph 2.06 provides the functions that are identified in (a) through (g) below. The circuitry is intended for voice application ***only***.

(a) Trunk supervision

(b) Announcement control

(c) EPSCS dial tone detection

(d) Voice amplification and attenuation

(e) Automatic outpulsing of digits (when required)

(f) Test features

(g) Visual alarm indications.

2.08 Each DNA trunk circuit can function with F-signaling units (FRA and FUA per SD-1C230) and a 4-wire DAL circuit per SD-1A364. The F-signaling units provide the required functional interface between a class 5 central office and the DNA unit within an EPSCS switching office. The SD-1A364 DAL circuit is required to provide the functional interface between the DNA unit and the trunk link network (TLN) of the EPSCS switch. The DAL circuit utilizes E&M, type II supervision.

2.09 The VSG amplifier is a 4-wire amplifier that is in the voice transmission path when talking is established between PSN and EPSCS station users. The VSG amplifier provides 6 dB of gain in the direction of greater voice energy and 6 dB of loss in the opposite direction. This improves voice transmission qualities for calls traversing both networks.

2.10 A portable test set and a test CP are provided with the DNA feature for use during installa-

tion, testing, and maintenance of the DNA equipment.

2.11 The DNA hardware was designed and developed by the Western Electric—Adaptive Design Engineering Group, Northeastern Region Headquarters. Ordering information is contained in AT&T Information Letter, IL 83-05-039.

DESCRIPTION

3. USER OPERATION

CUSTOMER

3.01 To complete an off- to on-network station-to-station call without the aid of an EPSCS network attendant, the sequential steps outlined in (1) through (9) below must be followed. Some of these sequential steps are either DNA or EPSCS switch responses, assuming no dialing error or hardware faults.

(1) From a dual-tone, multifrequency (DTMF) pushbutton telephone, the calling party goes off-hook and upon receipt of dial tone, dials the access MTS DN assigned in a class 5 office.

(2) One or two (two or three with version 2.0.0) bursts of audible ringing tone are returned to the calling station. At the point of reaching the DNA unit, answer supervision is provided for proper charging of the call in the MTS network.

(3) Audible ringing tone is removed and a brief (12 seconds maximum) customer-specified recorded announcement is returned to the calling station.

(4) At end of customer-specified recorded announcement, second dial tone is returned to the calling station.

Note: This is EPSCS dial tone. Dialing must not commence prior to receipt of EPSCS dial tone.

(5) The calling party dials the 7-digit EPSCS on-network station number.

Note: This dialing must commence within 5 seconds (10 seconds with version 2.0.0) following receipt of EPSCS dial tone.

(6) Recall (stutter) dial tone is returned to the calling station.

(7) Calling party dials 3- to 6-digit authorization code number (always required).

(8) Call progress tone (audible ringing) or an announcement is returned to the calling station.

(9) On-network station user (called party) answers and a 2-way talking path is established.

3.02 If no DNA trunk circuit is available, busy tone (60 ipm) is returned to the calling station in paragraph 3.01, Step (2).

3.03 If the recorded announcement circuit [paragraph 3.01, Step (3)] is not in service, EPSCS dial tone [paragraph 3.01, Step (4)] may be delayed for approximately 25 seconds. The originating call can proceed without an announcement.

3.04 Network busy or station busy may be encountered in paragraph 3.01, Step (8).

3.05 If an improper on-network station number or authorization code number is dialed, reorder tone or announcement is returned in paragraph 3.01, Step (8).

3.06 Failure to commence dialing of the on-network station number within 5 seconds (10 seconds with version 2.0.0) of receipt of EPSCS dial tone [paragraph 3.01, Step (5)] results in the call being routed to the EPSCS network attendant.

3.07 A rotary-dial (dial pulse) telephone can be used to gain access to the EPSCS network attendant. If used, the sequential steps (1) through (4), paragraphs 3.01 and 3.06 apply. Once an EPSCS network attendant is obtained, the calling party can give the desired on-network station number and the authorization code number. The attendant can then take action to deny or extend the call.

3.08 If sequential steps (4) or (6) in paragraph 3.01 fail due to hardware faults (eg, EPSCS dial tone or stutter dial tone is not returned), the calling party should go on-hook and reoriginate.

TELEPHONE COMPANY

3.09 Not applicable.

4. SYSTEM OPERATION

HARDWARE

A. Initial Installation

4.01 For an initial installation, a double-bay miscellaneous trunk frame assembly (ED1A151-70 G-1) is required (Fig. 1). This miscellaneous trunk frame is arranged to mount the following equipment:

- Thirteen (13) DNA Carrier Units FJ80NE0006AA
- One (1) 13A Announcement System J1C121A-1
- One (1) Control Unit J1A033EN-1
- Two (2) RMS Interface Units FJ80NE0006AB
- One (1) DNA Patch Panel FJ80NE0006AC
- Two (2) Fuse Panels J1A033EP-1 (modified)
- One (1) Fuse Panel J1A033ER-1 (modified)
- Two (2) Filter Units J1A053AA-1.

4.02 Each of the DNA carrier units (FJ80NE0006AA) is arranged for four DNA trunk circuits. Each DNA trunk circuit is contained on three CPs. These three CPs and their reference designators are:

- A VSG Amplifier CP (CP100)
- A Jack and Relay CP (CP200)
- A Control and Outpulser CP (CP300).

4.03 The 13A Announcement System (J1C121A-1) is modular equipped to handle up to eight channels (maximum) each of which has a maximum message length of 12 seconds. The total quantity of channels required is dependent on the number of DNA trunk circuits used. Each channel gets cross connected via a patch panel to the DNA trunk circuits, and the assignment of a channel to a trunk circuit is arbitrary. For detailed information applicable to the 13A Announcement System, see references A(3) and A(4) listed in Part 18.

4.04 The DNA frame has cable connectors for easy installation of interface cables that connect to the trunk distribution frame. Twenty-six 25-pair cables (FE81NE0003G-4) are required per DNA frame. All cables are to be ordered and installed during initial installation of the frame.

4.05 One DNA test set (FJ80NE0006AD) is required per EPSCS switching office. This test set provides simulated trunk seizure and supervision voltages for conducting a call through the DNA trunk circuit.

4.06 One test circuit pack (FE81NE0005G-2) is required per DNA frame. This circuit pack replaces the jack & relay CP200 when aligning the F-signaling circuits.

B. Addition to an Existing DNA Arrangement

4.07 When an existing DNA arrangement is already installed within an EPSCS switching office, the DNA trunk circuits may be increased as required. Each of the DNA carrier units contains four DNA trunk circuits.

4.08 Additional channels (message modules) can be added to the 13A Announcement System as required. Each list number of the 13A Announcement System provides one message channel.

C. Supporting Connecting Hardware Circuits

4.09 When the DNA frame is installed within an EPSCS switching office, the following supporting connecting circuits are required:

- Two (2) Office Alarm Circuits SD-1A158-01
- Two (2) Master Scanner Circuits SD-1A209-01
- One (1) DAL Circuit SD-1A364-XX per DNA trunk circuit provided.
- F-Signaling Circuit SD-1C230-01.

OFFICE DATA STRUCTURES

A. Translations

4.10 Other than master scanner number (MSN) translations for the DNA frame, the DNA feature requires no new or modified translation data. However, some of the supporting connecting hard-

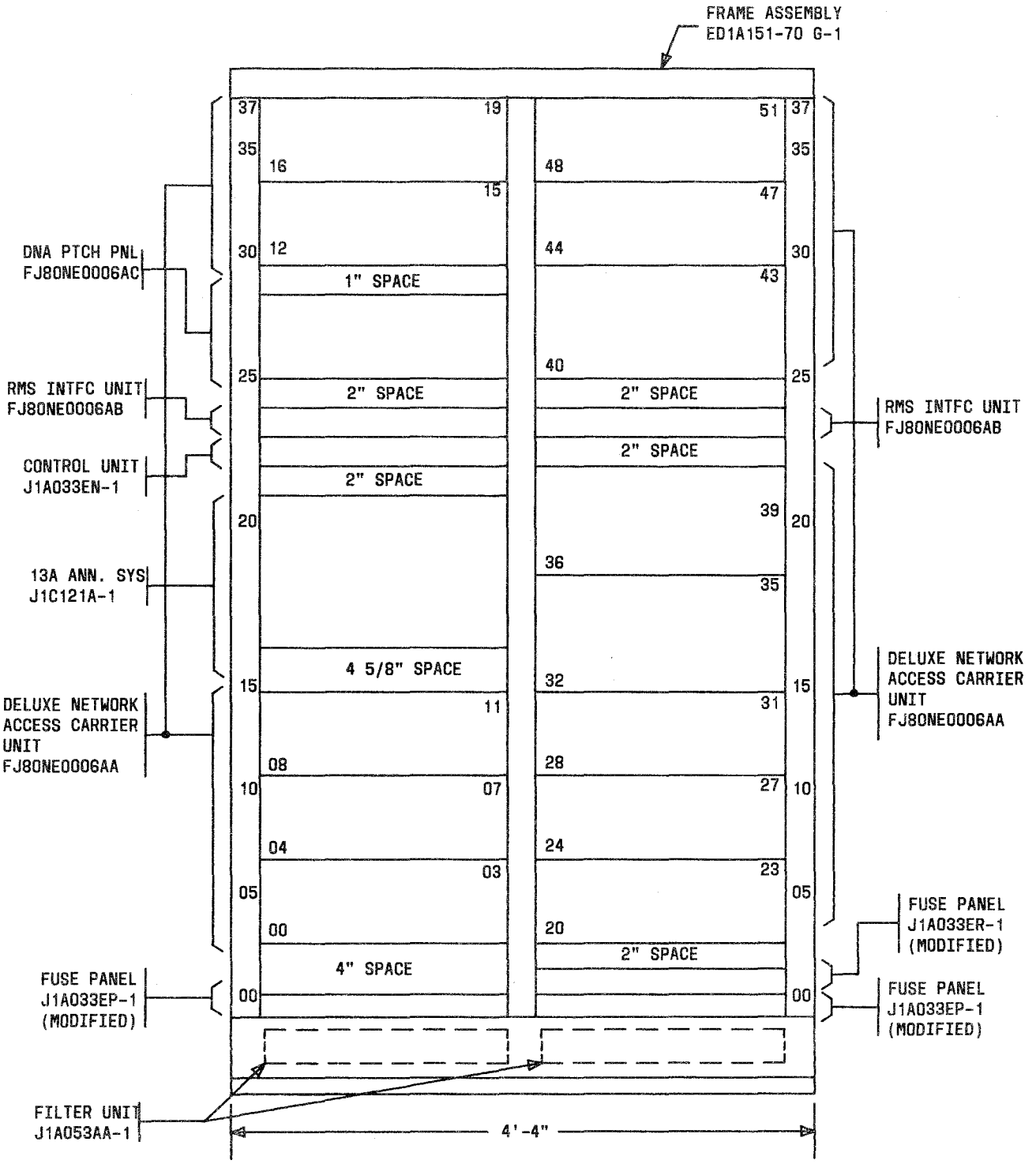

Fig. 1—Deluxe Network Access Frame—FJ80NE0006A

ware circuits (identified in paragraph 4.09) may require translation data.

4.11 For every DNA trunk circuit used within the DNA frame, an associated DAL circuit SD-1A364 is required. The Multiple Direct Access (MDAL) feature allows several DAL circuits to be assigned to a single trunk group. The translation data required for a SD-1A364 DAL circuit is included in the following translators:

(a) DN Auxiliary Block

(b) Trunk Group (TG) Auxiliary Block

(c) Trunk Network Number to Trunk Group Number (TNN-TGN) Auxiliary Block

(d) Trunk Class Code Expansion Table

(e) Trunk Network Number to Peripheral Group Number (TNN-PEN) Primary Translation Word

(f) Trunk Circuit Number Primary Translation Word.

4.12 For information pertaining to the DAL circuit translation data, see reference A(1) listed in Part 18.

B. Parameters/Call Store

4.13 Not applicable.

FEATURE OPERATION

4.14 The feature operation for the DNA feature is best understood by an explanation of how an off- to on-network call is handled. (See Fig. 2.)

4.15 When the class 5 office receives an EPSCS network access DN call, it generates a call-origination signal (resistive ground within the F-signaling circuit). This signal causes seizure and initialization of the DNA trunk circuit. Initialization includes changing the state of the trunk circuit and configuring the DNA control circuit (jack and relay CP200) to detect the ringing voltage. A call-origination signal without detection of ringing voltage within 5 seconds is treated as a false seizure. If this occurs, the DNA control circuit times out the

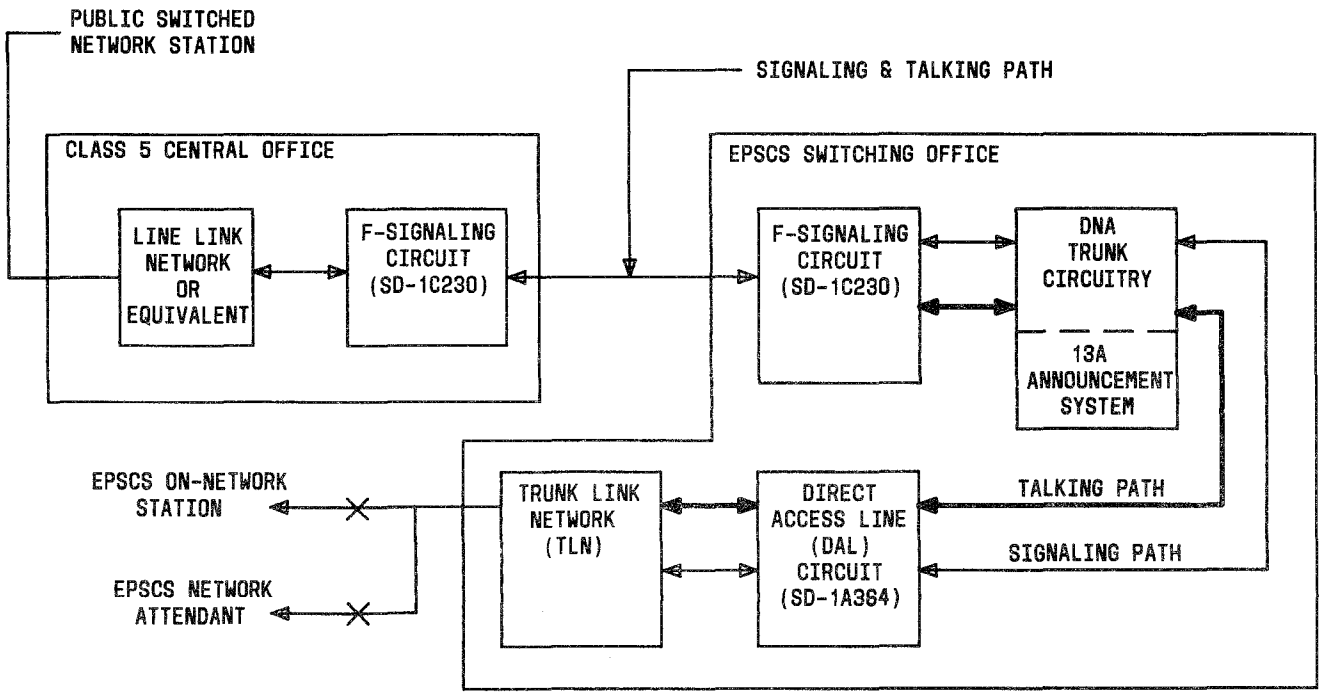

Fig. 2—Typical PSN-EPSCS Network Interface Diagram

seized DNA trunk circuit and recycles through the seizure routine. No alarm condition is generated.

4.16 After one or two (two or three with version 2.0.0) bursts of ringing voltage, the DNA control circuit expects a 2-second ground pulse from the 13A Announcement System indicating that the customer-specified announcement is ready to start. When this signal is received, the DNA control circuit connects an announcement channel to the incoming line and signals the class 5 office to trip ringing.

4.17 If the control signal from the 13A Announcement System is not detected within 25 seconds from the time it is first expected, the DNA control circuit issues an alarm to the EPSCS switching office. Lack of the announcements does not hinder the completion of the call.

4.18 At the conclusion of the announcement (or upon time-out, if the announcement failed), the DNA control circuit generates an off-hook signal in the direction of the EPSCS switching office via a DAL circuit. The DNA control circuit also disables the VSG amplifier in the direction of the class 5 office to avoid amplifier lockup due to the presence of dial tone.

4.19 The EPSCS switch returns dial tone to the seized DNA trunk circuit. When the EPSCS dial tone is detected, the DNA unit then goes into the cut-through state routing EPSCS dial tone to the calling party via the class 5 office.

4.20 If EPSCS dial tone is not received within 10 seconds following the transmission of the off-hook signal, the DNA unit sends an alarm to the EPSCS switching office. The DNA unit will remain in this waiting state until an on-hook condition is detected from the class 5 office. After the calling party disconnects, the DNA trunk circuit generates a maintenance busy (out-of-service) toward the class 5 office until a test call is made to clear the alarm indication.

4.21 Following cut-through of EPSCS dial tone, the EPSCS office and the DNA unit wait for dual-tone multifrequency digit dialing to commence. When this dialing is detected by the termination of dial tone, the DNA circuit opens the transmit-receive (transmit only with version 2.0.0) path toward the class 5 office and awaits the return of a second (recall) dial tone from the EPSCS office.

4.22 After the EPSCS office collects the 7-digit on-network station number, a second (recall) dial tone is returned to the class 5 office, signaling the input of the authorization code from the calling party. When the DNA control circuit detects the EPSCS dial tone, it converts it to stutter dial tone (through relay action) before passing it to the calling party. The calling party, upon receipt of stutter dial tone, dials the 3- to 6-digit authorization code number.

4.23 When the entry of the authorization code digits stops the second EPSCS dial tone, the DNA control circuit releases the relay used to generate the stutter dial tone. The transmit path toward the class 5 is kept open and the VSG amplifier is enabled for the remainder of the call.

4.24 Assuming the 7-digit on-network number and the 3- to 6-digit authorization code number are acceptable to the EPSCS office, the on-network call is now completed in the normal manner.

4.25 If less than seven digits are collected or if the on-network station number is not acceptable, the second EPSCS dial tone in paragraph 4.22 is not returned. When the DNA control circuit does not detect the second dial tone within 30 seconds of removal of the first EPSCS dial tone, the DNA unit is configured to allow reorder tone or announcement from the EPSCS office to the calling party.

4.26 If DTMF digit dialing from the calling party is not detected within 5 seconds (10 seconds with version 2.0.0) of cut-through of the first EPSCS dial tone (paragraph 4.19), the DNA unit switches an automatic dialer into the line. This circuit then attempts to outpulse DTMF digits that correspond to the EPSCS network attendant number. This action should break EPSCS dial tone. If the first outpulsing attempt does not break EPSCS dial tone, a second outpulsing attempt is tried. If EPSCS dial tone is not broken after the second outpulsing attempt, an alarm is sent to the EPSCS switching office.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The DNA feature is assigned on a per EPSCS customer basis.

6. LIMITATIONS

6.01 Not applicable.

7. INTERACTIONS

7.01 Not applicable.

8. RESTRICTION CAPABILITY

8.01 Not applicable.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 See reference B(1) in Part 18, for installation and test procedures applicable to the DNA feature.

9.02 There are no set cards applicable to the DNA feature.

10. HARDWARE REQUIREMENTS

10.01 Refer to Part 4 for hardware requirements applicable to the DNA feature.

11. SOFTWARE REQUIREMENTS

MEMORY

11.01 See reference A(1) in Part 18 for memory requirements applicable to the DAL feature.

REAL TIME IMPACT

11.02 The DNA feature may have a minor impact on cycle counts. Normally, 9515 cycles are required when an off-network call terminates to an on-network station. This assumes that the terminating station requires exactly two rings. Each additional ring requires approximately 430 cycles. Once a 7-digit on-network station number is dialed, the calling party is required to dial an authorization code number. Both numbers are required before the terminating station is rung.

12. DATA ASSIGNMENTS AND RECORDS

12.01 Not applicable.

13. TESTING

13.01 See reference B(1) in Part 18 for test procedures applicable to the DNA feature.

14. OTHER PLANNING TOPICS

14.01 Not applicable.

ADMINISTRATION

15. MEASUREMENTS

15.01 Not applicable.

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 Not applicable.

18. REFERENCES

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

A. Bell System Practices

(1) Section 231-190-133—4-Wire Direct Access Line Feature—Enhanced Private Switched Communications Service—Feature Document—2-Wire No. 1 Electronic Switching System

(2) Section 231-190-127—Enhanced Private Switched Communications Service Feature—Feature Document—2-Wire No. 1 Electronic Switching System

(3) Section 201-519-101—13A Announcement System—SD-97753-01—Description

(4) Section 201-519-301—13A Announcement System—SD-97753-01—Operating, Testing, and Trouble Analysis Procedures Common Systems

B. Other Documentation

(1) IAM-80NE0006, Issue 3, August, 1982—Installation and Maintenance Procedures—Deluxe Network Access Frame (DNA)—No. 1 ESS

(2) CD80NE0006, Issue 2, July, 1982—No. 1 ESS Deluxe Network Access (DNA) Frame Circuit

(3) Translation Guide TG-1A—2-Wire No. 1 and No. 1A Electronic Switching Systems

(4) Translation Output Configuration PA591003—No. 1 Electronic Switching System

(5) AT&T Information Letter, IL82-09-065—Voice Switched Gain (VSG) Amplifier Feature—Enhanced Private Switched Communications Service—No. 1 ESS.